

1. General description

NPN medium power transistors in a SOT89 (SC-62) flat lead Surface-Mounted Device (SMD) plastic package

2. Features and benefits

- High collector current capability I_C and I_{CM}
- Three current gain selections
- High power dissipation capability

3. Applications

- Linear voltage regulators
- MOSFET drivers
- Low-side switches
- Battery-driven devices
- Power management
- Amplifiers

4. Quick reference data

Table 1. Quick reference data

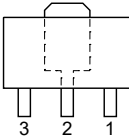
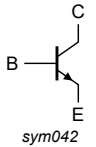
$T_{amb} = 25\text{ °C}$ unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{CEO}	collector-emitter voltage	open base	-	-	80	V
I_C	collector current		-	-	1	A
I_{CM}	peak collector current	single pulse; $t_p \leq 1\text{ ms}$	-	-	2	A
h_{FE}	DC current gain					
	BCX56	$V_{CE} = 2\text{ V}; I_C = 150\text{ mA}$	[1]	63	-	250
	BCX56-10		[1]	63	-	160
	BCX56-16		[1]	100	-	250

[1] pulsed; $t_p \leq 300\text{ }\mu\text{s}$; $\delta \leq 0.02$

5. Pinning information

Table 2. Pinning

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	E	emitter		 sym042
2	C	collector		
3	B	base		

6. Ordering information

Table 3. Ordering information

Type number	Package		Version
	Name	Description	
BCX56	SC-62	plastic, surface-mounted package; 3 leads; 1.5 mm pitch; 4.5 mm x 2.5 mm x 1.5 mm body	SOT89
BCX56-10			
BCX56-16			

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7. Limiting values

Table 4. Limiting values

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

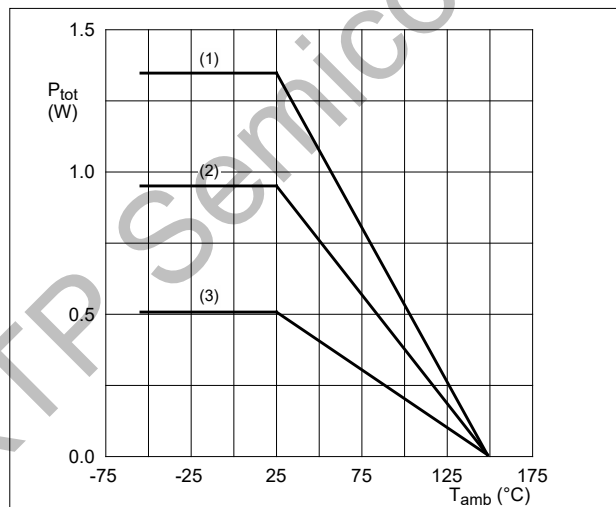
$T_{amb} = 25\text{ °C}$ unless otherwise specified.

Symbol	Parameter	Conditions	Min	Max	Unit
V_{CBO}	collector-base voltage	open emitter	-	100	V
V_{CEO}	collector-emitter voltage	open base	-	80	V
V_{EBO}	emitter-base voltage	open collector	-	5	V
I_C	collector current		-	1	A
I_{CM}	peak collector current	single pulse; $t_p \leq 1\text{ ms}$	-	2	A
I_B	base current		-	0.3	A
I_{BM}	peak base current	single pulse; $t_p \leq 1\text{ ms}$	-	0.3	A
P_{tot}	total power dissipation	$T_{amb} \leq 25\text{ °C}$	[1]	0.50	W
			[2]	0.95	W
			[3]	1.35	W
T_j	junction temperature		-	150	°C
T_{amb}	ambient temperature		-55	150	°C
T_{stg}	storage temperature		-65	150	°C

[1] Device mounted on an FR4 Printed-Circuit-Board (PCB); single-sided copper; tin-plated and standard footprint.

[2] Device mounted on an FR4 Printed-Circuit-Board (PCB); single-sided copper; tin-plated; mounting pad for collector 1 cm².

[3] Device mounted on an FR4 Printed-Circuit-Board (PCB); single-sided copper; tin-plated; mounting pad for collector 6 cm².



