

PRODUCT GUIDE

BCE0016A

## Power Transistors

2003 semiconductor

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# Toshiba Power Transistors

Thank you for purchasing Toshiba semiconductor products. As you may already know, semiconductor products are used in a wide range of fields, both domestic and industrial. This product guide includes a list of products categorized by function and application, a list of package line-ups, tapping information, a list of lead-formed products, an overall list of devices and a set of package diagrams. We hope that this guide will assist you in selecting products. For further details of specific devices, please refer to the relevant technical datasheets.



## Power transistors for audio power amplifiers

Using a minute pattern and a high-density MET design, Toshiba have achieved high levels of current efficiency. Package type can be selected to yield collector power output ranging from 60 W to 220 W. A wider selection of packages, including the TO-3P(N) and TO-3P(L), is now available.



## Power transistors for switching power supplies

Using a crystal mesh pattern, Toshiba has reduced the storage time (tstg) and fall time (tf) of 400-V and 800-V power transistors for switching power supplies. In addition, we have developed power transistors in a low-profile package. These types of transistor are suitable for low-output AC adapters and ballast lamp applications.



## Power transistor SMD Series

Power transistors in SMD packages are essential to the manufacture compact and slim items of electronic equipment.

- PW-MINI • PW-MOLD • TO-220(SM)
- DP • TSM • VS-6 • PS-8 (new package)



## IS (isolated package) Series

Toshiba has developed IS packages which make easy to isolate a device and heat sink. The entire TO-126 product line-up utilizes the IS package as standard. We recommend the TO-220NIS(new IS) package, which is 2 mm thinner than the previous package, the TO-220IS.



#### High-voltage transistors for horizontal-deflection output

Toshiba offers power transistors with  $V_{CE0}$  of 10 to 100 V and  $I_c$  of 1 to 5 A. Various types of packages are available for these power transistors. Also, we have developed high-speed switching transistors.



#### Standard Tape Packing for Automated Pick and Place Assembly

Products in the TO-126 and TO-220 packages are packed on tape: TPS(1.3 w) and TPL(1.8 w). These tape-packed packages can be mounted using a surface mounter, and automated pick and place system reduces assembly costs.

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### Standard Tape Packing for Automated Pick and Place Assembly

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| OTPS Type                    | 37 |
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| OPW-MINI(SOT-89)(SC-62) Type | 39 |
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# Selection Guide by Function and Application

## For High-Frequency Devices (2SA\*\*\*\* / 2SC\*\*\*\*)

| V <sub>CE0</sub> (V)<br>I <sub>C</sub> (A) | 10/(15)                                                                              |                                                                         |                                                      | (18)/20                                  |                                                                |                                           | (25)/30                                 |                    |                   | 40                            |                   |   | 45      |         |   | 50                                                                                                                    |                                                                                                  |                                                                           |
|--------------------------------------------|--------------------------------------------------------------------------------------|-------------------------------------------------------------------------|------------------------------------------------------|------------------------------------------|----------------------------------------------------------------|-------------------------------------------|-----------------------------------------|--------------------|-------------------|-------------------------------|-------------------|---|---------|---------|---|-----------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|
| 0.2                                        |                                                                                      |                                                                         |                                                      |                                          |                                                                |                                           |                                         |                    |                   |                               |                   |   | 2SA1483 | 2SC3803 | ◎ |                                                                                                                       |                                                                                                  |                                                                           |
| 0.5                                        |                                                                                      |                                                                         |                                                      | 2SC3613<br>(18V)                         |                                                                | @                                         | 2SA1811                                 | 2SC4707            | (*)               |                               |                   |   |         |         |   |                                                                                                                       |                                                                                                  |                                                                           |
| 0.6                                        |                                                                                      |                                                                         |                                                      | 2SC4200<br>(18V)                         |                                                                | @                                         |                                         |                    |                   |                               |                   |   |         |         |   |                                                                                                                       |                                                                                                  |                                                                           |
| 0.8                                        |                                                                                      |                                                                         |                                                      |                                          |                                                                |                                           | 2SA1426<br>2SA1404                      | 2SC2884            | (§)<br>(◎)        | 2SA1356                       | 2SC341            | @ |         |         |   |                                                                                                                       |                                                                                                  |                                                                           |
| 1                                          |                                                                                      |                                                                         |                                                      |                                          |                                                                |                                           | 2SC2703<br>2SC3666<br>2SA1734<br>2SA966 | 2SC4539<br>2SC2236 | (*)<br>(§)<br>(◎) |                               |                   |   |         |         |   | 2SA1735<br>2SA2070                                                                                                    | 2SC4540<br>(◎)<br>(◎)                                                                            | TPC6701<br>(Δ[V])<br>(◎)                                                  |
| 1.2                                        |                                                                                      |                                                                         |                                                      | TPC6D03                                  |                                                                | #[V]                                      | 2SA1203                                 | 2SC2883            | (◎)               |                               |                   |   |         |         |   |                                                                                                                       |                                                                                                  |                                                                           |
| 1.5                                        | 2SA2058                                                                              |                                                                         | [T]                                                  | 2SA2065<br>2SA2069                       | 2SC5784<br>2SC5819                                             | [T]<br>(◎)<br>(◎)                         |                                         |                    |                   |                               |                   |   |         |         |   |                                                                                                                       |                                                                                                  |                                                                           |
| 2                                          | 2SA1160<br>2SA1430<br>2SA1314<br>2SA2066<br>2SC5755<br>2SC5785<br>TPC6501<br>TPC6602 | 2SC2500<br>2SC3670<br>2SC2982<br>(◎)<br>(◎)<br>[T]<br>(◎)<br>[V]<br>[V] | (*)<br>(§)<br>(◎)<br>(◎)<br>[T]<br>(◎)<br>[V]<br>[V] |                                          |                                                                |                                           |                                         |                    |                   | 2SC3225<br>2SC3673<br>2SC3964 | (*)<br>(§)<br>(◎) |   |         |         |   | 2SA1735<br>2SA1020<br>2SA1241<br>2SA1382<br>2SA2056<br>TPC6601<br>2SA2060<br>2SA1428<br>2SA1680<br>2SA1681<br>2SA1891 | 2SC4540<br>2SC2655<br>2SC3076<br>(*)<br>[T]<br>[V]<br>(◎)<br>(§)<br>(*)<br>(◎)<br>(◎)<br>2SC5028 | (*)<br>(◎)<br>(◇)<br>(*)<br>[T]<br>[V]<br>(◎)<br>(§)<br>(*)<br>(◎)<br>(◎) |
| 2.5                                        |                                                                                      |                                                                         |                                                      | 2SA2061                                  |                                                                | [T]                                       |                                         |                    |                   |                               |                   |   |         |         |   | 2SC5692                                                                                                               |                                                                                                  | [T]                                                                       |
| 3                                          | 2SA1802                                                                              | 2SC4681<br>2SC4682<br>(15V)<br>2SC4683<br>(15V)                         | (◇)<br>(*)<br>(§)<br>(◎)                             | 2SA2059<br>*TPCP8F01                     |                                                                | (◎)<br>[P]                                |                                         |                    |                   | 2SA1359                       | 2SC3422           | @ |         |         |   | 2SA1761<br>2SA1869<br>2SA1892<br>2SA1736                                                                              | 2SC4604<br>2SC4935<br>2SC5029<br>2SC4541<br>2SC5712<br>*TPC6502                                  | (*)<br>(▲)<br>(◇)<br>(◎)<br>(◎)<br>[V]                                    |
| 3.5                                        |                                                                                      |                                                                         |                                                      | 2SC5738                                  |                                                                | [T]                                       |                                         |                    |                   |                               |                   |   |         |         |   |                                                                                                                       |                                                                                                  |                                                                           |
| 4                                          |                                                                                      | 2SC4781<br>2SC5713                                                      | (*)<br>(◎)                                           |                                          | 2SC5714                                                        | (◎)                                       |                                         | 2SC5906            | [T]               |                               |                   |   |         |         |   |                                                                                                                       | 2SC5703                                                                                          | [T]                                                                       |
| 5                                          |                                                                                      |                                                                         |                                                      | 2SA1242<br>2SA1357<br>2SA1431<br>2SA1893 | 2SC3072<br>2SC3420<br>2SC3671<br>2SC4684<br>2SC4685<br>2SC5030 | (◇)<br>@<br>(§)<br>(◇)<br>(◎)<br>@<br>(◇) |                                         |                    |                   |                               |                   |   |         |         |   | 2SA1244<br>2SA1905<br>2SA1931<br>2SA1933<br>2SA2097                                                                   | 2SC3074<br>2SC5076<br>2SC4881<br>2SC5175<br>2SC5886                                              | (◇)<br>(◇)<br>(▲)<br>(◎)<br>(◇)                                           |
| 10                                         |                                                                                      |                                                                         |                                                      | 2SA1327A                                 |                                                                | (▲)                                       |                                         |                    |                   |                               |                   |   |         |         |   |                                                                                                                       | 2SA1887                                                                                          | 2SC5000<br>(▲)                                                            |
| 12                                         |                                                                                      |                                                                         |                                                      |                                          |                                                                |                                           |                                         |                    |                   |                               |                   |   |         |         |   |                                                                                                                       | 2SA1451A                                                                                         | 2SC3709A<br>(▲)                                                           |

| V <sub>CE0</sub> (V)<br>I <sub>C</sub> (A) | 80                  |                               |                   | 100 |                    |          | 120                          |                               |                   | (140)/150                               |                                          |                        | 160                |                               |                   |
|--------------------------------------------|---------------------|-------------------------------|-------------------|-----|--------------------|----------|------------------------------|-------------------------------|-------------------|-----------------------------------------|------------------------------------------|------------------------|--------------------|-------------------------------|-------------------|
| 0.05                                       |                     |                               |                   |     |                    |          |                              |                               |                   | 2SA1145<br>2SA1360<br>2SA1200<br>2SA949 | 2SC2705<br>2SC3423<br>2SC2880<br>2SC2229 | (*)<br>@<br>(◎)<br>(*) |                    |                               |                   |
| 0.1                                        |                     |                               |                   |     |                    |          |                              |                               |                   |                                         |                                          |                        |                    | 2SC2230                       | (*)               |
| 0.2                                        |                     |                               |                   |     |                    |          |                              |                               |                   |                                         |                                          |                        |                    | 2SC3963                       | @                 |
| 0.3                                        |                     |                               |                   |     |                    |          |                              |                               |                   |                                         |                                          |                        | 2SC4439            | @                             |                   |
| 0.4                                        | 2SA817A<br>2SA1202  | 2SC1627A<br>2SC2882           | (*)<br>(◎)        |     |                    |          |                              |                               |                   |                                         |                                          |                        |                    |                               |                   |
| 0.5                                        |                     |                               |                   |     | 2SC4479<br>2SC4605 | @<br>(▲) |                              |                               |                   |                                         |                                          |                        |                    |                               |                   |
| 0.8                                        |                     |                               |                   |     |                    |          | 2SA965<br>2SA1201<br>2SA1425 | 2SC2235<br>2SC2881<br>2SC3665 | (*)<br>(◎)<br>(§) |                                         |                                          |                        |                    |                               |                   |
| 1                                          |                     |                               |                   |     |                    |          | 2SA1358                      | 2SC3421                       | @                 |                                         |                                          |                        | 2SA1013<br>2SA1225 | 2SC2383<br>2SC2983<br>2SC5154 | (*)<br>(◇)<br>(◇) |
| 1.5                                        |                     |                               |                   |     |                    |          |                              |                               |                   | 2SA940A<br>2SA1408                      | 2SC2073A<br>2SC3621                      | (▲)<br>@               |                    |                               |                   |
| 2                                          | 2SA1315<br>2SA1429  | 2SC3328<br>2SC3669<br>2SC3474 | (*)<br>(§)<br>(◇) |     | TPCP8501           | [P]      |                              |                               |                   |                                         |                                          |                        |                    |                               |                   |
| 3                                          | 2SA1926             |                               | (§)               |     |                    |          |                              |                               |                   |                                         |                                          |                        |                    |                               |                   |
| 5                                          | 2SA1934             | 2SC5176<br>2SC3303            | (◇)<br>(◇)        |     |                    |          |                              |                               |                   |                                         |                                          |                        |                    |                               |                   |
| 6                                          | 2SA1803<br>2SA1939  | 2SC4688<br>2SC5196            | (▼)<br>(▽)        |     |                    |          |                              |                               |                   |                                         |                                          |                        |                    |                               |                   |
| 8                                          |                     |                               |                   |     |                    |          | 2SA1804<br>2SA1940           | 2SC4689<br>2SC5197            | (▼)<br>(▽)        |                                         |                                          |                        |                    |                               |                   |
| 10                                         |                     |                               |                   |     |                    |          |                              |                               |                   | 2SA1805<br>2SA1941                      | 2SC4690<br>(140V)<br>2SC5198<br>(140V)   | (▼)<br>(▽)             |                    |                               |                   |
| 12                                         | 2SA1452A<br>2SA1771 | 2SC3710A                      | (▲)<br>(▲)        |     |                    |          |                              |                               |                   |                                         |                                          |                        |                    | 2SA1942                       | 2SC5199<br>(*)    |

□: New product, ★: Under development

| V <sub>CEO</sub> (V)<br>I <sub>C</sub> (A) | (180)/200 |                    |     | 230                                      |                                          |                          | 250     |         |     | 300     |                                                                                      |                                                      | 400(370)                                                       |  |                                        |
|--------------------------------------------|-----------|--------------------|-----|------------------------------------------|------------------------------------------|--------------------------|---------|---------|-----|---------|--------------------------------------------------------------------------------------|------------------------------------------------------|----------------------------------------------------------------|--|----------------------------------------|
| 0.05                                       |           |                    |     |                                          |                                          |                          | 2SA1321 | 2SC3334 | (*) |         |                                                                                      |                                                      | 2SC5122<br>2SC5307                                             |  | (*)<br>(◎)                             |
| 0.1                                        |           | 2SC2230A<br>(180V) | (*) |                                          |                                          |                          |         |         |     | 2SA1432 | 2SC3672<br>2SC2482<br>2SC3619<br>2SC3620<br>2SC4544<br>2SC5027<br>2SC5173<br>2SC3515 | (§)<br>(*)<br>(@)<br>(@)<br>(▲)<br>(□)<br>(■)<br>(@) |                                                                |  |                                        |
| 0.15                                       |           |                    |     |                                          |                                          |                          |         | 2SC4448 | (▲) | 2SC5360 |                                                                                      | (▲)                                                  |                                                                |  |                                        |
| 0.5                                        |           |                    |     |                                          |                                          |                          |         |         |     |         |                                                                                      |                                                      | 2SA1923<br>2SA1924<br>2SA1925<br>2SA1971                       |  | (◇)<br>(@)<br>(□)<br>(◎)               |
| 0.8                                        |           |                    |     |                                          |                                          |                          |         |         |     |         |                                                                                      |                                                      | 2SC3075<br>2SC3425<br>2SC5208<br>2SC5458                       |  | (◇)<br>(@)<br>(□)<br>(◇)               |
| 1                                          |           |                    |     | 2SA1837<br>2SA1932                       | 2SC4793<br>2SC5174                       | (▲)<br>(■)               |         |         |     |         | 2SC5930<br>(285V)                                                                    | (§)                                                  | 2SA1822                                                        |  | (▲)<br>(*)<br>(@)                      |
| 2                                          | 2SA1930   | 2SC5171<br>(180V)  | (▲) |                                          |                                          |                          |         |         |     |         |                                                                                      |                                                      | 2SC4754<br>2SC5075<br>2SC5279<br>2SC5548<br>(370V)<br>2SC5548A |  | (○)<br>(□)<br>(■)<br>(◇)<br>(◇)<br>(◇) |
| 3                                          |           |                    |     |                                          |                                          |                          |         |         |     |         |                                                                                      |                                                      | 2SA2034                                                        |  | (◇)                                    |
| 5                                          |           |                    |     |                                          |                                          |                          |         |         |     |         |                                                                                      |                                                      | 2SC5459<br>2SC5172<br>2SC5266A<br>2SC5355                      |  | (▲)<br>(▲)<br>(■)<br>(◆)               |
| 10                                         |           |                    |     |                                          |                                          |                          |         |         |     |         |                                                                                      |                                                      | 2SC5352                                                        |  | (▽)                                    |
| 12                                         | *2SA2120  | *2SC5948           | (▽) |                                          |                                          |                          |         |         |     |         |                                                                                      |                                                      |                                                                |  |                                        |
| 15                                         | *2SA2121  | *2SC5949           | (※) | 2SA1943<br>2SA1962<br>2SA1986<br>2SA1987 | 2SC5200<br>2SC5242<br>2SC5358<br>2SC5359 | (※)<br>(▽)<br>(▽)<br>(※) |         |         |     |         |                                                                                      |                                                      |                                                                |  |                                        |

| V <sub>CEO</sub> (V)<br>I <sub>C</sub> (A) | 450 |                    |            | 600     |         |     | 800                                      |                          |            | 1000/(1200) |                                |            | 1500    |  |     |
|--------------------------------------------|-----|--------------------|------------|---------|---------|-----|------------------------------------------|--------------------------|------------|-------------|--------------------------------|------------|---------|--|-----|
| 0.02                                       |     |                    |            |         |         |     |                                          |                          |            |             |                                |            | 2SC5563 |  | (▲) |
| 0.05                                       |     |                    |            |         | 2SC5201 | (*) |                                          | 2SC5460<br>2SC5466       | (@)<br>(▲) |             | 2SC4686<br>2SC4686A<br>(1200V) | (▲)<br>(▲) |         |  |     |
| 0.5                                        |     |                    |            | 2SA1937 |         | (◇) |                                          |                          |            |             |                                |            |         |  |     |
| 0.8                                        |     |                    |            |         |         |     | 2SC3405<br>2SC5465<br>2SC5562            | (◇)<br>(◇)<br>(□)        |            |             |                                |            |         |  |     |
| 2                                          |     | 2SC5351<br>2SC5368 | (□)<br>(@) |         |         |     |                                          |                          |            |             |                                |            |         |  |     |
| 3                                          |     |                    |            |         |         |     | 2SC3376<br>2SC5353<br>2SC5361<br>2SC5356 | (▽)<br>(▲)<br>(○)<br>(◆) |            |             |                                |            |         |  |     |
| 4                                          |     |                    |            |         |         |     | 2SC3657                                  | (▽)                      |            |             |                                |            |         |  |     |
| 5                                          |     |                    |            |         |         |     | 2SC5354                                  | (▽)                      |            |             |                                |            |         |  |     |
| 8                                          |     | 2SC5439            | (▲)        |         |         |     |                                          |                          |            |             |                                |            |         |  |     |
| 9                                          |     |                    |            |         |         |     |                                          |                          |            |             |                                |            |         |  |     |
| 10                                         |     | 2SC4157            | (▽)        |         |         |     | 2SC3307                                  | (※)                      |            |             |                                |            |         |  |     |

## Package Code

|                                                          |                                 |              |               |                                 |              |         |               |
|----------------------------------------------------------|---------------------------------|--------------|---------------|---------------------------------|--------------|---------|---------------|
| (*) LSTN                                                 | (§) MSTN                        | (@) TO-126IS | (▲) TO-220NIS | (○) TO-220FL                    | (●) TO-220SM | (◆) DP  | (▽) TO-3P (N) |
| (▼) TO-3P (N)IS                                          | (※) TO-3P (L)                   | (□) TPS      | (■) TPL       | (◎) PW-MINI                     | (◇) PW-MOLD  | [T] TSM | [V] VS-6      |
| (△) 2-in-1                                               | [#] 2-in-1 (Transistor + Diode) |              |               |                                 |              |         |               |
| Product number in italic signifies built-in damper diode |                                 |              |               | 2SA****/ 2SC****: complementary |              |         |               |

□: New product, ★: Under development

§: 2-in-1 (Transistor + S-MOS)

## For Low-Frequency Devices (2SB\*\*\*\* / 2SD\*\*\*\*)

| V <sub>CEO</sub> (V)<br>I <sub>C</sub> (A) | 20 |         |     | 30      |         |  | 40     |         |         | 50       |     |  | 60      |             |     |
|--------------------------------------------|----|---------|-----|---------|---------|--|--------|---------|---------|----------|-----|--|---------|-------------|-----|
| 1                                          |    |         |     |         |         |  |        |         |         |          |     |  | 2SD2686 | (¥) (%) (◎) |     |
| 1.5                                        |    |         |     | 2SD1140 | (%) (*) |  |        |         |         |          |     |  |         |             |     |
|                                            |    |         |     | 2SD1224 | (%) (◇) |  |        |         |         |          |     |  |         |             |     |
|                                            |    |         |     | 2SD1508 | (%) (@) |  |        |         |         |          |     |  |         |             |     |
|                                            |    |         |     | 2SD1631 | (%) (§) |  |        |         |         |          |     |  |         |             |     |
|                                            |    |         |     | 2SD1784 | (%) (◎) |  |        |         |         |          |     |  |         |             |     |
|                                            |    |         |     | 2SD2481 | (%) (□) |  |        |         |         |          |     |  |         |             |     |
| 2                                          |    | 2SD1160 | (◇) |         |         |  |        |         |         |          |     |  | 2SD1658 | (¥) (%) (@) |     |
|                                            |    |         |     |         |         |  |        |         |         |          |     |  | 2SD2088 | (¥) (%) (*) |     |
|                                            |    |         |     |         |         |  |        |         |         |          |     |  | 2SD2352 | (▲)         |     |
|                                            |    |         |     |         |         |  |        |         |         |          |     |  | 2SD2461 | (□)         |     |
| 3                                          |    |         |     |         |         |  | 2SB907 | 2SD1222 | (%) (◇) |          |     |  | 2SB906  | 2SD1221     | (◇) |
|                                            |    |         |     |         |         |  |        |         |         |          |     |  | 2SB1375 | 2SD2012     | (▲) |
|                                            |    |         |     |         |         |  |        |         |         |          |     |  | 2SD2462 | (□)         |     |
|                                            |    |         |     |         |         |  |        |         |         |          |     |  | 2SB1640 | 2SD2525     | (■) |
|                                            |    |         |     |         |         |  |        |         |         |          |     |  | 2SD2127 | (¥) (▲)     |     |
|                                            |    |         |     |         |         |  |        |         |         |          |     |  | 2SD2353 | (▲)         |     |
|                                            |    |         |     |         |         |  |        |         |         |          |     |  | 2SB1667 | (●)         |     |
| 4                                          |    |         |     |         |         |  |        |         |         |          |     |  | 2SB1642 | 2SD2531     | (▲) |
|                                            |    |         |     |         |         |  |        |         |         |          |     |  | 2SD2130 | (¥) (%) (@) |     |
|                                            |    |         |     |         |         |  |        |         |         |          |     |  | 2SD2204 | (¥) (%) (▲) |     |
|                                            |    |         |     |         |         |  |        |         |         |          |     |  | (65V)   |             |     |
| 5                                          |    |         |     |         |         |  |        |         |         |          |     |  | 2SD2131 | (¥) (%) (▲) |     |
| 6                                          |    |         |     |         |         |  |        |         |         |          |     |  | 2SD2440 | (▼)         |     |
| 7                                          |    |         |     |         |         |  |        |         |         | 2SD1412A | (▲) |  |         |             |     |

| V <sub>CEO</sub> (V)<br>I <sub>C</sub> (A) | 80       |             |             | 100/(120) |          |             | 140     |         |         | 150/(160) |          |         | 200     |         |  |
|--------------------------------------------|----------|-------------|-------------|-----------|----------|-------------|---------|---------|---------|-----------|----------|---------|---------|---------|--|
| 1.5                                        |          |             |             |           |          |             |         |         |         | 2SB905    | 2SD1220  | (◇)     |         |         |  |
| 2                                          | 2SB1067  | 2SD1509     | (%)         | 2SB1411   | 2SD2206  | (%) (*)     |         |         |         |           |          |         |         |         |  |
|                                            |          | 2SD2248     | (¥) (%) (*) | 2SB1457   | 2SD2206A | (%) (*)     |         |         |         |           |          |         |         |         |  |
|                                            |          |             |             |           | (120V)   |             |         |         |         |           |          |         |         |         |  |
|                                            |          |             |             | 2SB1617   | 2SD2480  | (%) (□)     |         |         |         |           |          |         |         |         |  |
|                                            |          |             |             |           | 2SD2536  | (¥) (%) (*) |         |         |         |           |          |         |         |         |  |
| 3                                          |          |             |             | 2SB1495   | 2SD2257  | (%) (▲)     |         |         |         |           |          |         |         |         |  |
|                                            |          |             |             |           | 2SD2092  | (▲)         |         |         |         |           |          |         |         |         |  |
|                                            |          |             |             |           | 2SD2129  | (%) (▲)     |         |         |         |           |          |         |         |         |  |
| 4                                          | 2SB908   | 2SD1223     | (%) (◇)     | 2SB1481   | 2SD2241  | (%) (▲)     |         |         |         |           |          |         |         |         |  |
|                                            |          | 2SD2406     | (▲)         |           |          |             |         |         |         |           |          |         |         |         |  |
| 5                                          |          |             |             | 2SB1381   | 2SD2079  | (%) (▲)     |         |         |         |           |          |         |         |         |  |
|                                            |          |             |             | 2SB1641   |          | (%) (■)     |         |         |         |           |          |         |         |         |  |
|                                            |          |             |             |           | 2SD2526  | (%) (■)     |         |         |         |           |          |         |         |         |  |
|                                            |          |             |             | 2SB1016A  | 2SD1407A | (▲)         |         |         |         |           |          |         |         |         |  |
|                                            |          |             |             |           | 2SD2604  | (¥) (%) (▲) |         |         |         |           |          |         |         |         |  |
| 7                                          |          | 2SD2414(SM) | (●)         | 2SB1020A  | 2SD1415A | (%) (▲)     | 2SB1555 | 2SD2384 | (%) (※) |           |          |         |         |         |  |
|                                            | 2SB1018A | 2SD1411A    | (▲)         |           | 2SD2584  | (%) (◆)     | 2SB1557 | 2SD2386 | (%) (▽) |           |          |         |         |         |  |
| 8                                          |          |             |             |           |          |             | 2SB1556 | 2SD2385 | (%) (※) | ★2SB1682  | ★2SD2636 | (%) (▽) |         |         |  |
|                                            |          |             |             |           |          |             | 2SB1558 | 2SD2387 | (%) (▽) |           | (160V)   |         |         |         |  |
| 10                                         |          |             |             |           | 2SD1947A | (▲)         |         |         |         | 2SB1594   | 2SD2449  | (%) (※) |         | (%) (▲) |  |
|                                            |          |             |             |           |          |             |         |         |         |           | (160V)   |         |         |         |  |
| 12                                         |          |             |             |           |          |             |         |         |         |           |          |         | 2SD2271 |         |  |
| 15                                         |          |             |             |           | 2SD1662  | (%) (▽)     |         |         |         |           |          |         |         |         |  |
| 30                                         |          |             |             |           | 2SD1525  | (%) (※)     |         |         |         |           |          |         |         |         |  |

| V <sub>CEO</sub> (V)<br>I <sub>C</sub> (A) | 250 |  |  | 350     |     |  | 400 |  |  | 450     |         |  |
|--------------------------------------------|-----|--|--|---------|-----|--|-----|--|--|---------|---------|--|
| 15                                         |     |  |  |         |     |  |     |  |  | 2SD1314 | (%) (※) |  |
| 25                                         |     |  |  | 2SD1313 | (※) |  |     |  |  |         |         |  |

## Package code

|                                                          |               |              |                                 |              |              |                          |                |
|----------------------------------------------------------|---------------|--------------|---------------------------------|--------------|--------------|--------------------------|----------------|
| (*) LSTM                                                 | (§) MSTM      | (@) TO-126IS | (▲) TO-220NIS                   | (○) TO-220FL | (●) TO-220SM | (◆) DP                   | (▽) TO-3P (N)  |
| (▼) TO-3P (N)IS                                          | (※) TO-3P (L) | (□) TPS      | (■) TPL                         | (◎) PW-MINI  | (◇) PW-MOLD  | (¥) Built-in zener diode | (%) darlington |
| Product number in italic signifies built-in damper diode |               |              | 2SB****/ 2SD****: complementary |              |              |                          |                |

## For Audio Power Amp

### ■ High-speed Darlington Transistors

- Using new pattern

Current

#### Pattern design for better current balance

New

Comb type → Crystal-mesh type



- Even distance between emitter and base contacts
- High integration



- High-current density
- Area optimization for power and driver stages
- R<sub>BE</sub> optimization

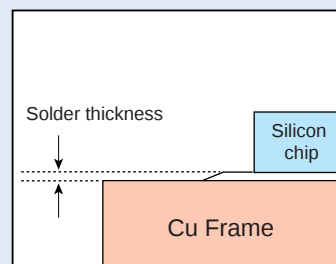
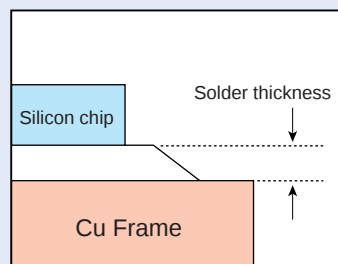
### ■ Transistors with collector power dissipations of 200 W and 220 W

- Die Mount Solder

Conventional  
Product

Second Generation

New



- Improved Thermal Conductivity

## Product Line-up

| Pc<br>(W) | Maximum Ratings      |                    | Polarity | New Part No.    | Discontinued Part No. |         | Package type |
|-----------|----------------------|--------------------|----------|-----------------|-----------------------|---------|--------------|
|           | V <sub>CEO</sub> (V) | I <sub>C</sub> (A) |          |                 |                       |         |              |
| 60        | 80<br>(100)          | 6                  | NPN      | <b>2SC5196</b>  | 2SC3180N              | 2SD716  | TO-3P(N)     |
|           |                      |                    | PNP      | <b>2SA1939</b>  | 2SA1263N              | 2SB686  |              |
| 80        | 120                  | 8                  | NPN      | <b>2SC5197</b>  | 2SC3181N              | 2SD718  | TO-3P(N)     |
|           |                      |                    | PNP      | <b>2SA1940</b>  | 2SC1264N              | 2SB688  |              |
| 100       | 140                  | 10                 | NPN      | <b>2SC5198</b>  | 2SC3182N              | 2SD1148 | TO-3P(N)     |
|           |                      |                    | PNP      | <b>2SA1941</b>  | 2SA1265N              | 2SB863  |              |
| 120       | 160                  | 12                 | NPN      | <b>2SC5199</b>  | 2SC3280               |         | TO-3P(L)     |
|           |                      |                    | PNP      | <b>2SA1942</b>  | 2SA1301               |         |              |
| 130       | 230<br>(180)         | 15<br>(12)         | NPN      | <b>2SC5242</b>  | 2SC3907               |         | TO-3P(N)     |
|           |                      |                    | PNP      | <b>2SA1962</b>  | 2SA1516               |         |              |
| 150       | 230                  | 15                 | NPN      | <b>2SC5358</b>  |                       |         | TO-3P(N)     |
|           |                      |                    | PNP      | <b>2SA1986</b>  |                       |         |              |
| 150       | 230<br>(200)         | 15                 | NPN      | <b>2SC5200</b>  | 2SC3281               |         | TO-3P(L)     |
|           |                      |                    | PNP      | <b>2SA1943</b>  | 2SA1302               |         |              |
| 180       | 230                  | 15                 | NPN      | <b>2SC5359</b>  |                       |         | TO-3P(L)     |
|           |                      |                    | PNP      | <b>2SA1987</b>  |                       |         |              |
| 200       | 200                  | 12                 | NPN      | <b>★2SC5948</b> |                       |         | TO-3P(N)     |
|           |                      |                    | PNP      | <b>★2SA2120</b> |                       |         |              |
| 220       | 200                  | 15                 | NPN      | <b>★2SC5949</b> |                       |         | TO-3P(L)     |
|           |                      |                    | PNP      | <b>★2SA2121</b> |                       |         |              |

