SILICON DIFFUSED POWER TRANSISTOR

High-voltage, high-speed switching npn transistor in SOT93 envelope intended for use in horizontal deflection circuits of colour television receivers. The BU508D has an integrated efficiency diode.

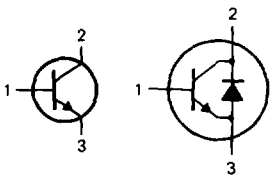
QUICK REFERENCE DATA

Collector-emitter voltage peak value; V_{BE} = 0	V_{CESM}	max.	1500 V
Collector-emitter voltage (open base)	V_{CEO}	max.	700 V
Collector current (DC)	I_C	max.	8 A
Collector current peak value	I_{CM}	max.	15 A
Total power dissipation up to T_{mb} = 25 °C	P_{tot}	max.	125 W
Collector-saturation voltage I_C = 4.5 A; I_B = 2 A	V_{CEsat}	max.	1 V
Saturation collector current	I_{Csat}	typ.	4.5 A
Diode forward voltage (BU508D) I_F = 4.5 A	V_F	typ.	1.6 V
Fall time I_{CM} = 4.5 A; $I_{B(on)}$ = 1.4 A	t_f	typ.	0.7 μs

MECHANICAL DATA

Fig. 1 SOT93.

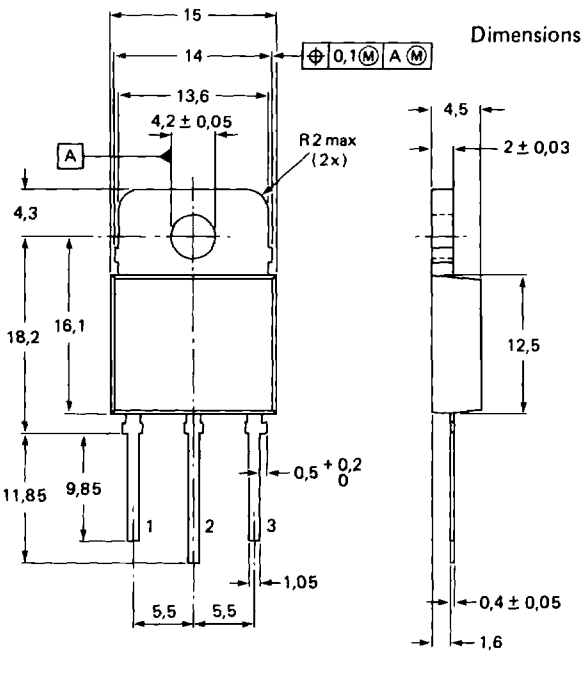
Dimensions in mm



BU508A BU508D

1 = base
2 = collector
3 = emitter

Collector connected to mounting base.



RATINGS

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

Collector-emitter voltage peak value; $V_{BE} = 0$	V_{CESM}	max.	1500 V
Collector-emitter voltage (open base)	V_{CEO}	max.	700 V
Collector current (DC)	I_C	max.	8 A
Collector current peak value	I_{CM}	max.	15 A
Base current (DC)	I_B	max.	4 A
Base current (peak value)	I_{BM}	max.	6 A
Reverse base current (DC or average over any 20 ms period)	$-I_{B(AV)}$	max.	100 mA
Reverse base current* (peak value)	$-I_{BM}$	max.	5 A
Total power dissipation up to $T_{mb} = 25\ ^oC$	P_{tot}	max.	125 W
Storage temperature range	T_{stg}		−65 to + 150 °C
Junction temperature	T_j	max.	150 °C

