

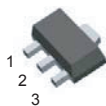
RoHS Compliant Product

A suffix of "-C" specifies halogen & lead-free

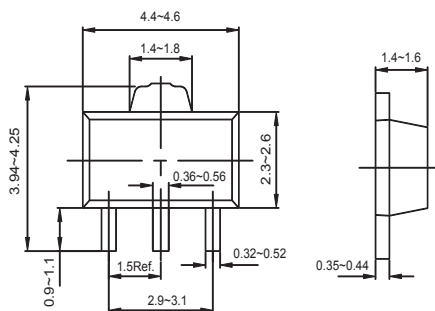
SOT-89

Features

- * Excellent Current-to-Gain Characteristics
- * Low Collector Saturation Voltage, Typically $V_{CE(SAT)}=0.5V(\text{Max.})$ for $I_C/I_B=2A/0.1A$



- 1.BASE
- 2.COLLECTOR
- 3.EMITTER



Dimension in Millimeter

Marking: CFQ, CFR, CFS

Absolute Maximum Ratings at $T_A=25^\circ\text{C}$

Symbol	Parameter	Value	Units
V_{CBO}	Collector-Base Voltage	40	V
V_{CEO}	Collector-Emitter Voltage	20	V
V_{EBO}	Emitter-Base Voltage	6	V
I_C	Collector Current	3	A
P_D	Total Power Dissipation	500	mW
T_J, T_{stg}	Junction and Storage Temperature	-55~+150	$^\circ\text{C}$

*These rating are limiting vaules above which the serviceability of any semiconductor device may be impaired.

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

Parameter	Symbol	Min	Typ.	Max	Unit	Test Conditions
Collector-Base Breakdown Voltage	BV_{CBO}	40	-	-	V	$I_C=50\mu A, I_E=0$
Collector-Emitter Breakdown Voltage	BV_{CEO}	20	-	-	V	$I_C=1\text{ mA}, I_B=0$
Emitter-Base Breakdown Voltage	BV_{EBO}	6	-	-	V	$I_E=50\mu A, I_C=0$
Collector-Base Cutoff Current	I_{CBO}	-	-	0.1	μA	$V_{CB}=30V, I_E=0$
Emitter-Base Cutoff Current	I_{EBO}	-	-	0.1	μA	$V_{EB}=5V, I_C=0$
Collector Saturation Voltage	* $V_{CE(sat)}$	-	-	0.5	V	$I_C=2A, I_B=100\text{ mA}$
DC Current Gain	* h_{FE}	120	-	560		$V_{CE}=2V, I_C=100\text{ mA}$
Gain-Bandwidth Product	* f_T	-	290	-	MHz	$V_{CE}=2V, I_C=500\text{ mA}, f=100\text{ MHz}$
Output Capacitance	C_{ob}	-	25	-	pF	$V_{CB}=10V, f=1\text{ MHz}, I_E=0$

*Pulse test: t_p 300 μS , 0.02.

CLASSIFICATION OF h_{FE}

Rank	Q	R	S
Range	120~270	180~390	270~560

Characteristics Curve

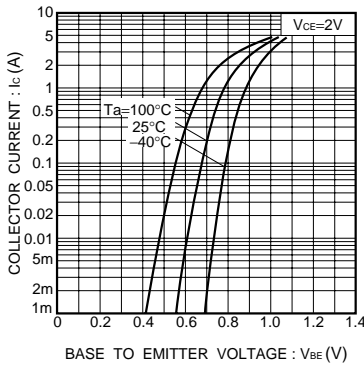


Fig.1 Grounded emitter propagation characteristics

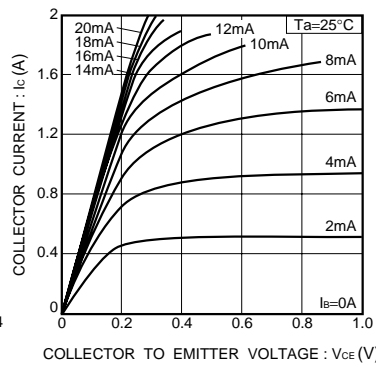


Fig.2 Grounded emitter output characteristics (I)