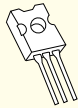
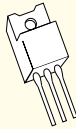
★: Under development

( ): Maximum rating of discontinued products

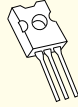
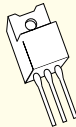
| Bipolar Transistor Single     | Driver Amplifier |          |         |              | Output Amplifier   |          |          |          |              |
|-------------------------------|------------------|----------|---------|--------------|--------------------|----------|----------|----------|--------------|
|                               | Pc(W)            | NPN      | PNP     | Package type | Non-isolation type | Pc(W)    | NPN      | PNP      | Package type |
|                               | 0.8              | 2SC1627A | 2SA817A | LSTM         |                    | 60       | 2SC5196  | 2SA1939  | TO-3P(N)     |
|                               | 0.9              | 2SC2235  | 2SA965  |              |                    | 80       | 2SC5197  | 2SA1940  |              |
|                               | 1                | 2SC3665  | 2SA1425 | MSTM         |                    | 100      | 2SC5198  | 2SA1941  |              |
|                               | 1.8              | 2SC5174  | 2SA1932 | TPL          |                    | 120      | 2SC5199  | 2SA1942  | TO-3P(L)     |
|                               | 5                | 2SC3423  | 2SA1360 | TO-126       |                    | 130      | 2SC5242  | 2SA1962  | TO-3P(N)     |
|                               |                  | 2SC3421  | 2SA1358 |              |                    | 150      | 2SC5358  | 2SA1986  |              |
|                               | 15               | 2SC2983  | 2SA1225 | PW MOLD      |                    |          | 2SC5200  | 2SA1943  | TO-3P(L)     |
|                               | 20               | 2SC4793  | 2SA1837 | TO-220(NIS)  |                    | 180      | 2SC5359  | 2SA1987  |              |
|                               | 2SC5171          | 2SA1930  |         | 200          |                    | ★2SC5948 | ★2SA2120 | TO-3P(N) |              |
|                               |                  |          |         | 220          | ★2SC5949           | ★2SA2121 | TO-3P(L) |          |              |
| Bipolar Transistor Darlington |                  |          |         |              | Isolation type     | 55       | 2SC4688  | 2SA1803  | TO-3P(N)IS   |
|                               |                  |          |         |              |                    | 70       | 2SC4689  | 2SA1804  |              |
|                               |                  |          |         |              |                    | 80       | 2SC4690  | 2SA1805  |              |
|                               |                  |          |         |              | Non-isolation type | 70       | 2SD2386  | 2SB1557  | TO-3P(N)     |
|                               |                  |          |         |              |                    | 80       | 2SD2387  | 2SB1558  |              |
|                               |                  |          |         |              |                    | 100      | ★2SD2636 | ★2SB1682 |              |
|                               |                  |          |         |              |                    | 100      | 2SD2384  | 2SB1555  | TO-3P(L)     |
|                               |                  |          |         |              |                    | 120      | 2SD2385  | 2SB1556  |              |
|                               |                  |          |         |              |                    | 150      | 2SD2449  | 2SB1594  |              |
|                               |                  |          |         |              |                    |          |          |          |              |

★: Under development

## For Vertical-Deflection Output

| Characteristics          | Package type | TO-92MOD                                                                          | TO-126(IS)                                                                         | TO-220(NIS)                                                                         |
|--------------------------|--------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| $V_{CE0}=160V, I_C=1A$   |              | <b>2SC2383</b><br><b>2SA1013</b>                                                  | -                                                                                  | -                                                                                   |
| $V_{CE0}=150V, I_C=1.5A$ |              | -                                                                                 | <b>2SC3621</b><br><b>2SA1408</b>                                                   | <b>2SC2073A</b><br><b>2SA940A</b>                                                   |
| Package Shape            |              |  |  |  |

## For Sound Output

| Characteristics                       | Package type | TO-92MOD                                                                            | TO-126(IS)                                                                           | TO-220(NIS)                                                                           |
|---------------------------------------|--------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| $V_{CE0}=160V, I_C=1A$                |              | <b>2SC2383</b><br><b>2SA1013</b>                                                    | -                                                                                    | -                                                                                     |
| $V_{CE0}=150V, I_C=1.5A$              |              |                                                                                     | <b>2SC3621</b><br><b>2SA1408</b>                                                     | <b>2SC2073A</b><br><b>2SA940A</b>                                                     |
| $V_{CE0}=160V$<br>$I_C=0.1$ to $0.2A$ |              | <b>2SC2230</b><br>$\times 2$                                                        | <b>2SC3963</b><br>$\times 2$                                                         | -                                                                                     |
| $V_{CE0}=180V$<br>$I_C=0.1$ to $0.2A$ |              | <b>2SC2230A</b><br>$\times 2$                                                       | -                                                                                    | -                                                                                     |
| Package Shape                         |              |  |  |  |

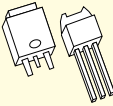
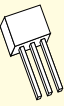
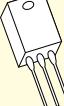
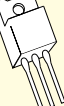
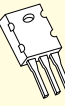
## For Speed Modulation

| Part No.       |                | $I_C$ | $V_{CE0}$ | $P_C$ | $h_{FE}$   |                 |              | $V_{CE(sat)}$ Max |               |               | $f_T$ Typ. |                 |              | Cob Typ. |                 | Package type |
|----------------|----------------|-------|-----------|-------|------------|-----------------|--------------|-------------------|---------------|---------------|------------|-----------------|--------------|----------|-----------------|--------------|
| NPN            | PNP            | (A)   | (V)       | (W)   |            | $V_{CE}$<br>(V) | $I_C$<br>(A) | (V)               | $I_C$<br>(mA) | $I_B$<br>(mA) | (MHz)      | $V_{CE}$<br>(V) | $I_C$<br>(A) | (pF)     | $V_{CB}$<br>(V) |              |
| <b>2SC4793</b> | -              | 1.0   | 230       | 20    | 100 to 320 | 5               | 0.1          | 1.5               | 500           | 50            | 100        | 10              | 0.1          | 20       | 10              | TO-220(NIS)  |
| -              | <b>2SA1837</b> |       |           |       |            |                 |              |                   |               |               | 70         |                 |              | 30       |                 |              |

## For Dynamic Focus

| Part No.        | $I_C$ | $V_{CE0}$ | $V_{CB0}$ | $P_C$ | $h_{FE}$ |                 |               | $V_{CE(sat)}$ Max |               |               | $f_T$ Typ. |                 |               | Cob Typ. |                 | Package type |
|-----------------|-------|-----------|-----------|-------|----------|-----------------|---------------|-------------------|---------------|---------------|------------|-----------------|---------------|----------|-----------------|--------------|
|                 | (mA)  | (V)       | (V)       | (W)   |          | $V_{CE}$<br>(V) | $I_C$<br>(mA) | (V)               | $I_C$<br>(mA) | $I_B$<br>(mA) | (MHz)      | $V_{CE}$<br>(V) | $I_C$<br>(mA) | (pF)     | $V_{CB}$<br>(V) |              |
| <b>2SC4686</b>  | 50    | 1000      | 1500      | 10    | 15 to 60 | 5               | 3             | 1.5               | 10            | 2             | 5.5        | 10              | 3             | 2.2      | 100             | TO-220(NIS)  |
| <b>2SC4686A</b> |       | 1200      |           |       |          |                 |               |                   |               |               |            |                 |               |          |                 |              |
| <b>2SC5460</b>  | 50    | 800       | 800       | 10    | 15 min   | 5               | 7             | 1.0               | 20            | 4             | -          | -               | -             | -        | -               | TO-126(IS)   |
| <b>2SC5466</b>  |       |           |           |       |          |                 |               |                   |               |               |            |                 |               |          |                 | TO-220(NIS)  |
| <b>2SC5563</b>  | 20    | 1500      | 1500      | 10    | 10 to 60 | 5               | 1             | 5.0               | 10            | 2             | -          | -               | -             | 2.0      | 100             | TO-220(NIS)  |

## For Power Supplies

| Package type<br>I <sub>C</sub> (A) | PW-MOLD<br>(SC-63/64)                                                             | DP<br>(SC-63/64)                                                                  | TPS                                                                               | TO -126(IS)                                                                       | TPL                                                                               | TO-220(N)IS                                                                       | TO-220SM                                                                           | TO-3P(N)                                                                            | TO-3P(L)                                                                            | M-STM                                                                               |
|------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| 0.8                                | <b>2SC5458</b><br><b>2SC5465#</b>                                                 |                                                                                   | <b>2SC5208</b><br><b>2SC5562#</b>                                                 | <b>2SC3425</b>                                                                    |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| 1                                  |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     | <b>2SC5930</b>                                                                      |
| 2                                  | <b>2SC5548</b><br><b>2SC5548A</b>                                                 |                                                                                   | <b>2SC5075</b><br><b>2SC5351</b>                                                  | <b>2SC5368</b>                                                                    | <b>2SC5279</b>                                                                    |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| 3                                  |                                                                                   | <b>2SC5356#</b>                                                                   |                                                                                   |                                                                                   |                                                                                   | <b>2SC5459</b><br><b>2SC5353#</b>                                                 | <b>2SC5361#</b>                                                                    |                                                                                     |                                                                                     |                                                                                     |
| 4                                  |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    | <b>2SC3657#</b>                                                                     |                                                                                     |                                                                                     |
| 5                                  |                                                                                   | <b>2SC5355</b>                                                                    |                                                                                   |                                                                                   | <b>2SC5266A</b>                                                                   | <b>2SC5172</b>                                                                    |                                                                                    | <b>2SC5354#</b>                                                                     |                                                                                     |                                                                                     |
| 8                                  |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   | <b>2SC5439</b>                                                                    |                                                                                    |                                                                                     |                                                                                     |                                                                                     |
| 10                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    | <b>2SC5352</b>                                                                      | <b>2SC3307#</b>                                                                     |                                                                                     |
| Package Shape                      |  |  |  |  |  |  |  |  |  |  |

: New Product

#:800 V series  
(V<sub>CEO</sub> = 285 ~ 450 V)

## V<sub>CEO</sub> and I<sub>C</sub> Rating List

| V <sub>CEO</sub> (V)<br>I <sub>C</sub> (A) | 285            | 400                                                                                     | 450                                                | 800                                                |
|--------------------------------------------|----------------|-----------------------------------------------------------------------------------------|----------------------------------------------------|----------------------------------------------------|
| 0.8 to 1                                   | <b>2SC5930</b> | <b>2SC3425</b><br><b>2SC5208</b><br><b>2SC5458</b>                                      |                                                    | <b>2SC5465</b><br><b>2SC5562</b>                   |
| 2 to 3                                     |                | <b>2SC5075</b><br><b>2SC5279</b><br><b>2SC5459</b><br><b>2SC5548</b><br><b>2SC5548A</b> | <b>2SC5351</b><br><b>2SC5357</b><br><b>2SC5368</b> | <b>2SC5353</b><br><b>2SC5356</b><br><b>2SC5361</b> |
| 4 to 5                                     |                | <b>2SC5172</b><br><b>2SC5266A</b><br><b>2SC5355</b>                                     |                                                    | <b>2SC3657</b><br><b>2SC5354</b>                   |
| 10                                         |                | <b>2SC5352</b>                                                                          |                                                    | <b>2SC3307</b>                                     |

: New product

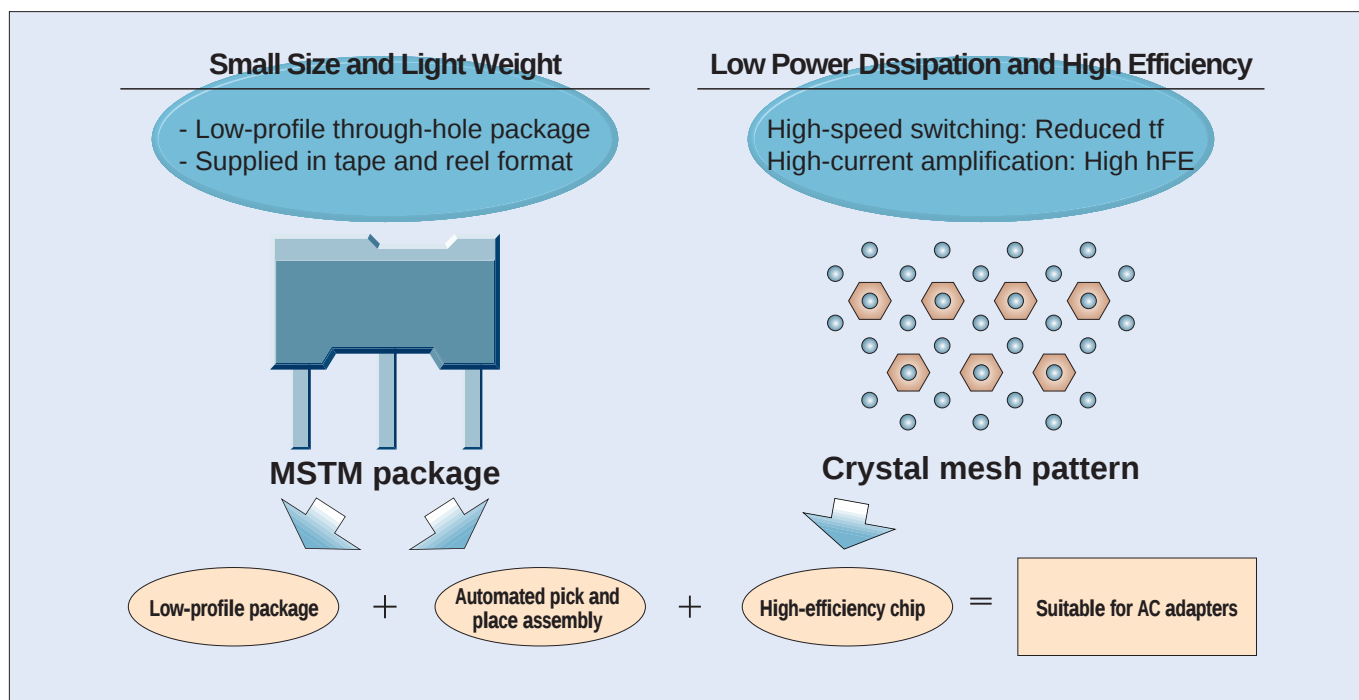
## For Switching Power Supplies

### AC-DC converters

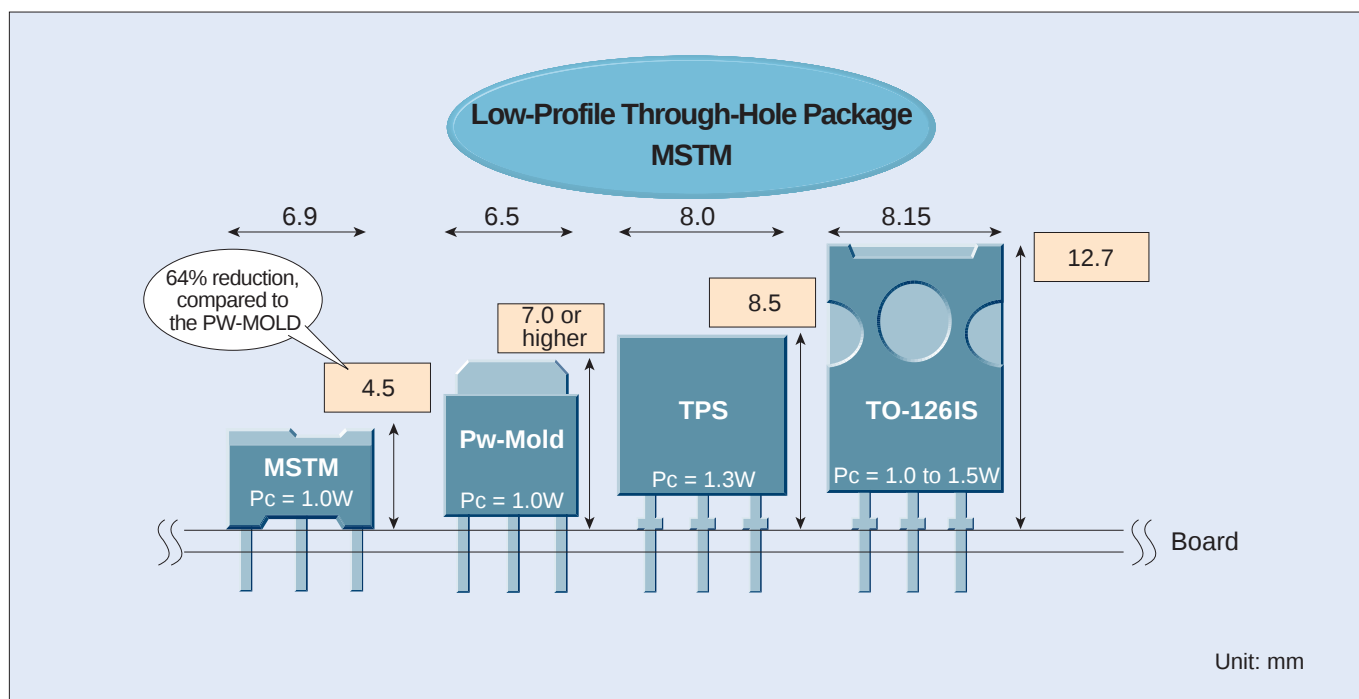
| Application          | Part No. | Maximum Ratings (Ta = 25°C) |                      |                    |                                                             | Package Type      |
|----------------------|----------|-----------------------------|----------------------|--------------------|-------------------------------------------------------------|-------------------|
|                      |          | V <sub>CEO</sub> (V)        | V <sub>CE0</sub> (V) | I <sub>C</sub> (A) | P <sub>C</sub> (W)<br>(T <sub>C</sub> = 25°C<br>*Ta = 25°C) |                   |
| Switching regulators | 2SC3425  | 500                         | 400                  | 0.8                | 10                                                          | TO-126(IS)        |
|                      | 2SC5075  |                             |                      | 2                  | 1.3*                                                        | TPS               |
|                      | 2SC5548  | 600                         | 370                  | 2                  | 15                                                          | PW-MOLD(SC-63/64) |
|                      | 2SC5548A |                             | 400                  | 2                  | 15                                                          | PW-MOLD(SC-63/64) |
|                      | 2SC5208  |                             |                      | 0.8                | 1.3*                                                        | TPS               |
|                      | 2SC5458  |                             |                      | 0.8                | 10                                                          | PW-MOLD(SC-63/64) |
|                      | 2SC5279  |                             |                      | 2                  | 1.8*                                                        | TPL               |
|                      | 2SC4917  |                             |                      | 2                  | 10                                                          | TO-126(IS)        |
|                      | 2SC5459  |                             |                      | 3                  | 25                                                          | TO-220(N)IS       |
|                      | 2SC5266A |                             |                      | 5                  | 1.8*                                                        | TPL               |
|                      | 2SC5355  |                             |                      | 5                  | 25                                                          | DP                |
|                      | 2SC5172  |                             |                      | 5                  | 25                                                          | TO-220(N)IS       |
|                      | 2SC5352  |                             |                      | 10                 | 80                                                          | TO-3P(N)          |
|                      | 2SC5351  |                             | 450                  | 2                  | 1.3*                                                        | TPS               |
|                      | 2SC5368  |                             |                      | 2                  | 10                                                          | TO-126IS          |
|                      | 2SC5465  | 900                         | 800                  | 0.8                | 20                                                          | PW-MOLD(SC-63/64) |
|                      | 2SC5562  |                             |                      | 0.8                | 1.3*                                                        | TPS               |
|                      | 2SC5353  |                             |                      | 3                  | 25                                                          | TO-220(N)IS       |
|                      | 2SC5356  |                             |                      |                    | 25                                                          | DP                |
|                      | 2SC5361  |                             |                      |                    | 40                                                          | TO-220FL          |
|                      | 2SC3657  |                             |                      | 4                  | 80                                                          | TO-3P(N)          |
|                      | 2SC5354  |                             |                      | 5                  | 100                                                         | TO-3P(N)          |
|                      | 2SC3307  |                             |                      | 10                 | 150                                                         | TO-3P(L)          |
|                      | 2SC5439  | 1000                        | 450                  | 8                  | 30                                                          | TO-220(N)IS       |

## Switching Transistors in a Low-Profile Through-Hole Package

### Characteristic



### Through-hole package comparison (height above PCB)



### Electrical Characteristic

| Part No. | Maximum Ratings         |                       | Package Type | Maximum Ratings        |                       |    |                        |                       |     |                                 |                       |                       | Switching Characteristics |          |        |
|----------|-------------------------|-----------------------|--------------|------------------------|-----------------------|----|------------------------|-----------------------|-----|---------------------------------|-----------------------|-----------------------|---------------------------|----------|--------|
|          |                         |                       |              | h <sub>FE(1)</sub> Min |                       |    | h <sub>FE(2)</sub> Min |                       |     | V <sub>CE(sat)</sub> Max<br>(V) |                       |                       | tr Max                    | tstg Max | tf Max |
|          |                         |                       |              | V <sub>CE</sub><br>(V) | I <sub>C</sub><br>(A) |    | V <sub>CE</sub><br>(V) | I <sub>C</sub><br>(A) |     | V <sub>CE</sub><br>(V)          | I <sub>C</sub><br>(A) | I <sub>B</sub><br>(A) |                           |          |        |
|          | V <sub>CEO</sub><br>(V) | I <sub>C</sub><br>(A) |              | (μs)                   |                       |    |                        |                       |     |                                 |                       |                       |                           |          |        |
| 2SC5930  | 285                     | 1                     | MSTM         | 20                     | 5                     | 1m | 40                     | 5                     | 0.2 | 1.0                             | 0.4                   | 0.05                  | 0.5                       | 3.0      | 0.3    |

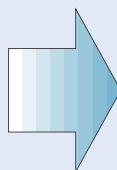
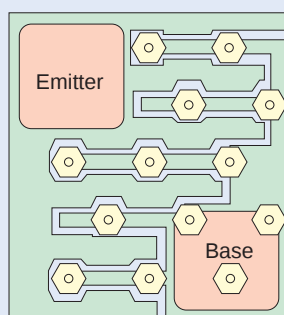
## Low $V_{CE(sat)}$ Series

### ■ Features

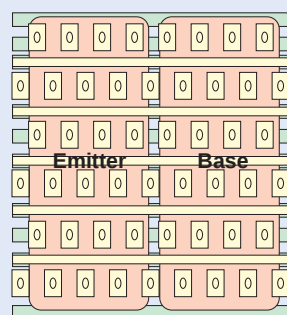
- Ultra high-speed switching
- New package

### Low withstanding voltage Super Hi-Met design

#### Low withstanding voltage Hi-Met III



#### Super Hi-Met

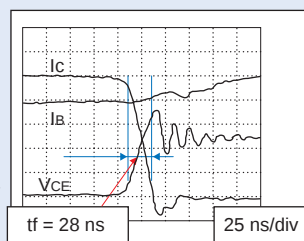
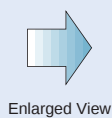
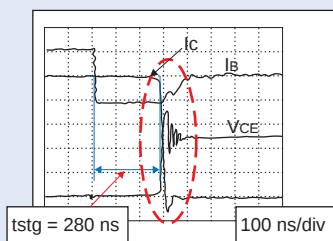


- Fine pattern
- Multi-layer wiring
- Ultra high speed

### ■ Switching time comparison

#### Ultra high-speed product

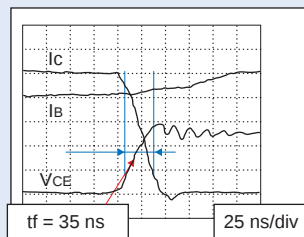
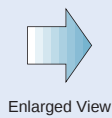
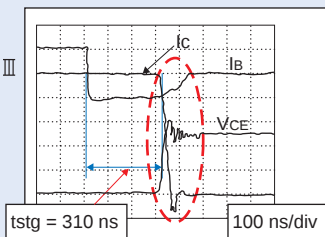
Super Hi-Met  
2SC5906  
(30V/4A/TSM)



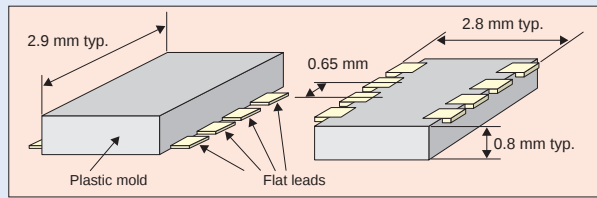
#### Conventional product

Low withstanding voltage Hi-Met III

I<sub>B</sub>: 50 mA/div  
I<sub>C</sub>: 320 mA/div  
V<sub>CE</sub>: 5 V/div

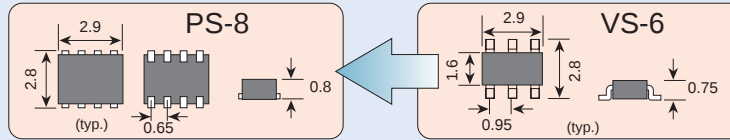


## New Package PS-8



Small thin package with equivalent in power dissipation of the PW-MINI package (1 W)

(unit: mm)



## Package line-up for low $V_{CE(sat)}$ series

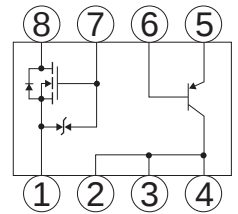
### PS-8 (New)

| Polarity          | Part No. | Maximum Ratings  |              |                     | $h_{FE}$   | $V_{CE}$<br>(V) | $I_C$<br>(A) | $V_{CE(sat)}$<br>(V) |              |               |
|-------------------|----------|------------------|--------------|---------------------|------------|-----------------|--------------|----------------------|--------------|---------------|
|                   |          | $V_{CEO}$<br>(V) | $I_C$<br>(A) | $P_C$ Note 1<br>(W) |            |                 |              | Max                  | $I_C$<br>(A) | $I_B$<br>(mA) |
| NPN / Single      | TPCP8501 | 100              | 2            | 1                   | 100 to 300 | 2               | 0.3          | 0.6                  | 1            | 33            |
| ★Note 2 PNP+S-MOS | TPCP8F01 | -20              | -3           | 1                   | 200 to 500 | -2              | -0.5         | -0.19                | -1.6         | -53           |

Note 1: When mounted on an FR4 board (copper area: 645 mm<sup>2</sup>, glass epoxy,  $t = 1.6$  mm)  
Note 2: Built-in n-channel S-MOS,  $VDSS = 20$  V,  $I_D = 0.1$  A,  $R_{on} = 4$  W (max)

★: Under development

Pin assignment of the TPCP8F01



### PW-MOLD(New)

| Polarity     | Part No. | Maximum Ratings  |              |                     | $h_{FE}$    | $V_{CE}$<br>(V) | $I_C$<br>(A) | $V_{CE(sat)}$<br>(V) |              |               |
|--------------|----------|------------------|--------------|---------------------|-------------|-----------------|--------------|----------------------|--------------|---------------|
|              |          | $V_{CEO}$<br>(V) | $I_C$<br>(A) | $P_C$ Note 1<br>(W) |             |                 |              | Max                  | $I_C$<br>(A) | $I_B$<br>(mA) |
| PNP / Single | 2SA2097  | -50              | -5           | 20                  | 200 to 500  | -2              | -0.5         | -0.27                | -1.6         | -53           |
| NPN / Single | 2SC5886  | 50               | 5            | 20                  | 400 to 1000 | 2               | 0.5          | 0.22                 | 1.6          | 32            |

