

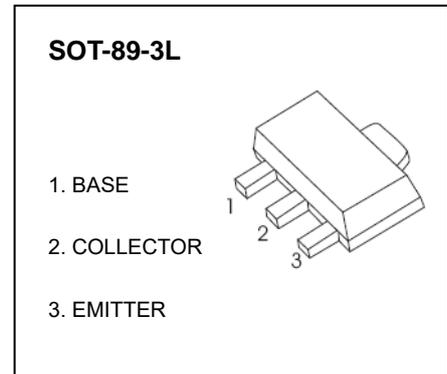
## NPN Silicon Epitaxial Planar Transistor

### 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.

### 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	$T_{amb} \leq 25\text{ °C}$			
		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<sup>2</sup>.
3. Device mounted on a FR4 printed-circuit board; single-sided copper; tin-plated; mounting pad for collector 6 cm<sup>2</sup>.
4. Device mounted on a ceramic printed-circuit board 7 cm<sup>2</sup>, single-sided copper, tin-plated.

**CHARACTERISTICS**
 $T_{amb} = 25\text{ }^{\circ}\text{C}$  unless otherwise specified.

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

**Note**

1. Pulse test:  $t_p \leq 300\text{ }\mu\text{s}; \delta \leq 0.02$ .

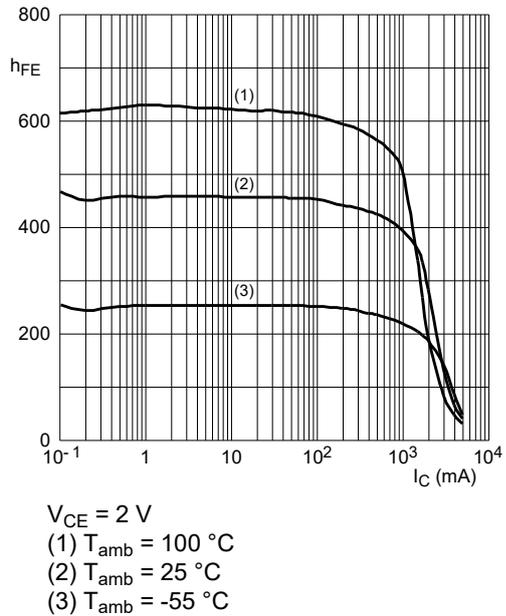
**Typical Characteristics**


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

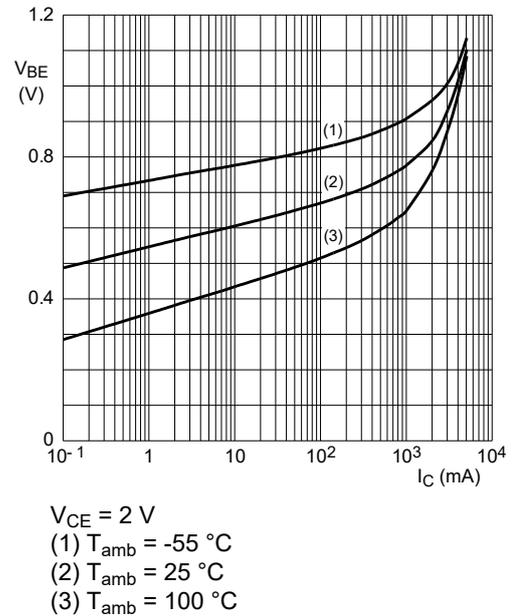


Fig.2 Base-emitter voltage as a function of collector current; typical values.

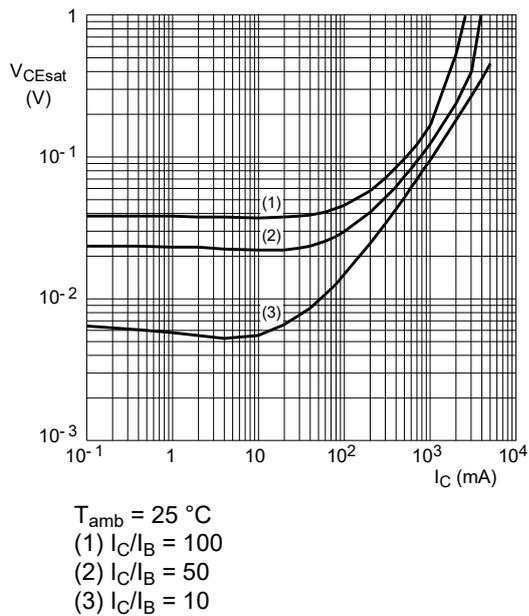


Fig.3 Collector-emitter saturation voltage as a function of collector current; typical values.

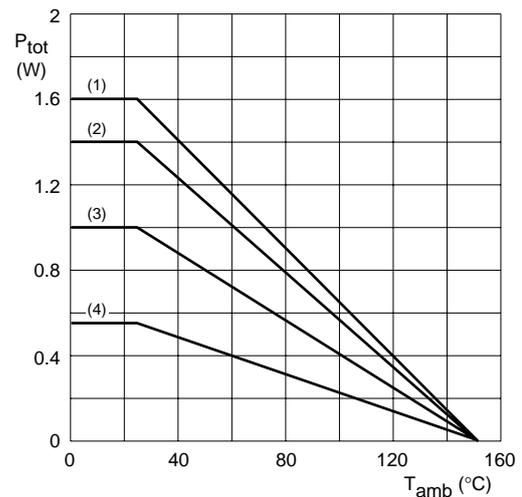


Fig.4 Power derating curves.