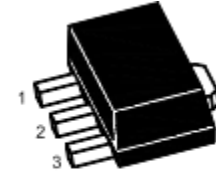


## NPN SILICON EPITAXIAL MEDIUM POWER TRANSISTOR

### CLASSIFICATION OF hFE

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



1.Base 2.Collector 3.Emitter  
SOT-89 Plastic Package

### Absolute Maximum Ratings (T<sub>a</sub> = 25 °C)

Parameter	Symbol	Value	Unit
Collector Base Voltage	V <sub>CB0</sub>	40	V
Collector Emitter Voltage	V <sub>CEO</sub>	32	V
Emitter Base Voltage	V <sub>EBO</sub>	5	V
Collector Current - DC	I <sub>C</sub>	1	A
Collector Current - Pulse <sup>1)</sup>	I <sub>CP</sub>	2	A
Total Power Dissipation	P <sub>tot</sub>	0.5 2 <sup>2)</sup>	W
Junction Temperature	T <sub>J</sub>	150	°C
Storage Temperature Range	T <sub>Stg</sub>	- 55 to + 150	°C

<sup>1)</sup> Single pulse, PW = 100 ms.

<sup>2)</sup> When mounted on a 40 X 40 X 0.7 mm ceramic board.

### Characteristics at T<sub>a</sub> = 25 °C

Parameter	Symbol	Min.	Typ.	Max.	Unit
DC Current Gain at V <sub>CE</sub> = 3 V, I <sub>C</sub> = 100 mA    Current Gain Group	P    h <sub>FE</sub>	82	-	180	-
	Q    h <sub>FE</sub>	120	-	270	-
	R    h <sub>FE</sub>	180	-	390	-
Collector Base Breakdown Voltage at I <sub>C</sub> = 50 μA	V <sub>(BR)CBO</sub>	40	-	-	V
Collector Emitter Breakdown Voltage at I <sub>C</sub> = 1 mA	V <sub>(BR)CEO</sub>	32	-	-	V
Emitter Base Breakdown Voltage at I <sub>E</sub> = 50 μA	V <sub>(BR)EBO</sub>	5	-	-	V
Collector Cutoff Current at V <sub>CB</sub> = 20 V	I <sub>CBO</sub>	-	-	0.5	μA
Emitter Cutoff Current at V <sub>EB</sub> = 4 V	I <sub>EBO</sub>	-	-	0.5	μA
Collector Emitter Saturation Voltage at I <sub>C</sub> = 500 mA, I <sub>B</sub> = 50 mA	V <sub>CE(sat)</sub>	-	-	0.4	V
Transition Frequency at -I <sub>E</sub> = 50 mA, V <sub>CE</sub> = 5 V, f = 100 MHz	f <sub>T</sub>	-	150	-	MHz
Output Capacitance at V <sub>CB</sub> = 10 V, f = 1 MHz	C <sub>ob</sub>	-	15	-	pF

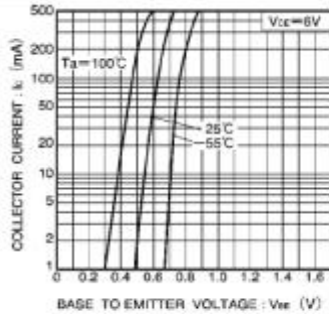


Fig.1 Grounded emitter propagation characteristics

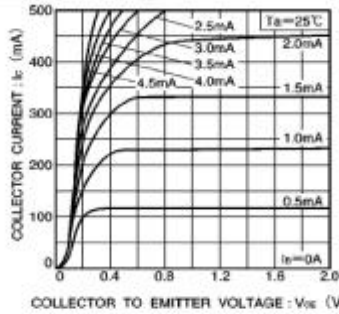


Fig.2 Grounded emitter output characteristics

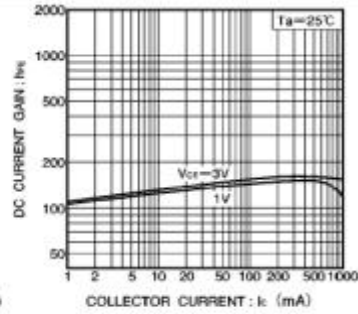


Fig.3 DC current gain vs. collector current ( I )

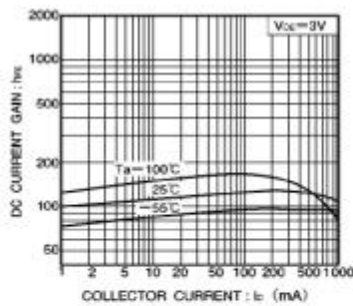


Fig.4 DC current gain vs. collector current ( II )

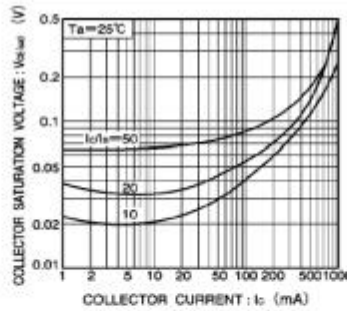


Fig.5 Collector-emitter saturation voltage vs. collector current ( I )

