

SILICON EPITAXIAL POWER TRANSISTORS

NPN silicon epitaxial power transistors, each in a SOT186 envelope with an electrically insulated mounting base.

PNP complements are BD944F, BD946F and BD948F.

QUICK REFERENCE DATA

			BD943F	945F	947F	
Collector-base voltage (open emitter)	V_{CB0}	max.	22	32	45	V
Collector-emitter voltage (open base)	V_{CEO}	max.	22	32	45	V
Emitter-base voltage (open collector)	V_{EBO}	max.		5		V
DC collector current	I_C	max.		5		A
Total power dissipation up to $T_H = 25^\circ\text{C}$	P_{tot}	max.		22		W

MECHANICAL DATA

Pinning

- 1 = base
- 2 = collector
- 3 = emitter

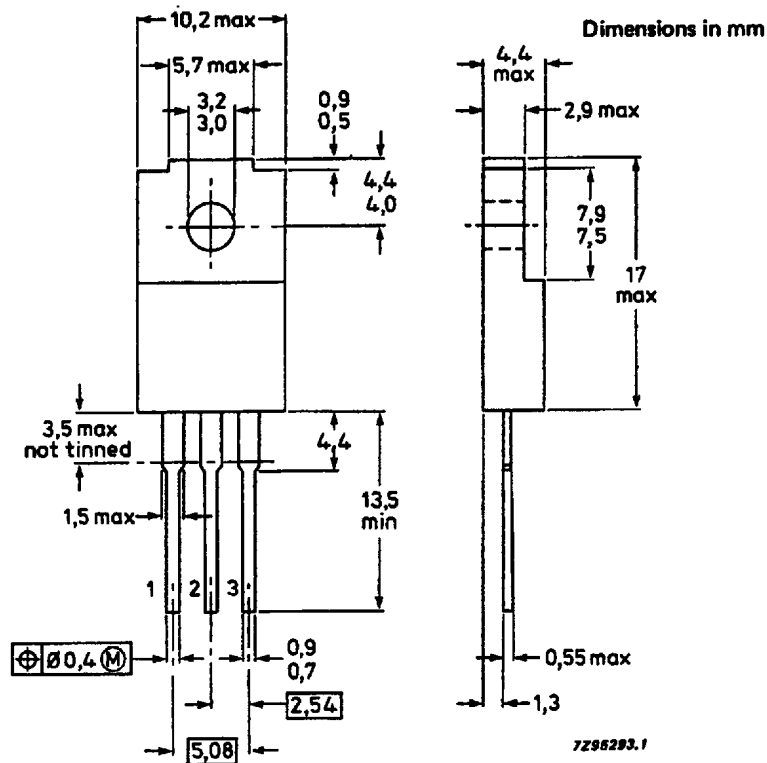
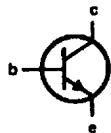


Fig.1 SOT186.

RATINGS

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

		BD943F	945F	947F	
Collector-base voltage (open emitter)	V _{CBO} max.	22	32	45	V
Collector-emitter voltage (open base)	V _{CEO} max.	22	32	45	V
Emitter-base voltage (open collector)	V _{EBO} max.		5		V
DC collector current	I _C max.		5		A
Peak collector current	I _{CM} max.		8		A
Base current	I _B max.		1		A
Total power dissipation up to T _h = 25 °C (note 1)	P _{tot} max.		15		W
up to T _h = 25 °C (note 2)	P _{tot} max.		22		W
Storage temperature range	T _{stg}	-65 to + 150			°C
Junction temperature	T _j max.		150		°C

THERMAL RESISTANCE

From junction to internal heatsink	R _{th j-mb} =		2.93		K/W
From junction to external heatsink (note 1)	R _{th j-h} =		7.93		K/W
From junction to external heatsink (note 2)	R _{th j-h} =		5.43		K/W

INSULATION

Voltage allowed between all terminals and external heatsink, peak value	V _{insul} max.		1000		V
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CHARACTERISTICS

T_j = 25 °C unless otherwise specified

Collector cut-off current I _E = 0; V _{CB} = V _{CBOmax}	I _{CBO} max.		50		μA
I _E = 0; V _{CB} = V _{CBOmax} ; T _j = 150 °C	I _{CBO} max.		1		mA
I _B = 0; V _{CE} = 15 V	I _{CEO} max.	BD943F	0.1		mA
I _B = 0; V _{CE} = 20 V	I _{CEO} max.	BD945F	0.1		mA
I _B = 0; V _{CE} = 25 V	I _{CEO} max.	BD947F	0.1		mA
Emitter cut-off current I _C = 0; V _{EB} = 5 V	I _{EBO} max.		0.2		mA

Notes

1. Mounted without heatsink compound and 30 ± 5 newton pressure on centre of envelope.
2. Mounted with heatsink compound and 30 ± 5 newton pressure on centre of envelope.

