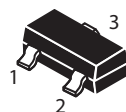
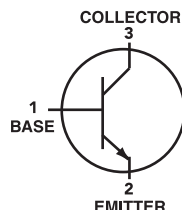


NPN General Purpose Transistors

 Lead(Pb)-Free



SOT-23

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CEO}	50	Vdc
Collector-Base Voltage	V_{CBO}	60	Vdc
Emitter-Base Voltage	V_{EBO}	7.0	Vdc
Collector Current-Continuous	I_C	150	mAdc

THERMAL CHARACTERISTICS

Characteristics	Symbol	Max	Unit
Total Device Dissipation FR-5 Board (1) TA=25 °C	P_D	200	mW
Derate above 25 °C		1.6	mW/°C
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	625	°C/W
Junction and Storage, Temperature	T_J, T_{stg}	-55 to +150	°C

ELECTRICAL CHARACTERISTICS

Characteristics	Symbol	Min	Max	Unit
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OFF CHARACTERISTICS

Collector-Emitter Breakdown Voltage ($I_C = 1.0 \text{ mAdc}, I_B = 0$)	$V_{(BR)CEO}$	50	-	Vdc
Collector-Base Breakdown Voltage ($I_C = 50 \text{ } \mu\text{Adc}, I_E = 0$)	$V_{(BR)CBO}$	60	-	Vdc
Emitter-Base Breakdown Voltage ($I_E = 50 \text{ } \mu\text{Adc}, I_C = 0$)	$V_{(BR)EBO}$	7.0	-	Vdc
Collector Cutoff Current ($V_{CE} = 50 \text{ Vdc}, I_E = 0$)	I_{CEO}	-	0.1	μAdc
Collector Cutoff Current ($V_{CB} = 60 \text{ Vdc}, I_E = 0$)	I_{CBO}	-	0.1	μAdc
Emitter Cutoff Current ($V_{EB} = 7.0 \text{ Vdc}, I_C = 0$)	I_{EBO}	-	0.1	μAdc

1.FR-5=1.0 x 0.75 x 0.062 in

ELECTRICAL CHARACTERISTICS ($T_A=25^{\circ}\text{C}$ unless otherwise noted) (Continued)

Characteristics	Symbol	Min	Typ	Max	Unit
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ON CHARACTERISTICS

DC Current Gain ($I_C = 1\text{ mA}$, $V_{CE} = 6.0\text{ Vdc}$)	h_{FE}	120	-	560	-
Collector-Emitter Saturation Voltage ($I_C = 50\text{ mA}$, $I_B = 5\text{ mA}$)	$V_{CE(sat)}$	-	-	0.4	Vdc
Output Capacitance $V_{CE} = 12\text{ Vdc}$, $I_E = 0\text{ A}$, $f = 1\text{ MHz}$	C_{ob}	-	2.0	3.5	PF
Current-Gain-Bandwidth Product ($I_E = 2\text{ mA}$, $V_{CE} = 12\text{ Vdc}$, $f = 100\text{ MHz}$)	f_T	-	180	-	MHz

CLASSIFICATION OF h_{FE}

Rank	Q	R	S
Range	120-270	180-390	270-560
Marking	BQ	BR	G1F

Fig.1 Grounded emitter propagation characteristics

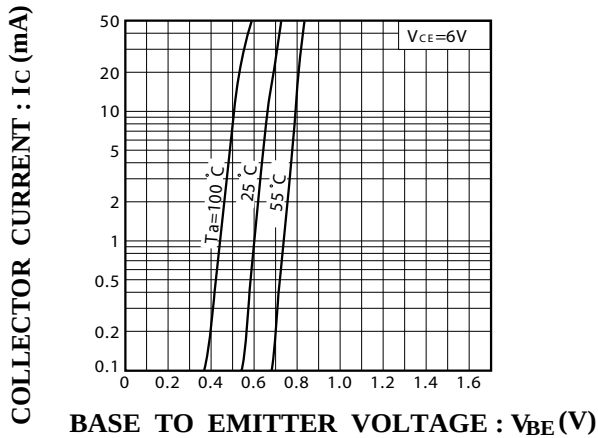


Fig.2 Grounded emitter output characteristics (1)

