JUNE 1973 - REVISED MARCH 1997

- ● **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**

SOT-93 PACKAGE
(TOP VIEW)

B — 1
C — 2
E — 3
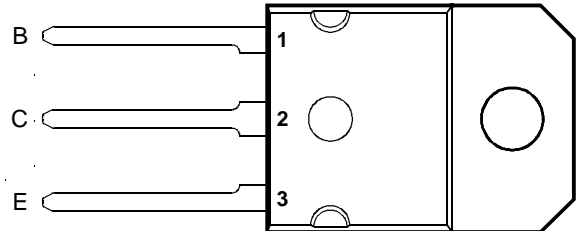
Pin 2 is in electrical contact with the mounting base.

MDTRAA

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

RATING		SYMBOL	VALUE	UNIT
Collector-emitter voltage (R_{BE} = 100 Ω)	BD249	V_{CER}	55	V
	BD249A		70	
	BD249B		90	
	BD249C		115	
Collector-emitter voltage (I_C = 30 mA)	BD249	V_{CEO}	45	V
	BD249A		60	
	BD249B		80	
	BD249C		100	
Emitter-base voltage		V_{EBO}	5	V
Continuous collector current		I_C	25	A
Peak collector current (see Note 1)		I_{CM}	40	A
Continuous base current		I_B	5	A
Continuous device dissipation at (or below) 25°C case temperature (see Note 2)		P_{tot}	125	W
Continuous device dissipation at (or below) 25°C free air temperature (see Note 3)		P_{tot}	3	W
Unclamped inductive load energy (see Note 4)		$\frac{1}{2}LI_C{}^2$	90	mJ
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 ≤ 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 Ω, $V_{BE(off)}$ = 0, R_S = 0.1 Ω, V_{CC} = 20 V.

P R O D U C T I N F O R M A T I O N

Power
I N N O V A T I O N S

BD249, BD249A, BD249B, BD249C
NPN SILICON POWER TRANSISTORS

JUNE 1973 - REVISED MARCH 1997

electrical characteristics at 25°C case temperature

PARAMETER		TEST CONDITIONS			MIN	TYP	MAX	UNIT
$V_{(BR)CEO}$	Collector-emitter breakdown voltage	$I_C = 30$ mA (see Note 5)	$I_B = 0$	BD249 BD249A BD249B BD249C	45 60 80 100			V
I_{CES}	Collector-emitter cut-off current	$V_{CE} = 55$ V $V_{CE} = 70$ V $V_{CE} = 90$ V $V_{CE} = 115$ V	$V_{BE} = 0$ $V_{BE} = 0$ $V_{BE} = 0$ $V_{BE} = 0$	BD249 BD249A BD249B BD249C			0.7 0.7 0.7 0.7	mA
I_{CEO}	Collector cut-off current	$V_{CE} = 30$ V $V_{CE} = 60$ V	$I_B = 0$ $I_B = 0$	BD249/249A BD249B/249C			1 1	mA
I_{EBO}	Emitter cut-off current	$V_{EB} = 5$ V	$I_C = 0$				1	mA
h_{FE}	Forward current transfer ratio	$V_{CE} = 4$ V $V_{CE} = 4$ V $V_{CE} = 4$ V	$I_C = 1.5$ A $I_C = 15$ A $I_C = 25$ A	(see Notes 5 and 6)	25 10 5			
$V_{CE(sat)}$	Collector-emitter saturation voltage	$I_B = 1.5$ A $I_B = 5$ A	$I_C = 15$ A $I_C = 25$ A	(see Notes 5 and 6)			1.8 4	V
V_{BE}	Base-emitter voltage	$V_{CE} = 4$ V $V_{CE} = 4$ V	$I_C = 15$ A $I_C = 25$ A	(see Notes 5 and 6)			2 4	V
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	3			

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	°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_{on}	Turn-on time	$I_C = 5$ A	$I_{B(on)} = 0.5$ A	$I_{B(off)} = -0.5$ A		0.3		µs
t_{off}	Turn-off time	$V_{BE(off)} = -5$ V	$R_L = 5$ Ω	$t_p = 20$ µs, dc ≤ 2%		0.9		µs

