NEC

# SILICON TRANSISTOR
# 2SD1581

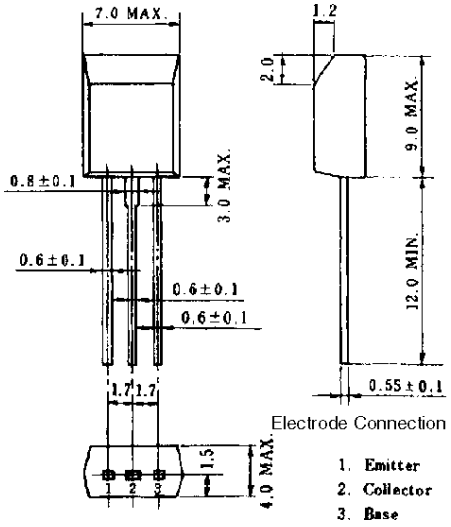
## NPN SILICON EPITAXIAL TRANSISTOR FOR LOW-FREQUENCY POWER AMPLIFIERS

The 2SD1581 is a single type super high $h_{FE}$ transistor and low collector saturation voltage and low power loss. This transistor is ideal for use in high current drives such as mortars, relays, and ramps.

### FEATURES

- Ultra high $h_{FE}$
  $h_{FE}$ = 800 to 3200 (@ $V_{CE}$ = 5.0 V, $I_C$ = 500 mA)
- Low collector saturation voltage
  $V_{CE(sat)}$ = 0.18 V TYP. (@ $I_C$ = 1.0 A, $I_B$ = 10 mA)

### PACKAGE DRAWING (UNIT: mm)




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

| Parameter | Symbol | Ratings | Unit |
|---|---|---|---|
| Collector to base voltage | $V_{CBO}$ | 30 | V |
| Collector to emitter voltage | $V_{CEO}$ | 25 | V |
| Emitter to base voltage | $V_{EBO}$ | 15 | V |
| Collector current (DC) | $I_{C(DC)}$ | 2.0 | A |
| Collector current (pulse) | $I_{C(pulse)}$* | 3.0 | A |
| Total power dissipation | $P_T$ | 1.0 | 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 | $I_{CBO}$ | $V_{CB}$ = 30 V, $I_E$ = 0 | | | | 100 | nA |
| Emitter cutoff current | $I_{EBO}$ | $V_{EB}$ = 10 V, $I_C$ = 0 | | | | 100 | nA |
| DC current gain | $h_{FE1}$ | $V_{CE}$ = 5.0 V, $I_C$ = 500 mA | * | 800 | 1500 | 3200 | − |
| DC current gain | $h_{FE2}$ | $V_{CE}$ = 5.0 V, $I_C$ = 2.0 mA | * | 400 | | | − |
| DC base voltage | $V_{BE}$ | $V_{CE}$ = 5.0 V, $I_C$ = 300 mA | * | 600 | 660 | 700 | mV |
| Collector saturation voltage | $V_{CE(sat)}$ | $I_C$ = 1.0 A, $I_B$ = 10 mA | * | | 0.18 | 0.30 | V |
| Base saturation voltage | $V_{BE(sat)}$ | $I_C$ = 1.0 A, $I_B$ = 10 mA | * | | 0.83 | 1.2 | V |
| Output capacitance | $C_{ob}$ | $V_{CB}$ = 10 V, $I_E$ = 0, f = 1.0 MHz | | | 26 | 35 | pF |
| Gain bandwidth product | $f_T$ | $V_{CE}$ = 10 V, $I_E$ = −500 mA | | 150 | 350 | | MHz |

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

$h_{FE1}/h_{FE}$ CLASSIFICATION M : 800 to 1600 L : 1200 to 2400 K : 2000 to 3200



