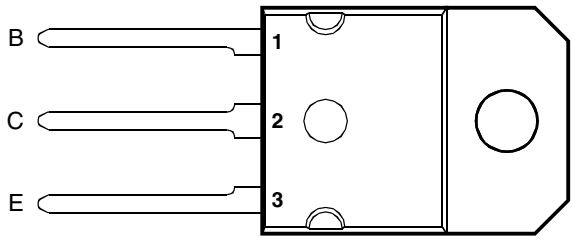
- **Designed for Complementary Use with the BD745 Series**
- **115 W at 25°C Case Temperature**
- **20 A Continuous Collector Current**
- **25 A Peak Collector Current**
- **Customer-Specified Selections Available**

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)	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)		$½LI_C^2$	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 ≤ 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 Ω, $V_{BE(off)}$ = 0, R_S = 0.1 Ω, V_{CC} = -20 V.

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

NOTES: 5. These parameters must be measured using pulse techniques, t_p = 300 µs, duty cycle ≤ 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	°C/W
$R_{\theta JA}$	Junction to free air thermal resistance			35.7	°C/W

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

PARAMETER		TEST CONDITIONS †			MIN	TYP	MAX	UNIT
t_d	Delay time	I_C = -5 A	$I_{B(on)}$ = -0.5 A	$I_{B(off)}$ = 0.5 A		20		ns
t_r	Rise time	$V_{BE(off)}$ = 4.2 V	R_L = 6 Ω	t_p = 20 µs, dc ≤ 2%		120		ns
t_s	Storage time					600		ns
t_f	Fall time					300		ns

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

TYPICAL CHARACTERISTICS

TYPICAL DC CURRENT GAIN vs COLLECTOR CURRENT

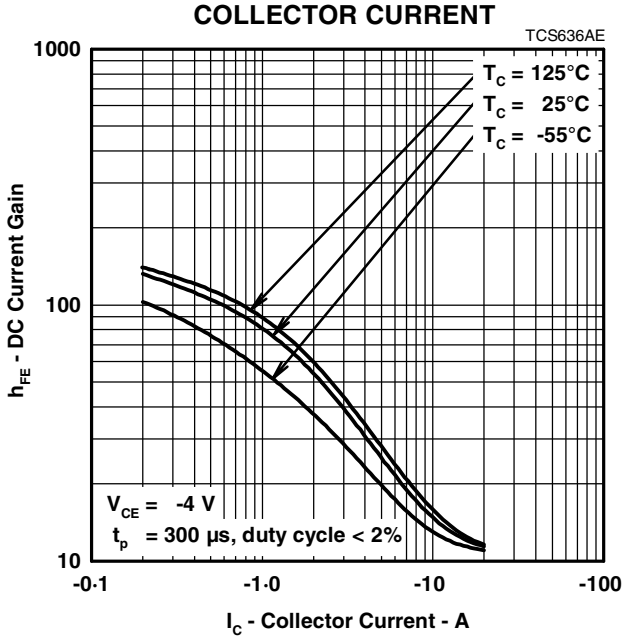


Figure 1.

COLLECTOR-EMITTER SATURATION VOLTAGE vs COLLECTOR CURRENT

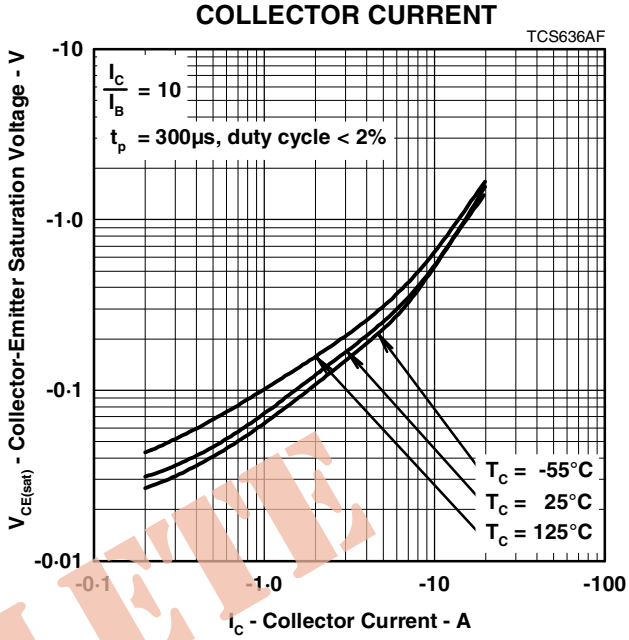


Figure 2.

MAXIMUM SAFE OPERATING REGIONS

MAXIMUM FORWARD-BIAS SAFE OPERATING AREA

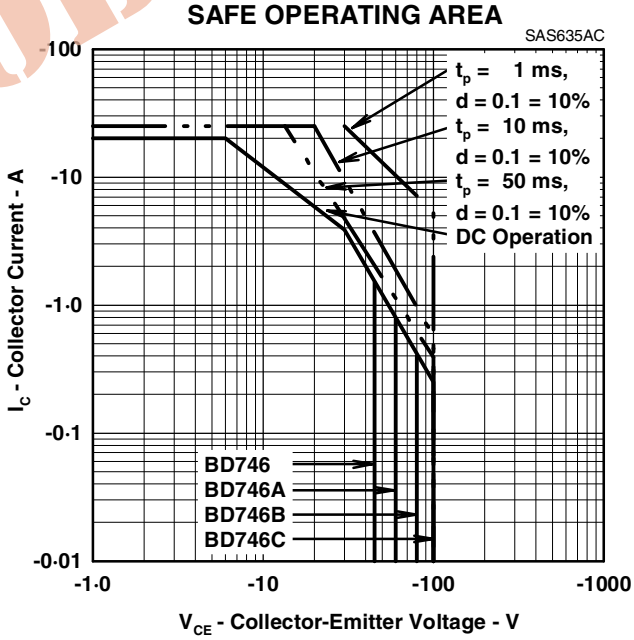


Figure 3.

THERMAL INFORMATION

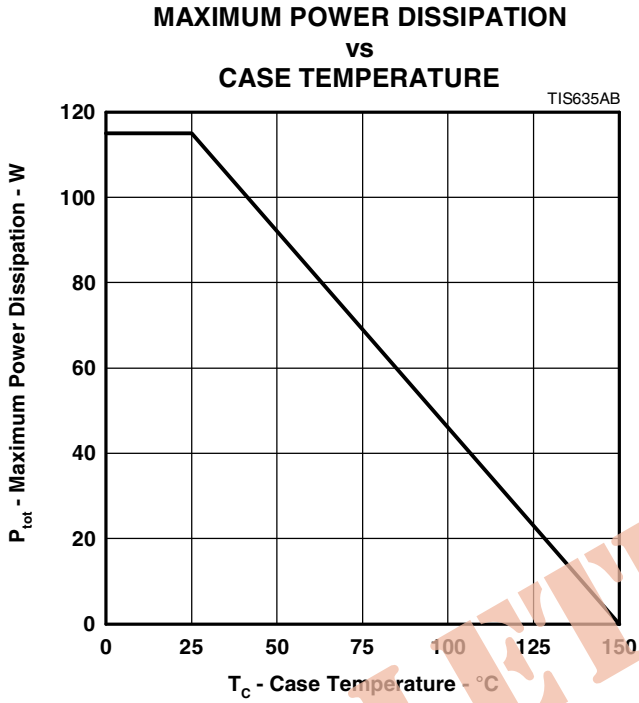


Figure 4.