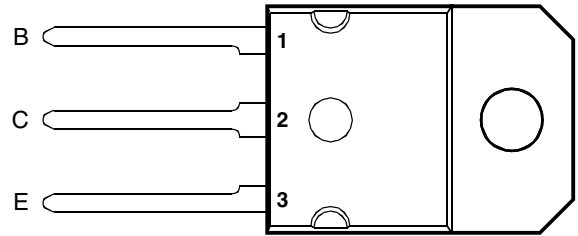


- Designed for Complementary Use with the BD246 Series
- 80 W at 25°C Case Temperature
- 10 A Continuous Collector Current
- 15 A Peak Collector Current
- Customer-Specified Selections Available

SOT-93 PACKAGE  
(TOP VIEW)



Pin 2 is in electrical contact with the mounting base.

MDTRA4A

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

| RATING                                                                             |        | SYMBOL              | VALUE       | UNIT |
|------------------------------------------------------------------------------------|--------|---------------------|-------------|------|
| Collector-emitter voltage ( $R_{BE} = 100 \Omega$ )                                | BD245  | $V_{CE}$            | 55          | V    |
|                                                                                    | BD245A |                     | 70          |      |
|                                                                                    | BD245B |                     | 90          |      |
|                                                                                    | BD245C |                     | 115         |      |
| Collector-emitter voltage ( $I_C = 30 \text{ mA}$ )                                | BD245  | $V_{CEO}$           | 45          | V    |
|                                                                                    | BD245A |                     | 60          |      |
|                                                                                    | BD245B |                     | 80          |      |
|                                                                                    | BD245C |                     | 100         |      |
| Emitter-base voltage                                                               |        | $V_{EBO}$           | 5           | V    |
| Continuous collector current                                                       |        | $I_C$               | 10          | A    |
| Peak collector current (see Note 1)                                                |        | $I_{CM}$            | 15          | A    |
| Continuous base current                                                            |        | $I_B$               | 3           | A    |
| Continuous device dissipation at (or below) 25°C case temperature (see Note 2)     |        | $P_{tot}$           | 80          | W    |
| Continuous device dissipation at (or below) 25°C free air temperature (see Note 3) |        | $P_{tot}$           | 3           | W    |
| Unclamped inductive load energy (see Note 4)                                       |        | $\frac{1}{2}LI_C^2$ | 62.5        | mJ   |
| 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                                   |        | $T_L$               | 250         | °C   |

NOTES: 1. This value applies for  $t_p \leq 0.3 \text{ ms}$ , duty cycle  $\leq 10\%$ .  
2. Derate linearly to 150°C case temperature at the rate of 0.64 W/°C.  
3. Derate linearly to 150°C free air temperature at the rate of 24 mW/°C.  
4. This rating is based on the capability of the transistor to operate safely in a circuit of:  $L = 20 \text{ mH}$ ,  $I_{B(on)} = 0.4 \text{ A}$ ,  $R_{BE} = 100 \Omega$ ,  $V_{BE(off)} = 0$ ,  $R_S = 0.1 \Omega$ ,  $V_{CC} = 20 \text{ V}$ .

**PRODUCT INFORMATION**

**electrical characteristics at 25°C case temperature**

| PARAMETER                                              | TEST CONDITIONS                                                                                           |                                                                    |                                     | MIN                   | TYP | MAX                      | UNIT |
|--------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|-------------------------------------|-----------------------|-----|--------------------------|------|
| $V_{(BR)CEO}$ Collector-emitter breakdown voltage      | $I_C = 30 \text{ mA}$<br>(see Note 5)                                                                     | $I_B = 0$                                                          | BD245<br>BD245A<br>BD245B<br>BD245C | 45<br>60<br>80<br>100 |     |                          | V    |
| $I_{CES}$ Collector-emitter cut-off current            | $V_{CE} = 55 \text{ V}$<br>$V_{CE} = 70 \text{ V}$<br>$V_{CE} = 90 \text{ V}$<br>$V_{CE} = 115 \text{ V}$ | $V_{BE} = 0$<br>$V_{BE} = 0$<br>$V_{BE} = 0$<br>$V_{BE} = 0$       | BD245<br>BD245A<br>BD245B<br>BD245C |                       |     | 0.4<br>0.4<br>0.4<br>0.4 | mA   |
| $I_{CEO}$ Collector cut-off current                    | $V_{CE} = 30 \text{ V}$<br>$V_{CE} = 60 \text{ V}$                                                        | $I_B = 0$<br>$I_B = 0$                                             | BD245/245A<br>BD245B/245C           |                       |     | 0.7<br>0.7               | mA   |
| $I_{EBO}$ Emitter cut-off current                      | $V_{EB} = 5 \text{ V}$                                                                                    | $I_C = 0$                                                          |                                     |                       |     | 1                        | 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>$I_C = 3 \text{ A}$<br>$I_C = 10 \text{ A}$ | (see Notes 5 and 6)                 | 40<br>20<br>4         |     |                          |      |
| $V_{CE(sat)}$ Collector-emitter saturation voltage     | $I_B = 0.3 \text{ A}$<br>$I_B = 2.5 \text{ A}$                                                            | $I_C = 3 \text{ A}$<br>$I_C = 10 \text{ A}$                        | (see Notes 5 and 6)                 |                       |     | 1<br>4                   | V    |
| $V_{BE}$ Base-emitter voltage                          | $V_{CE} = 4 \text{ V}$<br>$V_{CE} = 4 \text{ V}$                                                          | $I_C = 3 \text{ A}$<br>$I_C = 10 \text{ A}$                        | (see Notes 5 and 6)                 |                       |     | 1.6<br>3                 | V    |
| $h_{fe}$ Small signal forward current transfer ratio   | $V_{CE} = 10 \text{ V}$                                                                                   | $I_C = 0.5 \text{ A}$                                              | $f = 1 \text{ kHz}$                 | 20                    |     |                          |      |
| $ h_{fe} $ Small signal forward current transfer ratio | $V_{CE} = 10 \text{ V}$                                                                                   | $I_C = 0.5 \text{ A}$                                              | $f = 1 \text{ MHz}$                 | 3                     |     |                          |      |