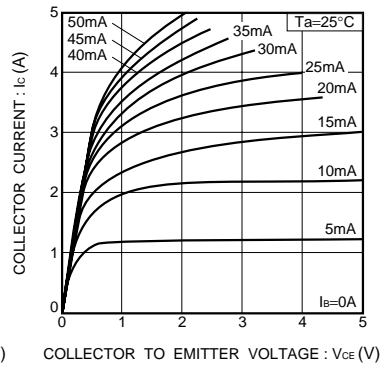


Fig.3 Grounded emitter output characteristics (II)

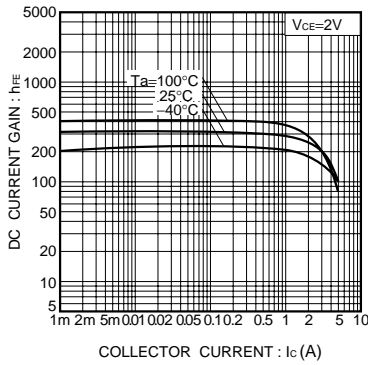


Fig.4 DC current gain vs. collector current

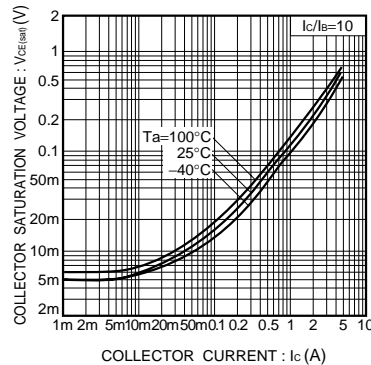


Fig.5 Collector-emitter saturation voltage vs. collector current (I)

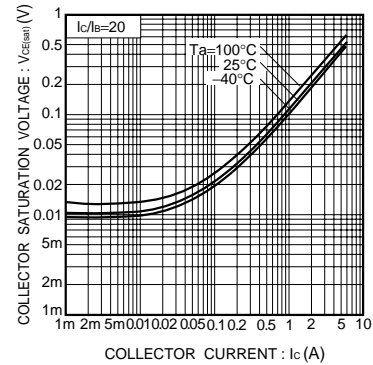


Fig.6 Collector-emitter saturation voltage vs. collector current (II)

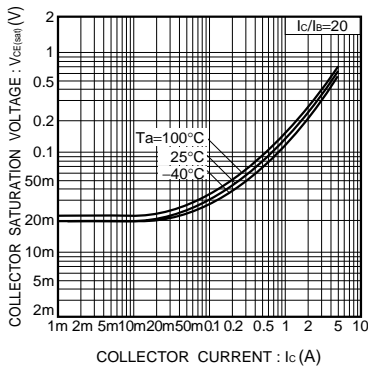


Fig.7 Collector-emitter saturation voltage vs. collector current (III)

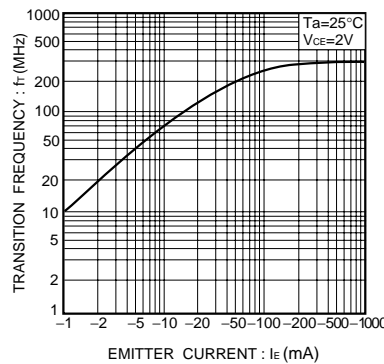


Fig.8 Gain bandwidth product vs. emitter current

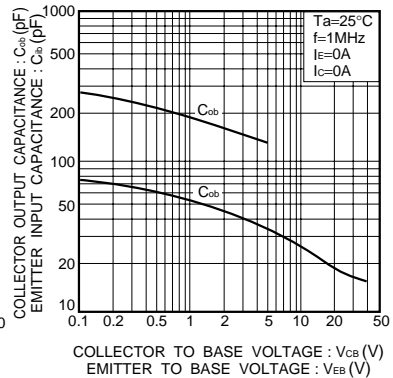


Fig.9 Collector output capacitance vs. collector-base voltage
Emitter input capacitance vs. emitter-base voltage