

TABLE 5 — PLASTIC TO-220 (continued)

| I <sub>C</sub> Cont<br>Amps<br>Max | V <sub>CEO</sub> (sus)<br>Volts<br>Min | Device Type |          | h <sub>FE</sub><br>Min/Max | @ I <sub>C</sub><br>Amp | Resistive Switching         |                             |                         | f <sub>T</sub><br>MHz<br>Min | P <sub>D</sub> (Case)<br>Watts<br>@ 25°C |
|------------------------------------|----------------------------------------|-------------|----------|----------------------------|-------------------------|-----------------------------|-----------------------------|-------------------------|------------------------------|------------------------------------------|
|                                    |                                        | NPN         | PNP      |                            |                         | t <sub>s</sub><br>μs<br>Max | t <sub>f</sub><br>μs<br>Max | @ I <sub>C</sub><br>Amp |                              |                                          |
| 7                                  | 45                                     | BD795       | BD796    | 25 min                     | 3                       |                             |                             |                         | 3                            | 65                                       |
|                                    | 50                                     | 2N6290      | 2N6109   | 30/150                     | 2.5                     | 0.4 typ                     | 0.15 typ                    | 3                       | 4                            | 40                                       |
|                                    | 60                                     | BD797       | BD798    | 25 min                     | 3                       |                             |                             |                         | 3                            | 65                                       |
|                                    | 70                                     | 2N6292      | 2N6107   | 30/150                     | 3                       | 0.4 typ                     | 0.15 typ                    | 3                       | 4                            | 40                                       |
|                                    | 80                                     | BD799       | BD800    | 15 min                     | 3                       |                             |                             |                         | 3                            | 65                                       |
|                                    | 100                                    | BD801       | BD802    | 15 min                     | 3                       |                             |                             |                         | 3                            | 65                                       |
|                                    | 150                                    | BU407,D     |          | 30 min                     | 1.5                     |                             | 0.75                        | 5                       | 10                           | 60                                       |
|                                    | 200                                    | BU406,D     |          | 30 min                     | 1.5                     |                             | 0.75                        | 5                       | 10                           | 60                                       |
|                                    | 375                                    | BU522##     |          | 250 min                    | 2.5                     |                             |                             |                         | 7.5                          | 75                                       |
|                                    | 425                                    | BU522A##    |          | 250 min                    | 2.5                     |                             |                             |                         | 7.5                          | 75                                       |
| 8                                  | 450                                    | BU522B##    |          | 250 min                    | 2.5                     |                             |                             |                         | 7.5                          | 75                                       |
|                                    | 40                                     | 2N6386##    |          | 1k/20k                     | 3                       |                             |                             |                         | 20#                          | 65                                       |
|                                    | 45                                     | BDX53##     | BDX54##  | 750 min                    | 3                       |                             |                             |                         | 4#                           | 60                                       |
|                                    |                                        | BD895##     | BD896##  | 750 min                    | 3                       |                             |                             |                         | 1#                           | 70                                       |
|                                    |                                        | BD895A##    | BD896A## | 750 min                    | 4                       |                             |                             |                         | 1#                           | 70                                       |
|                                    | 60                                     | 2N6043##    | 2N6040## | 1k/10k                     | 4                       | 1.5 typ                     | 1.5 typ                     | 3                       | 4#                           | 75                                       |
|                                    |                                        | BDX53A##    | BDX54A## | 750 min                    | 3                       |                             |                             |                         | 4#                           | 60                                       |
|                                    |                                        | BD897##     | BD898##  | 750 min                    | 3                       |                             |                             |                         | 1#                           | 70                                       |
|                                    |                                        | BD897A##    | BD898A## | 750 min                    | 4                       |                             |                             |                         | 1#                           | 70                                       |
|                                    |                                        | TIP100##    | TIP105## | 1k/20k                     | 3                       | 1.5 typ                     | 1.5 typ                     | 3                       | 4#                           | 80                                       |
|                                    | 80                                     | 2N6044##    | 2N6041## | 1k/10k                     | 4                       | 1.5 typ                     | 1.5 typ                     | 3                       | 4#                           | 75                                       |
|                                    |                                        | BDX53B##    | BDX54B## | 750 min                    | 3                       |                             |                             |                         | 4#                           | 60                                       |
|                                    |                                        | BD899##     | BD900##  | 750 min                    | 3                       |                             |                             |                         | 1#                           | 70                                       |
|                                    |                                        | BD899A##    | BD900A## | 750 min                    | 4                       |                             |                             |                         | 1#                           | 70                                       |
|                                    |                                        | TIP101##    | TIP106## | 1k/20k                     | 3                       | 1.5 typ                     | 1.5 typ                     | 3                       | 4#                           | 80                                       |
|                                    | 100                                    | 2N6045##    | 2N6042## | 1k/10k                     | 3                       | 1.5 typ                     | 1.5 typ                     | 3                       | 4#                           | 75                                       |
|                                    |                                        | BDX53C##    | BDX54C## | 750 min                    | 3                       |                             |                             |                         | 4#                           | 60                                       |
