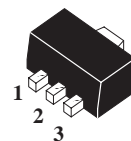


NPN Epitaxial Planar Transistors
(Pb) Lead(Pb)-Free

Features:

 * Low $V_{CE(sat)}$, $V_{CE(sat)}=0.15V$ (typical).($I_C/I_B=500mA/50mA$)

 1. BASE
 2. COLLECTOR
 3. EMITTER

SOT-89
ABSOLUTE MAXIMUM RATINGS ($T_A=25^{\circ}C$)

Rating	Symbol	Limits	Unit
Collector-Base Voltage	V_{CBO}	40	V
Collector-Emitter Voltage	V_{CEO}	32	V
Emitter-Base Voltage	V_{EBO}	5.0	V
Collector Current	I_C	1.0	A
Collector Power Dissipation	P_D	0.5	W
Junction Temperature	T_j	-55 to +150	$^{\circ}C$
Storage Temperature Range	T_{stg}	-55 to +150	$^{\circ}C$

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

Parameter	Symbol	Min	Typ	Max	Unit
Collector-Base Breakdown Voltage $I_C=50\mu A, I_E=0$	BV_{CBO}	40	-	-	V
Collector-Emitter Breakdown Voltage $I_C=1mA, I_B=0$	BV_{CEO}	32	-	-	V
Emitter-Base Breakdown Voltage $I_E=50\mu A, I_C=0$	BV_{EBO}	5	-	-	V
Collector Cutoff Current $V_{CB}=20V, I_E=0$	I_{CBO}	-	-	0.5	μA
Collector Cutoff Current $V_{EB}=4V, I_C=0$	I_{EBO}	-	-	0.5	μA

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

Characteristic	Symbol	Min	Typ	Max	Unit
----------------	--------	-----	-----	-----	------

ON CHARACTERISTICS

DC Current Gain $V_{CE}=3\text{V}, I_C=100\text{mA}$	h_{FE}	82	-	390	-
Collector-Emitter Saturation Voltage $I_C=0.5\text{A}, I_B=50\text{mA}$	$V_{CE(sat)}$	-	-	0.4	V

DYNAMIC CHARACTERISTICS

Transition Frequency $V_{CE}=5\text{V}, I_C=50\text{mA}, f=100\text{MHz}$	f_T	-	150	-	MHz
Output Capacitance $V_{CB}=10\text{V}, I_E=0, f=1\text{MHz}$	C_{ob}	-	15	-	pF

CLASSIFICATION OF h_{FE}

Rank	P	Q	R
Range	82-180	120-270	180-390
Marking	DAP	DAQ	DAR

Typical Characteristics

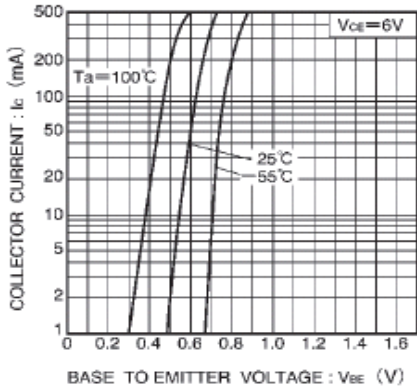


Fig.1 Grounded emitter propagation characteristics

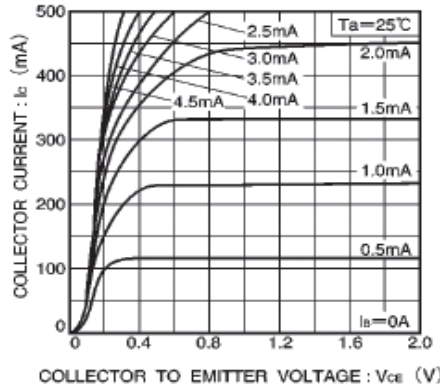


Fig.2 Grounded emitter output characteristics

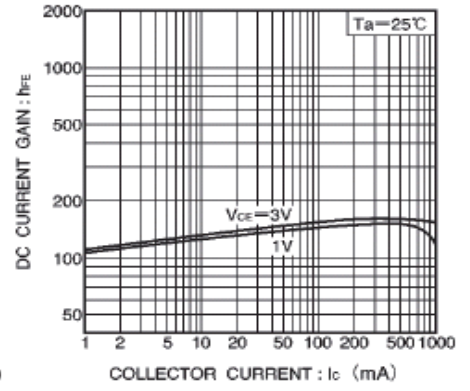


Fig.3 DC current gain vs. collector current (I)

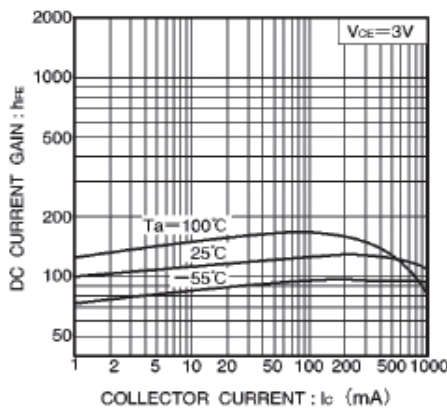


Fig.4 DC current gain vs. collector current (II)

