

# DARLINGTON POWER TRANSISTOR 2SC4810

### NPN SILICON EPITAXIAL TRANSISTOR (DARLINGTON CONNECTION) FOR HIGH-SPEED SWITCHING

The 2SC4810 is a high-speed Darlington power transistor. This transistor is ideal for high-precision control such as PWM control for pulse motors or brushless motors in OA and FA equipment.

In addition, this transistor features a package that can be auto-mounted in radial taping specifications, thus contributing to mounting cost reduction.

#### FEATURES

- Auto-mounting possible in radial taping specifications
- Resin-molded insulation type package with power rating of 1.8 W in stand-alone conditions
- On-chip C-to-E reverse diode
- Fast switching speed

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

| Parameter                    | Symbol                 | Ratings     | Unit |
|------------------------------|------------------------|-------------|------|
| Collector to base voltage    | V <sub>CBO</sub>       | 100         | V    |
| Collector to emitter voltage | V <sub>CEO</sub>       | 100         | V    |
| Emitter to base voltage      | V <sub>EBO</sub>       | 8.0         | V    |
| Collector current (DC)       | I <sub>C(DC)</sub>     | ±5.0        | A    |
| Collector current (pulse)    | I <sub>C(pulse)*</sub> | ±10         | A    |
| Base current (DC)            | I <sub>B(DC)</sub>     | 0.5         | A    |
| Total power dissipation      | P <sub>T</sub>         | 1.8         | W    |
| Junction temperature         | T <sub>j</sub>         | 150         | °C   |
| Storage temperature          | T <sub>stg</sub>       | -55 to +150 | °C   |

\* PW ≤ 300 μs, duty cycle ≤ 10%

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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 to emitter voltage | V <sub>CE0(SUS)</sub>  | I <sub>C</sub> = 5 A, I <sub>B</sub> = 5 mA, L = 180 μH             | 100   |      |        | V    |
| Collector to emitter voltage | V <sub>CEX(SUS)</sub>  | I <sub>C</sub> = 5 A, I <sub>B</sub> = 5 mA<br>L = 180 μH, clamped  | 100   |      |        | V    |
| Collector cutoff current     | I <sub>CBO</sub>       | V <sub>CB</sub> = 100 V, I <sub>E</sub> = 0                         |       |      | 1.0    | μA   |
| Emitter cutoff current       | I <sub>EB0</sub>       | V <sub>EB</sub> = 5 V, I <sub>C</sub> = 0                           |       |      | 5.0    | mA   |
| DC current gain              | h <sub>FE1</sub> *     | V <sub>CE</sub> = 2.0 V, I <sub>C</sub> = 2.0 A                     | 2,000 |      | 20,000 | –    |
| DC current gain              | h <sub>FE2</sub> *     | V <sub>CE</sub> = 2.0 V, I <sub>C</sub> = 4.0 A                     | 500   |      |        | –    |
| Collector saturation voltage | V <sub>CE(sat)</sub> * | I <sub>C</sub> = 2.0 A, I <sub>B</sub> = 2.0 mA                     |       | 0.9  | 1.5    | V    |
| Base saturation voltage      | V <sub>BE(sat)</sub> * | I <sub>C</sub> = 2.0 A, I <sub>B</sub> = 2.0 mA                     |       | 1.5  | 2.0    | V    |
| Turn-on time                 | t <sub>on</sub>        | I <sub>C</sub> = 2.0 A, I <sub>B1</sub> = -I <sub>B2</sub> = 2.0 mA |       | 0.5  |        | μs   |
| Storage time                 | t <sub>stg</sub>       | R <sub>L</sub> = 25 Ω, V <sub>CC</sub> ≅ 50 V                       |       | 2.5  |        | μs   |
| Fall time                    | t <sub>f</sub>         | Refer to the test circuit.  |       | 0.6  |        | μs   |

