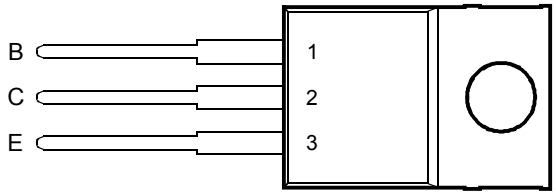
BUPD1520
NPN SILICON TRANSISTOR WITH INTEGRATED DIODE

MAY 1999 - REVISED SEPTEMBER 1999

- **Designed for Self Oscillating Inverter Applications**
- **Rugged 1500 V Planar Construction**
- **Integral Free-Wheeling Anti-Parallel Diode**

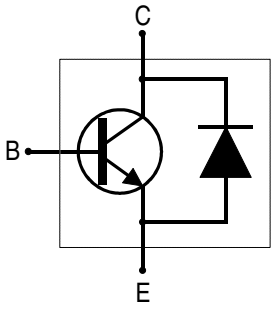
TO-220 PACKAGE
(TOP VIEW)



Pin 2 is in electrical contact with the mounting base.

MDTRACA

device symbol



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

RATING	SYMBOL	VALUE	UNIT
Collector-emitter voltage (I_B = 0)	V_{CEO}	700	V
Collector-emitter voltage (V_{BE} = 0)	V_{CES}	1500	V
Emitter-base voltage (I_C = 0)	V_{EBO}	11	V
Continuous collector current	I_C	2	A
Peak collector current (see Note 1)	I_{CM}	2.5	A
Continuous base current	I_B	2	A
Peak base current (see Note 1)	I_{BM}	2.5	A
Continuous device dissipation at (or below) 25°C case temperature	P_{tot}	50	W
Operating junction temperature range	T_j	-55 to +125	°C
Storage temperature range	T_{stg}	-55 to +150	°C
Lead temperature 3.2 mm from case for 10 seconds	T_L	300	°C

NOTE 1: This value applies for t_p = 10 ms, duty cycle ≤ 2%.

electrical characteristics at 25°C case temperature

PARAMETER		TEST CONDITIONS			MIN	TYP	MAX	UNIT
V_{CEO}	Collector-emitter voltage	I_C = 1 mA			700			V
V_{CBO}	Collector-base voltage	I_C = 100 µA			1500			V
V_{EBO}	Emitter-base voltage	I_{EB} = 1 mA			11			V
I_{CEO}	Collector cut-off current	V_{CE} = 700 V	I_B = 0				100	µA
I_{CES}	Collector-emitter cut-off current	V_{CE} = 1500 V	V_{BE} = 0				100	µA
I_{EBO}	Emitter cut-off current	V_{EB} = 11 V	I_C = 0				1	mA
$V_{BE(sat)}$	Base-emitter saturation voltage	I_B = 100 mA I_B = 100 mA I_B = 400 mA	I_C = 500 mA I_C = 1 A I_C = 2 A	(see Notes 2 and 3)			1.0 1.1 1.2	V
$V_{CE(sat)}$	Collector-emitter saturation voltage	I_B = 50 mA I_B = 100 mA	I_C = 250 mA I_C = 500 mA	(see Notes 2 and 3)		0.3 0.7	1.2 3.0	V
h_{FE}	Forward current transfer ratio	V_{CE} = 5 V V_{CE} = 5 V V_{CE} = 5 V V_{CE} = 5 V	I_C = 10 mA I_C = 100 mA I_C = 250 mA I_C = 500 mA	(see Notes 2 and 3)	10 10 10 7	21 25 25 18		

NOTES: 2. These parameters must be measured using pulse techniques, t_p = 300 µs, duty cycle ≤ 2%.
3. These parameters must be measured using voltage-sensing contacts, separate from the current carrying contacts, and located within 3.2 mm from the device body.

thermal characteristics

PARAMETER		MIN	TYP	MAX	UNIT
$R_{\theta JA}$	Junction to free air thermal resistance			62.5	°C/W
$R_{\theta JC}$	Junction to case thermal resistance			2	°C/W

resistive switching characteristics at 25°C case temperature

PARAMETER		TEST CONDITIONS			MIN	TYP	MAX	UNIT
t_d	Delay time	I_C = 500 mA V_{CC} = 125 V	$I_{B(on)}$ = 50 mA $I_{B(off)}$ = 250 mA	t_p = 300 µs Duty cycle = 2%		0.1		µs
t_r	Rise time					0.6		µs
t_s	Storage time					1.0		µs
t_f	Fall time					0.2		µs