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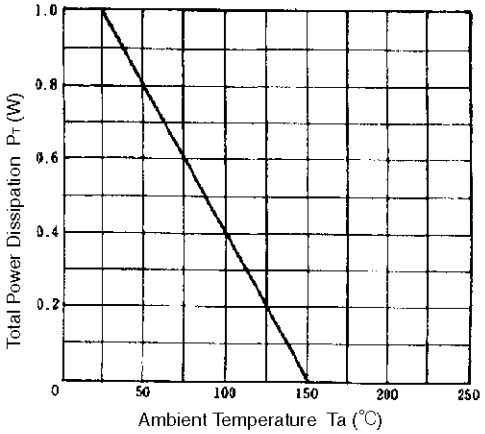
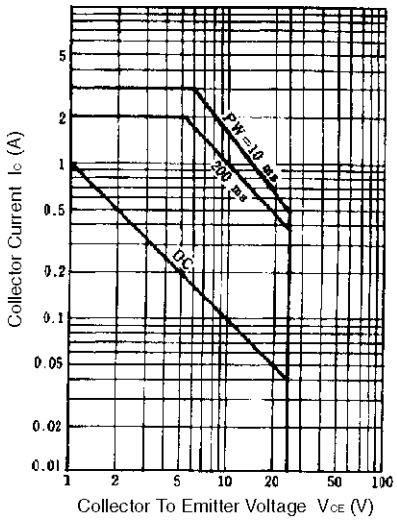
## TYPICAL CHARACTERISTICS (Ta = 25°C)

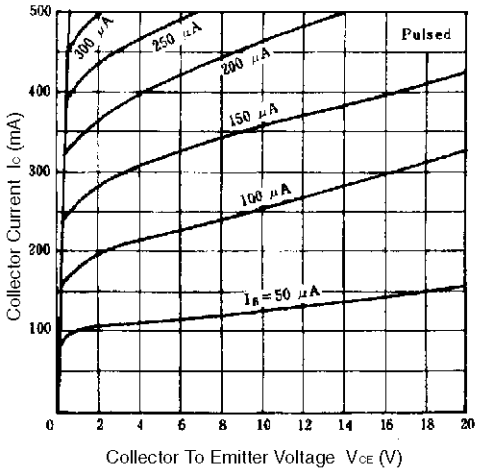
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



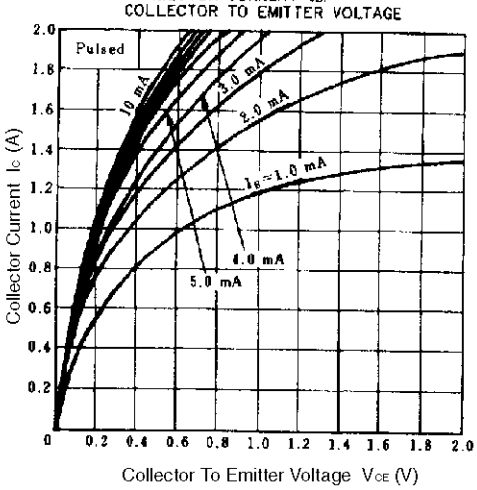

SAFE OPERATING AREAS(TRANSIENT THERMAL RESISTANCE METHOD)