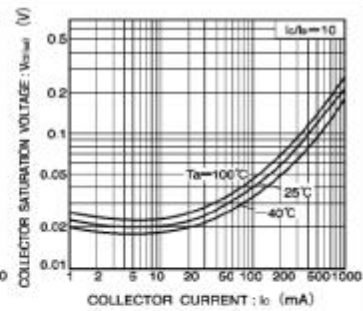


Fig.6 Collector-emitter saturation voltage vs. collector current ( II )

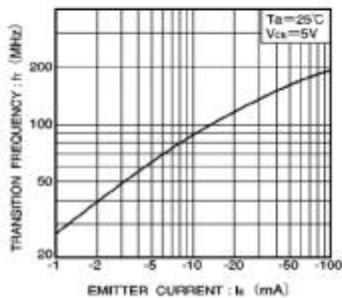


Fig.7 Gain bandwidth product vs. emitter current

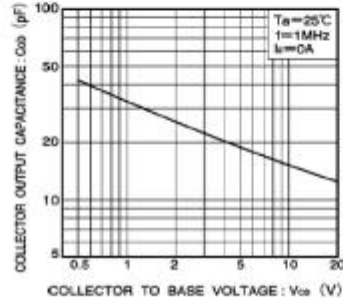


Fig.8 Collector output capacitance vs. collector-base voltage

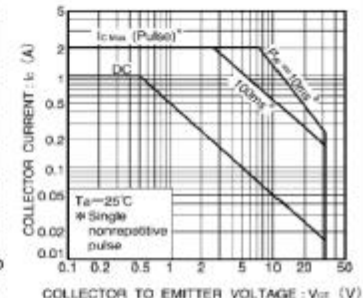


Fig.9 Safe operating area (2SD1664)

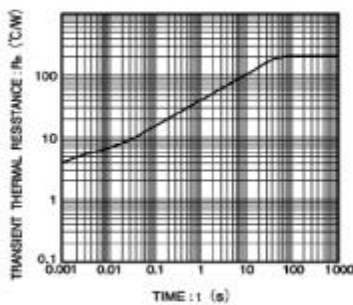
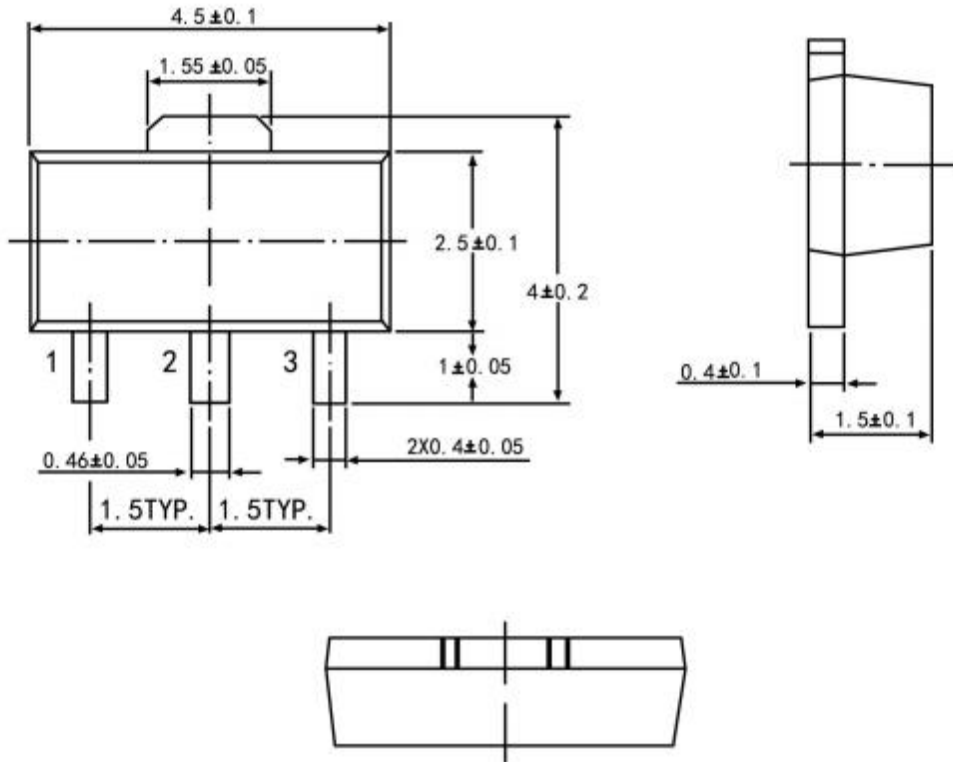


Fig.10 Transient thermal resistance (2SD1664)

### SOT-89 PACKAGE OUTLINE



Symbol	Dimension in Millimeters	
	Min	Max
A	1.40	1.60
B	0.44	0.62
B1	0.35	0.54
C	0.35	0.44
D	4.40	4.60
D1	1.62	1.83
E	2.29	2.60
e	1.50 Typ	
H	3.94	4.25
H1	2.63	2.93
L	0.89	1.20

All Dimensions In mm