

### NPN SILICON EPITAXIAL TRANSISTOR (DARLINGTON CONNECTION) FOR LOW-FREQUENCY POWER AMPLIFIERS

#### FEATURES

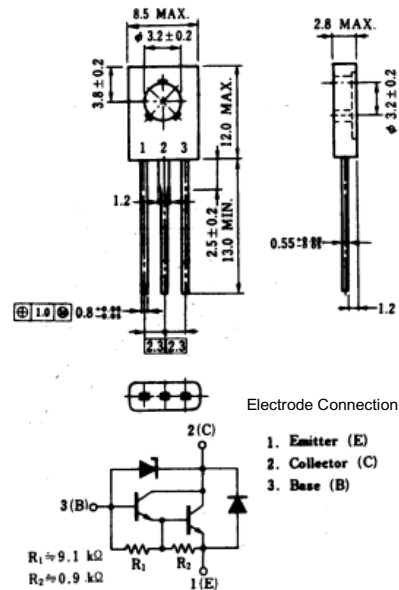
- On-chip Zener diode
- High DC current gain due to Darlington connection
- Large current capacity and low  $V_{CE(sat)}$
- Large power dissipation TO-126 type power transistor
- Complementary transistor: 2SB1150

#### 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      | $V_{EBO}$                      | 8.0             | V                |
| Collector current (DC)       | $I_{C(DC)}$                    | $\pm 3.0$       | A                |
| Collector current (pulse)    | $I_{C(pulse)^*}$               | $\pm 5.0$       | A                |
| Total power dissipation      | $P_T (T_A = 25^\circ\text{C})$ | 1.3             | W                |
| Total power dissipation      | $P_T (T_C = 25^\circ\text{C})$ | 15              | W                |
| Junction temperature         | $T_j$                          | 150             | $^\circ\text{C}$ |
| Storage temperature          | $T_{stg}$                      | $-55$ to $+150$ | $^\circ\text{C}$ |

\*  $PW \leq 10$  ms, duty cycle  $\leq 50\%$

#### PACKAGE DRAWING (UNIT: mm)



#### ELECTRICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ )

| Parameter                    | Symbol             | Conditions                                  | MIN.  | TYP. | MAX.   | Unit          |
|------------------------------|--------------------|---|-------|------|--------|---------------|
| Collector to base voltage    | $V_{CBO}$          | $I_C = 1.0$ mA, $I_E = 0$                   | 50    | 60   | 70     | V             |
| Collector to emitter voltage | $V_{CEO}$          | $I_C = 10$ mA, $R_{BE} = \infty$            | 50    | 60   | 70     | V             |
| Collector to emitter voltage | $V_{CEO(SUS)}$     | $I_C = 3.0$ A, $I_B = 3.0$ mA, $L = 1.0$ mH | 50    |      |        | V             |
| Collector cutoff current     | $I_{CBO}$          | $V_{CB} = 40$ V, $I_E = 0$                  |       |      | 10     | $\mu\text{A}$ |
| Collector cutoff current     | $I_{CEO}$          | $V_{CE} = 40$ V, $R_{BE} = \infty$          |       |      | 1.0    | mA            |
| DC current gain              | $h_{FE1}^{**}$     | $V_{CE} = 2.0$ V, $I_C = 1.5$ A             | 2,000 |      | 20,000 |               |
| DC current gain              | $h_{FE2}^{**}$     | $V_{CE} = 2.0$ V, $I_C = 3.0$ A             | 1,000 |      |        |               |
| Collector saturation voltage | $V_{CE(sat)}^{**}$ | $I_C = 1.5$ A, $I_B = 1.5$ mA               |       | 0.9  | 1.2    | V             |
| Base saturation voltage      | $V_{BE(sat)}^{**}$ | $I_C = 1.5$ A, $I_B = 1.5$ mA               |       | 1.5  | 2.0    | V             |
| Turn-on time                 | $t_{on}$           | $I_C = 1.5$ A                               |       | 0.5  |        | $\mu\text{s}$ |
| Storage time                 | $t_{stg}$          | $I_{B1} = -I_{B2} = 1.5$ mA                 |       | 2.0  |        | $\mu\text{s}$ |
| Fall time                    | $t_f$              | $R_L = 27 \Omega$ , $V_{CC} \approx 40$ V   |       | 1.0  |        | $\mu\text{s}$ |