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

P R O D U C T   I N F O R M A T I O N

TYPICAL CHARACTERISTICS
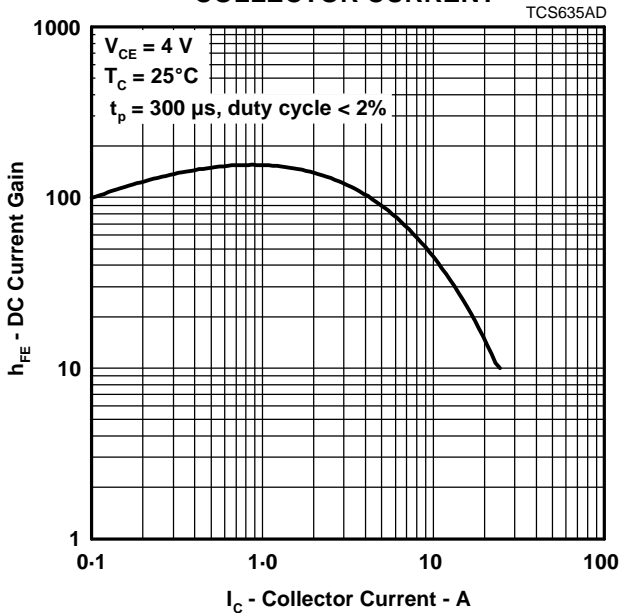
**TYPICAL DC CURRENT GAIN
vs
COLLECTOR CURRENT**

Figure 1.
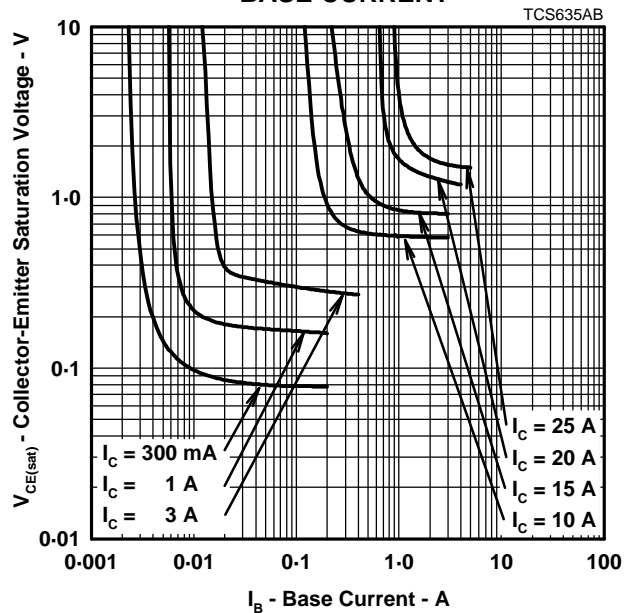
**COLLECTOR-EMITTER SATURATION VOLTAGE
vs
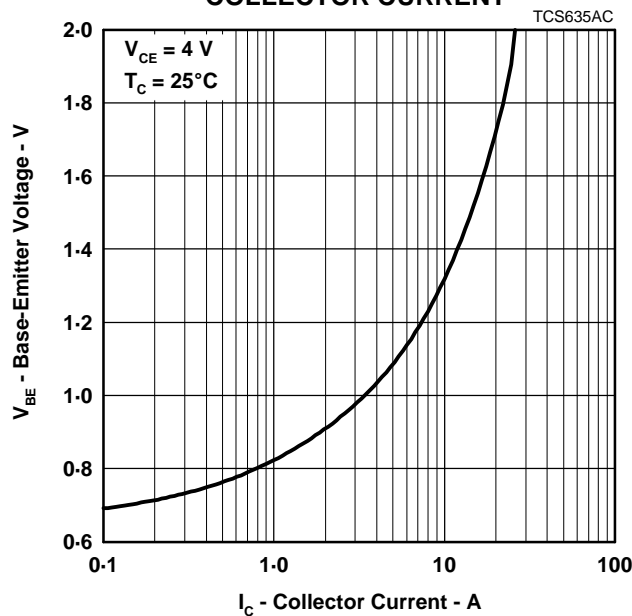BASE CURRENT**

Figure 2.

**BASE-EMITTER VOLTAGE
vs
COLLECTOR CURRENT**

Figure 3.

