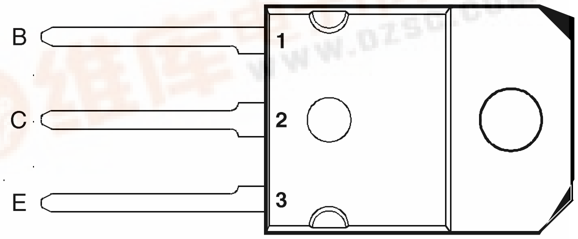
TRANSYS
ELECTRONICS
LIMITED

BUV48, BUV48A
NPN SILICON POWER TRANSISTORS

- **Rugged Triple-Diffused Planar Construction**
- **15 A Continuous Collector Current**
- **1000 Volt Blocking Capability**

SOT-93 PACKAGE
(TOP VIEW)



Pin 2 is in electrical contact with the mounting base.

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

RATING		SYMBOL	VALUE	UNIT
Collector-emitter voltage (V_{BE} = 0 V)	BUV48 BUV48A	V_{CES}	850 1000	V
Collector-emitter voltage (R_{BE} = 10 Ω)	BUV48 BUV48A	V_{CER}	850 1000	V
Collector-emitter voltage (I_B = 0)	BUV48 BUV48A	V_{CEO}	400 450	V
Continuous collector current		I_C	15	A
Peak collector current (see Note 1)		I_{CM}	30	A
Continuous base current		I_B	4	A
Peak base current		I_{BM}	20	A
Non repetitive accidental peak surge current		I_{CSM}	55	A
Continuous device dissipation at (or below) 25˚C case temperature		P_{tot}	125	W
Operating junction temperature range		T_j	-65 to +150	˚C
Storage temperature range		T_{stg}	-65 to +150	˚C

NOTE 1: This value applies for $t_p \leq 2$ ms, duty cycle ≤ 2%.

electrical characteristics at 25°C case temperature (unless otherwise noted)

PARAMETER		TEST CONDITIONS				MIN	TYP	MAX	UNIT
$V_{CEO(sus)}$	Collector-emitter sustaining voltage	I_C = 200 mA	L = 25 mH	(see Note 2)	BUV48	400			V
					BUV48A	450			
I_{CES}	Collector-emitter cut-off current	V_{CE} = 850 V	V_{BE} = 0		BUV48			0.2	mA
		V_{CE} = 1000 V	V_{BE} = 0		BUV48A			0.2	
		V_{CE} = 850 V	V_{BE} = 0	T_C = 125°C	BUV48			2.0	
		V_{CE} = 1000 V	V_{BE} = 0	T_C = 125°C	BUV48A			2.0	
I_{CER}	Collector-emitter cut-off current	V_{CE} = 850 V	R_{BE} = 10 Ω		BUV48			0.5	mA
		V_{CE} = 1000 V	R_{BE} = 10 Ω		BUV48A			0.5	
		V_{CE} = 850 V	R_{BE} = 10 Ω	T_C = 125°C	BUV48			4.0	
		V_{CE} = 1000 V	R_{BE} = 10 Ω	T_C = 125°C	BUV48A			4.0	
I_{EBO}	Emitter cut-off current	V_{EB} = 5 V	I_C = 0					1	mA
V_{EBO}	Emitter-base breakdown voltage	I_E = 50 mA	I_C = 0			7		30	V
$V_{CE(sat)}$	Collector-emitter saturation voltage	I_B = 2 A	I_C = 10 A	(see Notes 3 and 4)	BUV48			1.5	V
		I_B = 3 A	I_C = 15 A		BUV48			5.0	
		I_B = 1.6 A	I_C = 8 A		BUV48A			1.5	
		I_B = 2.4 A	I_C = 12 A		BUV48A			5.0	
$V_{BE(sat)}$	Base-emitter saturation voltage	I_B = 2 A	I_C = 10 A	(see Notes 3 and 4)	BUV48			1.6	V
		I_B = 1.6 A	I_C = 8 A		BUV48A			1.6	
f_t	Current gain bandwidth product	V_{CE} = 10 V	I_C = 0.5 A	f = 1 MHz			10		MHz
C_{ob}	Output capacitance	V_{CB} = 20 V	I_C = 0	f = 1 MHz			150		pF

NOTES: 2. Inductive loop switching measurement.
3. These parameters must be measured using pulse techniques, t_p = 300 µs, duty cycle ≤ 2%.
4. 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