Note 1:  $T_c = 25^\circ\text{C}$

## For DC-DC Converters (Low $V_{CE(sat)}$ )

| Collector $I_C$ (A) | Collector-Emitter Breakdown Voltage $V_{CEO}$ (V) |                                           |                                      |                                                          |                                                                                                                      |                                                                          |                             |                                           |
|---------------------|---------------------------------------------------|-------------------------------------------|--------------------------------------|----------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|-----------------------------|-------------------------------------------|
|                     | 10(V)                                             |                                           | 20(V)                                |                                                          | 50(V)                                                                                                                |                                                                          | 80(V)                       |                                           |
|                     | PNP                                               | NPN                                       | PNP                                  | NPN                                                      | PNP                                                                                                                  | NPN                                                                      | PNP                         | NPN                                       |
| 12                  |                                                   |                                           |                                      |                                                          | 2SA1451A (▲)                                                                                                         | 2SC3709A (▲)                                                             | 2SA1452A (▲)<br>2SA1771 (▲) | 2SC3710A (▲)                              |
| 10                  |                                                   |                                           | 2SA1327A (▲)                         |                                                          | 2SA1887 (▲)                                                                                                          | 2SC5000 (▲)                                                              |                             |                                           |
| 5                   |                                                   |                                           | 2SA1431 (§)                          | 2SC3671 (§)                                              | 2SA1244 (◇)                                                                                                          | 2SC3074 (◇)                                                              | 2SA1934 (■)                 | 2SC5176 (■)<br>2SC3303 (◇)                |
|                     |                                                   |                                           | 2SA1242 (◇)                          | 2SC4684 (◇)                                              | 2SA1931 (▲)                                                                                                          | 2SC4881 (▲)                                                              |                             |                                           |
|                     |                                                   |                                           | 2SA1357 (@)                          | 2SC4685 (@)                                              | 2SA1905 (□)                                                                                                          | 2SC5076 (□)                                                              |                             |                                           |
|                     |                                                   |                                           | 2SA1893 (□)                          | 2SC5030 (□)                                              | 2SA1993 (■)                                                                                                          | 2SC5175 (■)                                                              |                             |                                           |
| 4                   |                                                   | 2SC5713 (◎)                               |                                      | 2SC5714 (◎)<br>2SC5906 (T)<br>(30V)                      |                                                                                                                      | 2SC5703 (T)                                                              |                             |                                           |
| 3.5                 |                                                   |                                           |                                      | 2SC5738 (T)                                              |                                                                                                                      |                                                                          |                             |                                           |
| 3                   |                                                   |                                           | 2SA1802(10V) (◇)<br>2SA2059 (◎)      | 2SC4681(10V) (◇)<br>2SC4682(15V) (*)<br>2SC4683(15V) (§) | 2SA1761 (*)<br>2SA1869 (▲)<br>2SA1892 (□)                                                                            | 2SC4604 (*)<br>2SC4935 (▲)<br>2SC5029 (□)<br>2SC5712 (◎)<br>★TPC6502 (V) | 2SA1926 (§)                 |                                           |
|                     |                                                   |                                           |                                      |                                                          |                                                                                                                      | 2SC5692 (T)                                                              |                             |                                           |
|                     |                                                   |                                           | 2SA2061 (T)                          |                                                          |                                                                                                                      |                                                                          |                             |                                           |
| 2                   | 2SA2066 (◎)<br>TPC6602 (V)                        | 2SC5755 (T)<br>2SC5785 (◎)<br>TPC6501 (V) | 2SA1430(10V) (§)<br>2SA1160(10V) (*) | 2SC3670(10V) (§)<br>2SC2500(10V) (*)                     | 2SA1020 (*)<br>2SA1241 (◇)<br>2SA1428 (§)<br>2SA1680 (*)<br>2SA1891 (□)<br>TPC6601 (V)<br>2SA2056 (T)<br>2SA2060 (◎) | 2SC2655 (*)<br>2SC3076 (◇)<br>2SC3668 (§)<br>2SC4408 (*)<br>2SC5028 (□)  | 2SA1315 (*)<br>2SA1429 (§)  | 2SC3328 (*)<br>2SC3669 (§)<br>2SC3474 (◇) |
|                     |                                                   |                                           |                                      |                                                          |                                                                                                                      |                                                                          |                             |                                           |
|                     |                                                   |                                           |                                      |                                                          |                                                                                                                      |                                                                          |                             |                                           |
|                     |                                                   |                                           |                                      |                                                          |                                                                                                                      |                                                                          |                             |                                           |
|                     |                                                   |                                           |                                      |                                                          |                                                                                                                      |                                                                          |                             |                                           |
|                     |                                                   |                                           |                                      |                                                          |                                                                                                                      |                                                                          |                             |                                           |
| 1.5                 | 2SA2058 (T)                                       |                                           | 2SA2065 (T)<br>2SA2069 (◎)           | 2SC5784 (T)<br>2SC5819 (◎)                               |                                                                                                                      |                                                                          |                             |                                           |
| 1.2                 |                                                   |                                           | TPC6D03(V)(#)                        |                                                          |                                                                                                                      |                                                                          |                             |                                           |
| 1                   |                                                   |                                           |                                      |                                                          | 2SA2070 (◎)                                                                                                          | TPC6701 (V)(△)<br>2SC5810 (◎)                                            |                             |                                           |
| 0.8                 |                                                   |                                           |                                      |                                                          | TPC6801(V)(△)                                                                                                        |                                                                          |                             |                                           |

□: New product, ★: Under development

|                |                        |              |               |              |              |         |              |
|----------------|------------------------|--------------|---------------|--------------|--------------|---------|--------------|
| (*) LSTM       | (§) MSTM               | (@) TO-126IS | (▲) TO-220NIS | (◎) TO-220FL | (●) TO-220SM | (◆) DP  | (▽) TO-3P(N) |
| (▼) TO-3P(N)IS | (※) TO-3P(L)           | (□) TPS      | (■) TPL       | (◎) PW-MINI  | (◇) PW-MOLD  | (T) TSM | (V) VS-6     |
| (△) 2-in-1     | (#) Transistor + Diode |              |               |              |              |         |              |

# Transistor Product List

| Part No. | Package Type      | V <sub>CEO</sub><br>(V) | I <sub>C</sub><br>(A) | Remark | Page |
|----------|-------------------|-------------------------|-----------------------|--------|------|
| 2SA562TM | TO-92             | -30                     | -0.5                  |        | —    |
| 2SA817A  | TO-92MOD          | -80                     | -0.4                  |        | 21   |
| 2SA940A  | TO-220(N)IS       | -150                    | -1.5                  |        | 24   |
| 2SA949   | TO-92MOD          | -150                    | -0.05                 |        | 21   |
| 2SA950   | TO-92             | -30                     | -0.8                  |        | —    |
| 2SA965   | TO-92MOD          | -120                    | -0.8                  |        | 21   |
| 2SA966   | TO-92MOD          | -30                     | -1.5                  |        | 21   |
| 2SA970   | TO-92             | -120                    | -0.1                  |        | —    |
| 2SA1013  | TO-92MOD          | -160                    | -1                    |        | 21   |
| 2SA1015  | TO-92             | -50                     | -0.15                 |        | —    |
| 2SA1020  | TO-92MOD          | -50                     | -2                    |        | 21   |
| 2SA1048  | MINI              | -50                     | -0.15                 |        | —    |
| 2SA1049  | MINI              | -120                    | -0.1                  |        | —    |
| 2SA1091  | TO-92             | -300                    | -0.1                  |        | —    |
| 2SA1145  | TO-92MOD          | -150                    | -0.05                 |        | 21   |
| 2SA1150  | MINI              | -30                     | -0.8                  |        | —    |
| 2SA1160  | TO-92MOD          | -10                     | -2                    |        | 21   |
| 2SA1162  | S-MINI(SC-59)     | -50                     | -0.15                 |        | —    |
| 2SA1163  | S-MINI(SC-59)     | -120                    | -0.1                  |        | —    |
| 2SA1182  | S-MINI(SC-59)     | -30                     | -0.5                  |        | —    |
| 2SA1200  | PW-MINI(SC-62)    | -150                    | -0.05                 |        | 29   |
| 2SA1201  | PW-MINI(SC-62)    | -120                    | -0.8                  |        | 29   |
| 2SA1202  | PW-MINI(SC-62)    | -80                     | -0.4                  |        | 29   |
| 2SA1203  | PW-MINI(SC-62)    | -30                     | -1.5                  |        | 29   |
| 2SA1204  | PW-MINI(SC-62)    | -30                     | -0.8                  |        | 29   |
| 2SA1213  | PW-MINI(SC-62)    | -50                     | -2                    |        | 29   |
| 2SA1225  | PW-MOLD(SC-63/64) | -160                    | -1.5                  |        | 30   |
| 2SA1241  | PW-MOLD(SC-63/64) | -50                     | -2                    |        | 30   |
| 2SA1242  | PW-MOLD(SC-63/64) | -20                     | 5                     |        | 30   |
| 2SA1244  | PW-MOLD(SC-63/64) | -50                     | -5                    |        | 30   |
| 2SA1255  | S-MINI(SC-59)     | -200                    | -0.05                 |        | —    |
| 2SA1296  | TO-92             | -20                     | -2                    |        | —    |
| 2SA1297  | MINI              | -20                     | -2                    |        | —    |
| 2SA1298  | S-MINI(SC-59)     | -25                     | -0.8                  |        | —    |
| 2SA1300  | TO-92             | -10                     | -2                    |        | —    |
| 2SA1312  | S-MINI(SC-59)     | -120                    | -0.1                  |        | —    |
| 2SA1313  | S-MINI(SC-59)     | -50                     | -0.5                  |        | —    |
| 2SA1314  | PW-MINI(SC-62)    | -10                     | -2                    |        | 29   |
| 2SA1315  | TO-92MOD          | -80                     | -2                    |        | 21   |
| 2SA1320  | TO-92             | -250                    | -0.05                 |        | —    |
| 2SA1321  | TO-92MOD          | -250                    | -0.05                 |        | 21   |
| 2SA1327A | TO-220(N)IS       | -20                     | -10                   |        | 24   |
| 2SA1356  | TO-126(IS)        | -40                     | -0.8                  |        | 23   |
| 2SA1357  | TO-126(IS)        | -20                     | -5                    |        | 23   |
| 2SA1358  | TO-126(IS)        | -120                    | -1                    |        | 23   |
| 2SA1359  | TO-126(IS)        | -40                     | -3                    |        | 23   |
| 2SA1360  | TO-126(IS)        | -150                    | -0.05                 |        | 23   |
| 2SA1361  | TO-126(IS)        | -250                    | -0.05                 |        | 23   |

| Part No. | Package Type      | V <sub>CEO</sub><br>(V) | I <sub>C</sub><br>(A) | Remark | Page |
|----------|-------------------|-------------------------|-----------------------|--------|------|
| 2SA1362  | S-MINI(SC-59)     | -15                     | -0.8                  |        | —    |
| 2SA1382  | TO-92MOD          | -50                     | -2                    |        | 21   |
| 2SA1384  | PW-MINI(SC-62)    | -300                    | -0.1                  |        | 29   |
| 2SA1408  | TO-126(IS)        | -150                    | -1.5                  |        | 23   |
| 2SA1425  | MSTM              | -120                    | -0.8                  |        | 22   |
| 2SA1426  | MSTM              | -30                     | -0.8                  |        | 22   |
| 2SA1428  | MSTM              | -50                     | -2                    |        | 22   |
| 2SA1429  | MSTM              | -80                     | -2                    |        | 22   |
| 2SA1430  | MSTM              | -10                     | -2                    |        | 22   |
| 2SA1431  | MSTM              | -20                     | -5                    |        | 22   |
| 2SA1432  | MSTM              | -300                    | -0.1                  |        | 22   |
| 2SA1451A | TO-220(N)IS       | -50                     | -12                   |        | 25   |
| 2SA1452A | TO-220(N)IS       | -80                     | -12                   |        | 25   |
| 2SA1483  | PW-MINI(SC-62)    | -45                     | -0.2                  |        | 29   |
| 2SA1586  | USM(SC-70)        | -50                     | -0.15                 |        | —    |
| 2SA1587  | USM(SC-70)        | -120                    | -0.1                  |        | —    |
| 2SA1588  | USM(SC-70)        | -30                     | -0.5                  |        | —    |
| 2SA1618  | SMV               | -50                     | -0.15                 |        | —    |
| 2SA1620  | S-MINI(SC-59)     | -80                     | -0.3                  |        | —    |
| 2SA1621  | S-MINI(SC-59)     | -30                     | -0.8                  |        | —    |
| 2SA1680  | TO-92MOD          | -50                     | -2                    |        | 21   |
| 2SA1681  | PW-MINI(SC-62)    | -50                     | -2                    |        | 29   |
| 2SA1721  | S-MINI(SC-59)     | -300                    | -0.1                  |        | —    |
| 2SA1734  | PW-MINI(SC-62)    | -30                     | -1.2                  |        | 29   |
| 2SA1735  | PW-MINI(SC-62)    | -50                     | -1                    |        | 29   |
| 2SA1736  | PW-MINI(SC-62)    | -50                     | -3                    |        | 29   |
| 2SA1761  | TO-92MOD          | -50                     | -3                    |        | 21   |
| 2SA1771  | TO-220(N)IS       | -80                     | -12                   |        | 25   |
| 2SA1802  | PW-MOLD(SC-63/64) | -10                     | -3                    |        | 30   |
| 2SA1803  | TO-3P(N)IS        | -80                     | -6                    |        | 26   |
| 2SA1804  | TO-3P(N)IS        | -120                    | -8                    |        | 26   |
| 2SA1805  | TO-3P(N)IS        | -140                    | -10                   |        | 26   |
| 2SA1811  | TO-92MOD          | -30                     | -0.5                  |        | 21   |
| 2SA1822  | TO-220(N)IS       | -400                    | -1                    |        | 24   |
| 2SA1832  | SSM               | -50                     | -0.15                 |        | —    |
| 2SA1837  | TO-220(N)IS       | -230                    | -1                    |        | 24   |
| 2SA1869  | TO-220(N)IS       | -50                     | -3                    |        | 24   |
| 2SA1873  | USV               | -50                     | -0.15                 |        | —    |
| 2SA1887  | TO-220(N)IS       | -50                     | -10                   |        | 25   |
| 2SA1891  | TPS               | -50                     | -2                    |        | 28   |
| 2SA1892  | TPS               | -50                     | -3                    |        | 28   |
| 2SA1893  | TPS               | -20                     | -5                    |        | 28   |
| 2SA1905  | TPS               | -50                     | -5                    |        | 28   |
| 2SA1923  | PW-MOLD(SC-63/64) | -400                    | -0.5                  |        | 30   |
| 2SA1924  | TO-126(IS)        | -400                    | -0.5                  |        | 23   |
| 2SA1925  | TPS               | -400                    | -0.5                  |        | 28   |
| 2SA1926  | MSTM              | -80                     | -3                    |        | 22   |
| 2SA1930  | TO-220(N)IS       | -180                    | -2                    |        | 24   |

| Part No. | Package Type      | V <sub>CEO</sub> (V) | I <sub>C</sub> (A) | Remark                 | Page |
|----------|-------------------|----------------------|--------------------|------------------------|------|
| 2SA1931  | TO-220(N)IS       | -50                  | -5                 |                        | 25   |
| 2SA1932  | TPL               | -230                 | -1                 |                        | 28   |
| 2SA1933  | TPL               | -50                  | -5                 |                        | 28   |
| 2SA1934  | TPL               | -80                  | -5                 |                        | 28   |
| 2SA1937  | PW-MOLD(SC-63/64) | -600                 | -0.5               |                        | 30   |
| 2SA1939  | TO-3P(N)          | -80                  | -6                 |                        | 26   |
| 2SA1940  | TO-3P(N)          | -120                 | -8                 |                        | 26   |
| 2SA1941  | TO-3P(N)          | -140                 | -10                |                        | 26   |
| 2SA1942  | TO-3P(L)          | -160                 | -12                |                        | 27   |
| 2SA1943  | TO-3P(L)          | -230                 | -15                |                        | 27   |
| 2SA1954  | USM(SC-70)        | -12                  | -0.5               |                        | —    |
| 2SA1955  | SSM               | -12                  | -0.4               |                        | —    |
| 2SA1962  | TO-3P(N)          | -230                 | -15                |                        | 26   |
| 2SA1971  | PW-MINI(SC-62)    | -400                 | -0.5               |                        | —    |
| 2SA1972  | TO-92MOD          | -400                 | -0.5               |                        | 21   |
| 2SA1986  | TO-3P(N)          | -230                 | -15                |                        | 26   |
| 2SA1987  | TO-3P(L)          | -230                 | -15                |                        | 27   |
| 2SA2034  | PW-MOLD(SC-63)    | -400                 | -2                 |                        | 30   |
| 2SA2056  | TSM               | -50                  | -2                 | Low-saturation voltage | 31   |
| 2SA2058  | TSM               | -10                  | -1.5               | Low-saturation voltage | 31   |
| 2SA2059  | PW-MINI           | -20                  | -3                 | Low-saturation voltage | 29   |
| 2SA2060  | PW-MINI           | -50                  | -2                 | Low-saturation voltage | 29   |
| 2SA2061  | TSM               | -20                  | -2.5               | Low-saturation voltage | 31   |
| 2SA2065  | TSM               | -20                  | -1.5               | Low-saturation voltage | 31   |
| 2SA2066  | PW-MINI           | -10                  | -2                 | Low-saturation voltage | 29   |
| 2SA2069  | PW-MINI           | -20                  | -1.5               | Low-saturation voltage | 29   |
| 2SA2070  | PW-MINI           | -50                  | -1                 | Low-saturation voltage | 29   |
| 2SA2097  | PW-MOLD(SC-63)    | -50                  | -5                 | Low-saturation voltage | 30   |
| 2SA2120  | TO-3P(N)          | -200                 | -12                |                        | 26   |
| 2SA2121  | TO-3P(L)          | -200                 | -15                |                        | 27   |
| 2SB905   | PW-MOLD(SC-63/64) | -150                 | -1.5               |                        | 30   |
| 2SB906   | PW-MOLD(SC-63/64) | -60                  | -3                 |                        | 30   |
| 2SB907   | PW-MOLD(SC-63/64) | -40                  | -3                 | Darlington             | 30   |
| 2SB908   | PW-MOLD(SC-63/64) | -80                  | -4                 | Darlington             | 30   |
| 2SB1016A | TO-220(N)IS       | -100                 | -5                 |                        | 24   |
| 2SB1018A | TO-220(N)IS       | -80                  | -7                 | Darlington             | 25   |
| 2SB1020A | TO-220(N)IS       | -100                 | -7                 | Darlington             | 25   |
| 2SB1067  | TO-126(IS)        | -80                  | -2                 | Darlington             | 23   |
| 2SB1375  | TO-220(N)IS       | -60                  | -3                 |                        | 24   |
| 2SB1381  | TO-220(N)IS       | -100                 | -5                 |                        | 25   |
| 2SB1411  | TO-220(N)IS       | -100                 | -2                 | Darlington             | 25   |
| 2SB1457  | TO-92MOD          | -100                 | -2                 | Darlington             | 21   |
| 2SB1481  | TO-220(N)IS       | -100                 | -4                 | Darlington             | 25   |
| 2SB1495  | TO-220(N)IS       | -100                 | -3                 | Darlington             | 25   |
| 2SB1555  | TO-3P(L)          | -140                 | -7                 | Darlington             | 27   |
| 2SB1556  | TO-3P(L)          | -140                 | -8                 | Darlington             | 27   |
| 2SB1557  | TO-3P(N)          | -140                 | -7                 | Darlington             | 26   |
| 2SB1558  | TO-3P(N)          | -140                 | -8                 | Darlington             | 26   |

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| 2SB1594   | TO-3P(L)      | -160                 | -10                | Darlington | 27   |
| 2SB1617   | TPS           | -100                 | -2                 | Darlington | 28   |
| 2SB1640   | TPL           | -60                  | -3                 |            | 28   |
| 2SB1641   | TPL           | -100                 | -5                 | Darlington | 28   |
| 2SB1642   | TO-220(N)IS   | -60                  | -4                 |            | 24   |
| 2SB1667   | TO-220FL/SM   | -60                  | -3                 |            | 25   |
| 2SB1682   | TO-3P(N)      | -150                 | -8                 |            | 26   |
| 2SC380TM  | TO-92(SC-43)  | 30                   | 0.05               |            | —    |
| 2SC388ATM | TO-92         | 25                   | 0.05               |            | —    |
| 2SC732TM  | TO-92         | 50                   | 0.15               |            | —    |
| 2SC941TM  | TO-92         | 30                   | 0.1                |            | —    |
| 2SC982TM  | TO-92         | 40                   | 0.3                |            | —    |
| 2SC1627   | TO-92         | 80                   | 0.3                |            | —    |
| 2SC1627A  | TO-92MOD      | 80                   | 0.4                |            | 21   |
| 2SC1815   | TO-92         | 50                   | 0.15               |            | —    |
| 2SC1923   | TO-92         | 30                   | 0.02               |            | —    |
| 2SC1959   | TO-92         | 30                   | 0.5                |            | —    |
| 2SC2073A  | TO-220(N)IS   | 150                  | 1.5                |            | 24   |
| 2SC2120   | TO-92         | 30                   | 0.8                |            | —    |
| 2SC2216   | TO-92         | 45                   | 0.05               |            | —    |
| 2SC2229   | TO-92MOD      | 150                  | 0.05               |            | 21   |
| 2SC2230   | TO-92MOD      | 160                  | 0.1                |            | 21   |
| 2SC2230A  | TO-92MOD      | 180                  | 0.1                |            | 21   |
| 2SC2235   | TO-92MOD      | 120                  | 0.8                |            | 21   |
| 2SC2236   | TO-92MOD      | 30                   | 1.5                |            | 21   |
| 2SC2240   | TO-92         | 120                  | 0.1                |            | —    |
| 2SC2290   | (2-13B1A)     | 45                   | 20                 | For RF     | —    |
| 2SC2347   | TO-92         | 15                   | 0.05               |            | —    |
| 2SC2349   | TO-92         | 15                   | 0.05               |            | —    |
| 2SC2383   | TO-92MOD      | 160                  | 1                  |            | 21   |
| 2SC2458   | MINI          | 50                   | 0.15               |            | —    |
| 2SC2459   | MINI          | 120                  | 0.1                |            | —    |
| 2SC2482   | TO-92MOD      | 300                  | 0.1                |            | 21   |
| 2SC2498   | TO-92         | 20                   | 0.05               |            | —    |
| 2SC2500   | TO-92MOD      | 10                   | 2                  |            | 21   |
| 2SC2510   | (2-13B1A)     | 35                   | 20                 | For RF     | —    |
| 2SC2532   | S-MINI(SC-59) | 40                   | 0.3                |            | —    |
| 2SC2551   | TO-92         | 300                  | 0.1                |            | —    |
| 2SC2655   | TO-92MOD      | 50                   | 2                  |            | 21   |
| 2SC2668   | MINI          | 30                   | 0.02               |            | —    |
| 2SC2669   | MINI          | 30                   | 0.05               |            | —    |
| 2SC2670   | MINI          | 30                   | 0.1                |            | —    |
| 2SC2703   | TO-92MOD      | 30                   | 1                  |            | 21   |
| 2SC2705   | TO-92MOD      | 150                  | 0.05               |            | 21   |
| 2SC2710   | MINI          | 30                   | 0.8                |            | —    |
| 2SC2712   | S-MINI(SC-59) | 50                   | 0.15               |            | —    |
| 2SC2713   | S-MINI(SC-59) | 120                  | 0.1                |            | —    |
| 2SC2714   | S-MINI(SC-59) | 30                   | 0.02               | For RF     | —    |

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| 2SC2715  | S-MINI(SC-59)     | 30                      | 0.05                  | For RF | —    |
| 2SC2716  | S-MINI(SC-59)     | 30                      | 0.1                   | For RF | —    |
| 2SC2782  | (2-13C1A)         | 16                      | 20                    | For RF | —    |
| 2SC2859  | S-MINI(SC-59)     | 30                      | 0.5                   |        | —    |
| 2SC2873  | PW-MINI(SC-62)    | 50                      | 2                     |        | 29   |
| 2SC2878  | TO-92             | 20                      | 0.3                   |        | —    |
| 2SC2879  | (2-13B1A)         | 18                      | 25                    | For RF | —    |
| 2SC2880  | PW-MINI(SC-62)    | 150                     | 0.05                  |        | 29   |
| 2SC2881  | PW-MINI(SC-62)    | 120                     | 0.8                   |        | 29   |
| 2SC2882  | PW-MINI(SC-62)    | 80                      | 0.4                   |        | 29   |
| 2SC2883  | PW-MINI(SC-62)    | 30                      | 1.5                   |        | 29   |
| 2SC2884  | PW-MINI(SC-62)    | 30                      | 0.8                   |        | 29   |
| 2SC2982  | PW-MINI(SC-62)    | 10                      | 2                     |        | 29   |
| 2SC2983  | PW-MOLD(SC-63/64) | 160                     | 1.5                   |        | 30   |
| 2SC2995  | MINI              | 30                      | 0.05                  |        | —    |
| 2SC2996  | S-MINI(SC-59)     | 30                      | 0.05                  |        | —    |
| 2SC3072  | PW-MOLD(SC-63/64) | 20                      | 5                     |        | 30   |
| 2SC3074  | PW-MOLD(SC-63/64) | 50                      | 5                     |        | 30   |
| 2SC3075  | PW-MOLD(SC-63/64) | 400                     | 0.8                   |        | 30   |
| 2SC3076  | PW-MOLD(SC-63/64) | 50                      | 2                     |        | 30   |
| 2SC3112  | TO-92             | 50                      | 0.15                  |        | —    |
| 2SC3113  | MINI              | 50                      | 0.15                  |        | —    |
| 2SC3120  | S-MINI(SC-59)     | 15                      | 0.05                  | For RF | —    |
| 2SC3121  | S-MINI(SC-59)     | 15                      | 0.05                  | For RF | —    |
| 2SC3122  | S-MINI(SC-59)     | 30                      | 0.02                  | For RF | —    |
| 2SC3123  | S-MINI(SC-59)     | 20                      | 0.05                  | For RF | —    |
| 2SC3124  | S-MINI(SC-59)     | 15                      | 0.05                  | For RF | —    |
| 2SC3125  | S-MINI(SC-59)     | 25                      | 0.05                  | For RF | —    |
| 2SC3138  | S-MINI(SC-59)     | 200                     | 0.05                  |        | —    |
| 2SC3225  | TO-92MOD          | 40                      | 2                     |        | 21   |
| 2SC3265  | S-MINI(SC-59)     | 25                      | 0.8                   |        | —    |
| 2SC3266  | TO-92             | 20                      | 2                     |        | —    |
| 2SC3267  | MINI              | 20                      | 2                     |        | —    |
| 2SC3279  | TO-92             | 10                      | 2                     |        | —    |
| 2SC3295  | S-MINI(SC-59)     | 50                      | 0.15                  |        | —    |
| 2SC3303  | PW-MOLD(SC-63/64) | 80                      | 5                     |        | 30   |
| 2SC3307  | TO-3P(L)          | 800                     | 10                    |        | 27   |
| 2SC3324  | S-MINI(SC-59)     | 120                     | 0.1                   |        | —    |
| 2SC3325  | S-MINI(SC-59)     | 50                      | 0.5                   |        | —    |
| 2SC3326  | S-MINI(SC-59)     | 20                      | 0.3                   |        | —    |
| 2SC3327  | MINI              | 20                      | 0.3                   |        | —    |
| 2SC3328  | TO-92MOD          | 80                      | 2                     |        | 21   |
| 2SC3333  | TO-92             | 250                     | 0.05                  |        | —    |
| 2SC3334  | TO-92MOD          | 250                     | 0.05                  |        | 21   |
| 2SC3405  | PW-MOLD(SC-63/64) | 800                     | 0.8                   |        | 30   |
| 2SC3419  | TO-126(IS)        | 40                      | 0.8                   |        | 23   |
| 2SC3420  | TO-126(IS)        | 20                      | 5                     |        | 23   |
| 2SC3421  | TO-126(IS)        | 120                     | 1                     |        | 23   |

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|----------|-------------------|-------------------------|-----------------------|--------|------|
| 2SC3422  | TO-126(IS)        | 40                      | 3                     |        | 23   |
| 2SC3423  | TO-126(IS)        | 150                     | 0.05                  |        | 23   |
| 2SC3424  | TO-126(IS)        | 250                     | 0.05                  |        | 23   |
| 2SC3425  | TO-126(IS)        | 400                     | 0.8                   |        | 23   |
| 2SC3437  | S-MINI(SC-59)     | 15                      | 0.2                   |        | —    |
| 2SC3474  | PW-MOLD(SC-63/64) | 80                      | 2                     |        | 30   |
| 2SC3515  | PW-MINI(SC-62)    | 300                     | 0.1                   |        | 29   |
| 2SC3547A | S-MINI(SC-59)     | 12                      | 0.03                  | For RF | —    |
| 2SC3606  | S-MINI(SC-59)     | 12                      | 0.08                  | For RF | —    |
| 2SC3613  | TO-126(IS)        | 18                      | 0.5                   |        | 23   |
| 2SC3619  | TO-126(IS)        | 300                     | 0.1                   |        | 23   |
| 2SC3620  | TO-126(IS)        | 300                     | 0.1                   |        | 23   |
| 2SC3621  | TO-126(IS)        | 150                     | 1.5                   |        | 23   |
| 2SC3657  | TO-3P(N)          | 800                     | 4                     |        | 26   |
| 2SC3665  | MSTM              | 120                     | 0.8                   |        | 22   |
| 2SC3666  | MSTM              | 30                      | 1                     |        | 22   |
| 2SC3668  | MSTM              | 50                      | 2                     |        | 22   |
| 2SC3669  | MSTM              | 80                      | 2                     |        | 22   |
| 2SC3670  | MSTM              | 10                      | 2                     |        | 22   |
| 2SC3671  | MSTM              | 20                      | 5                     |        | 22   |
| 2SC3672  | MSTM              | 300                     | 0.1                   |        | 22   |
| 2SC3673  | MSTM              | 40                      | 2                     |        | 22   |
| 2SC3709A | TO-220(N)IS       | 50                      | 12                    |        | 25   |
| 2SC3710A | TO-220(N)IS       | 80                      | 12                    |        | 25   |
| 2SC3862  | S-MINI(SC-59)     | 15                      | 0.05                  | For RF | —    |
| 2SC3963  | TO-126(IS)        | 160                     | 0.2                   |        | 23   |
| 2SC3964  | TO-126(IS)        | 40                      | 2                     |        | 23   |
| 2SC4116  | USM(SC-70)        | 50                      | 0.15                  |        | —    |
| 2SC4117  | USM(SC-70)        | 120                     | 0.1                   |        | —    |
| 2SC4118  | USM(SC-70)        | 30                      | 0.5                   |        | —    |
| 2SC4157  | TO-3P(N)          | 450                     | 10                    |        | 26   |
| 2SC4200  | TO-126(IS)        | 18                      | 0.6                   |        | 23   |
| 2SC4207  | SMV               | 50                      | 0.15                  |        | —    |
| 2SC4209  | S-MINI(SC-59)     | 80                      | 0.3                   |        | —    |
| 2SC4210  | S-MINI(SC-59)     | 30                      | 0.8                   |        | —    |
| 2SC4213  | USM(SC-70)        | 20                      | 0.3                   |        | —    |
| 2SC4214  | SMQ(SC-61)        | 20                      | 0.02                  | For RF | —    |
| 2SC4215  | USM(SC-70)        | 30                      | 0.02                  | For RF | —    |
| 2SC4244  | USM(SC-70)        | 20                      | 0.02                  | For RF | —    |
| 2SC4245  | USM(SC-70)        | 15                      | 0.05                  | For RF | —    |
| 2SC4246  | USM(SC-70)        | 15                      | 0.05                  | For RF | —    |
| 2SC4247  | USM(SC-70)        | 12                      | 0.03                  | For RF | —    |
| 2SC4249  | USM(SC-70)        | 30                      | 0.02                  | For RF | —    |
| 2SC4250  | USM(SC-70)        | 20                      | 0.05                  | For RF | —    |
| 2SC4251  | USM(SC-70)        | 15                      | 0.05                  | For RF | —    |
| 2SC4252  | USM(SC-70)        | 12                      | 0.03                  | For RF | —    |
| 2SC4253  | USM(SC-70)        | 25                      | 0.05                  | For RF | —    |
| 2SC4408  | TO-92MOD          | 50                      | 2                     |        | 21   |

