SILICON DIFFUSED POWER TRANSISTOR

High-voltage, high-speed, glass-passivated npn switching transistor in a TO-3 envelope, intended for use in three-phase AC motor control systems.

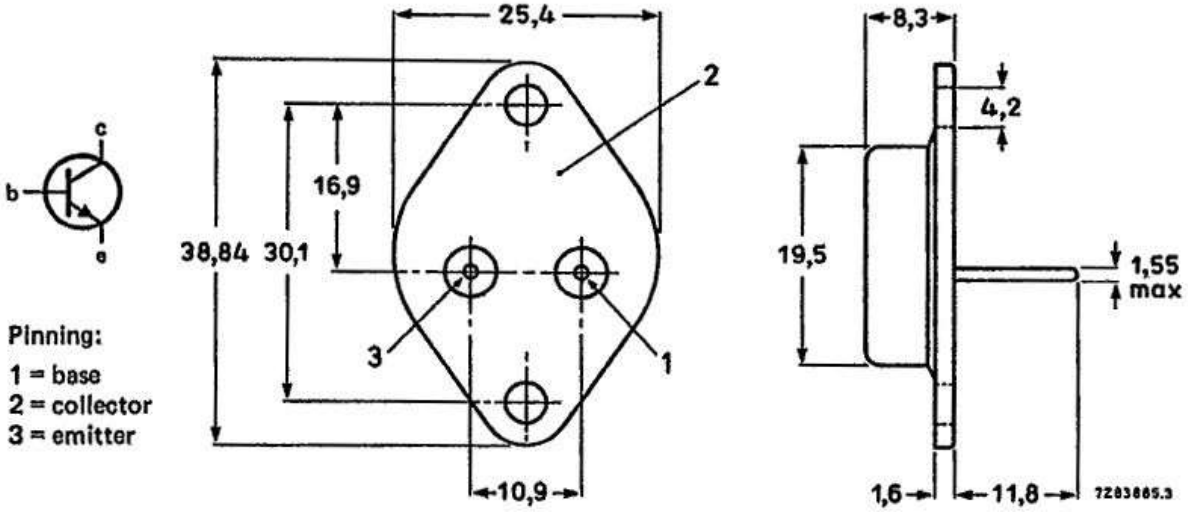
QUICK REFERENCE DATA

Collector-emitter voltage (peak value; V_{BE} = 0)	V_{CESM}	max.	1500 V
Collector-emitter voltage (open base)	V_{CEO}	max.	700 V
Collector-emitter saturation voltage	V_{CEsat}	max.	1 V
Collector current (DC)	I_C	max.	12 A
Collector current (peak value)	I_{CM}	max.	20 A
Total power dissipation up to T_{mb} = 25 °C	P_{tot}	max.	160 W
Collector saturation current	I_{Csat}	typ.	9 A
Fall time	t_f	typ.	0,5 μs

MECHANICAL DATA

Dimensions in mm

Fig. 1 TO-3.



Pinning:
1 = base
2 = collector
3 = emitter

Collector connected to case.

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.	12	A
Collector current (peak value)	I_{CM}	max.	20	A
Base current (DC)	I_B	max.	8	A
Base current (peak value)	I_{BM}	max.	12	A
Total power dissipation up to T_{mb} = 25 °C	P_{tot}	max.	160	W
Storage temperature range	T_{stg}	−65 to +	150	°C
Junction temperature	T_j	max.	150	°C

THERMAL RESISTANCE

From junction to mounting base	$R_{th\ j\text{-}mb}$	=	0,78	K/W

CHARACTERISTICS

T_j = 25 °C unless otherwise specified

Collector cut-off current*				
$V_{CE} = V_{CESMmax}$; V_{BE} = 0	I_{CES}	max.	1	mA
$V_{CE} = V_{CESMmax}$; V_{BE} = 0; T_j = 125 °C	I_{CES}	max.	4	mA
Emitter cut-off current				
I_C = 0; V_{EB} = 5 V	I_{EBO}	max.	10	mA
Saturation voltages				
I_C = 9 A; I_B = 4 A	V_{CEsat}	max.	1	V
	V_{BEsat}	max.	1,5	V
I_C = 12 A; I_B = 6 A	V_{CEsat}	max.	3	V
Collector-emitter sustaining voltage				
I_C = 200 mA; I_B = 0; L = 25 mH	$V_{CEOsust}$	min.	700	V
Second breakdown collector current				
V_{CE} = 100 V; t_p = 1 s	$I_{(SB)C}$	min.	0,4	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.	200	pF

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

Switching times resistive load (Figs 2 and 3)