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

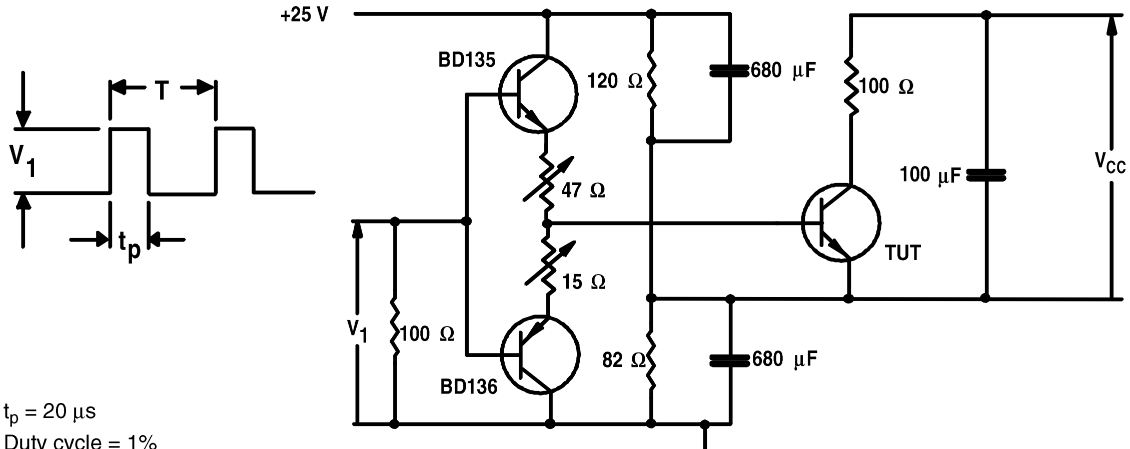
PARAMETER		TEST CONDITIONS †			MIN	TYP	MAX	UNIT
t_{on}	Turn on time	I_C = 10 A $I_{B(on)}$ = 2 A	V_{CC} = 150 V $I_{B(off)}$ = -2 A	BUV48 (see Figures 1 and 2)			1.0	µs
t_s	Storage time						3.0	µs
t_f	Fall time						0.8	µs
t_{on}	Turn on time	I_C = 8 A $I_{B(on)}$ = 1.6 A	V_{CC} = 150 V $I_{B(off)}$ = -1.6 A	BUV48A (see Figures 1 and 2)			1.0	µs
t_s	Storage time						3.0	µs
t_f	Fall time						0.8	µs

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

inductive-load-switching characteristics at 100°C case temperature

PARAMETER		TEST CONDITIONS †			MIN	TYP	MAX	UNIT
t_{sv}	Voltage storage time	I_C = 10 A	$I_{B(on)}$ = 2 A	BUV48			4.0	µs
t_{fi}	Current fall time	$V_{BE(off)}$ = -5 V	(see Figures 3 and 4)				0.4	µs
t_{sv}	Voltage storage time	I_C = 8 A	$I_{B(on)}$ = 1.6 A	BUV48A			4.0	µs
t_{fi}	Current fall time	$V_{BE(off)}$ = -5 V	(see Figures 3 and 4)				0.4	µs

