

PNP Transistors

**National Semiconductor**  
**General Purpose Amplifiers and Switches**

| Type No.                                          | Case Style | V <sub>CB0</sub> (V)<br>Min | V <sub>CEO</sub> (V)<br>Min | V <sub>EB0</sub> (V)<br>Min | ICES*<br>ICB0 @ (nA)<br>Max | V <sub>CB</sub> (V)<br>Max | h <sub>FE</sub> Min<br>I <sub>C</sub> @ (mA)<br>Max | V <sub>CE</sub> (V)<br>Max | V <sub>BE</sub> (SAT) (V)<br>Min | I <sub>C</sub> (mA)<br>Max | C <sub>OB</sub> (pF)<br>Max | f <sub>T</sub> (MHz)<br>Min | I <sub>C</sub> (mA)<br>Max | t <sub>OFF</sub> (ns)<br>Max | NF (dB)<br>Max | Test Conditions | Process No. |
|---------------------------------------------------|------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|----------------------------|-----------------------------------------------------|----------------------------|----------------------------------|----------------------------|-----------------------------|-----------------------------|----------------------------|------------------------------|----------------|-----------------|-------------|
| 2N2904                                            | TO-5       | 60                          | 40                          | 5                           | 20                          | 50                         | 20                                                  | 0.4                        | 1.3                              | 50                         | 8                           | 200                         | 50                         | 100                          |                | (Note 2)        | 63          |
| 2N2904A                                           | TO-5       | 60                          | 60                          | 5                           | 10                          | 50                         | 40                                                  | 0.4                        | 1.3                              | 50                         | 8                           | 200                         | 50                         | 100                          |                | (Note 2)        | 63          |
| 2N2905<br>also<br>Avail.<br>JAN/TX/V<br>Versions  | TO-5       | 60                          | 40                          | 5                           | 20                          | 50                         | 30                                                  | 0.4                        | 1.3                              | 50                         | 8                           | 200                         | 50                         | 100                          |                | (Note 2)        | 63          |
| 2N2905A<br>also<br>Avail.<br>JAN/TX/V<br>Versions | TO-5       | 60                          | 60                          | 5                           | 10                          | 50                         | 100                                                 | 0.4                        | 1.3                              | 50                         | 8                           | 200                         | 50                         | 100                          |                | (Note 2)        | 63          |
| 2N2906                                            | TO-18      | 60                          | 40                          | 5                           | 20                          | 50                         | 20                                                  | 0.4                        | 1.3                              | 50                         | 8                           | 200                         | 50                         | 100                          |                | (Note 2)        | 63          |

## General Purpose Amplifiers and Switches (Continued)

| Type No.                                          | Case Style    | V <sub>CE0</sub><br>(V)<br>Min | V <sub>CE0</sub><br>(V)<br>Min | V <sub>BE0</sub><br>(V)<br>Min | I <sub>CS</sub> <sup>*</sup><br>I <sub>CB0</sub> @ V <sub>CB</sub><br>(mA)<br>Max | I <sub>FE</sub> @ I <sub>C</sub> & V <sub>CE</sub><br>(mA)<br>Min Max | V <sub>CE(SAT)</sub><br>(V) &<br>Max | V <sub>BE(SAT)</sub><br>(V) @<br>Min Max | I <sub>C</sub><br>(mA)<br>Max | CoB<br>(pF)<br>Max | f <sub>T</sub><br>(MHz) @<br>Min Max | I <sub>C</sub><br>(mA)<br>Max | t <sub>OFF</sub><br>(ns)<br>Max | NF<br>(dB)<br>Max | Test<br>Conditions | Process<br>No. |
|---------------------------------------------------|---------------|--------------------------------|--------------------------------|--------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------|--------------------------------------|------------------------------------------|-------------------------------|--------------------|--------------------------------------|-------------------------------|---------------------------------|-------------------|--------------------|----------------|
| 2N2906A                                           | TO-18         | 60                             | 60                             | 5                              | 10 50                                                                             | 40 500 10<br>40 120 150 10<br>40 10 10 10<br>40 1 10 10<br>40 0.1 10  | 0.4 1.3 150<br>1.6 2.6 500           |                                          |                               | 8                  | 200 50                               | 100                           |                                 |                   | (Note 2)           | 63             |
| 2N2907<br>also<br>Avail.<br>JAN/TX/V<br>Versions  | TO-18         | 60                             | 40                             | 5                              | 20 50                                                                             | 35 500 10<br>100 300 150 10<br>75 10 10 10<br>50 1 10<br>35 0.1 10    | 0.4 1.3 150<br>1.6 2.6 500           |                                          |                               | 8                  | 200 50                               | 100                           |                                 |                   | (Note 2)           | 63             |
| 2N2907A<br>also<br>Avail.<br>JAN/TX/V<br>Versions | TO-18         | 60                             | 60                             | 5                              | 10 50                                                                             | 50 500 10<br>100 300 150 10<br>100 10 10 10<br>100 1 10<br>75 0.1 10  | 0.4 1.3 150<br>1.6 2.6 500           |                                          |                               | 8                  | 200 50                               | 100                           |                                 |                   | (Note 2)           | 63             |
| 2N3638                                            |               | Same as PN3638                 |                                |                                |                                                                                   |                                                                       |                                      |                                          |                               |                    |                                      |                               |                                 |                   |                    | 63             |
| 2N3638A                                           |               | Same as PN3638A                |                                |                                |                                                                                   |                                                                       |                                      |                                          |                               |                    |                                      |                               |                                 |                   |                    | 63             |
| 2N3644                                            |               | Same as PN3644                 |                                |                                |                                                                                   |                                                                       |                                      |                                          |                               |                    |                                      |                               |                                 |                   |                    | 63             |
| 2N3645                                            |               | Same as PN3645                 |                                |                                |                                                                                   |                                                                       |                                      |                                          |                               |                    |                                      |                               |                                 |                   |                    | 63             |
| 2N3702                                            | TO-92<br>(94) | 40                             | 25                             | 5                              | 100 20                                                                            | 60 300 50 5                                                           | 0.25                                 |                                          | 50                            | 12                 | 100 50                               |                               |                                 |                   |                    | 63             |
| 2N3703                                            | TO-92<br>(94) | 50                             | 30                             | 5                              | 100 20                                                                            | 30 150 50 5                                                           | 0.25                                 |                                          | 50                            | 12                 | 100 50                               |                               |                                 |                   |                    | 63             |
| 2N4142                                            |               | Same as PN4142                 |                                |                                |                                                                                   |                                                                       |                                      |                                          |                               |                    |                                      |                               |                                 |                   |                    | 63             |
| 2N4143                                            |               | Same as PN4143                 |                                |                                |                                                                                   |                                                                       |                                      |                                          |                               |                    |                                      |                               |                                 |                   |                    | 63             |
| 2N4290                                            | TO-92<br>(94) | 30                             | 20                             | 5                              | 500 20                                                                            | 50 300 100 10<br>40 10 10 10<br>20 0.1 10                             | 0.4 1.5 100                          |                                          | 10                            | 10                 | 100 10                               |                               |                                 |                   |                    | 63             |
| 2N4291                                            | TO-92<br>(94) | 40                             | 30                             | 6                              | 200 30                                                                            | 100 300 100 10<br>50 10 10 10<br>30 0.1 10                            | 0.4 1.5 100                          |                                          | 10                            | 10                 | 100 10                               |                               |                                 |                   |                    | 63             |