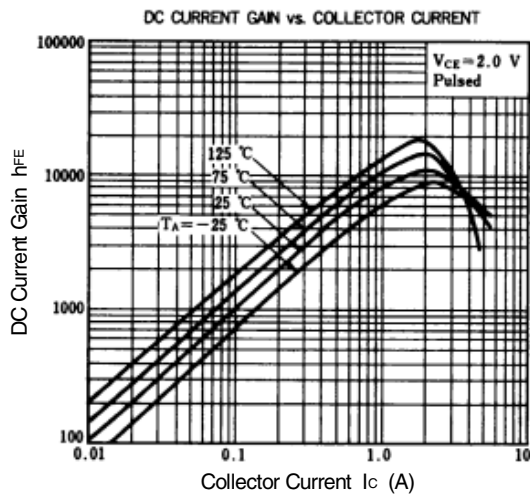
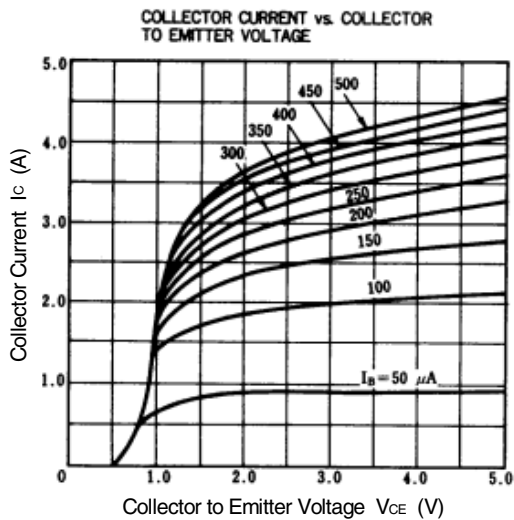
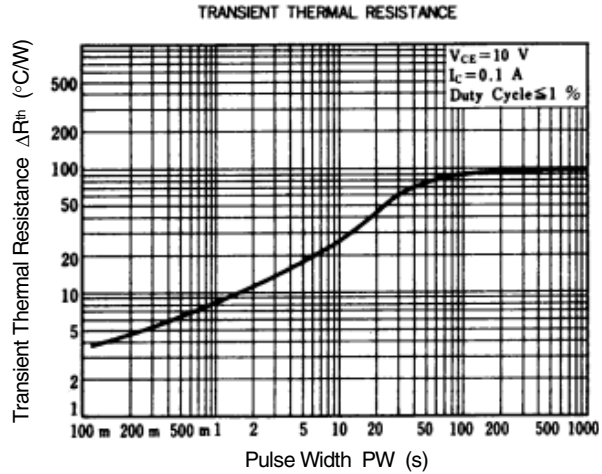
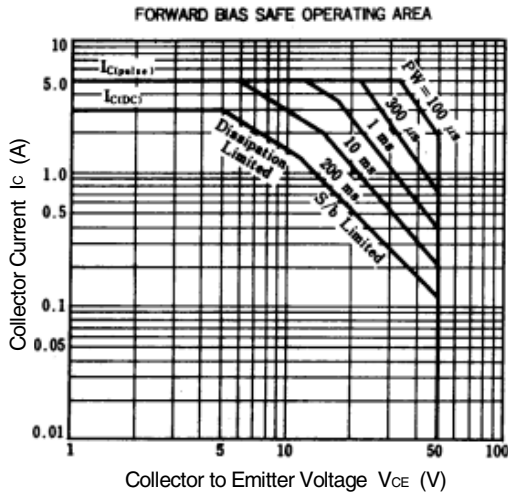
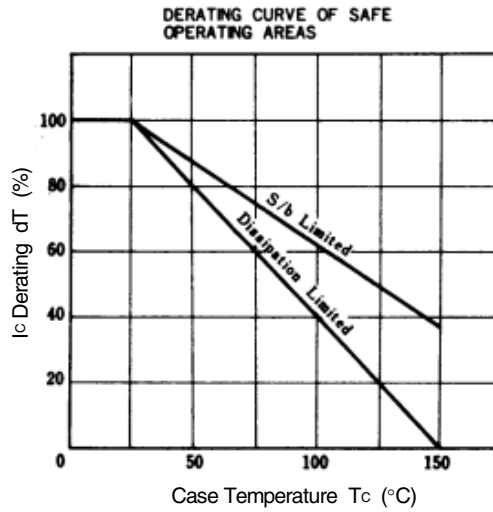
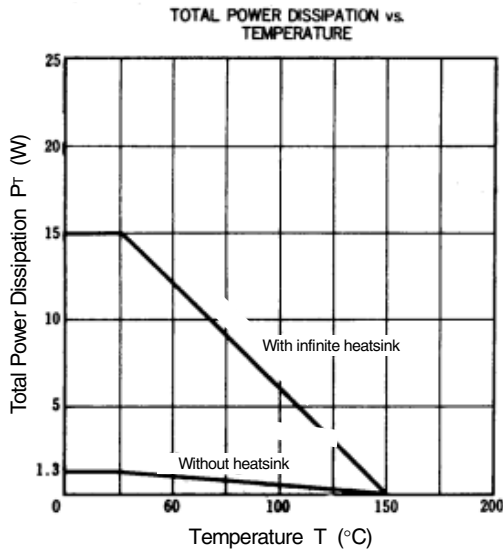
\*\* Pulse test  $PW \leq 350 \mu\text{s}$ , duty cycle  $\leq 2\%$ /per pulsed

