DATA SHEET

NEC

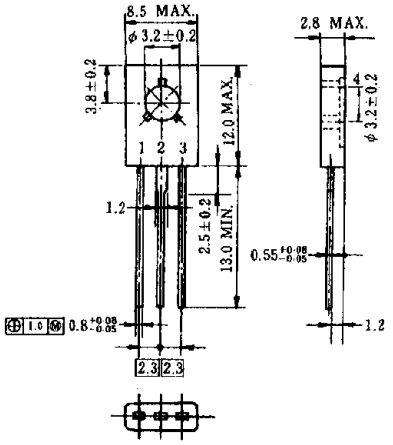
# SILICON POWER TRANSISTOR
# 2SB548, 549/2SD414, 415

## PNP/NPN SILICON EPITAXIAL TRANSISTOR FOR LOW-FREQUENCY POWER AMPLIFIERS

### FEATURES

- Ideal for audio amplifier drivers with 30 W to 50 W output
- High voltage
- Available for small mount spaces due to small and thin package
- Easy to be attached to radiators

### PACKAGE DRAWING (UNIT: mm)




Electrode Connection
1. Emitter
2. Collector connected to mounting plane
3. Base
4. Fin (Collector)

### ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

| Parameter | Symbol | 2SB548/ 2SD414 | 2SB549/ 2SD415 | Unit |
|---|---|---|---|---|
| Collector to base voltage | $V_{CBO}$ | −100/120 | | V |
| Collector to emitter voltage | $V_{CEO}$ | −80/80 | −100/100 | V |
| Emitter to base voltage | $V_{EBO}$ | −5.0/5.0 | | V |
| Collector current | $I_{C(DC)}$ | −0.8/0.8 | | A |
| Collector current | $I_{C(pulse)}$* | −1.5/1.5 | | A |
| Total power dissipation | $P_T$ (Ta = 25°C) | 1.0 | | W |
| Total power dissipation | $P_T$ (Tc = 25°C) | 10 | | W |
| Junction temperature | $T_j$ | 150 | | °C |
| Storage temperature | $T_{stg}$ | −55 to +150 | | °C |

* PW ≤ 10 ms, duty cycle ≤ 50%

### ELECTRICAL CHARACTERISTICS (Ta = 25°C)

| Parameter | Symbol | Conditions | MIN. | TYP. | MAX. | Unit |
|---|---|---|---|---|---|---|
| Collector cutoff current | $I_{CBO}$ | $V_{CB}$ = −80/80 V, $I_E$ = 0 | | | −1.0/1.0 | μA |
| Emitter cutoff current | $I_{EBO}$ | $V_{EB}$ = −3.0/3.0 V, $I_C$ = 0 | | | −1.0/1.0 | μA |
| DC current gain | $h_{FE1}$ | $V_{CE}$ = −5.0/5.0 V, $I_C$ = −2.0/2.0 mA* | 20 | | | |
| DC current gain | $h_{FE2}$ | $V_{CE}$ = −5.0/5.0 V, $I_C$ = −200/200 mA* | 40 | 90 | 320 | |
| Collector saturation voltage | $V_{CE(sat)}$ | $I_C$ = −500/500 mA, $I_B$ = −50/50 mA* | | −0.4/0.3 | −2.0/2.0 | V |
| Base saturation voltage | $V_{BE(sat)}$ | $I_C$ = −500/500 mA, $I_B$ = −50/50 mA* | | −0.9/0.9 | −1.5/1.5 | V |
| Gain bandwidth product | $f_T$ | $V_{CE}$ = −5.0/5.0 V, $I_C$ = −100/100 mA | | 70/45 | | MHz |
| Collector capacitance | $C_{ob}$ | $V_{CB}$ = −10/10 V, $I_E$ = 0, f = 1.0 MHz | | 25/15 | | pF |

* Pulse test PW ≤ 350 μs, duty cycle ≤ 2%

### $h_{FE2}$ CLASSIFICATION

| Marking | S | R | Q | P |
|---|---|---|---|---|
| $h_{FE2}$ | 40 to 80 | 60 to 120 | 100 to 200 | 160 to 320 |



