Silicon diffused power transistors — BU508AF; BU508DF

High-voltage, high-speed switching npn transistors in a fully isolated SOT199 envelope (with integrated efficiency diode for the BU508DF), primarily intended for use in horizontal deflection circuits of colour television receivers.

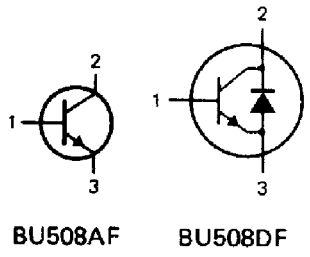
QUICK REFERENCE DATA

Collector-emitter voltage			
peak value; V_{BE} = 0	V_{CESM}	max.	1500 V
open base	V_{CEO}	max.	700 V
Collector saturation current	I_{Csat}	max.	4,5 A
Collector current (DC)	I_C	max.	8 A
Collector current (peak value)	I_{CM}	max.	15 A
Total power dissipation up to T_h = 25 °C	P_{tot}	max.	34 W
Collector-emitter saturation voltage	V_{CEsat}	max.	1 V
Diode forward voltage			
I_F = 4,5 A (BU508DF)	V_F	typ.	1,6 V
Fall time	t_f	typ.	0,7 μs

MECHANICAL DATA

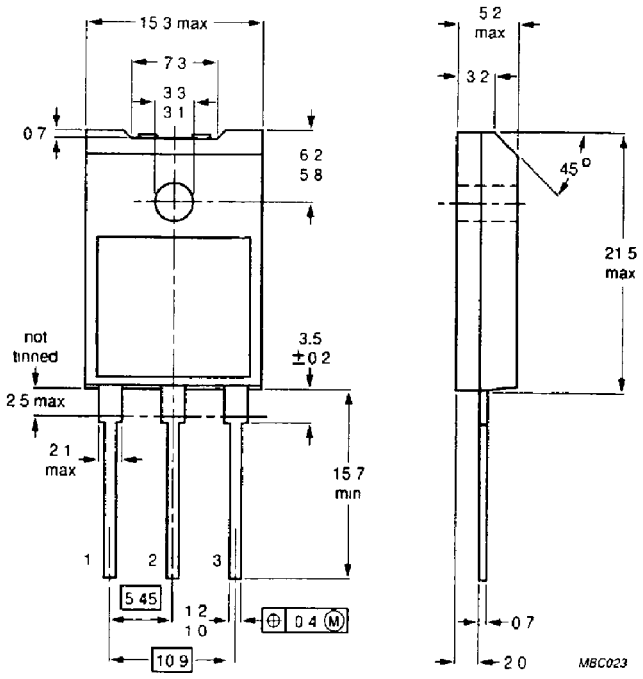
Dimensions in mm

Fig. 1 SOT199.



BU508AF BU508DF

1 = base
2 = collector
3 = emitter
Mounting base is electrically isolated from all terminals.



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
open base	V_{CEO}	max.	700 V
Collector current			
DC	I_C	max.	8 A
peak value	I_{CM}	max.	15 A
saturation	I_{Csat}	max.	4,5 A
Base current			
DC	I_B	max.	4 A
peak value	I_{BM}	max.	6 A
Total power dissipation			
up to $T_h = 25\ ^oC$*	P_{tot}	max.	34 W
Storage temperature	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
From junction to external heatsink*	$R_{th\,j\text{-}h}$	=	3,7 K/W
From junction to external heatsink**	$R_{th\,j\text{-}h}$	=	2,8 K/W
From junction to ambient	$R_{th\,j\text{-}a}$	=	35 K/W

ISOLATION

Isolation voltage from all terminals to external heatsink (peak value)	V_{isol}	max.	1500 V
Isolation capacitance from collector to external heatsink	C_{isol}	typ.	21 pF

CHARACTERISTICS

$T_j = 25\ ^oC$ unless otherwise specified

Collector cut-off current			
$V_{CE} = V_{CESmax}$; $V_{BE} = 0$	I_{CES}	max.	1 mA
$V_{CE} = V_{CESmax}$; $V_{BE} = 0$; $T_j = 125\ ^oC$	I_{CES}	max.	2 mA
Emitter cut-off current			
$V_{EB} = 6$ V; $I_C = 0$	I_{EBO}	max.	10 mA
DC current gain			
$I_C = 100$ mA; $V_{CE} = 5$ V	h_{FE}	min.	6
	h_{FE}	typ.	13
	h_{FE}	max.	30

* Mounted without heatsink compound and 30 ± 5 newtons pressure on centre of envelope.

