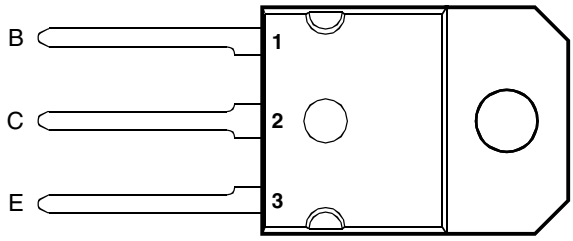
BD745, BD745A, BD745B, BD745C
NPN SILICON POWER TRANSISTORS

BOURNS®

- **Designed for Complementary Use with the BD746 Series**
- **115 W at 25°C Case Temperature**
- **20 A Continuous Collector Current**
- **25 A Peak Collector Current**
- **Customer-Specified Selections Available**

SOT-93 PACKAGE
(TOP VIEW)



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
Collector-base voltage (I_E = 0)	BD745	V_{CBO}	50	V
	BD745A		70	
	BD745B		90	
	BD745C		110	
Collector-emitter voltage (I_B = 0)	BD745	V_{CEO}	45	V
	BD745A		60	
	BD745B		80	
	BD745C		100	
Emitter-base voltage		V_{EBO}	5	V
Continuous collector current		I_C	20	A
Peak collector current (see Note 1)		I_{CM}	25	A
Continuous base current		I_B	7	A
Continuous device dissipation at (or below) 25°C case temperature (see Note 2)		P_{tot}	115	W
Continuous device dissipation at (or below) 25°C free air temperature (see Note 3)		P_{tot}	3.5	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	260	°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 0.92 W/°C.
3. Derate linearly to 150°C free air temperature at the rate of 28 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.

PRODUCT INFORMATION

AUGUST 1978 - REVISED SEPTEMBER 2002

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)	BD745	45			V
					BD745A	60			
					BD745B	80			
					BD745C	100			
I_{CBO}	Collector cut-off current	V_{CE} = 50 V	V_{BE} = 0		BD745			0.1	mA
		V_{CE} = 70 V	V_{BE} = 0		BD745A			0.1	
		V_{CE} = 90 V	V_{BE} = 0		BD745B			0.1	
		V_{CE} = 110 V	V_{BE} = 0		BD745C			0.1	
		V_{CE} = 50 V	V_{BE} = 0	T_C = 125°C	BD745			5	
		V_{CE} = 70 V	V_{BE} = 0	T_C = 125°C	BD745A			5	
		V_{CE} = 90 V	V_{BE} = 0	T_C = 125°C	BD745B			5	
		V_{CE} = 110 V	V_{BE} = 0	T_C = 125°C	BD745C			5	
I_{CEO}	Collector cut-off current	V_{CE} = 30 V	I_B = 0		BD745/745A			0.1	mA
		V_{CE} = 60 V	I_B = 0		BD745B/745C			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 = 20 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 = 20 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 = 20 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			1.1	°C/W
$R_{\theta JA}$	Junction to free air thermal resistance			35.7	°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					350		ns
t_s	Storage time	$V_{BE(off)}$ = -4.2 V	R_L = 6 Ω	t_p = 20 µs, dc ≤ 2%		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

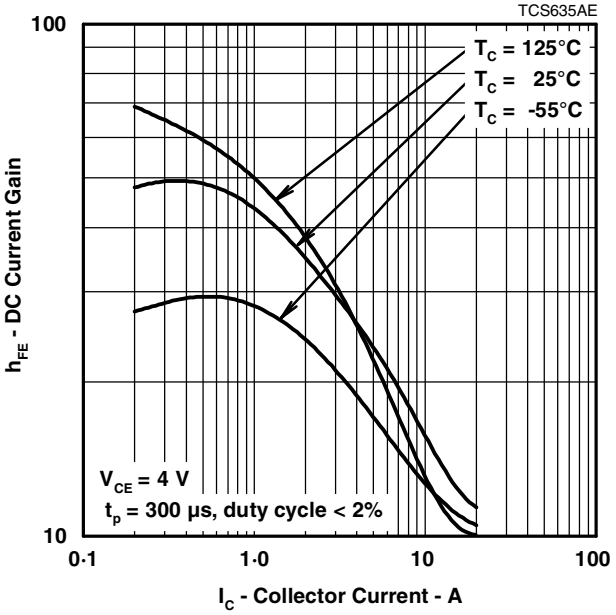


Figure 1.

