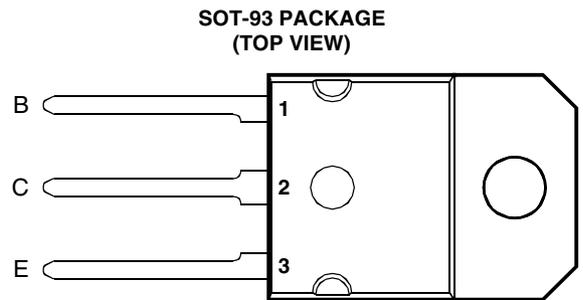


- Designed for Complementary Use with the BD745 Series
- 115 W at 25°C Case Temperature
- 20 A Continuous Collector Current
- 25 A Peak Collector Current
- Customer-Specified Selections Available

 This model is currently available, but not recommended for new designs. For more information, see http://bourns.com/data/global/pdfs/TSP1203_SOT93_POM.pdf.



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 BD746A BD746B BD746C	-45 -60 -80 -100		V
I_{CBO} Collector cut-off current	$V_{CE} = -50 \text{ V}$ $V_{CE} = -70 \text{ V}$ $V_{CE} = -90 \text{ V}$ $V_{CE} = -110 \text{ V}$ $V_{CE} = -50 \text{ V}$ $V_{CE} = -70 \text{ V}$ $V_{CE} = -90 \text{ V}$ $V_{CE} = -110 \text{ V}$	$V_{BE} = 0$ $V_{BE} = 0$	$T_C = 125^\circ\text{C}$ $T_C = 125^\circ\text{C}$ $T_C = 125^\circ\text{C}$ $T_C = 125^\circ\text{C}$	BD746 BD746A BD746B BD746C BD746 BD746A BD746B BD746C		-0.1 -0.1 -0.1 -0.1 -5 -5 -5 -5	mA
I_{CEO} Collector cut-off current	$V_{CE} = -30 \text{ V}$ $V_{CE} = -60 \text{ V}$	$I_B = 0$ $I_B = 0$		BD746/746A BD746B/746C		-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					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

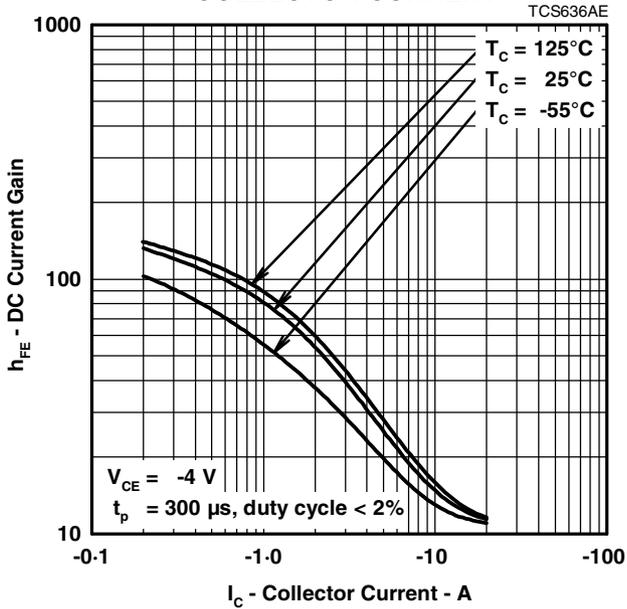


Figure 1.