** Mounted with heatsink compound and 30 ± 5 newtons pressure on centre of envelope.

Saturation voltages			
$I_C = I_{Csat}; I_B = 2$ A	V_{CEsat}	max.	1 V
	V_{BEsat}	max.	1,3 V
Diode forward voltage			
$I_F = 4,5$ A (BU508DF)	V_F	max.	2 V
	V_F	typ.	1,6 V
Collector-emitter sustaining voltage			
$I_C = 0,1$ A; $I_B = 0$; L = 25 mH	V_{CEOsus}	min.	700 V

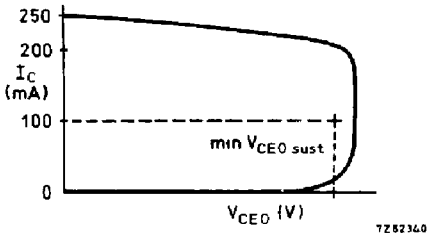


Fig. 2 Oscilloscope display for $V_{CEOsust}$.

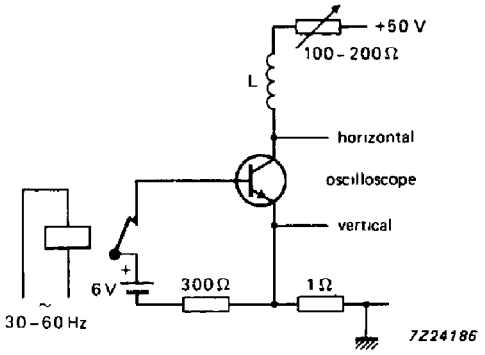


Fig. 3 Test circuit for $V_{CEOsust}$.

Second-breakdown current			
$V_{CE} = 120$ V; T = 200 μs	I_{SB}	min.	11 A
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
Switching times in horizontal deflection circuit			
$-V_{IM} = 4$ V; $L_B = 6$ μH			
$I_C = I_{Csat}$; $I_{B(end)} = 1,4$ A	t_f	typ.	0,7 μs
$(-dI_B/dt = 0,6$ A/μs)	t_s	typ.	6,5 μs

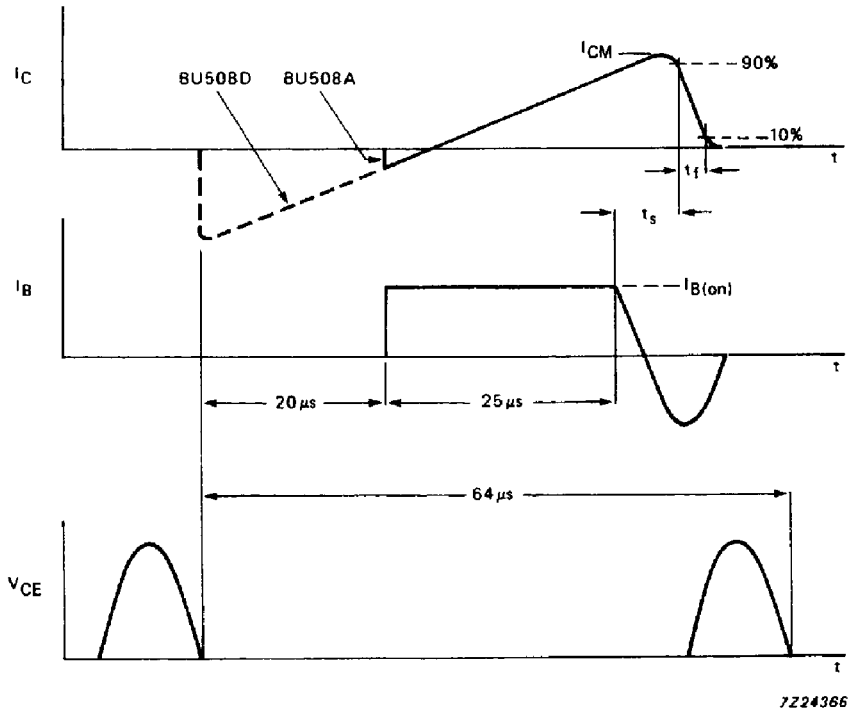


Fig. 4 Switching times waveforms.

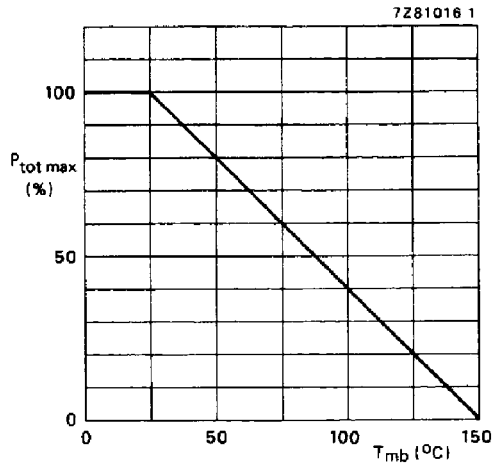


Fig. 5 Power derating curve.