COLLECTOR-EMITTER SATURATION VOLTAGE vs COLLECTOR CURRENT

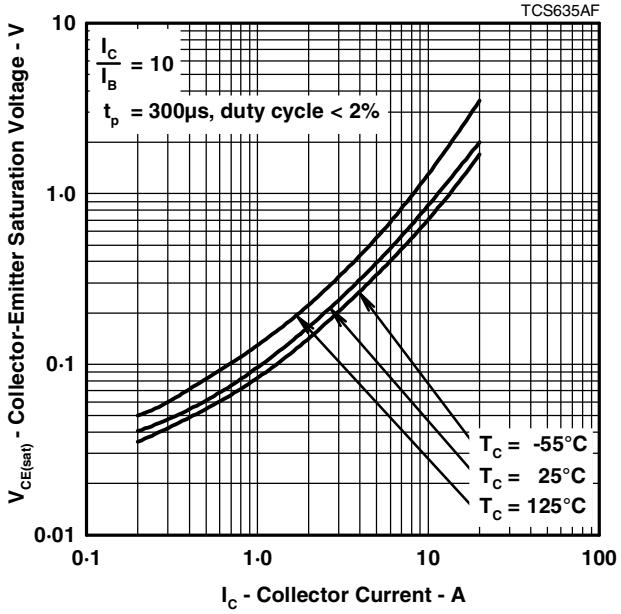


Figure 2.

MAXIMUM SAFE OPERATING REGIONS

MAXIMUM FORWARD-BIAS SAFE OPERATING AREA

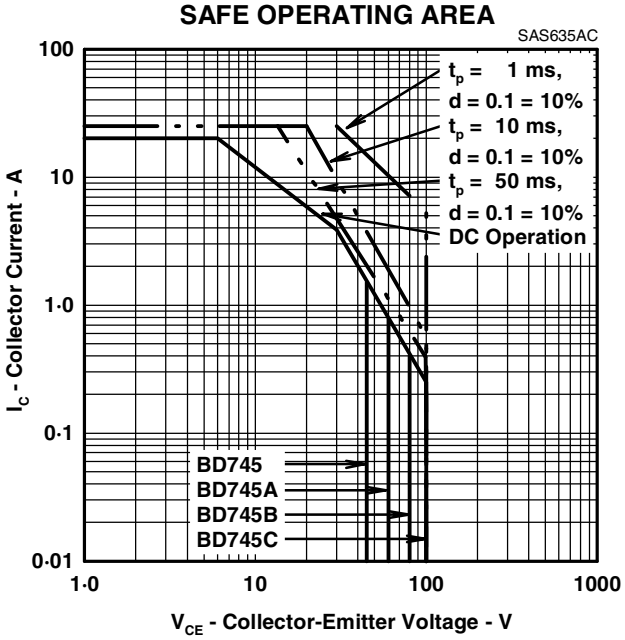


Figure 3.

