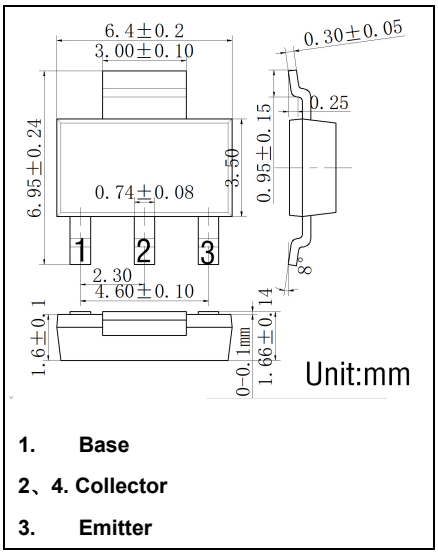
SOT-223 Plastic-Encapsulate Transistors

BCP68

NPN Medium Power Transistor; 20V, 2 A



1. Base
2、4. Collector
3. Emitter

Features

- High current
- Two current gain selections
- 1.35 W total power dissipation

Applications

- Linear voltage regulators
- Low side switches
- Supply line switch for negative voltages
- MOSFET drivers
- Audio pre-amplifiers

Maximum Ratings (T_a=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Value	Unit
V_{CBO}	Collector Base Voltage	open emitter	32	V
V_{CEO}	Collector Emitter Voltage	open base	20	V
V_{EBO}	Emitter Base Voltage	open collector	5	V
I_C	Collector Current (DC)		2	A
I_{CM}	Peak Collector Current		3	A
I_{BM}	Peak Base Current		400	mA
P_{tot}	Total Power Dissipation	T_{amb} ≤ 25 °C; notes 1	0.65	W
		T_{amb} ≤ 25 °C; notes 2	1	W
		T_{amb} ≤ 25 °C; notes 3	1.35	W
T_j	Junction Temperature		150	°C
T_{stg}	Storage Temperature		- 65 to +150	°C
T_{amb}	Operating Ambient Temperature		- 65 to +150	°C
$R_{th(j-a)}$	Thermal Resistance from Junction to Ambient	T_{amb} ≤ 25 °C; notes 2	192	K/W
		T_{amb} ≤ 25 °C; notes 3	125	K/W
		T_{amb} ≤ 25 °C; notes 3	93	K/W
$R_{th(j-s)}$	Thermal Resistance from Junction to Solder Point	T_{amb} ≤ 25 °C	16	K/W

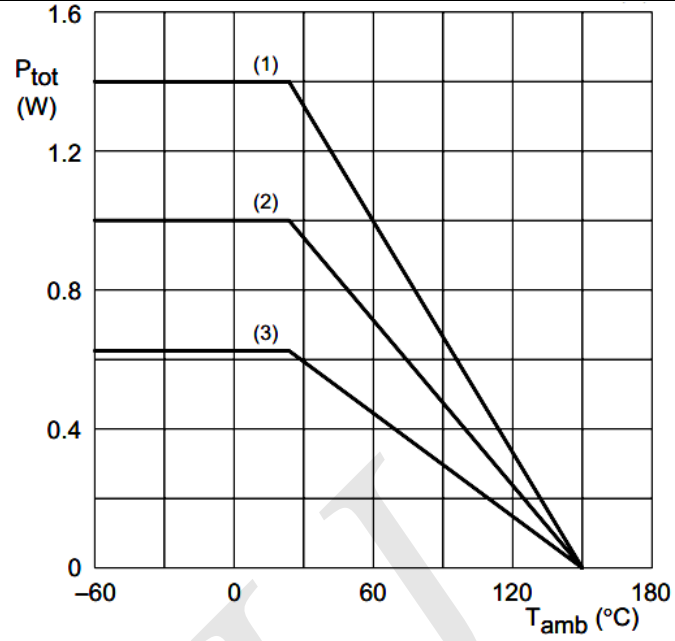
Notes

1. Device mounted on a FR4 printed-circuit board; single-sided copper; tinplated; standard footprint.
2. Device mounted on a FR4 printed-circuit board; single-sided copper; tinplated; 1 cm^2 collector mounting pad.
3. Device mounted on a FR4 printed-circuit board; single-sided copper; tinplated; 6 cm^2 collector mounting pad.

Electrical Characteristics (T_a=25°C unless otherwise specified)

