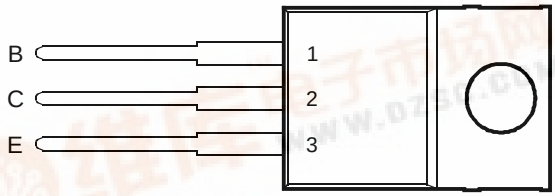
BD743, BD743A, BD743B, BD743C
NPN SILICON POWER TRANSISTORS

 AUGUST 1978 - REVISED MARCH 1997

- **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

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

RATING		SYMBOL	VALUE	UNIT
Collector-base voltage (I_E = 0)	BD743	V_{CBO}	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)		$½LI_C^2$	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 ≤ 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 Ω, $V_{BE(off)}$ = 0, R_S = 0.1 Ω, V_{CC} = 20 V.

BD743, BD743A, BD743B, BD743C
NPN SILICON POWER TRANSISTORS

AUGUST 1978 - REVISED MARCH 1997

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 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 V	V_{BE} = 0		BD743			0.1	mA
		V_{CE} = 70 V	V_{BE} = 0		BD743A			0.1	
		V_{CE} = 90 V	V_{BE} = 0		BD743B			0.1	
		V_{CE} = 110 V	V_{BE} = 0		BD743C			0.1	
		V_{CE} = 50 V	V_{BE} = 0	T_C = 125°C	BD743			5	
		V_{CE} = 70 V	V_{BE} = 0	T_C = 125°C	BD743A			5	
		V_{CE} = 90 V	V_{BE} = 0	T_C = 125°C	BD743B			5	
		V_{CE} = 110 V	V_{BE} = 0	T_C = 125°C	BD743C			5	
I_{CEO}	Collector cut-off current	V_{CE} = 30 V	I_B = 0		BD743/743A			0.1	mA
		V_{CE} = 60 V	I_B = 0		BD743B/743C			0.1	
I_{EBO}	Emitter cut-off current	V_{EB} = 5 V	I_C = 0					0.5	mA
h_{FE}	Forward current transfer ratio	V_{CE} = 4 V	I_C = 1 A			40			
		V_{CE} = 4 V	I_C = 5 A	(see Notes 5 and 6)		20		150	
		V_{CE} = 4 V	I_C = 15 A			5			
$V_{CE(sat)}$	Collector-emitter saturation voltage	I_B = 0.5 A	I_C = 5 A	(see Notes 5 and 6)				1	V
		I_B = 5 A	I_C = 15 A					3	
V_{BE}	Base-emitter voltage	V_{CE} = 4 V	I_C = 5 A	(see Notes 5 and 6)				1	V
		V_{CE} = 4 V	I_C = 15 A					3	
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		5			

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			1.4	°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_d	Delay time	I_C = 5 A	$I_{B(on)}$ = 0.5 A	$I_{B(off)}$ = -0.5 A		20		ns
t_r	Rise time	$V_{BE(off)}$ = -4.2 V	R_L = 6 Ω	t_p = 20 µs, dc ≤ 2%		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

TYPICAL DC CURRENT GAIN
vs
COLLECTOR CURRENT

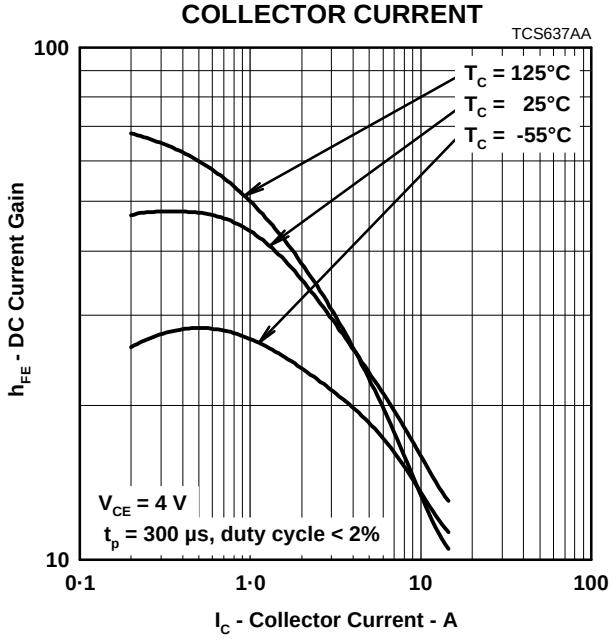


Figure 1.

