

Silicon NPN Power Transistor

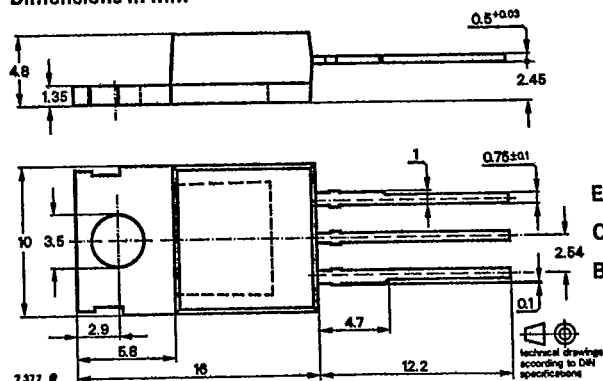
T-33-13

Application: Switching mode power supply, electronic ballast

Features:

- In multi diffusion technique
- Glass passivation
- High reverse voltage
- Short switching time
- Power dissipation 100 W

Dimensions in mm

Collector connected
with metallic surfaceStandard plastic case
14 A 3 DIN 41 869
JEDEC TO 220
Weight max. 2.5 g

Accessories

Isolating washer No. 564 542

Absolute maximum ratings

Collector emitter voltage

V_{CE0}	430	V
V_{CES}	800	V
V_{CER}	800	V

 $R_{BE} \leq 100 \Omega$

Collector peak current

I_{CM}	10	A
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Collector current

I_C	8	A
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Base current

I_{BM}	4	A
I_{BM}	4	A

Total power dissipation

P_{tot}	100	W
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 $T_{case} \leq 25^\circ C$

Junction temperature

T_j	150	$^\circ C$
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Storage temperature range

T_{stg}	-55 ... +150	$^\circ C$
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Maximum thermal resistance

Junction case

R_{thJC}	1.25	K/W
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Characteristics	Min.	Typ.	Max.
$T_{case} = 25^{\circ}C$, unless otherwise specified			
Collector cut-off current			
$V_{CE} = 800 V$	I_{CES}		1 mA
$T_J = 150^{\circ}C, V_{CE} = 800 V$	I_{CES}		2 mA
Collector-emitter breakdown voltage			
$I_C = 100 mA; L_C = 125 mH$	$V_{(BR)CEO}^{2)}$	430	V
$I_C = 0.5 mA, R_{BE} \leq 100 \Omega$	$V_{(BR)CER}$	800	V
Emitter-base breakdown voltage			
$I_E = 1 mA$	$V_{(BR)EBO}$	6	V
Base saturation voltage			
$I_C = 4 A, I_B = 0.8 A$	$V_{BEsat}^{2)}$		2 V
DC forward current transfer ratio			
$V_{CE} = 5 V, I_C = 1 A$	h_{FE}	20	45
$V_{CE} = 5 V, I_C = 4 A$	h_{FE}	5.5	
Gain bandwidth product			
$V_{CE} = 10 V, I_C = 500 mA, f = 1 MHz$	f_T	10	MHz
Switching characteristics			
$I_C = 4 A, I_{B1} = -I_{B2} = 1.25 A, t_p = 20 \mu s$			
Turn-off time	t_{off}		4 μs
Fall time	$t_f^{1)}$		1 μs
$I_C = 2.5 A, I_{B1} = 0.5 A, -di_B/dt \approx 0.5 A/\mu s,$ $dV_{CE}/dt = 500 V/\mu s$ Fig. 6	t_f		0.25 μs

Instruction for the calculation of storage time and turn-off base current with charging values $Q_{s(BE)}$ for inductive collector load, $I_{CE} = 2.5 A$ and $-I_{B2}$ limited due to:

$$-I_{B2} = 1.41 \sqrt{Q_{s(BE)} \cdot \left| \frac{di_B}{dt} \right|} - I_{B1}$$
$$t_s \approx \frac{I_{B1} + |I_{B2}|}{\left| \frac{di_B}{dt} \right|}$$

1) By using retrace at switching-off inductive load
2) $\frac{t_p}{T} \geq 0.01, t_p = 0.3 ms$