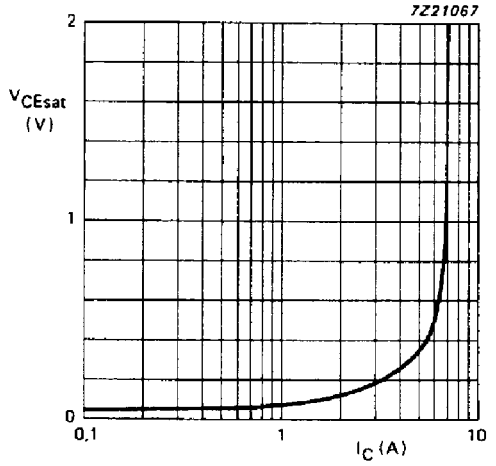


Fig. 6 Typical values $I_C/I_B = 2$; $T_j = 25\ ^oC$.

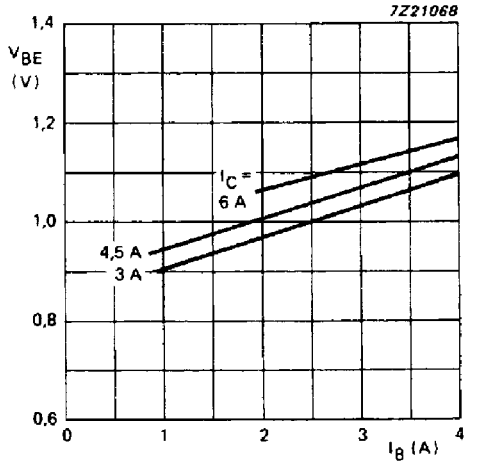


Fig. 7 Typical values base-emitter voltage at $T_j = 25\ ^oC$.

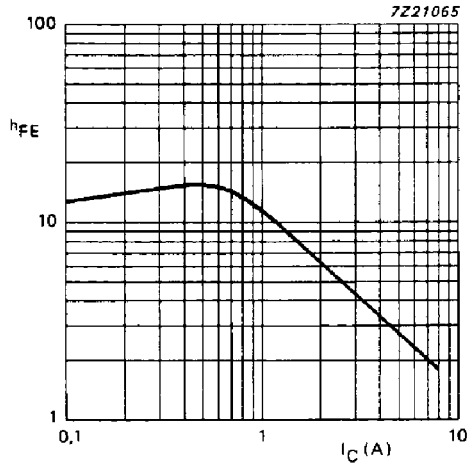


Fig. 8 Typical values DC current gain at V_{CE} = 5 V; T_j = 25 °C.