TYPICAL CHARACTERISTICS

FORWARD CURRENT TRANSFER RATIO vs COLLECTOR CURRENT

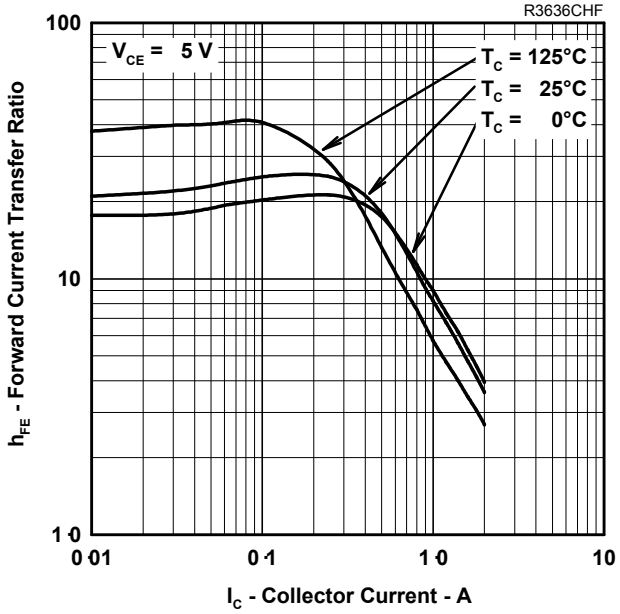


Figure 1.

MAXIMUM SAFE OPERATING REGIONS

MAXIMUM FORWARD-BIAS SAFE OPERATING AREA

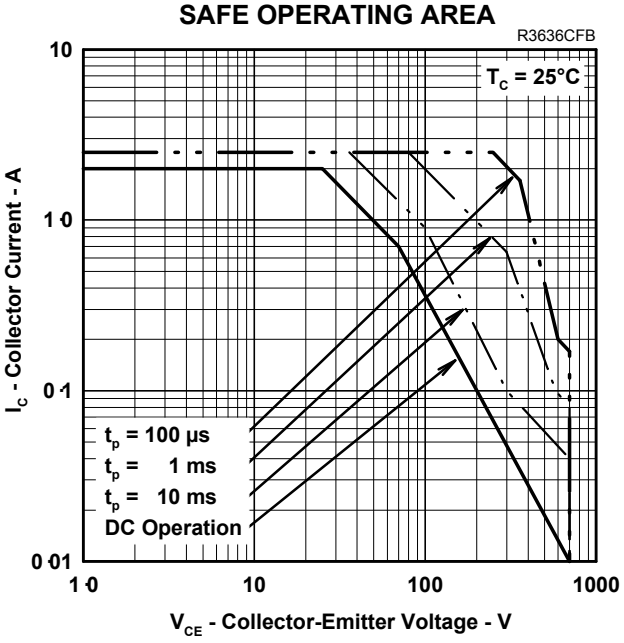


Figure 2.