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## General Purpose Amplifiers and Switches (Continued)

| Type No. | Case Style | V <sub>CB0</sub> (V)<br>Min | V <sub>CEO</sub> (V)<br>Min | V <sub>EB0</sub> (V)<br>Min | I <sub>CS</sub> *<br>I <sub>CB0</sub> @ (V)<br>(mA) Max | h <sub>FE</sub> @ I <sub>C</sub> & V <sub>CE</sub><br>Min Max | V <sub>CE(SAT)</sub> (V)<br>Max | V <sub>BE(SAT)</sub> (V)<br>Min Max | I <sub>C</sub> @ (mA)<br>Max | C <sub>OB</sub> (pF)<br>Max | f <sub>T</sub> (MHz)<br>Min Max | I <sub>C</sub> (mA)<br>Max | t <sub>OFF</sub> (ns)<br>Max | NF (dB)<br>Max | Test Conditions | Process No. |
|----------|------------|-----------------------------|-----------------------------|-----------------------------|---------------------------------------------------------|---------------------------------------------------------------|---------------------------------|-------------------------------------|------------------------------|-----------------------------|---------------------------------|----------------------------|------------------------------|----------------|-----------------|-------------|
| 2N4402   | TO-92 (94) | 40                          | 40                          | 5                           |                                                         | 20 500 2<br>50 150 2<br>50 10 1<br>30 1 1                     | 0.4<br>0.75                     | 0.7 0.95 150<br>1.3 500             | 10                           | 150                         | 20                              | 255                        |                              | (Note 4)       | 63              |             |
| 2N4403   | TO-92 (92) | 40                          | 40                          | 5                           |                                                         | 20 500 2<br>100 300 150 2<br>100 10 1<br>60 1 1<br>30 0.1 1   | 0.4<br>0.75                     | 0.75 0.95 150<br>1.3 500            | 10                           | 200                         | 20                              | 255                        |                              | (Note 4)       | 63              |             |
| 2N4971   |            | Same as PN2906              |                             |                             |                                                         |                                                               |                                 |                                     |                              |                             |                                 |                            |                              |                |                 | 63          |
| 2N4972   |            | Same as PN2907              |                             |                             |                                                         |                                                               |                                 |                                     |                              |                             |                                 |                            |                              |                |                 | 63          |
| 2N5142   |            | Same as PN5142              |                             |                             |                                                         |                                                               |                                 |                                     |                              |                             |                                 |                            |                              |                |                 | 63          |
| 2N5143   |            | Same as PN5143              |                             |                             |                                                         |                                                               |                                 |                                     |                              |                             |                                 |                            |                              |                |                 | 63          |
| 2N5221   | TO-92 (92) | 15                          | 15                          | 3                           | 100                                                     | 30 600 50 10<br>30 10 10                                      | 0.5                             | 1.1 150                             | 15                           | 100                         | 20                              |                            |                              |                |                 | 63          |
| 2N5226   | TO-92 (92) | 25                          | 25                          | 4                           | 300                                                     | 30 600 50 10<br>25 10 10                                      | 0.8                             | 1.0 100                             | 20                           | 50                          | 20                              |                            |                              |                |                 | 63          |
| 2N5354   | TO-92 (94) | 25                          | 25                          | 4                           | 100                                                     | 40 120 50 1                                                   | 0.25                            | 50                                  | 8                            |                             |                                 |                            |                              |                |                 | 63          |
| 2N5355   | TO-92 (94) | 25                          | 25                          | 4                           | 100                                                     | 100 300 50 1                                                  | 0.25                            | 50                                  | 8                            |                             |                                 |                            |                              |                |                 | 63          |
| 2N5365   | TO-92 (94) | 40                          | 40                          | 4                           | 100                                                     | 20 300 5<br>40 120 50 1<br>32 2 1                             | 0.25                            | 1.1 50<br>2.0 200                   | 8                            |                             |                                 |                            |                              |                |                 | 63          |
| 2N5366   | TO-92 (94) | 40                          | 40                          | 4                           | 100                                                     | 40 300 5<br>100 300 50 1<br>80 2 1                            | 0.25                            | 1.1 50<br>2.0 200                   | 8                            |                             |                                 |                            |                              |                |                 | 63          |
| 2N5447   | TO-92 (97) | 40                          | 25                          | 5                           |                                                         | 60 300 50 8                                                   | 0.25                            | 50                                  | 12                           | 100                         | 50                              |                            |                              |                |                 | 63          |
| 2N5817   | TO-92 (97) | 50                          | 40                          | 5                           | 100                                                     | 25 500 2<br>100 200 2                                         | 0.75                            | 1.2 500                             | 15                           | 100                         | 50                              |                            |                              |                |                 | 63          |