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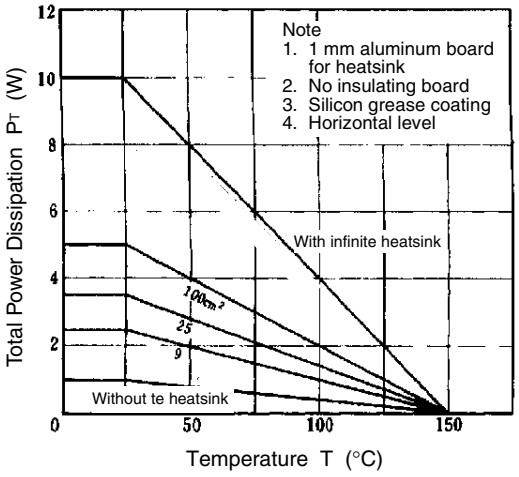
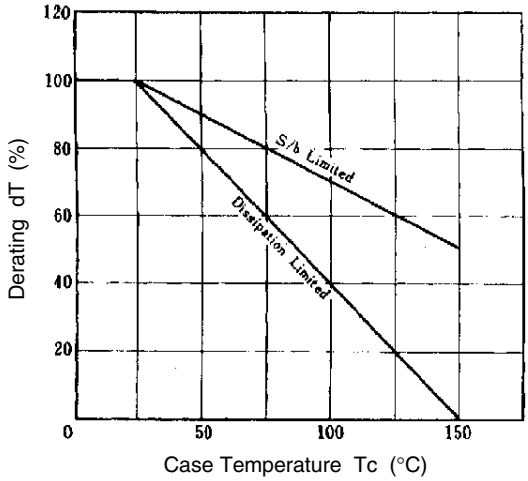
## TYPICAL CHARACTERISTICS (Ta = 25°C)

