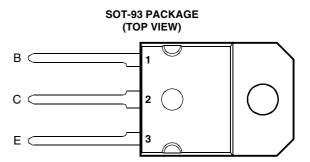
# **BOURNS®**

- Designed for Complementary Use with the BD250 Series
- 125 W at 25°C Case Temperature
- 25 A Continuous Collector Current
- 40 A Peak Collector Current
- Customer-Specified Selections Available



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	
	BD249		55	
Collector-emitter voltage ( $R_{BE} = 100 \Omega$ )	BD249A	V	70	V
	BD249B	V <sub>CER</sub>	90	٧
	BD249C		115	
	BD249		45	
Collector-emitter voltage (I <sub>C</sub> = 30 mA)	BD249A	V	60	V
	BD249B	V <sub>CEO</sub>	80	
	BD249C		100	
Emitter-base voltage			5	V
Continuous collector current			25	Α
Peak collector current (see Note 1)			40	Α
Continuous base current			5	Α
Continuous device dissipation at (or below) 25°C case temperature (see Note 2)			125	W
Continuous device dissipation at (or below) 25°C free air temperature (see Note 3)			3	W
Unclamped inductive load energy (see Note 4)			90	mJ
Operating junction temperature range			-65 to +150	°C
Storage temperature range			-65 to +150	°C
Lead temperature 3.2 mm from case for 10 seconds			250	°C

NOTES: 1. This value applies for  $t_p \le 0.3$  ms, duty cycle  $\le 10\%$ .

- 2. Derate linearly to 150°C case temperature at the rate of 1 W/°C.
- 3. Derate linearly to 150°C free air temperature at the rate of 24 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.



#### electrical characteristics at 25°C case temperature

	PARAMETER		TEST CONDITION	ONS	MIN	TYP	MAX	UNIT
V <sub>(BR)CEO</sub>	Collector-emitter breakdown voltage			BD249 BD249A	45 60			
		(see Note 5)	$I_B = 0$	BD249B	80			V
			BD249C	100				
		V <sub>CE</sub> = 55 V	V <sub>BE</sub> = 0	BD249			0.7	
1	Collector-emitter	$V_{CE} = 70 V$	$V_{BE} = 0$	BD249A			0.7	mA
ICES	cut-off current	$V_{CE} = 90 V$	$V_{BE} = 0$	BD249B		0.7	0.7	ША
		V <sub>CE</sub> = 115 V	$V_{BE} = 0$	BD249C			0.7	
1	Collector cut-off	V <sub>CE</sub> = 30 V	I <sub>B</sub> = 0	BD249/249A			1	mA
I <sub>CEO</sub>	current	$V_{CE} = 60 V$	$I_B = 0$	BD249B/249C			1	
I <sub>EBO</sub>	Emitter cut-off current	V <sub>EB</sub> = 5 V	I <sub>C</sub> = 0				1	mA
	Forward current transfer ratio	$V_{CE} = 4 V$ $I_{C} = 1.5 A$	25					
h <sub>FE</sub>		$V_{CE} = 4 V$	$I_{C} = 15 A$	(see Notes 5 and 6)	10			
		$V_{CE} = 4 V$	$I_C = 25 A$		5			
V <sub>CE(sat)</sub>	Collector-emitter	I <sub>B</sub> = 1.5 A	I <sub>C</sub> = 15 A	(see Notes 5 and 6)			1.8	V
CE(sat)	saturation voltage	I <sub>B</sub> = 5 A	$I_C = 25 A$				4	•
V <sub>BE</sub>	Base-emitter	$V_{CE} = 4 V$	I <sub>C</sub> = 15 A	(see Notes 5 and 6)			2	V
▼BE	voltage	$V_{CE} = 4 V$	$I_C = 25 A$				4	•
h <sub>fe</sub>	Small signal forward current transfer ratio	V <sub>CE</sub> = 10 V	I <sub>C</sub> = 1 A	f = 1 kHz	25			
h <sub>fe</sub>	Small signal forward current transfer ratio	V <sub>CE</sub> = 10 V	I <sub>C</sub> = 1 A	f = 1 MHz	3			

NOTES: 5. These parameters must be measured using pulse techniques,  $t_p = 300 \mu s$ , duty cycle  $\leq 2\%$ .

#### thermal characteristics

	PARAMETER	MIN	TYP	MAX	UNIT
$R_{\theta JC}$	Junction to case thermal resistance			1	°C/W
$R_{\theta,JA}$	Junction to free air thermal resistance			42	°C/W

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

	PARAMETER	TEST CONDITIONS †			MIN	TYP	MAX	UNIT
t <sub>on</sub>	Turn-on time	I <sub>C</sub> = 5 A	$I_{B(on)} = 0.5 A$	$I_{B(off)} = -0.5 A$		0.3		μs
t <sub>off</sub>	Turn-off time	$V_{BF(off)} = -5 \text{ V}$	$R_1 = 5 \Omega$	$t_{\rm p} = 20 \ \mu s, \ dc \le 2\%$		0.9		μs

<sup>&</sup>lt;sup>†</sup> Voltage and current values shown are nominal; exact values vary slightly with transistor parameters.