COLLECTOR-EMITTER SATURATION VOLTAGE
VS
COLLECTOR CURRENT

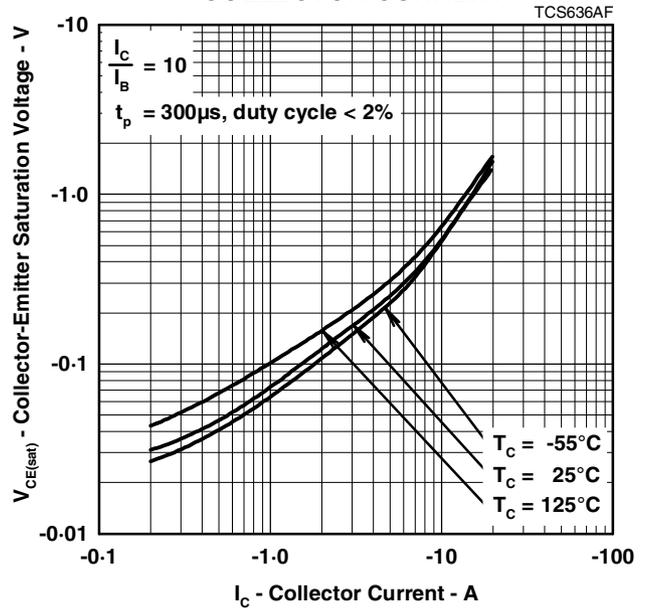


Figure 2.

MAXIMUM SAFE OPERATING REGIONS

MAXIMUM FORWARD-BIAS
SAFE OPERATING AREA

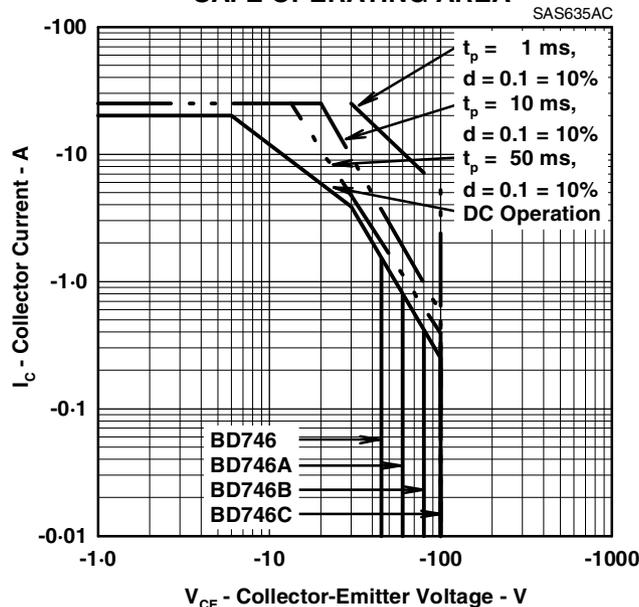


Figure 3.

PRODUCT INFORMATION

THERMAL INFORMATION

**MAXIMUM POWER DISSIPATION
VS
CASE TEMPERATURE**

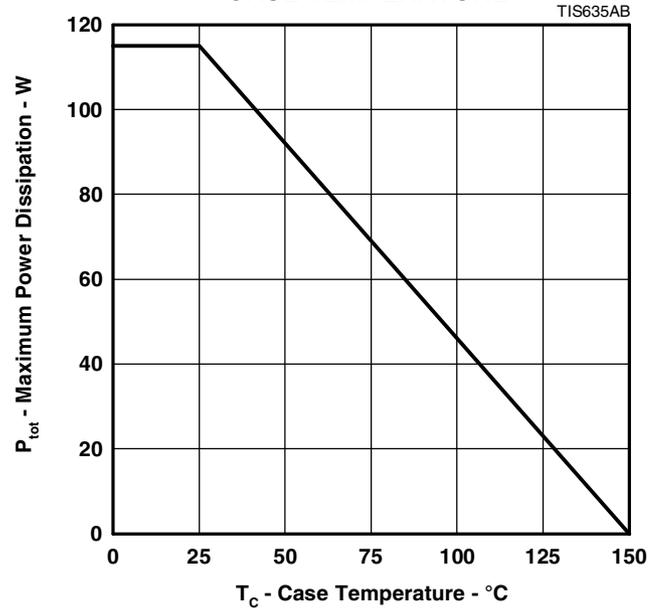


Figure 4.

Mouser Electronics

Authorized Distributor

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[BD746](#) [BD745](#) [BD745A](#) [BD746A](#) [BD746C](#) [BD745C](#) [BD745B](#) [BD746B](#) [BD746A-S](#) [BD746B-S](#) [BD746C-S](#)
[BD746-S](#)