(1) FR4 PCB, mounting pad for collector 6 cm²

(2) FR4 PCB, mounting pad for collector 1 cm²

(3) FR4 PCB, standard footprint

Fig. 1. Power derating curves SOT89

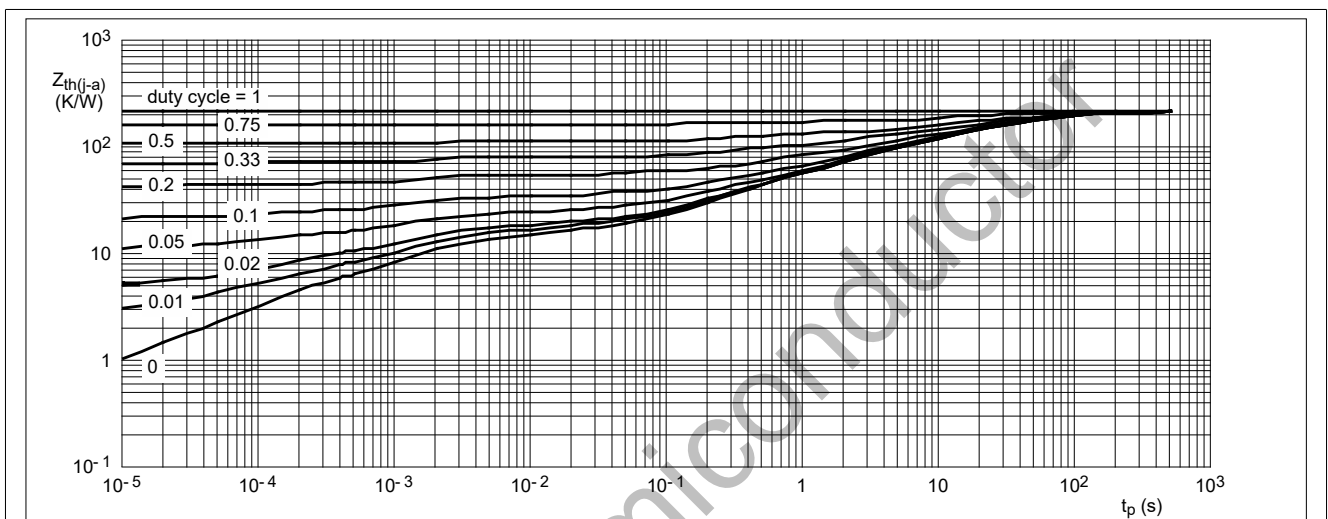
8. Thermal characteristics

Table 5. Thermal characteristics

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

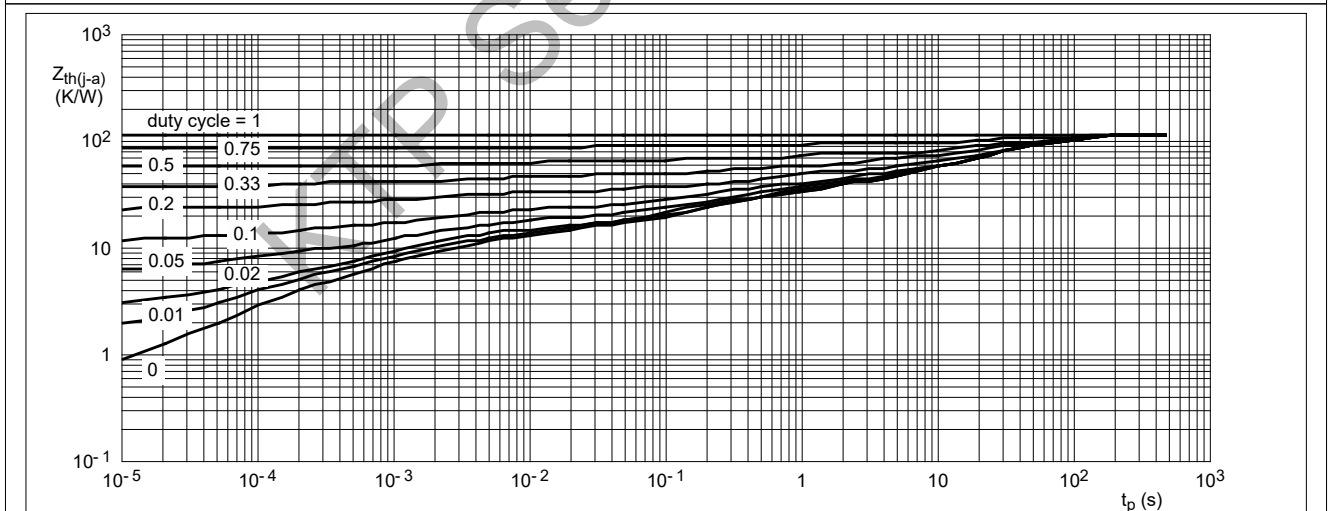
Symbol	Parameter	Conditions	Min	Typ	Max	Unit	
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1]	-	-	250	K/W
			[2]			132	K/W
			[3]			93	K/W
$R_{(j-sp)}$	thermal resistance from junction to solder point		-	-	16	K/W	

- [1] Device mounted on an FR4 PCB; single-sided copper; tin-plated and standard footprint.
- [2] Device mounted on an FR4 PCB; single-sided copper; tin-plated; mounting pad for collector 1 cm^2 .
- [3] Device mounted on an FR4 PCB; single-sided copper; tin-plated; mounting pad for collector 6 cm^2 .