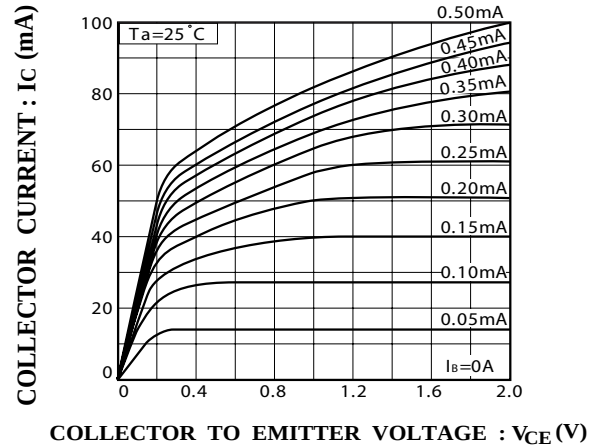


Fig.3 Grounded emitter output characteristics (11)

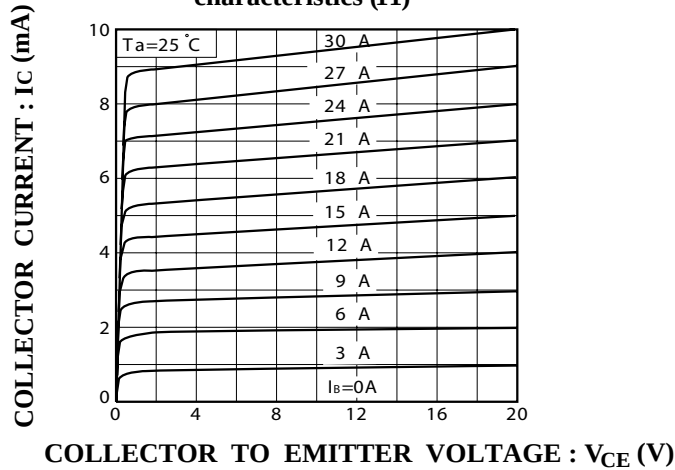


Fig.4 DC current gain vs. collector current (1)

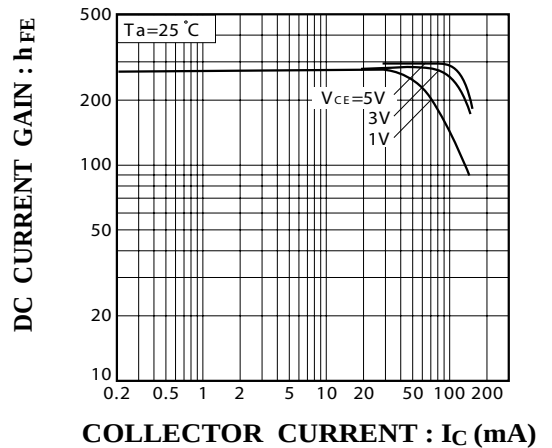


Fig.5 DC current gain vs. collector current (11)

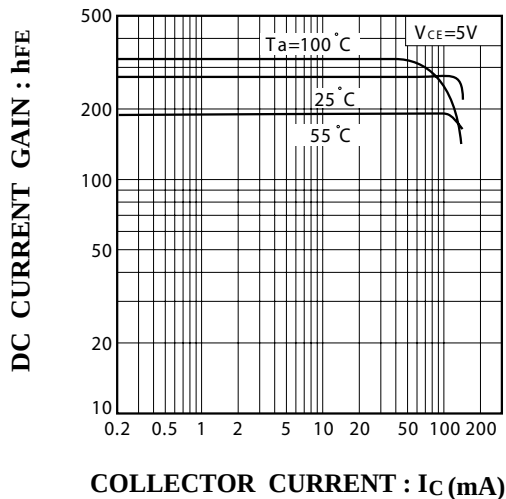
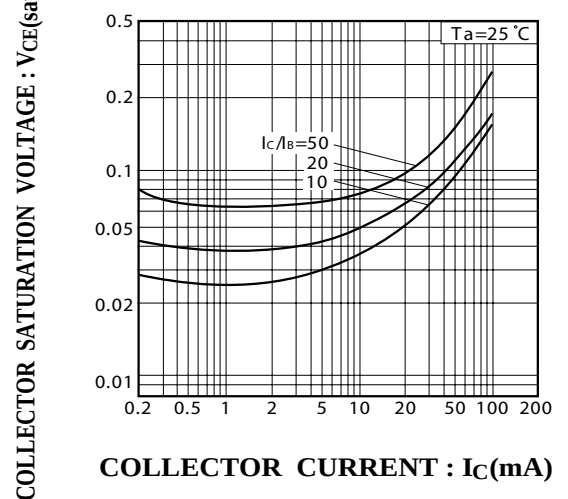
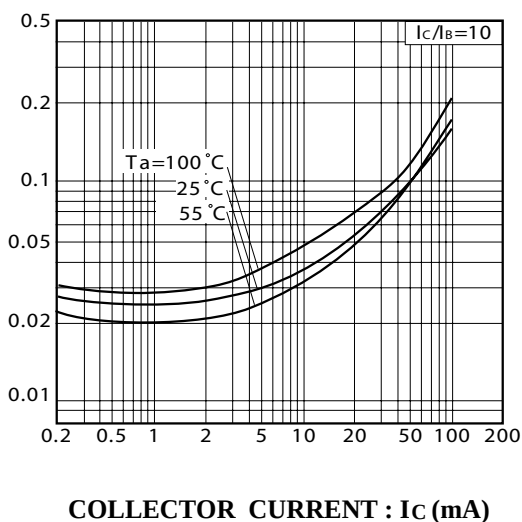


