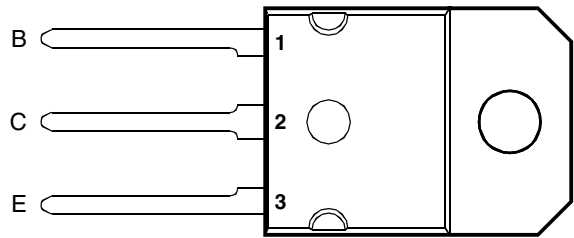




- Designed for Complementary Use with the BD746 Series
- 115 W at 25°C Case Temperature
- 20 A Continuous Collector Current
- 25 A Peak Collector Current
- Customer-Specified Selections Available

SOT-93 PACKAGE  
(TOP VIEW)



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 ( $I_E = 0$ )	BD745	$V_{CBO}$	50	V
	BD745A		70	
	BD745B		90	
	BD745C		110	
Collector-emitter voltage ( $I_B = 0$ )	BD745	$V_{CEO}$	45	V
	BD745A		60	
	BD745B		80	
	BD745C		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)	BD745 BD745A BD745B BD745C	45 60 80 100		V
$I_{CBO}$ Collector cut-off current	$V_{CE} = 50 \text{ V}$ $V_{CE} = 70 \text{ V}$ $V_{CE} = 90 \text{ V}$ $V_{CE} = 110 \text{ V}$	$V_{BE} = 0$ $V_{BE} = 0$ $V_{BE} = 0$ $V_{BE} = 0$	$T_C = 125^\circ\text{C}$ $T_C = 125^\circ\text{C}$ $T_C = 125^\circ\text{C}$ $T_C = 125^\circ\text{C}$	BD745 BD745A BD745B BD745C		0.1 0.1 0.1 0.1	mA
$I_{CEO}$ Collector cut-off current	$V_{CE} = 30 \text{ V}$ $V_{CE} = 60 \text{ V}$	$I_B = 0$ $I_B = 0$		BD745/745A BD745B/745C		0.1 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	$V_{CE} = 4 \text{ V}$ $V_{CE} = 4 \text{ V}$ $V_{CE} = 4 \text{ V}$	$I_C = 1 \text{ A}$ $I_C = 5 \text{ A}$ $I_C = 20 \text{ A}$	(see Notes 5 and 6)		40 20 5	150	
$V_{CE(sat)}$ Collector-emitter saturation voltage	$I_B = 0.5 \text{ A}$ $I_B = 5 \text{ A}$	$I_C = 5 \text{ A}$ $I_C = 20 \text{ A}$	(see Notes 5 and 6)			1 3	V
$V_{BE}$ Base-emitter voltage	$V_{CE} = 4 \text{ V}$ $V_{CE} = 4 \text{ V}$	$I_C = 5 \text{ A}$ $I_C = 20 \text{ A}$	(see Notes 5 and 6)			1 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**

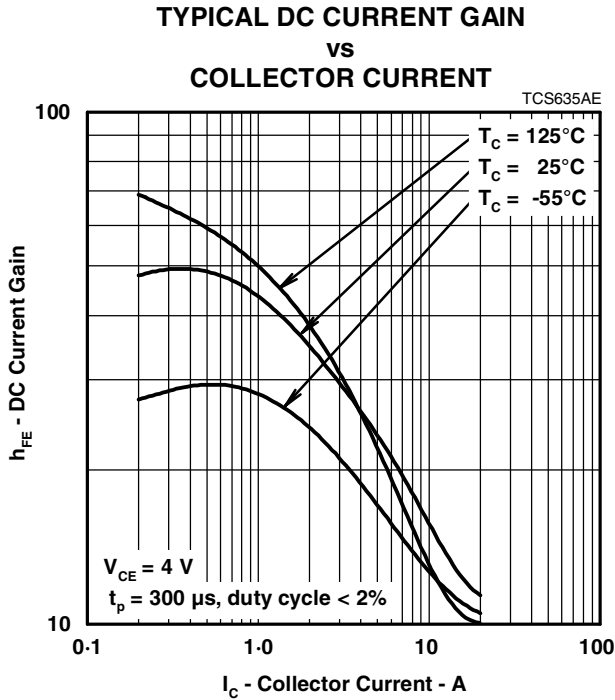
PARAMETER	MIN	TYP	MAX	UNIT
$R_{\theta JC}$ Junction to case thermal resistance			1.1	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$ Junction to free air thermal resistance			35.7	$^\circ\text{C}/\text{W}$

