

# SILICON POWER TRANSISTOR 2SD1481

**NPN SILICON EPITAXIAL TRANSISTOR (DARLINGTON CONNECTION)  
FOR LOW-FREQUENCY POWER AMPLIFIERS AND LOW-SPEED SWITCHING**

### FEATURES

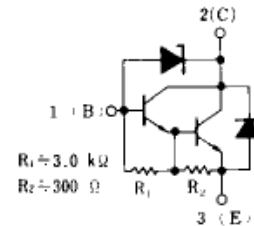
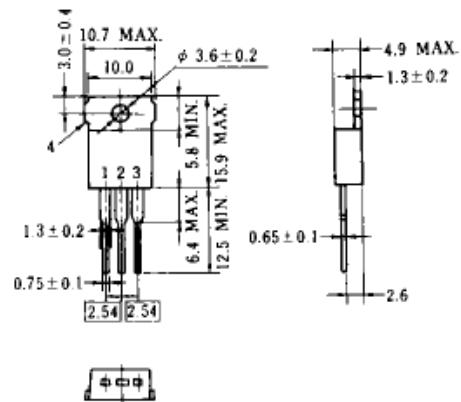
- On-chip C-to-B Zener diode for surge voltage absorption
- Low collector saturation voltage:  $V_{CE(SAT)} = 1.5 \text{ V MAX.}$  (at 1 A)
- Ideal for use in a direct drive from IC to the devices such as OA and FA equipment and motor solenoid relay printer head drivers

### ABSOLUTE MAXIMUM RATINGS ( $T_a = 25^\circ\text{C}$ )

| Parameter                    | Symbol                         | Ratings     | Unit             |
|------------------------------|--------------------------------|-------------|------------------|
| Collector to base voltage    | $V_{CBO}$                      | $60 \pm 10$ | V                |
| Collector to emitter voltage | $V_{CEO}$                      | $60 \pm 10$ | V                |
| Emitter to base voltage      | $V_{EBO}$                      | 7.0         | V                |
| Collector current            | $I_{C(DC)}$                    | 2.0         | A                |
| Collector current            | $I_{C(pulse)}^*$               | 4.0         | A                |
| Base current                 | $I_{B(DC)}$                    | 0.2         | A                |
| Total power dissipation      | $P_T (T_c = 25^\circ\text{C})$ | 15          | W                |
| Total power dissipation      | $P_T (T_a = 25^\circ\text{C})$ | 1.5         | W                |
| Junction temperature         | $T_j$                          | 150         | $^\circ\text{C}$ |
| Storage temperature          | $T_{stg}$                      | -55 to +150 | $^\circ\text{C}$ |

\*  $PW \leq 300 \mu\text{s}$ , duty cycle  $\leq 10\%$

### PACKAGE DRAWING (UNIT: mm)



Electrode Connection

1. Base
2. Collector
3. Emitter
4. Fin (collector)

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Not all devices/types available in every country. Please check with local NEC representative for availability and additional information.

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

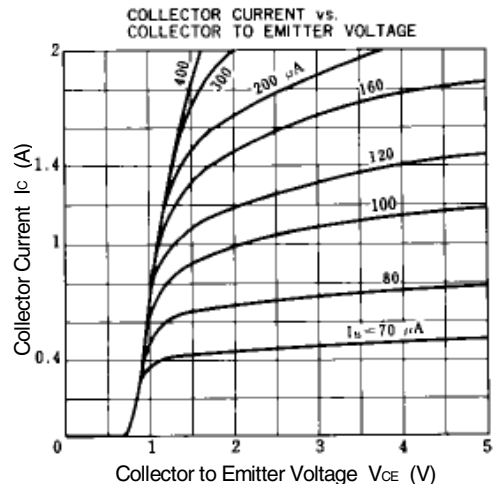
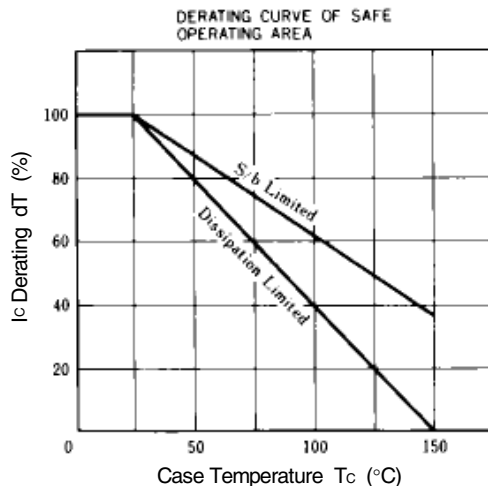
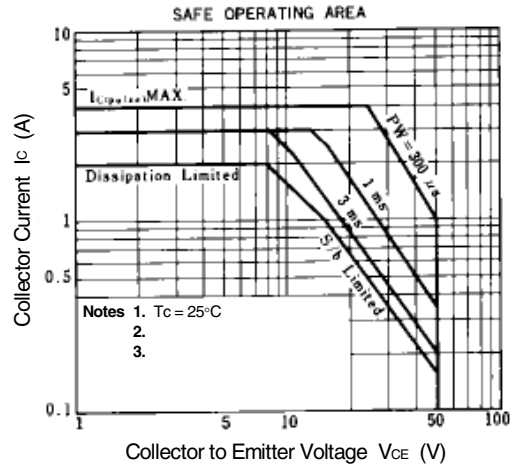
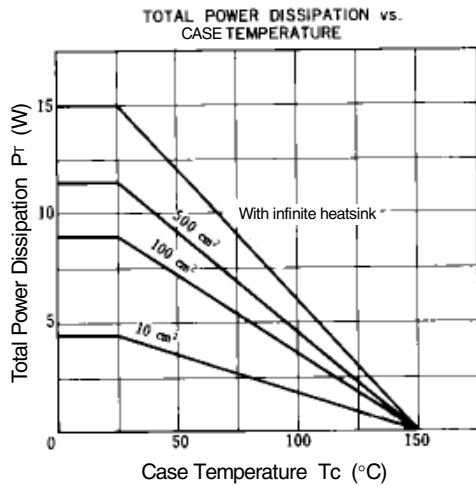
| Parameter                    | Symbol        | Conditions  | MIN.  | TYP. | MAX.   | Unit          |
|------------------------------|---------------|---|-------|------|--------|---------------|
| Collector cutoff current     | $I_{CBO}$     | $V_{CB} = 40\text{ V}, I_E = 0$   |       |      | 1.0    | $\mu\text{A}$ |
| DC current gain              | $h_{FE1}$     | $V_{CE} = 2.0\text{ V}, I_C = 1.0\text{ A}^*$   | 2,000 |      | 20,000 |               |
| DC current gain              | $h_{FE2}$     | $V_{CE} = 2.0\text{ V}, I_C = 3.0\text{ A}^*$   | 500   |      |        |               |
| Collector saturation voltage | $V_{CE(sat)}$ | $I_C = 1.0\text{ A}, I_B = 1.0\text{ mA}^*$   |       |      | 1.5    | V             |
| Base saturation voltage      | $V_{BE(sat)}$ | $I_C = 1.0\text{ A}, I_B = 1.0\text{ mA}^*$   |       |      | 2.0    | V             |
| Turn-on time                 | $t_{on}$      | $I_C = 1.0\text{ A}, I_{B1} = -I_{B2} = 10\text{ mA}$<br>$R_L = 50\ \Omega, V_{CC} \cong 50\text{ V}$<br>Refer to the test circuit. |       | 0.5  |        | $\mu\text{s}$ |
| Storage time                 | $t_{stg}$     |   |       | 2.0  |        | $\mu\text{s}$ |
| Fall time                    | $t_f$         |   |       | 1.0  |        | $\mu\text{s}$ |