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| 2SC4409   | PW-MINI(SC-62)    | 50                   | 2                  |        | 29   |
| 2SC4439   | TO-126(IS)        | 150                  | 0.3                |        | 23   |
| 2SC4448   | TO-220(N)IS       | 250                  | 0.15               |        | 24   |
| 2SC4479   | TO-126(IS)        | 100                  | 0.5                |        | 23   |
| 2SC4497   | S-MINI(SC-59)     | 300                  | 0.1                |        | —    |
| 2SC4527   | USM(SC-70)        | 15                   | 0.05               |        | —    |
| 2SC4539   | PW-MINI(SC-62)    | 30                   | 1.2                |        | 29   |
| 2SC4540   | PW-MINI(SC-62)    | 50                   | 1                  |        | 29   |
| 2SC4541   | PW-MINI(SC-62)    | 50                   | 3                  |        | 29   |
| 2SC4544   | TO-220(N)IS       | 300                  | 0.1                |        | 24   |
| 2SC4604   | TO-92MOD          | 50                   | 3                  |        | 21   |
| 2SC4605   | TO-220(N)IS       | 100                  | 0.5                |        | 24   |
| 2SC4666   | USM(SC-70)        | 50                   | 0.15               |        | —    |
| 2SC4667   | USM(SC-70)        | 15                   | 0.2                |        | —    |
| 2SC4681   | PW-MOLD(SC-63/64) | 10                   | 3                  |        | 30   |
| 2SC4682   | TO-92MOD          | 15                   | 3                  |        | 21   |
| 2SC4683   | MSTM              | 15                   | 3                  |        | 22   |
| 2SC4684   | PW-MOLD(SC-63/64) | 20                   | 5                  |        | 30   |
| 2SC4685   | TO-126(IS)        | 20                   | 5                  |        | 23   |
| 2SC4686   | TO-220(N)IS       | 1000                 | 0.05               |        | 24   |
| 2SC4686A  | TO-220(N)IS       | 1200                 | 0.05               |        | 24   |
| 2SC4688   | TO-3P(N)IS        | 80                   | 6                  |        | 26   |
| 2SC4689   | TO-3P(N)IS        | 120                  | 8                  |        | 26   |
| 2SC4690   | TO-3P(N)IS        | 140                  | 10                 |        | 26   |
| 2SC4707   | TO-92MOD          | 30                   | 0.5                |        | 21   |
| 2SC4738   | SSM               | 50                   | 0.15               |        | —    |
| 2SC4738F  | ESM               | 50                   | 0.15               |        | —    |
| 2SC4754   | TO-220FL/SM       | 400                  | 2                  |        | 25   |
| 2SC4781   | TO-92MOD          | 10                   | 4                  |        | 21   |
| 2SC4793   | TO-220(N)IS       | 230                  | 1                  |        | 24   |
| 2SC4881   | TO-220(N)IS       | 50                   | 5                  |        | 25   |
| 2SC4915   | SSM               | 30                   | 0.02               | For RF | —    |
| 2SC4935   | TO-220(N)IS       | 50                   | 3                  |        | 24   |
| 2SC4944   | USV               | 50                   | 0.15               |        | —    |
| 2SC5000   | TO-220(N)IS       | 50                   | 10                 |        | 25   |
| 2SC5027   | TPS               | 300                  | 0.1                |        | 28   |
| 2SC5028   | TPS               | 50                   | 2                  |        | 28   |
| 2SC5029   | TPS               | 50                   | 3                  |        | 28   |
| 2SC5030   | TPS               | 20                   | 5                  |        | 28   |
| 2SC5064   | S-MINI(SC-59)     | 12                   | 0.03               | For RF | —    |
| 2SC5065   | USM(SC-70)        | 12                   | 0.03               | For RF | —    |
| 2SC5066   | SSM               | 12                   | 0.03               | For RF | —    |
| 2SC5066FT | TESM              | 12                   | 0.03               | For RF | —    |
| 2SC5075   | TPS               | 400                  | 2                  |        | 28   |
| 2SC5076   | TPS               | 50                   | 5                  |        | 28   |
| 2SC5084   | S-MINI(SC-59)     | 12                   | 0.08               | For RF | —    |
| 2SC5085   | USM(SC-70)        | 12                   | 0.08               | For RF | —    |
| 2SC5086   | SSM               | 12                   | 0.08               | For RF | —    |

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| 2SC5086FT | TESM          | 12                   | 0.08               | For RF | —    |
| 2SC5087   | SMQ           | 12                   | 0.08               | For RF | —    |
| 2SC5088   | USQ           | 12                   | 0.08               | For RF | —    |
| 2SC5089   | S-MINI(SC-59) | 10                   | 0.04               | For RF | —    |
| 2SC5090   | USM(SC-70)    | 10                   | 0.04               | For RF | —    |
| 2SC5091   | SSM           | 10                   | 0.04               | For RF | —    |
| 2SC5091FT | TESM          | 8                    | 0.04               | For RF | —    |
| 2SC5092   | SMQ           | 10                   | 0.04               | For RF | —    |
| 2SC5093   | USQ           | 10                   | 0.04               | For RF | —    |
| 2SC5094   | S-MINI(SC-59) | 10                   | 0.015              |        | —    |
| 2SC5095   | USM(SC-70)    | 10                   | 0.015              | For RF | —    |
| 2SC5096   | SSM           | 10                   | 0.015              | For RF | —    |
| 2SC5096FT | TESM          | 8                    | 0.015              | For RF | —    |
| 2SC5097   | SMQ           | 10                   | 0.015              | For RF | —    |
| 2SC5098   | USQ           | 10                   | 0.015              | For RF | —    |
| 2SC5106   | S-MINI(SC-59) | 10                   | 0.03               | For RF | —    |
| 2SC5107   | USM(SC-70)    | 10                   | 0.03               | For RF | —    |
| 2SC5108   | SSM           | 10                   | 0.03               | For RF | —    |
| 2SC5108FT | TESM          | 10                   | 0.03               | For RF | —    |
| 2SC5109   | S-MINI(SC-59) | 10                   | 0.06               | For RF | —    |
| 2SC5110   | USM(SC-70)    | 10                   | 0.06               | For RF | —    |
| 2SC5111   | SSM           | 10                   | 0.06               | For RF | —    |
| 2SC5111FT | TESM          | 10                   | 0.06               | For RF | —    |
| 2SC5122   | TO-92MOD      | 400                  | 0.05               |        | 21   |
| 2SC5154   | TPS           | 160                  | 1.5                |        | 28   |
| 2SC5171   | TO-220(N)IS   | 180                  | 2                  |        | 24   |
| 2SC5172   | TO-220(N)IS   | 400                  | 5                  |        | 25   |
| 2SC5173   | TPL           | 300                  | 0.1                |        | 28   |
| 2SC5174   | TPL           | 230                  | 1                  |        | 28   |
| 2SC5175   | TPL           | 50                   | 5                  |        | 28   |
| 2SC5176   | TPL           | 80                   | 5                  |        | 28   |
| 2SC5196   | TO-3P(N)      | 80                   | 6                  |        | 26   |
| 2SC5197   | TO-3P(N)      | 120                  | 8                  |        | 26   |
| 2SC5198   | TO-3P(N)      | 140                  | 10                 |        | 26   |
| 2SC5199   | TO-3P(L)      | 160                  | 12                 |        | 27   |
| 2SC5200   | TO-3P(L)      | 230                  | 15                 |        | 27   |
| 2SC5201   | TO-92MOD      | 600                  | 0.05               |        | 21   |
| 2SC5208   | TPS           | 400                  | 0.8                |        | 28   |
| 2SC5233   | USM(SC-70)    | 12                   | 0.5                |        | —    |
| 2SC5242   | TO-3P(N)      | 230                  | 15                 |        | 26   |
| 2SC5255   | USM(SC-70)    | 7                    | 0.04               | For RF | —    |
| 2SC5256   | SSM           | 7                    | 0.04               | For RF | —    |
| 2SC5256FT | TESM          | 7                    | 0.04               | For RF | —    |
| 2SC5257   | SMQ           | 7                    | 0.04               | For RF | —    |
| 2SC5260   | USM(SC-70)    | 7                    | 0.015              | For RF | —    |
| 2SC5261   | SSM           | 7                    | 0.015              | For RF | —    |
| 2SC5261FT | TESM          | 7                    | 0.015              | For RF | —    |
| 2SC5262   | SMQ           | 7                    | 0.015              | For RF | —    |

\*: Collector - base voltage (V<sub>CB0</sub>)

| Part No.  | Package Type      | V <sub>CEO</sub><br>(V) | I <sub>C</sub><br>(A) | Remark | Page |
|-----------|-------------------|-------------------------|-----------------------|--------|------|
| 2SC5266A  | TPL               | 400                     | 5                     |        | 28   |
| 2SC5279   | TPL               | 400                     | 2                     |        | 28   |
| 2SC5280   | TO-3P(H)IS        | 1500*                   | 8                     |        | —    |
| 2SC5307   | PW-MINI(SC-62)    | 400                     | 0.05                  |        | —    |
| 2SC5317   | SSM               | 5                       | 0.02                  | For RF | —    |
| 2SC5317FT | TESM              | 5                       | 0.02                  | For RF | —    |
| 2SC5319   | USQ               | 5                       | 0.02                  | For RF | —    |
| 2SC5322   | SSM               | 5                       | 0.01                  | For RF | —    |
| 2SC5322FT | TESM              | 5                       | 0.01                  | For RF | —    |
| 2SC5339   | TO-3P(H)(IS)      | 1500*                   | 7                     |        | —    |
| 2SC5351   | TPS               | 450                     | 2                     |        | 28   |
| 2SC5352   | TO-3P(N)          | 400                     | 10                    |        | 26   |
| 2SC5353   | TO-220(N)IS       | 800                     | 3                     |        | 25   |
| 2SC5354   | TO-3P(N)          | 800                     | 5                     |        | 26   |
| 2SC5355   | DP(SC-63/64)      | 400                     | 5                     |        | 31   |
| 2SC5356   | DP(SC-63/64)      | 800                     | 3                     |        | 31   |
| 2SC5358   | TO-3P(N)          | 230                     | 15                    |        | 26   |
| 2SC5359   | TO-3P(L)          | 230                     | 15                    |        | 27   |
| 2SC5360   | TO-220(N)IS       | 300                     | 0.15                  |        | 24   |
| 2SC5361   | TO-220FL/SM       | 800                     | 3                     |        | 25   |
| 2SC5368   | TO-126(IS)        | 450                     | 2                     |        | 23   |
| 2SC5376   | ESM               | 12                      | 0.4                   |        | —    |
| 2SC5386   | TO-3P(H)IS        | 1500*                   | 8                     |        | —    |
| 2SC5387   | TO-3P(H)IS        | 1500*                   | 10                    |        | —    |
| 2SC5404   | TO-3P(H)IS        | 1500*                   | 9                     |        | —    |
| 2SC5411   | TO-3P(H)IS        | 1500*                   | 14                    |        | —    |
| 2SC5421   | TO-3P(LH)         | 1500*                   | 15                    |        | —    |
| 2SC5422   | TO-3P(LH)         | 1700*                   | 15                    |        | —    |
| 2SC5439   | TO-220(N)IS       | 450                     | 8                     |        | 25   |
| 2SC5445   | TO-3P(LH)         | 1500*                   | 20                    |        | —    |
| 2SC5446   | TO-3P(LH)         | 1700*                   | 18                    |        | —    |
| 2SC5458   | PW-MOLD(SC-63/64) | 400                     | 0.8                   |        | 30   |
| 2SC5459   | TO-220(N)IS       | 400                     | 3                     |        | 25   |
| 2SC5460   | TO-126(IS)        | 800                     | 0.05                  |        | 23   |
| 2SC5463   | USM(SC-70)        | 12                      | 0.06                  | For RF | —    |
| 2SC5464   | SSM               | 12                      | 0.06                  | For RF | —    |
| 2SC5464FT | TESM              | 12                      | 0.06                  | For RF | —    |
| 2SC5465   | PW-MOLD(SC-63/64) | 800                     | 0.8                   |        | 30   |
| 2SC5466   | TO-220(N)IS       | 800                     | 0.05                  |        | 24   |
| 2SC5497   | USQ               | 4.5                     | 0.015                 | For RF | —    |
| 2SC5548   | PW-MOLD(SC-63/64) | 370                     | 2                     |        | 30   |
| 2SC5548A  | PW-MOLD(SC-63/64) | 400                     | 2                     |        | 30   |
| 2SC5549   | TO-92MOD          | 400                     | 1                     |        | 21   |
| 2SC5550   | TO-126(IS)        | 400                     | 1                     |        | 23   |
| 2SC5562   | TPS               | 800                     | 0.8                   |        | 28   |
| 2SC5563   | TO-220(N)IS       | 1500                    | 0.02                  |        | 24   |
| 2SC5570   | TO-3P(LH)         | 1700*                   | 28                    |        | —    |
| 2SC5587   | TO-3P(H)IS        | 1500*                   | 17                    |        | —    |

| Part No. | Package Type      | V <sub>CEO</sub><br>(V) | I <sub>C</sub><br>(A) | Remark                 | Page |
|----------|-------------------|-------------------------|-----------------------|------------------------|------|
| 2SC5588  | TO-3P(H)IS        | 1700*                   | 15                    |                        | —    |
| 2SC5589  | TO-3P(LH)         | 1500*                   | 18                    |                        | —    |
| 2SC5590  | TO-3P(LH)         | 1700*                   | 16                    |                        | —    |
| 2SC5612  | TO-3P(LH)         | 2000*                   | 22                    |                        | —    |
| 2SC5692  | TSM               | 50                      | 2.5                   | Low-saturation voltage | 31   |
| 2SC5695  | TO-3P(LH)         | 1500*                   | 22                    |                        | —    |
| 2SC5703  | TSM               | 50                      | 4                     | Low-saturation voltage | 31   |
| 2SC5712  | PW-MINI           | 50                      | 3                     | Low-saturation voltage | 29   |
| 2SC5713  | PW-MINI           | 10                      | 4                     | Low-saturation voltage | 29   |
| 2SC5714  | PW-MINI           | 20                      | 4                     | Low-saturation voltage | 29   |
| 2SC5716  | TO-3P(H)IS        | 1700*                   | 8                     |                        | —    |
| 2SC5717  | TO-3P(H)IS        | 1500*                   | 21                    |                        | —    |
| 2SC5738  | TSM               | 20                      | 3.5                   | Low-saturation voltage | 31   |
| 2SC5748  | TO-3P(LH)         | 2000*                   | 16                    |                        | —    |
| 2SC5749  | TO-3P(LH)         | 2000*                   | 16                    |                        | —    |
| 2SC5755  | TSM               | 10                      | 2                     | Low-saturation voltage | 31   |
| 2SC5784  | TSM               | 20                      | 1.5                   | Low-saturation voltage | 31   |
| 2SC5785  | PW-MINI           | 10                      | 2                     | Low-saturation voltage | 29   |
| 2SC5810  | PW-MINI           | 50                      | 1                     | Low-saturation voltage | 29   |
| 2SC5819  | PW-MINI           | 20                      | 1.5                   | Low-saturation voltage | 29   |
| 2SC5855  | TO-3P(H)IS        | 1500*                   | 12                    |                        | —    |
| 2SC5856  | TO-3P(H)IS        | 1500*                   | 14                    |                        | —    |
| 2SC5857  | TO-3P(H)IS        | 1700*                   | 21                    |                        | —    |
| 2SC5858  | TO-3P(LH)         | 1700*                   | 22                    |                        | —    |
| 2SC5859  | TO-3P(LH)         | 1700*                   | 23                    |                        | —    |
| 2SC5861  | TO-3P(LH)         | 1700*                   | 28                    |                        | —    |
| 2SC5886  | PW-MOLD(SC-63)    | 50                      | 5                     | Low-saturation voltage | 30   |
| 2SC5906  | TSM               | 30                      | 4                     | Ultra high speed       | 31   |
| 2SC5930  | MSTM              | 285                     | 1                     |                        | 22   |
| 2SC5948  | TO-3P(N)          | 200                     | 12                    |                        | 26   |
| 2SC5949  | TO-3P(L)          | 200                     | 15                    |                        | 27   |
| 2SD1140  | TO-92MOD          | 30                      | 1.5                   | Darlington             | 21   |
| 2SD1160  | PW-MOLD(SC-63/64) | 20                      | 2                     |                        | 30   |
| 2SD1220  | PW-MOLD(SC-63/64) | 150                     | 1.5                   |                        | 30   |
| 2SD1221  | PW-MOLD(SC-63/64) | 60                      | 3                     |                        | 30   |
| 2SD1222  | PW-MOLD(SC-63/64) | 40                      | 3                     |                        | 30   |
| 2SD1223  | PW-MOLD(SC-63/64) | 80                      | 4                     | Darlington             | 30   |
| 2SD1224  | PW-MOLD(SC-63/64) | 30                      | 1.5                   | Darlington             | 30   |
| 2SD1313  | TO-3P(L)          | 350                     | 25                    |                        | 27   |
| 2SD1314  | TO-3P(L)          | 450                     | 15                    | Darlington             | 27   |
| 2SD1407A | TO-220(N)IS       | 100                     | 5                     |                        | 24   |
| 2SD1411A | TO-220(N)IS       | 80                      | 7                     |                        | 25   |
| 2SD1412A | TO-220(N)IS       | 50                      | 7                     |                        | 25   |
| 2SD1415A | TO-220(N)IS       | 100                     | 7                     | Darlington             | 25   |
| 2SD1508  | TO-126(IS)        | 30                      | 1.5                   | Darlington             | 23   |
| 2SD1509  | TO-126(IS)        | 80                      | 2                     | Darlington             | 23   |
| 2SD1525  | TO-3P(L)          | 100                     | 30                    | Darlington             | 27   |
| 2SD1631  | MSTM              | 30                      | 1.5                   | Darlington             | 22   |

\*: Collector - base voltage (V<sub>CB0</sub>)

| Part No. | Package Type   | V <sub>CEO</sub><br>(V) | I <sub>C</sub><br>(A) | Remark     | Page |
|----------|----------------|-------------------------|-----------------------|------------|------|
| 2SD1658  | TO-126(IS)     | 60                      | 2                     | Darlington | 23   |
| 2SD1662  | TO-3P(N)       | 100                     | 15                    | Darlington | 26   |
| 2SD1784  | PW-MINI(SC-62) | 30                      | 1.5                   | Darlington | 29   |
| 2SD1947A | TO-220(N)IS    | 100                     | 10                    |            | 25   |
| 2SD2012  | TO-220(N)IS    | 60                      | 3                     |            | 24   |
| 2SD2079  | TO-220(N)IS    | 100                     | 5                     | Darlington | 25   |
| 2SD2088  | TO-92MOD       | 60                      | 2                     | Darlington | 21   |
| 2SD2092  | TO-220(N)IS    | 100                     | 3                     |            | 25   |
| 2SD2127  | TO-220(N)IS    | 60                      | 3                     |            | 25   |
| 2SD2129  | TO-220(N)IS    | 100                     | 3                     | Darlington | 25   |
| 2SD2130  | TO-126(IS)     | 60                      | 4                     | Darlington | 23   |
| 2SD2131  | TO-220(N)IS    | 60                      | 5                     | Darlington | 25   |
| 2SD2204  | TO-220(N)IS    | 65                      | 4                     | Darlington | 25   |
| 2SD2206  | TO-92MOD       | 100                     | 2                     | Darlington | 21   |
| 2SD2206A | TO-92MOD       | 120                     | 2                     | Darlington | 21   |
| 2SD2241  | TO-220(N)IS    | 100                     | 4                     | Darlington | 25   |
| 2SD2248  | TO-92MOD       | 80                      | 2                     | Darlington | 21   |
| 2SD2257  | TO-220(N)IS    | 100                     | 3                     | Darlington | 25   |
| 2SD2271  | TO-220(N)IS    | 200                     | 12                    | Darlington | 25   |
| 2SD2352  | TO-220(N)IS    | 60                      | 2                     |            | 24   |
| 2SD2353  | TO-220(N)IS    | 60                      | 3                     |            | 24   |
| 2SD2384  | TO-3P(L)       | 140                     | 7                     | Darlington | 27   |
| 2SD2385  | TO-3P(L)       | 140                     | 8                     | Darlington | 27   |
| 2SD2386  | TO-3P(N)       | 140                     | 7                     | Darlington | 26   |
| 2SD2387  | TO-3P(N)       | 140                     | 8                     | Darlington | 26   |
| 2SD2406  | TO-220(N)IS    | 80                      | 4                     |            | 24   |
| 2SD2414  | TO-220FL/SM    | 80                      | 7                     |            | 25   |
| 2SD2440  | TO-3P(N)IS     | 60                      | 6                     |            | 26   |
| 2SD2449  | TO-3P(L)       | 160                     | 10                    |            | 27   |
| 2SD2461  | TPS            | 60                      | 2                     |            | 28   |
| 2SD2462  | TPS            | 60                      | 3                     |            | 28   |
| 2SD2480  | TPS            | 100                     | 2                     | Darlington | 28   |
| 2SD2481  | TPS            | 30                      | 1.5                   | Darlington | 28   |
| 2SD2498  | TO-3P(H)IS     | 1500*                   | 6                     |            | —    |
| 2SD2499  | TO-3P(H)IS     | 1500*                   | 6                     |            | —    |
| 2SD2500  | TO-3P(H)IS     | 1500*                   | 10                    |            | —    |
| 2SD2525  | TPL            | 60                      | 3                     |            | 28   |
| 2SD2526  | TPL            | 100                     | 5                     | Darlington | 28   |
| 2SD2531  | TO-220(N)IS    | 60                      | 4                     |            | 24   |
| 2SD2536  | TO-92MOD       | 100                     | 2                     | Darlington | 21   |
| 2SD2539  | TO-3P(H)IS     | 1500*                   | 7                     |            | —    |
| 2SD2551  | TO-3P(H)IS     | 1700*                   | 5                     |            | —    |
| 2SD2553  | TO-3P(H)IS     | 1700*                   | 8                     |            | —    |
| 2SD2559  | TO-3P(H)IS     | 1500*                   | 8                     |            | —    |
| 2SD2584  | DP(SC-63/64)   | 100                     | 7                     | Darlington | 31   |
| 2SD2586  | TO-3P(H)IS     | 1500*                   | 5                     |            | —    |
| 2SD2599  | TO-3P(H)IS     | 1500*                   | 3.5                   |            | —    |
| 2SD2604  | TO-220(N)IS    | 110                     | 5                     | Darlington | 25   |

| Part No. | Package Type | V <sub>CEO</sub><br>(V) | I <sub>C</sub><br>(A) | Remark             | Page |
|----------|--------------|-------------------------|-----------------------|--------------------|------|
| 2SD2636  | TO-3P(N)     | 150                     | 8                     |                    | 26   |
| 2SD2638  | TO-3P(H)IS   | 1700*                   | 7                     |                    | —    |
| 2SD2686  | PW-MINI      | 60                      | 1                     | Darlington         | 29   |
| S2000N   | TO-3P(H)IS   | 1500*                   | 8                     |                    | —    |
| S2055N   | TO-3P(H)IS   | 1500*                   | 8                     |                    | —    |
| TPC6501  | VS-6(1in1)   | 10                      | 2                     | 1-in-1 transistor  | 32   |
| TPC6502  | VS-6(1in1)   | 50                      | 3                     | 1-in-1 transistor  | 32   |
| TPC6601  | VS-6(1in1)   | -50                     | -2                    | 1-in-1 transistor  | 32   |
| TPC6602  | VS-6(1in1)   | -10                     | -2                    | 1-in-1 transistor  | 32   |
| TPC6701  | VS-6(2in1)   | 50                      | 1                     | 2-in-1 transistor  | 32   |
| TPC6D03  | VS-6(2in1)   | -20                     | -1.2                  | transistor + diode | 32   |
| TPCP8501 | PS-8(1in1)   | 100                     | 2                     | 1-in-1 transistor  | 32   |
| TPCP8F01 | PS-8(2in1)   | -20                     | -3                    | transistor + S-MOS | 32   |

\*: Collector - base voltage (V<sub>CB0</sub>)

# Package Line-up

## TO-92MOD(L-STM)

(Weight: 0.36g typ.)

TO-92 MOD.



| Part No. |         | Ic<br>(A) | VCE0<br>(V) | Pc<br>Tc = 25°C<br>(W) | hFE         |            | VCE(sat) Max |            |            | fr Typ.(min) |            |            | Cob Max (typ.) |             |            | Note |                           |
|----------|---------|-----------|-------------|------------------------|-------------|------------|--------------|------------|------------|--------------|------------|------------|----------------|-------------|------------|------|---------------------------|
| NPN      | PNP     |           |             |                        | VCE<br>(V)  | Ic<br>(mA) | VCE<br>(V)   | Ic<br>(mA) | Ib<br>(mA) | (MHz)        | VCE<br>(V) | Ie<br>(mA) | (pF)           | VCB<br>(V)  | f<br>(MHz) |      |                           |
| 2SC4707  | 2SA1811 | 0.5       | 30          | 0.8                    | 100 to 300  | 2          | 100          | 0.5        | 300        | 30           | 200        | 6          | 20             | (9)         | 10         | 1    | For audio                 |
| 2SC2703  | —       | 1         | 30          | 0.9                    | 100 to 320  | 2          | 100          | 0.5        | 800        | 80           | 150        | 2          | 100            | (13)        | 10         | 1    |                           |
| 2SC2383  | 2SA1013 |           | 160         | 0.9                    | 60 to 320   | 5          | 200          | 1.5        | 500        | 50           | (15)       | 5          | 200            | 20 / 35     | 10         | 1    |                           |
| 2SC2236  | 2SA966  | 1.5       | 30          | 0.9                    | 100 to 320  | 2          | 500          | 2.0        | 1500       | 30           | 120        | 2          | 500            | 30          | 10         | 1    | For audio                 |
| 2SC2500  | 2SA1160 | 2         | 10          | 0.9                    | 140 to 600  | 1          | 500          | 0.5        | 2000       | 50           | 150        | 1          | 500            | (27)        | 10         | 1    | Low-saturation voltage    |
| 2SC3225  | —       |           | 40          | 0.9                    | 500 min     | 1          | 400          | 0.5        | 300        | 1            | 220        | 2          | 100            | (20)        | 10         | 1    |                           |
| 2SC2655  | 2SA1020 |           | 50          | 0.9                    | 70 to 240   | 2          | 500          | 0.5        | 1000       | 50           | 100        | 2          | 500            | (30) / (40) | 10         | 1    |                           |
| 2SC4408  | 2SA1680 |           | 50          | 0.9                    | 120 to 400  | 2          | 100          | 0.5        | 1000       | 50           | 100        | 2          | 100            | (15) / (23) | 10         | 1    |                           |
| —        | 2SA1382 |           | 50          | 0.9                    | 150 to 400  | 2          | 500          | 0.5        | 1000       | 33           | 110        | 2          | 500            | (50)        | 10         | 1    |                           |
| 2SC3328  | 2SA1315 | 3         | 80          | 0.9                    | 70 to 240   | 2          | 500          | 0.5        | 1000       | 50           | 80 / 100   | 2          | 500            | 30 / 45     | 10         | 1    | High-withstanding voltage |
| 2SC4682  | —       |           | 15          | 0.9                    | 800 to 3200 | 1          | 500          | 0.5        | 3000       | 30           | 150        | 1          | 500            | (30)        | 10         | 1    | For strobe flash          |
| 2SC4604  | 2SA1761 |           | 50          | 0.9                    | 120 to 400  | 2          | 100          | 0.5        | 1500       | 75           | 100        | 2          | 100            | (20) / (32) | 10         | 1    | Low-saturation voltage    |
| 2SC4781  | —       | 4         | 10          | 0.9                    | 200 to 600  | 2          | 100          | 0.5        | 4000       | 80           | 170        | 2          | 500            | (50)        | 10         | 1    | For strobe flash          |

|          |         |      |     |     |            |    |     |           |     |     |          |    |    |               |    |   |                           |
|----------|---------|------|-----|-----|------------|----|-----|-----------|-----|-----|----------|----|----|---------------|----|---|---------------------------|
| 2SC2229  | 2SA949  | 0.05 | 150 | 0.8 | 70 to 240  | 5  | 10  | 0.5 / 0.8 | 10  | 1   | 120      | 30 | 10 | 3.5 / (4)     | 10 | 1 | High-withstanding voltage |
| 2SC2705  | 2SA1145 |      | 150 | 0.8 | 80 to 240  | 5  | 10  | 1.0       | 10  | 1   | 200      | 5  | 10 | (1.8) / (2.5) | 10 | 1 |                           |
| 2SC3334  | 2SA1321 |      | 250 | 0.9 | 50 min     | 20 | 25  | 1.5       | 10  | 1   | 100 / 80 | 10 | 10 | 1.8           | 30 | 1 |                           |
| 2SC5122  | —       |      | 400 | 0.9 | 100 to 300 | 5  | 20  | 1.0       | 20  | 0.5 | —        | —  | —  | (4)           | 10 | 1 |                           |
| 2SC5201  | —       |      | 600 | 0.9 | 100 to 300 | 5  | 20  | 1.0       | 20  | 0.5 | —        | —  | —  | —             | —  | — |                           |
| 2SC2230  | —       | 0.1  | 160 | 0.8 | 120 to 400 | 10 | 10  | 0.5       | 50  | 5   | (50)     | 10 | 10 | 7             | 10 | 1 |                           |
| 2SC2230A | —       |      | 180 | 0.8 | 120 to 400 | 10 | 10  | 0.5       | 50  | 5   | (50)     | 10 | 10 | 7             | 10 | 1 |                           |
| 2SC2482  | —       |      | 300 | 0.9 | 30 to 150  | 10 | 20  | 1.0       | 10  | 1   | (50)     | 10 | 20 | (3)           | 10 | 1 |                           |
| —        | 2SA1972 | 0.5  | 400 | 0.9 | 140 to 400 | 5  | 100 | 1.0       | 100 | 10  | —        | —  | —  | —             | —  | — |                           |
| 2SC5549  | —       | 1    | 400 | 0.9 | 20 to 65   | 5  | 40  | 1.0       | 200 | 25  | —        | —  | —  | —             | —  | — |                           |

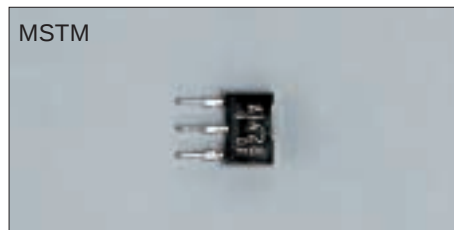
|          |         |     |     |     |           |   |     |     |     |    |     |    |     |             |    |   |           |
|----------|---------|-----|-----|-----|-----------|---|-----|-----|-----|----|-----|----|-----|-------------|----|---|-----------|
| 2SC1627A | 2SA817A | 0.4 | 80  | 0.8 | 70 to 240 | 2 | 50  | 0.4 | 200 | 20 | 100 | 10 | 10  | (10) / (14) | 10 | 1 | For audio |
| 2SC2235  | 2SA965  | 0.8 | 120 | 0.9 | 80 to 240 | 5 | 100 | 1.0 | 500 | 50 | 120 | 5  | 100 | 30 / 40     | 10 | 1 |           |

| Part No. |         | Ic  | V <sub>CEO</sub> | P <sub>C</sub><br>T <sub>C</sub> = 25°C | h <sub>FE</sub> |     |      | V <sub>CE(sat)</sub> Max |                        |     | SW Time(typ.)          |                        |                         | Note       |
|----------|---------|-----|------------------|-----------------------------------------|-----------------|-----|------|--------------------------|------------------------|-----|------------------------|------------------------|-------------------------|------------|
| NPN      | PNP     |     |                  |                                         | (A)             | (V) | (W)  | V <sub>CE</sub><br>(V)   | I <sub>C</sub><br>(mA) | (V) | I <sub>C</sub><br>(mA) | I <sub>B</sub><br>(mA) | t <sub>on</sub><br>(μs) |            |
| 2SD1140  | —       | 1.5 | 30               | 0.9                                     | 4000 min        | 2   | 150  | 1.5                      | 1000                   | 1   | 0.2                    | 0.6                    | 0.3                     | Darlington |
| 2SD2088  | —       | 2.0 | 60 ± 10          | 0.9                                     | 2000 min        | 2   | 1000 | 1.5                      | 1000                   | 1   | 0.4                    | 4.0                    | 0.6                     |            |
| 2SD2248  | —       | 2.0 | 80 ± 10          | 0.9                                     | 2000 min        | 2   | 1000 | 1.5                      | 1000                   | 1   | 0.4                    | 4.0                    | 0.6                     |            |
| 2SD2206  | 2SB1457 | 2.0 | 100              | 0.9                                     | 2000 min        | 2   | 1000 | 1.5                      | 1000                   | 1   | 0.4                    | 4.0 / 2.0              | 0.6 / 0.4               |            |
| 2SD2536  | —       | 2.0 | 100 ± 15         | 0.9                                     | 2000 min        | 2   | 1000 | 1.5                      | 1000                   | —   | —                      | —                      | —                       |            |
| 2SD2206A | —       | 2.0 | 120              | 0.9                                     | 2000 min        | 2   | 1000 | 1.5                      | 1000                   | 1   | 1.1                    | 2.0                    | 0.6                     |            |

## MSTM

(Weight: 0.2g typ.)

