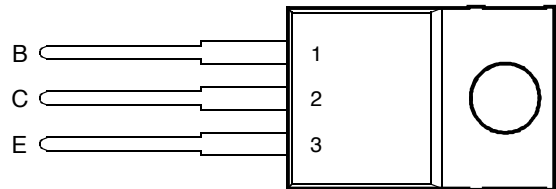


# BD540, BD540A, BD540B, BD540C PNP SILICON POWER TRANSISTORS

**BOURNS®**

- Designed for Complementary Use with the BD539 Series
- 45 W at 25°C Case Temperature
- 5 A Continuous 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 not recommended for new designs.

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

RATING		SYMBOL	VALUE	UNIT
Collector-base voltage ( $I_E = 0$ )	BD540	$V_{CB0}$	-40	V
	BD540A		-60	
	BD540B		-80	
	BD540C		-100	
Collector-emitter voltage ( $I_B = 0$ ) (see Note 1)	BD540	$V_{CEO}$	-40	V
	BD540A		-60	
	BD540B		-80	
	BD540C		-100	
Emitter-base voltage		$V_{EBO}$	-5	V
Continuous collector current		$I_C$	-5	A
Continuous device dissipation at (or below) 25°C case temperature (see Note 2)		$P_{tot}$	45	W
Continuous device dissipation at (or below) 25°C free air temperature (see Note 3)		$P_{tot}$	2	W
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. These values apply when the base-emitter diode is open circuited.  
 2. Derate linearly to 150°C case temperature at the rate of 0.36 W/°C.  
 3. Derate linearly to 150°C free air temperature at the rate of 16 mW/°C.

## PRODUCT INFORMATION

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

# BD540, BD540A, BD540B, BD540C PNP SILICON POWER TRANSISTORS

**BOURNS®**

## electrical characteristics at 25°C case temperature

PARAMETER	TEST CONDITIONS			MIN	TYP	MAX	UNIT
$V_{(BR)CEO}$ Collector-emitter breakdown voltage	$I_C = -30 \text{ mA}$ (see Note 4)	$I_B = 0$	BD540 BD540A BD540B BD540C	-40 -60 -80 -100			V
$I_{CES}$ Collector-emitter cut-off current	$V_{CE} = -40 \text{ V}$ $V_{CE} = -60 \text{ V}$ $V_{CE} = -80 \text{ V}$ $V_{CE} = -100 \text{ V}$	$V_{BE} = 0$ $V_{BE} = 0$ $V_{BE} = 0$ $V_{BE} = 0$	BD540 BD540A BD540B BD540C			-0.2 -0.2 -0.2 -0.2	mA
$I_{CEO}$ Collector cut-off current	$V_{CE} = -30 \text{ V}$ $V_{CE} = -60 \text{ V}$	$I_B = 0$ $I_B = 0$	BD540/540A BD540B/540C			-0.3 -0.3	mA
$I_{EBO}$ Emitter cut-off current	$V_{EB} = -5 \text{ V}$	$I_C = 0$				-1	mA
$h_{FE}$ Forward current transfer ratio	$V_{CE} = -4 \text{ V}$ $V_{CE} = -4 \text{ V}$ $V_{CE} = -4 \text{ V}$	$I_C = -0.5 \text{ A}$ $I_C = -1 \text{ A}$ $I_C = -3 \text{ A}$	(see Notes 4 and 5)	40 30 12			
$V_{CE(sat)}$ Collector-emitter saturation voltage	$I_B = -125 \text{ mA}$ $I_B = -375 \text{ mA}$ $I_B = -1 \text{ A}$	$I_C = -1 \text{ A}$ $I_C = -3 \text{ A}$ $I_C = -5 \text{ A}$	(see Notes 4 and 5)			-0.25 -0.8 -1.5	V
$V_{BE}$ Base-emitter voltage	$V_{CE} = -4 \text{ V}$	$I_C = -3 \text{ A}$	(see Notes 4 and 5)			-1.25	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: 4. These parameters must be measured using pulse techniques,  $t_p = 300 \mu\text{s}$ , duty cycle  $\leq 2\%$ .