THERMAL RESISTANCE

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

CHARACTERISTICS

$T_j = 25\ ^oC$ unless otherwise specified

Collector cut-off current**			
$V_{BE} = 0$; $V_{CE} = V_{CESMmax}$	I_{CES}	max.	1 mA
$V_{BE} = 0$; $V_{CE} = V_{CESMmax}$; $T_j = 125\ ^oC$	I_{CES}	max.	2 mA
Emitter cut-off current			
$V_{EB} = 6$ V; $I_C = 0$	I_{EBO}	max.	10 mA
Collector-emitter sustaining voltage			
$I_B = 0$; $I_C = 100$ mA; L = 25 mH	$V_{CEOsust}$	min.	700 V
Saturation voltages			
$I_C = 4.5$ A; $I_B = 2$ A	V_{CEsat}	max.	1 V
	V_{BEsat}	max.	1.3 V
DC current gain			
$I_C = 100$ mA; $V_{CE} = 5$ V	h_{FE}	min.	6
	h_{FE}	typ.	13
	h_{FE}	max.	30
Transition frequency at f = 5 MHz			
$I_C = 0.1$ A; $V_{CE} = 5$ V	f_T	typ.	7 MHz
Collector capacitance at f = 1 MHz			
$I_E = I_e = 0$; $V_{CB} = 10$ V	C_c	typ.	125 pF

* Turn-off current.

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

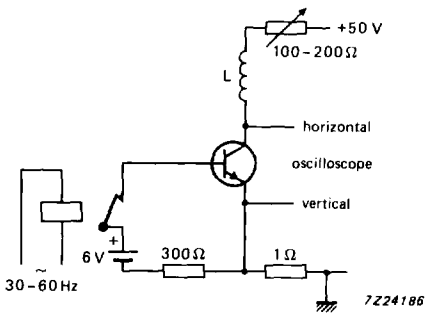


Fig. 2 Test circuit for $V_{CEOsust}$.

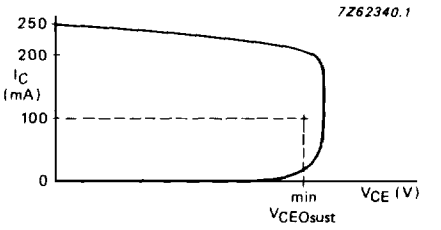


Fig. 3 Oscilloscope display for $V_{CEOsust}$.

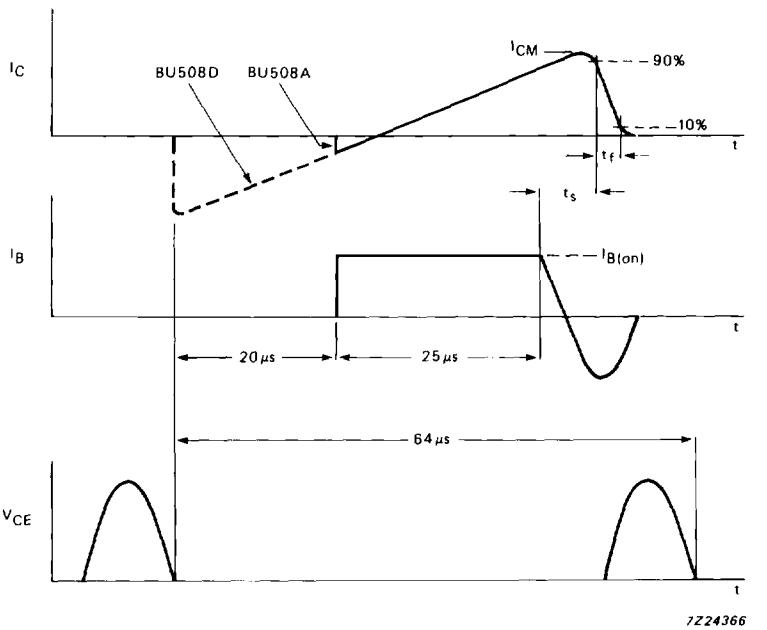


Fig. 4 Switching times waveforms; I_{CM} = 4.5 A; $I_{B(on)}$ = 1.4 A; L_B = 6 μH; $-V_{BB}$ = 4 V; $-dI_B/dt$ = 0.6 A/μs; typical value of t_s = 6.5 μs; typical value of t_f = 0.7 μs.