			BD943F	945F	947F	
DC current gain (note 1) $I_C = 10 \text{ mA}; V_{CE} = 5 \text{ V}$ $I_C = 500 \text{ mA}; V_{CE} = 1 \text{ V}$	h_{FE}	min.	25	25	25	
	h_{FE}	min.	85	85	85	
	h_{FE}	max.	475	475	475	
	h_{FE}	min.	50	50	40	
Base-emitter voltage (notes 1 and 2) $I_C = 2 \text{ A}; V_{CE} = 1 \text{ V}$ $I_C = 3 \text{ A}; V_{CE} = 1 \text{ V}$	V_{BE}	max.	1.1	1.1	—	V
	V_{BE}	max.	—	—	1.3	V
Collector-emitter saturation voltage (note 1) $I_C = 2 \text{ A}; I_B = 0.2 \text{ A}$ $I_C = 3 \text{ A}; I_B = 0.3 \text{ A}$	V_{CEsat}	max.	0.5	0.5	—	V
	V_{CEsat}	max.	—	—	0.7	V
Knee voltage (note 1) $I_C = 2 \text{ A}; I_B = 20 \text{ mA}$	V_{CEK}	max.		0.8		V
Transition frequency at $f = 1 \text{ MHz}$ $I_C = 250 \text{ mA}; V_{CE} = 1 \text{ V}$	f_T	min.		3		MHz

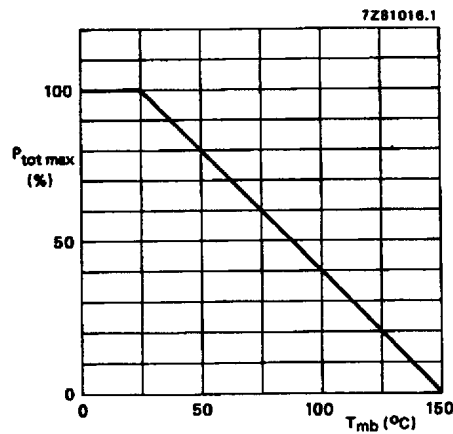
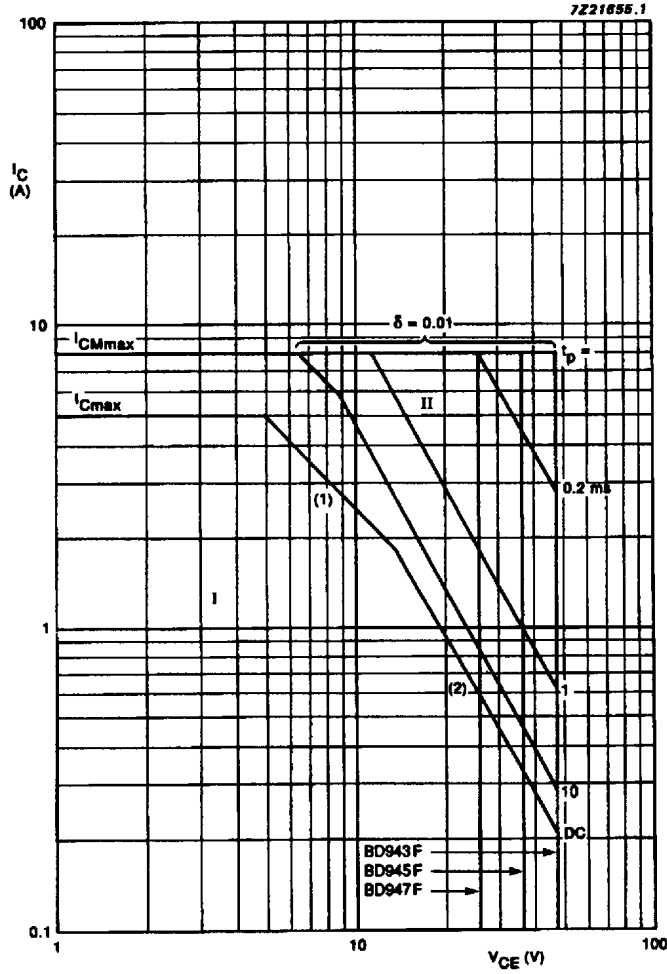


Fig. 2 Power derating curve.