5. 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			2.78	°C/W
$R_{\theta JA}$ Junction to free air thermal resistance			62.5	°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	$V_{BE(off)} = 4.3 \text{ V}$	$R_L = 30 \Omega$	$t_p = 20 \mu\text{s}$ , dc $\leq 2\%$		1		$\mu\text{s}$

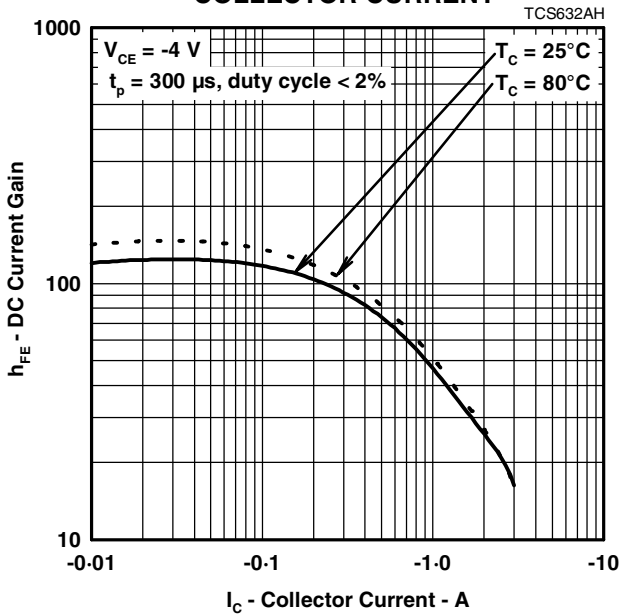
† Voltage and current values shown are nominal; exact values vary slightly with transistor parameters.

## PRODUCT INFORMATION

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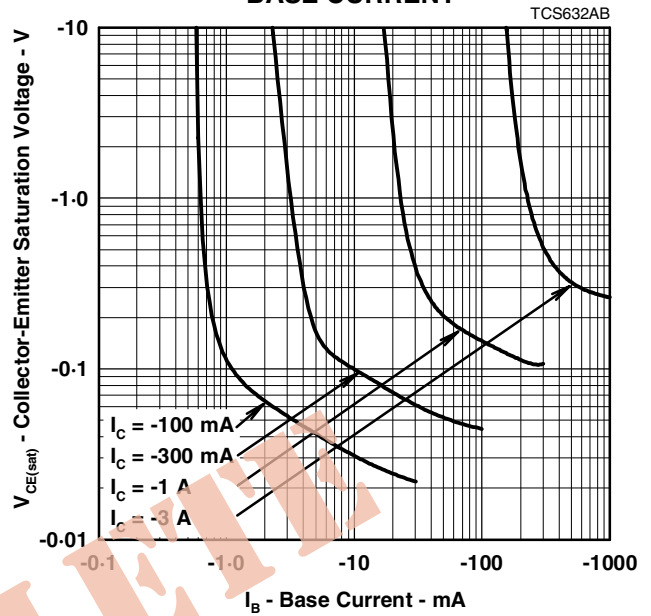
**TYPICAL CHARACTERISTICS**