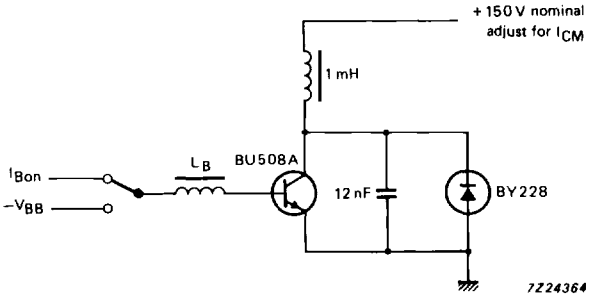


Fig. 5 Switching times test circuit (BU508A).

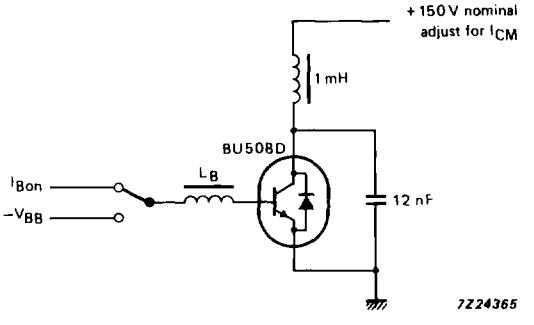
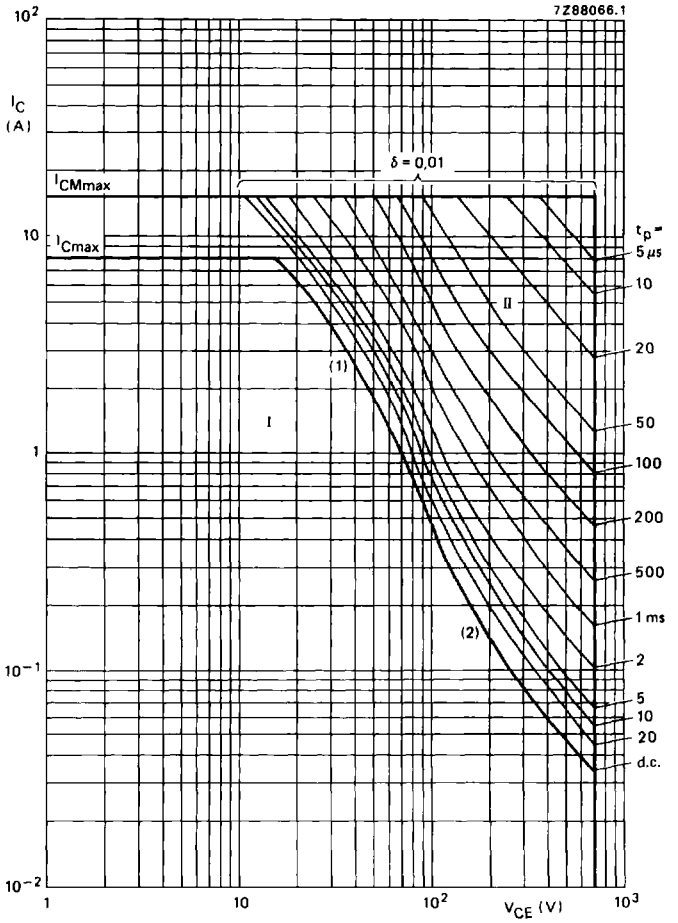


Fig. 6 Switching times test circuit (BU508D).



(1) $P_{tot\ max}$ line.
(2) Second-breakdown limits (independent of temperature).
I Region of permissible DC operation.
II Permissible extension for repetitive pulse operation.

Fig. 7 Safe operating area; $T_{mb} < 25\ ^{o}C$.