MSTM



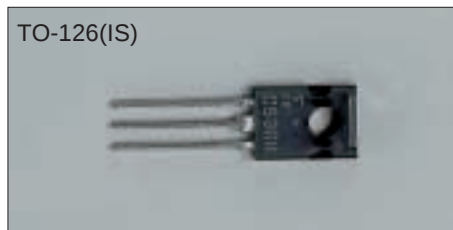
| Part No. |         | Ic<br>(A) | VCE0<br>(V) | Pc<br>(W) | hFE         |            |     | VCE(sat) Max |            |            | fT Typ. |            |            | Cob Max(Typ.) |            |            | Note                                    |
|----------|---------|-----------|-------------|-----------|-------------|------------|-----|--------------|------------|------------|---------|------------|------------|---------------|------------|------------|-----------------------------------------|
| NPN      | PNP     |           |             |           | VCE<br>(V)  | Ic<br>(mA) |     | VCE<br>(V)   | Ic<br>(mA) | IB<br>(mA) | (MHz)   | VCE<br>(V) | Ic<br>(mA) | (pF)          | VCB<br>(V) | f<br>(MHz) |                                         |
| 2SC3672  | 2SA1432 | 0.1       | 300         | 1.0       | 30 to 150   | 10         | 20  | 0.5          | 20         | 2          | 80/60   | 10         | 20         | 4/8           | 10         | 1          | High-withstanding voltage               |
| 2SC3665  | 2SA1425 | 0.8       | 120         | 1.0       | 80 to 240   | 5          | 100 | 1.0          | 500        | 50         | 120     | 5          | 100        | 30/40         | 10         | 1          | For audio                               |
| 2SC3666  | 2SA1426 | 1.0       | 30          | 1.0       | 100 to 320  | 2/1        | 100 | 0.5/0.7      | 800        | 80         | 150/120 | 2          | 100        | (13)/(19)     | 10         | 1          | Low-saturation voltage                  |
| 2SC5930  | —       | 1.0       | 285         | 1.0       | 40 to 100   | 5          | 200 | 1.0          | 400        | 50         | —       | —          | —          | —             | —          | —          | For High-withstanding voltage switching |
| 2SD1631  | —       | 1.5       | 30          | 1.0       | 4000 min    | 2          | 150 | 1.5          | 1000       | 1          | —       | —          | —          | —             | —          | —          | Darlington                              |
| 2SC3670  | 2SA1430 | 2.0       | 10          | 1.0       | 140 to 600  | 1          | 500 | 0.5          | 2000       | 50         | 150/140 | 1          | 500        | (27)/(50)     | 10         | 1          | Low-saturation voltage                  |
| 2SC3673  | —       | 2.0       | 40          | 1.0       | 500 min     | 1          | 400 | 0.5          | 300        | 1          | 220     | 2          | 100        | (20)          | 10         | 1          | High hFE                                |
| 2SC3668  | 2SA1428 | 2.0       | 50          | 1.0       | 70 to 240   | 2          | 500 | 0.5          | 1000       | 50         | 100     | 2          | 500        | (30)/(40)     | 10         | 1          | Low-saturation voltage                  |
| 2SC3669  | 2SA1429 | 2.0       | 80          | 1.0       | 70 to 240   | 2          | 500 | 0.5          | 1000       | 50         | 100/80  | 2          | 500        | (30)/(45)     | 10         | 1          |                                         |
| 2SC4683  | —       | 3.0       | 15          | 1.0       | 800 to 3200 | 1          | 500 | 0.5          | 3000       | 30         | 150     | 1          | 500        | (30)          | 10         | 1          |                                         |
| —        | 2SA1926 | 3.0       | 80          | 1.0       | 100 to 300  | 2          | 500 | 0.17         | 1000       | 50         | —       | —          | —          | 45            | 10         | 1          |                                         |
| 2SC3671  | 2SA1431 | 5.0       | 20          | 1.0       | 100 to 320  | 2          | 500 | 1.0          | 4000       | 100        | 100/170 | 2          | 500        | (40)/(62)     | 10         | 1          |                                         |

 : New product

## TO-126(IS)

(Weight: 0.82g typ.)

TO-126(IS)

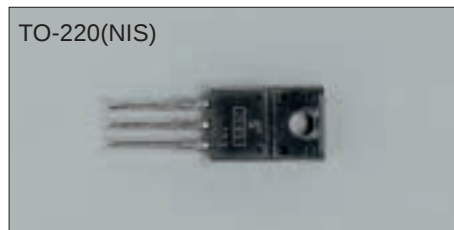


| Part No. |         | I <sub>C</sub><br>(A) | V <sub>CEO</sub><br>(V) | P <sub>C</sub><br><small>T<sub>C</sub> = 25°C<br/>*T<sub>a</sub> = 25°C</small><br>(W) | h <sub>FE</sub>        |                       |      | V <sub>CE(sat)</sub> Max |                       |                        | f <sub>T</sub> Typ. |                        |                       | Note                      |
|----------|---------|-----------------------|-------------------------|----------------------------------------------------------------------------------------|------------------------|-----------------------|------|--------------------------|-----------------------|------------------------|---------------------|------------------------|-----------------------|---------------------------|
| NPN      | PNP     |                       |                         |                                                                                        | V <sub>CE</sub><br>(V) | I <sub>C</sub><br>(A) |      | V <sub>CE</sub><br>(V)   | I <sub>C</sub><br>(A) | I <sub>B</sub><br>(mA) | (MHz)               | V <sub>CE</sub><br>(V) | I <sub>C</sub><br>(A) |                           |
| 2SC3423  | 2SA1360 |                       | 150                     | 5                                                                                      | 80 to 240              | 10                    | 10 m | 1                        | 10 m                  | 1                      | 200                 | 10                     | 10 m                  | For audio                 |
| 2SC3424  | 2SA1361 |                       | 250                     | 5                                                                                      | 50 to 200              | 20                    | 25 m | 1.5                      | 10 m                  | 1                      | 80                  | 10                     | 10 m                  | Chroma output             |
| 2SC3619  | —       |                       | 300                     | 5                                                                                      | 30 to 150              | 10                    | 20 m | 1                        | 0.01                  | 1                      | 80                  | 10                     | 20 m                  |                           |
| 2SC5460  | —       |                       | 800                     | 10                                                                                     | 15 min                 | 50                    | 7 m  | 1.0                      | 20 m                  | 4                      | —                   | —                      | —                     | Dynamic focus             |
| 2SC3620  | —       | 0.1                   | 300                     | 10                                                                                     | 40 to 170              | 10                    | 50 m | 1                        | 0.1                   | 20                     | 50 min              | 10                     | 30 m                  | Chroma output             |
| 2SC3963  | —       | 0.2                   | 160                     | *1.5                                                                                   | 100 to 320             | 10                    | 50 m | 1                        | 0.2                   | 20                     | 50 min              | 10                     | 50 m                  | For audio                 |
| 2SC4439  | —       | 0.3                   | 150                     | 10                                                                                     | 40 to 240              | 10                    | 50 m | 1                        | 0.2                   | 20                     | 400                 | 10                     | 70 m                  | Video output              |
| 2SC3613  | —       | 0.5                   | 18                      | 5                                                                                      | 25 min                 | 10                    | 20 m | 1.5                      | 0.05                  | 5                      | 3500                | 10                     | 20 m                  |                           |
| 2SC4479  | —       |                       | 100                     | 10                                                                                     | 30 to 240              | 10                    | 0.1  | 3                        | 0.3                   | 30                     | 1100                | 10                     | 100 m                 |                           |
| —        | 2SA1924 | 0.6                   | 400                     | 10                                                                                     | 100 to 320             | 5                     | 0.1  | 1                        | 0.1                   | 10                     | 35                  | 5                      | 50 m                  | High-withstanding voltage |
| 2SC4200  | —       |                       | 18                      | 5                                                                                      | 25 min                 | 10                    | 50 m | 1                        | 0.1                   | 10                     | 2500                | 10                     | 0.2                   | Video output              |
| 2SC3419  | 2SA1356 | 0.8                   | 40                      | 5                                                                                      | 70 to 240              | 2                     | 50 m | 0.8                      | 0.5                   | 50                     | 100                 | 2                      | 0.5                   | General-purpose           |
| 2SC3425  | —       |                       | 400                     | 10                                                                                     | 20 to 100              | 5                     | 0.1  | 0.5                      | 0.1                   | 10                     | —                   | —                      | —                     | High-withstanding voltage |
| 2SC3421  | 2SA1358 | 1                     | 120                     | 10                                                                                     | 80 to 240              | 5                     | 0.1  | 1                        | 0.5                   | 50                     | 120                 | 5                      | 0.1                   | For audio                 |
| 2SC5550  | —       | 1                     | 400                     | 10                                                                                     | 20 to 65               | 5                     | 40 m | 1                        | 0.2                   | 25                     | —                   | —                      | —                     | For ballast               |
| 2SC3621  | 2SA1408 | 1.5                   | 150                     | 10                                                                                     | 60 to 320              | 5                     | 0.2  | 1                        | 0.5                   | 50                     | 20 min              | 5                      | 0.2                   | Vertical-deflectin output |
| 2SC3964  | —       | 2                     | 40                      | *1.5                                                                                   | 500 min                | 1                     | 0.4  | 0.5                      | 0.3                   | 1.0                    | 220                 | 2                      | 0.1                   | General-purpose           |
| 2SC5368  | —       |                       | 450                     | 10                                                                                     | 20 to 65               | 5                     | 0.2  | 1                        | 0.8                   | 0.1                    | —                   | —                      | —                     | High-withstanding voltage |
| 2SC3422  | 2SA1359 | 3                     | 40                      | 10                                                                                     | 80 to 240              | 2                     | 0.5  | 0.8                      | 2                     | 200                    | 100                 | 2                      | 0.5                   | General-purpose           |
| 2SC3420  | —       | 5                     | 20                      | 10                                                                                     | 140 to 450             | 2                     | 0.5  | 1                        | 4                     | 100                    | 100                 | 2                      | 0.5                   | For strobe flash          |
| 2SC4685  | —       |                       |                         |                                                                                        | 800 to 3200            | 2                     | 0.5  | 0.5                      | 4                     | 40                     | 150                 | 2                      | 0.5                   |                           |
| —        | 2SA1357 |                       |                         |                                                                                        | 100 to 320             | 2                     | 0.5  | 1                        | 4                     | 100                    | 170                 | 2                      | 0.5                   |                           |
| 2SD1508  | —       | 1.5                   | 30                      | 10                                                                                     | 4000 min               | 2                     | 0.15 | 1.5                      | 1                     | 1                      | —                   | —                      | —                     | Darlington                |
| 2SD1509  | 2SB1067 | 2                     | 80                      | 10                                                                                     | 2000 min               | 2                     | 1    | 1.5                      | 1                     | 1                      | 100/50              | 2                      | 0.5                   |                           |
| 2SD1658  | —       |                       | 60 ± 10                 | 10                                                                                     | 2000 min               | 2                     | 1    | 1.5                      | 1                     | 1                      | 100                 | 2                      | 0.5                   |                           |
| 2SD2130  | —       | 4                     | 60 ± 10                 | 10                                                                                     | 2000 min               | 2                     | 1    | 1.5                      | 3                     | 10                     | 60                  | 2                      | 0.5                   |                           |

## TO-220 Series

**TO-220(NIS)** [isolated type]  
(Weight: 1.7g typ.)

TO-220(NIS)



| Part No. |          | Ic<br>(A) | V <sub>CEO</sub><br>(V) | P <sub>C</sub><br>T <sub>C</sub> = 25°C<br>(W) | h <sub>FE</sub>        |                       |                        | V <sub>CE(sat)</sub> Max |                       |       | f <sub>T</sub> Typ.    |                       |                         | SW Time Typ.             |                        |      | Note                      |
|----------|----------|-----------|-------------------------|------------------------------------------------|------------------------|-----------------------|------------------------|--------------------------|-----------------------|-------|------------------------|-----------------------|-------------------------|--------------------------|------------------------|------|---------------------------|
| NPN      | PNP      |           |                         |                                                | V <sub>CE</sub><br>(V) | I <sub>C</sub><br>(A) | V <sub>CE</sub><br>(V) | I <sub>C</sub><br>(A)    | I <sub>B</sub><br>(A) | (MHz) | V <sub>CE</sub><br>(V) | I <sub>C</sub><br>(A) | t <sub>on</sub><br>(μs) | t <sub>stg</sub><br>(μs) | t <sub>r</sub><br>(μs) |      |                           |
| 2SC5563  | —        | 0.02      | 1500                    | 10                                             | 10 to 60               | 5                     | 1 m                    | 5.0                      | 10 m                  | 2 m   | —                      | —                     | —                       | —                        | —                      | —    | Dynamic focus             |
| 2SC5466  | —        | 0.05      | 800                     | 10                                             | 15 min                 | 5                     | 7 m                    | 1.0                      | 20 m                  | 4 m   | 5.5                    | 10                    | 3 m                     | —                        | —                      | —    | Dynamic focus             |
| 2SC4686  | —        |           | 1000                    | 10                                             | 15 to 60               | 5                     | 3 m                    | 1.5                      | 0.01                  | 2 m   | 5.5                    | 10                    | 3 m                     | —                        | —                      | —    |                           |
| 2SC4686A | —        |           | 1200                    | 10                                             | 15 to 60               | 5                     | 3 m                    | 1.5                      | 0.01                  | 2 m   | 5.5                    | 10                    | 3 m                     | —                        | —                      | —    |                           |
| 2SC4544  | —        | 0.1       | 300                     | 8                                              | 30 to 200              | 10                    | 0.02                   | 1.0                      | 0.01                  | 1 m   | 70                     | 20                    | 20 m                    | —                        | —                      | —    | Chroma output             |
| 2SC4448  | —        | 0.15      | 250                     | 10                                             | 40 to 200              | 10                    | 0.01                   | 1.0                      | 0.05                  | 5 m   | 240                    | 10                    | 40 m                    | —                        | —                      | —    |                           |
| 2SC5360  | —        |           | 300                     | 12.5                                           | 40 to 170              | 10                    | 50 m                   | 1.2                      | 0.1                   | 20 m  | 100                    | 10                    | 30 m                    | —                        | —                      | —    |                           |
| 2SC4605  | —        | 0.5       | 100                     | 10                                             | 30 to 150              | 10                    | 0.1                    | 3.0                      | 0.3                   | 30 m  | 1100                   | 10                    | 0.1                     | —                        | —                      | —    | Video output              |
| 2SC4793  | 2SA1837  | 1         | 230                     | 20                                             | 100 to 320             | 5                     | 0.1                    | 1.5                      | 0.5                   | 50 m  | 100                    | 10                    | 0.1                     | —                        | —                      | —    | For audio                 |
| —        | 2SA1822  |           | 400                     | 25                                             | 30 to 100              | 5                     | 0.3                    | 1.0                      | 0.3                   | 30 m  | —                      | —                     | —                       | *1.0                     | *5.0                   | *1.0 | General-purpose           |
| 2SC2073A | 2SA940A  | 1.5       | 150                     | 20                                             | 40 to 140              | 10                    | 0.5                    | 1.5                      | 0.5                   | 50 m  | 4/6                    | 10                    | 0.5                     | —                        | —                      | —    | Vertical-deflectin output |
| 2SD2352  | —        | 2         | 60                      | 25                                             | 800 to 3200            | 5                     | 0.1                    | 1.0                      | 0.5                   | 5 m   | 17                     | 5                     | 0.5                     | —                        | —                      | —    | General-purpose           |
| 2SC5171  | 2SA1930  |           | 180                     | 20                                             | 100 to 320             | 5                     | 0.1                    | 1.0                      | 1                     | 0.1   | 200                    | 5                     | 0.3                     | —                        | —                      | —    | For audio                 |
| 2SC4935  | 2SA1869  | 3         | 50                      | 10                                             | 70 to 140              | 2                     | 0.5                    | 0.6                      | 2                     | 0.2   | 50/100                 | 2                     | 0.5                     | —                        | —                      | —    | General-purpose           |
| 2SD2012  | 2SB1375  |           | 60                      | 25                                             | 100 to 320             | 5                     | 0.5                    | 1.0/1.5                  | 2                     | 0.2   | 3                      | 5                     | 0.5                     | —                        | —                      | —    |                           |
| 2SD2353  | —        |           | 60                      | 25                                             | 800 to 3200            | 5                     | 0.2                    | 1.0                      | 1                     | 10 m  | 18                     | 5                     | 0.5                     | —                        | —                      | —    |                           |
| 2SD2531  | —        | 4         | 60                      | 25                                             | 100 to 320             | 5                     | 0.5                    | 1.5                      | 2                     | 0.2   | 3                      | 5                     | 0.5                     | —                        | —                      | —    |                           |
| —        | 2SB1642  |           | 60                      | 25                                             | 100 to 320             | 5                     | 0.5                    | 1.5                      | 2.5                   | 0.25  | 9                      | 5                     | 0.5                     | —                        | —                      | —    |                           |
| 2SD2406  | —        |           | 80                      | 25                                             | 70 to 240              | 5                     | 0.5                    | 1.5                      | 3                     | 0.3   | 8                      | 5                     | 0.5                     | —                        | —                      | —    |                           |
| 2SD1407A | 2SB1016A | 5         | 100                     | 30                                             | 40 to 240              | 5                     | 1                      | 2.0                      | 4                     | 0.4   | 12                     | 5                     | 1.0                     | —                        | —                      | —    | For strobe flash          |
| —        | 2SA1327A | 10        | 20                      | 20                                             | 100 to 320             | 2                     | 1                      | 0.4                      | 8                     | 0.4   | 45                     | 2                     | 1                       | —                        | —                      | —    |                           |

\* : Max

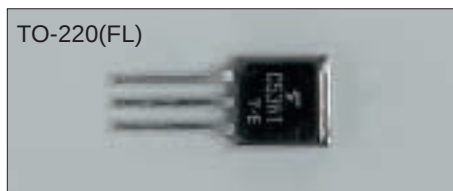
| Part No. |          | Ic | VCEO    | Pc<br>Tc = 25°C<br>(W) | hFE         |     |     | VCE(sat) Max |     |           | fr Typ.   |       |            | SW Time Typ. |             |              | Note                                            |
|----------|----------|----|---------|------------------------|-------------|-----|-----|--------------|-----|-----------|-----------|-------|------------|--------------|-------------|--------------|-------------------------------------------------|
| NPN      | PNP      |    |         |                        | (A)         | (V) | (V) | Ic<br>(A)    | (V) | Ic<br>(A) | Ib<br>(A) | (MHz) | VCE<br>(V) | Ic<br>(A)    | ton<br>(μs) | tstg<br>(μs) |                                                 |
| 2SD2127  | —        | 3  | 60 ± 10 | 25                     | 500 to 1500 | 1   | 0.5 | 0.3          | 1   | 0.01      | 140       | 5     | 0.5        | 0.6          | 1.6         | 0.4          | Low-saturation voltage<br>(For DC-DC Converter) |
| 2SD2092  | —        |    | 100     | 25                     | 500 to 1500 | 1   | 0.5 | 0.3          | 1   | 0.01      | 140       | 5     | 0.5        | 0.5          | 5.0         | 0.7          |                                                 |
| 2SC4881  | 2SA1931  | 5  | 50      | 20                     | 100 to 320  | 1   | 1   | 0.4          | 2.5 | 0.125     | 100       | 4     | 1          | 0.1          | 0.8         | 0.1          |                                                 |
| 2SD1412A | —        | 7  | 50      | 30                     | 70 to 240   | 1   | 1   | 0.4          | 4   | 0.4       | 10        | 4     | 1          | 0.2          | 2.5         | 0.5          |                                                 |
| 2SD1411A | 2SB1018A |    | 80      | 30                     | 70 to 240   | 1   | 1   | 0.5          | 4   | 0.4       | 10        | 4     | 1          | 0.4          | 2.5         | 0.5          |                                                 |
| 2SC5000  | 2SA1887  | 10 | 50      | 25                     | 120 to 400  | 1   | 1   | 0.4          | 5   | 0.25      | 45        | 1     | 1          | —            | —           | —            |                                                 |
| 2SD2075A | —        |    | 60 ± 10 | 30                     | 500 to 1500 | 1   | 1   | 0.3          | 5   | 0.05      | 150       | 5     | 1          | 0.5          | 2.0         | 0.6          |                                                 |
| 2SD1947A | —        |    | 100     | 40                     | 500 to 1500 | 1   | 1   | 0.3          | 5   | 0.05      | 70        | 5     | 1          | 0.5          | 6.0         | 1.0          |                                                 |
| 2SC3709A | 2SA1451A | 12 | 50      | 30                     | 70 to 240   | 1   | 1   | 0.4          | 6   | 0.3       | 90/70     | 5     | 1          | 0.2/0.3      | 1.0         | 0.2/0.5      |                                                 |
| 2SC3710A | 2SA1452A |    | 80      | 30                     | 70 to 240   | 1   | 1   | 0.4          | 6   | 0.3       | 80/50     | 5     | 1          | 0.2/0.3      | 1.0         | 0.2/0.5      |                                                 |
| —        | 2SA1771  |    | 80      | 30                     | 70 to 240   | 1   | 1   | 0.4          | 6   | 0.3       | 50        | 5     | 1          | 0.3          | 1.0         | 0.5          |                                                 |

| Part No. |     | Ic | VCE0 | Pc<br>Tc=25°C | hFE      |     |      | VCE(sat) Max |           |      | SW Time Typ. |           |             | Note                                        |
|----------|-----|----|------|---------------|----------|-----|------|--------------|-----------|------|--------------|-----------|-------------|---------------------------------------------|
| NPN      | PNP |    |      |               | (A)      | (V) | (W)  | VCE<br>(V)   | Ic<br>(A) | (V)  | Ic<br>(A)    | Ib<br>(A) | ton<br>(μs) |                                             |
| 2SC5459  | —   | 3  | 400  | 25            | 20 min   | 5   | 0.3  | 1.0          | 1.2       | 0.24 | ▲*0.5        | *2.0      | *0.3        | High-withstanding voltage,<br>For switching |
| 2SC5353  | —   | 3  | 800  | 25            | 15 min   | 5   | 0.15 | 1            | 1.2       | 0.24 | ▲*0.7        | *4.0      | *0.5        |                                             |
| 2SC5172  | —   | 5  | 400  | 25            | 20 min   | 5   | 1    | 1            | 3         | 0.4  | ▲*0.7        | *2.5      | *0.5        |                                             |
| 2SC5439  | —   | 8  | 450  | 30            | 14 to 34 | 5   | 1    | 1.0          | 3.2       | 0.64 | ▲*0.2        | *3.5      | 0.15        |                                             |

|          |          |    |          |    |               |   |     |     |     |       |          |         |         |            |
|----------|----------|----|----------|----|---------------|---|-----|-----|-----|-------|----------|---------|---------|------------|
| —        | 2SB1411  | 2  | 100      | 20 | 1500 to 15000 | 3 | 1   | 2.5 | 2   | 8 m   | 1.0      | 3.0     | 2.0     | Darlington |
| 2SD2257  | 2SB1495  | 3  | 100      | 20 | 2000 min      | 2 | 1   | 1.5 | 1.5 | 1.5 m | 0.5      | 2.0     | 0.5     |            |
| 2SD2129  | —        |    | 100      | 20 | 2000 to 15000 | 3 | 1.5 | 2.0 | 3   | 12 m  | 1.0      | 5.0     | 2.0     |            |
| 2SD2204  | —        | 4  | 60       | 25 | 2000 to 15000 | 3 | 1.5 | 2.0 | 3   | 12 m  | 1.0      | 5.0     | 20      |            |
| 2SD2241  | 2SB1481  |    | 100      | 25 | 2000 min      | 2 | 1.5 | 1.5 | 3   | 6 m   | 0.2/0.15 | 1.5/0.8 | 0.6/0.4 |            |
| 2SD2131  | —        | 5  | 60       | 30 | 2000 to 15000 | 3 | 3   | 1.5 | 3   | 6 m   | 1.0      | 4.0     | 2.5     |            |
| —        | 2SB1381  |    | 100      | 30 | 1500 to 15000 | 3 | 2.5 | 1.5 | 2.5 | 5 m   | 0.8      | 2.5     | 2.0     |            |
| 2SD2079  | —        |    | 100      | 30 | 2000 to 15000 | 3 | 3   | 1.5 | 3   | 6 m   | 1.0      | 4.0     | 2.5     |            |
| 2SD2604  | —        |    | 110 ± 15 | 20 | 2000 to 15000 | 3 | 2   | 1.5 | 2   | 4 m   | 0.5      | 5.0     | 0.7     |            |
| 2SD1415A | 2SB1020A | 7  | 100      | 30 | 2000 to 15000 | 3 | 3   | 1.5 | 3   | 6 m   | 0.3/0.8  | 5.1/2   | 0.6/2.5 |            |
| 2SD2271  | —        | 12 | 200      | 30 | 500 to 5000   | 2 | 5   | 2.0 | 10  | 100 m | (*) 1.0  | (*) 12  | (*) 2.0 |            |

▲ : tr. \* : Max

TO-220(FL)



TO-220(SM)

**TO-220(FL)**

(Weight: 1.5g typ.)

**TO-220(SM)**

(Weight: 1.4g typ.)

| Part No. |         | IC | V <sub>CEO</sub> | P <sub>C</sub><br><br>T <sub>C</sub> = 25°C<br>(W) | h <sub>FE</sub> |     | V <sub>CE(sat)</sub> Max |                       |     | SW Time Typ.          |                       |                         | Note  |                                          |
|----------|---------|----|------------------|----------------------------------------------------|-----------------|-----|--------------------------|-----------------------|-----|-----------------------|-----------------------|-------------------------|-------|------------------------------------------|
| NPN      | PNP     |    |                  |                                                    | (A)             | (V) | V <sub>CE</sub><br>(V)   | I <sub>C</sub><br>(A) | (V) | I <sub>C</sub><br>(A) | I <sub>B</sub><br>(A) | t <sub>on</sub><br>(μs) |       | t <sub>stg</sub><br>(μs)                 |
| 2SC4754  | —       | 2  | 400              | 20                                                 | 20 min          | 5   | 0.1                      | 1                     | 1   | 0.2                   | 1.0                   | 12.5                    | 1.0   | High-withstanding voltage, For switching |
| 2SD2414  | —       | 7  | 80               | 30                                                 | 70 to 240       | 1   | 1                        | 0.5                   | 4   | 0.4                   | 0.4                   | 2.5                     | 0.5   | Low-saturation voltage                   |
| —        | 2SB1667 | 3  | 60               | 25                                                 | 60 to 200       | 5   | 0.5                      | 1.7                   | 3   | 0.3                   | 0.4                   | 1.7                     | 0.5   | General-purpose                          |
| 2SC5361  | —       |    | 800              | 40                                                 | 15 min          | 5   | 0.15                     | 1.0                   | 1.2 | 0.24                  | ▲*0.7                 | ▲*4.0                   | ▲*0.5 | High-withstanding voltage, For switching |

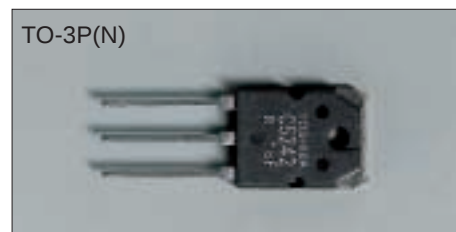
▲ : tr. \* : Max

## TO-3P Series

### TO-3P(N)

(Weight: 4.7g typ.)

