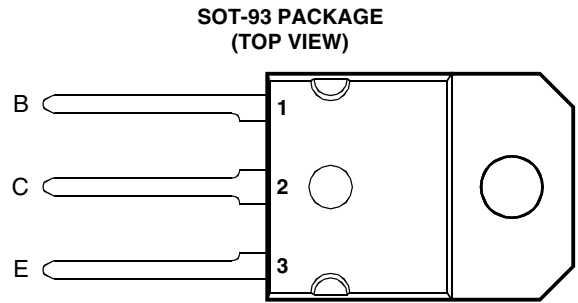


- Designed for Complementary Use with the BD745 Series
- 115 W at 25°C Case Temperature
- 20 A Continuous Collector Current
- 25 A Peak Collector Current
- Customer-Specified Selections Available



Pin 2 is in electrical contact with the mounting base.

MDTRAAA

**absolute maximum ratings at 25°C case temperature (unless otherwise noted)**

| RATING                                                                             |        | SYMBOL              | VALUE       | UNIT |
|------------------------------------------------------------------------------------|--------|---------------------|-------------|------|
| Collector-base voltage ( $I_E = 0$ )                                               | BD746  | $V_{CBO}$           | -50         | V    |
|                                                                                    | BD746A |                     | -70         |      |
|                                                                                    | BD746B |                     | -90         |      |
|                                                                                    | BD746C |                     | -110        |      |
| Collector-emitter voltage ( $I_B = 0$ )                                            | BD746  | $V_{CEO}$           | -45         | V    |
|                                                                                    | BD746A |                     | -60         |      |
|                                                                                    | BD746B |                     | -80         |      |
|                                                                                    | BD746C |                     | -100        |      |
| Emitter-base voltage                                                               |        | $V_{EBO}$           | -5          | V    |
| Continuous collector current                                                       |        | $I_C$               | -20         | A    |
| Peak collector current (see Note 1)                                                |        | $I_{CM}$            | -25         | A    |
| Continuous base current                                                            |        | $I_B$               | -7          | A    |
| Continuous device dissipation at (or below) 25°C case temperature (see Note 2)     |        | $P_{tot}$           | 115         | W    |
| Continuous device dissipation at (or below) 25°C free air temperature (see Note 3) |        | $P_{tot}$           | 3.5         | W    |
| Unclamped inductive load energy (see Note 4)                                       |        | $\frac{1}{2}LI_C^2$ | 90          | mJ   |
| Operating free air temperature range                                               |        | $T_A$               | -65 to +150 | °C   |
| Operating junction temperature range                                               |        | $T_j$               | -65 to +150 | °C   |
| Storage temperature range                                                          |        | $T_{stg}$           | -65 to +150 | °C   |
| Lead temperature 3.2 mm from case for 10 seconds                                   |        | $T_L$               | 260         | °C   |

NOTES: 1. This value applies for  $t_p \leq 0.3$  ms, duty cycle  $\leq 10\%$ .

2. Derate linearly to 150°C case temperature at the rate of 0.92 W/°C.

3. Derate linearly to 150°C free air temperature at the rate of 28 mW/°C.

4. This rating is based on the capability of the transistor to operate safely in a circuit of:  $L = 20$  mH,  $I_{B(on)} = -0.4$  A,  $R_{BE} = 100 \Omega$ ,  $V_{BE(off)} = 0$ ,  $R_S = 0.1 \Omega$ ,  $V_{CC} = -20$  V.

