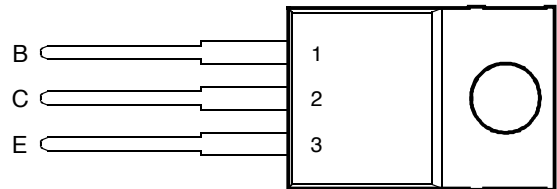


# BD743, BD743A, BD743B, BD743C NPN SILICON POWER TRANSISTORS

**BOURNS®**

- Designed for Complementary Use with the BD744 Series
- 90 W at 25°C Case Temperature
- 15 A Continuous Collector Current
- 20 A Peak Collector Current
- Customer-Specified Selections Available

TO-220 PACKAGE  
(TOP VIEW)



Pin 2 is in electrical contact with the mounting base.

MDTRACA



This series is obsolete and not recommended for new designs.

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

RATING		SYMBOL	VALUE	UNIT
Collector-base voltage ( $I_E = 0$ )	BD743	$V_{CB0}$	50	V
	BD743A		70	
	BD743B		90	
	BD743C		110	
Collector-emitter voltage ( $I_B = 0$ )	BD743	$V_{CEO}$	45	V
	BD743A		60	
	BD743B		80	
	BD743C		100	
Emitter-base voltage		$V_{EBO}$	5	V
Continuous collector current		$I_C$	15	A
Peak collector current (see Note 1)		$I_{CM}$	20	A
Continuous base current		$I_B$	5	A
Continuous device dissipation at (or below) 25°C case temperature (see Note 2)		$P_{tot}$	90	W
Continuous device dissipation at (or below) 25°C free air temperature (see Note 3)		$P_{tot}$	2	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		$T_L$	250	°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 0.72 W/°C.

3. Derate linearly to 150°C free air temperature at the rate of 16 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

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

**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)	BD743	45		V
				BD743A	60		
				BD743B	80		
				BD743C	100		
$I_{CBO}$ Collector cut-off current	$V_{CE} = 50 \text{ V}$ $V_{CE} = 70 \text{ V}$ $V_{CE} = 90 \text{ V}$ $V_{CE} = 110 \text{ V}$	$V_{BE} = 0$ $V_{BE} = 0$ $V_{BE} = 0$ $V_{BE} = 0$	$T_C = 125^\circ\text{C}$	BD743		0.1	mA
				BD743A		0.1	
				BD743B		0.1	
				BD743C		0.1	
				BD743		5	
				BD743A		5	
				BD743B		5	
$I_{CEO}$ Collector cut-off current	$V_{CE} = 30 \text{ V}$ $V_{CE} = 60 \text{ V}$	$I_B = 0$ $I_B = 0$		BD743/743A		0.1	mA
				BD743B/743C		0.1	
$I_{EBO}$ Emitter cut-off current	$V_{EB} = 5 \text{ V}$	$I_C = 0$				0.5	mA
$h_{FE}$ Forward current transfer ratio	$V_{CE} = 4 \text{ V}$	$I_C = 1 \text{ A}$ $I_C = 5 \text{ A}$ $I_C = 15 \text{ A}$	(see Notes 5 and 6)		40	150	
					20		
					5		
$V_{CE(sat)}$ Collector-emitter saturation voltage	$I_B = 0.5 \text{ A}$ $I_B = 5 \text{ A}$	$I_C = 5 \text{ A}$ $I_C = 15 \text{ A}$	(see Notes 5 and 6)			1	V
						3	
$V_{BE}$ Base-emitter voltage	$V_{CE} = 4 \text{ V}$ $V_{CE} = 4 \text{ V}$	$I_C = 5 \text{ A}$ $I_C = 15 \text{ A}$	(see Notes 5 and 6)			1	V
						3	
$h_{fe}$ 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			1.4	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$ Junction to free air thermal resistance			62.5	$^\circ\text{C}/\text{W}$

**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

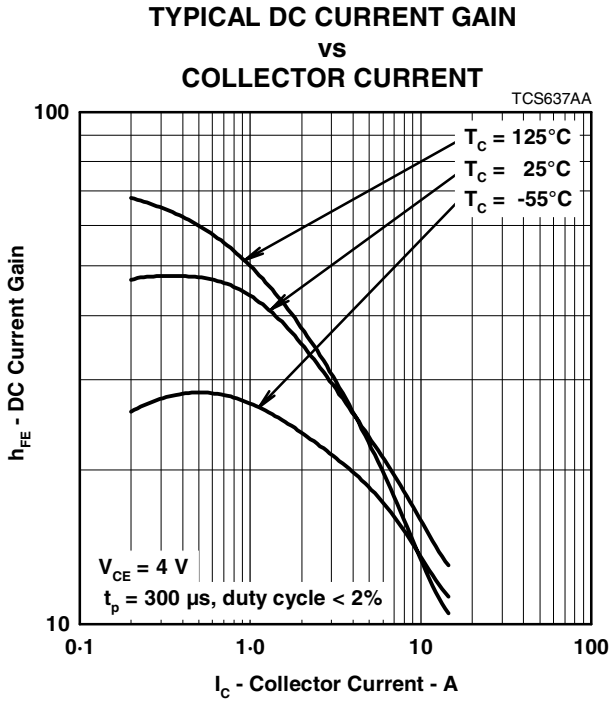


Figure 1.

