

Silicon diffused power transistors

BUV47; BUV47A

High-voltage, high-speed, glass-passivated npn power transistors in a SOT93 envelope, intended for use in converters, inverters, switching regulators, motor control systems etc.

QUICK REFERENCE DATA

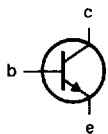
		BUV47		47A	
Collector-emitter voltage (peak value; $V_{BE} = 0$)	V_{CESM}	max.	850	1000	V
Collector-emitter voltage (open base)	V_{CEO}	max.	400	450	V
Collector current (DC)	I_C	max.	9		A
Collector current (peak value)	I_{CM}	max.	15		A
Total power dissipation up to $T_{mb} = 25\text{ }^\circ\text{C}$	P_{tot}	max.	120		W
Collector-emitter saturation voltage $I_C = 5\text{ V}; I_B = 1,0\text{ A}$	V_{CEsat}	max.	1,5	1,5	V
Fall time (resistive load) $I_{Con} = 5\text{ A}; I_{Bon} = -I_{Boff} = 1,0\text{ A}$	t_f	max.	0,8	0,8	μs

MECHANICAL DATA

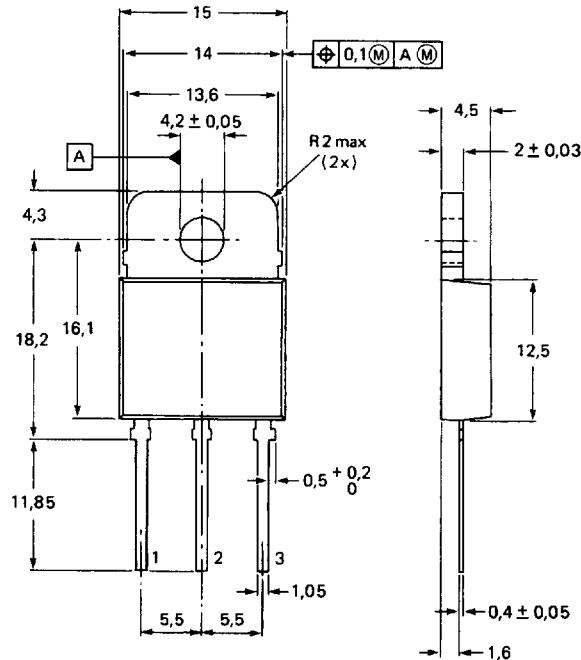
Dimensions in mm

Fig. 1 SOT93.

Collector connected to mounting base.



Pinning:
1 = base
2 = collector
3 = emitter



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RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

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Collector-emitter voltage (peak value; $V_{BE} = 0$)	V_{CESM} max.	850	1000 V
Collector-emitter voltage (open base)	V_{CEO} max.	400	450 V
Emitter-base voltage	V_{EBO} max.	7	V
Collector current (DC)	I_C max.	9	A
Collector current (peak value)	I_{CM} max.	15	A
Base current (DC)	I_B max.	3	A
Base current (peak value)	I_{BM} max.	6	A
Total power dissipation up to $T_{mb} = 25\text{ }^\circ\text{C}$	P_{tot} max.	120	W
Storage temperature	T_{stg}	-65 to + 175	$^\circ\text{C}$
Junction temperature	T_j max.	175	$^\circ\text{C}$

THERMAL RESISTANCE

From junction to mounting base	$R_{th\ j-mb}$ =	1,25	K/W
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CHARACTERISTICS

$T_j = 25\text{ }^\circ\text{C}$ unless otherwise specified

Collector cut-off current*

$V_{CE} = V_{CESMmax}; V_{BE} = -2,5\text{ V}$ I_{CEX} max. 0,15 mA

$V_{CE} = V_{CESMmax}; V_{BE} = -2,5\text{ V}; T_j = 125\text{ }^\circ\text{C}$ I_{CEX} max. 1,5 mA

$V_{CE} = V_{CESMmax}; R_{BE} = 10\ \Omega$ I_{CER} max. 0,4 mA

$V_{CE} = V_{CESMmax}; R_{BE} = 10\ \Omega; T_j = 125\text{ }^\circ\text{C}$ I_{CER} max. 3,0 mA

Emitter cut-off current

$I_C = 0; -V_{BE} = 5\text{ V}$ I_{EBO} max. 1,0 mA

Collector-emitter sustaining voltage

$I_C = 100\text{ mA}; I_B = 0; L = 25\text{ mH}$ $V_{CEO\text{sust}}$ min. 400 | 450 V

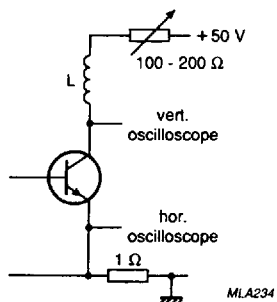


Fig. 2 Test circuit for $V_{CEO\text{sust}}$

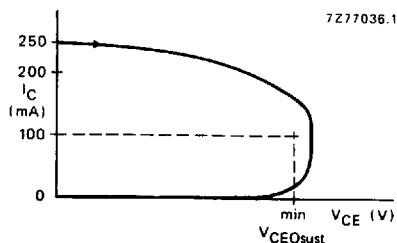


Fig. 3 Oscilloscope display for sustaining voltage.

* Measured with a half-sinewave voltage (curve tracer).