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## General Purpose Amplifiers and Switches (Continued)

| Type No. | Case Style    | V <sub>CEO</sub><br>(V)<br>Min | V <sub>CE0</sub><br>(V)<br>Min | V <sub>EB0</sub><br>(V)<br>Min | I <sub>CS</sub> *<br>I <sub>CB0</sub> @ (V)<br>(mA)<br>Max | h <sub>FE</sub><br>Min | I <sub>C</sub> @ (V)<br>(mA)<br>Max | V <sub>CE(SAT)</sub><br>(V) &<br>Max | V <sub>BE(SAT)</sub><br>(V) @<br>Min | I <sub>C</sub><br>(mA)<br>Max | COB<br>(pF)<br>Max | f <sub>T</sub><br>(MHz) @<br>Min | I <sub>C</sub><br>(mA)<br>Max | t <sub>OFF</sub><br>(ns)<br>Max | NF<br>(dB)<br>Max | Test<br>Conditions | Process<br>No. |
|----------|---------------|--------------------------------|--------------------------------|--------------------------------|------------------------------------------------------------|------------------------|-------------------------------------|--------------------------------------|--------------------------------------|-------------------------------|--------------------|----------------------------------|-------------------------------|---------------------------------|-------------------|--------------------|----------------|
| MPQ2907  | TO-116        | 60                             | 40                             | 5                              | 50                                                         | 75                     | 10                                  | 0.4                                  | 1.3                                  | 150                           | 8                  | 200                              | 20                            |                                 |                   |                    | 63             |
| MPS3638  | TO-92<br>(92) | Same as PN3638                 |                                |                                |                                                            |                        |                                     |                                      |                                      |                               |                    |                                  |                               |                                 |                   |                    | 63             |
| MPS3638A | TO-92<br>(92) | Same as PN3638A                |                                |                                |                                                            |                        |                                     |                                      |                                      |                               |                    |                                  |                               |                                 |                   |                    | 63             |
| MPS3644  | TO-92<br>(92) | Same as PN3644                 |                                |                                |                                                            |                        |                                     |                                      |                                      |                               |                    |                                  |                               |                                 |                   |                    | 63             |
| MPS3645  | TO-92<br>(92) | Same as PN3645                 |                                |                                |                                                            |                        |                                     |                                      |                                      |                               |                    |                                  |                               |                                 |                   |                    | 63             |
| MPS3702  | TO-92<br>(92) | 40                             | 25                             | 5                              | 100                                                        | 60                     | 300                                 | 0.25                                 |                                      | 50                            | 12                 | 100                              | 50                            |                                 |                   |                    | 63             |
| MPS3703  | TO-92<br>(92) | 50                             | 30                             | 5                              | 100                                                        | 30                     | 150                                 | 0.25                                 |                                      | 50                            | 12                 | 100                              | 50                            |                                 |                   |                    | 63             |
| MPS6533  | TO-92<br>(92) | 40                             | 40                             | 4                              | 50                                                         | 25                     | 500                                 | 0.5                                  | 1.0                                  | 100                           | 6                  |                                  |                               |                                 |                   |                    | 63             |
|          |               |                                |                                |                                |                                                            | 40                     | 120                                 |                                      |                                      |                               |                    |                                  |                               |                                 |                   |                    |                |
|          |               |                                |                                |                                |                                                            | 30                     | 10                                  |                                      |                                      |                               |                    |                                  |                               |                                 |                   |                    |                |
| MPS6534  | TO-92<br>(92) | 40                             | 40                             | 4                              | 50                                                         | 50                     | 500                                 | 0.3                                  | 1.0                                  | 100                           | 6                  |                                  |                               |                                 |                   |                    | 63             |
|          |               |                                |                                |                                |                                                            | 90                     | 270                                 |                                      |                                      |                               |                    |                                  |                               |                                 |                   |                    |                |
|          |               |                                |                                |                                |                                                            | 60                     | 10                                  |                                      |                                      |                               |                    |                                  |                               |                                 |                   |                    |                |
| MPS6535  | TO-92<br>(92) | 30                             | 30                             | 4                              | 100                                                        | 30                     | 100                                 | 0.5                                  | 1.2                                  | 100                           | 6                  |                                  |                               |                                 |                   |                    | 63             |
| PN2906   | TO-92<br>(92) | 60                             | 40                             | 5                              | 20                                                         | 20                     | 500                                 | 0.4                                  | 1.3                                  | 150                           | 8                  | 200                              | 50                            | 100                             |                   | (Note 2)           | 63             |
|          |               |                                |                                |                                |                                                            | 40                     | 120                                 |                                      |                                      |                               |                    |                                  |                               |                                 |                   |                    |                |
|          |               |                                |                                |                                |                                                            | 35                     | 10                                  | 1.6                                  | 2.6                                  | 500                           |                    |                                  |                               |                                 |                   |                    |                |
|          |               |                                |                                |                                |                                                            | 25                     | 1                                   |                                      |                                      |                               |                    |                                  |                               |                                 |                   |                    |                |
|          |               |                                |                                |                                |                                                            | 20                     | 0.1                                 |                                      |                                      |                               |                    |                                  |                               |                                 |                   |                    |                |