COLLECTOR-EMITTER SATURATION VOLTAGE
vs
COLLECTOR CURRENT

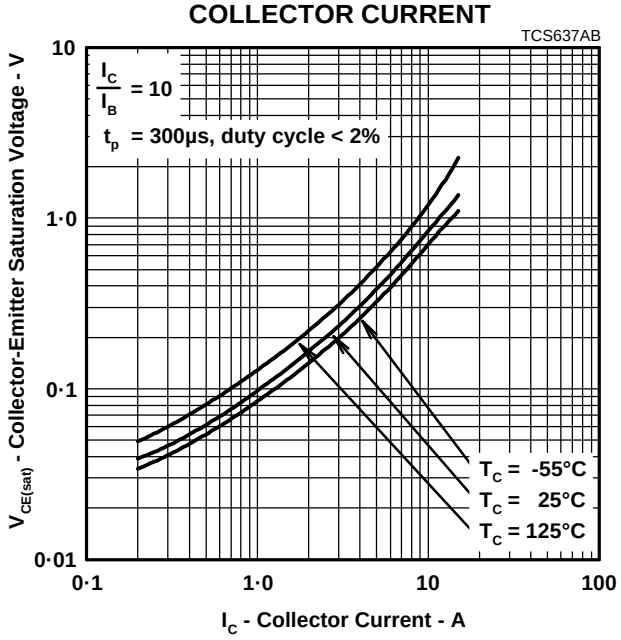


Figure 2.

BASE-EMITTER VOLTAGE
vs
COLLECTOR CURRENT

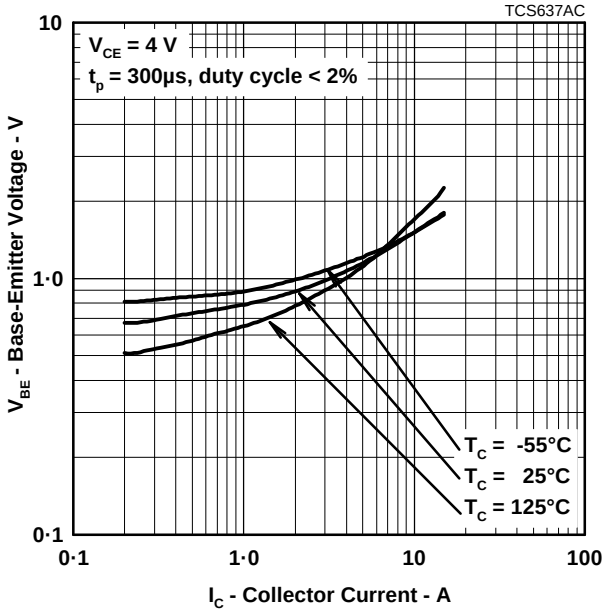


Figure 3.

MAXIMUM SAFE OPERATING REGIONS

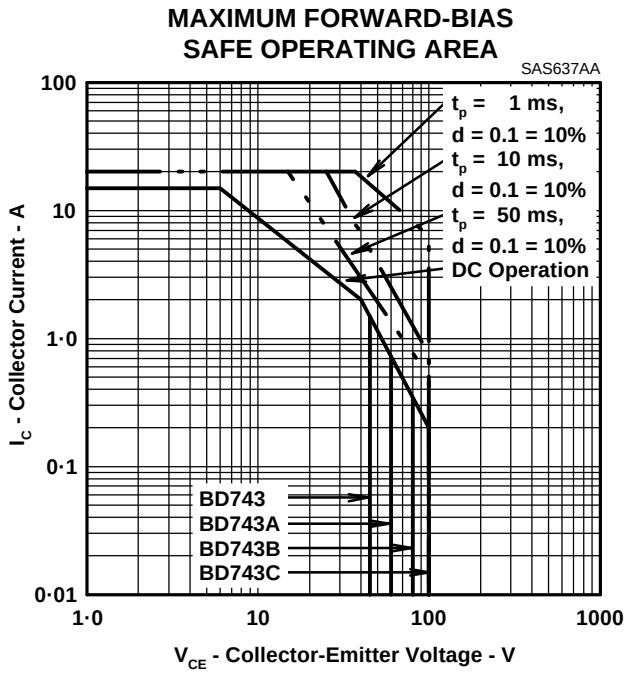


Figure 4.

