Silicon diffused power transistors — BUV48; BUV48A

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

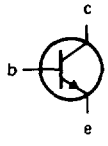
			BUV48	BUV48A	
Collector-emitter voltage (peak value; V_{BE} = 0)	V_{CESM}	max.	850	1000	V
Collector-emitter voltage (open base)	V_{CEO}	max.	400	450	V
Collector current (DC)	I_C	max.	15		A
Collector current (peak value)	I_{CM}	max.	30		A
Total power dissipation up to T_{mb} = 25 °C	P_{tot}	max.	150		W
Collector-emitter saturation voltage					
I_C = 10 A; I_B = 2 A	V_{CEsat}	max.	1.5	–	V
I_C = 8 A; I_B = 1.6 A	V_{CEsat}	max.	–	1.5	V
Fall time (resistive load)					
I_{Con} = 10 A; I_{Bon} = $-I_{Boff}$ = 2 A	t_f	max.	0.8	–	μs
I_{Con} = 8 A; I_{Bon} = $-I_{Boff}$ = 1.6 A	t_f	max.	–	0.8	μs

MECHANICAL DATA

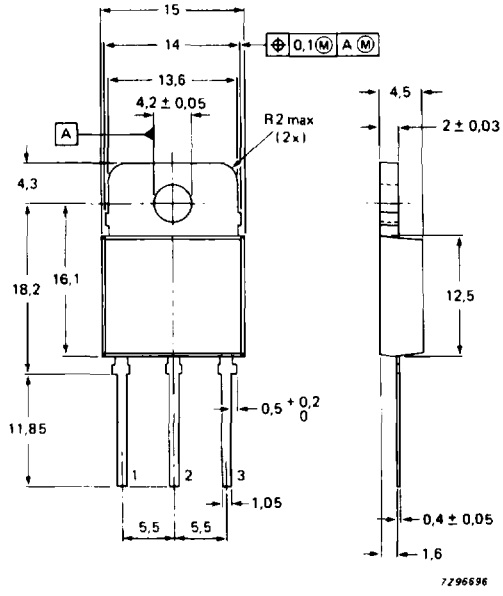
Dimensions in mm

Fig.1 SOT93.

Collector connected to mounting base.



Pinning:
1 = base
2 = collector
3 = emitter



RATINGS

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

			BUV48	BUV48A	
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.	15		A
Collector current (peak value)	I_{CM}	max.	30		A
Base current (DC)	I_B	max.	4		A
Base current (peak value)	I_{BM}	max.	20		A
Total power dissipation up to T_{mb} = 25 °C	P_{tot}	max.	150		W
Storage temperature	T_{stg}		−65 to + 175		°C
Junction temperature	T_j	max.	175		°C

THERMAL RESISTANCE

From junction to mounting base	$R_{th\ j\text{-}mb}$	=	1,0	K/W

CHARACTERISTICS

T_{mb} = 25 °C unless otherwise specified

Collector cut-off current*					
$V_{CE} = V_{CESMmax}$; V_{BE} = 0	I_{CES}	max.	0,2		mA
$V_{CE} = V_{CESMmax}$; V_{BE} = 0; T_{mb} = 125 °C	I_{CES}	max.	2		mA
$V_{CE} = V_{CESMmax}$; $R_{BE} \leqslant 10\ \Omega$	I_{CER}	max.	0,5		mA
$V_{CE} = V_{CESMmax}$; $R_{BE} \leqslant 10\ \Omega$; T_{mb} = 125 °C	I_{CER}	max.	4		mA
Emitter cut-off current					
I_C = 0; V_{EB} = 5 V	I_{EBO}	max.	1		mA
Emitter-base breakdown voltage					
I_C = 0; I_B = 50 mA	$V_{(BR)EBO}$		7 to 30		V
			BUV48	BUV48A	
Saturation voltages					
I_C = 15 A; I_B = 4 A	V_{CEsat}	max.	3,5	–	V
I_C = 10 A; I_B = 2 A	V_{CEsat}	max.	1,5	–	V
	V_{BEsat}	max.	1,6	–	V
I_C = 12 A; I_B = 2,4 A	V_{CEsat}	max.	–	5	V
I_C = 8 A; I_B = 1,6 A	V_{CEsat}	max.	–	1,5	V
	V_{BEsat}	max.	–	1,6	V