P R O D U C T   I N F O R M A T I O N

Power
INNOVATIONS

BD249, BD249A, BD249B, BD249C
NPN SILICON POWER TRANSISTORS

MAXIMUM SAFE OPERATING REGIONS

MAXIMUM FORWARD-BIAS
SAFE OPERATING AREA

SAS635AB

t_p = 300 µs, d = 0.1 = 10%
t_p = 1 ms, d = 0.1 = 10%
t_p = 10 ms, d = 0.1 = 10%
DC Operation

BD249
BD249A
BD249B
BD249C

I_C - Collector Current - A

V_{CE} - Collector-Emitter Voltage - V
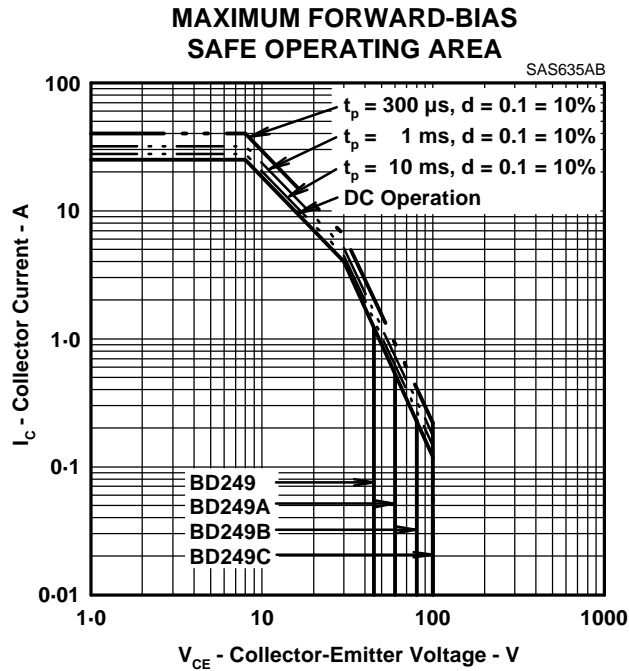
Figure 4.

THERMAL INFORMATION

MAXIMUM POWER DISSIPATION
vs
CASE TEMPERATURE

TIS635AA

P_{tot} - Maximum Power Dissipation - W

T_C - Case Temperature - °C
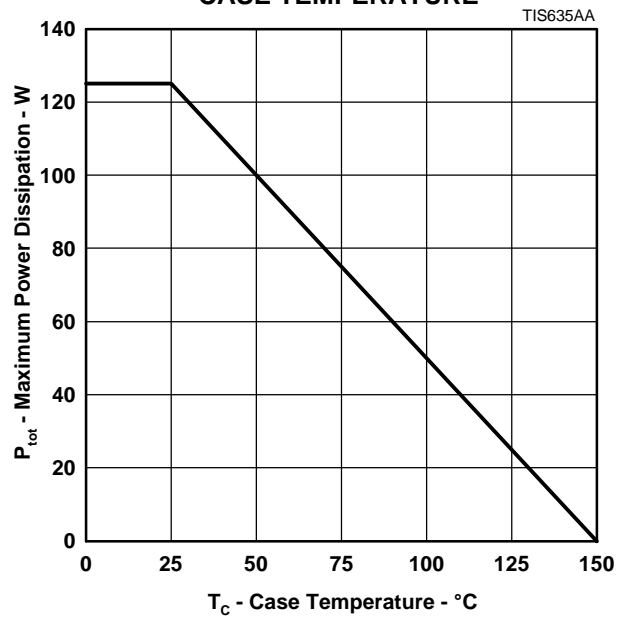
Figure 5.

P R O D U C T   I N F O R M A T I O N

4

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.