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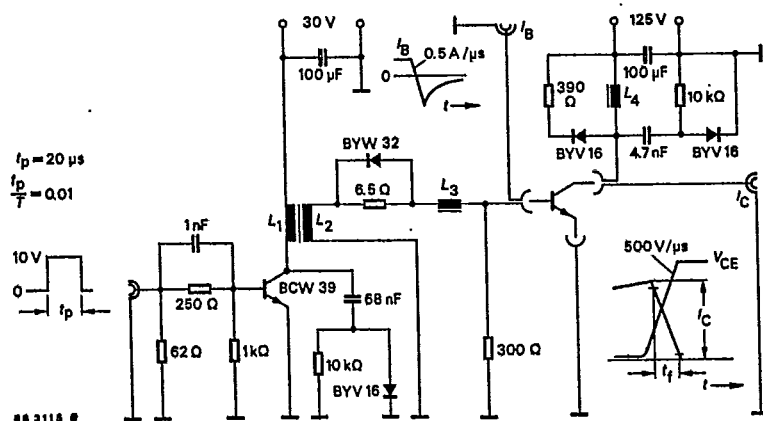
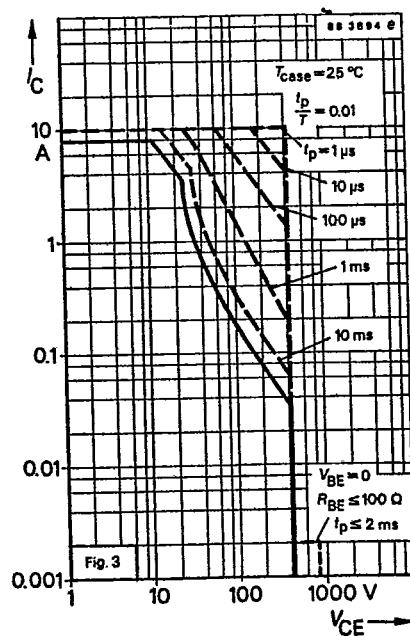
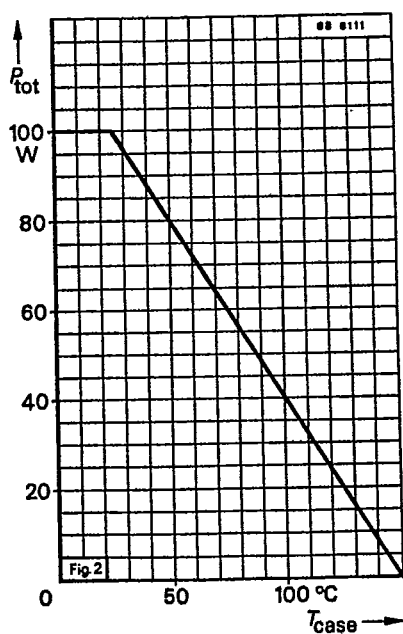
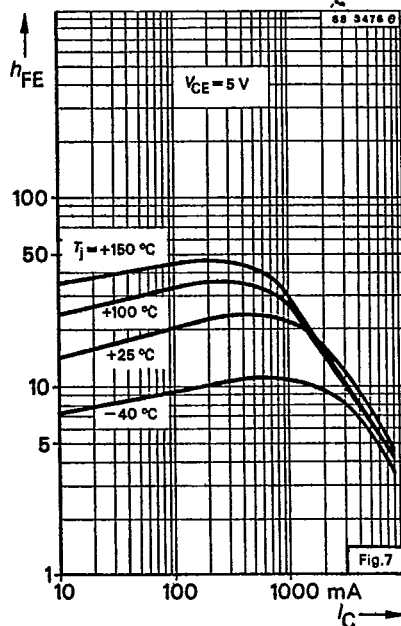
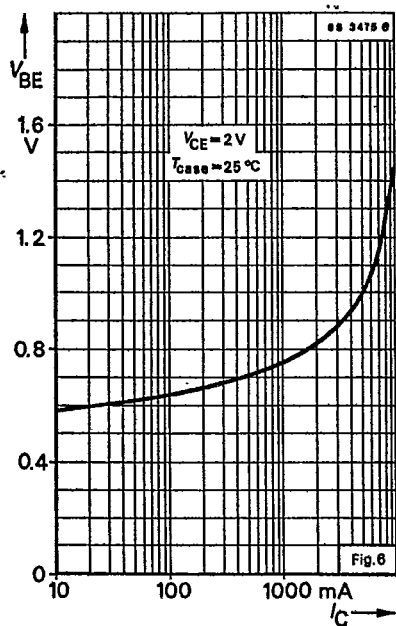
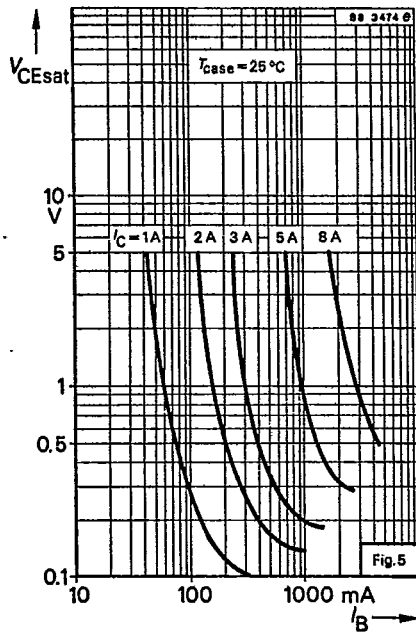
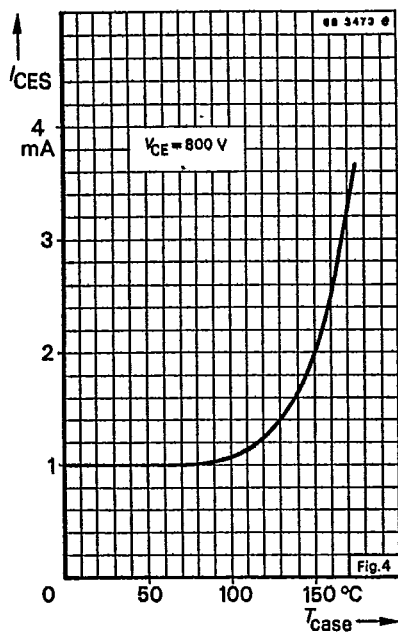