**PRODUCT INFORMATION**

**electrical characteristics at 25°C case temperature (unless otherwise noted)**

| PARAMETER                                              | TEST CONDITIONS                                                                                                                                                                                                                |                                                                                                                              |                                                                                                                  | MIN                                                                        | TYP                       | MAX                                                  | UNIT |
|--------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|---------------------------|------------------------------------------------------|------|
| $V_{(BR)CEO}$ Collector-emitter breakdown voltage      | $I_C = -30 \text{ mA}$                                                                                                                                                                                                         | $I_B = 0$                                                                                                                    | (see Note 5)                                                                                                     | BD746<br>BD746A<br>BD746B<br>BD746C                                        | -45<br>-60<br>-80<br>-100 |                                                      | V    |
| $I_{CBO}$ Collector cut-off current                    | $V_{CE} = -50 \text{ V}$<br>$V_{CE} = -70 \text{ V}$<br>$V_{CE} = -90 \text{ V}$<br>$V_{CE} = -110 \text{ V}$<br>$V_{CE} = -50 \text{ V}$<br>$V_{CE} = -70 \text{ V}$<br>$V_{CE} = -90 \text{ V}$<br>$V_{CE} = -110 \text{ V}$ | $V_{BE} = 0$<br>$V_{BE} = 0$<br>$V_{BE} = 0$<br>$V_{BE} = 0$<br>$V_{BE} = 0$<br>$V_{BE} = 0$<br>$V_{BE} = 0$<br>$V_{BE} = 0$ | $T_C = 125^\circ\text{C}$<br>$T_C = 125^\circ\text{C}$<br>$T_C = 125^\circ\text{C}$<br>$T_C = 125^\circ\text{C}$ | BD746<br>BD746A<br>BD746B<br>BD746C<br>BD746<br>BD746A<br>BD746B<br>BD746C |                           | -0.1<br>-0.1<br>-0.1<br>-0.1<br>-5<br>-5<br>-5<br>-5 | mA   |
| $I_{CEO}$ Collector cut-off current                    | $V_{CE} = -30 \text{ V}$<br>$V_{CE} = -60 \text{ V}$                                                                                                                                                                           | $I_B = 0$<br>$I_B = 0$                                                                                                       |                                                                                                                  | BD746/746A<br>BD746B/746C                                                  |                           | -0.1<br>-0.1                                         | mA   |
| $I_{EBO}$ Emitter cut-off current                      | $V_{EB} = -5 \text{ V}$                                                                                                                                                                                                        | $I_C = 0$                                                                                                                    |                                                                                                                  |                                                                            |                           | -0.5                                                 | mA   |
| $h_{FE}$ Forward current transfer ratio                | $V_{CE} = -4 \text{ V}$<br>$V_{CE} = -4 \text{ V}$<br>$V_{CE} = -4 \text{ V}$                                                                                                                                                  | $I_C = -1 \text{ A}$<br>$I_C = -5 \text{ A}$<br>$I_C = -20 \text{ A}$                                                        | (see Notes 5 and 6)                                                                                              |                                                                            | 40<br>20<br>5             | 150                                                  |      |
| $V_{CE(sat)}$ Collector-emitter saturation voltage     | $I_B = -0.5 \text{ A}$<br>$I_B = -5 \text{ A}$                                                                                                                                                                                 | $I_C = -5 \text{ A}$<br>$I_C = -20 \text{ A}$                                                                                | (see Notes 5 and 6)                                                                                              |                                                                            |                           | -1<br>-3                                             | V    |
| $V_{BE}$ Base-emitter voltage                          | $V_{CE} = -4 \text{ V}$<br>$V_{CE} = -4 \text{ V}$                                                                                                                                                                             | $I_C = -5 \text{ A}$<br>$I_C = -20 \text{ A}$                                                                                | (see Notes 5 and 6)                                                                                              |                                                                            |                           | -1<br>-3                                             | V    |
| $h_{fe}$ Small signal forward current transfer ratio   | $V_{CE} = -10 \text{ V}$                                                                                                                                                                                                       | $I_C = -1 \text{ A}$                                                                                                         | $f = 1 \text{ kHz}$                                                                                              | 25                                                                         |                           |                                                      |      |
| $ h_{fe} $ Small signal forward current transfer ratio | $V_{CE} = -10 \text{ V}$                                                                                                                                                                                                       | $I_C = -1 \text{ A}$                                                                                                         | $f = 1 \text{ MHz}$                                                                                              | 5                                                                          |                           |                                                      |      |

NOTES: 5. These parameters must be measured using pulse techniques,  $t_p = 300 \mu\text{s}$ , duty cycle  $\leq 2\%$ .