Fig. 6 Collector-emitter saturation voltage vs. collector current



COLLECTOR SATURATION VOLTAGE : $V_{CE(sat)}$ (V)

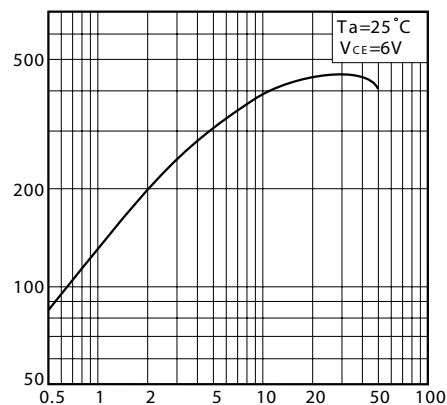
Fig.7 Collector-emitter saturation voltage vs. collector current (1)



COLLECTOR CURRENT : I_C (mA)

TRANSITION FREQUENCY : f_T (MHz)

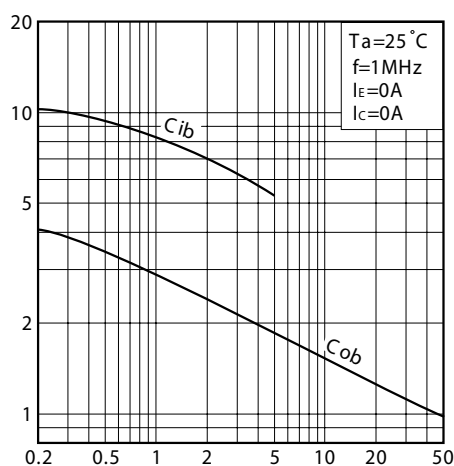
Fig.8 Gain bandwidth product vs. emitter current



EMITTER CURRENT : I_E (mA)

**Fig.9 Collector output capacitance vs. collector-base voltage
Emitter input capacitance vs. emitter-base voltage**

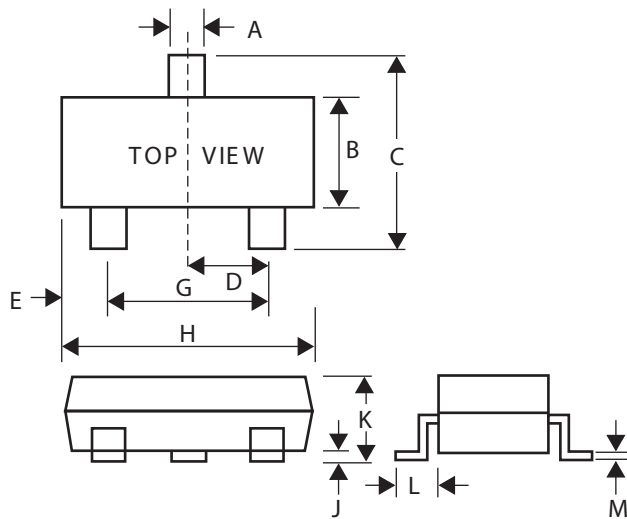
COLLECTOR OUTPUT CAPACITANCE : C_{ob} (pF)
EMITTER INPUT CAPACITANCE : C_{ib} (pF)



COLLECTOR TO BASE VOLTAGE : V_{CB} (V)
EMITTER TO BASE VOLTAGE : V_{EB} (V)

SOT-23 Package Outline Dimensions

Unit:mm



Dim	Min	Max
A	0.35	0.51
B	1.19	1.40
C	2.10	3.00
D	0.85	1.05
E	0.46	1.00
G	1.70	2.10
H	2.70	3.10
J	0.01	0.13
K	0.89	1.10
L	0.30	0.61
M	0.076	0.25