PARAMETER MEASUREMENT INFORMATION



t_p = 20 µs
Duty cycle = 1%
V_1 = 15 V, Source Impedance = 50 Ω

Figure 1. Resistive-Load Switching Test Circuit

A - B = t_d
B - C = t_r
E - F = t_f
D - E = t_s
A - C = t_{on}
D - F = t_{off}

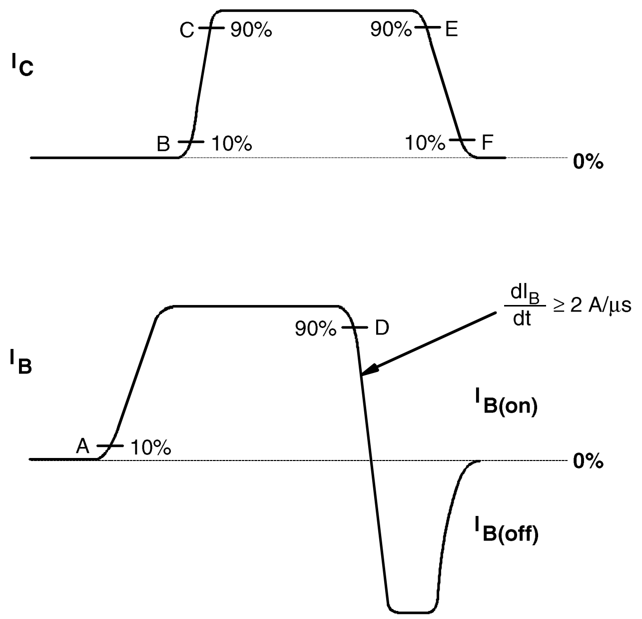
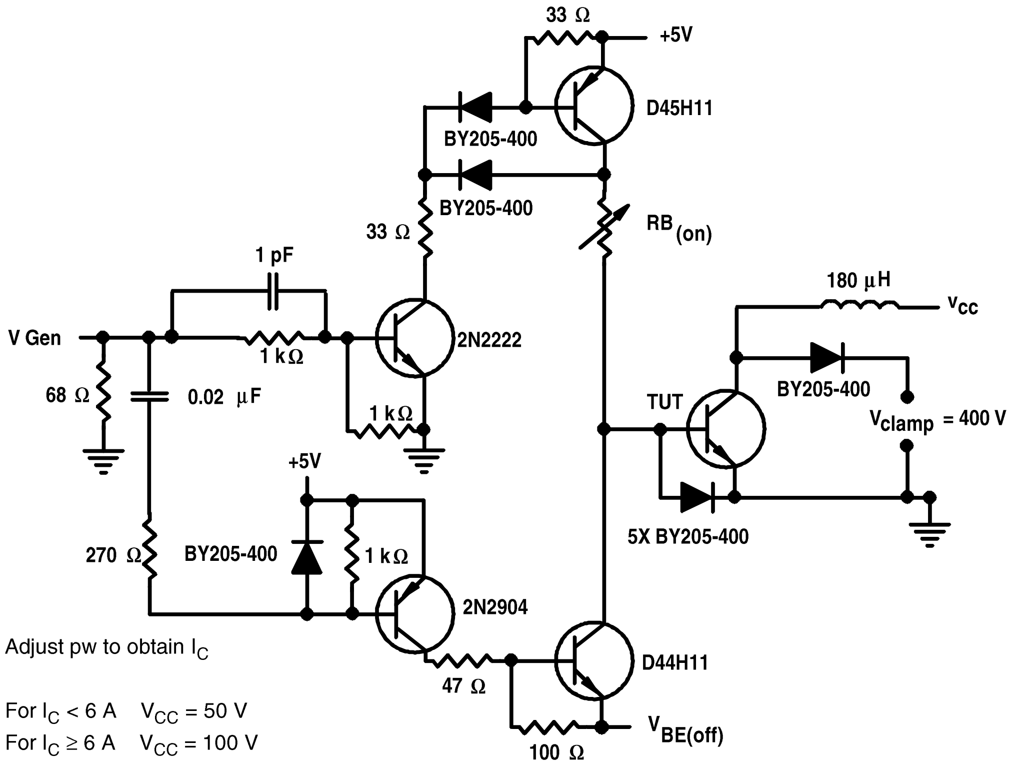


Figure 2. Resistive-Load Switching Waveforms

PARAMETER MEASUREMENT INFORMATION

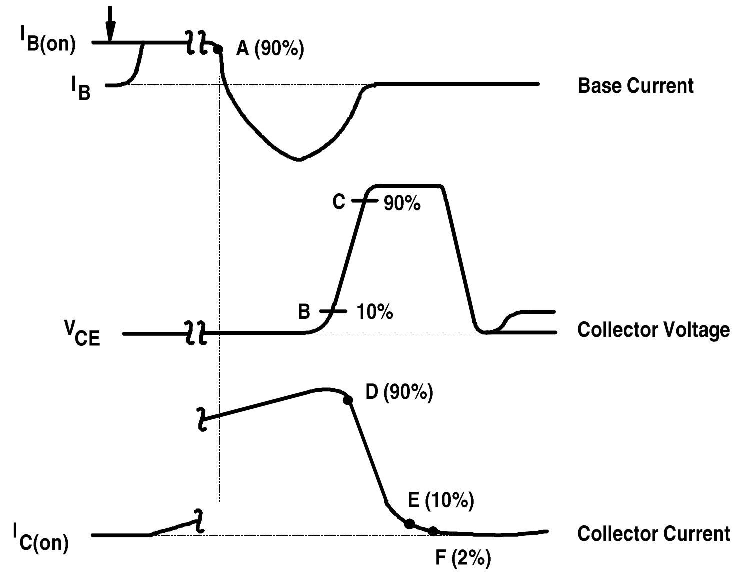


Adjust pw to obtain I_C

For $I_C < 6$ A $V_{CC} = 50$ V
For $I_C \geq 6$ A $V_{CC} = 100$ V

Figure 3. Inductive-Load Switching Test Circuit

A - B = t_{sv}
B - C = t_{rv}
D - E = t_{fi}
E - F = t_{ti}
B - E = t_{xo}



NOTES: A. Waveforms are monitored on an oscilloscope with the following characteristics: $t_r < 15$ ns, $R_{in} > 10\ \Omega$, $C_{in} < 11.5$ pF.
B. Resistors must be noninductive types.