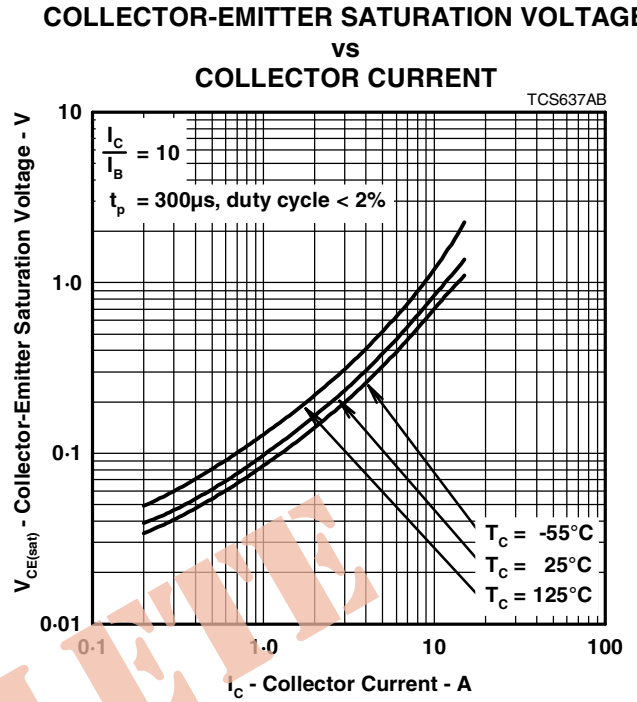


Figure 2.

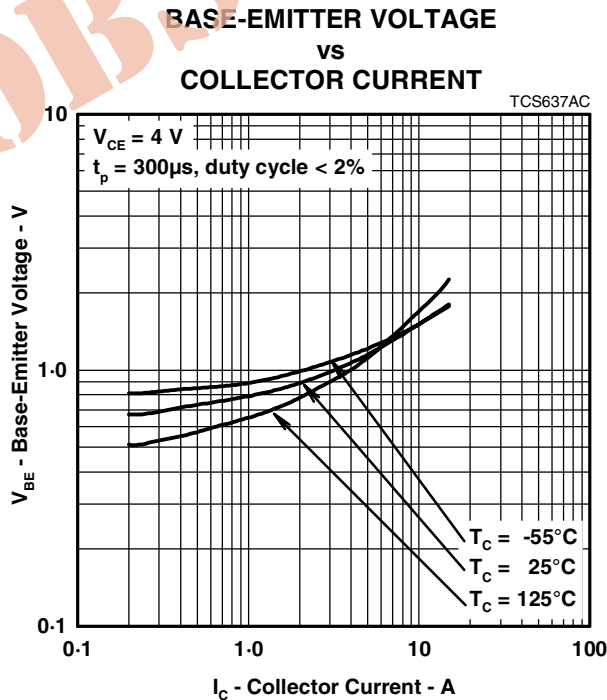


Figure 3.

**PRODUCT INFORMATION**

**MAXIMUM SAFE OPERATING REGIONS**

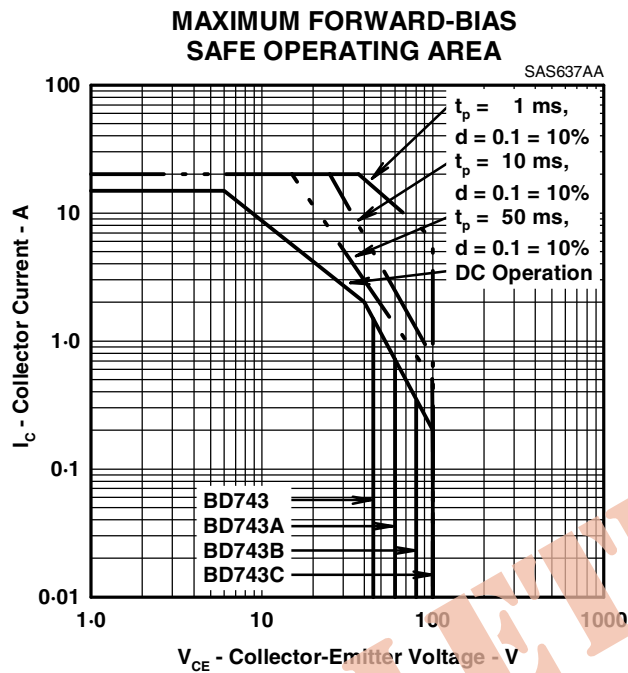


Figure 4.

**THERMAL INFORMATION**

**MAXIMUM POWER DISSIPATION  
vs  
CASE TEMPERATURE**

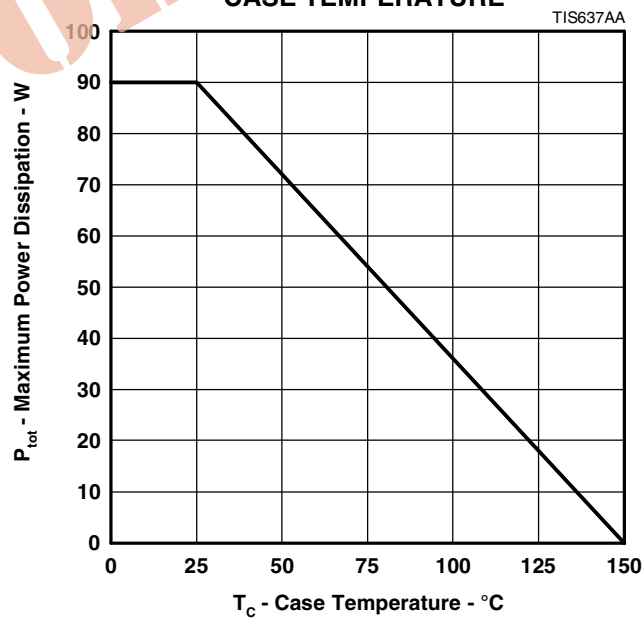


Figure 5.

**PRODUCT INFORMATION**

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