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

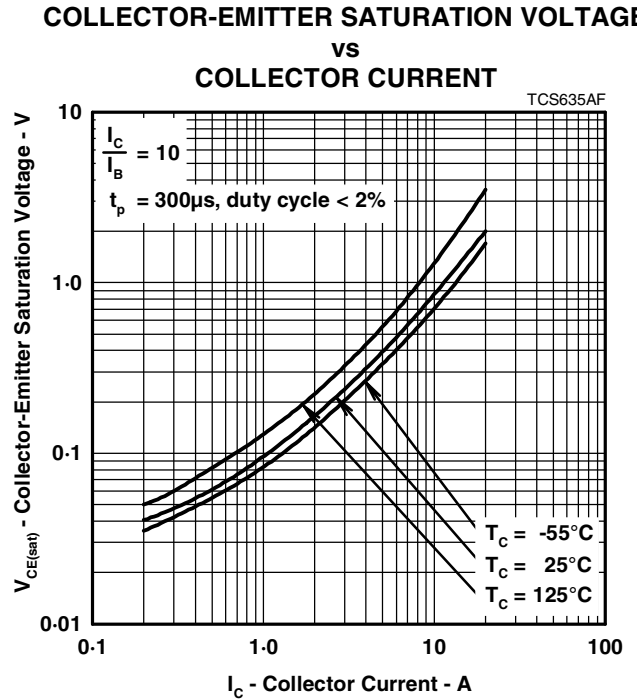
PARAMETER	TEST CONDITIONS †			MIN	TYP	MAX	UNIT
$t_d$ Delay time	$I_C = 5 \text{ A}$ $V_{BE(off)} = -4.2 \text{ V}$	$I_{B(on)} = 0.5 \text{ A}$ $R_L = 6 \Omega$	$I_{B(off)} = -0.5 \text{ A}$ $t_p = 20 \mu\text{s}$ , $dc \leq 2\%$		20		ns
$t_r$ Rise time					350		ns
$t_s$ Storage time					500		ns
$t_f$ Fall time					400		ns

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

**TYPICAL CHARACTERISTICS**

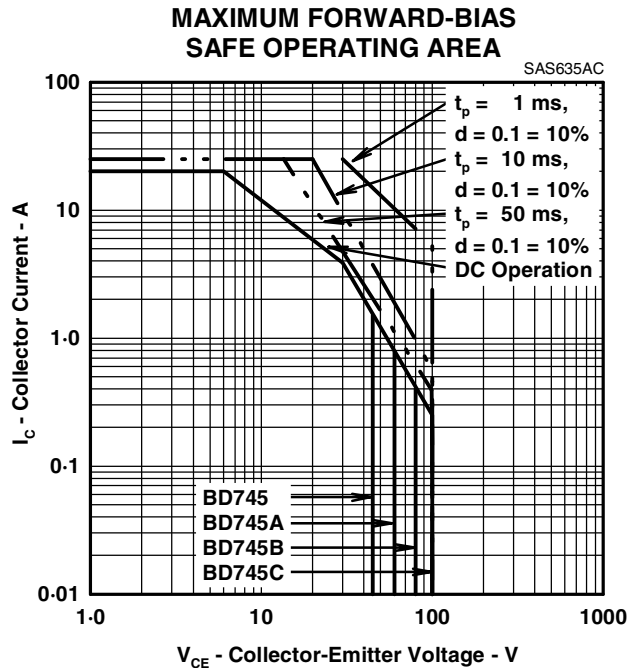


**Figure 1.**



**Figure 2.**

**MAXIMUM SAFE OPERATING REGIONS**



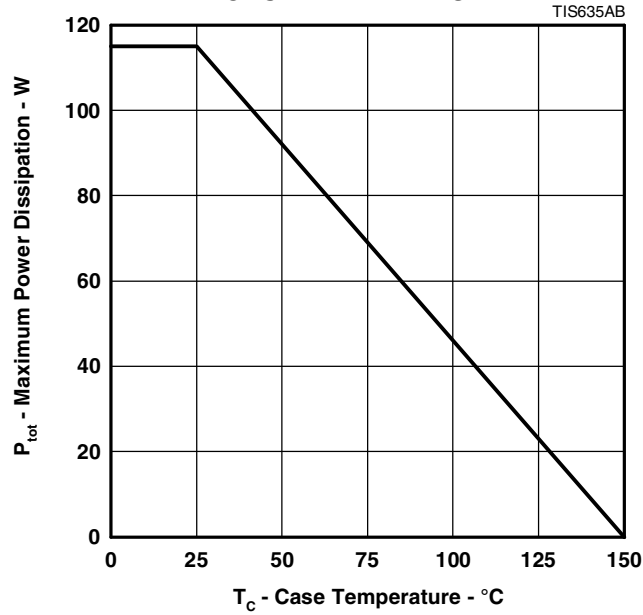
**Figure 3.**

**PRODUCT INFORMATION**

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

**THERMAL INFORMATION**

**MAXIMUM POWER DISSIPATION  
VS  
CASE TEMPERATURE**



**Figure 4.**