I_{Con} = 9 A; I_{Bon} = $-I_{Boff}$ = 4 A

Turn-on time	t_{on}	typ.	1,5	μs
Turn-off: Storage time	t_s	typ.	4,5	μs
Fall time	t_f	typ.	0,5	μs

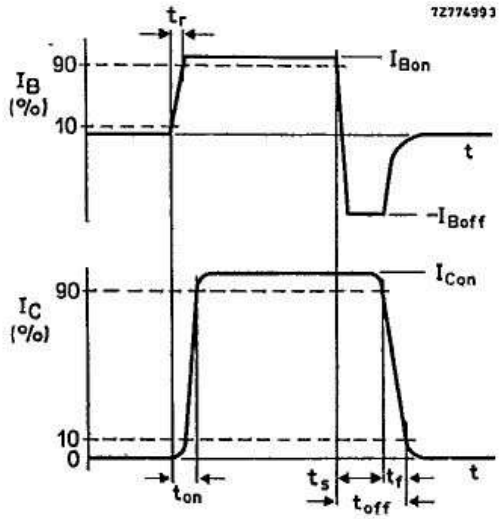


Fig. 2 Switching times waveforms with resistive load.

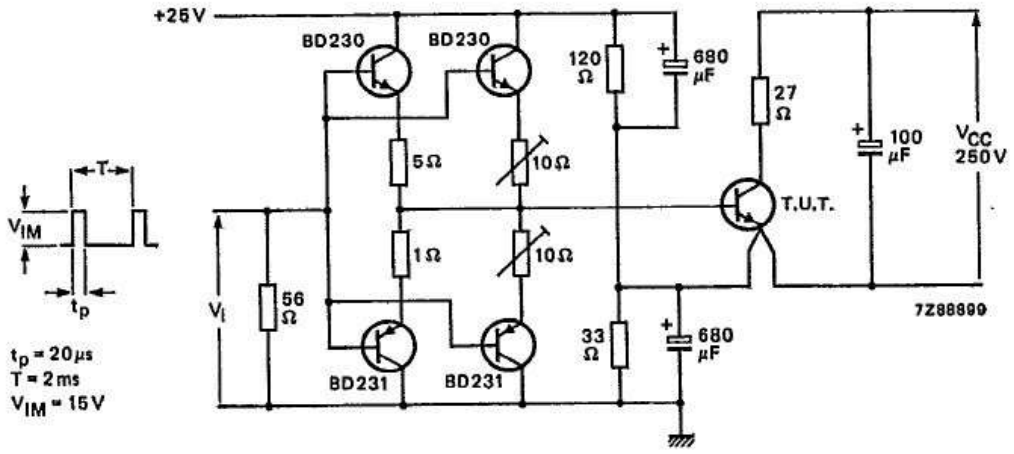
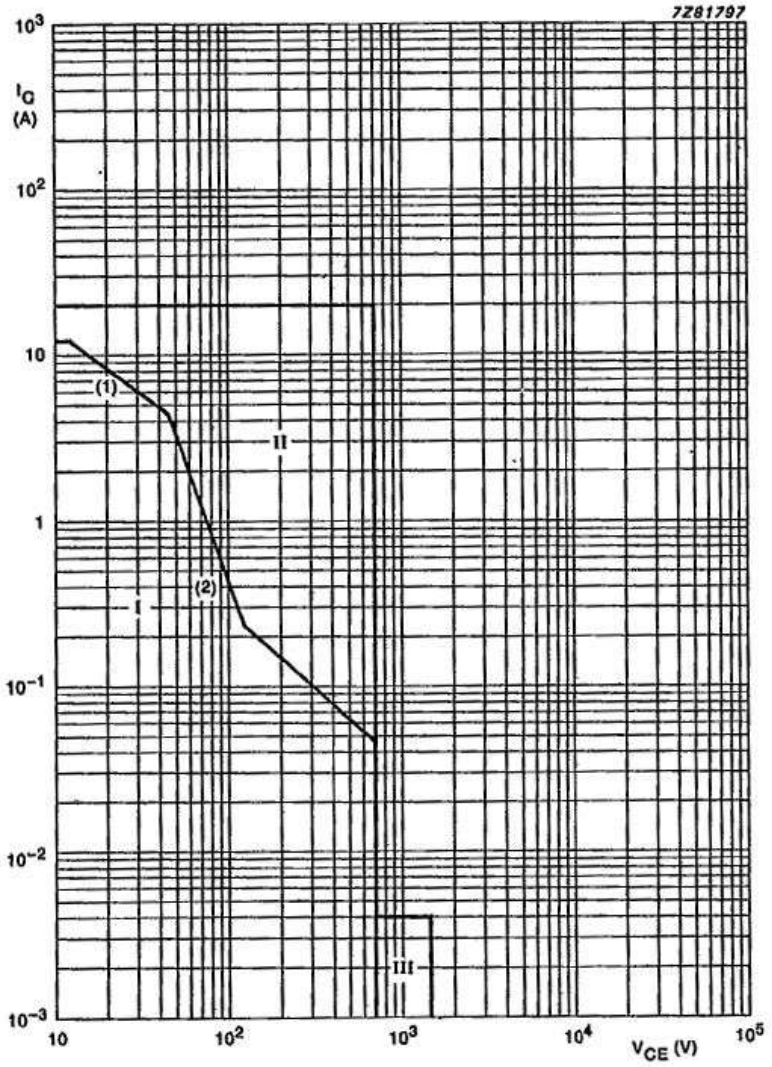