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Saturation voltages

$$I_C = 8 \text{ A}; I_B = 2,5 \text{ A}$$

$$I_C = 5 \text{ A}; I_B = 1 \text{ A}$$

Switching times resistive load (Figs 4 and 5)

$$I_{Con} = 5 \text{ A}; I_{Bon} = -I_{Boff} = 1 \text{ A}$$

Turn-on time

Turn-off: Storage time

Fall time

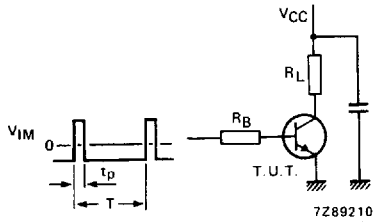


Fig. 4 Test circuit resistive load.
 $V_{CC} = 150 \text{ V}$; $V_{IM} = -6 \text{ to } +8 \text{ V}$;
 $t_p/T = 0,01$; $t_p = 20 \mu\text{s}$.

The values of R_B and R_L are selected
 in accordance with I_{Con} and I_B
 requirements.

		BUV47	47A
V_{CEsat}	max.	3	3 V
	typ.	0,6	0,6 V
V_{BEsat}	max.	1,5	1,5 V
	typ.	1,6	1,6 V
t_{on}	typ.	0,34	0,34 μs
	max.	1,0	1,0 μs
t_s	typ.	1,75	1,75 μs
	max.	3,0	3,0 μs
t_f	typ.	0,36	0,36 μs
	max.	0,8	0,8 μs

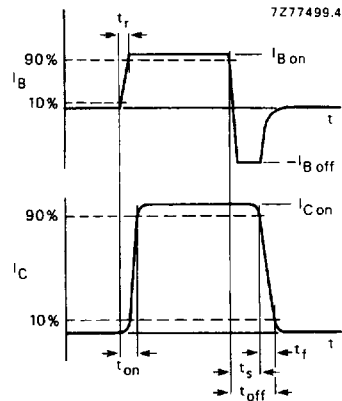


Fig. 5 Switching times waveforms
 with resistive load.

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CHARACTERISTICS (continued)

Switching times inductive load (Figs 6 and 7)

$I_{Con} = 5\text{ A}; I_{Bon} = 1,0\text{ A}$

Turn-off: Storage time
Fall time

$I_{Con} = 5\text{ A}; I_{Bon} = 1,0\text{ A}; T_j = 100\text{ }^\circ\text{C}$

Turn-off: Storage time
Fall time

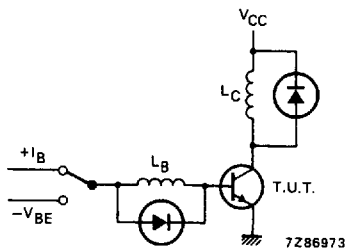


Fig. 6 Test circuit inductive load.
 $V_{CC} = 300\text{ V}; -V_{BE} = 5\text{ V};$
 $L_B = 3\text{ }\mu\text{H}; L_C = 1\text{ mH}.$

		BUV47	47A
t_s	typ.		
t_f	typ.	90	90 ns
t_s	max.		
t_f	max.	0,4	0,4 μs

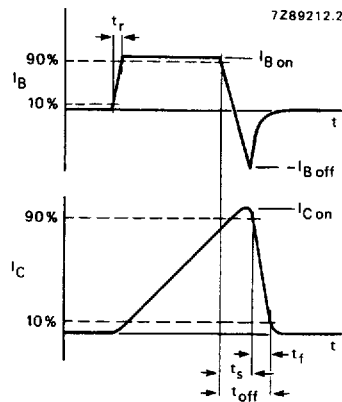
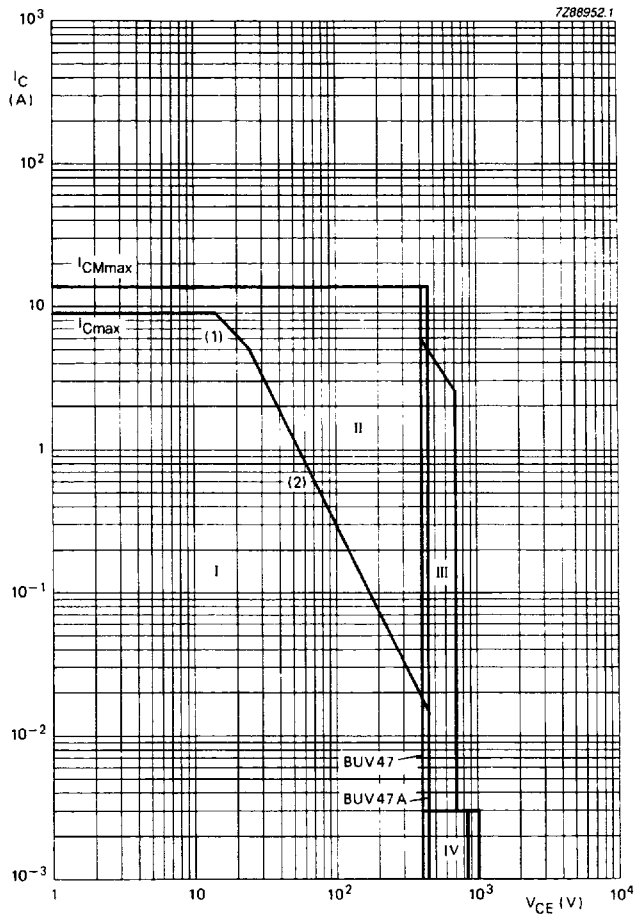


Fig. 7 Switching times waveforms with inductive load.

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(1) $P_{tot\ max}$.

(2) Second-breakdown limits (independent of temperature).

I Region of permissible DC operation.

II Permissible extension for repetitive pulse operation.

III Area of permissible operation during turn-on in single transistor converters, provided $R_{BE} \leq 100\ \Omega$ and $t_p \leq 0,6\ \mu s$.

IV Repetitive pulse operation in this region is permissible provided $V_{BE} \leq 0$ and $t_p \leq 2\ ms$.

Fig. 8 Safe Operating Area at $T_{mb} \leq 25\ ^\circ C$.