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General Purpose Amplifiers and Switches (Continued)

| Type No. | Case Style | V <sub>CB0</sub> (V)<br>Min | V <sub>CE0</sub> (V)<br>Min | V <sub>EB0</sub> (V)<br>Min | ICES*<br>ICB0 @ V <sub>CB</sub> (nA)<br>Max | hFE @ IC & VCE<br>Min Max (mA) (V)                                                   | VCE(SAT)<br>(V) &<br>Max                      | VBE(SAT)<br>(V) @<br>Min Max | IC (mA)<br>Max | COB<br>(pF)<br>Max | f <sub>T</sub><br>(MHz)<br>Min Max | IC (mA)<br>Max | t <sub>OFF</sub><br>(ns)<br>Max | NF<br>(dB)<br>Max | Test Conditions | Process No. |
|----------|------------|-----------------------------|-----------------------------|-----------------------------|---------------------------------------------|--------------------------------------------------------------------------------------|-----------------------------------------------|------------------------------|----------------|--------------------|------------------------------------|----------------|---------------------------------|-------------------|-----------------|-------------|
| PN2906A  | TO-92 (92) | 60                          | 60                          | 5                           | 10 50                                       | 40 500 10<br>40 120 150 10<br>40 10 10 10<br>40 1 10 10<br>40 0.1 10                 | 0.4 1.3 150<br>1.6 2.6 500                    |                              | 50             | 8                  | 200                                | 50             | 100                             |                   | (Note 2)        | 63          |
| PN2907   | TO-92 (92) | 60                          | 40                          | 5                           | 20 50                                       | 30 500 10<br>100 300 150 10<br>75 10 10 10<br>60 1 10 10<br>35 0.1 10                | 0.4 1.3 150<br>1.6 2.6 500                    |                              | 50             | 8                  | 200                                | 50             | 100                             |                   | (Note 2)        | 63          |
| PN2907A  | TO-92 (92) | 60                          | 60                          | 5                           | 20 50                                       | 50 500 10<br>100 300 150 10<br>100 10 10 10<br>100 1 10 10<br>75 0.1 10              | 0.4 1.3 150<br>1.6 2.6 500                    |                              | 50             | 8                  | 200                                | 50             | 100                             |                   | (Note 2)        | 63          |
| PN3638   | TO-92 (92) | 25                          | 25                          | 4                           | 35* 15                                      | 20 300 2<br>20 50 1<br>30 10 10                                                      | 0.25 1.1 50<br>1.0 0.8 2.0 300                |                              | 50             | 20                 | 100                                | 50             | 170                             |                   | (Note 1)        | 63          |
| PN3636A  | TO-92 (92) | 25                          | 25                          | 4                           | 25* 15                                      | 20 300 2<br>100 50 1<br>100 10 10 10<br>80 1 10                                      | 0.25 1.1 50<br>1.0 0.8 2.0 300                |                              | 50             | 10                 | 150                                | 50             | 170                             |                   | (Note 1)        | 63          |
| PN3644   | TO-92 (92) | 45                          | 45                          | 5                           | 35* 30                                      | 20 300 2<br>100 300 150 10<br>80 240 50 1<br>100 10 10 10<br>80 1 10 10<br>40 0.1 10 | 0.25 1.0 50<br>0.4 1.3 150<br>1.0 0.8 2.0 300 |                              | 20             | 8                  | 200                                | 20             | 100                             |                   | (Note 4)        | 63          |
| PN3645   | TO-92 (92) | 60                          | 60                          | 5                           | 35* 50                                      | 20 300 2<br>100 300 150 10<br>80 240 50 1<br>100 10 10 10<br>80 1 10 10<br>40 0.1 10 | 0.25 1.0 50<br>0.4 1.3 150<br>1.0 0.8 2.0 300 |                              | 20             | 8                  | 200                                | 20             | 100                             |                   | (Note 4)        | 63          |