TO-3P(N)



| Part No. |          | Ic<br>(A) | VCE0<br>(V) | Pc<br>Tc=25°C<br>(W) | hFE           |           |   | VCE(sat) Max |           |           | fr Typ. |            |           | SW Time Typ. |              |            | Note                      |
|----------|----------|-----------|-------------|----------------------|---------------|-----------|---|--------------|-----------|-----------|---------|------------|-----------|--------------|--------------|------------|---------------------------|
| NPN      | PNP      |           |             |                      | VCE<br>(V)    | Ic<br>(A) |   | VCE<br>(V)   | Ic<br>(A) | Ib<br>(A) | (MHz)   | VCE<br>(V) | Ic<br>(A) | ton<br>(μs)  | tstg<br>(μs) | tr<br>(μs) |                           |
| 2SC5196  | 2SA1939  | 6         | 80          | 60                   | 55 to 160     | 5         | 1 | 2            | 5         | 0.5       | 30      | 5          | 1         | —            | —            | —          | Audio amp                 |
| 2SC5197  | 2SA1940  | 8         | 120         | 80                   | 55 to 160     | 5         | 1 | 2            | 6         | 0.6       | 30      | 5          | 1         | —            | —            | —          |                           |
| 2SC5198  | 2SA1941  | 10        | 140         | 100                  | 55 to 160     | 5         | 1 | 2            | 7         | 0.7       | 30      | 5          | 1         | —            | —            | —          |                           |
| 2SC5242  | 2SA1962  | 15        | 230         | 130                  | 55 to 160     | 5         | 1 | 3            | 8         | 0.8       | 30      | 5          | 1         | —            | —            | —          |                           |
| 2SC5358  | 2SA1986  |           | 230         | 150                  | 55 to 160     | 5         | 1 | 3            | 8         | 0.8       | 30      | 5          | 1         | —            | —            | —          |                           |
| ★2SC5948 | ★2SA2120 | 12        | 200         | 200                  | 55 to 180     | 5         | 1 | 3            | 8         | 0.8       | 25      | 5          | 1         | —            | —            | —          |                           |
| 2SD2386  | 2SB1557  | 7         | 140         | 70                   | 5000 to 30000 | 5         | 6 | 2.5          | 6         | 6 m       | 30      | 5          | 1         | —            | —            | —          | Audio amp<br>(Darlington) |
| ★2SD2387 | ★2SB1558 | 8         | 140         | 80                   | 5000 to 30000 | 5         | 7 | 2.5          | 7         | 7 m       | 30      | 5          | 1         | —            | —            | —          |                           |
| 2SD2636  | 2SB1682  | 8         | 150         | 100                  | 3500 to 15000 | 5         | 7 | 3            | 7         | 7 m       | 30      | 5          | 1         |              |              |            |                           |

|         |   |    |     |     |        |   |     |   |   |     |   |   |   |       |      |      |                                             |
|---------|---|----|-----|-----|--------|---|-----|---|---|-----|---|---|---|-------|------|------|---------------------------------------------|
| 2SC3657 | — | 4  | 800 | 80  | 10 min | 5 | 1   | 1 | 2 | 0.4 | — | — | — | ▲*1.0 | *2.5 | *1.0 | High-withstanding voltage,<br>For switching |
| 2SC5354 | — | 5  | 800 | 100 | 15 min | 5 | 0.5 | 1 | 2 | 0.2 | — | — | — | ▲*0.7 | *4.0 | *0.5 |                                             |
| 2SC5352 | — | 10 | 400 | 80  | 20 min | 5 | 1   | 1 | 4 | 0.5 | — | — | — | ▲*0.5 | *2.0 | *0.3 |                                             |
| 2SC4157 | — |    | 450 | 100 | 15 min | 5 | 5   | 1 | 5 | 1.0 | — | — | — | ▲*0.5 | *2.5 | *0.5 |                                             |

|         |   |    |     |     |          |   |    |     |    |      |    |   |   |   |   |     |            |
|---------|---|----|-----|-----|----------|---|----|-----|----|------|----|---|---|---|---|-----|------------|
| 2SD1662 | — | 15 | 100 | 100 | 1000 min | 3 | 15 | 1.5 | 15 | 25 m | 14 | 5 | 1 | 1 | 2 | 1.5 | Darlington |
|---------|---|----|-----|-----|----------|---|----|-----|----|------|----|---|---|---|---|-----|------------|

★: Under development

▲: tr. \*: Max

### TO-3P(N)IS [isolated type]

(Weight: 5.8g typ.)

TO-3P(N)IS

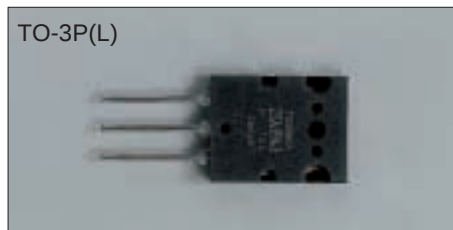


| Part No. |         | Ic | VCE0 | Pc<br>Tc=25°C | hFE        |     |     | VCE(sat) Max |           |     | fr Typ.   |           |       | Note            |
|----------|---------|----|------|---------------|------------|-----|-----|--------------|-----------|-----|-----------|-----------|-------|-----------------|
| NPN      | PNP     |    |      |               | (A)        | (V) | (W) | VCE<br>(V)   | Ic<br>(A) | (V) | Ic<br>(A) | Ib<br>(A) | (MHz) |                 |
| 2SC4688  | 2SA1803 | 6  | 80   | 55            | 55 to 160  | 5   | 1   | 2.0          | 5.0       | 0.5 | 30        | 5         | 1     | Audio amp       |
| 2SC4689  | 2SA1804 | 8  | 120  | 70            | 55 to 160  | 5   | 1   | 2.0          | 6.0       | 0.6 | 30        | 5         | 1     |                 |
| 2SC4690  | 2SA1805 | 10 | 140  | 80            | 55 to 160  | 5   | 1   | 2.0          | 7.0       | 0.7 | 30        | 5         | 1     |                 |
| 2SD2440  | —       | 6  | 60   | 40            | 200 to 900 | 5   | 0.5 | 1.2          | 5.0       | 1.0 | 5         | 10        | 0.5   | General-purpose |

# TO-3P(L)

(Weight: 9.75g typ.)

TO-3P(L)



| Part No.  |           | Ic<br>(A) | VCE0<br>(V) | Pc<br>Tc = 25°C<br>(W) | hFE           |           |   | VCE(sat) Max |           |           | fr Typ. |            |           | Note                      |
|-----------|-----------|-----------|-------------|------------------------|---------------|-----------|---|--------------|-----------|-----------|---------|------------|-----------|---------------------------|
| NPN       | PNP       |           |             |                        | VCE<br>(V)    | Ic<br>(A) |   | (V)          | Ic<br>(A) | Ib<br>(A) | (MHz)   | VCE<br>(V) | Ic<br>(A) |                           |
| 2SC5199   | 2SA1942   | 12        | 160         | 120                    | 55 to 160     | 5         | 1 | 2.5          | 8         | 0.8       | 30      | 5          | 1         | Audio amp                 |
| 2SC5200   | 2SA1943   | 15        | 230         | 150                    | 55 to 160     | 5         | 1 | 3            | 8         | 0.8       | 30      | 5          | 1         |                           |
| 2SC5359   | 2SA1987   | 15        | 230         | 180                    | 55 to 160     | 5         | 1 | 3.0          | 8         | 0.8       | 30      | 5          | 1         |                           |
| ★ 2SC5949 | ★ 2SA2121 | 15        | 200         | 220                    | 55 to 160     | 5         | 1 | 3.0          | 10        | 1         | 25      | 5          | 1         |                           |
| 2SD2384   | 2SB1555   | 7         | 140         | 100                    | 5000 to 30000 | 5         | 6 | 2.5          | 6         | 6 m       | 30      | 5          | 1         | Audio amp<br>(Darlington) |
| 2SD2385   | 2SB1556   | 8         | 140         | 120                    | 5000 to 30000 | 5         | 7 | 2.5          | 7         | 7 m       | 30      | 5          | 1         |                           |
| 2SD2449   | 2SB1594   | 10        | 160         | 150                    | 3000 to 20000 | 5         | 8 | 3.0          | 8         | 8 m       | 30      | 5          | 1         |                           |

★: Under development

| Part No. |     | Ic<br>(A) | VCE0<br>(V) | Pc<br>Tc = 25°C<br>(W) | hFE        |           |    | VCE(sat) Max |           |           | SW Time Typ. |              |            | Note                                     |
|----------|-----|-----------|-------------|------------------------|------------|-----------|----|--------------|-----------|-----------|--------------|--------------|------------|------------------------------------------|
| NPN      | PNP |           |             |                        | VCE<br>(V) | Ic<br>(A) |    | (V)          | Ic<br>(A) | Ib<br>(A) | ton<br>(μs)  | tstg<br>(μs) | tr<br>(μs) |                                          |
| 2SC3307  | —   | 10        | 800         | 150                    | 10 min     | 5         | 5  | 1.0          | 5         | 1.0       | ▲*1.0        | *3.0         | *1.0       | High-withstand voltage,<br>For awitching |
| 2SD1313  | —   | 25        | 350         | 200                    | 6 min      | 5         | 25 | 1.0          | 15        | 3.0       | 0.8          | 3.0          | 0.5        |                                          |

|         |   |    |     |     |          |   |    |     |    |     |      |     |      |            |
|---------|---|----|-----|-----|----------|---|----|-----|----|-----|------|-----|------|------------|
| 2SD1314 | — | 15 | 450 | 150 | 100 min  | 5 | 15 | 2.0 | 15 | 0.4 | *1.0 | *12 | *3.0 | Darlington |
| 2SD1525 | — | 30 | 100 | 150 | 1000 min | 5 | 20 | 1.5 | 20 | 0.2 | 1.5  | 10  | 1.5  |            |

▲: tr. \*: Max

## TPS

(Weight: 0.55g Typ.)

TPS

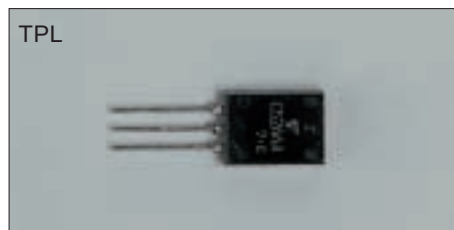


| Part No. |         | I <sub>C</sub><br>(A) | V <sub>CEO</sub><br>(V) | P <sub>C</sub><br>(W) | h <sub>FE</sub> |                        |                       | V <sub>CE(sat)</sub> Max |                       |                        | f <sub>T</sub> Typ. |                        |                       | Note                                     |
|----------|---------|-----------------------|-------------------------|-----------------------|-----------------|------------------------|-----------------------|--------------------------|-----------------------|------------------------|---------------------|------------------------|-----------------------|------------------------------------------|
| NPN      | PNP     |                       |                         |                       |                 | V <sub>CE</sub><br>(V) | I <sub>C</sub><br>(A) | (V)                      | I <sub>C</sub><br>(A) | I <sub>B</sub><br>(mA) | (MHz)               | V <sub>CE</sub><br>(V) | I <sub>C</sub><br>(A) |                                          |
| 2SC5027  | —       | 0.1                   | 300                     | 1.3                   | 30 to 200       | 10                     | 0.02                  | 1.0                      | 0.01                  | 1                      | 70                  | 10                     | 0.02                  | Video output                             |
| —        | 2SA1925 | 0.5                   | 400                     | 1.3                   | 60 min          | 5                      | 0.05                  | 1.2                      | 0.1                   | 10                     | —                   | —                      | —                     | High-withstand voltage,<br>For switching |
| 2SC5562  | —       | 0.8                   | 800                     | 1.3                   | 15 min          | 5                      | 0.08                  | 1.0                      | 0.3                   | 60                     | —                   | —                      | —                     | High-withstand voltage,<br>For switching |
| 2SC5154  | —       | 1.5                   | 160                     | 1.3                   | 70 to 240       | 5                      | 0.1                   | 1.5                      | 0.5                   | 50                     | 100                 | 10                     | 0.1                   | For audio                                |
| 2SC5028  | 2SA1891 | 2                     | 50                      | 1.3                   | 120 to 400      | 2                      | 0.1                   | 0.5                      | 1                     | 50                     | 100                 | 2                      | 0.1                   | Low-saturation voltage                   |
| 2SD2461  | —       | 2                     | 60                      | 1.3                   | 800 to 3200     | 5                      | 0.1                   | 1.0                      | 0.5                   | 5                      | 17                  | 5                      | 0.5                   | High h <sub>FE</sub>                     |
| 2SC5075  | —       | 2                     | 400                     | 1.3                   | 20 min          | 5                      | 0.1                   | 1.0                      | 1                     | 200                    | —                   | —                      | —                     | High-withstand voltage,<br>For switching |
| 2SC5208  | —       | 2                     | 400                     | 1.3                   | 20 to 80        | 5                      | 0.1                   | 0.4                      | 0.1                   | 10                     | —                   | —                      | —                     | High-withstand voltage,<br>For switching |
| 2SC5351  | —       | 2                     | 450                     | 1.3                   | 20 min          | 5                      | 0.2                   | 1.0                      | 0.8                   | 100                    | —                   | —                      | —                     | High-withstand voltage,<br>For switching |
| 2SC5029  | 2SA1892 | 3                     | 50                      | 1.3                   | 70 to 240       | 2                      | 0.5                   | 0.5                      | 1                     | 50                     | 100                 | 2                      | 0.5                   | Low-saturation voltage                   |
| 2SD2462  | —       | 3                     | 60                      | 1.3                   | 800 to 3200     | 5                      | 0.2                   | 1.0                      | 1.0                   | 10                     | 18                  | 5                      | 0.5                   | High h <sub>FE</sub>                     |
| —        | 2SA1893 | 5                     | 20                      | 1.3                   | 100 to 320      | 2                      | 0.5                   | 1.0                      | 4                     | 100                    | 170                 | 2                      | 0.5                   | For strobe flash                         |
| 2SC5030  | —       | 5                     | 20                      | 1.3                   | 800 to 3200     | 2                      | 0.5                   | 0.5                      | 4                     | 40                     | 150                 | 2                      | 0.5                   | For strobe flash                         |
| 2SC5076  | 2SA1905 | 5                     | 50                      | 1.3                   | 70 to 240       | 1                      | 1                     | 0.4                      | 3                     | 150                    | 120/60              | 4                      | 1                     | Low-saturation voltage                   |
| 2SD2481  | —       | 1.5                   | 30                      | 1.3                   | 4000 min        | 2                      | 0.15                  | 1.5                      | 1                     | 1                      | —                   | —                      | —                     | Darlington                               |
| 2SD2480  | 2SB1617 | 2                     | 100                     | 1.3                   | 2000 min        | 2                      | 1                     | 1.5                      | 1                     | 1                      | 100/50              | 2                      | 0.5                   | Darlington                               |

## TPL

(Weight: 1.5g Typ.)

TPL



| Part No. |         | I <sub>C</sub><br>(A) | V <sub>CEO</sub><br>(V) | P <sub>C</sub><br>(W) | h <sub>FE</sub> |                        |                       | V <sub>CE(sat)</sub> Max |                       |                        | f <sub>T</sub> Typ. |                        |                       | Note                                     |
|----------|---------|-----------------------|-------------------------|-----------------------|-----------------|------------------------|-----------------------|--------------------------|-----------------------|------------------------|---------------------|------------------------|-----------------------|------------------------------------------|
| NPN      | PNP     |                       |                         |                       |                 | V <sub>CE</sub><br>(V) | I <sub>C</sub><br>(A) | (V)                      | I <sub>C</sub><br>(A) | I <sub>B</sub><br>(mA) | (MHz)               | V <sub>CE</sub><br>(V) | I <sub>C</sub><br>(A) |                                          |
| 2SC5173  | —       | 0.1                   | 300                     | 1.8                   | 30 to 200       | 10                     | 0.02                  | 1.0                      | 0.01                  | 1                      | 70/50               | 10                     | 0.02                  | Chrome output                            |
| 2SC5174  | 2SA1932 | 1                     | 230                     | 1.8                   | 100 to 320      | 5                      | 0.1                   | 1.5                      | 0.5                   | 50                     | 100/70              | 10                     | 0.1                   | General-purpose                          |
| 2SD2525  | 2SB1640 | 3                     | 60                      | 1.8                   | 100 to 320      | 5                      | 0.1                   | 1.0/1.5                  | 2                     | 200                    | 3/9                 | 5                      | 0.5                   | General-purpose                          |
| 2SC5175  | 2SA1933 | 5                     | 50                      | 1.8                   | 100 to 320      | 1                      | 1                     | 0.4                      | 2.5/2                 | 125/200                | 100/60              | 4                      | 1                     | Low saturation voltage                   |
| 2SC5176  | 2SA1934 | 5                     | 80                      | 1.8                   | 70 to 240       | 1                      | 1                     | 0.4                      | 3                     | 150                    | 120/60              | 4                      | 1                     | Low saturation voltage                   |
| —        | 2SB1641 | 5                     | 100                     | 1.8                   | 1500 to 15000   | 3                      | 2.5                   | 1.5                      | 2.5                   | 5                      | —                   | —                      | —                     | Darlington                               |
| 2SD2526  | —       | 5                     | 100                     | 1.8                   | 2000 to 15000   | 3                      | 3                     | 1.5                      | 3                     | 6                      | —                   | —                      | —                     | Darlington                               |
| 2SC5279  | —       | 2                     | 400                     | 1.8                   | 20 min          | 5                      | 0.1                   | 1.0                      | 1                     | 100                    | —                   | —                      | —                     | High-withstand voltage,<br>For switching |
| 2SC5266A | —       | 5                     | 400                     | 1.8                   | 20 min          | 5                      | 1                     | 1.0                      | 3                     | 400                    | —                   | —                      | —                     | High-withstand voltage,<br>For switching |

# PW-MINI(SC-62)

(Weight: 0.05g Typ.)

PW-MINI



| Part No. |         | Ratings               |                                    |                                     |                         |                       | Electrical Characteristics |      |                        |                        |            |                        |                        |               |                        |                        |     | Marking |           | Equivalent to<br>TO-92MOD<br>(TO-92) |                        | Note |
|----------|---------|-----------------------|------------------------------------|-------------------------------------|-------------------------|-----------------------|----------------------------|------|------------------------|------------------------|------------|------------------------|------------------------|---------------|------------------------|------------------------|-----|---------|-----------|--------------------------------------|------------------------|------|
|          |         | P <sub>C</sub><br>(W) | P <sub>C</sub> <sup>*</sup><br>(W) | P <sub>C</sub> <sup>**</sup><br>(W) | V <sub>CEO</sub><br>(V) | I <sub>C</sub><br>(A) | h <sub>FE</sub>            |      | V <sub>CE(sat)</sub>   |                        |            | f <sub>T</sub>         |                        |               |                        |                        |     |         |           |                                      |                        |      |
|          |         |                       |                                    |                                     |                         |                       | Min                        | Max  | V <sub>CE</sub><br>(V) | I <sub>C</sub><br>(mA) | (V)<br>Max | I <sub>C</sub><br>(mA) | I <sub>B</sub><br>(mA) | (MHz)<br>Typ. | V <sub>CE</sub><br>(V) | I <sub>C</sub><br>(mA) |     |         |           |                                      |                        |      |
| NPN      | PNP     |                       |                                    |                                     |                         |                       |                            |      |                        |                        |            |                        |                        |               |                        | NPN                    | PNP | NPN     | PNP       |                                      |                        |      |
| 2SC2880  | 2SA1200 | 0.5                   | 0.8                                | –                                   | 150                     | 0.05                  | 70                         | 240  | 5                      | 10                     | 0.5 / 0.8  | 10                     | 1                      | 120           | 30                     | 10                     | A□  | B□      | 2SC2229   | 2SA949                               | High-withstand voltage |      |
| 2SC2881  | 2SA1201 | 0.5                   | 1.0                                | –                                   | 120                     | 0.8                   | 80                         | 240  | 5                      | 100                    | 1.0        | 500                    | 50                     | 120           | 5                      | 100                    | C□  | D□      | 2SC2235   | 2SA965                               | For audio              |      |
| 2SC2882  | 2SA1202 | 0.5                   | 1.0                                | –                                   | 80                      | 0.4                   | 70                         | 240  | 2                      | 50                     | 0.4        | 200                    | 20                     | 120/100       | 10                     | 10                     | E□  | F□      | (2SC1627) | (2SA817)                             | Low-saturation voltage |      |
| 2SC2883  | 2SA1203 | 0.5                   | 1.0                                | –                                   | 30                      | 1.5                   | 100                        | 320  | 2                      | 500                    | 2.0        | 1500                   | 30                     | 120           | 2                      | 500                    | G□  | H□      | 2SC2236   | 2SA966                               | For audio              |      |
| 2SC2884  | 2SA1204 | 0.5                   | 1.0                                | –                                   | 30                      | 0.8                   | 100                        | 320  | 1                      | 100                    | 0.5 / 0.7  | 500                    | 20                     | 120           | 5                      | 10                     | P□  | R□      | (2SC2120) | (2SA950)                             | Low-saturation voltage |      |
| 2SC2873  | 2SA1213 | 0.5                   | 1.0                                | –                                   | 50                      | 2.0                   | 70                         | 240  | 2                      | 500                    | 0.5        | 1000                   | 50                     | 120           | 2                      | 500                    | M□  | N□      | 2SC2655   | 2SA1020                              | Low-saturation voltage |      |
| 2SC2982  | 2SA1314 | 0.5                   | 1.0                                | –                                   | 10                      | 2.0                   | 140                        | 600  | 1                      | 500                    | 0.5        | 2000                   | 50                     | 140           | 1                      | 500                    | S□  | T□      | (2SC3279) | (2SA1300)                            | Low-saturation voltage |      |
| 2SC3515  | 2SA1384 | 0.5                   | 1.0                                | –                                   | 300                     | 0.1                   | 30                         | 150  | 10                     | 20                     | 0.5        | 20                     | 2                      | 60            | 10                     | 20                     | J□  | I□      | (2SC2551) | (2SA1091)                            | Low-saturation voltage |      |
| 2SC3803  | 2SA1483 | 0.5                   | 1.0                                | –                                   | 45                      | 0.2                   | 40                         | 240  | 1                      | 10                     | 0.3        | 100                    | 10                     | 200           | 10                     | 10                     | V□  | W□      | –         | –                                    | Low-saturation voltage |      |
| 2SC4409  | 2SA1681 | 0.5                   | 1.0                                | –                                   | 50                      | 2.0                   | 120                        | 400  | 2                      | 100                    | 0.5        | 1000                   | 50                     | 100           | 2                      | 100                    | KA  | LA      | 2SC4408   | 2SA1680                              | Low-saturation voltage |      |
| 2SC4539  | 2SA1734 | 0.5                   | 1.0                                | –                                   | 30                      | 1.2                   | 120                        | 400  | 2                      | 100                    | 0.5        | 700                    | 35                     | 100           | 2                      | 100                    | KB  | LB      | –         | –                                    | Low-saturation voltage |      |
| 2SC4540  | 2SA1735 | 0.5                   | 1.0                                | –                                   | 50                      | 1.0                   | 120                        | 400  | 2                      | 100                    | 0.5        | 500                    | 25                     | 100           | 2                      | 100                    | KC  | LC      | –         | –                                    | Low-saturation voltage |      |
| 2SC4541  | 2SA1736 | 0.5                   | 1.0                                | –                                   | 50                      | 3.0                   | 120                        | 400  | 2                      | 100                    | 0.5        | 1500                   | 75                     | 100           | 2                      | 100                    | KD  | LD      | –         | –                                    | Low-saturation voltage |      |
| 2SD1784  | –       | 0.5                   | 1.0                                | –                                   | 30                      | 1.5                   | 4000                       | –    | 2                      | 150                    | 1.5        | 1000                   | 1                      | –             | –                      | –                      | XN  | –       | 2SD1140   | –                                    | Driver (Darlington)    |      |
| 2SC5785  | –       | –                     | –                                  | 1                                   | 10                      | 2                     | 400                        | 1000 | 2                      | 200                    | 0.12       | 600                    | 12                     | –             | –                      | –                      | 3E  | –       | –         | –                                    | Low-saturation voltage |      |
| –        | 2SA2066 | –                     | –                                  | 1                                   | –10                     | –2                    | 200                        | 500  | –2                     | –200                   | –0.19      | –600                   | –20                    | –             | –                      | –                      | –   | 4E      | –         | –                                    | Low-saturation voltage |      |
| 2SC5713  | –       | –                     | –                                  | 1                                   | 10                      | 4                     | 400                        | 1000 | 2                      | 500                    | 0.15       | 1600                   | 32                     | –             | –                      | –                      | 2C  | –       | –         | –                                    | Low-saturation voltage |      |
| 2SC5819  | –       | –                     | –                                  | 1                                   | 20                      | 1.5                   | 400                        | 1000 | 2                      | 150                    | 0.12       | 500                    | 10                     | –             | –                      | –                      | 3D  | –       | –         | –                                    | Low-saturation voltage |      |
| –        | 2SA2069 | –                     | –                                  | 1                                   | –20                     | –1.5                  | 200                        | 500  | –2                     | –150                   | –0.14      | –500                   | –17                    | –             | –                      | –                      | 4D  | –       | –         | –                                    | Low-saturation voltage |      |
| 2SC5714  | –       | –                     | –                                  | 1                                   | 20                      | 4                     | 400                        | 1000 | 2                      | 500                    | 0.15       | 1600                   | 32                     | –             | –                      | –                      | 2E  | –       | –         | –                                    | Low-saturation voltage |      |
| –        | 2SA2059 | –                     | –                                  | 1                                   | –20                     | –3                    | 200                        | 500  | –2                     | –500                   | –0.19      | –1600                  | –53                    | –             | –                      | –                      | –   | 4F      | –         | –                                    | Low-saturation voltage |      |
| 2SC5712  | –       | –                     | –                                  | 1                                   | 50                      | 3                     | 400                        | 1000 | 2                      | 300                    | 0.14       | 1000                   | 20                     | –             | –                      | –                      | 2A  | –       | –         | –                                    | Low-saturation voltage |      |
| –        | 2SA2060 | –                     | –                                  | 1                                   | –50                     | –2                    | 200                        | 500  | –2                     | –300                   | –0.20      | –1000                  | –33                    | –             | –                      | –                      | –   | 4G      | –         | –                                    | Low-saturation voltage |      |
| 2SC5810  | –       | –                     | –                                  | 1                                   | 50                      | 1                     | 400                        | 1000 | 2                      | 100                    | 0.17       | 300                    | 6                      | –             | –                      | –                      | 3C  | –       | –         | –                                    | Low-saturation voltage |      |
| –        | 2SA2070 | –                     | –                                  | 1                                   | –50                     | –1                    | 200                        | 500  | –2                     | –100                   | –0.18      | –300                   | –10                    | –             | –                      | –                      | –   | 4C      | –         | –                                    | Low-saturation voltage |      |
| 2SD2686  | –       | –                     | –                                  | 1                                   | 60±10                   | 1                     | 2000                       | –    | 2                      | 1000                   | 1.5        | 1000                   | 1                      | –             | –                      | –                      | 3H  | –       | –         | –                                    | Darlington             |      |

Remark: h<sub>FE</sub> rank symbol listed below enters blank column □ in device marking  
(R rank → R, O rank → O, Y rank → Y, A rank → A, B rank → B, C rank → C, D rank → D)

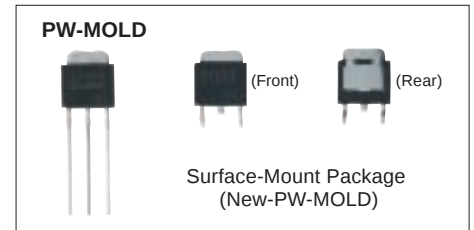
\*: When mounted on ceramic board (250 mm x 250 mm x 0.8 mm)

\*\*: When mounted on glass epoxy board (645 mm x 645 mm x 1.6 mm)

□: New product

# PW-MOLD(D-PACK)(SC-63/64)

(Weight: 0.36g Typ.)



| Part No. |         | I <sub>C</sub><br>(A) | V <sub>CEO</sub><br>*V <sub>CB0</sub><br>(V) | P <sub>C</sub><br>T <sub>C</sub> =25°C<br>(W) | h <sub>FE</sub>        |                       |      | V <sub>CE(sat)</sub> Max |                       |                        | f <sub>T</sub> Typ. |                        |                       | Surface-Mount Package | Note                                     |
|----------|---------|-----------------------|----------------------------------------------|-----------------------------------------------|------------------------|-----------------------|------|--------------------------|-----------------------|------------------------|---------------------|------------------------|-----------------------|-----------------------|------------------------------------------|
| NPN      | PNP     |                       |                                              |                                               | V <sub>CE</sub><br>(V) | I <sub>C</sub><br>(A) |      | V <sub>CE</sub><br>(V)   | I <sub>C</sub><br>(A) | I <sub>B</sub><br>(mA) | (MHz)               | V <sub>CE</sub><br>(V) | I <sub>C</sub><br>(A) |                       |                                          |
| -        | 2SA1923 | 0.5                   | 400                                          | 10                                            | 100 to 320             | 5                     | 0.1  | 1.0                      | 0.1                   | 10                     | 35                  | 10                     | 1                     | -                     | High-withstand voltage,<br>For switching |
| -        | 2SA1937 | 0.5                   | 600                                          | 10                                            | 100 to 500             | 5                     | 0.02 | 1                        | 0.1                   | 10                     | 35                  | 5                      | 0.05                  | -                     |                                          |
| 2SC3075  | -       | 0.8                   | 400                                          | 10                                            | 20 to 100              | 5                     | 0.1  | 0.5                      | 0.1                   | 10                     | -                   | -                      | -                     | ○                     |                                          |
| 2SC5458  | -       |                       | 400                                          | 10                                            | 20 min                 | 5                     | 0.08 | 1                        | 0.3                   | 0.04                   | -                   | -                      | -                     | -                     |                                          |
| -        | 2SA2034 | 2                     | 400                                          | 15                                            | 80 to 240              | 5                     | 0.1  | 1                        | 0.5                   | 100                    | -                   | -                      | -                     | ○                     |                                          |
| 2SC3405  | -       | 0.8                   | 800                                          | 20                                            | 10 min                 | 5                     | 0.3  | 0.5                      | 0.3                   | 60                     | -                   | -                      | -                     | △                     |                                          |
| 2SC5465  | -       |                       | 800                                          | 20                                            | 15 min                 | 5                     | 0.08 | 1                        | 0.3                   | 0.06                   | -                   | -                      | -                     | -                     |                                          |
| 2SD1220  | 2SB905  | 1.5                   | 150                                          | 10                                            | 60 to 320              | 5                     | 0.2  | 1.5                      | 0.5                   | 50                     | 100                 | 5                      | 0.2                   | ○/△                   | For audio                                |
| 2SC2983  | 2SA1225 |                       | 160                                          | 15                                            | 70 to 240              | 5                     | 0.1  | 1.5                      | 0.5                   | 50                     | 100                 | 10                     | 0.1                   | ○                     | For audio                                |
| 2SD1160  | -       | 2                     | *50                                          | 10                                            | 100 to 300             | 2                     | 1    | 0.6                      | 2                     | 40                     | -                   | -                      | -                     | -                     | General-purpose                          |
| 2SD1221  | 2SB906  | 3                     | 60                                           | 20                                            | 60 to 200              | 5                     | 0.5  | 1                        | 3                     | 300                    | 3                   | 5                      | 0.5                   | ○                     | General-purpose                          |