Notes

1. Measured under pulse conditions; $t_p < 300 \mu\text{s}$; $\delta < 2\%$.
2. V_{BE} decreases by about 2.3 mV/K with increasing temperature.



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

Fig. 3 Safe Operating Area, $T_{mb} = 25\ ^\circ\text{C}$.

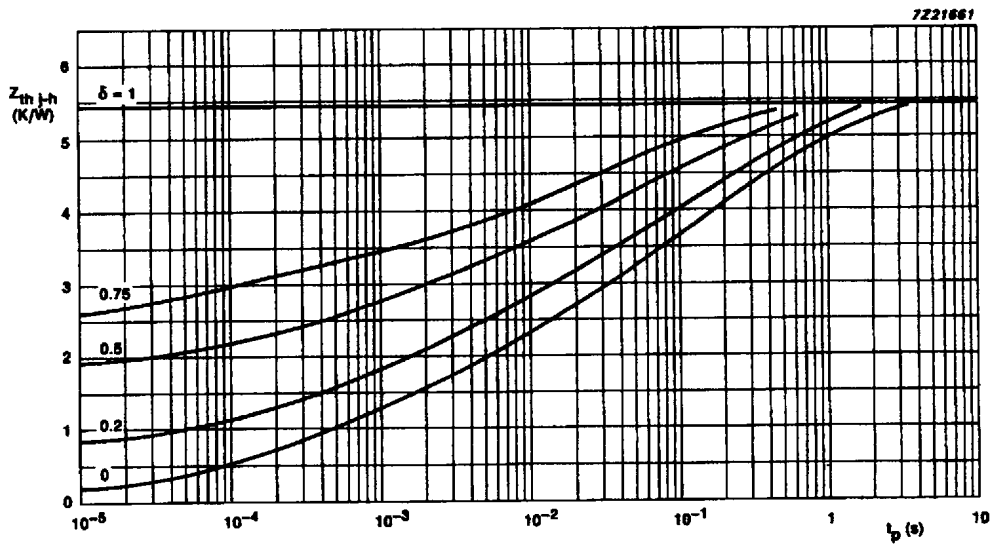


Fig. 4 Pulse power rating chart.

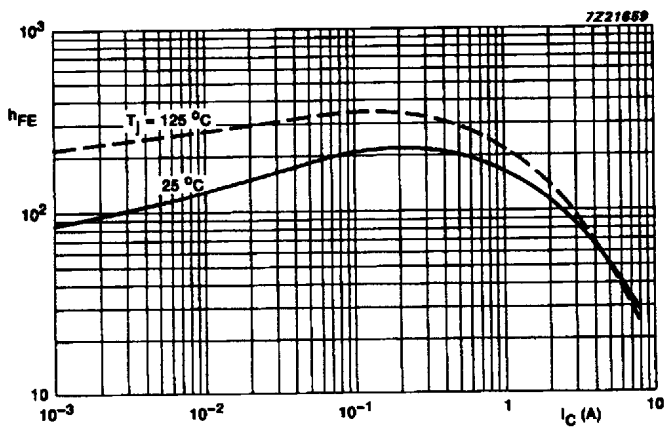


Fig. 5 DC current gain; $V_{CE} = 1$ V; typical values.

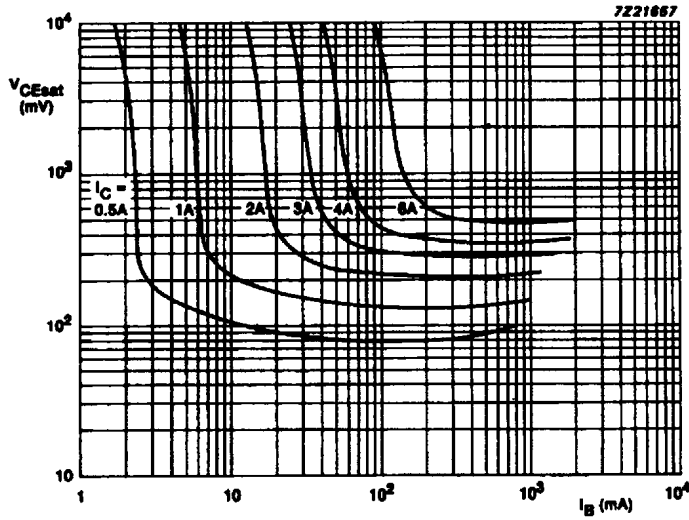


Fig.6 Collector-emitter saturation voltage as a function of base current $T_h = 25^\circ\text{C}$.