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

Collector-emitter sustaining voltage
I_C = 200 mA; I_{Boff} = 0; L = 25 mH

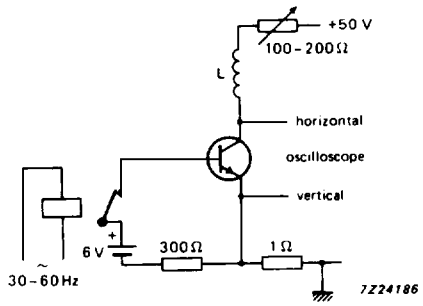


Fig. 2 Test circuit for $V_{CEOsust}$.

		BUV48	BUV48A	
$V_{CEOsust}$	min.	400	450	V

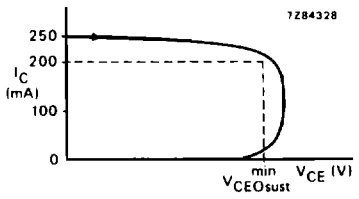


Fig. 3 Oscilloscope display for sustaining voltage.

Switching times resistive load (Figs 4 and 5)

			BUV48	BUV48A	
I_{Con} = 10 A; I_{Bon} = $-I_{Boff}$ = 2 A					
Turn-on time	t_{on}	typ.	0,55	–	μs
		max.	1,0	–	μs
Turn-off: Storage time	t_s	typ.	1,5	–	μs
		max.	3,0	–	μs
Fall time	t_f	typ.	0,3	–	μs
		max.	0,8	–	μs
I_{Con} = 8 A; I_{Bon} = $-I_{Boff}$ = 1,6 A					
Turn-on time	t_{on}	typ.	–	0,55	μs
		max.	–	1,0	μs
Turn-off: Storage time	t_s	typ.	–	1,5	μs
		max.	–	3,0	μs
Fall time	t_f	typ.	–	0,3	μs
		max.	–	0,8	μs

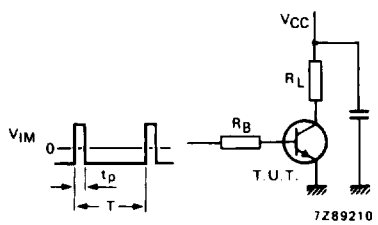


Fig. 4 Test circuit resistive load.
V_{CC} = 150 V; V_{IM} = −6 to + 8 V;
t_p = 20 μs; δ = t_p/T = 0,01.
The values of R_B and R_L are selected in accordance with I_{Con} and I_B requirements.

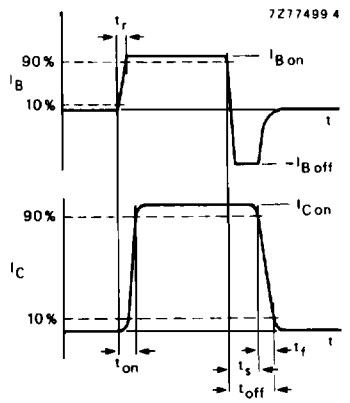


Fig. 5 Switching times waveforms with resistive load.