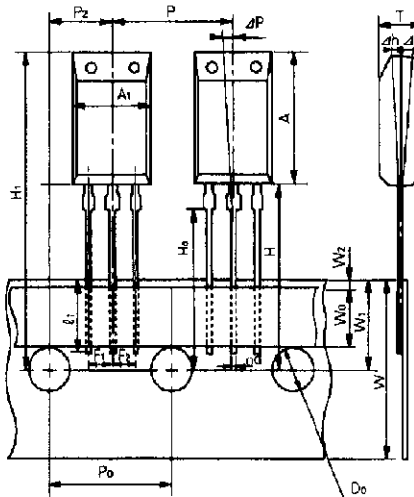
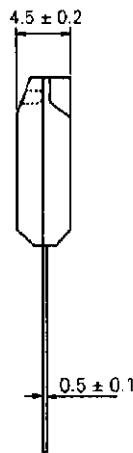
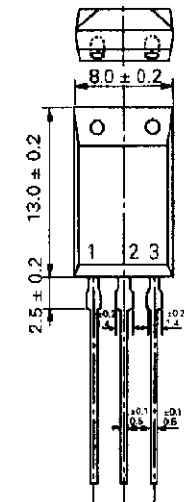
\* Pulse test PW ≤ 350 μs, duty cycle ≤ 2%

**h<sub>FE</sub> CLASSIFICATION**

| Marking          | M              | L               | K               |
|------------------|----------------|-----------------|-----------------|
| h <sub>FE1</sub> | 2,000 to 5,000 | 4,000 to 10,000 | 8,000 to 20,000 |