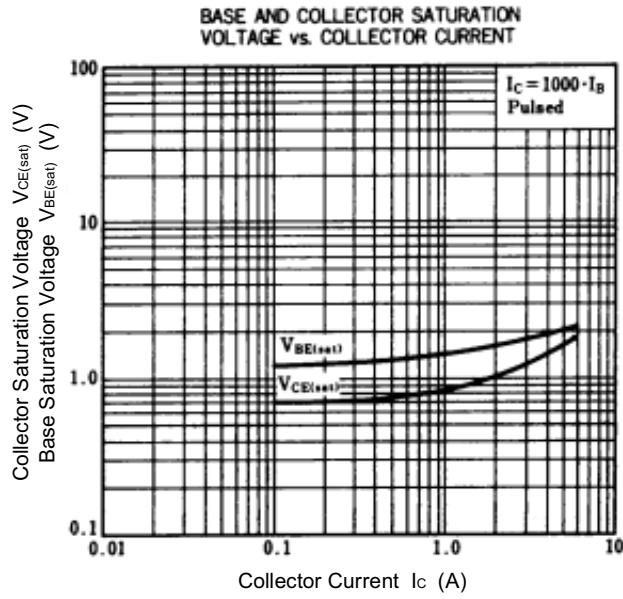
#### $h_{FE}$ CLASSIFICATION

| Marking   | M              | L               | K               |
|-----------|----------------|-----------------|-----------------|
| $h_{FE1}$ | 2,000 to 5,000 | 4,000 to 12,000 | 3,000 to 20,000 |

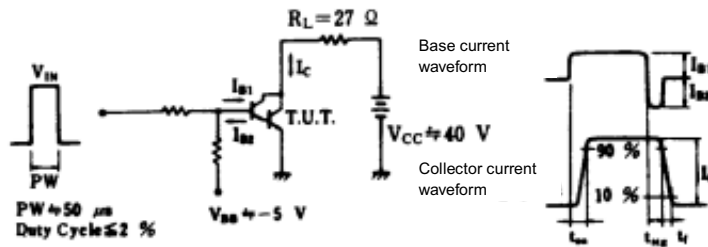
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TYPICAL CHARACTERISTICS (T<sub>A</sub> = 25°C)





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



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