Switching times inductive load (Figs 6 and 7)

I_{Con} = 10 A; I_{Bon} = 2 A;
Turn-off: Storage time
Fall time

I_{Con} = 10 A; I_{Bon} = 2 A; T_j = 100 °C
Turn-off: Storage time
Fall time

I_{Con} = 8 A; I_{Bon} = 1,6 A;
Turn-off: Storage time
Fall time

I_{Con} = 8 A; I_{Bon} = 1,6 A; T_j = 100 °C
Turn-off: Storage time
Fall time

		BUV48	BUV48A	
t_s	typ.	3,5	–	µs
t_f	typ.	0,08	–	µs
t_s	max.	5,0	–	µs
t_f	max.	0,4	–	µs
t_s	typ.	–	3,5	µs
t_f	typ.	–	0,08	µs
t_s	max.	–	5,0	µs
t_f	max.	–	0,4	µs

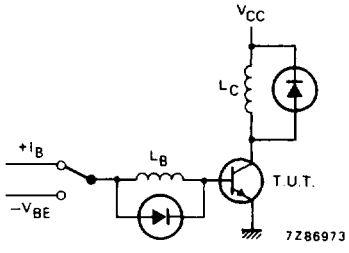


Fig. 6 Test circuit inductive load.
V_{CC} = 300 V; $-V_{BE}$ = 5 V; L_B = 3 µH; L_C = 1 mH

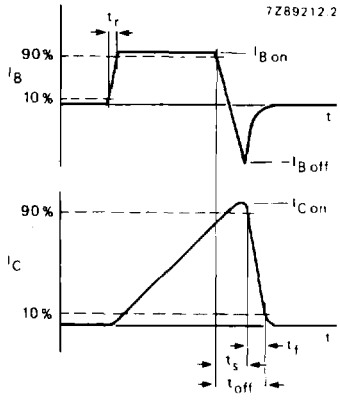
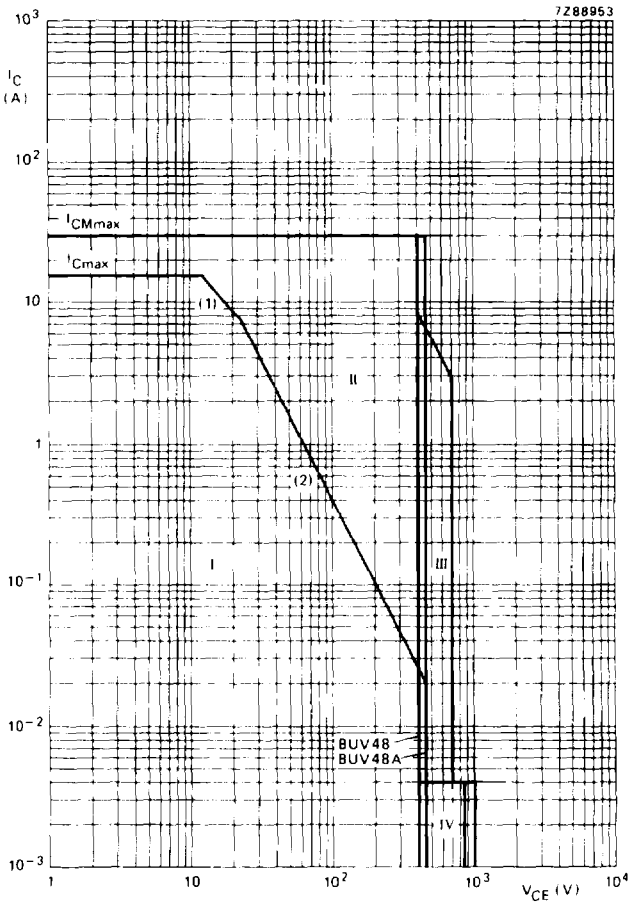


Fig. 7 Switching times waveforms with inductive load.



(1) $P_{tot\ max}$ values.
(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 $R_{BE} \leqslant 100\ \Omega$ and $t_p \leqslant 0{,}6\ \mu s$.
IV Repetitive pulse operation in this region is permissible provided $V_{BE} \leqslant 0$ and $t_p \leqslant 2$ ms.

Fig. 8 Safe Operating Area at $T_{mb} \leqslant 25\ ^oC$.