△: Under development

|         |         |   |    |    |             |   |     |      |     |     |     |   |     |   |                        |
|---------|---------|---|----|----|-------------|---|-----|------|-----|-----|-----|---|-----|---|------------------------|
| 2SC3076 | 2SA1241 | 2 | 50 | 10 | 70 to 240   | 2 | 0.5 | 0.5  | 1   | 50  | 100 | 2 | 0.5 | ○ | Low saturation voltage |
| 2SC3474 | -       |   | 80 | 20 | 500 min     | 1 | 0.4 | 0.5  | 0.3 | 1   | 85  | 2 | 0.1 | ○ |                        |
| 2SC4681 | 2SA1802 | 3 | 10 | 10 | 200 to 600  | 2 | 0.5 | 0.5  | 3   | 60  | 150 | 2 | 0.5 | - |                        |
| 2SC3074 | 2SA1244 | 5 | 50 | 20 | 70 to 240   | 1 | 1   | 0.4  | 3   | 150 | 120 | 4 | 1   | ○ |                        |
| 2SC5886 | -       |   | 50 | 20 | 400 to 1000 | 2 | 0.5 | 0.22 | 1.6 | 32  | -   | - | -   | ○ |                        |
| -       | 2SA2097 |   | 50 | 20 | 200 to 500  | 2 | 0.5 | 0.27 | 1.6 | 53  | -   | - | -   | ○ |                        |
| 2SC3303 | -       |   | 80 | 20 | 70 to 240   | 1 | 1   | 0.4  | 3   | 150 | 120 | 4 | 1   | ○ |                        |

|         |         |   |    |    |             |   |     |     |   |     |     |   |     |   |                  |
|---------|---------|---|----|----|-------------|---|-----|-----|---|-----|-----|---|-----|---|------------------|
| 2SC3072 | -       | 5 | 20 | 10 | 140 to 450  | 2 | 0.5 | 1   | 4 | 100 | 100 | 2 | 0.5 | ○ | For strobe flash |
| 2SC4684 | -       |   | 20 | 10 | 800 to 3200 | 2 | 0.5 | 0.5 | 4 | 40  | 150 | 2 | 0.5 | ○ |                  |
| -       | 2SA1242 |   | 20 | 10 | 100 to 320  | 2 | 0.5 | 1   | 4 | 100 | 100 | 2 | 0.5 | ○ |                  |

|          |        |     |     |    |           |   |      |     |     |     |   |   |   |   |                                          |
|----------|--------|-----|-----|----|-----------|---|------|-----|-----|-----|---|---|---|---|------------------------------------------|
| 2SD1224  | -      | 1.5 | 30  | 10 | 400 min   | 2 | 0.15 | 1.5 | 1   | 1   | - | - | - | - | Darlington                               |
| 2SD1222  | 2SB907 | 3   | 40  | 15 | 2000 min  | 2 | 1    | 1.5 | 2   | 4   | - | - | - | ○ |                                          |
| 2SD1223  | 2SB908 | 4   | 80  | 15 | 2000 min  | 2 | 1    | 1.5 | 3   | 6   | - | - | - | ○ |                                          |
| 2SC5548  | -      | 2   | 370 | 15 | 60 to 120 | 5 | 0.2  | 1   | 0.8 | 100 | - | - | - | ○ | High-withstand voltage,<br>For switching |
| 2SC5548A | -      | 2   | 400 | 15 | 40 to 100 | 5 | 0.2  | 1   | 0.8 | 100 | - | - | - | ○ |                                          |

□: New product, package line-up for low V<sub>CE</sub> (sat) series

## DP

(Weight: 0.36g typ.)



| Part No. |     | Ic  | VCE0 | Pc             | hFE           |            |           | VCE(sat) Max |           |           | SW Time(Typ.) |              |            | Note                                     |
|----------|-----|-----|------|----------------|---------------|------------|-----------|--------------|-----------|-----------|---------------|--------------|------------|------------------------------------------|
| NPN      | PNP | (A) | (V)  | Tc=25°C<br>(W) |               | VCE<br>(V) | Ic<br>(A) | (V)          | Ic<br>(A) | Ib<br>(A) | ton<br>(μs)   | tstg<br>(μs) | tr<br>(μs) |                                          |
| 2SC5356  | –   | 3   | 800  | 40             | 15min.        | 5          | 0.15      | 1.0          | 1.2       | 0.24      | ▲*0.7         | 4.0          | 0.5        | High-withstand voltage,<br>For switching |
| 2SC5355  | –   | 5   | 400  | 40             | 20 to 65      | 5          | 0.5       | 1.0          | 2.0       | 0.25      | ▲*0.5         | 2.0          | 0.3        |                                          |
| 2SD2584  | –   | 7   | 100  | 40             | 2000 to 15000 | 3          | 3.0       | 1.5          | 3.0       | 6m        | 0.3           | 5.1          | 0.6        | Darlington                               |

▲ : tr. \* : Max

Package Line ups

## TSM

(Weight: 0.012g typ.)



| Part No. | Ratings             |                    |                     | Electrical Characteristics |    |       |                          |                    |                     | Marking |
|----------|---------------------|--------------------|---------------------|----------------------------|----|-------|--------------------------|--------------------|---------------------|---------|
|          |                     |                    |                     | h <sub>FE</sub>            |    |       | V <sub>CE(sat)</sub> Max |                    |                     |         |
|          | V <sub>CE</sub> (V) | I <sub>C</sub> (A) | I <sub>CP</sub> (A) |                            |    |       | (V)                      | I <sub>C</sub> (A) | I <sub>B</sub> (mA) |         |
| 2SC5755  | 10                  | 2                  | 3.5                 | 400 to 1000                | 2  | 0.2   | 0.12                     | 0.6                | 12                  | WL      |
| 2SA2058  | −10                 | −1.5               | −2.5                | 200 to 500                 | −2 | −0.2  | −0.19                    | −0.6               | −20                 | WM      |
| 2SC5784  | 20                  | 1.5                | 2.5                 | 400 to 1000                | 2  | 0.15  | 0.12                     | 0.5                | 10                  | WJ      |
| 2SA2065  | −20                 | −1.5               | −2.5                | 200 to 500                 | −2 | −0.15 | −0.14                    | −0.5               | −17                 | WK      |
| 2SC5738  | 20                  | 3.5                | 6                   | 400 to 1000                | 2  | 0.5   | 0.15                     | 1.6                | 32                  | WD      |
| 2SA2061  | −20                 | −2.5               | −4                  | 200 to 500                 | −2 | −0.5  | −0.19                    | −1.6               | −53                 | WE      |
| 2SC5906  | 30                  | 4                  | 7                   | 200 to 500                 | 2  | 0.5   | 0.2                      | 1.6                | 53                  | WP      |
| 2SC5692  | 50                  | 2.5                | 4                   | 400 to 1000                | 2  | 0.3   | 0.14                     | 1                  | 20                  | WB      |
| 2SA2056  | −50                 | −2                 | −3.5                | 200 to 500                 | −2 | −0.3  | −0.2                     | −1                 | −33                 | WF      |
| 2SC5703  | 50                  | 4                  | 7                   | 400 to 1000                | 2  | 0.5   | 0.12                     | 1.6                | 32                  | WA      |

□ : New product, Package line-up for low VCE (sat) series

## VS-6

(Weight: 0.011g typ.)

VS-6



| Part No.  | Polarity   | Ratings     |          |             | Electrical Characteristics |             |          |                              |          |           | Marking |
|-----------|------------|-------------|----------|-------------|----------------------------|-------------|----------|------------------------------|----------|-----------|---------|
|           |            | $V_{CE}(V)$ | $I_C(A)$ | $I_{CP}(A)$ | $h_{FE}$                   | $V_{CE}(V)$ | $I_C(A)$ | $V_{CE(sat)} \text{ Max}(V)$ | $I_C(A)$ | $I_B(mA)$ |         |
| TPC6501   | NPN/Single | 10          | 2        | 3.5         | 400 to 1000                | 2           | 0.2      | 0.12                         | 0.6      | 12        | H2A     |
| ★ TPC6502 | NPN/Single | 50          | 3        | 4           | 400 to 1000                | 2           | 0.3      | 0.14                         | 1        | 20        | H2B     |
| TPC6601   | PNP/Single | -50         | -2       | -3.5        | 200 to 500                 | -2          | -0.3     | -0.2                         | -1       | -33       | H3A     |
| TPC6602   | PNP/Single | -10         | -2       | -3.5        | 200 to 500                 | -2          | -0.2     | -0.19                        | -0.6     | -20       | H3B     |
| TPC6701   | NPN/Dual   | 50          | 1        | 2           | 400 to 1000                | 2           | 0.1      | 0.17                         | 0.3      | 6         | H4A     |

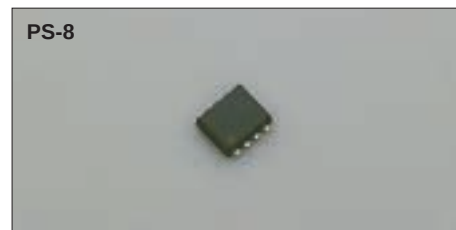
| Part No. | Package | Ratings    |      |    |       |     | Electrical Characteristics(Transistor) |             |          |                              |          |           | Electrical Characteristics(Diode) |          |                          |          | Marking |
|----------|---------|------------|------|----|-------|-----|----------------------------------------|-------------|----------|------------------------------|----------|-----------|-----------------------------------|----------|--------------------------|----------|---------|
|          |         | Transistor |      |    | Diode |     | $h_{FE}$                               | $V_{CE}(V)$ | $I_C(A)$ | $V_{CE(sat)} \text{ Max}(V)$ | $I_C(A)$ | $I_B(mA)$ | $V_F \text{ Max}(V)$              | $I_F(A)$ | $I_R \text{ Max}(\mu A)$ | $V_R(V)$ |         |
| TPC6D03  | PNP+Di  | -20        | -1.2 | -2 | 30    | 0.7 | 140 to 350                             | -2          | -0.15    | -0.17                        | -0.5     | -16.7     | 0.5                               | 0.7      | 100                      | 10       | H8C     |

□: New product, ★: Under development

## PS-8

(Weight: 0.0173g typ.)

PS-8



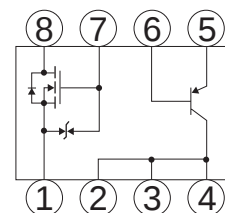
| Part No.   | Polarity                      | Ratings      |          |                                     | $h_{FE}$    |          |             | $V_{CE(sat)}(V)$ |          |          | $I_C(A)$ | $I_B(mA)$ |
|------------|-------------------------------|--------------|----------|-------------------------------------|-------------|----------|-------------|------------------|----------|----------|----------|-----------|
|            |                               | $V_{CEO}(V)$ | $I_C(A)$ | $P_C \text{ (W)}$ <sup>Note 1</sup> | $V_{CE}(V)$ | $I_C(A)$ | $V_{CE}(V)$ | $I_C(A)$         | $I_C(A)$ | $I_C(A)$ |          |           |
| TPCP8501   | NPN/Single                    | 100          | 2        | 1                                   | 100 to 300  | 2        | 0.3         | 0.6              | 1        | 33       |          |           |
| ★ TPCP8F01 | ★ PNP+S-MOS <sup>Note 2</sup> | -20          | -3       | 1                                   | 200 to 500  | -2       | -0.5        | -0.19            | -1.6     | -53      |          |           |

Note 1: When mounted on an FR4 board (copper area: 645 mm<sup>2</sup>, glass epoxy, t = 1.6 mm)

Note 2: Built-in n-channel S-MOS,  $V_{DS} = 20 V$ ,  $I_D = 0.1 A$ ,  $R_{on} = 4 W \text{ (max)}$

□: New product, ★: Under development

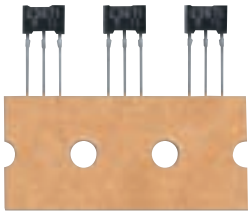
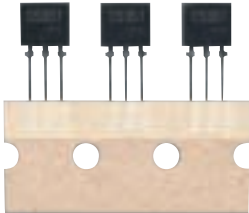
Pin assignment of the TPCP8F01





# Standard Tape Packing for Automated Pick and Place Assembly

| Tape Appearance                                                                                            | Tape Type Suffix | Packing Type  | Packing Quantity |
|------------------------------------------------------------------------------------------------------------|------------------|---------------|------------------|
|  <p>TSM</p>               | TE85L            | Embossed Type | 3000 / reel      |
|  <p>VS-6</p>              | TE85L            | Embossed Type | 3000 / reel      |
|  <p>PS-8</p>            | TE85L            | Embossed Type | 3000 / reel      |
|  <p>PW-MINI(SOT-89)</p> | TE12L            | Embossed Type | 1000 / reel      |
|  <p>New-PW-MOLD</p>     | TE16L1,N         | Embossed Type | 2000 / reel      |

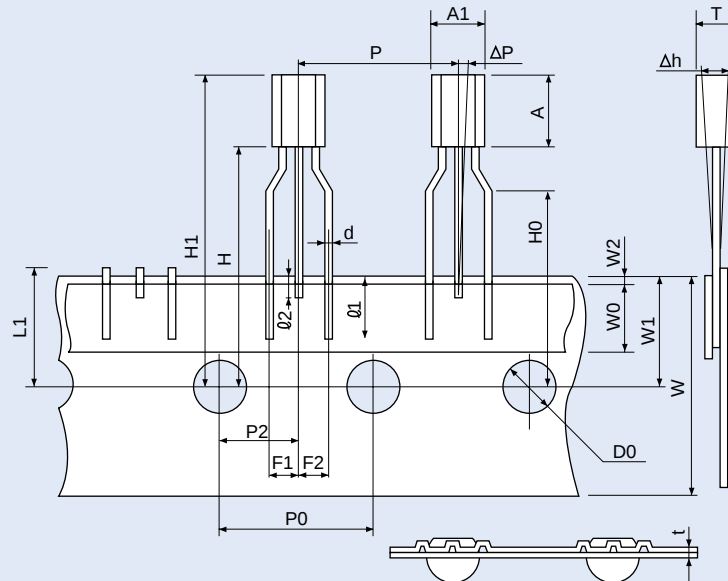
| Tape Appearance                                                                                   | Tape Type Suffix | Packing Type   | Packing Quantity |
|---------------------------------------------------------------------------------------------------|------------------|----------------|------------------|
|  <p>TO-92MOD</p> | TPE6             | Ammo pack Type | 2000 / carton    |
|  <p>MSTM</p>     | TPF2             | Ammo pack Type | 2000 / carton    |
|  <p>TPL</p>     | TP               | Ammo pack Type | 1000 / carton    |
|  <p>TPS</p>    | TP               | Ammo pack Type | 2000 / carton    |

## TO-92MOD(L-STM) Type

### ◆Tape specifications

| Tape Type | Packing Type | Packing Quantity (PCS) | Weight (g)   |
|-----------|--------------|------------------------|--------------|
| TPE6      | Ammo pack    | 2000                   | Approx. 1100 |

### ◆Tape dimensions



Unit: mm

| Name                            | Symbol | Dimensions                            | Note |
|---------------------------------|--------|---------------------------------------|------|
| Product width                   | A1     | 5.1 max                               |      |
| Product height                  | A      | 8.2 max                               |      |
| Product thickness               | T      | 4.1 max                               |      |
| Lead width                      | d      | 0.60 max                              |      |
| Lead length attached to tape    | ℓ1     | 3.5 min                               |      |
| Product pitch                   | P      | 12.7±1.0                              | 1    |
| Feed hole pitch                 | P0     | 12.7±0.3                              |      |
| Feed hole center to lead center | P2     | 6.35±0.4                              |      |
| Lead spacing                    | F1/F2  | 2.5 <sup>+0.6</sup> / <sub>-0.3</sub> |      |
| Product misalignment (1)        | △ h    | 0±2.0                                 |      |
| Product misalignment (2)        | △ P    | 0±1.0                                 |      |

| Name                                                                                     | Symbol | Dimensions                             | Note |
|------------------------------------------------------------------------------------------|--------|----------------------------------------|------|
| Tape width                                                                               | W      | 18.0 <sup>+1.0</sup> / <sub>-0.5</sub> |      |
| Cover Tape width                                                                         | W0     | 6.0±0.3                                |      |
| Feed hole position error                                                                 | W1     | 9.0±0.5                                |      |
| Cover Tape position error                                                                | W2     | 0.5 max                                |      |
| Perpendicular distance from base of package to feed hole center                          | H      | 20.0 max                               |      |
| Lead clinch height                                                                       | H0     | 16.3 <sup>+2.0</sup> / <sub>-0.8</sub> |      |
| Perpendicular distance from top of package to feed hole center                           | H1     | 32.25 max                              |      |
| Feed hole diameter                                                                       | D0     | 4.0±0.2                                |      |
| Tape thickness                                                                           | t      | 0.6±0.2                                | 2    |
| Perpendicular distance from feed hole center at which leads of defective product are cut | L1     | 11.0 max                               |      |
| Length of overlap between center lead and cover tape                                     | ℓ2     | 2.1typ.                                |      |

Note 1: Cumulative pitch error tolerance is ± 1 mm for 20 pitches.

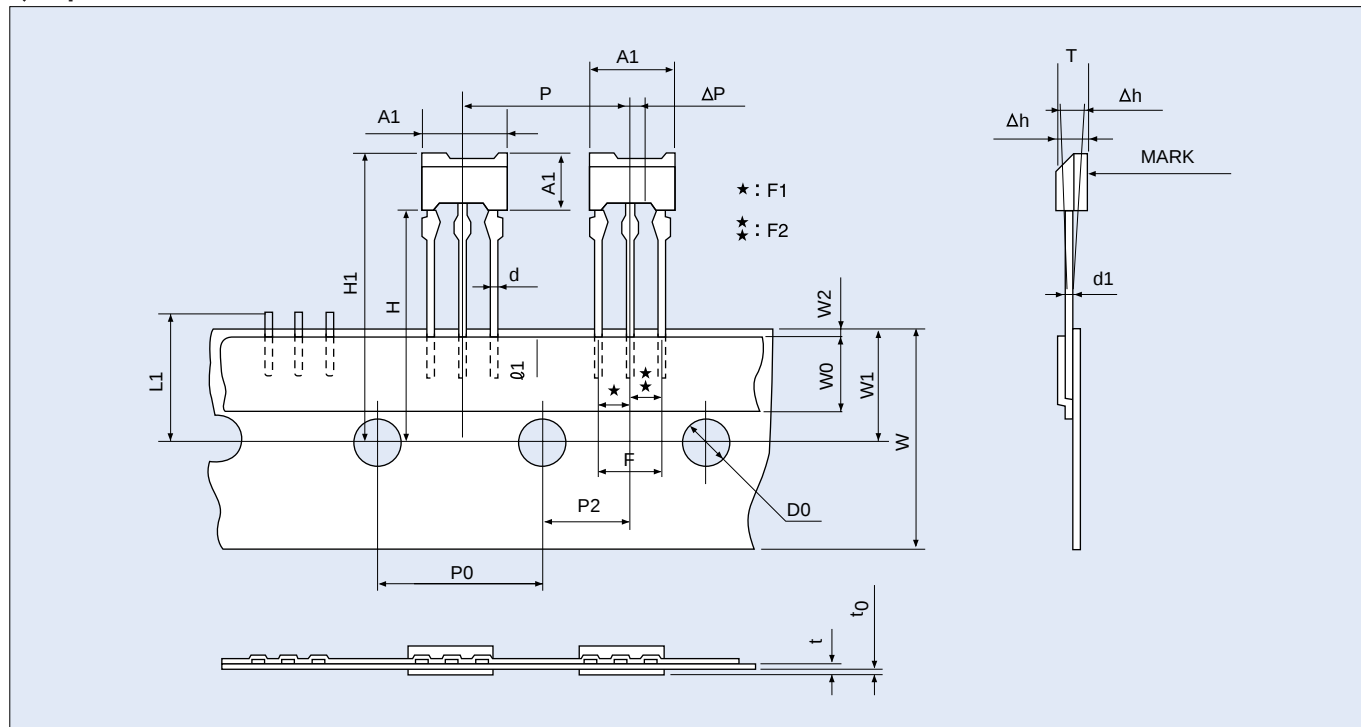
Note 2: Board thickness is 0.4 mm ± 0.1mm

## MSTM Type

### ◆Tape specifications

| Tape Type | Packing Type | Packing Quantity (PCS) | Weight (g)  |
|-----------|--------------|------------------------|-------------|
| TPE2      | Ammo pack    | 2000                   | Approx. 790 |

### ◆Tape dimensions



Unit: mm

| Name                            | Symbol | Dimensions                           | Note |
|---------------------------------|--------|--------------------------------------|------|
| Product width                   | A1     | 7.1 max                              |      |
| Product height                  | A      | 4.7 max                              |      |
| Product thickness               | T      | 2.7 max                              |      |
| Lead width)                     | d      | 0.45                                 |      |
| Lead thickness                  | d1     | 0.45                                 |      |
| Lead length attached to tape    | l1     | 2.60 min                             |      |
| Product pitch                   | P      | 12.7±0.5                             |      |
| Feed hole pitch                 | P0     | 12.7±0.2                             | 1    |
| Feed hole center to lead center | P2     | 6.35±0.4                             |      |
| Lead spacing                    | F1/F2  | 2.54 <sup>+0.3</sup> <sub>-0.2</sub> |      |
| Lead spacing differenc          | F1-F2  | 0±0.3                                |      |

| Name                                                                                     | Symbol | Dimensions                           | Note |
|------------------------------------------------------------------------------------------|--------|--------------------------------------|------|
| Product misalignment (1)                                                                 | △ h    | 0±1.0                                |      |
| Product misalignment (2)                                                                 | △ P    | 0±1.0                                |      |
| Tape width                                                                               | W      | 18.0 <sup>+1.0</sup> <sub>-0.5</sub> |      |
| Cover Tape width                                                                         | W0     | 6.0±0.3                              |      |
| Feed hole position error                                                                 | W1     | 9.0±0.5                              |      |
| Cover Tape position error                                                                | W2     | 0.5 max                              |      |
| Perpendicular distance from base of package to feed hole center                          | H      | 19.0±0.5                             |      |
| Perpendicular distance from top of package to feed hole center                           | H1     | 25.0 max                             |      |
| Feed hole diameter                                                                       | D0     | 4.0±0.2                              |      |
| Tape thickness                                                                           | t      | 0.6±0.2                              |      |
| Mount thickness                                                                          | t0     | 0.4±0.1                              |      |
| Perpendicular distance from feed hole center at which leads of defective product are cut | L1     | 11.0 max                             |      |

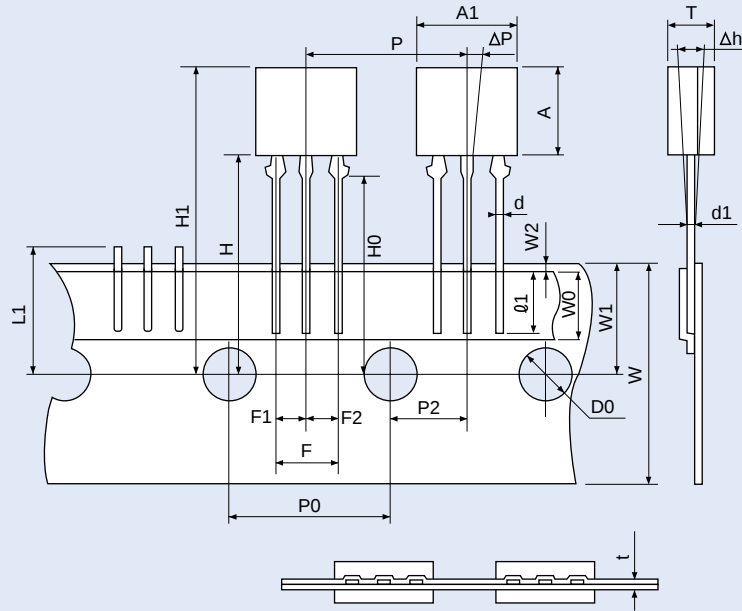
Note 1: Cumulative pitch error tolerance is ± 1 mm for 20 pitches.

## TPS Type

### ◆Tape specifications

| Tape Type | Packing Type | Packing Quantity (PCS) | Weight (g)   |
|-----------|--------------|------------------------|--------------|
| TP        | Ammo pack    | 2000                   | Approx. 1500 |

### ◆Tape dimensions



Unit: mm

| Name                            | Symbol  | Dimensions            | Note |
|---------------------------------|---------|-----------------------|------|
| Product width                   | A1      | $8.0 \pm 0.2$         |      |
| Product height                  | A       | $7.0 \pm 0.2$         |      |
| Product thickness               | T       | $3.5 \pm 0.2$         |      |
| Lead width                      | d       | $0.5^{+0.15}_{-0.05}$ |      |
| Lead thickness                  | d1      | $0.5^{+0.15}_{-0.05}$ |      |
| Lead length attached to tape    | φ1      | 4.5 Min               |      |
| Product pitch                   | P       | $12.7 \pm 1.0$        |      |
| Feed hole pitch                 | P0      | $12.7 \pm 0.2$        | 1    |
| Feed hole center to lead center | P2      | $6.35 \pm 0.5$        |      |
| Lead spacing                    | F1 / F2 | $2.5^{+0.4}_{-0.1}$   |      |
| Product misalignment (1)        | Δ h     | $0 \pm 2.0$           |      |

| Name                                                                                     | Symbol | Dimensions            | Note |
|------------------------------------------------------------------------------------------|--------|-----------------------|------|
| Product misalignment (2)                                                                 | Δ P    | $0 \pm 1.3$           |      |
| Tape width                                                                               | W      | $18.0^{+1.0}_{-0.5}$  |      |
| Cover Tape width                                                                         | W0     | $6.0 \pm 0.5$         |      |
| Feed hole position error                                                                 | W1     | $9.0^{+0.75}_{-0.5}$  |      |
| Cover Tape position error                                                                | W2     | 1.0 Max               |      |
| Perpendicular distance from base of package to feed hole center                          | H      | $17.5^{+0.75}_{-0.5}$ |      |
| Lead clinch height                                                                       | H0     | $16.0 \pm 0.5$        |      |
| Perpendicular distance from top of package to feed hole center                           | H1     | 32.25 Max             |      |
| Feed hole diameter                                                                       | D0     | $4.0 \pm 0.2$         |      |
| Tape thickness                                                                           | t      | $0.6 \pm 0.3$         | 2    |
| Perpendicular distance from feed hole center at which leads of defective product are cut | L1     | 11.0 Max              |      |

Note 1: Cumulative pitch error tolerance is  $\pm 1$  mm for 20 pitches.

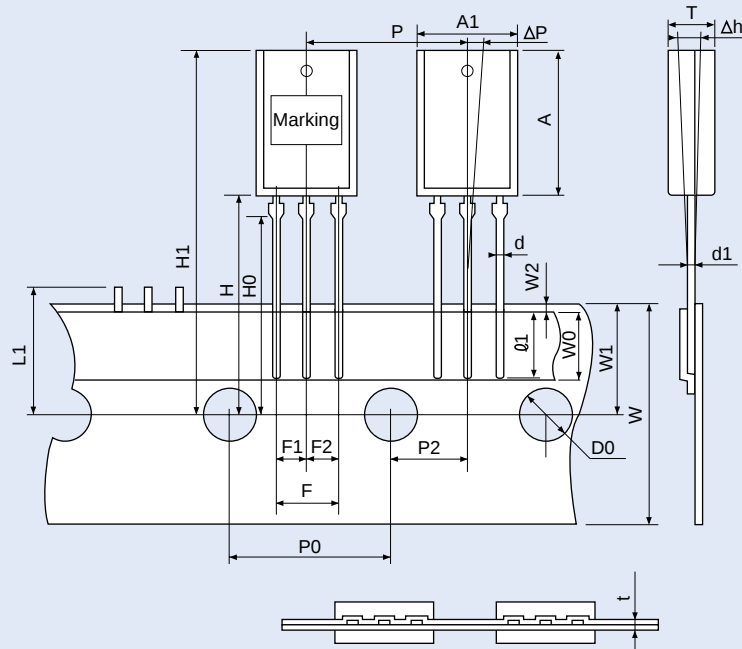
Note 2: Board thickness is  $0.4 \text{ mm} \pm 0.1 \text{ mm}$

## TPL Type

### ◆Tape dimensions

| Tape Type | Packing Type | Packing Quantity (PCS) | Weight (g)   |
|-----------|--------------|------------------------|--------------|
| TP        | Ammo pack    | 1000                   | Approx. 1800 |

### ◆Tape dimensions



Unit: mm

| Name                            | Symbol  | Dimensions                              | Note |
|---------------------------------|---------|-----------------------------------------|------|
| Product width                   | A1      | 10.0 ± 0.2                              |      |
| Product height                  | A       | 13.4 ± 0.4                              |      |
| Product thickness               | T       | 4.5 ± 0.2                               |      |
| Lead width                      | d       | 0.5 <sup>+0.15</sup> / <sub>-0.05</sub> |      |
| Lead thickness                  | d1      | 0.5 <sup>+0.15</sup> / <sub>-0.05</sub> |      |
| Lead length attached to tape    | q1      | 4.8 Min                                 |      |
| Product pitch                   | P       | 12.7 ± 1.0                              |      |
| Feed hole pitch                 | P0      | 12.7 ± 0.2                              | 1    |
| Feed hole center to lead center | P2      | 6.35 ± 0.5                              |      |
| Lead spacing                    | F1 / F2 | 2.5 <sup>+0.4</sup> / <sub>-0.1</sub>   |      |
| Product misalignment (1)        | Δ h     | 0 ± 2.0                                 |      |

| Name                                                                                     | Symbol | Dimensions                             | Note |
|------------------------------------------------------------------------------------------|--------|----------------------------------------|------|
| Product misalignment (2)                                                                 | Δ P    | 0 ± 1.3                                |      |
| Tape width                                                                               | W      | 18.0 <sup>+1.0</sup> / <sub>-0.5</sub> |      |
| Cover Tape width                                                                         | W0     | 6.5 ± 0.5                              |      |
| Feed hole position error                                                                 | W1     | 9.0 <sup>+0.75</sup> / <sub>-0.5</sub> |      |
| Cover Tape position error                                                                | W2     | 1.0 Max                                |      |
| Perpendicular distance from base of package to feed hole center                          | H      | 17.5 ± 0.5                             |      |
| Lead clinch height                                                                       | H0     | 16.0 ± 0.5                             |      |
| Perpendicular distance from top of package to feed hole center                           | H1     | 32.25 Max                              |      |
| Feed hole diameter                                                                       | D0     | 4.0 ± 0.2                              |      |
| Tape thickness                                                                           | t      | 0.6 ± 0.3                              | 2    |
| Perpendicular distance from feed hole center at which leads of defective product are cut | L1     | 11.0 Max                               |      |

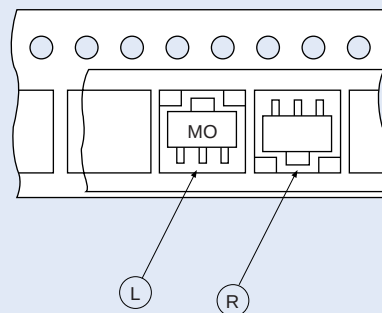
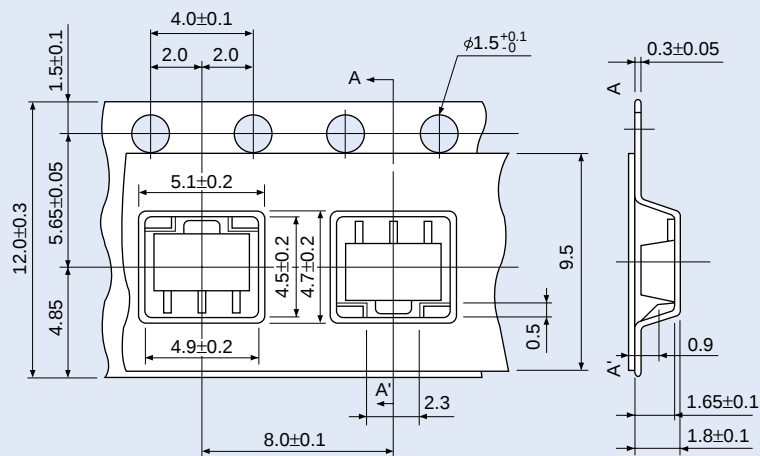
Note 1: Cumulative pitch error tolerance is ± 1 mm for 20 pitches.