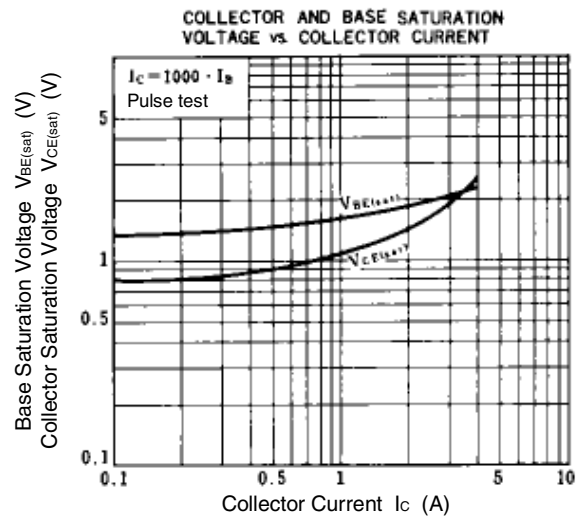
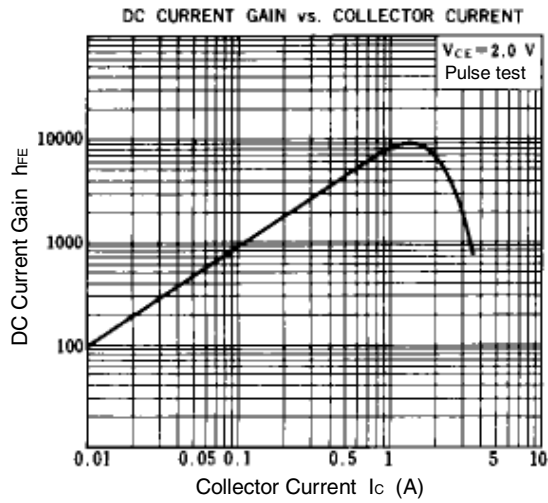
\* Pulse test  $PW \leq 350\ \mu\text{s}$ , duty cycle  $\leq 2\%$

**$h_{FE}$  CLASSIFICATION**

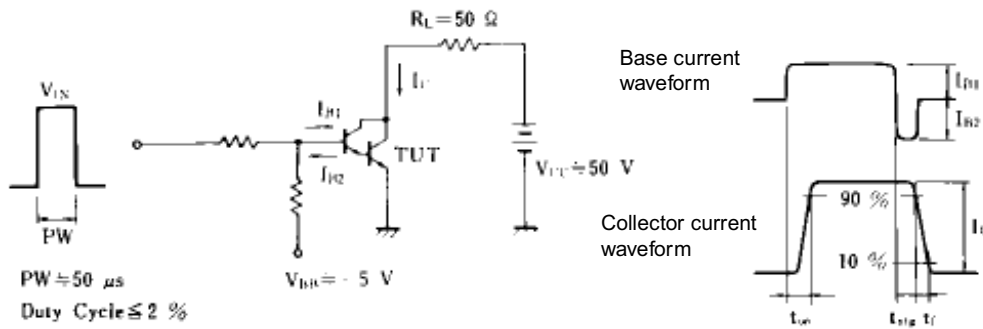
| Marking   | M              | L               | K               |
|-----------|----------------|-----------------|-----------------|
| $h_{FE1}$ | 2,000 to 5,000 | 4,000 to 10,000 | 8,000 to 20,000 |

**TYPICAL CHARACTERISTICS (Ta = 25°C)**





SWITCHING TIME ( $t_{on}$ ,  $t_{stg}$ ,  $t_f$ ) TEST CIRCUIT



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