

## NPN SILICON POWER TRANSISTOR 2SC2752

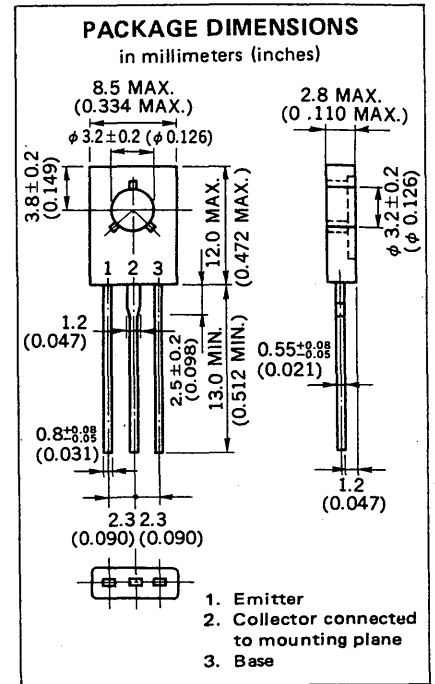
**DESCRIPTION** The 2SC2752 is suitable for Low Power Switching regulator, DC-DC converter and High Voltage Switch.

- FEATURES**
- High Breakdown Voltage.
  - Low Collector Saturation Voltage.
  - High Speed Switching.
  - Complementary to the NEC 2SA1156 PNP Transistor.

**ABSOLUTE MAXIMUM RATINGS**

|  |                              |                 |
|--|------------------------------|-----------------|
| Maximum Temperatures                                   |                              |                 |
| Storage Temperature                                    | .....                        | -55 to +150 °C  |
| Junction Temperature                                   | .....                        | +150 °C Maximum |
| Maximum Power Dissipations                             |                              |                 |
| Total Power Dissipation (T <sub>a</sub> = 25 °C)       | .....                        | 1.0 W           |
| Total Power Dissipation (T <sub>c</sub> = 25 °C)       | .....                        | 10 W            |
| Maximum Voltages and Currents (T <sub>a</sub> = 25 °C) |                              |                 |
| V <sub>CB0</sub>                                       | Collector to Base Voltage    | ..... 500 V     |
| V <sub>CEO</sub>                                       | Collector to Emitter Voltage | ..... 400 V     |
| V <sub>EBO</sub>                                       | Emitter to Base Voltage      | ..... 7.0 V     |
| I <sub>C(DC)</sub>                                     | Collector Current            | ..... 0.5 A     |
| I <sub>C(pulse)</sub> *                                | Collector Current            | ..... 1.0 A     |
| I <sub>B(DC)</sub>                                     | Base Current                 | ..... 0.25 A    |

\* PW ≤ 10 ms, Duty Cycle ≤ 50 %



ELECTRICAL CHARACTERISTICS (T<sub>a</sub> = 25 °C)