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     |     |     | 1.56 | °C/W |
| $R_{\theta JA}$ Junction to free air thermal resistance |     |     | 42   | °C/W |

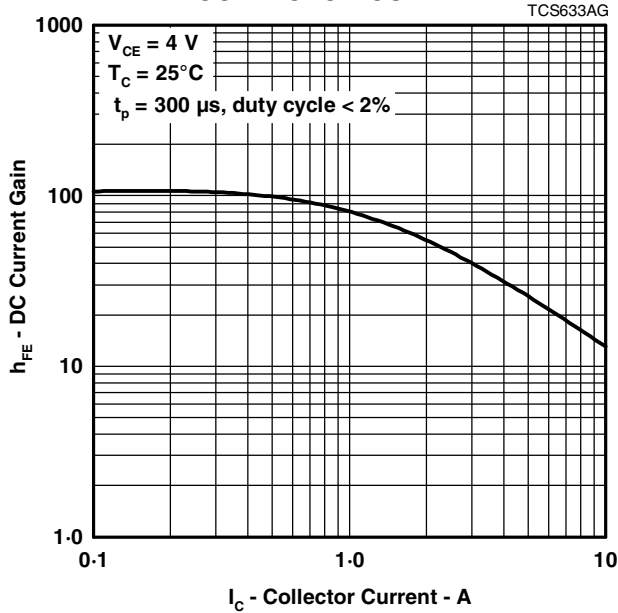
**resistive-load-switching characteristics at 25°C case temperature**

| PARAMETER               | TEST CONDITIONS †              |                             |                                        | MIN | TYP | MAX | UNIT          |
|-------------------------|--------------------------------|-----------------------------|----------------------------------------|-----|-----|-----|---------------|
| $t_{on}$ Turn-on time   | $I_C = 1 \text{ A}$            | $I_{B(on)} = 0.1 \text{ A}$ | $I_{B(off)} = -0.1 \text{ A}$          |     | 0.3 |     | $\mu\text{s}$ |
| $t_{off}$ Turn-off time | $V_{BE(off)} = -3.7 \text{ V}$ | $R_L = 20 \Omega$           | $t_p = 20 \mu\text{s}$ , dc $\leq 2\%$ |     | 1   |     | $\mu\text{s}$ |

