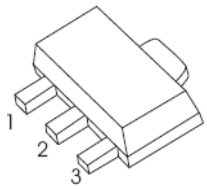
NPN Silicon Epitaxial Planar Transistor

FEATURES

- SOT89 package
- Low collector-emitter saturation voltage V_{CEsat}
- High collector current capability: I_C and I_{CM}
- Higher efficiency leading to less heat generation
- Reduced printed-circuit board requirements.

SOT-89-3L



1. BASE
2. COLLECTOR
3. EMITTER

APPLICATIONS

- Power management
  - DC/DC converters
  - Supply line switching
  - Battery charger
  - LCD backlighting.

MARKING: S43

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 60134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{CBO}	collector-base voltage	open emitter	–	50	V
V_{CEO}	collector-emitter voltage	open base	–	50	V
V_{EBO}	emitter-base voltage	open collector	–	5	V
I_C	collector current (DC)	note 4	–	3	A
I_{CM}	peak collector current	limited by $T_{j(max)}$	–	5	A
I_B	base current (DC)		–	0.5	A
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C			
		note 1	–	550	mW
		note 2	–	1	W
		note 3	–	1.4	W
		note 4	–	1.6	W
T_{stg}	storage temperature		–65	+150	°C
T_j	junction temperature		–	150	°C
T_{amb}	ambient temperature		–65	+150	°C

Notes

1. Device mounted on a FR4 printed-circuit board; single-sided copper; tin-plated; standard footprint.
2. Device mounted on a FR4 printed-circuit board; single-sided copper; tin-plated; mounting pad for collector 1 cm^2.
3. Device mounted on a FR4 printed-circuit board; single-sided copper; tin-plated; mounting pad for collector 6 cm^2.
4. Device mounted on a ceramic printed-circuit board 7 cm^2, single-sided copper, tin-plated.

CHARACTERISTICS

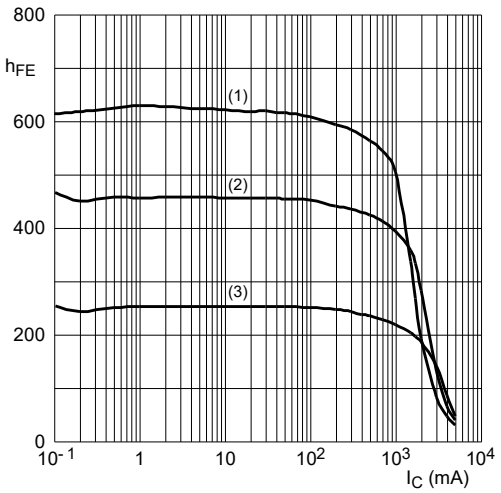
T_{amb} = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
I_{CBO}	collector-base cut-off current	V_{CB} = 50 V; I_E = 0 A	–	–	100	nA
		V_{CB} = 50 V; I_E = 0 A; T_j = 150 °C	–	–	50	μA
I_{CES}	collector-emitter cut-off current	V_{CE} = 50 V; V_{BE} = 0 V	–	–	100	nA
I_{EBO}	emitter-base cut-off current	V_{EB} = 5 V; I_C = 0 A	–	–	100	nA
h_{FE}	DC current gain	V_{CE} = 2 V				
		I_C = 0.1 A	300	–	–	
		I_C = 0.5 A	300	–	–	
		I_C = 1 A; note 1	300	–	700	
		I_C = 2 A; note 1	200	–	–	
		I_C = 3 A; note 1	100	–	–	
V_{CEsat}	collector-emitter saturation voltage	I_C = 0.5 A; I_B = 50 mA	–	–	80	mV
		I_C = 1 A; I_B = 50 mA	–	–	160	mV
		I_C = 2 A; I_B = 100 mA	–	–	280	mV
		I_C = 2 A; I_B = 200 mA; note 1	–	–	260	mV
		I_C = 3 A; I_B = 300 mA; note 1	–	–	370	mV
R_{CEsat}	equivalent on-resistance	I_C = 2 A; I_B = 200 mA; note 1	–	–	130	mΩ
V_{BEsat}	base-emitter saturation voltage	I_C = 2 A; I_B = 100 mA	–	–	1.1	V
		I_C = 3 A; I_B = 300 mA; note 1	–	–	1.2	V
V_{BEon}	base-emitter turn-on voltage	V_{CE} = 2 V; I_C = 1 A	–	–	1.1	V
f_T	transition frequency	I_C = 100 mA; V_{CE} = 5 V; f = 100 MHz	100	–	–	MHz
C_c	collector capacitance	V_{CB} = 10 V; I_E = i_e = 0 A; f = 1 MHz	–	–	30	pF

