

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

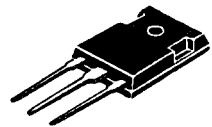
**PNP
2SB688**

**8 AMPERE
POWER
TRANSISTOR**

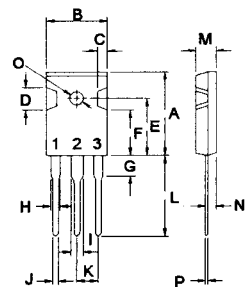
**120 VOLTS
80 WATTS**

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 @ $T_C = 25^\circ\text{C}$ Derate above 25°C | P_D | 80 0.64 | W W/ $^\circ\text{C}$ |
| Operating and Storage Junction Temperature Range | T_J, T_{STG} | -55 to +150 | $^\circ\text{C}$ |



TO-247(3P)

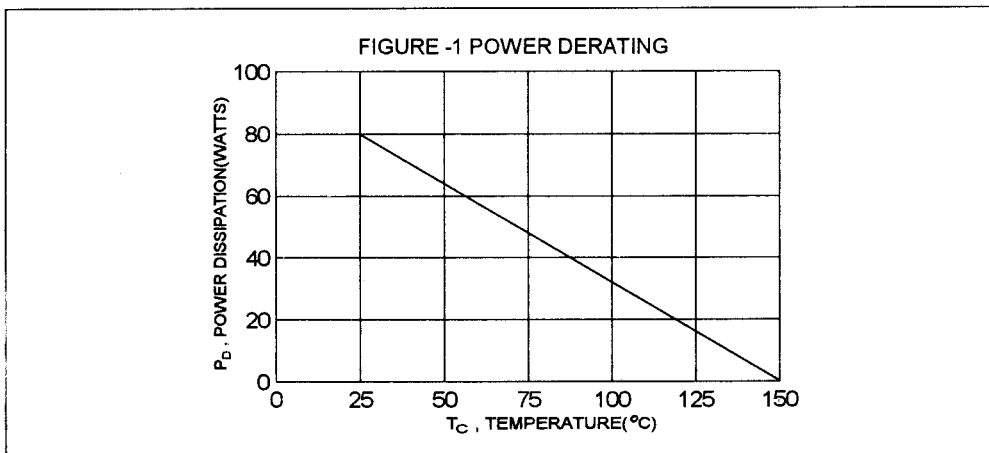


PIN 1.BASE
2.COLLECTOR
3.EMITTER

THERMAL CHARACTERISTICS

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

| 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 |
|----------------|--------|-----|-----|------|
|----------------|--------|-----|-----|------|

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 | μA |
| Emitter Cutoff Current ($V_{EB} = 5.0 \text{ V}$, $I_C = 0$) | I_{EBO} | | 10 | μA |

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 |

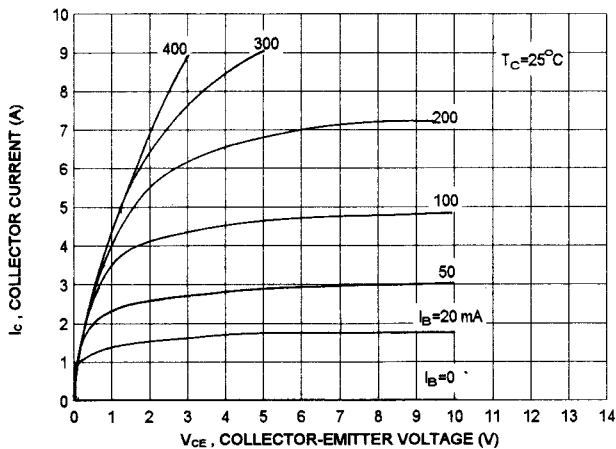
DYNAMIC CHARACTERISTICS

| | | | | |
|--|----------|----------|--|-----|
| 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 |