**PACKAGE DRAWING (UNIT: mm)**

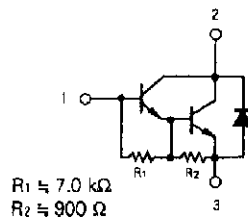
**TAPING SPECIFICATION**



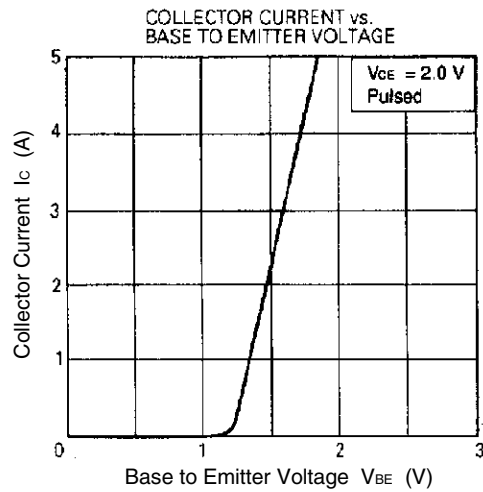
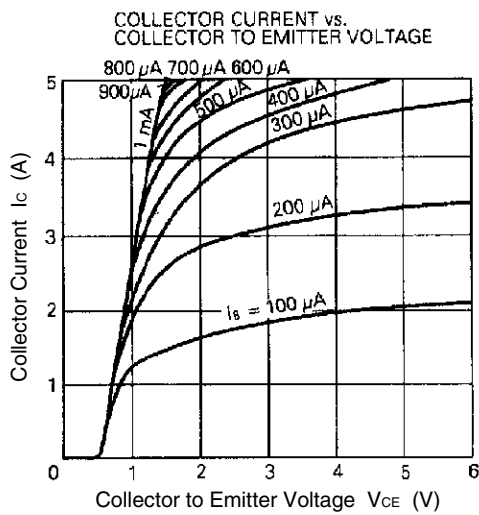
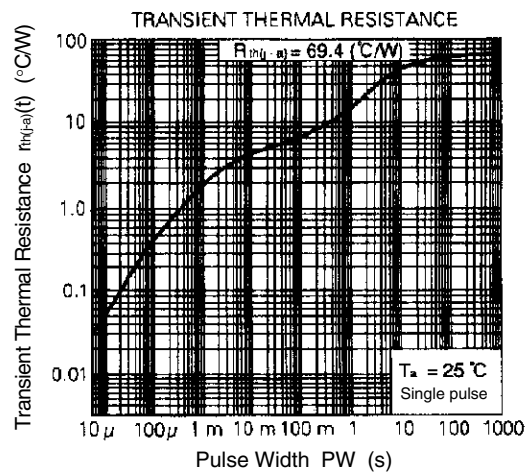
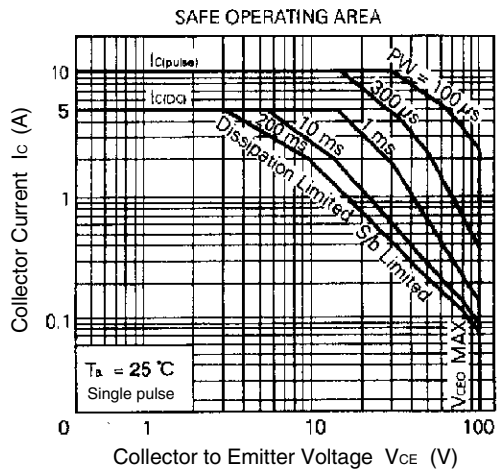
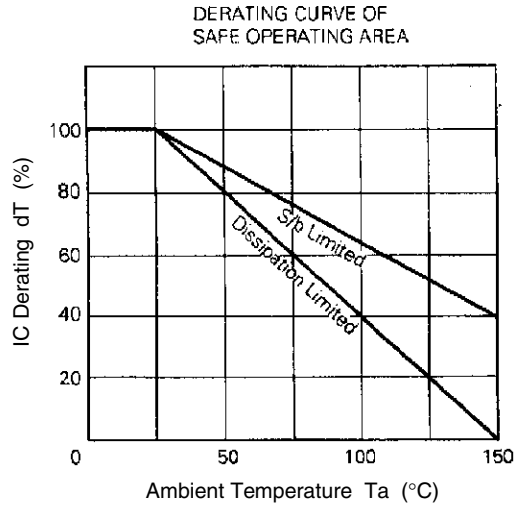
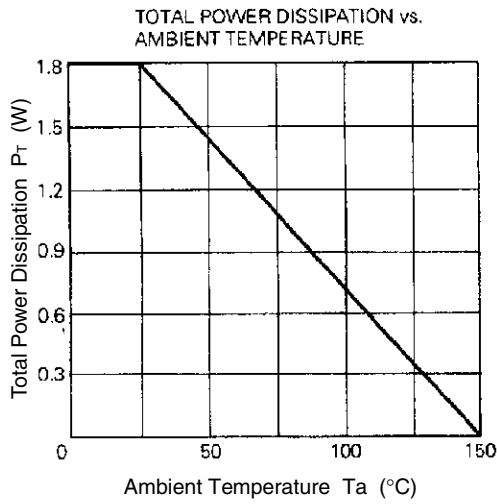
|                |                                      |
|----------------|--------------------------------------|
| A <sub>1</sub> | 8.0 ± 0.2                            |
| A              | 13.0 ± 0.2                           |
| D <sub>0</sub> | φ4.0 ± 0.2                           |
| d              | 0.5 ± 0.1                            |
| F <sub>1</sub> | 2.5 <sup>+0.4</sup> <sub>-0.1</sub>  |
| F <sub>2</sub> | 2.5 <sup>+0.4</sup> <sub>-0.1</sub>  |
| H              | 20.0 MAX.                            |
| H <sub>0</sub> | 16.0 ± 0.5                           |
| H <sub>1</sub> | 32.2 MAX.                            |
| Δh             | 0 ± 1.0                              |
| l <sub>1</sub> | 2.5 MIN.                             |
| P              | 12.7 ± 1.0                           |
| P <sub>0</sub> | 12.7 ± 0.3                           |
| P <sub>2</sub> | 6.35 ± 0.5                           |
| ΔP             | 0 ± 1.3                              |
| T              | 4.5 ± 0.2                            |
| W              | 18.0 <sup>+1.0</sup> <sub>-0.5</sub> |
| W <sub>0</sub> | 5.0 MIN.                             |
| W <sub>1</sub> | 9.0 ± 0.5                            |
| W <sub>2</sub> | 0.7 MIN.                             |