MAXIMUM REVERSE-BIAS SAFE OPERATING AREA

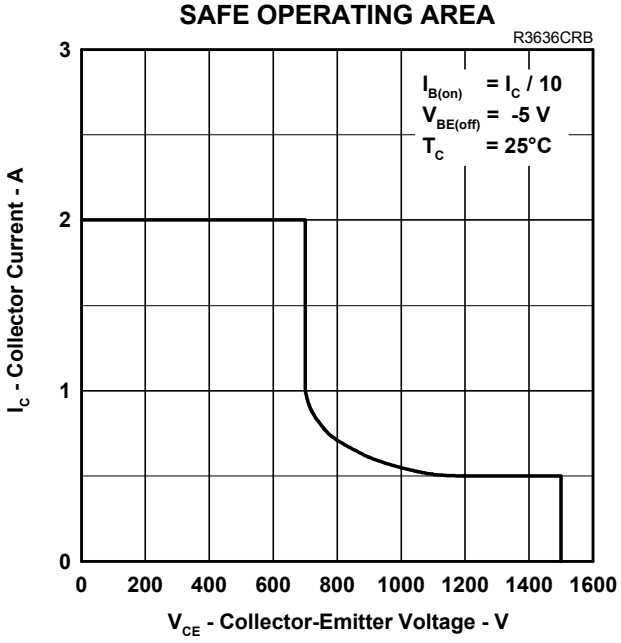
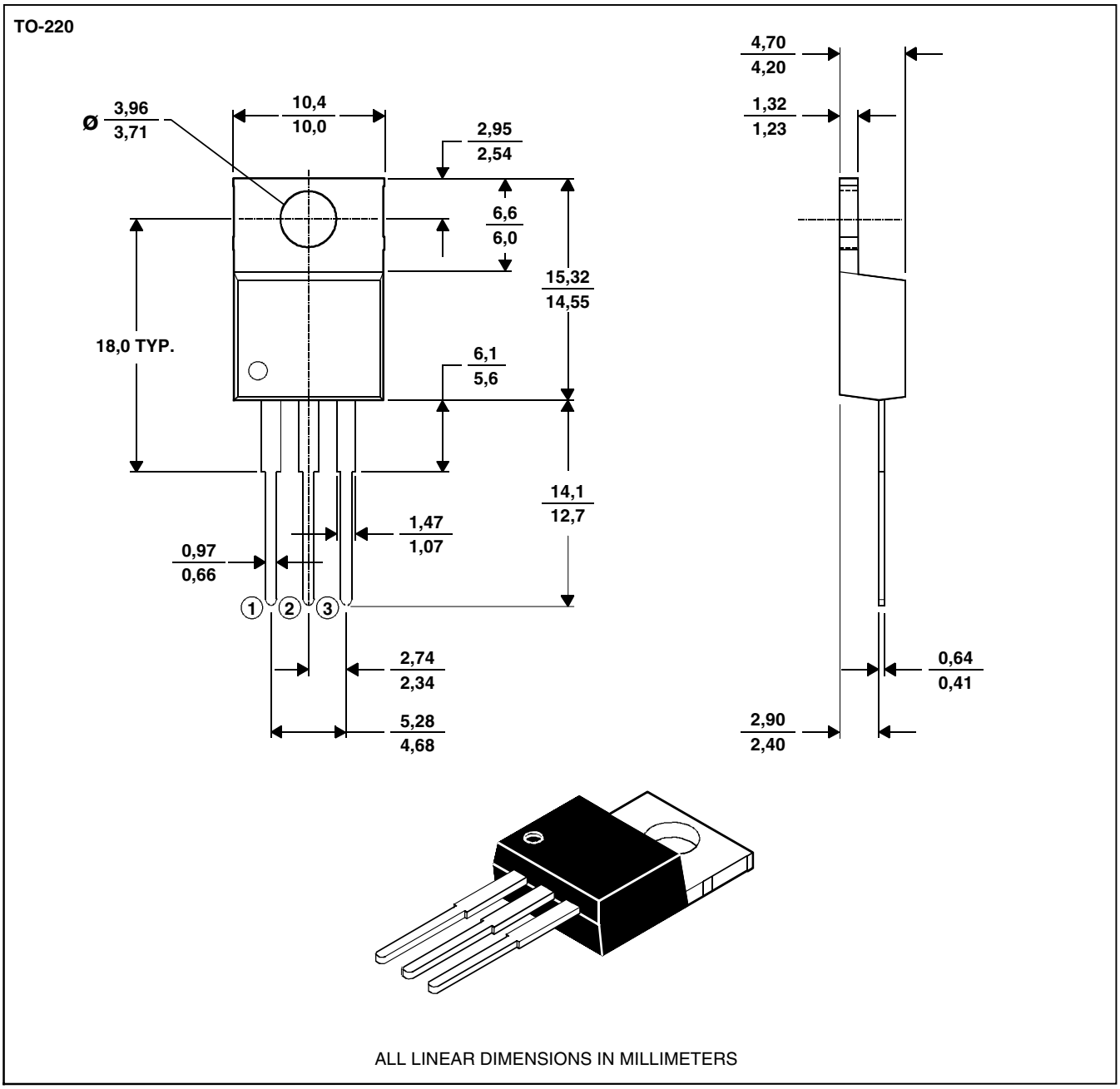


Figure 3.

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.



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

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