Figure 4. Inductive-Load Switching Waveforms

TYPICAL CHARACTERISTICS

TYPICAL DC CURRENT GAIN
vs
COLLECTOR CURRENT

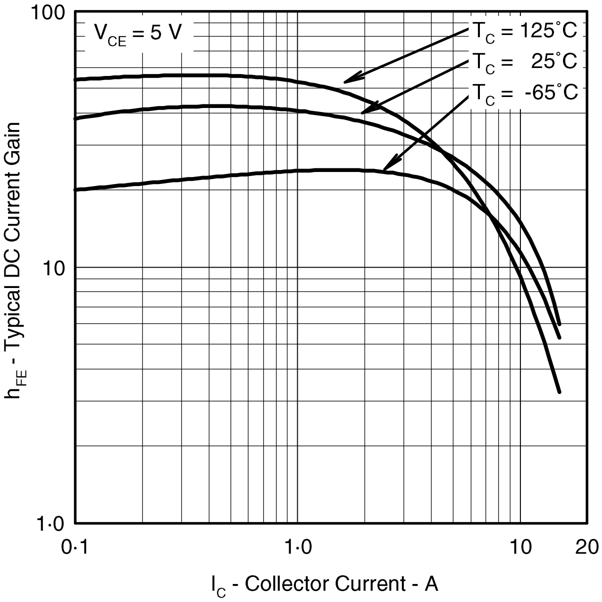


Figure 5.

COLLECTOR-EMITTER SATURATION VOLTAGE
vs
BASE CURRENT

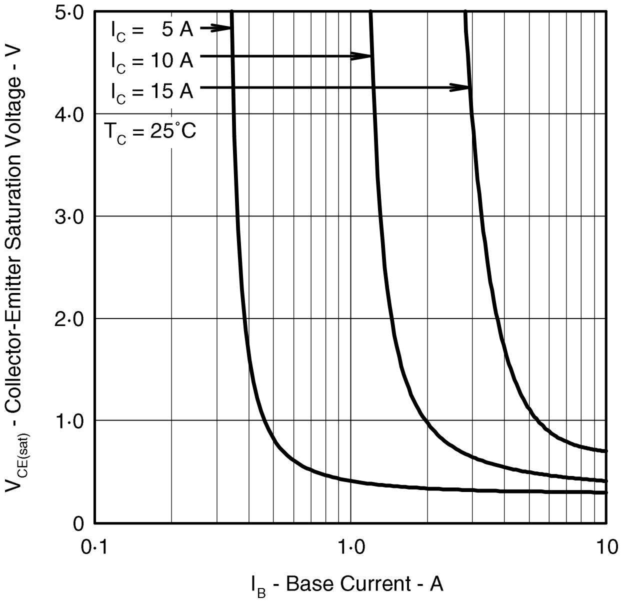


Figure 6.

COLLECTOR-EMITTER SATURATION VOLTAGE
vs
BASE CURRENT

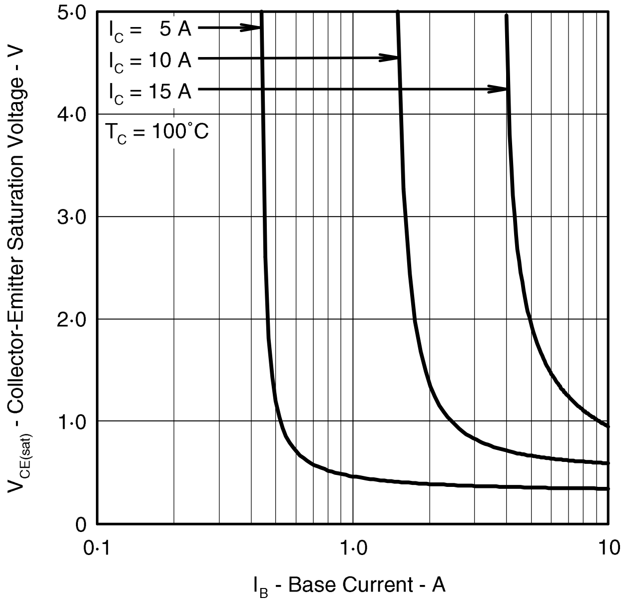


Figure 7.