THERMAL INFORMATION

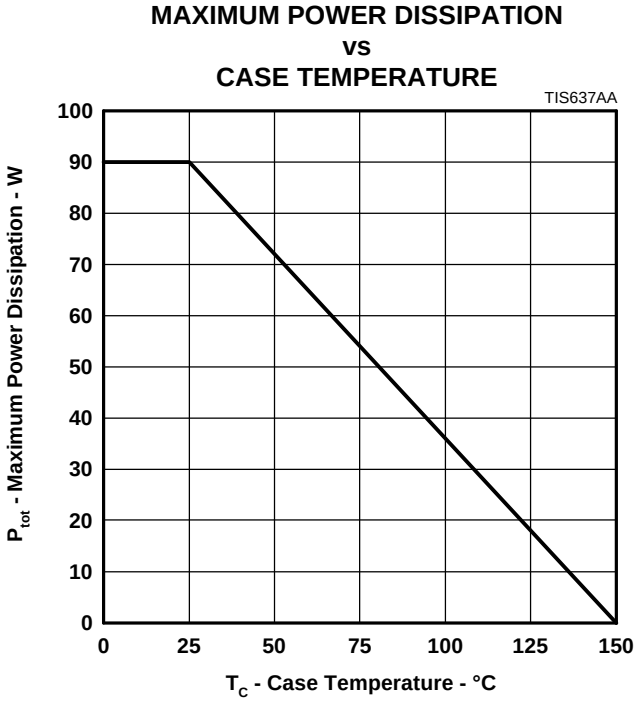
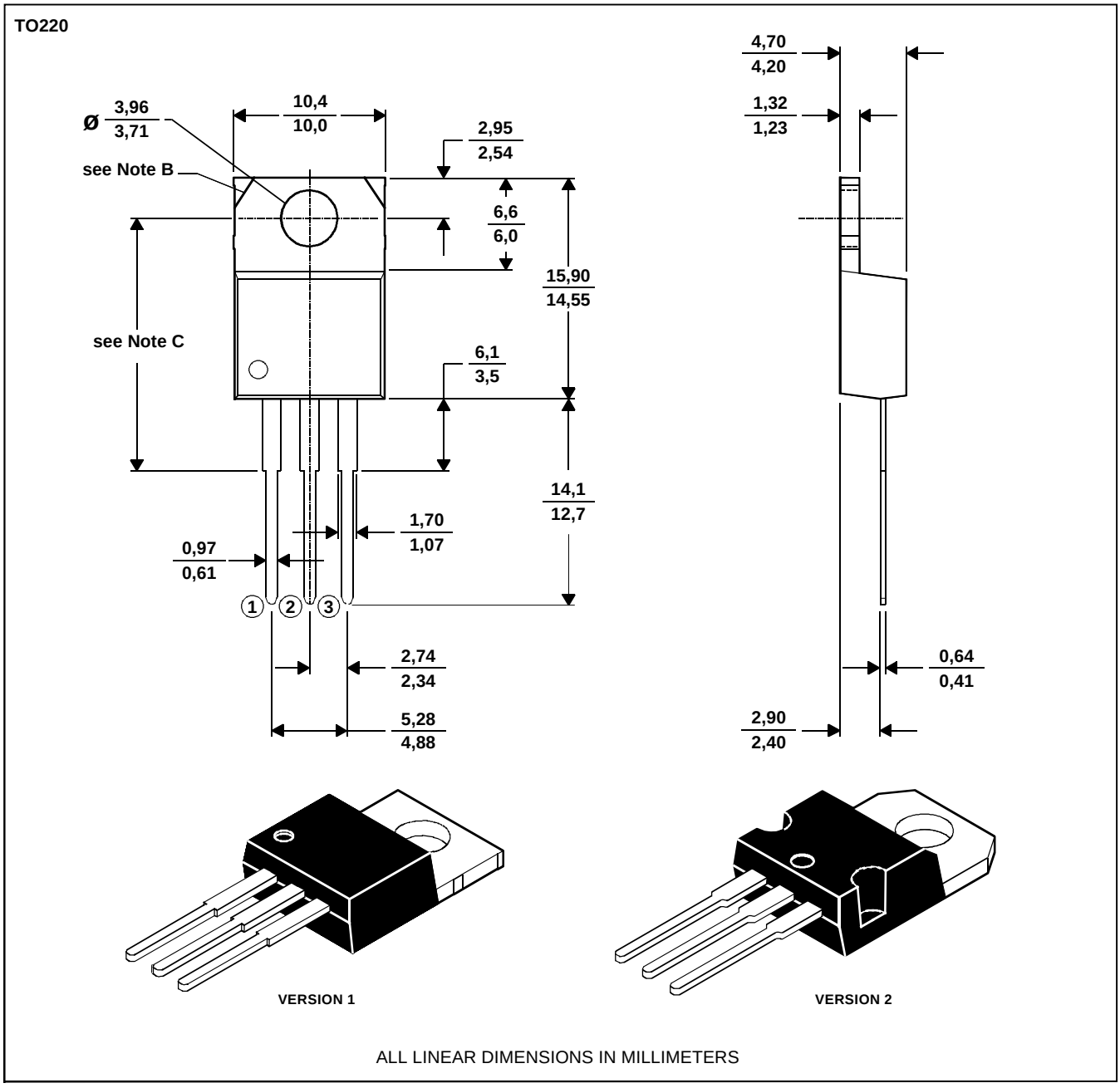


Figure 5.

MECHANICAL DATA

TO-220
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.



NOTES: A. The centre pin is in electrical contact with the mounting tab.
B. Mounting tab corner profile according to package version.
C. Typical fixing hole centre stand off height according to package version.
Version 1, 18.0 mm. Version 2, 17.6 mm.

MDXXBE

BD743, BD743A, BD743B, BD743C
NPN SILICON POWER TRANSISTORS

AUGUST 1978 - REVISED MARCH 1997

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.