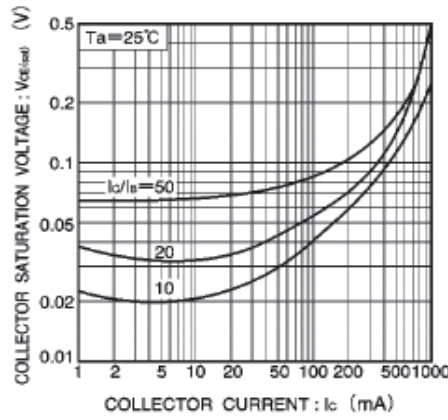


Fig.5 Collector-emitter saturation voltage vs. collector current (I)

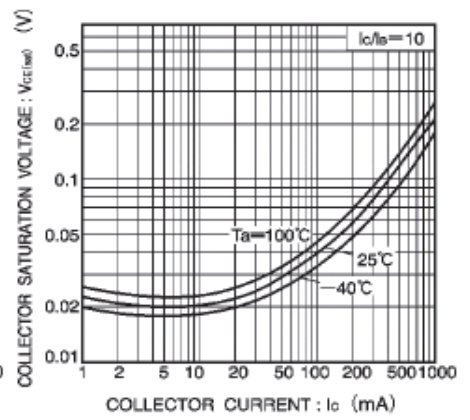


Fig.6 Collector-emitter saturation voltage vs. collector current (II)

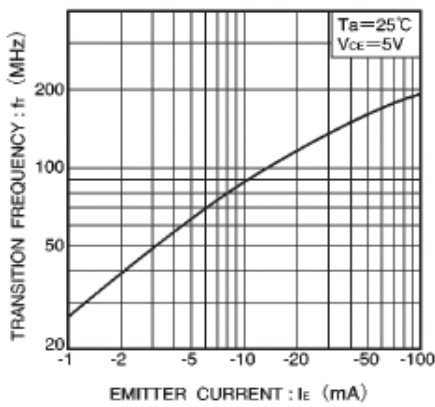


Fig.7 Gain bandwidth product vs. emitter current

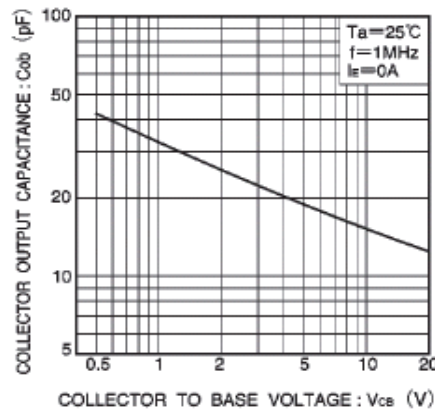


Fig.8 Collector output capacitance vs. collector-base voltage

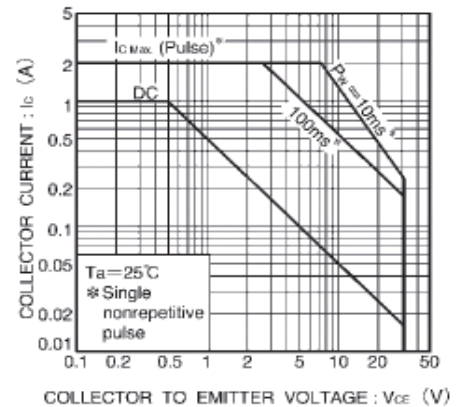


Fig.9 Safe operating area (2SD1664)

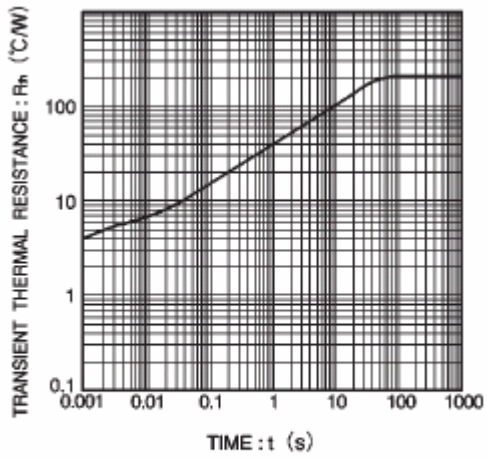
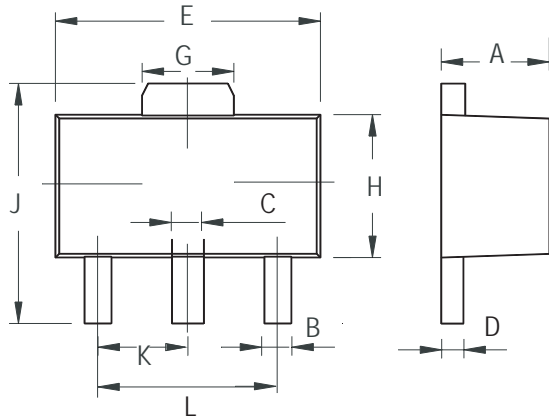


Fig.10 Transient thermal resistance (2SD1664)

SOT-89 Outline Dimensions

unit:mm



SOT-89		
Dim	Min	Max
A	1.400	1.600
B	0.320	0.520
C	0.360	0.560
D	0.350	0.440
E	4.400	4.600
G	1.400	1.800
H	2.300	2.600
J	3.940	4.250
K	1.500 TYP	
L	2.900	3.100