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## General Purpose Amplifiers and Switches (Continued)

| Type No. | Case Style  | V <sub>CB0</sub> (V)<br>Min | V <sub>CE0</sub> (V)<br>Min | V <sub>BE0</sub> (V)<br>Min | ICES*<br>I <sub>CB0</sub> @ V <sub>CB</sub><br>(nA) Max | h <sub>FE</sub> @ I <sub>C</sub> & V <sub>CE</sub><br>Min Max               | V <sub>CE(SAT)</sub> (V) & V <sub>BE(SAT)</sub> (V)<br>Max Min | I <sub>C</sub> (mA)<br>Max | C <sub>OB</sub> (pF)<br>Max | f <sub>T</sub> (MHz)<br>Min Max | I <sub>C</sub> (mA)<br>Max | t <sub>OFF</sub> (ns)<br>Max | NF (dB)<br>Max | Test Conditions | Process No. |
|----------|-------------|-----------------------------|-----------------------------|-----------------------------|---------------------------------------------------------|-----------------------------------------------------------------------------|----------------------------------------------------------------|----------------------------|-----------------------------|---------------------------------|----------------------------|------------------------------|----------------|-----------------|-------------|
| PN4142   | TO-92 (92)  | 60                          | 40                          | 5                           |                                                         | 20 500 10<br>20 150 1<br>40 120 150 10<br>35 10 10<br>25 1 10<br>20 0.1 10  | 0.4 1.3 150 500<br>1.6 2.6 500                                 |                            | 8                           | 200 50                          | 100                        |                              |                | (Note 12)       | 63          |
| PN4143   | TO-92 (92)  | 60                          | 40                          | 5                           |                                                         | 30 500 10<br>50 150 1<br>100 300 150 10<br>75 10 10<br>50 1 10<br>35 0.1 10 | 0.4 1.3 150 500<br>1.6 2.6 500                                 |                            | 8                           | 200 50                          | 100                        |                              |                | (Note 12)       | 63          |
| PN5142   | TO-92 (92)  | 20                          | 20                          | 4                           | 50* 12                                                  | 15 300 10<br>30 50 1                                                        | 0.5 1.5 50 300<br>0.2 0.8 2.5 300                              |                            | 10                          | 100 50                          | 200                        |                              |                | (Note 1)        | 63          |
| PN5143   | TO-92 (92)  | 20                          | 20                          | 4                           | 50* 12                                                  | 15 300 10<br>30 50 1                                                        | 0.5 1.5 50 300<br>0.2 0.8 2.5 300                              |                            | 10                          | 100 50                          | 200                        |                              |                | (Note 1)        | 63          |
| TIS91    | TO-92 (94)  | 40                          | 40                          | 4                           | 100 20                                                  | 100 300 50 2                                                                | 0.25 0.6 1.0 50                                                |                            |                             |                                 |                            |                              |                |                 | 63          |
| TIS92    | TO-92 (97)  | 40                          | 40                          | 5                           | 100 20                                                  | 100 300 50 2                                                                | 0.25 0.6 1.0 50                                                |                            |                             |                                 |                            |                              |                |                 | 63          |
| TIS93    | TO-92 (97)  | 40                          | 40                          | 5                           | 100 20                                                  | 100 300 50 2                                                                | 0.25 0.6 1.0 50                                                |                            |                             |                                 |                            |                              |                |                 | 63          |
| TN2904A  | TO-237 (91) | 60                          | 60                          | 5                           | 10 50                                                   | 40 0.1 10<br>40 1.0 10<br>40 10 10<br>40 120 150 10<br>40 500 10            | 0.4 1.3 150 500<br>1.6 2.6 500                                 |                            | 8                           | 200 50                          | 100                        |                              |                | (Note 2)        | 63          |
| TN2905   | TO-237 (91) | 60                          | 40                          | 5                           | 20 50                                                   | 30 500 10<br>100 300 150 10<br>75 10 10<br>50 1 10<br>35 0.1 10             | 0.4 1.3 150 500<br>1.6 2.6 500                                 |                            | 8                           | 200 50                          | 100                        |                              |                | (Note 2)        | 63          |