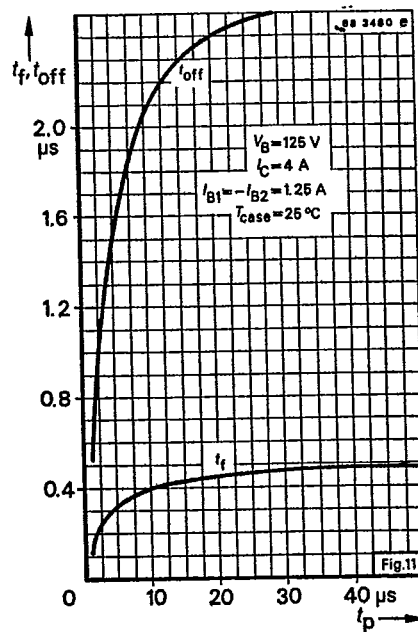
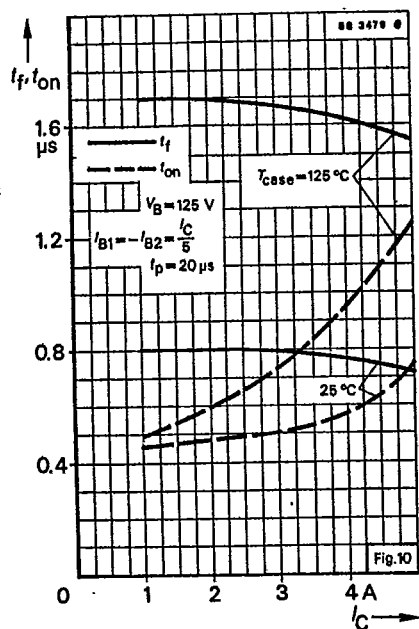
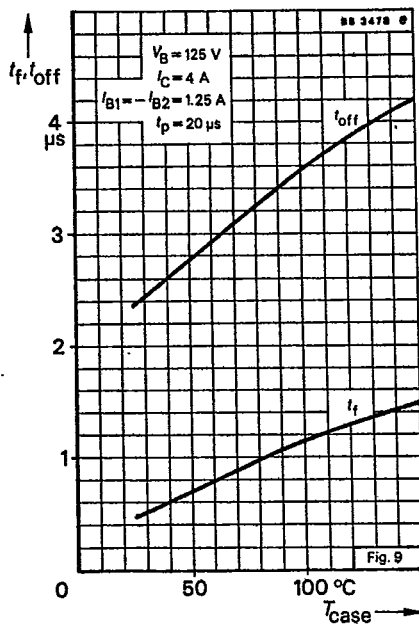
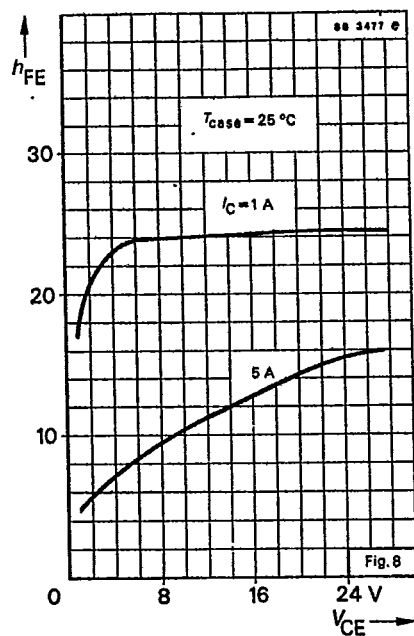
Fig. 1 Test circuit for switching characteristics