Note

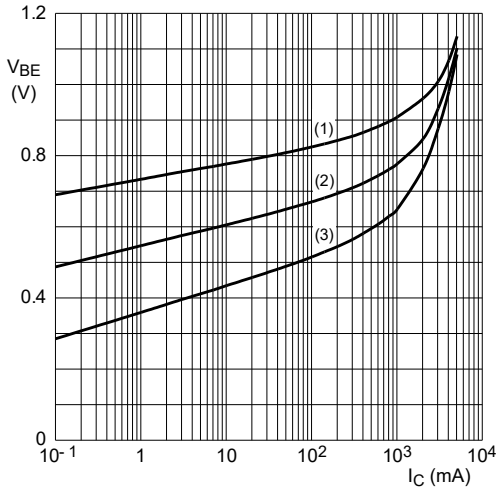
1. Pulse test: $t_p \leq 300$ μs; $\delta \leq 0.02$.

Typical Characteristics



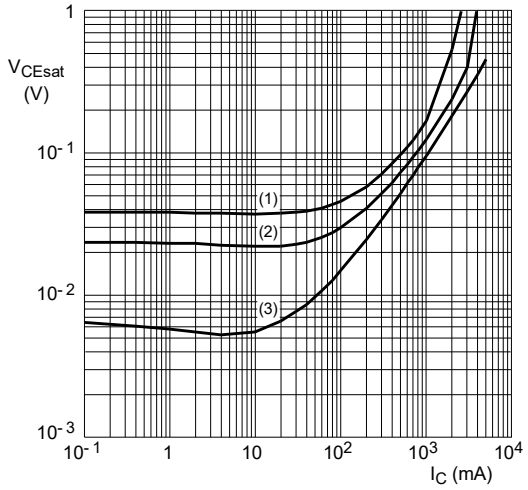
V_{CE} = 2 V
(1) T_{amb} = 100 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = -55 °C

Fig.1 DC current gain as a function of collector current; typical values.



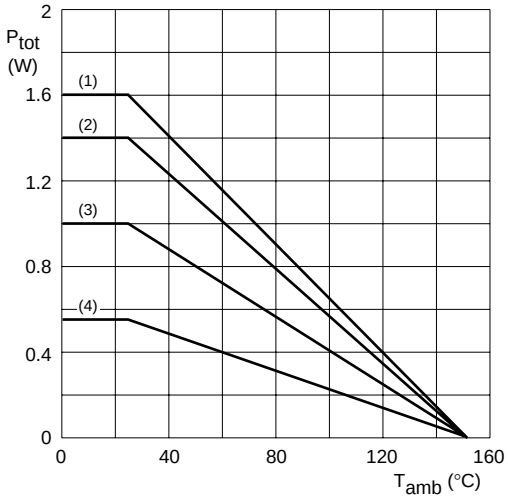
V_{CE} = 2 V
(1) T_{amb} = -55 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = 100 °C

Fig.2 Base-emitter voltage as a function of collector current; typical values.



T_{amb} = 25 °C
(1) I_C/I_B = 100
(2) I_C/I_B = 50
(3) I_C/I_B = 10

Fig.3 Collector-emitter saturation voltage as a function of collector current; typical values.



(1) Ceramic PCB; 7 cm² mounting pad for collector.
(2) FR4 PCB; 6 cm² copper mounting pad for collector.
(3) FR4 PCB; 1 cm² copper mounting pad for collector.
(4) Standard footprint.

Fig.4 Power derating curves.