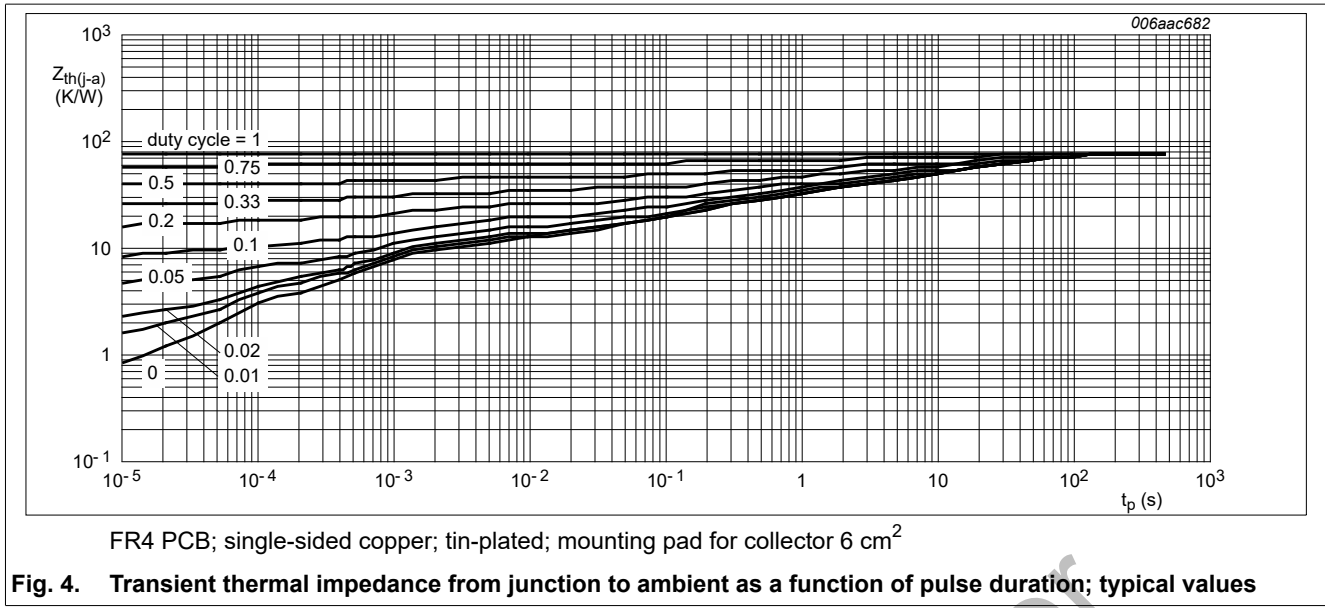
FR4 PCB; single-sided copper; tin-plated and standard footprint

Fig. 2. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values



FR4 PCB; single-sided copper; tin-plated; mounting pad for collector 1 cm^2

Fig. 3. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values



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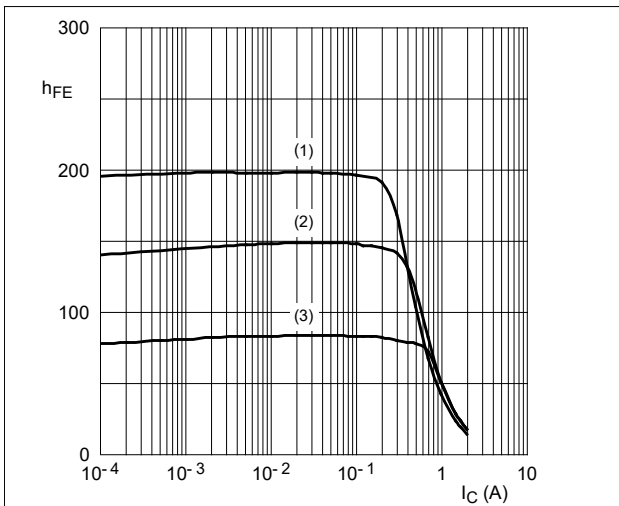
9. Characteristics