THERMAL INFORMATION

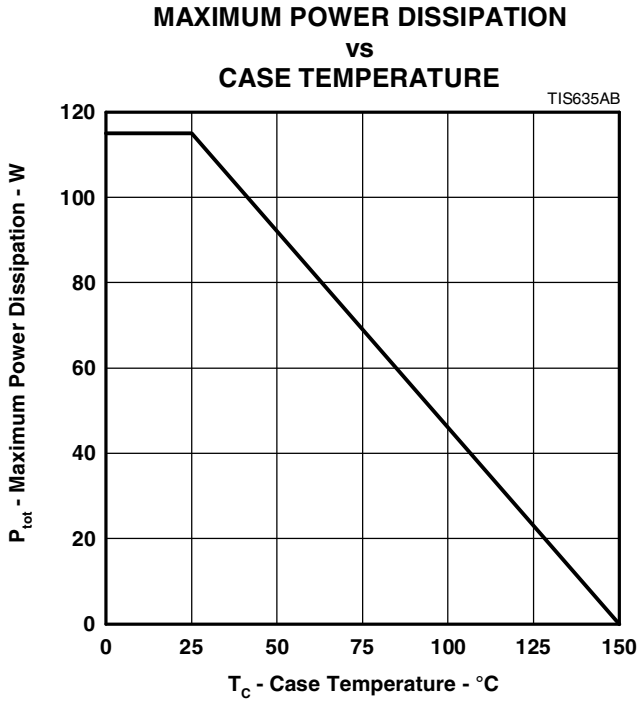


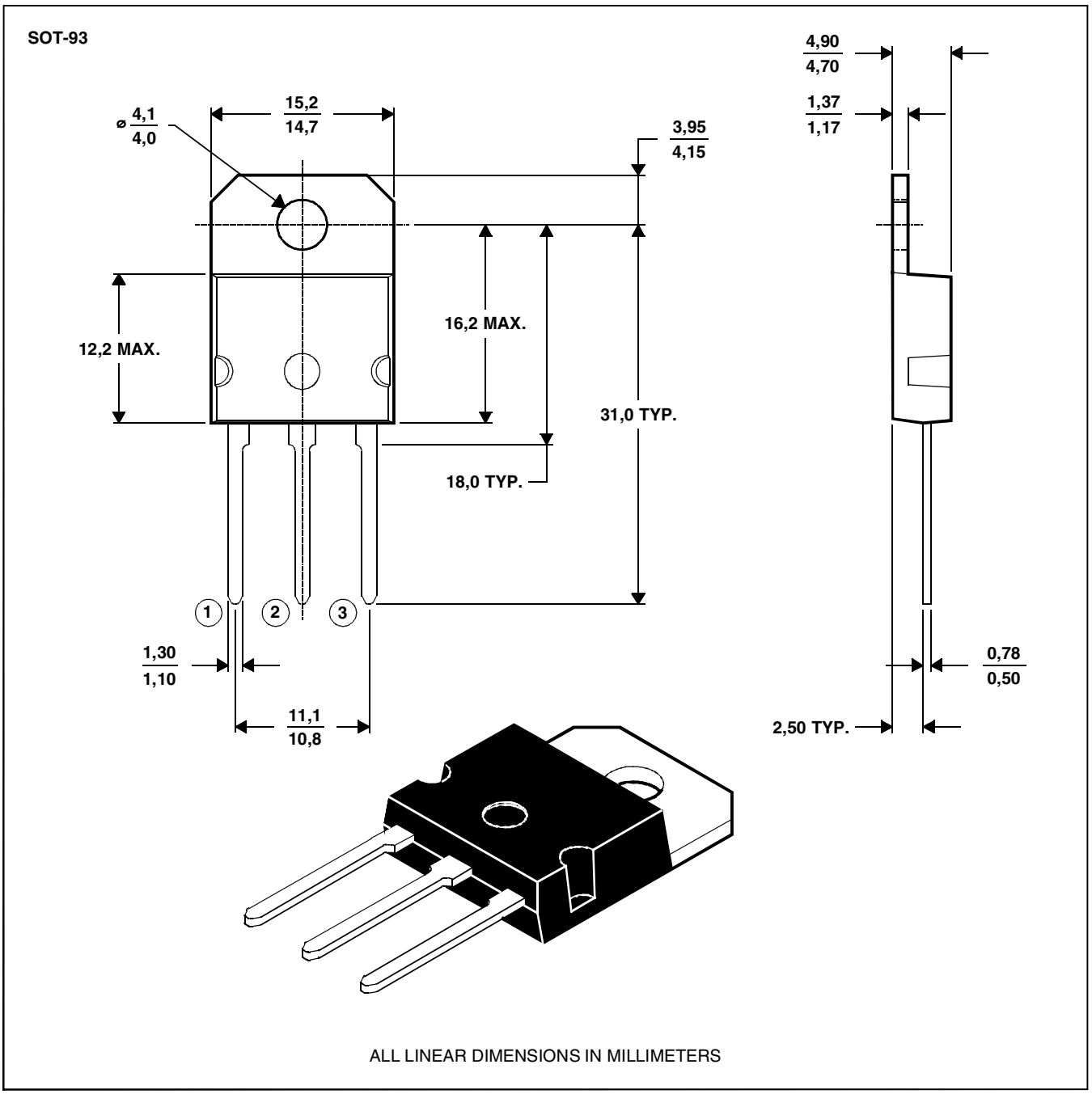
Figure 4.

BOURNS®

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