BASE-EMITTER SATURATION VOLTAGE
vs
BASE CURRENT

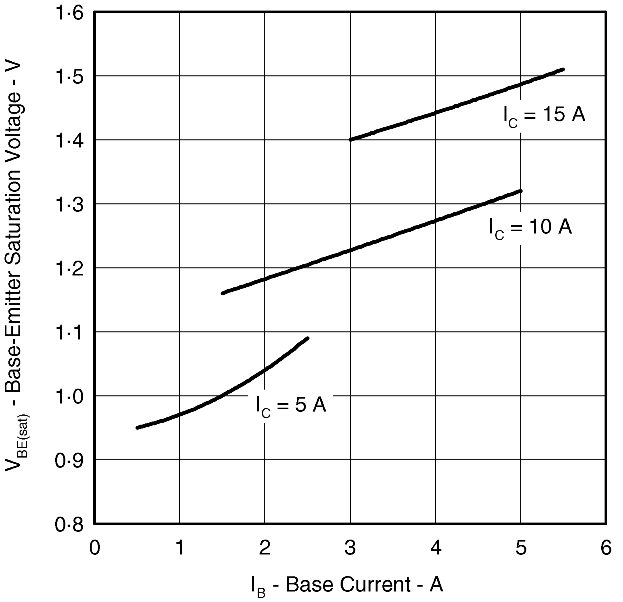


Figure 8.

TYPICAL CHARACTERISTICS

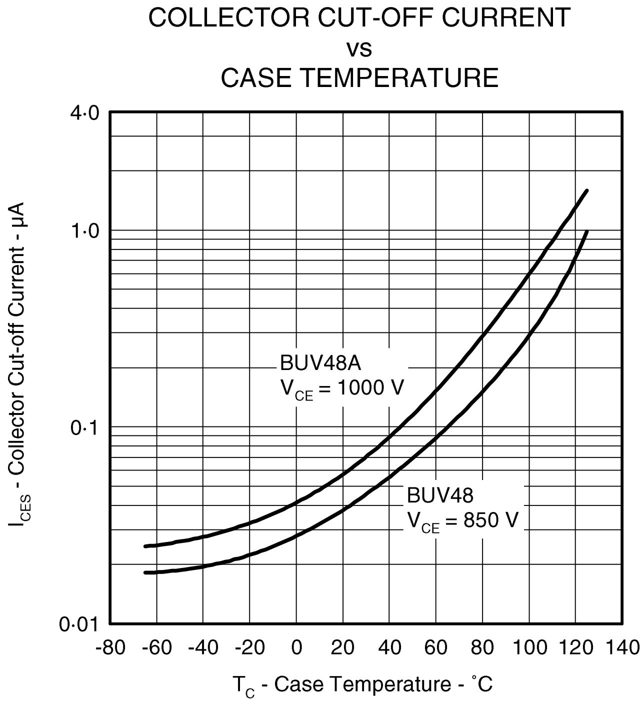

COLLECTOR CUT-OFF CURRENT vs CASE TEMPERATURE

Figure 9.