|                                    |                                        | BD901##     | BD902##  | 750 min                    | 3                       |                             |                             |                         | 1#                           | 70                                       |
|                                    | 120                                    | TIP102##    | TIP107## | 1k/20k                     | 3                       | 1.5 typ                     | 1.5 typ                     | 3                       | 4#                           | 80                                       |
|                                    |                                        | BDX53D##    | BDX54D## | 750 min                    | 3                       |                             |                             |                         | 4#                           | 60                                       |
|                                    |                                        | MJE15028    | MJE15029 | 20 min                     | 4                       |                             |                             |                         | 30                           | 50                                       |
|                                    | 150                                    | MJE15030    | MJE15031 | 20 min                     | 4                       |                             |                             |                         |                              | 50                                       |
|                                    |                                        | BU807##     |          | 100 min                    | 5                       | 0.55 typ                    | 0.2 typ                     | 5                       | 30                           | 60                                       |
|                                    | 200                                    | BU806##     |          | 100 min                    | 5                       | 0.55 typ                    | 0.2 typ                     | 5                       |                              | 60                                       |
|                                    | 300                                    | MJE13006    |          | 5/30                       | 5                       | 3                           | 0.7                         | 5                       | 4                            | 80                                       |
|                                    |                                        | MJE5740##   |          | 200 min                    | 4                       | 8 typ                       | 2 typ                       | 6                       |                              | 80                                       |
|                                    | 350                                    |             | MJE5850  | 15 min                     | 2                       | 2                           | 0.5                         | 4                       |                              | 80                                       |
|                                    |                                        | MJE5741##   |          | 200 min                    | 4                       | 8 typ                       | 2 typ                       | 6                       |                              | 80                                       |
|                                    | 400                                    |             | MJE5851  | 15 min                     | 2                       | 2                           | 0.5                         | 4                       |                              | 80                                       |
|                                    |                                        | MJE5742W##  |          | 200 min                    | 4                       | 8 typ                       | 2 typ                       | 6                       |                              | 80                                       |
|                                    |                                        | MJE13007    |          | 5/30                       | 5                       | 3                           | 0.7                         | 5                       | 4                            | 80                                       |
|                                    |                                        |             | MJE5852  | 15 min                     | 2                       | 2                           | 0.5                         | 4                       |                              | 80                                       |
| 10                                 | 30                                     |             |          | 5 min                      | 8                       | 2                           | 0.5                         | 5                       |                              | 80                                       |
|                                    |                                        |             |          | 6/25                       | 8                       | 2 typ                       | 0.1 typ                     | 5                       |                              | 100                                      |
|                                    | 450                                    | MJE16080    |          | 5 min                      | 8                       |                             |                             |                         |                              | 80                                       |
|                                    |                                        | MJE16106    |          | 6/25                       | 8                       |                             |                             |                         |                              | 100                                      |
|                                    | 40                                     |             |          | 5 min                      | 8                       |                             |                             |                         |                              | 80                                       |
|                                    |                                        |             |          | 6/25                       | 8                       |                             |                             |                         |                              | 100                                      |
|                                    | 45                                     |             |          | 5 min                      | 8                       |                             |                             |                         |                              | 80                                       |
|                                    |                                        |             |          | 6/25                       | 8                       |                             |                             |                         |                              | 100                                      |
| 10                                 | 30                                     |             |          | 5 min                      | 8                       |                             |                             |                         |                              | 80                                       |
|                                    |                                        |             |          | 6/25                       | 8                       |                             |                             |                         |                              | 100                                      |
|                                    | 40                                     |             |          | 5 min                      | 8                       |                             |                             |                         |                              | 80                                       |
|                                    |                                        |             |          | 6/25                       | 8                       |                             |                             |                         |                              | 100                                      |
|                                    | 45                                     |             |          | 5 min                      | 8                       |                             |                             |                         |                              | 80                                       |
|                                    |                                        |             |          | 6/25                       | 8                       |                             |                             |                         |                              | 100                                      |
|                                    | 60                                     |             |          | 5 min                      | 8                       |                             |                             |                         |                              | 80                                       |
|                                    |                                        |             |          | 6/25                       | 8                       |                             |                             |                         |                              | 100                                      |