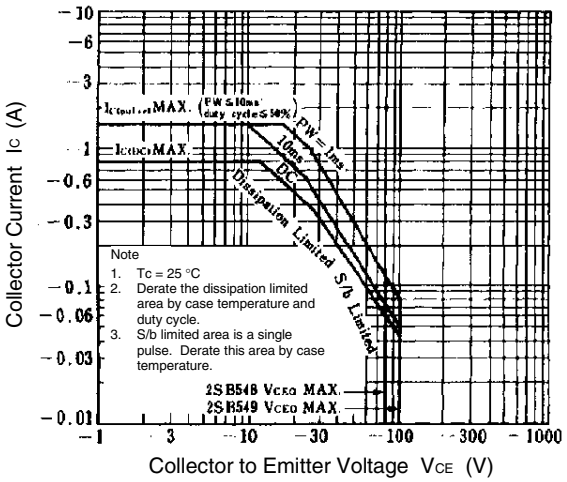
TOTAL POWER DISSIPATION vs. TEMPERATURE



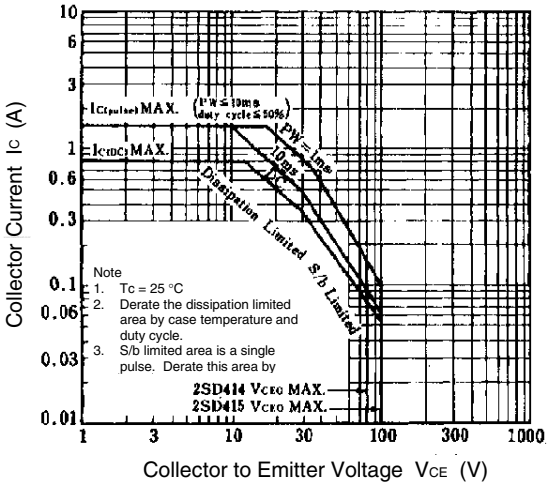

DERATING CURVE OF SAFE OPERATING AREA



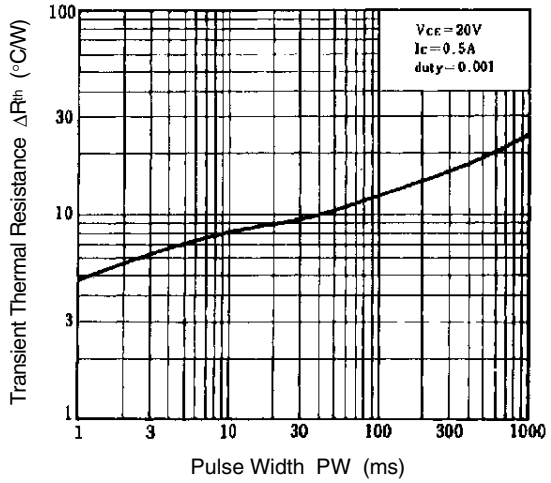

2SB548, 2SB549
FORWARD BIAS SAFE OPERATING AREA



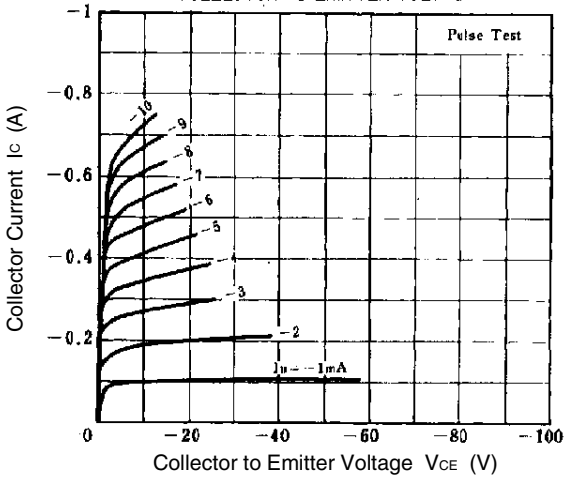

2SD414, 2SD415
FORWARD BIAS SAFE OPERATING AREA



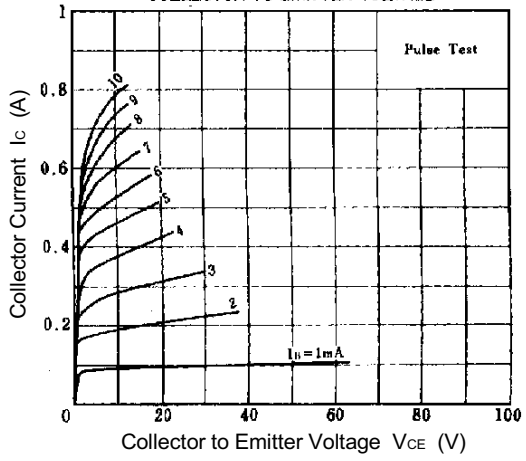

TRANSIENT THERMAL RESISTANCE



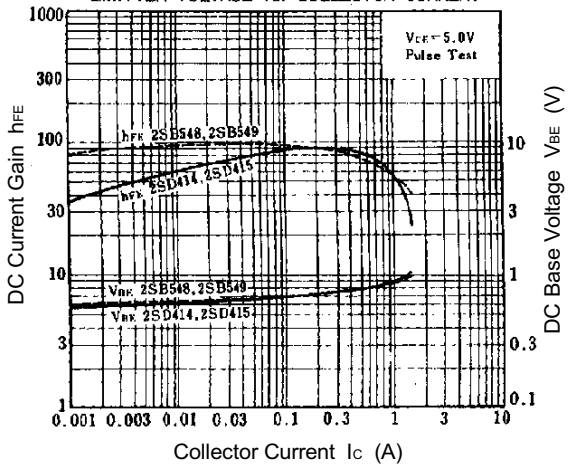

2SB548, 2SB549
COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



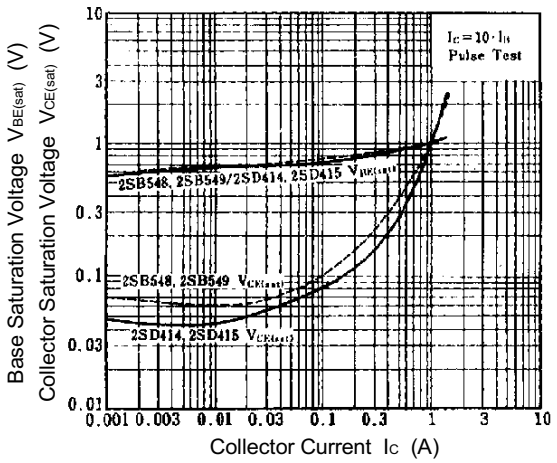
2SD414, 2SD415
COLLECTOR CURRENT vs.
COLLECTOR TO EMITTER VOLTAGE



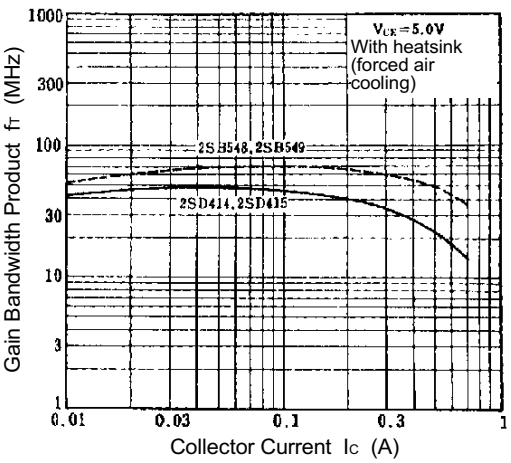

DC CURRENT GAIN AND BASE TO
EMITTER VOLTAGE vs. COLLECTOR CURRENT



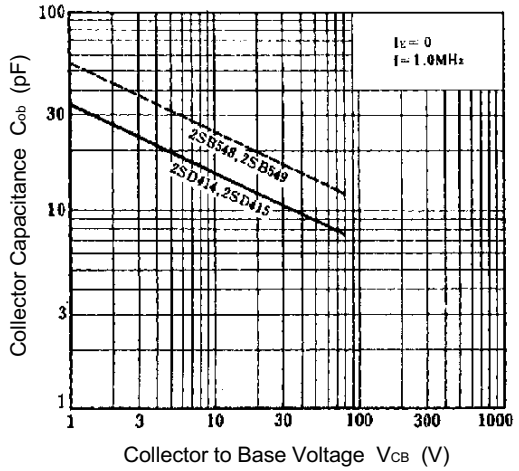

BASE AND COLLECTOR SATURATION
VOLTAGE vs. COLLECTOR CURRENT




GAIN BANDWIDTH PRODUCT vs.
COLLECTOR CURRENT




OUTPUT CAPACITANCE vs. COLLECTOR
TO BASE VOLTAGE



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