Table 6. Characteristics

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

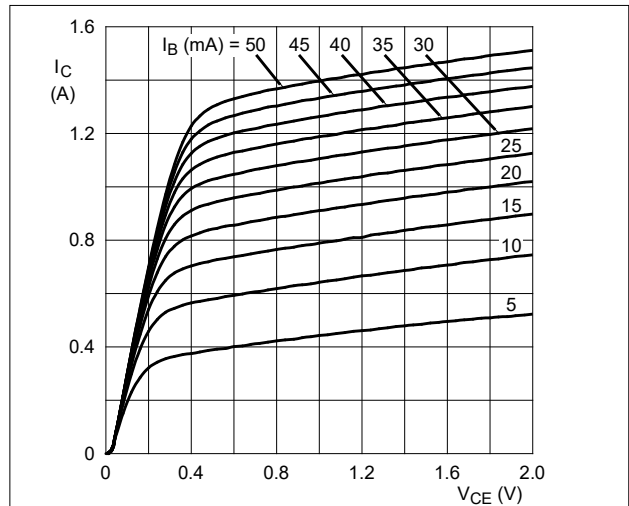
Symbol	Parameter	Conditions	Min	Typ	Max	Unit	
V _{(BR)CBO}	collector-base breakdown voltage	I _C = 100 μA; I _E = 0 A	100	-	-	V	
V _{(BR)CEO}	collector-emitter breakdown voltage	I _C = 2 mA; I _B = 0 A	80	-	-	V	
V _{(BR)EBO}	emitter-base breakdown voltage	I _E = 100 μA; I _C = 0 A	5	-	-	V	
I _{CBO}	collector-base cut-off current	V _{CB} = 30 V; I _E = 0 A	-	-	100	nA	
		V _{CB} = 30 V; I _E = 0 A; T _J = 150 °C	-	-	10	μA	
I _{EBO}	emitter-base cut-off current	V _{EB} = 5 V; I _C = 0 A	-	-	100	nA	
h _{FE}	DC current gain						
	BCX56	V _{CE} = 2 V; I _C = 5 mA	[1]	63	-	-	
		V _{CE} = 2 V; I _C = 150 mA		63	-	250	
		V _{CE} = 2 V; I _C = 500 mA		40	-	-	
	BCX56-10	V _{CE} = 2 V; I _C = 5 mA	[1]	63	-	-	
		V _{CE} = 2 V; I _C = 150 mA		63	-	160	
		V _{CE} = 2 V; I _C = 500 mA		40	-	-	
	BCX56-16	V _{CE} = 2 V; I _C = 5 mA	[1]	63	-	-	
		V _{CE} = 2 V; I _C = 150 mA		100	-	250	
V _{CE} = 2 V; I _C = 500 mA			40	-	-		
V _{CEsat}	collector-emitter saturation voltage	I _C = 500 mA; I _B = 50 mA	[1]	-	0.5	V	
V _{BE}	base-emitter voltage	V _{CE} = 2 V; I _C = 500 mA	[1]	-	1	V	
C _C	collector capacitance	V _{CB} = 10 V; I _E = I _e = 0 A; f = 1 MHz	-	6	-	pF	
f _T	transition frequency	V _{CE} = 5 V; I _C = 50 mA; f = 100 MHz	100	180	-	MHz	

[1] pulsed; t_p ≤ 300 μs; δ ≤ 0.02



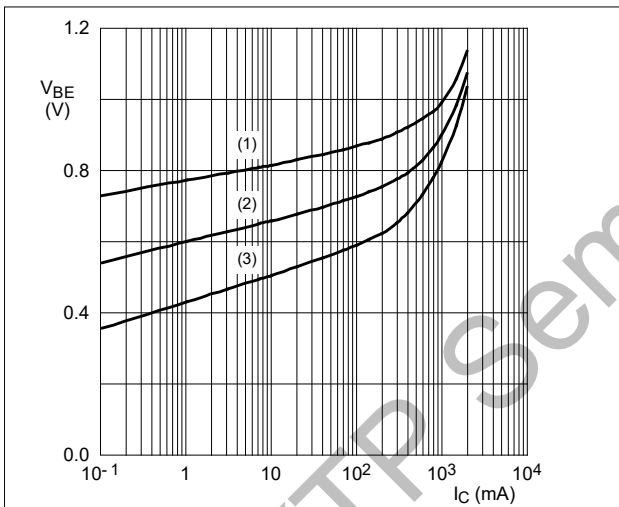
$V_{CE} = 2\text{ V}$
 (1) $T_{amb} = 100\text{ }^\circ\text{C}$
 (2) $T_{amb} = 25\text{ }^\circ\text{C}$
 (3) $T_{amb} = -55\text{ }^\circ\text{C}$