## General Purpose Amplifiers and Switches (Continued)

| Type No. | Case Style     | V <sub>CE0</sub><br>(V)<br>Min | V <sub>BE0</sub><br>(V)<br>Min | I <sub>CE0</sub><br>(mA)<br>Max | I <sub>CE0</sub> @ V <sub>CE</sub><br>(mA)<br>Min Max   | V <sub>CE(SAT)</sub><br>(V) &<br>V <sub>BE(SAT)</sub><br>(V)<br>Max Min | I <sub>C</sub><br>(mA)<br>Max | C <sub>OB</sub><br>(pF)<br>Max | f <sub>T</sub><br>(MHz)<br>Min Max | I <sub>C</sub><br>(mA)<br>Max | t <sub>OFF</sub><br>(ns)<br>Max | NF<br>(dB)<br>Max | Test Conditions | Process No. |    |
|----------|----------------|--------------------------------|--------------------------------|---------------------------------|---------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------|--------------------------------|------------------------------------|-------------------------------|---------------------------------|-------------------|-----------------|-------------|----|
| TN2905A  | TO-237<br>(91) | 60                             | 5                              | 10                              | 50 100 500<br>100 300 150<br>100 10 10<br>75 0.1 10     | 0.4 1.3<br>1.6 2.6                                                      | 150 500                       | 8                              | 200                                | 50                            | 100                             |                   | (Note 2)        | 63          |    |
| 2N3905   | TO-92<br>(92)  | 40                             | 5                              |                                 | 15 100 1<br>30 50 1<br>50 150 10<br>40 1 1<br>30 0.1 1  | 0.25 0.65 0.85<br>0.4 0.95 50                                           | 10 10 50                      | 4.5                            | 200                                | 10                            | 260                             | 5                 | (Notes 5, 8)    | 66          |    |
| 2N3906   | TO-92<br>(92)  | 40                             | 40                             | 5                               | 30 100 1<br>80 50 1<br>100 300 10<br>80 1 1<br>60 0.1 1 | 0.25 0.65 0.85<br>0.4 0.95 50                                           | 10 10 50                      | 4.5                            | 250                                | 10                            | 300                             | 4                 | (Notes 5, 8)    | 66          |    |
| 2N4121   |                | Same as PN4121                 |                                |                                 |                                                         |                                                                         |                               |                                |                                    |                               |                                 |                   |                 |             | 66 |
| 2N4122   |                | Same as PN4122                 |                                |                                 |                                                         |                                                                         |                               |                                |                                    |                               |                                 |                   |                 |             | 66 |
| 2N4125   | TO-92<br>(92)  | 30                             | 30                             | 4                               | 25 50 2<br>50 150 2                                     | 0.4 0.95 50                                                             | 50 50                         | 4.5                            | 200                                | 10                            |                                 | 5                 | (Note 8)        | 66          |    |
| 2N4126   | TO-92<br>(92)  | 25                             | 25                             | 4                               | 60 50 1<br>120 360 2                                    | 0.4 0.95 50                                                             | 50 50                         | 4.5                            | 250                                | 10                            |                                 | 4                 | (Note 8)        | 66          |    |
| 2N4916   |                | Same as PN4916                 |                                |                                 |                                                         |                                                                         |                               |                                |                                    |                               |                                 |                   |                 |             | 66 |
| 2N4917   |                | Same as PN4917                 |                                |                                 |                                                         |                                                                         |                               |                                |                                    |                               |                                 |                   |                 |             | 66 |
| 2N5138   |                | Same as PN5138                 |                                |                                 |                                                         |                                                                         |                               |                                |                                    |                               |                                 |                   |                 |             | 66 |
| 2N5139   |                | Same as PN5139                 |                                |                                 |                                                         |                                                                         |                               |                                |                                    |                               |                                 |                   |                 |             | 66 |
| MPQ3906  | TO-116         | 60                             | 40                             | 6                               | 40 0.1 1<br>60 1 1<br>75 10 1                           | 0.25 0.85 10                                                            | 4.5                           |                                |                                    |                               |                                 |                   |                 | 66          |    |

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## General Purpose Amplifiers and Switches (Continued)

| Type No. | Case Style | V <sub>CB0</sub> (V) Min | V <sub>CE0</sub> (V) Min | V <sub>EB0</sub> (V) Min | ICES*<br>ICB0 @ V <sub>CB</sub> (mA) Max | h <sub>FE</sub> @ I <sub>C</sub> & V <sub>CE</sub> (mA) (V) Min Max | V <sub>CE(SAT)</sub> (V) & V <sub>BE(SAT)</sub> (V) Max Min | I <sub>C</sub> @ (mA) Min Max | C <sub>OB</sub> (pF) Max | f <sub>T</sub> (MHz) @ I <sub>C</sub> (mA) Min Max | t <sub>OFF</sub> (ns) Max | NF (dB) Max | Test Conditions | Process No.   |
|----------|------------|--------------------------|--------------------------|--------------------------|------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------|-------------------------------|--------------------------|----------------------------------------------------|---------------------------|-------------|-----------------|---------------|
| MPQ6700  | TO-116     | 40                       | 40                       | 5                        | 50 30                                    | 30 50 70                                                            | 0.1 1 10                                                    | 0.25 0.9 10                   | 4.5                      | 200 10                                             |                           |             |                 | 66 (2) 23 (2) |
| MPS3905  | TO-92 (92) | 40                       | 40                       | 5                        |                                          | 30 40 50 30 15                                                      | 0.1 1 1 10 50 1 100 1                                       | 0.25 0.65 0.85 10 0.4 0.95 50 | 4.5                      | 200 10                                             |                           | 5           | (Note 8)        | 66            |
| MPS3906  | TO-92 (92) | 40                       | 40                       | 5                        |                                          | 60 80 100 300 60 30                                                 | 0.1 1 1 10 50 1 100 1                                       | 0.25 0.65 0.85 10 0.4 0.95 50 | 4.5                      | 250 10                                             |                           | 4           | (Note 8)        | 66            |
| MPS6516  | TO-92 (92) | 40                       | 40                       | 4                        | 50 30                                    | 30 50 100 2                                                         | 10 10                                                       | 0.5 50 50                     | 4                        |                                                    |                           |             |                 | 66            |
| MPS6517  | TO-92 (92) | 40                       | 40                       | 4                        | 50 30                                    | 60 90 180                                                           | 10 10 2                                                     | 0.5 50 50                     | 4                        |                                                    |                           |             |                 | 66            |
| MPS6518  | TO-92 (92) |                          | 40                       | 4                        | 500 30                                   | 80 150 300                                                          | 0.1 1 2                                                     | 0.5 50 50                     | 4                        |                                                    |                           |             |                 | 66            |
| PN3251   | TO-92 (92) | 50                       | 40                       | 5                        |                                          | 80 90 100 300                                                       | 0.1 1 1 10 50 1 100 1                                       | 0.25 0.6 0.9 10 0.5 1.2 50    | 6                        | 300 10                                             |                           | 6           | (Note 6)        | 66            |
| PN4121   | TO-92 (92) | 40                       | 40                       | 5                        | 25* 30                                   | 15 70 60 40                                                         | 50 10 1 0.1                                                 | 0.13 0.7 0.9 10 0.3 1.1 50    | 4.5                      | 400 10                                             | 150                       | 4           | (Notes 11, 8)   | 66            |
| PN4122   | TO-92 (92) | 40                       | 40                       | 5                        | 25* 30                                   | 30 150 100                                                          | 50 10 1 0.1                                                 | 0.13 0.7 0.9 10 0.3 1.1 50    | 4.5                      | 450 10                                             | 150                       | 4           | (Notes 11, 8)   | 66            |