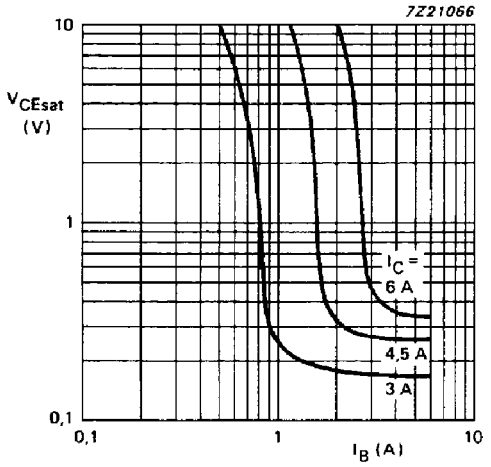
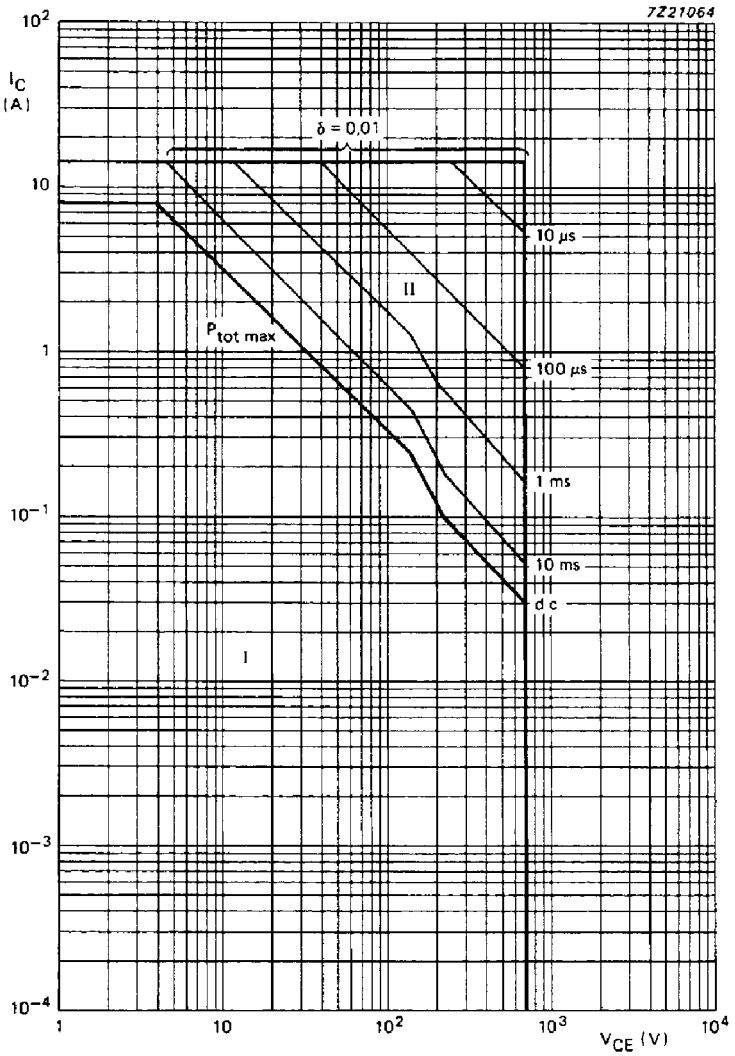
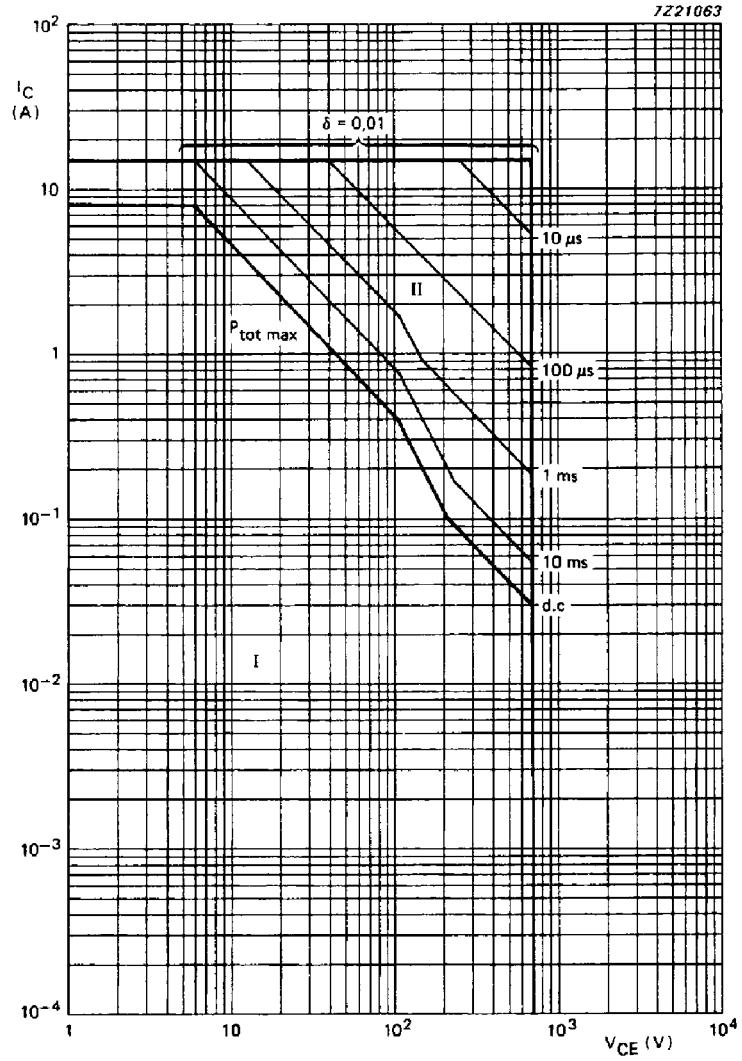


Fig. 9 Typical values collector-emitter voltage at T_j = 25 °C.



I Region of permissible DC operation.
II Permissible extension for repetitive pulse operation.
Note: Mounted without heatsink compound and 30 ± 5 newtons pressure on the centre of the envelope.

Fig. 10 Safe Operating Area; T_h = 25 °C.



I Region of permissible DC operation.
II Permissible extension for repetitive pulse operation.
Note: Mounted with heatsink compound and 30 ± 5 newtons pressure on the centre of the envelope.

Fig. 11 Safe Operating Area; T_h = 25 °C.