# h<sub>FE</sub> @ 1 MHz, ## Darlington

(continued)

# MOTOROLA SEMICONDUCTOR TECHNICAL DATA

**BD796  
BD798**

**BD800  
BD802**

## PLASTIC HIGH POWER SILICON PNP TRANSISTOR

designed for use up to 30 Watt audio amplifiers utilizing complementary or quasi complementary circuits.

- DC Current Gain— $h_{FE} = 40$  (Min) @  $I_C = 1.0$  Adc
- BD 796, 798, 800, 802 are complementary with BD 795, 797, 799, 801

### MAXIMUM RATINGS

| Rating                                                                               | Symbol         | Type                             | Value                 | Unit           |
|--------------------------------------------------------------------------------------|----------------|----------------------------------|-----------------------|----------------|
| Collector-Emitter Voltage                                                            | $V_{CEO}$      | BD796<br>BD798<br>BD800<br>BD802 | 45<br>60<br>80<br>100 | Vdc            |
| Collector-Base Voltage                                                               | $V_{CBO}$      | BD796<br>BD798<br>BD800<br>BD802 | 45<br>60<br>80<br>100 | Vdc            |
| Emitter-Base Voltage                                                                 | $V_{EBO}$      |                                  | 5                     | Vdc            |
| Collector Current                                                                    | $I_C$          |                                  | 8                     | Adc            |
| Base Current                                                                         | $I_B$          |                                  | 3                     | Adc            |
| Total Device Dissipation $T_C = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$ | $P_D$          |                                  | 65<br>522             | Watts<br>mW/°C |
| Operating and Storage Junction<br>Temperature Range                                  | $T_J, T_{stg}$ |                                  | -55 to +150           | °C             |

### THERMAL CHARACTERISTICS

| Characteristic                       | Symbol        | Max  | Unit |
|--------------------------------------|---------------|------|------|
| Thermal Resistance, Junction to Case | $\theta_{JC}$ | 1.92 | °C/W |