Fig. 5. DC current gain as a function of collector current; typical values



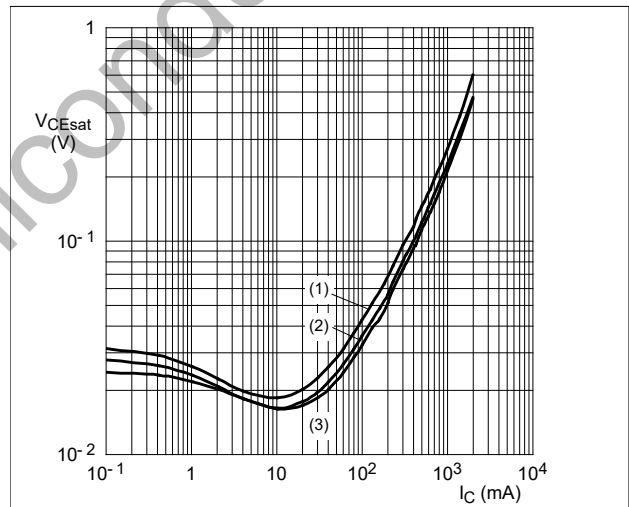
$T_{amb} = 25\text{ }^\circ\text{C}$

Fig. 6. Collector current as a function of collector-emitter voltage; typical values



$V_{CE} = 2\text{ V}$
 (1) $T_{amb} = -55\text{ }^\circ\text{C}$
 (2) $T_{amb} = 25\text{ }^\circ\text{C}$
 (3) $T_{amb} = 100\text{ }^\circ\text{C}$

Fig. 7. Base-emitter voltage as a function of collector current; typical values



$I_C/I_B = 10$
 (1) $T_{amb} = 100\text{ }^\circ\text{C}$
 (2) $T_{amb} = 25\text{ }^\circ\text{C}$
 (3) $T_{amb} = -55\text{ }^\circ\text{C}$

Fig. 8. Collector-emitter saturation voltage as a function of collector current; typical values

10. Package outline

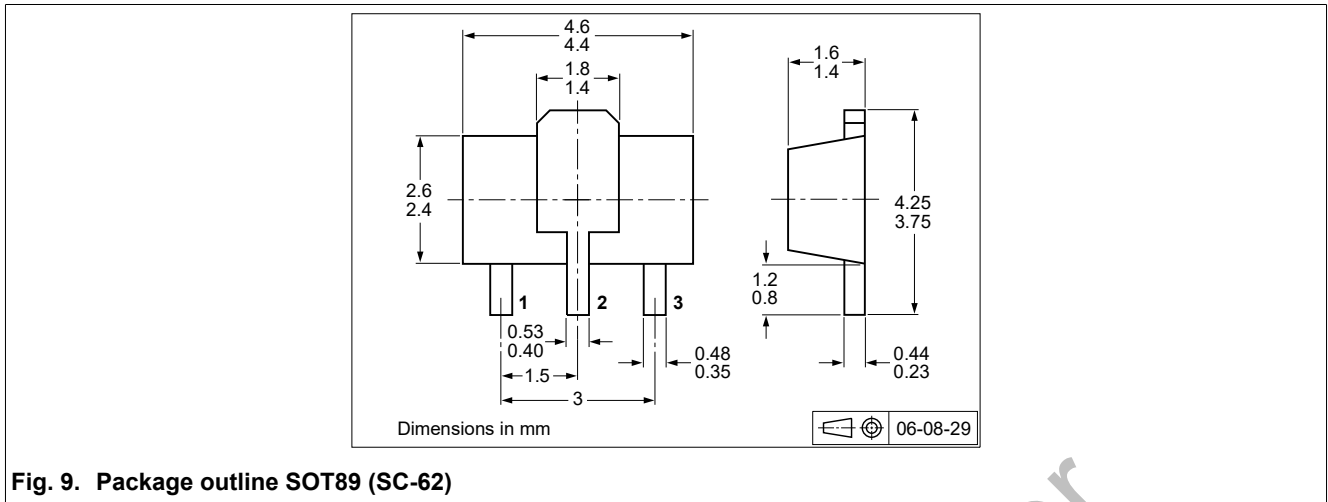


Fig. 9. Package outline SOT89 (SC-62)

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11. Soldering