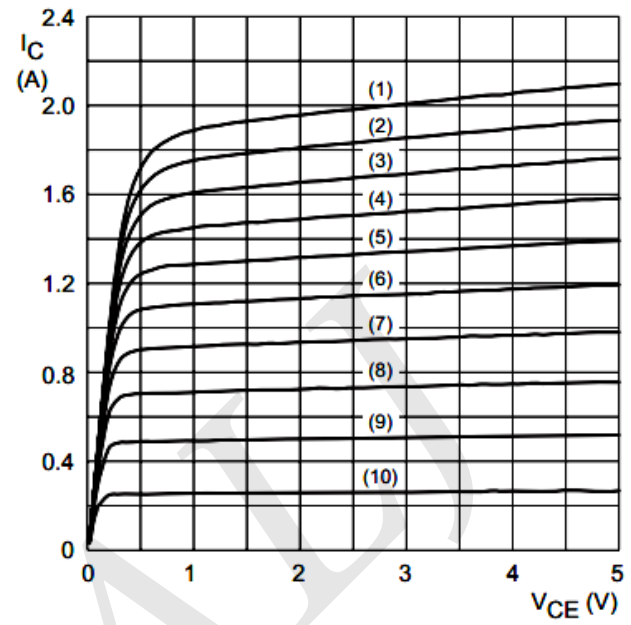
Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
$V_{(BR)CBO}$	Collector-base breakdown voltage	I_C = 0.1mA, I_E = 0A	32	-	-	V
$V_{(BR)CEO}$	Collector-emitter breakdown voltage	I_C = 1mA, I_B = 0A	20	-	-	V
$V_{(BR)EBO}$	Base-emitter breakdown voltage	I_E = 100μA, I_C = 0A	5	-	-	V
I_{CBO}	Collector cut-off current	V_{CB} = 25V, I_E = 0			0.1	μA
		V_{CB} = 25V, I_E = 0; T_j = 150 °C			10	μA
I_{EBO}	Emitter cut-off current	V_{EB} = 5V, I_C = 0			0.1	μA
h_{FE}	DC current gain	V_{CE} = 1V, I_C = 500mA	85		375	
		V_{CE} = 10V, I_C = 5mA	50			
		V_{CE} = 1V, I_C = 1A	60			
		V_{CE} = 1V, I_C = 2A	40			
$V_{CE(sat)}$	Collector-emitter saturation voltage	I_C = 1A, I_B = 100mA			0.5	V
		I_C = 2A, I_C = 200mA			0.6	V
V_{BE}	Base-emitter voltage	V_{CE} = 10V, I_C = 5mA			0.7	V
		V_{CE} = 1V, I_C = 1A			1	V
C_C	Collector capacitance	V_{CB} =10V; I_E=i_e = 0; f = 1 MHz		22		pF
f_T	Transition frequency	V_{CE}=5V, I_C=50mA, f=100MHz	40	170		MHz

Typical Characteristics



(1) 6 cm^2 collector mounting pad.
(2) 1 cm^2 collector mounting pad.
(3) Standard PCB footprint.

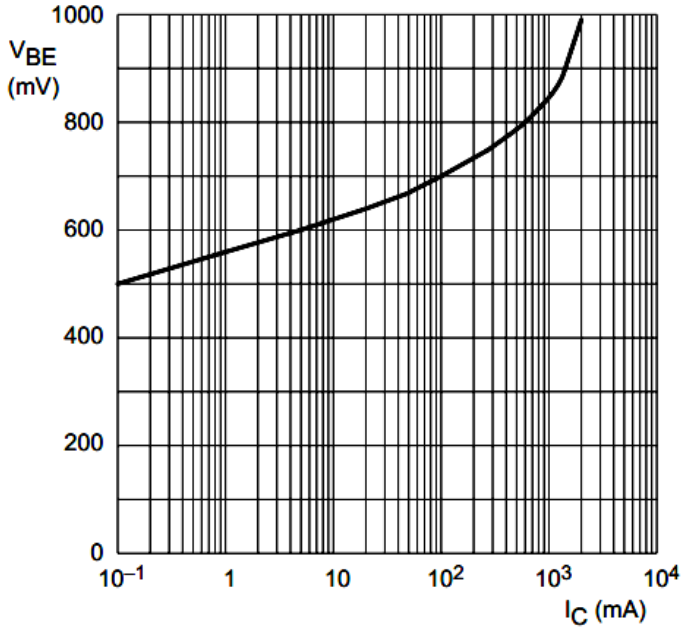
Fig.1 Power derating curve.



T_{amb} = 25 °C.

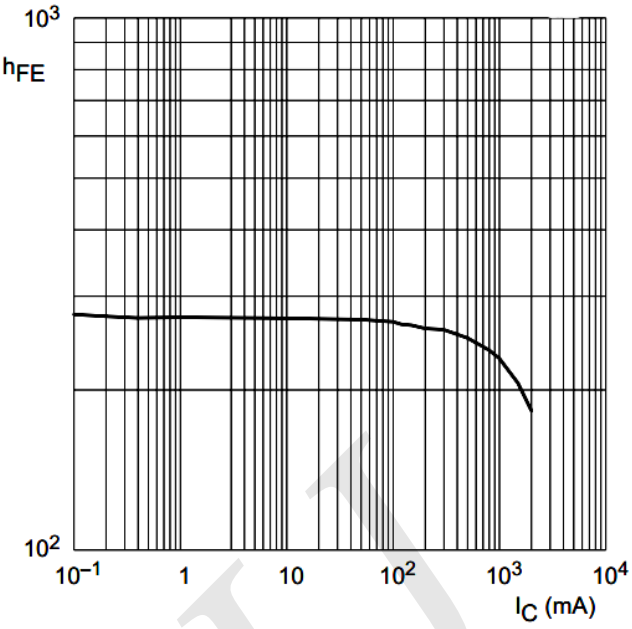
(1) I_B = 10 mA.
(2) I_B = 9 mA.
(3) I_B = 8 mA.
(4) I_B = 7 mA.
(5) I_B = 6 mA.
(6) I_B = 5 mA.
(7) I_B = 4 mA.
(8) I_B = 3 mA.
(9) I_B = 2 mA.
(10) I_B = 1 mA.