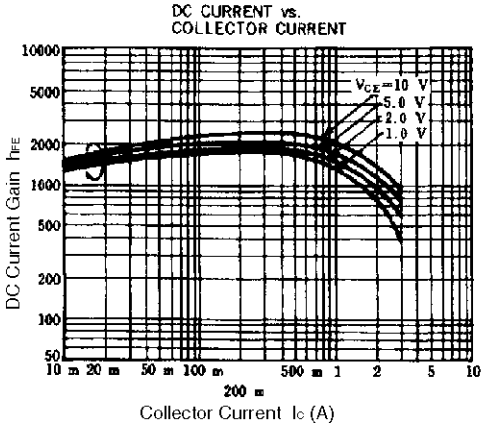

COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



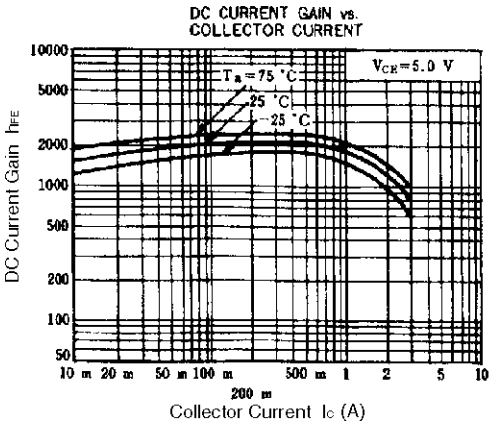

COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



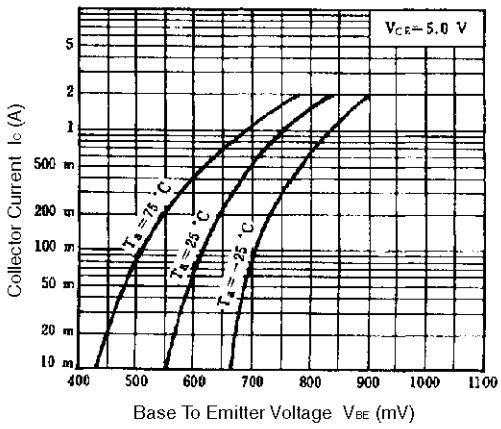

DC CURRENT vs. COLLECTOR CURRENT



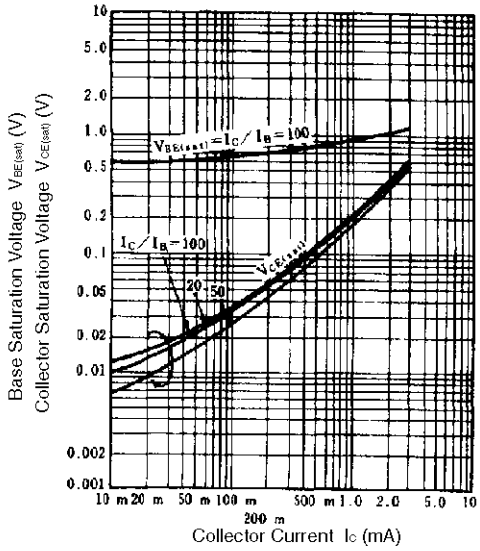

DC CURRENT GAIN vs. COLLECTOR CURRENT



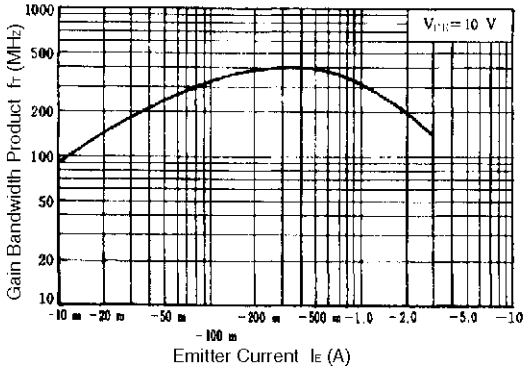
COLLECTOR CURRENT vs.
BASE TO EMITTER VOLTAGE



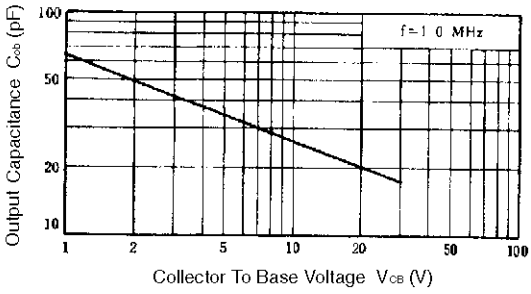

COLLECTOR AND BASE SATURATION
VOLTAGE vs. COLLECTOR CURRENT




GAIN BANDWIDTH PRODUCT vs.
EMITTER CURRENT




OUTPUT CAPACITANCE vs.
COLLECTOR TO BASE VOLTAGE



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