

## HIGH-POWER PNP SILICON POWER TRANSISTORS

...designed for use in general-purpose amplifier and switching application .

### FEATURES:

- \* Recommend for 45 - 50W Audio Frequency Amplifier Output stage.
- \* Complementary to 2SD718

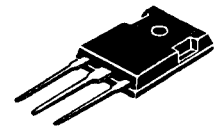
**PNP  
2SB688**

**8 AMPERE  
POWER  
TRANSISTOR**

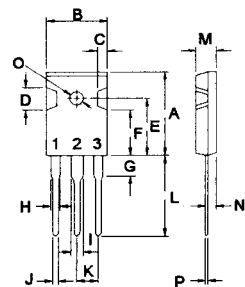
**120 VOLTS  
80 WATTS**

### MAXIMUM RATINGS

Characteristic	Symbol	2SB688	Unit
Collector-Emitter Voltage	$V_{CEO}$	120	V
Collector-Base Voltage	$V_{CBO}$	120	V
Emitter-Base Voltage	$V_{EBO}$	5.0	V
Collector Current - Continuous	$I_C$	8.0	A
- Peak	$I_{CM}$	16	
Base current	$I_B$	0.8	A
Total Power Dissipation @ $T_c = 25^\circ C$ Derate above $25^\circ C$	$P_D$	80 0.64	W W/ $^\circ C$
Operating and Storage Junction Temperature Range	$T_J, T_{STG}$	-55 to +150	$^\circ C$



**TO-247(3P)**

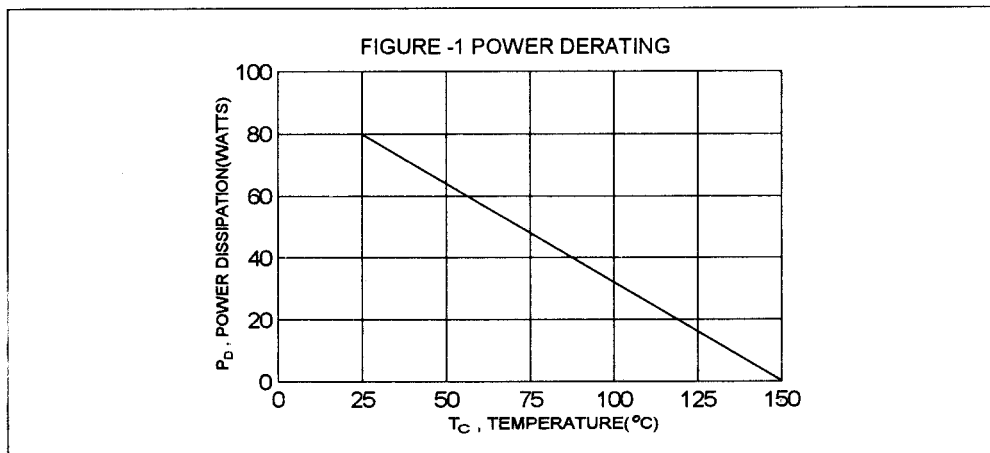


PIN 1.BASE  
2.COLLECTOR  
3.EMITTER

### THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance Junction to Case	$R^{\theta}_{jc}$	1.56	$^\circ C/W$

DIM	MILLIMETERS	
	MIN	MAX
A	20.63	22.38
B	15.38	16.20
C	1.90	2.70
D	5.10	6.10
E	14.81	15.22
F	11.72	12.84
G	4.20	4.50
H	1.82	2.46
I	2.92	3.23
J	0.89	1.53
K	5.26	5.66
L	18.50	21.50
M	4.68	5.36
N	2.40	2.80
O	3.25	3.65
P	0.55	0.70



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

Characteristic	Symbol	Min	Max	Unit
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## OFF CHARACTERISTICS

Collector-Emitter Breakdown Voltage ( $I_C = 50\text{ mA}$ , $I_B = 0$ )	$V_{(BR)CEO}$	120		V
Collector Cutoff Current ( $V_{CB} = 120\text{ V}$ , $I_E = 0$ )	$I_{CBO}$		10	$\mu\text{A}$
Emitter Cutoff Current ( $V_{EB} = 5.0\text{ V}$ , $I_C = 0$ )	$I_{EBO}$		10	$\mu\text{A}$

## ON CHARACTERISTICS (1)

DC Current Gain ( $I_C = 1.0\text{ A}$ , $V_{CE} = 5.0\text{ V}$ ) *	$h_{FE(2)}$	55	160	
Collector-Emitter Saturation Voltage ( $I_C = 5.0\text{ A}$ , $I_B = 0.5\text{ A}$ )	$V_{CE(sat)}$		2.5	V
Base-Emitter On Voltage ( $I_C = 5.0\text{ A}$ , $V_{CE} = 5.0\text{ V}$ )	$V_{BE(on)}$		1.5	V