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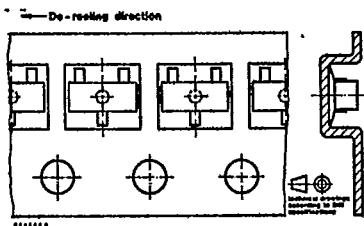


Fig. 7.4 Standard taped SOT 23

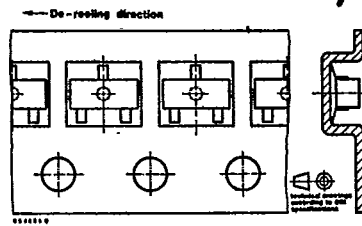


Fig. 7.6 Reverse taped SOT 23

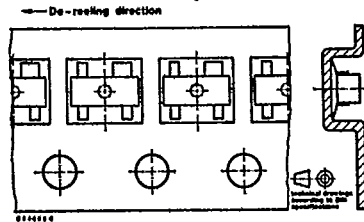


Fig. 7.5 Standard taped SOT 143

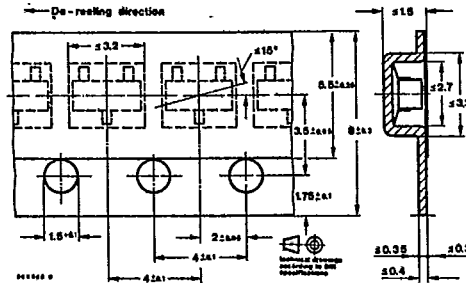


Fig. 7.7 Dimensions of tape in mm

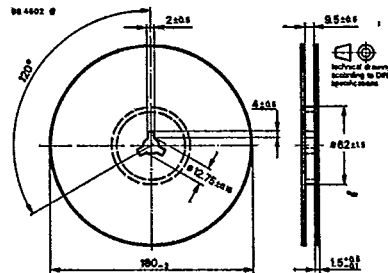


Fig. 7.8 Dimensions of reel in mm

8. Assessories

Number	Fig.	Designation	For case
119880	8.1.	Isolating washer thickness 80 µm	12A 3 DIN 41 869 JEDEC TO 126 (SOT 32)
564542	8.2.	Isolating washer thickness 50 µm	14A 3 DIN 41 869 JEDEC TO 220 (SOT 78)
912884	8.3	Isolating washer thickness 50 µm	15A 3 DIN 41 869 (TOP3) for clip mounting
191131	8.4	Isolating washer thickness 50 µm	15A 3 DIN 41 869 (TOP3) for screw mounting
191140	8.5	Mounting clip	15A 3 DIN 41 869 (TOP3)
569524	8.6	Isolating washer thickness 100 µm + 50 µm	3B 2 DIN 41 872 JEDEC TO 3 Devices with high reverse voltage