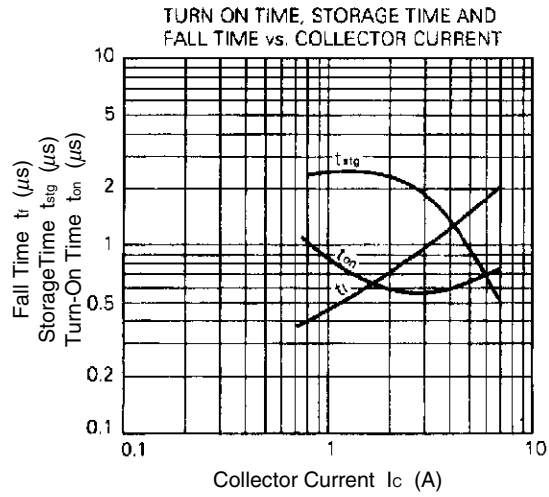
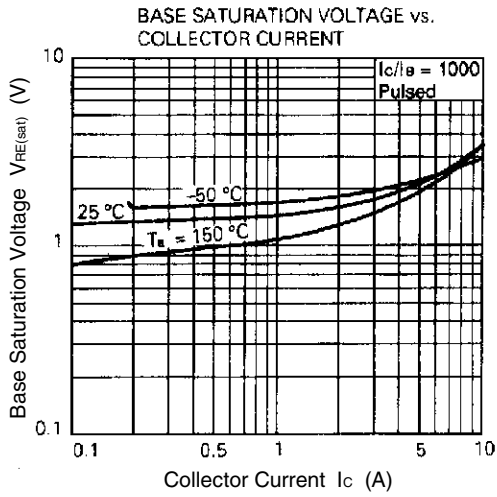
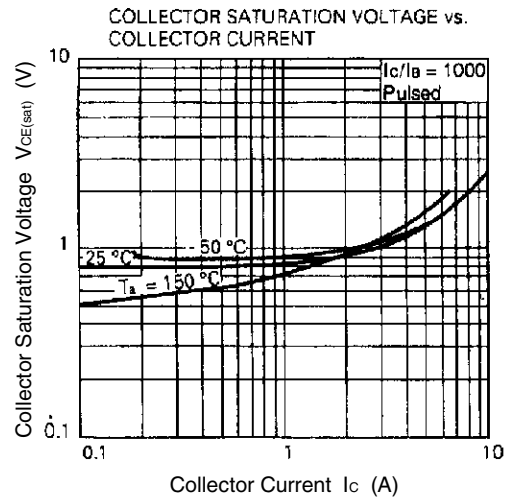
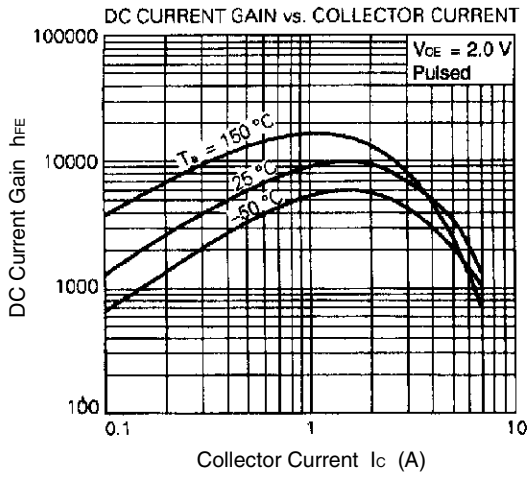
Electrode Connection

- 1. Base
- 2. Collector
- 3. Emitter

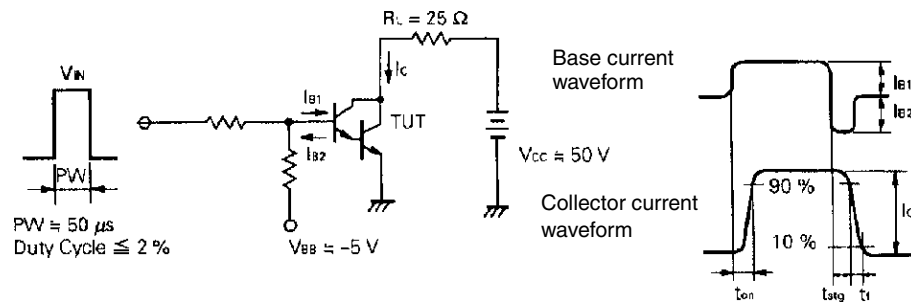


TYPICAL CHARACTERISTICS (Ta = 25°C)





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



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