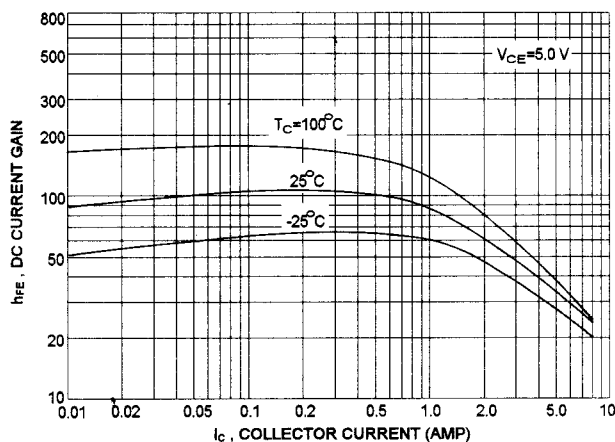
(1) Pulse Test: Pulse Width = 300 μs , Duty Cycle $\leq 2.0\%$ * $h_{FE(2)}$ Classification :

| | | | | | |
|----|---|-----|----|---|-----|
| 55 | R | 110 | 80 | O | 160 |
|----|---|-----|----|---|-----|

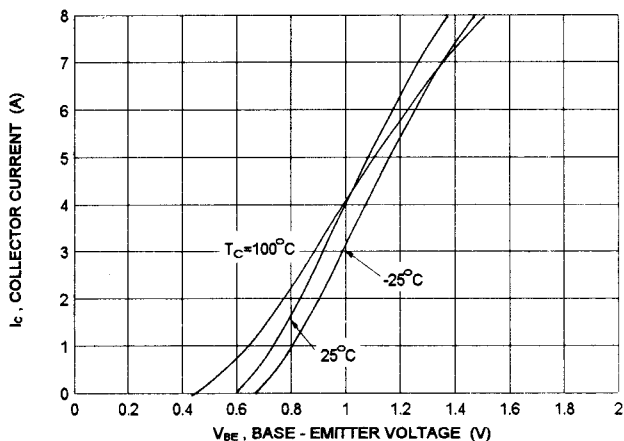
$I_c - V_{ce}$



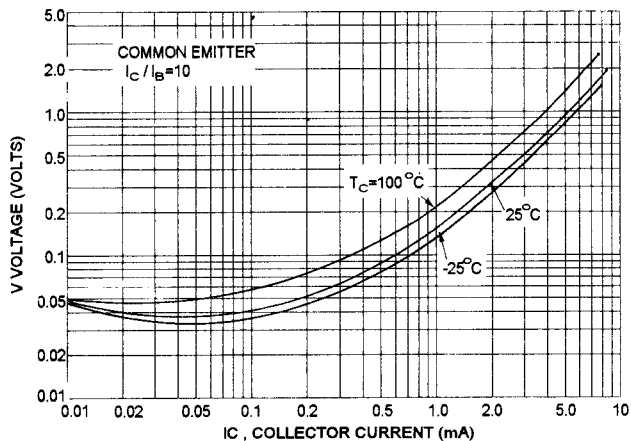
DC CURRENT GAIN



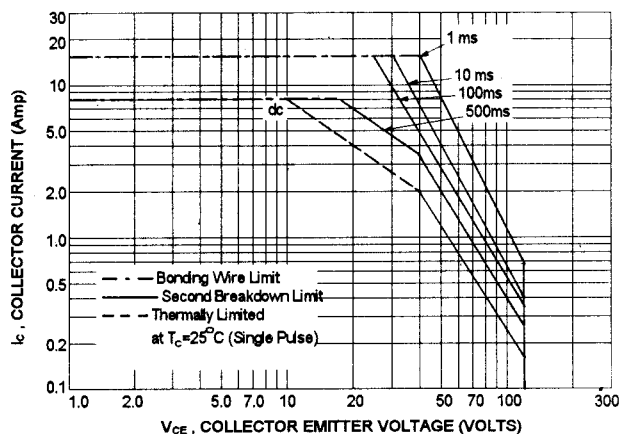
$I_c - V_{be}$



$V_{ce(sat)} - I_c$



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.