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## General Purpose Amplifiers and Switches (Continued)

| Type No. | Case Style | V <sub>CB0</sub> (V)<br>Min | V <sub>CE0</sub> (V)<br>Min | V <sub>EB0</sub> (V)<br>Min | I <sub>CB0</sub> (mA)<br>Max | I <sub>CB0</sub> (mA)<br>Min | I <sub>FE</sub> (mA)<br>Min | I <sub>FE</sub> (mA)<br>Max | I <sub>C</sub> (mA)<br>Min | I <sub>C</sub> (mA)<br>Max | V <sub>CE(SAT)</sub> (V)<br>Max | V <sub>BE(SAT)</sub> (V)<br>Min | V <sub>BE(SAT)</sub> (V)<br>Max | I <sub>C</sub> (mA)<br>Min | I <sub>C</sub> (mA)<br>Max | CoB (pF)<br>Max | f <sub>T</sub> (MHz)<br>Min | f <sub>T</sub> (MHz)<br>Max | t <sub>OFF</sub> (ns)<br>Max | NF (dB)<br>Max | Test Conditions | Process No. |
|----------|------------|-----------------------------|-----------------------------|-----------------------------|------------------------------|------------------------------|-----------------------------|-----------------------------|----------------------------|----------------------------|---------------------------------|---------------------------------|---------------------------------|----------------------------|----------------------------|-----------------|-----------------------------|-----------------------------|------------------------------|----------------|-----------------|-------------|
| PN4916   | TO-92 (92) | 30                          | 30                          | 5                           | 25*                          | 15                           | 15                          | 15                          | 200                        | 50                         | 1                               | 0.13                            | 0.75                            | 1                          | 0.75                       | 4.5             | 400                         | 10                          | 150                          | 4              | (Notes 13, 8)   | 66          |
| PN4917   | TO-92 (92) | 30                          | 30                          | 5                           | 25*                          | 15                           | 15                          | 15                          | 300                        | 10                         | 1                               | 0.14                            | 0.7                             | 0.9                        | 10                         | 4.5             | 450                         | 10                          | 150                          | 4              | (Notes 13, 8)   | 66          |
| PN5138   | TO-92 (92) | 30                          | 30                          | 5                           | 50                           | 20                           | 50                          | 10                          | 10                         | 10                         | 0.3                             | 1.0                             | 1.0                             | 10                         | 0.5                        | 7               | 30                          | 0.5                         |                              |                |                 | 66          |
| PN5139   | TO-92 (92) | 20                          | 20                          | 5                           | 50*                          | 15                           | 15                          | 10                          | 10                         | 10                         | 0.2                             | 0.7                             | 1.0                             | 10                         | 10                         | 5               | 300                         | 10                          | 200                          |                | (Note 13)       | 66          |
| ST3906   | TO-92 (92) | 40                          | 40                          | 5                           |                              |                              |                             |                             | 300                        | 10                         | 1                               | 0.25                            | 0.65                            | 0.85                       | 10                         | 4.5             | 250                         | 10                          |                              |                |                 | 66          |
| 2N6076   | TO-92 (94) | 25                          | 25                          | 5                           | 100                          | 25                           | 100                         | 10                          | 10                         | 10                         | 0.25                            | 0.8                             | 1.0                             | 10                         |                            |                 |                             |                             |                              |                |                 | 68          |
| MPQ200   | TO-116     | 60                          | 45                          | 6                           | 50                           | 50                           | 80                          | 0.1                         | 1                          | 1                          | 0.2                             | 0.85                            | 1.0                             | 10                         | 20                         | 6               | 250                         | 20                          |                              | 4              | (Note 8)        | 68          |
| PN200    | TO-92 (92) | 60                          | 45                          | 6                           | 50                           | 50                           | 80                          | 0.1                         | 1                          | 1                          | 0.2                             | 0.85                            | 1.0                             | 10                         | 20                         | 6               | 250                         | 20                          |                              | 4              | (Note 8)        | 68          |

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## General Purpose Amplifiers and Switches (Continued)