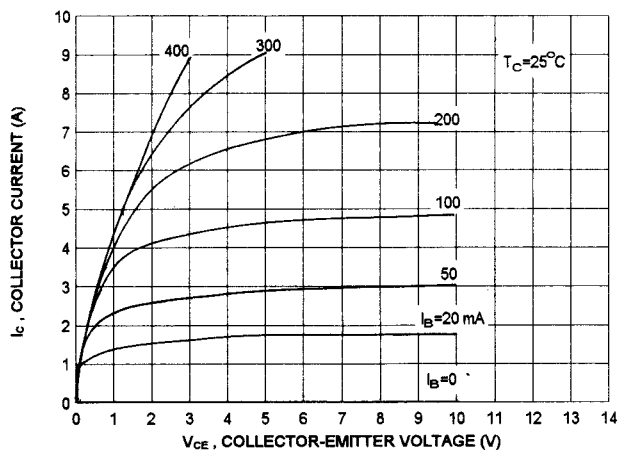
## DYNAMIC CHARACTERISTICS

Current-Gain-Bandwidth Product ( $I_C = 1.0\text{ A}$ , $V_{CE} = 5.0\text{ V}$ , $f = 1.0\text{ MHz}$ )	$f_T$	10(typ)		MHz
Output capacitance ( $V_{CB} = 10\text{ V}$ , $I_E = 0$ , $f = 1.0\text{ MHz}$ )	$C_{Ob}$	280(typ)		pF

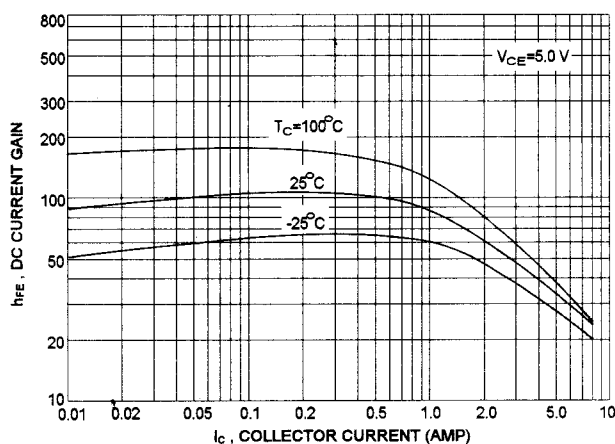
(1) Pulse Test: Pulse Width = 300  $\mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ \*  $h_{FE(2)}$  Classification :

55	R	110	80	O	160
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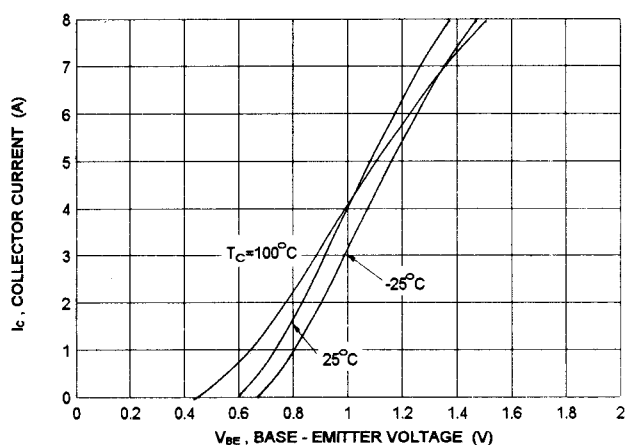
$I_c - V_{ce}$



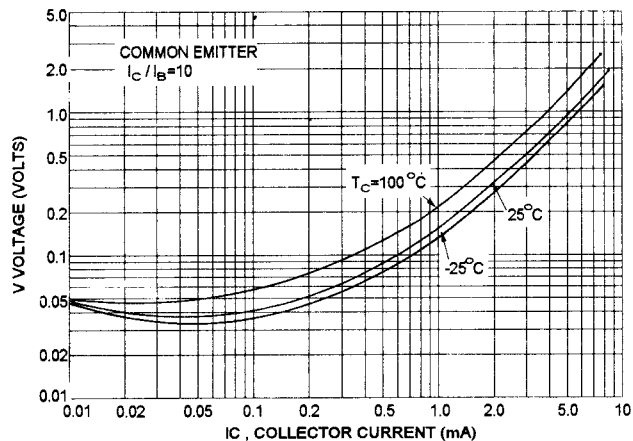
DC CURRENT GAIN



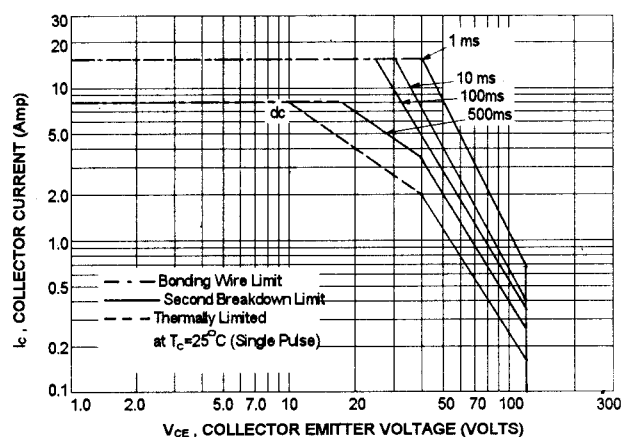
$I_c - V_{be}$



$V_{ce(sat)} - I_c$



ACTIVE-REGION SAFE OPERATING AREA (SOA)



There are two limitation on the power handling ability of a transistor: average junction temperature and second breakdown safe operating area curves indicate  $I_c - V_{ce}$  limits of the transistor that must be observed for reliable operation i.e., the transistor must not be subjected to greater dissipation than curves indicate.

The data of SOA curve is base on  $T_{j(pk)}=150^\circ\text{C}$ ;  $T_c$  is variable depending on conditions. second breakdown pulse limits are valid for duty cycles to 10% provided  $T_{j(pk)} < 150^\circ\text{C}$ . At high case temperatures, thermal limitation will reduce the power that can be handled to values less than the limitations imposed by second breakdown.