**TYPICAL DC CURRENT GAIN  
vs  
COLLECTOR CURRENT**



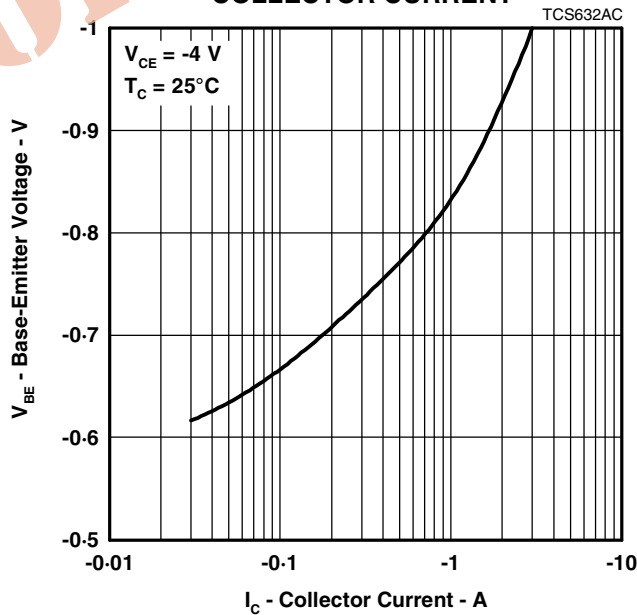
**Figure 1.**

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



**Figure 2.**

**BASE-EMITTER VOLTAGE  
vs  
COLLECTOR CURRENT**



**Figure 3.**

**PRODUCT INFORMATION**

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**MAXIMUM SAFE OPERATING REGIONS**

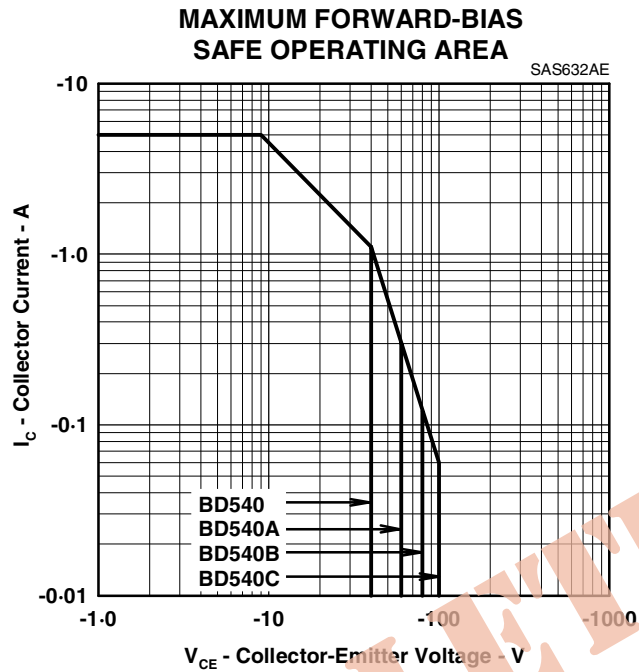


Figure 4.

**THERMAL INFORMATION**

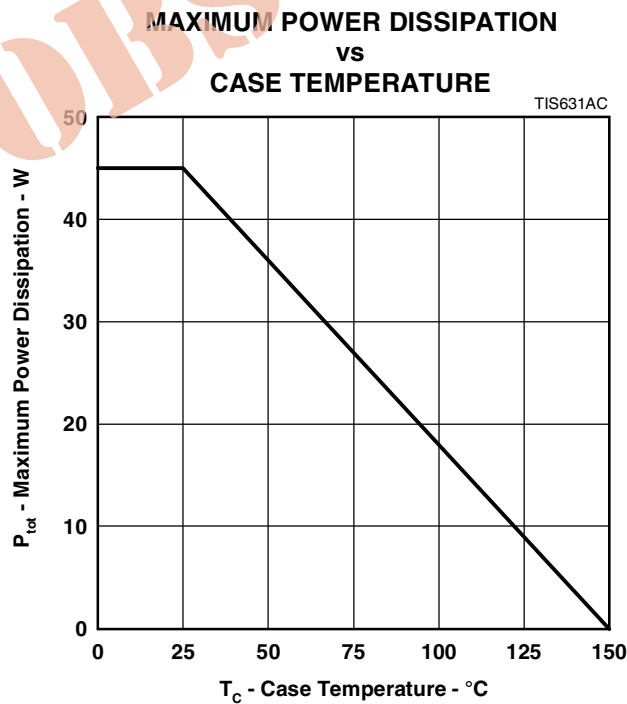


Figure 5.

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