| Type No. | Case Style    | V <sub>CEO</sub><br>(V)<br>Min | V <sub>CE0</sub><br>(V)<br>Min | V <sub>BE0</sub><br>(V)<br>Min | I <sub>CEO</sub><br>(nA)<br>Max | I <sub>CBO</sub> @<br>(V)<br>Max | h <sub>FE</sub><br>@<br>I <sub>C</sub> & V <sub>CE</sub><br>(mA) (V) | V <sub>CE(SAT)</sub><br>(V) &<br>V <sub>BE(SAT)</sub><br>(V) @<br>I <sub>C</sub> (mA) | COB<br>(pF)<br>Max | f <sub>T</sub><br>(MHz)<br>@<br>I <sub>C</sub> (mA)<br>Min Max | t <sub>OFF</sub><br>(ns)<br>Max | NF<br>(dB)<br>Max | Test<br>Conditions                               | Process<br>No. |
|----------|---------------|--------------------------------|--------------------------------|--------------------------------|---------------------------------|----------------------------------|----------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------|----------------------------------------------------------------|---------------------------------|-------------------|--------------------------------------------------|----------------|
| PN200A   | TO-92<br>(92) | 60                             | 45                             | 6                              | 50                              | 50                               | 300 600<br>100 100<br>250 0.1                                        | 0.2 0.85<br>10 10<br>200 200                                                          | 6                  | 250 20                                                         |                                 | 4                 | (Note 8)                                         | 68             |
| PN201    | TO-92<br>(92) | 80                             | 65                             | 6                              | 50                              | 60                               | 60 375<br>75 10<br>50 100                                            | 0.2 0.85<br>10 10<br>200 200                                                          | 4.5                | 100 10                                                         |                                 | 4                 | (Note 8)                                         | 69             |
| 2N5400   | TO-92<br>(92) | 130                            | 120                            | 5                              | 100                             | 100                              | 40 50<br>40 180<br>30 1                                              | 0.2 1.0<br>10 10<br>50 50                                                             | 6                  | 100 400 10                                                     |                                 | 8                 | (Note 9)                                         | 74             |
| 2N5401   | TO-92<br>(92) | 160                            | 150                            | 5                              | 50                              | 120                              | 50 240<br>60 10<br>50 1                                              | 0.2 1.0<br>10 10<br>50 50                                                             | 6                  | 100 300 10                                                     |                                 | 8                 | (Note 9)                                         | 74             |
| MP5L51   | TO-92<br>(92) | 100                            | 100                            | 4                              | 1 μA                            | 50                               | 40 250<br>50 50<br>30 1                                              | 0.25 1.2<br>0.3 1.2<br>0.5 0.9                                                        | 8                  | 60 10                                                          |                                 |                   |                                                  | 74             |
| PN4888   | TO-92<br>(92) | 150                            | 150                            | 6                              | 50                              | 100                              | 40 400<br>30 1                                                       | 0.5 0.9<br>10 10                                                                      | 4                  | 30 60                                                          |                                 |                   |                                                  | 74             |
| PN4889   | TO-92<br>(92) | 150                            | 150                            | 6                              | 10                              | 100                              | 80 300<br>70 1<br>60 0.1                                             | 0.5 0.9<br>10 10                                                                      | 4                  | 40 160 1                                                       |                                 | 4<br>10<br>3      | (Note 15)<br>(Note 16)<br>(Note 17)<br>(Note 18) | 74             |

## TEST CONDITIONS:

Note 1: I<sub>C</sub> = 300 mA, V<sub>CC</sub> = 10V, I<sub>B</sub> = I<sub>B</sub><sup>2</sup> = 30 mA.  
 Note 2: I<sub>C</sub> = 150 mA, V<sub>CC</sub> = 8V, I<sub>B</sub> = I<sub>B</sub><sup>2</sup> = 15 mA.  
 Note 3: I<sub>C</sub> = 300 mA, V<sub>CC</sub> = 15V, I<sub>B</sub> = I<sub>B</sub><sup>2</sup> = 30 mA.  
 Note 4: I<sub>C</sub> = 300 mA, V<sub>CC</sub> = 30V, I<sub>B</sub> = I<sub>B</sub><sup>2</sup> = 30 mA.  
 Note 5: I<sub>C</sub> = 10 mA, V<sub>CC</sub> = 3V, I<sub>B</sub> = I<sub>B</sub><sup>2</sup> = 1 mA.  
 Note 6: I<sub>C</sub> = 100 μA, V<sub>CE</sub> = 5V, f = 100 Hz.

Note 7: I<sub>C</sub> = 30 μA, V<sub>CE</sub> = 5V, f = 1 kHz.  
 Note 8: I<sub>C</sub> = 100 μA, V<sub>CE</sub> = 5V, f = 1 kHz.  
 Note 9: I<sub>C</sub> = 250 μA, V<sub>CE</sub> = 5V, f = 1 kHz.  
 Note 10: I<sub>C</sub> = 10 μA, V<sub>CE</sub> = 5V, f = 1 kHz.  
 Note 11: I<sub>C</sub> = 50 mA, V<sub>CC</sub> = 30V, I<sub>B</sub> = I<sub>B</sub><sup>2</sup> = 5 mA.  
 Note 12: I<sub>C</sub> = 150 mA, V<sub>CC</sub> = 30V, I<sub>B</sub> = I<sub>B</sub><sup>2</sup> = 15 mA.

Note 13: I<sub>C</sub> = 50 mA, V<sub>CC</sub> = 10V, I<sub>B</sub> = I<sub>B</sub><sup>2</sup> = 5 mA.  
 Note 14: I<sub>C</sub> = 500 mA, V<sub>CC</sub> = 30V, I<sub>B</sub> = I<sub>B</sub><sup>2</sup> = 50 mA.  
 Note 15: I<sub>C</sub> = 100 μA, V<sub>CC</sub> = 10V, f = 1 kHz.  
 Note 16: I<sub>C</sub> = 200 μA, V<sub>CE</sub> = 5V, f = 1 kHz.  
 Note 17: I<sub>C</sub>/I<sub>B</sub> = 40.  
 Note 18: I<sub>C</sub>/I<sub>B</sub> = 20.

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