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

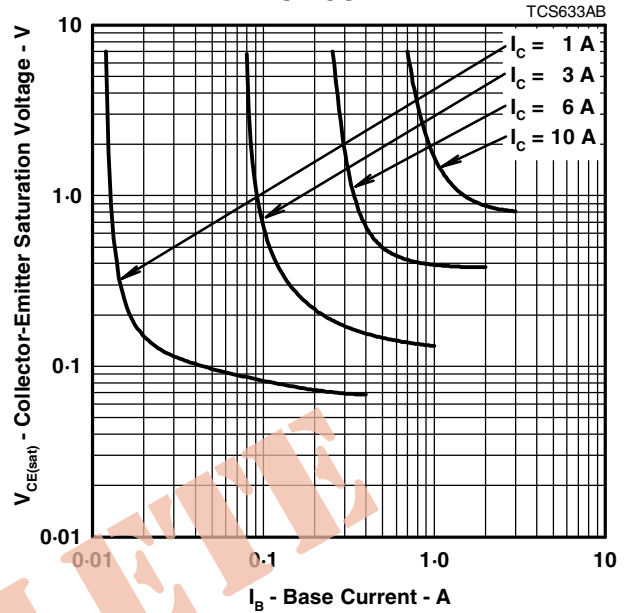
**TYPICAL CHARACTERISTICS**

**TYPICAL DC CURRENT GAIN**  
**VS**  
**COLLECTOR CURRENT**



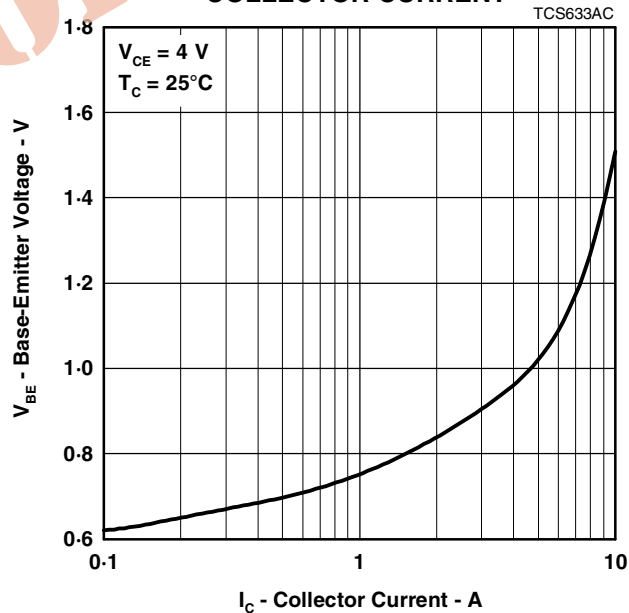
**Figure 1.**

**COLLECTOR-EMITTER SATURATION VOLTAGE**  
**VS**  
**BASE CURRENT**



**Figure 2.**

**BASE-EMITTER VOLTAGE**  
**VS**  
**COLLECTOR CURRENT**



**Figure 3.**

**PRODUCT INFORMATION**

## MAXIMUM SAFE OPERATING REGIONS

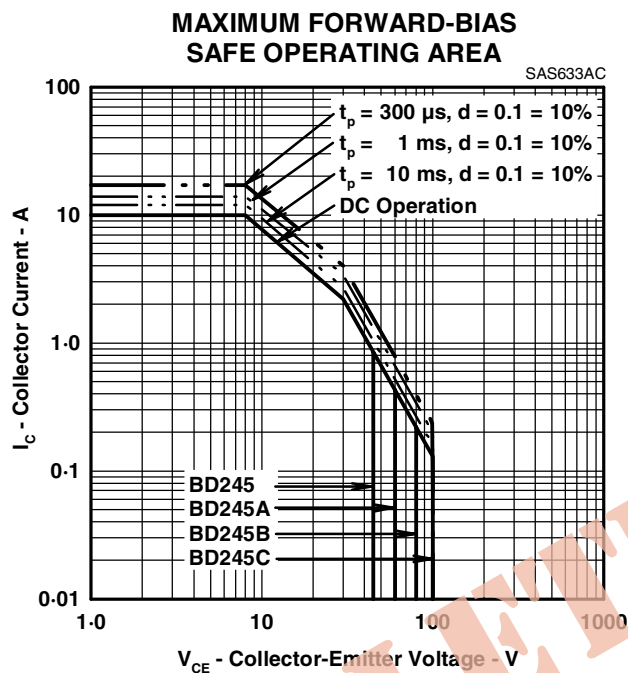


Figure 4.

## THERMAL INFORMATION

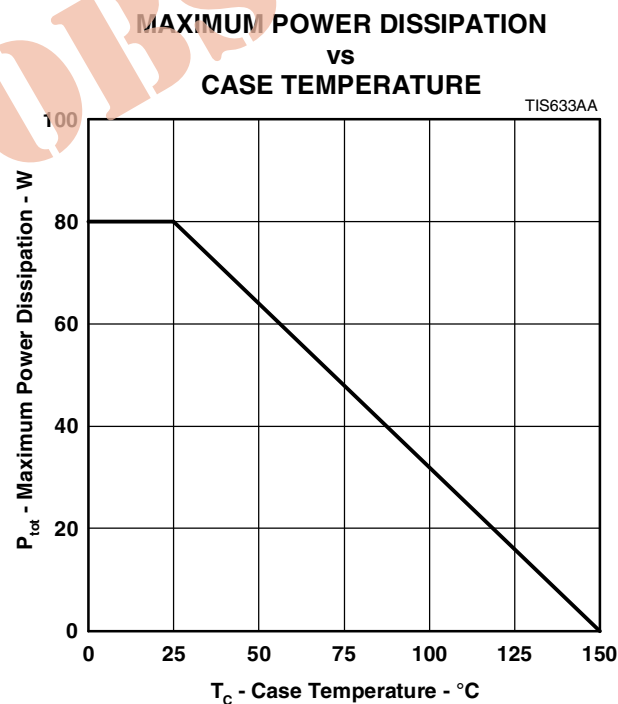


Figure 5.

## PRODUCT INFORMATION

JUNE 1973 - REVISED SEPTEMBER 2002  
Specifications are subject to change without notice.