ALL LINEAR DIMENSIONS IN MILLIMETERS
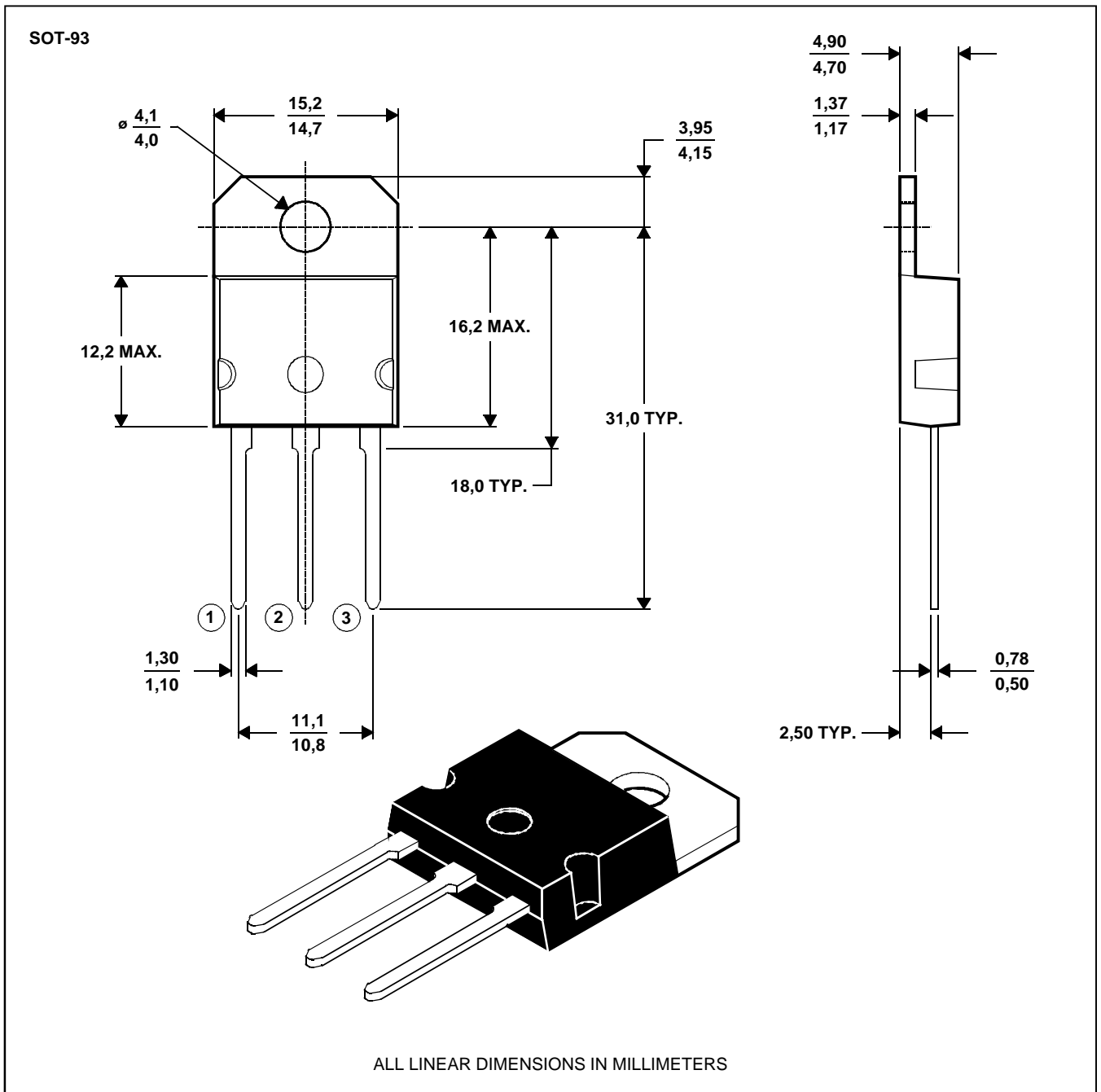
NOTE A: The centre pin is in electrical contact with the mounting tab.

MDXXAW

P R O D U C T   I N F O R M A T I O N

Power
INNOVATIONS

BD249, BD249A, BD249B, BD249C
NPN SILICON POWER TRANSISTORS

IMPORTANT NOTICE

Power Innovations Limited (PI) reserves the right to make changes to its products or to discontinue any semiconductor product or service without notice, and advises its customers to verify, before placing orders, that the information being relied on is current.

PI warrants performance of its semiconductor products to the specifications applicable at the time of sale in accordance with PI's standard warranty. Testing and other quality control techniques are utilized to the extent PI deems necessary to support this warranty. Specific testing of all parameters of each device is not necessarily performed, except as mandated by government requirements.

PI accepts no liability for applications assistance, customer product design, software performance, or infringement of patents or services described herein. Nor is any license, either express or implied, granted under any patent right, copyright, design right, or other intellectual property right of PI covering or relating to any combination, machine, or process in which such semiconductor products or services might be or are used.

PI SEMICONDUCTOR PRODUCTS ARE NOT DESIGNED, INTENDED, AUTHORIZED, OR WARRANTED TO BE SUITABLE FOR USE IN LIFE-SUPPORT APPLICATIONS, DEVICES OR SYSTEMS.

P R O D U C T   I N F O R M A T I O N