Fig. 3 Test circuit resistive load.



(1) $P_{tot\ max}$ line.
(2) Second-breakdown limits.

I Region of permissible DC operation.
II Permissible extension for repetitive pulse operation.
III Repetitive pulse operation in this region is permissible, provided $V_{BE} \leqslant 0$ and $t_p \leqslant 5$ ms.

Fig. 4 Safe operating area at $T_{mb} \leqslant 25$ °C.

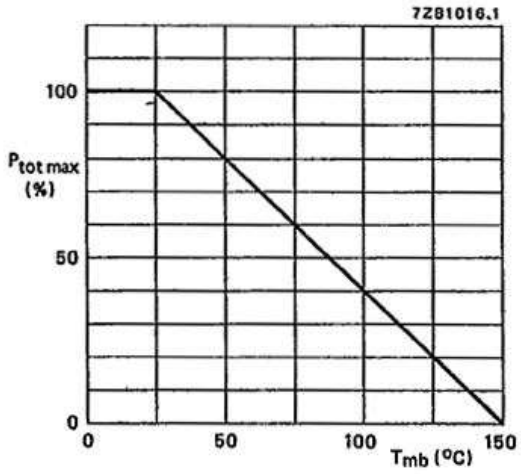


Fig. 5 Power derating curve.

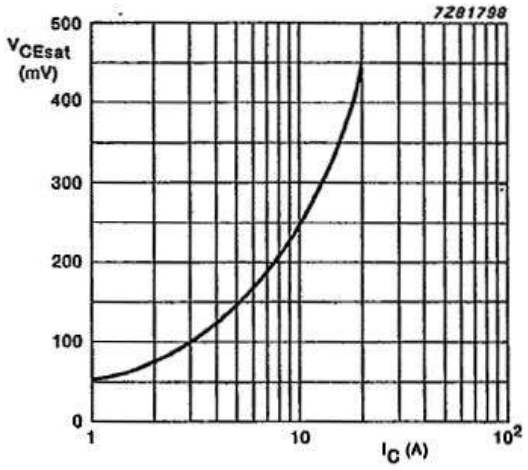


Fig. 6 Typical values $I_C/I_B = 2$; $T_j = 25$ °C.

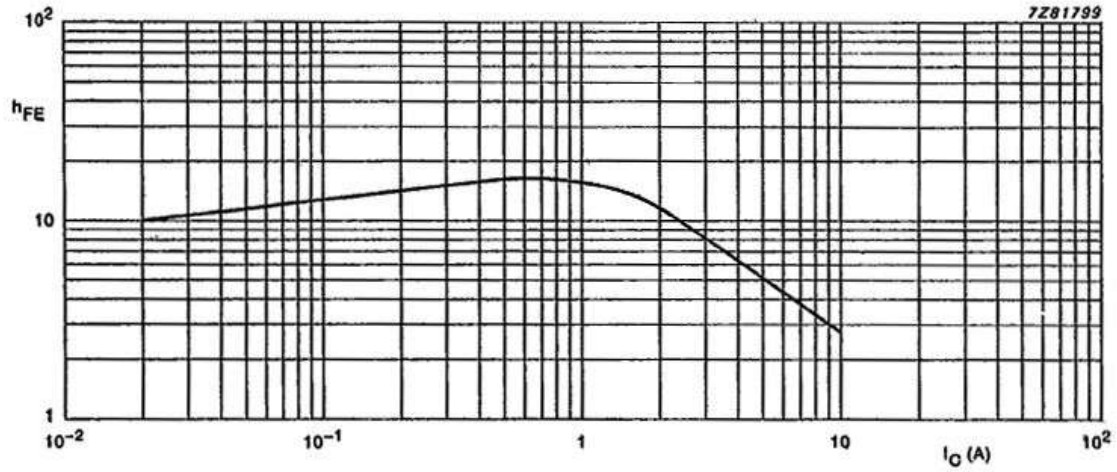


Fig. 7 Typical values DC current gain at $V_{CE} = 5$ V; $T_{mb} = 25$ °C.