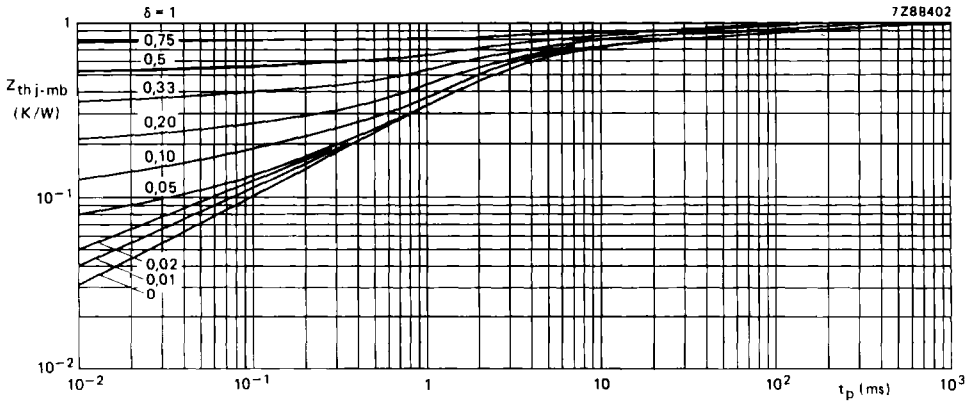


Fig. 8 Pulse power rating chart.

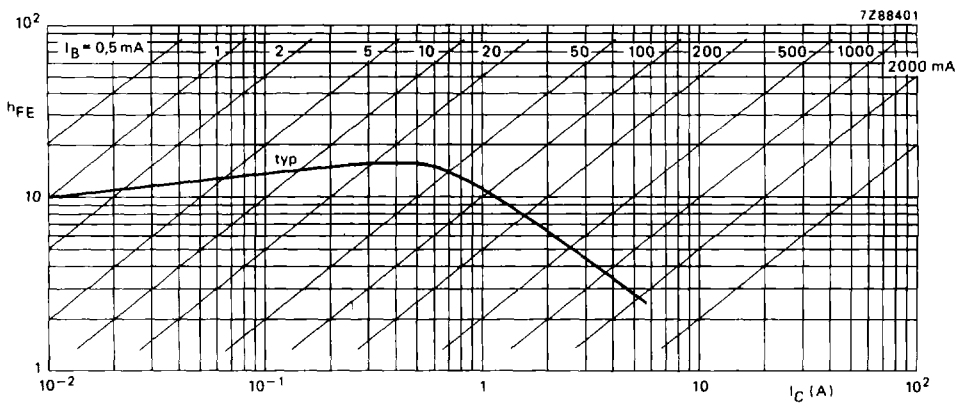


Fig. 9 Typical values DC current gain at V_{CE} = 5 V; T_{mb} = 25 °C.

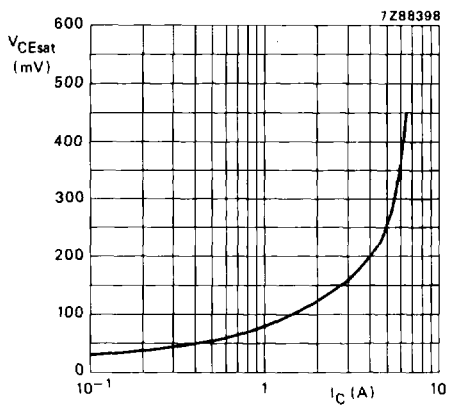


Fig. 10 Typical values I_C/I_B = 2; T_j = 25 °C.

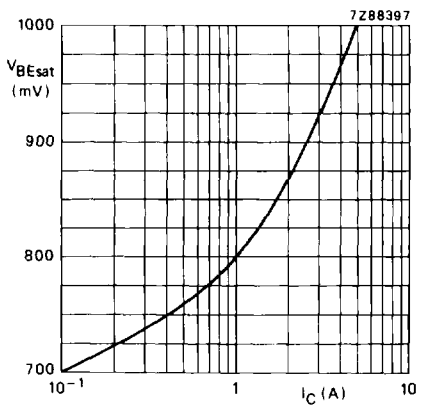


Fig. 11 Typical values I_C/I_B = 2; T_j = 25 °C.