Fig.4 Collector current as a function of collector-emitter voltage; typical values.



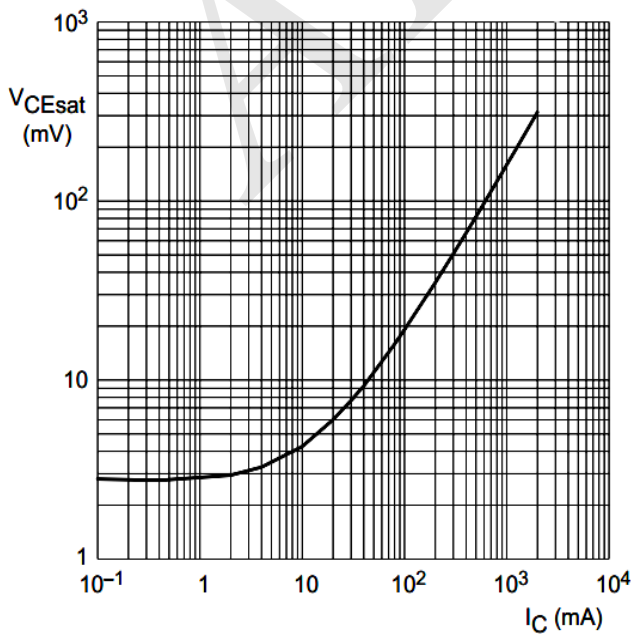
V_{BE}/V_{CE} = 1 V.

Fig.5 Base-emitter voltage as a function of collector current; typical values.



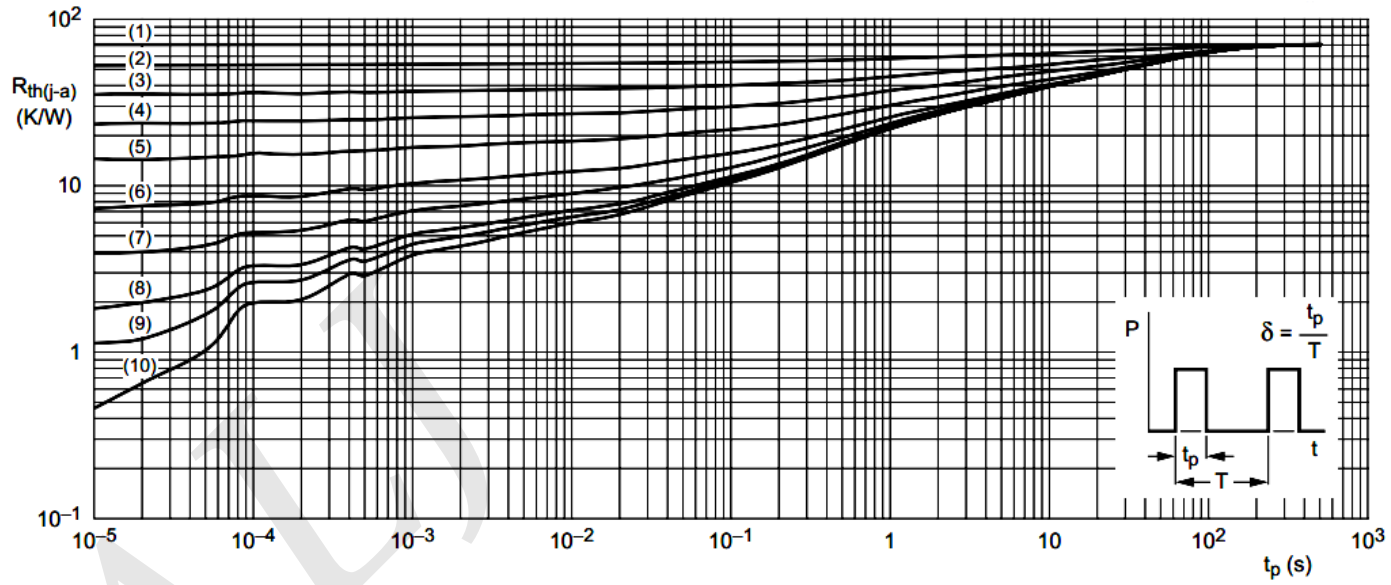
h_{FE}/V_{CE} = 1 V.

Fig.6 DC current gain as a function of collector current; typical values.



I_C/I_B = 10.

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



(1) δ = 1.0. (3) δ = 0.5. (5) δ = 0.2. (7) δ = 0.05. (9) δ = 0.01.
(2) δ = 0.75. (4) δ = 0.33. (6) δ = 0.1. (8) δ = 0.02. (10) δ = 0.0.

Fig.8 Transient thermal resistance from junction to ambient as a function of pulse time for 6 cm^2 collector mounting pad.