6. These parameters must be measured using voltage-sensing contacts, separate from the current carrying contacts.

**thermal characteristics**

| PARAMETER                                               | MIN | TYP | MAX  | UNIT               |
|---------------------------------------------------------|-----|-----|------|--------------------|
| $R_{\theta JC}$ Junction to case thermal resistance     |     |     | 1.1  | $^\circ\text{C/W}$ |
| $R_{\theta JA}$ Junction to free air thermal resistance |     |     | 35.7 | $^\circ\text{C/W}$ |

**resistive-load-switching characteristics at 25°C case temperature**

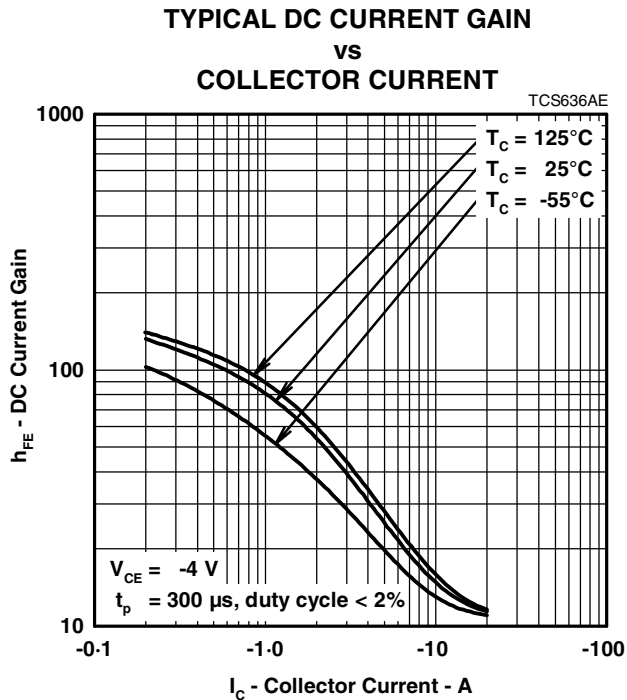
| PARAMETER          | TEST CONDITIONS <sup>†</sup> |  |  | MIN | TYP | MAX | UNIT |
|--------------------|------------------------------|--|--|-----|-----|-----|------|
| $t_d$ Delay time   |                              |  |  |     | 20  |     | ns   |
| $t_r$ Rise time    |                              |  |  |     | 120 |     | ns   |
| $t_s$ Storage time |                              |  |  |     | 600 |     | ns   |
| $t_f$ Fall time    |                              |  |  |     | 300 |     | ns   |

<sup>†</sup> Voltage and current values shown are nominal; exact values vary slightly with transistor parameters.