MAXIMUM SAFE OPERATING REGIONS

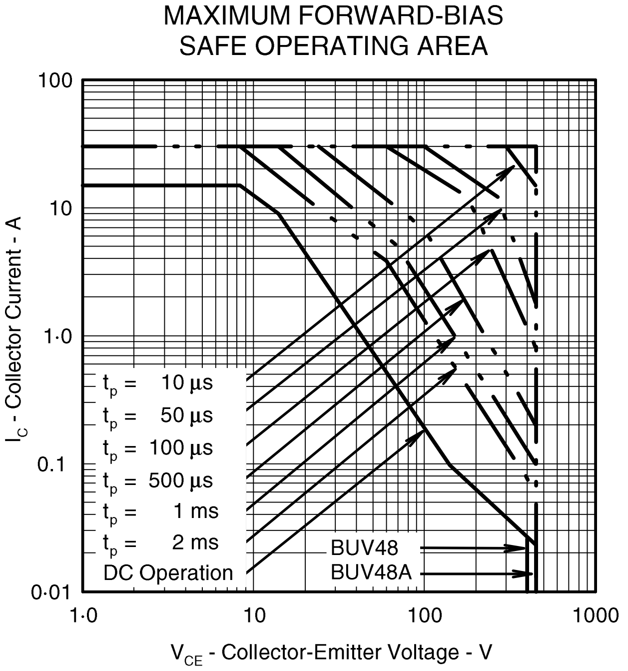

MAXIMUM FORWARD-BIAS SAFE OPERATING AREA

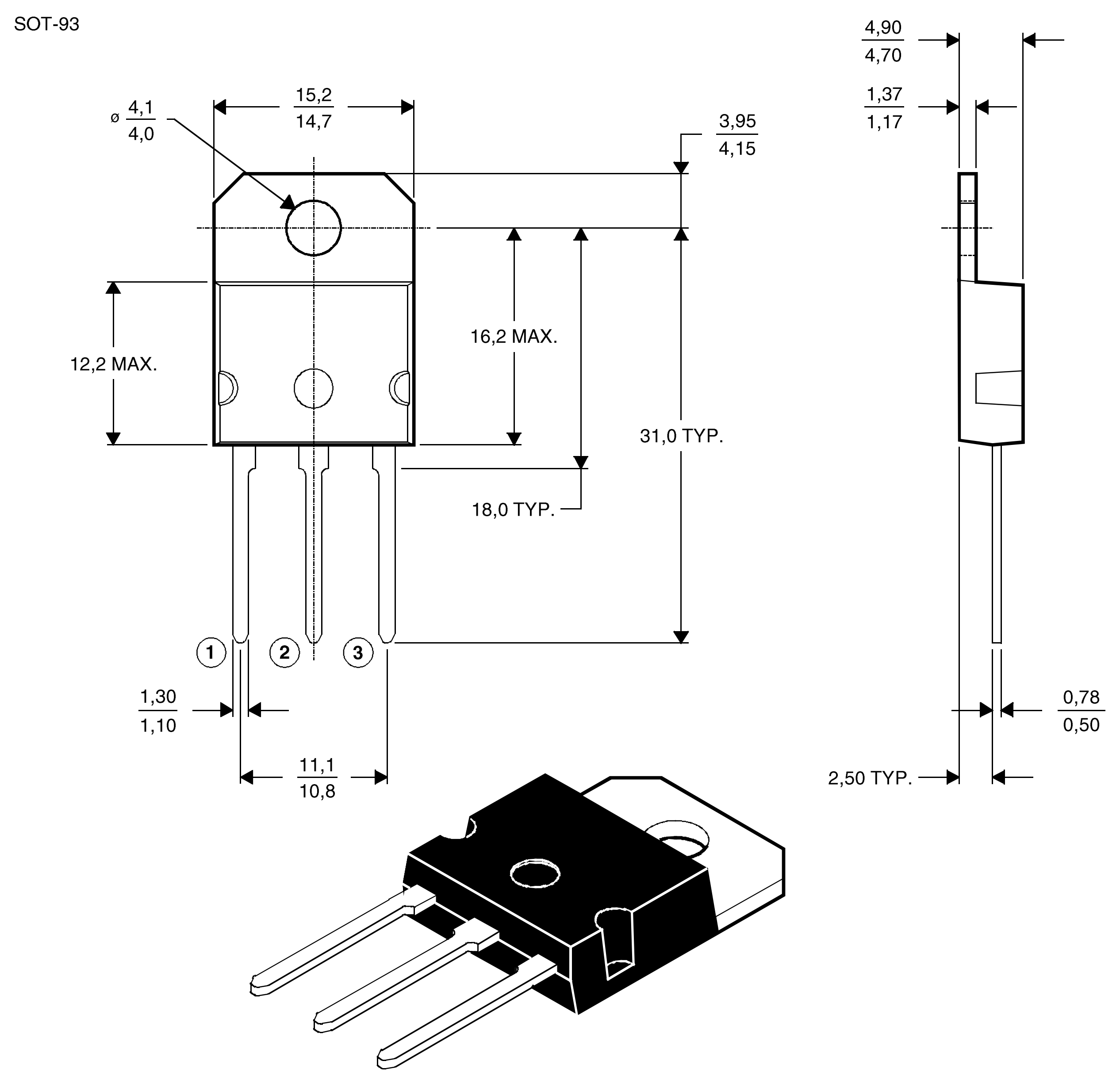
Figure 10.

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.