### ELECTRICAL CHARACTERISTICS ( $T_C = 25^\circ\text{C}$ unless otherwise noted)

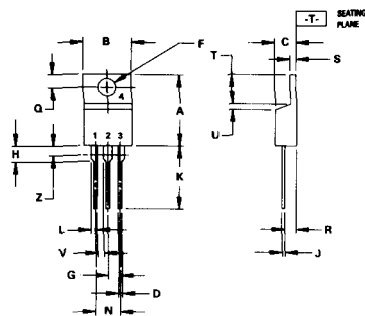
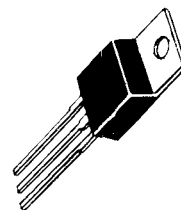
| Characteristic                                                                                                                                                            | Symbol        | Type                                                 | Min                   | Max                      | Unit |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|------------------------------------------------------|-----------------------|--------------------------|------|
| Collector-Emitter Sustaining Voltage*<br>( $I_C = 0.1$ Adc, $I_B = 0$ )                                                                                                   | $V_{CEO}$     | BD796<br>BD798<br>BD800<br>BD802                     | 45<br>60<br>80<br>100 | —                        | Vdc  |
| Collector Cutoff Current<br>( $V_{CB} = 45$ Vdc, $I_E = 0$ )<br>( $V_{CB} = 60$ Vdc, $I_E = 0$ )<br>( $V_{CB} = 80$ Vdc, $I_E = 0$ )<br>( $V_{CB} = 100$ Vdc, $I_E = 0$ ) | $I_{CBO}$     | BD796<br>BD798<br>BD800<br>BD802                     | —                     | 0.1<br>0.1<br>0.1<br>0.1 | mAdc |
| Emitter Cutoff Current<br>( $V_{BE} = 5.0$ Vdc, $I_C = 0$ )                                                                                                               | $I_{EBO}$     |                                                      | —                     | 1.0                      | mAdc |
| DC current Gain<br>( $I_C = 1$ A, $V_{CE} = 2$ V)<br>( $I_C = 3$ A, $V_{CE} = 2$ V)                                                                                       | $h_{FE}$      | BD 796/798<br>BD 800/802<br>BD 796/798<br>BD 800/802 | 40<br>30<br>25<br>15  | —                        |      |
| Collector-Emitter Saturation Voltage*<br>( $I_C = 3$ Adc, $I_B = 0.3$ Adc)                                                                                                | $V_{CE(sat)}$ |                                                      | —                     | 1.0                      | Vdc  |
| Base-Emitter On Voltage*<br>( $I_C = 3$ Adc, $V_{CE} = 2.0$ Vdc)                                                                                                          | $V_{BE(on)}$  |                                                      | —                     | 1.6                      | Vdc  |
| Current-Gain-Bandwidth Product<br>( $I_C = 0.25$ Adc, $V_{CE} = 10$ Vdc, $f = 1.0$ MHz)                                                                                   | $f_T$         |                                                      | 3.0                   | —                        | MHz  |

\* Pulse Test. Pulse Width  $\leq 300 \mu\text{s}$ . Duty Cycle  $\leq 2.0\%$ .

## 8 AMPERE POWER TRANSISTOR

### PNP SILICON

45, 60, 80, 100 VOLTS  
65 WATTS



- NOTES:  
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.  
2. CONTROLLING DIMENSION: INCH.  
3. DIM Z DEFINES A ZONE WHERE ALL BODY AND LEAD IRREGULARITIES ARE ALLOWED.

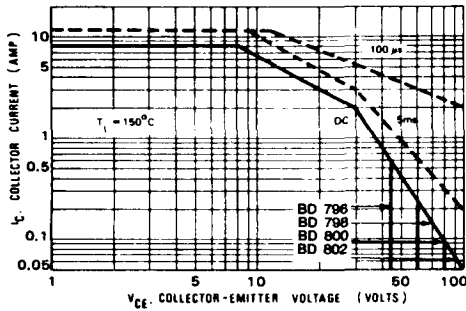
| DIM | MILLIMETERS |       | INCHES |       |
|-----|-------------|-------|--------|-------|
|     | MIN         | MAX   | MIN    | MAX   |
| A   | 14.48       | 15.75 | 0.570  | 0.620 |
| B   | 9.65        | 10.29 | 0.380  | 0.405 |
| C   | 4.07        | 4.82  | 0.160  | 0.190 |
| D   | 0.64        | 0.88  | 0.025  | 0.035 |
| F   | 3.61        | 3.73  | 0.142  | 0.147 |
| G   | 2.42        | 2.66  | 0.095  | 0.105 |
| H   | 2.80        | 3.83  | 0.110  | 0.150 |
| J   | 0.46        | 0.71  | 0.018  | 0.028 |
| K   | 12.70       | 14.27 | 0.500  | 0.562 |
| L   | 1.15        | 1.39  | 0.045  | 0.055 |
| N   | 4.83        | 5.33  | 0.190  | 0.210 |
| Q   | 2.54        | 3.04  | 0.100  | 0.120 |
| R   | 2.04        | 2.79  | 0.080  | 0.110 |
| S   | 1.15        | 1.39  | 0.045  | 0.055 |
| T   | 5.97        | 6.47  | 0.235  | 0.255 |
| U   | 0.00        | 1.27  | 0.000  | 0.050 |
| V   | 1.15        | —     | 0.045  | —     |
| Z   | —           | 2.04  | —      | 0.080 |