Note 2: Board thickness is 0.4 mm ± 0.1mm

## PW-MINI Type(SOT-89)(SC-62)

### ◆Tape dimensions and device orientation

Unit : mm



Device orientation

L: TE12L

R: TE12R

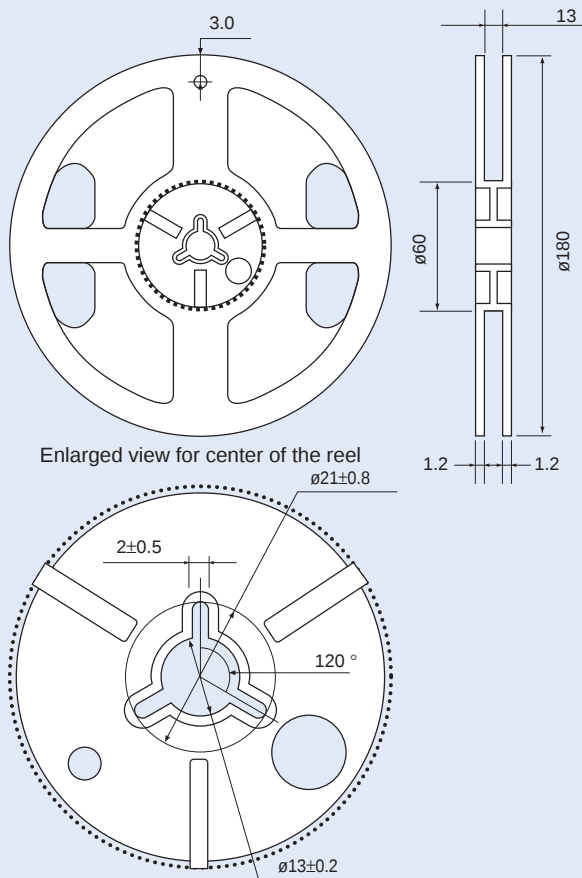
Packing quantity: 1000 / reel

Cumulative pitch error tolerance is less than  $\pm 0.2$  for 10 pitches.  
Material: plastic

### ◆Reel dimensions

Unit : mm

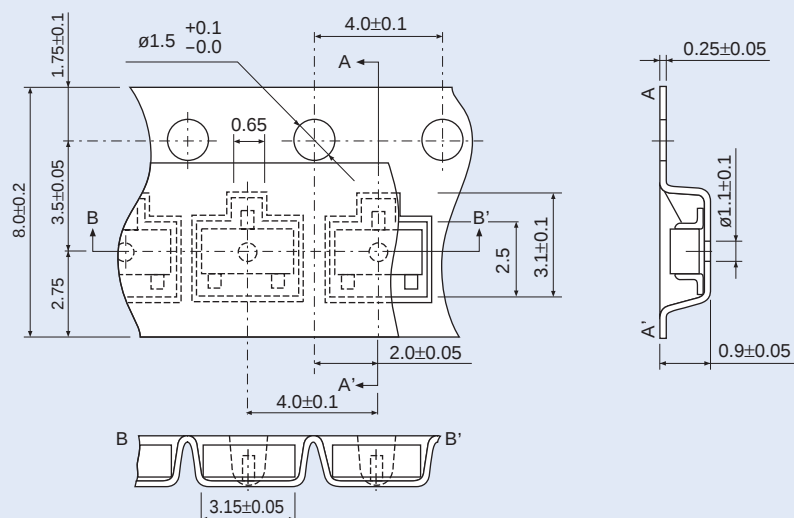
Material: plastic



## TSM Type

### ◆ Tape dimensions and device orientation

Unit: mm



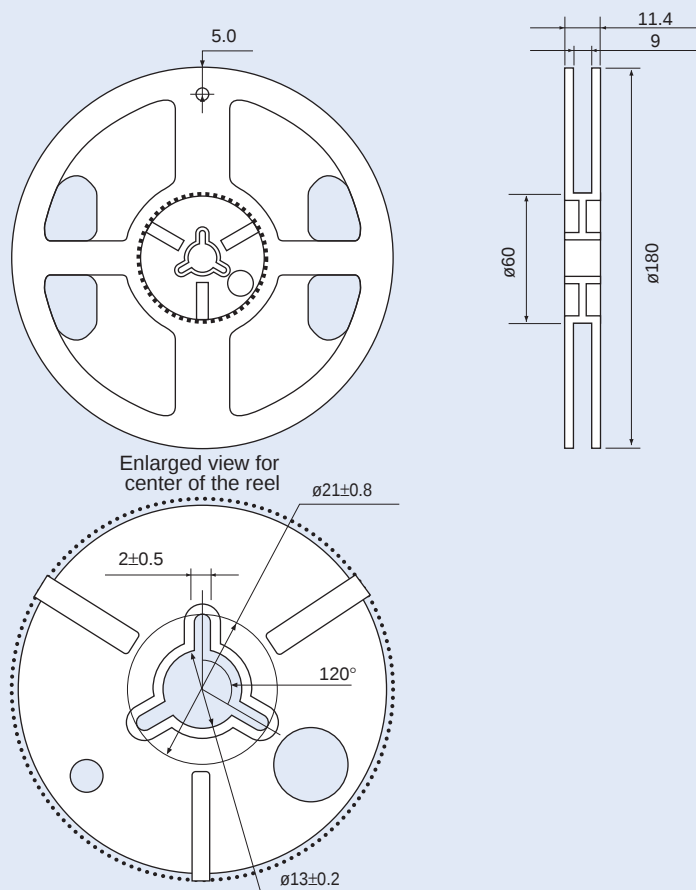
Cumulative pitch error tolerance is less than  $\pm 0.2$  for 10 pitches.  
Material: plastic

Device orientation: TE85L  
Packing quantity: 3000 / reel

### ◆ Reel dimensions

Unit: mm

Material: plastic



Enlarged view for center of the reel

### ◆ Tape dimensions and device orientation

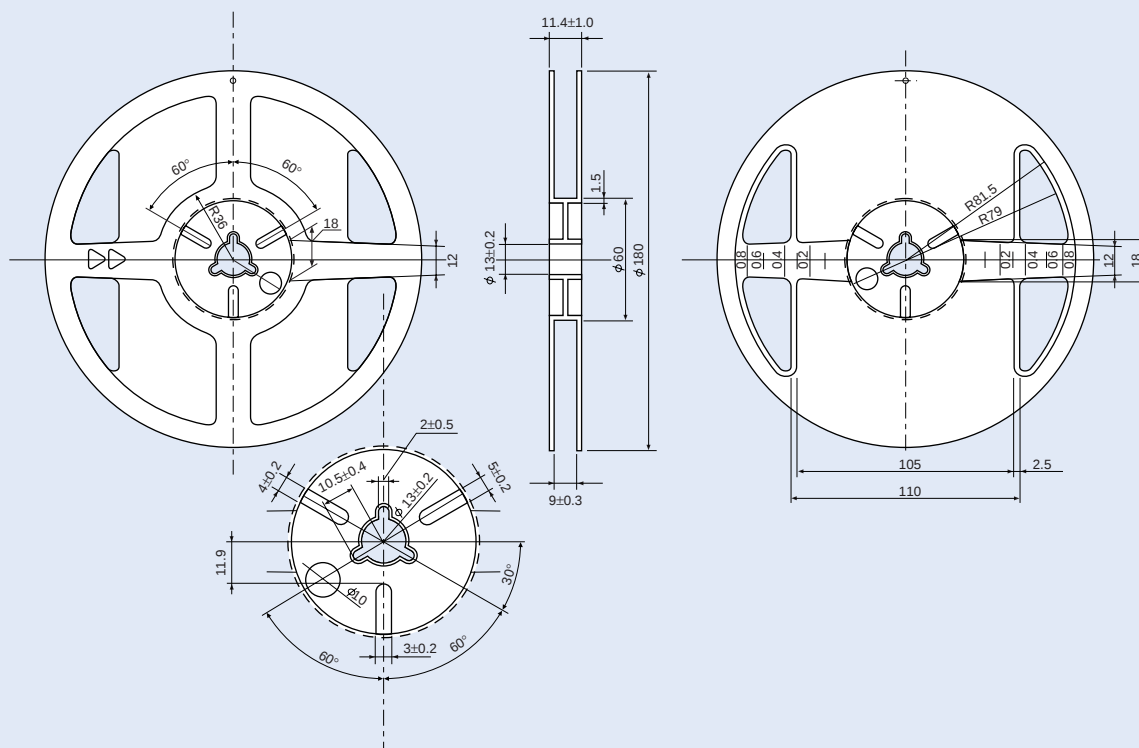
[illegible]

Cumulative pitch error tolerance is less than  $\pm 0.2$  for 10 pitches  
Material: Pvc with carbon

Device orientation: TE85L  
Packing quantity: 3000 / reel

### ◆ Reel dimentions

Material: plastic

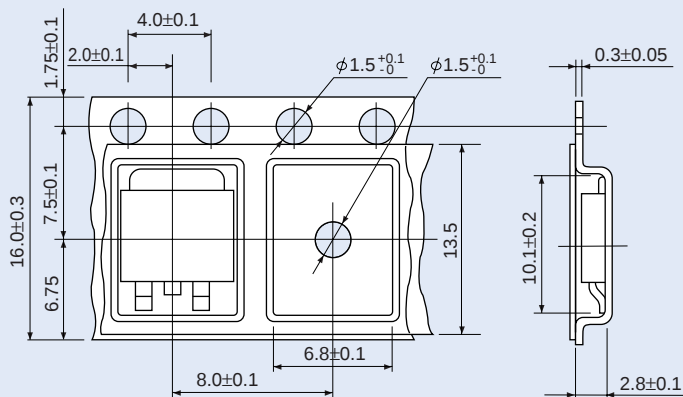


### Standard Tape Packing for Automated Pick and Place Assembly

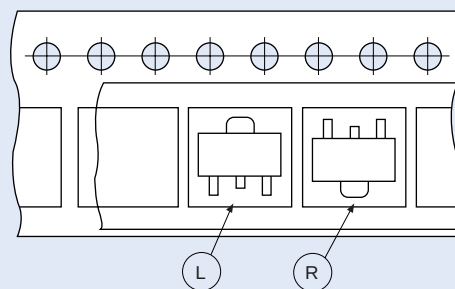
## New-PW-MOLD, DP Type

### ◆ Tape dimensions and device orientation

Unit: mm



Cumulative pitch error tolerance is less than  $\pm 0.2$  for 10 pitches.  
Material: plastic

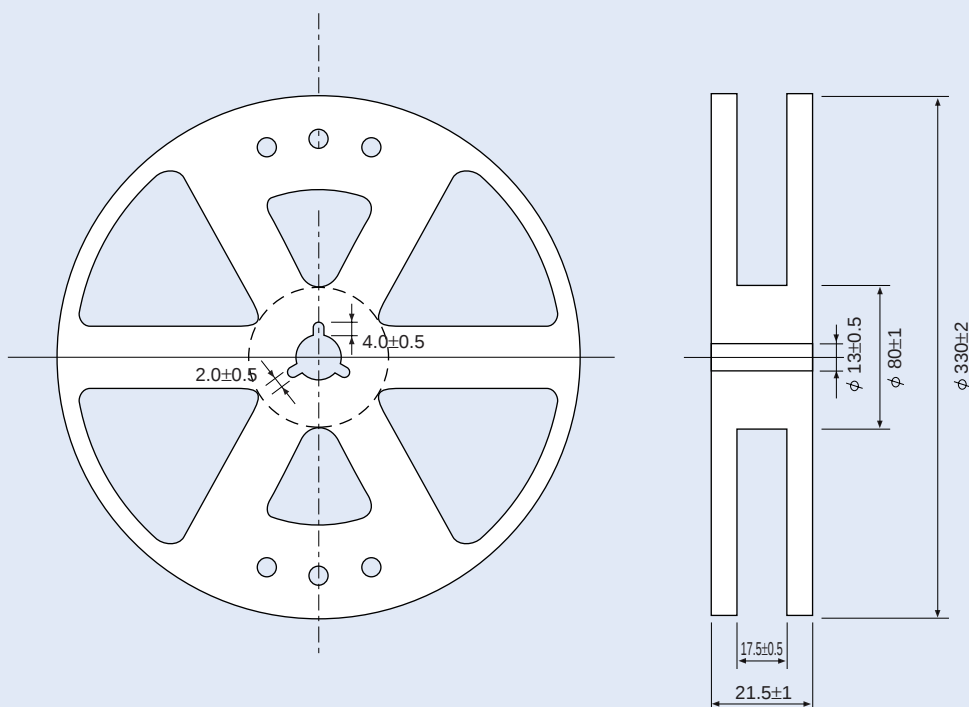


Device orientation  
L: TE16L1  
R: TE16R1  
Packing quantity: 2000 / reel

### ◆ Reel dimensions

Unit: mm

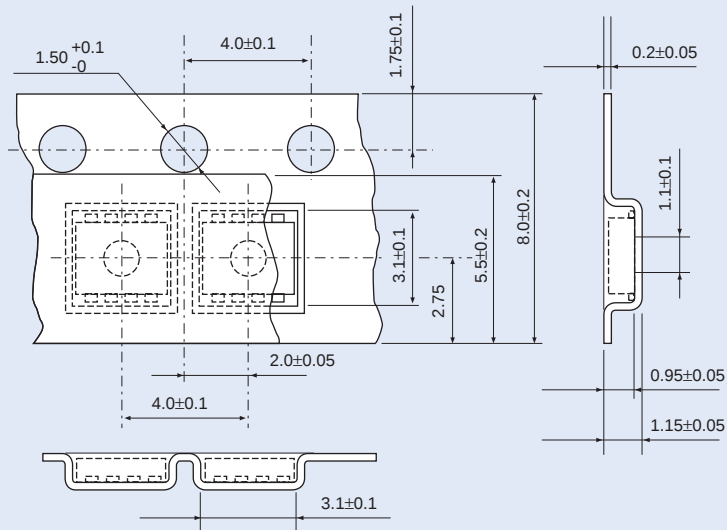
Material: paper



## PS-8 Type

### ◆ Tape dimensions and device orientation

Unit: mm



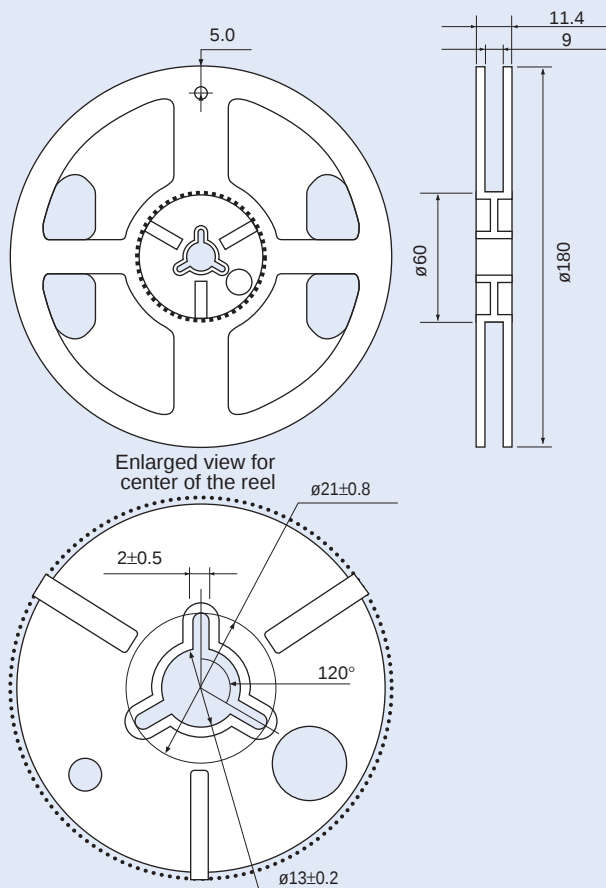
Cumulative pitch error tolerance is less than  $\pm 0.2$  for 10 pitches.  
Material: plastic

Device orientation  
L: TE85L  
Packing quantity: 3000 / reel

### ◆ Reel dimensions

Unit: mm

Material: plastic

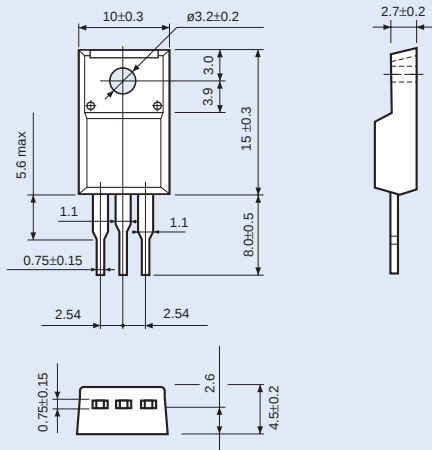




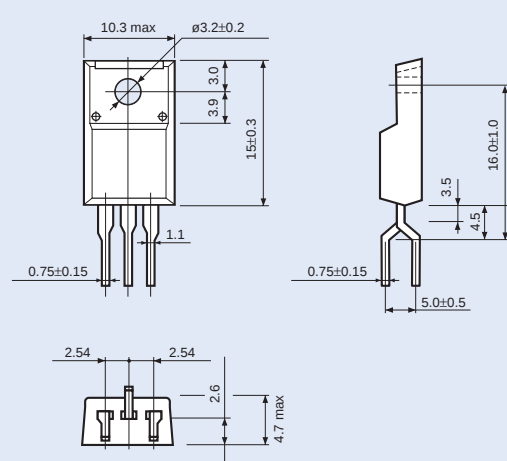
# List of Standard Lead-Formed Products

## TO-220(NIS) Type

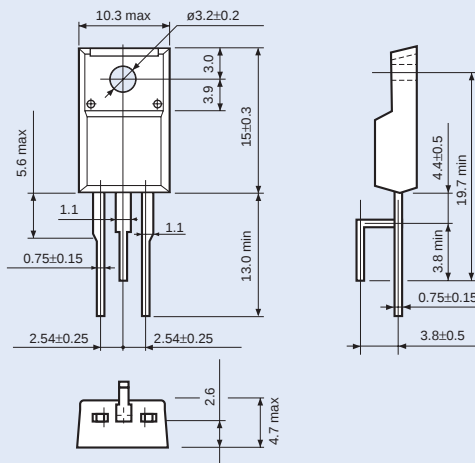
### 2-10R101A



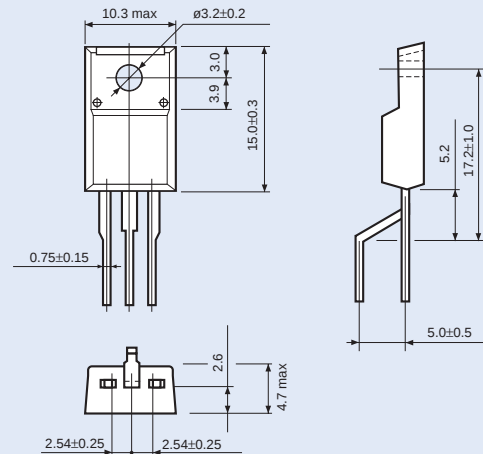
### 2-10R103A



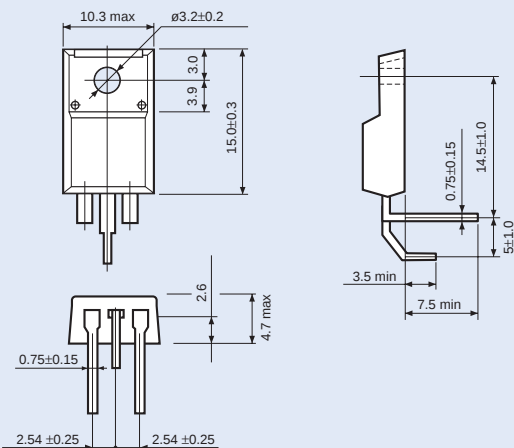
### 2-10R104A



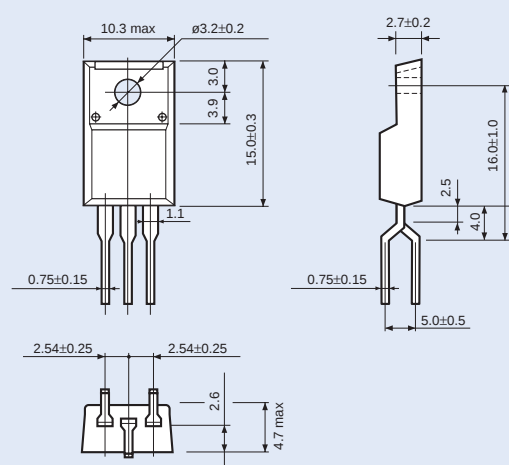
### 2-10R107A



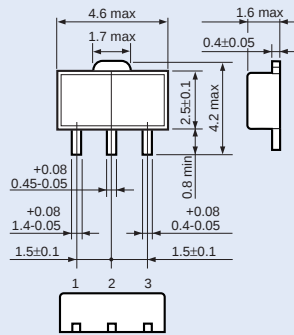
### 2-10R180A



### 2-10R181A

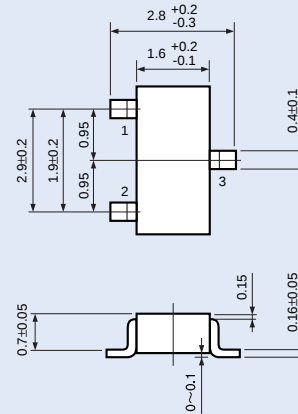


## POWER MINI



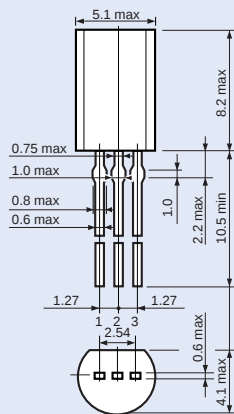
1. Base
2. Collector (heat sink)
3. Emitter

## TSM



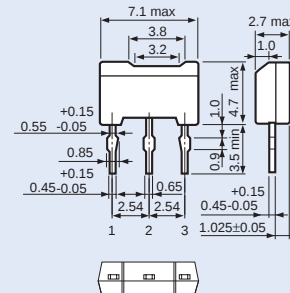
1. Base
2. Emitter
3. Collector

## L-STM



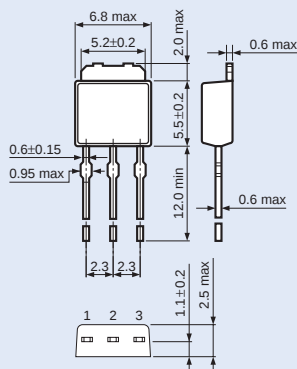
1. Emitter
2. Collector
3. Base

## MSTM



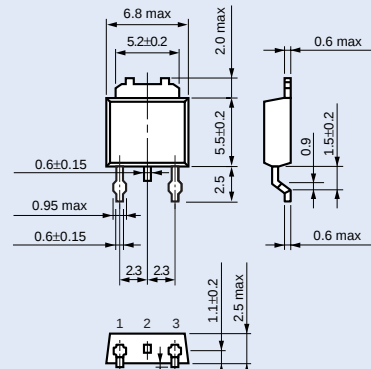
1. Base
2. Collector
3. Emitter

## POWER MOLD/DP



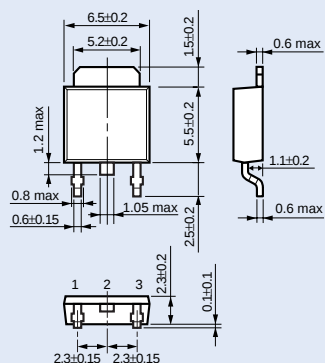
1. Base
2. Collector (heat sink)
3. Emitter

## DP LB



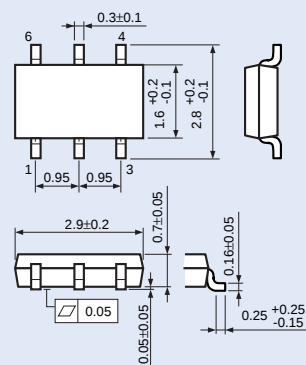
1. Base
2. Collector (heat sink)
3. Emitter

## New POWER MOLD



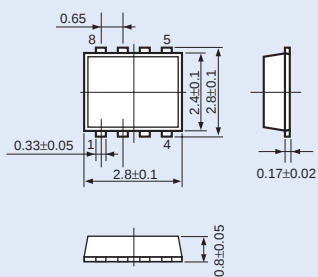
1. Base
2. Collector (heat sink)
3. Emitter

## VS-6



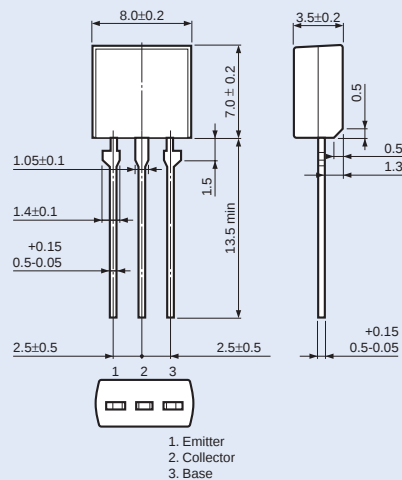
1. Collector
2. Collector
3. Base
4. Emitter
5. Collector
6. Collector

## PS-8



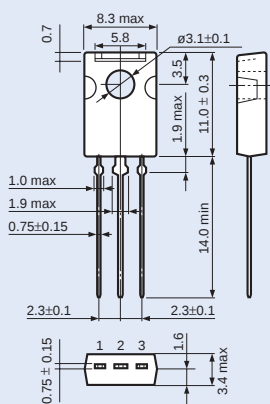
1. Collector
2. Collector
3. Collector
4. Base
5. Emitter
6. Collector
7. Collector
8. Collector

## TPS



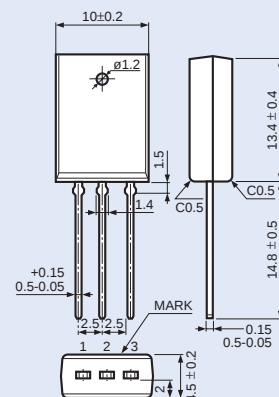
1. Emitter
2. Collector
3. Base

## TO-126(IS)



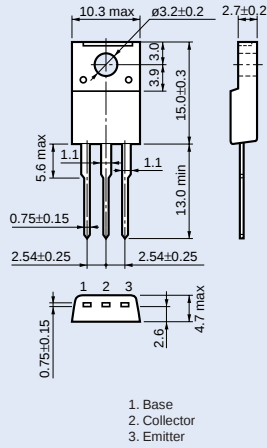
1. Emitter
2. Collector
3. Base

## TPL

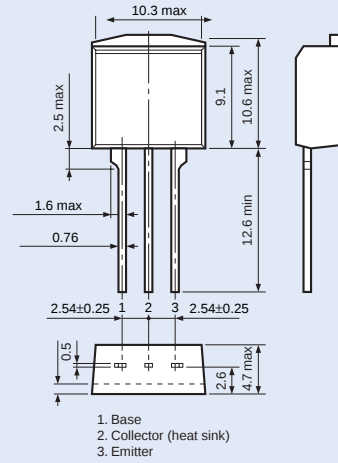


1. Base
2. Collector
3. Emitter

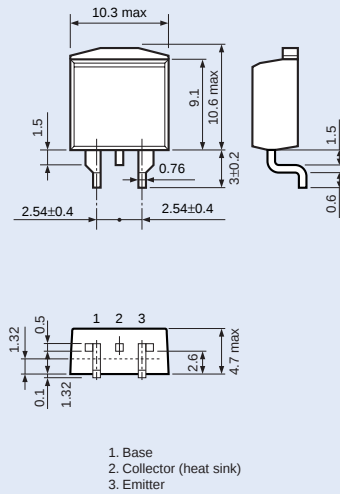
### TO-220 TYPE TO-220 (NIS)



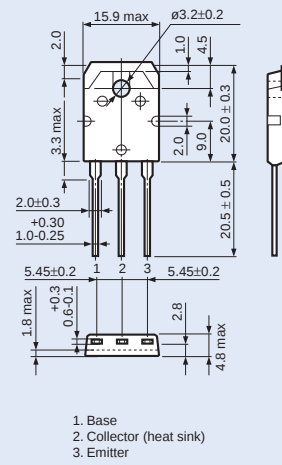
### TO-220 TYPE TO-220FL



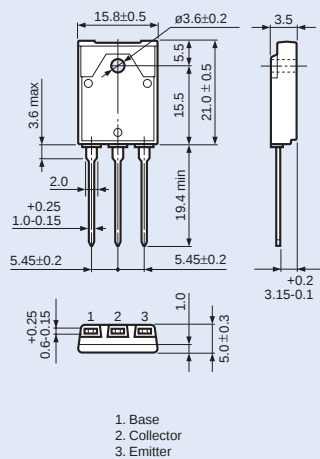
### TO-220 TYPE TO-220SM



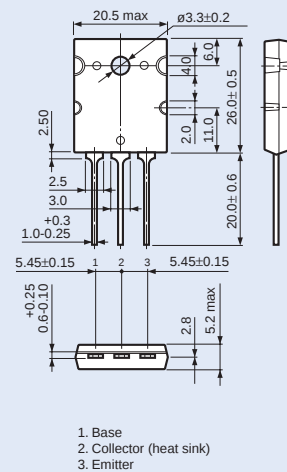
### TO-3P TYPE TO-3P(N)



### TO-3P TYPE TO-3P(N)IS



### LARGE TO-3 TYPE TO-3P(L)



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(As of April 1, 2003)

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