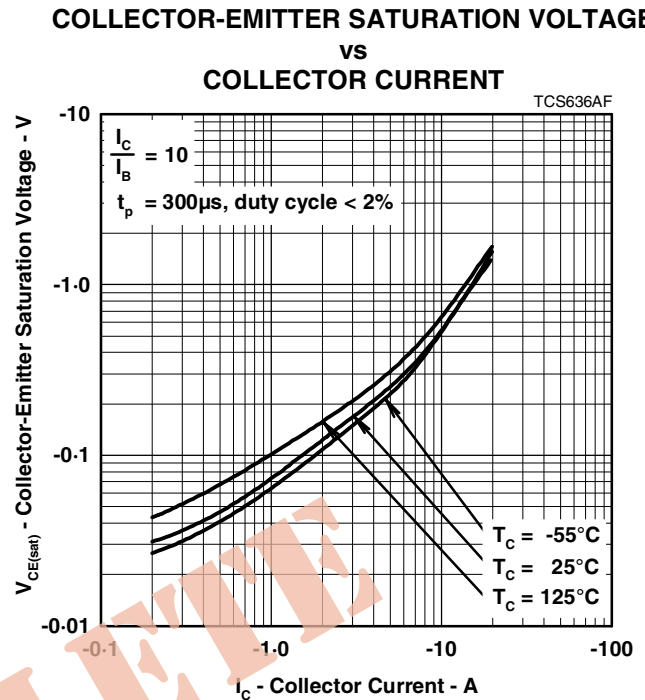
**PRODUCT INFORMATION**

AUGUST 1978 - REVISED SEPTEMBER 2002  
 Specifications are subject to change without notice.

**TYPICAL CHARACTERISTICS**

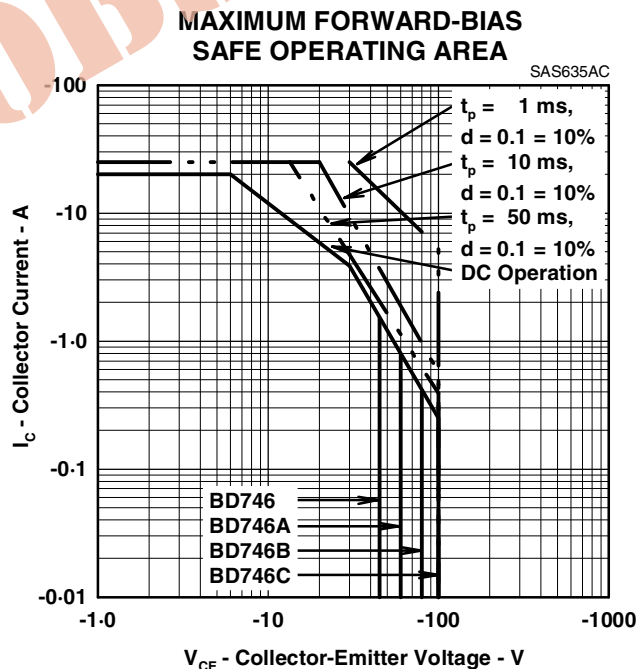


**Figure 1.**



**Figure 2.**

**MAXIMUM SAFE OPERATING REGIONS**



**Figure 3.**

**PRODUCT INFORMATION**

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**THERMAL INFORMATION**

**MAXIMUM POWER DISSIPATION  
vs  
CASE TEMPERATURE**

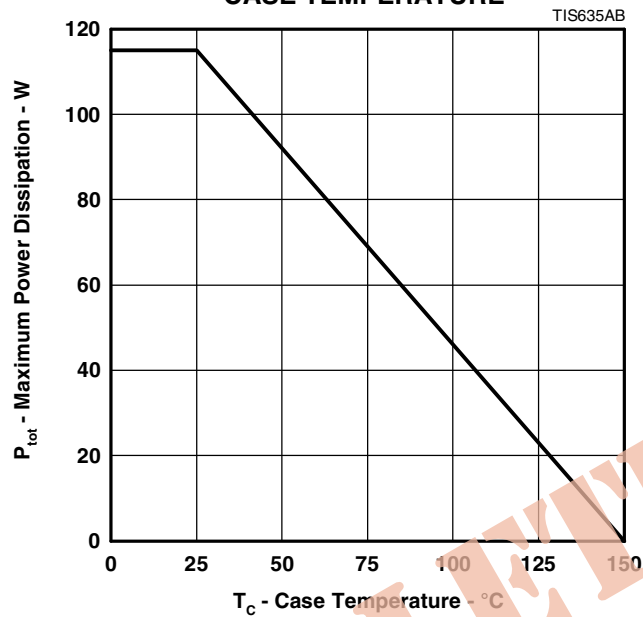


Figure 4.

**PRODUCT INFORMATION**

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