- STYLE 1:  
PIN 1: BASE  
2: COLLECTOR  
3: EMITTER  
4: COLLECTOR

CASE 221A-04  
TO-220AB

# BD796, BD798, BD800, BD802

FIGURE 1 - ACTIVE REGION SAFE OPERATING AREA



The Safe Operating Area Curves indicate  $I_C$ - $V_{CE}$  limits below which the device will not enter secondary breakdown. Collector load lines for specific circuits must fall within the applicable Safe Area to avoid causing a catastrophic failure. To insure operation below the maximum  $T_J$ , power-temperature derating must be observed for both steady state and pulse power conditions.

FIGURE 2 - COLLECTOR SATURATION REGION

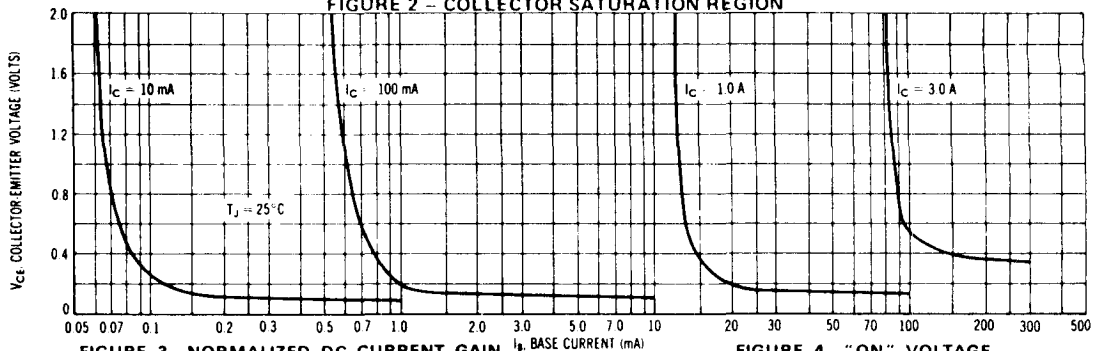


FIGURE 3 - NORMALIZED DC CURRENT GAIN

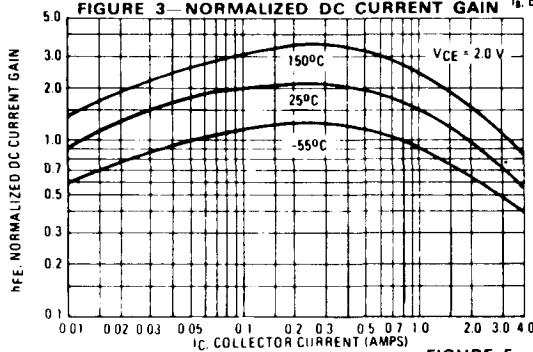


FIGURE 4 - "ON" VOLTAGE

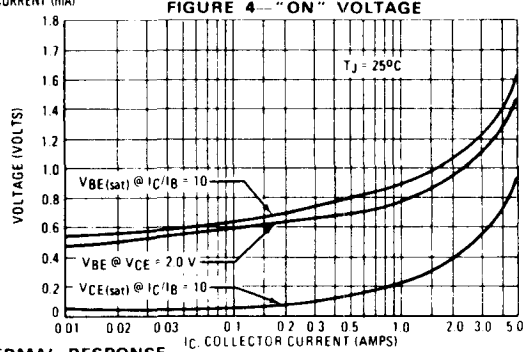


FIGURE 5 - THERMAL RESPONSE