<sup>6.</sup> These parameters must be measured using voltage-sensing contacts, separate from the current carrying contacts.

#### **TYPICAL CHARACTERISTICS**

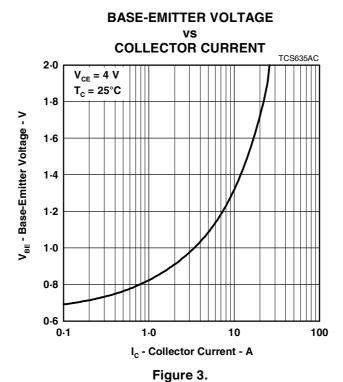
# **TYPICAL DC CURRENT GAIN** vs **COLLECTOR CURRENT** TCS635AD 1000 $V_{CE} = 4 V$ $T_{\rm C} = 25^{\circ}{\rm C}$ $t_p = 300 \mu s$ , duty cycle < 2%h<sub>FE</sub> - DC Current Gain 100 10 0.1 1.0 10 100 I<sub>c</sub> - Collector Current - A

Figure 1.

## **COLLECTOR-EMITTER SATURATION VOLTAGE** vs **BASE CURRENT** TCS635AB 10 V<sub>CE(sat)</sub> - Collector-Emitter Saturation Voltage - V 1.0 0.1 = 300 mA1 A 3 A 10 A 0.01 0.01 0.001 0.1 1.0 100 10

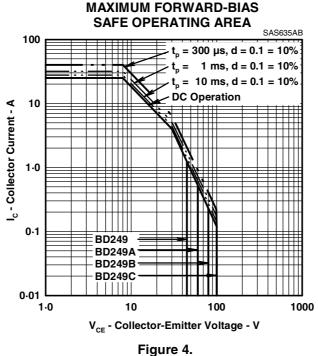
Figure 2.

I<sub>B</sub> - Base Current - A



#### PRODUCT INFORMATION

#### **MAXIMUM SAFE OPERATING REGIONS**



#### THERMAL INFORMATION

# **MAXIMUM POWER DISSIPATION**

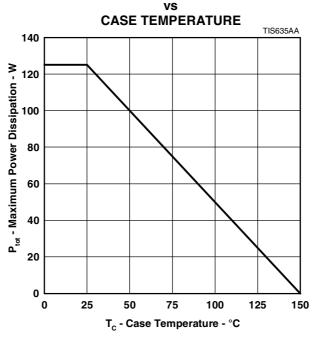


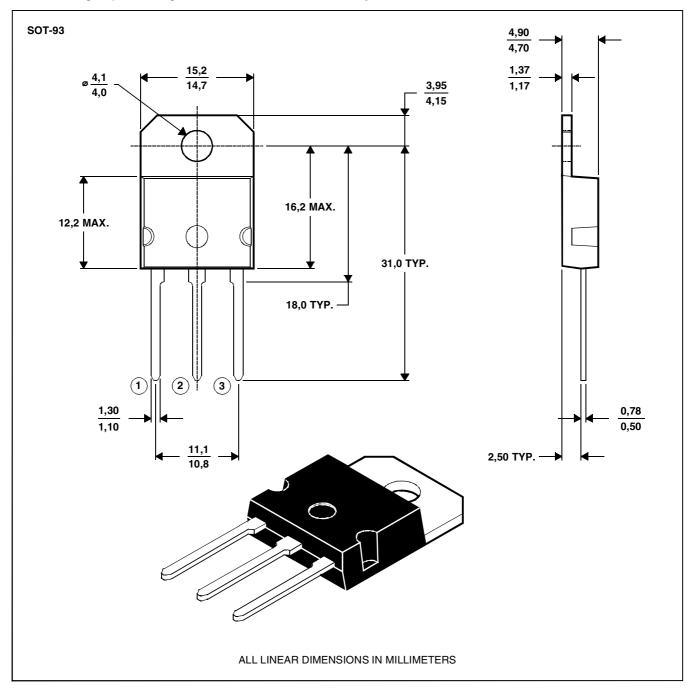
Figure 5.

#### **MECHANICAL DATA**

#### **SOT-93**

### 3-pin plastic flange-mount package

This single-in-line package consists of a circuit mounted on a lead frame and encapsulated within a plastic compound. The compound will withstand soldering temperature with no deformation, and circuit performance characteristics will remain stable when operated in high humidity conditions. Leads require no additional cleaning or processing when used in soldered assembly.



NOTE A: The centre pin is in electrical contact with the mounting tab.

**MDXXAW**