| SYMBOL                 | CHARACTERISTIC                          | MIN. | TYP. | MAX. | UNIT | TEST CONDITIONS  |
|------------------------|---|------|------|------|------|--|
| h <sub>FE1</sub> *     | DC Current Gain                         | 20   |      | 80   | —    | V <sub>CE</sub> = 5.0 V, I <sub>C</sub> = 0.05 A   |
| h <sub>FE2</sub> *     | DC Current Gain                         | 10   |      |      | —    | V <sub>CE</sub> = 5.0 V, I <sub>C</sub> = 0.3 A  |
| t <sub>on</sub>        | Turn On Time                            |      |      | 1.0  | μs   | (I <sub>C</sub> = 0.3 A, I <sub>B1</sub> = -I <sub>B2</sub> = 0.06 A, PW ≐ 50 μs<br>R <sub>L</sub> = 500 Ω, V <sub>CC</sub> ≐ 150 V)   |
| t <sub>stg</sub>       | Storage Time                            |      |      | 2.5  | μs   |  |
| t <sub>f</sub>         | Fall Time                               |      |      | 1.0  | μs   |  |
| V <sub>ECO(sus)</sub>  | Collector to Emitter Sustaining Voltage | 400  |      |      | V    | Table 1, I <sub>C</sub> = 0.3 A, I <sub>B1</sub> = 0.06 A, L = 10 mH   |
| V <sub>CEX(sus)1</sub> | Collector to Emitter Sustaining Voltage | 450  |      |      | V    | (Table 1, I <sub>C</sub> = 0.3 A, I <sub>B1</sub> = -I <sub>B2</sub> = 0.06 A<br>V <sub>clamp</sub> = Rated V <sub>CEX</sub> , T <sub>a</sub> = 125 °C,<br>L = 10 mH           |
| V <sub>CEX(sus)2</sub> | Collector to Emitter Sustaining Voltage | 400  |      |      | V    | (Table 1, I <sub>C</sub> = 0.6 A, I <sub>B1</sub> = 0.2 A,<br>I <sub>B2</sub> = -0.06 A<br>V <sub>clamp</sub> = Rated V <sub>CEX</sub> , T <sub>a</sub> = 125 °C,<br>L = 10 mH |
| I <sub>CER</sub>       | Collector Cutoff Current                |      |      | 1.0  | mA   | V <sub>CE</sub> = 400 V, R <sub>BE</sub> = 51 Ω, T <sub>a</sub> = 125 °C   |
| I <sub>CEX1</sub>      | Collector Cutoff Current                |      |      | 10   | μA   | V <sub>CE</sub> = 400 V, V <sub>BE(OFF)</sub> = -1.5 V   |
| I <sub>CEX2</sub>      | Collector Cutoff Current                |      |      | 1.0  | mA   | (V <sub>CE</sub> = 400 V, V <sub>BE(OFF)</sub> = -1.5 V,<br>T <sub>a</sub> = 125 °C  |
| I <sub>EBO</sub>       | Emitter Cutoff Current                  |      |      | 10   | μA   | V <sub>EB</sub> = 5.0 V, I <sub>C</sub> = 0  |
| V <sub>CE(sat)</sub> * | Collector Saturation Voltage            |      |      | 1.0  | V    | I <sub>C</sub> = 0.3 A, I <sub>B</sub> = 0.06 A  |
| V <sub>BE(sat)</sub> * | Base Saturation Voltage                 |      |      | 1.2  | V    | I <sub>C</sub> = 0.3 A, I <sub>B</sub> = 0.06 A  |

\* Pulsed / PW ≐ 350 μs, Duty Cycle ≐ 2 %

Classification of h<sub>FE1</sub>

| Rank  | M        | L        | K        |
|-------|----------|----------|----------|
| Range | 20 to 40 | 30 to 60 | 40 to 80 |

Test Conditions: V<sub>CE</sub> = 5.0 V, I<sub>C</sub> = 0.05 A

TYPICAL CHARACTERISTICS ( $T_a = 25^\circ\text{C}$ )

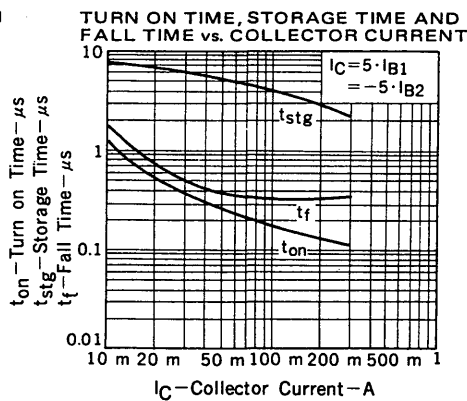
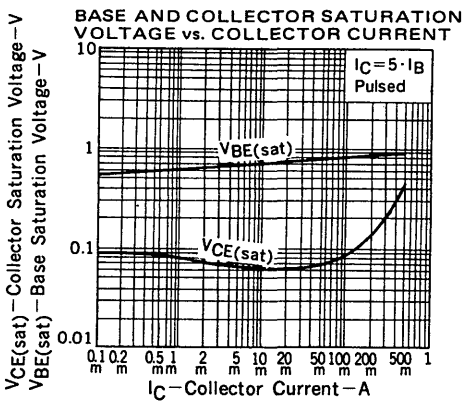
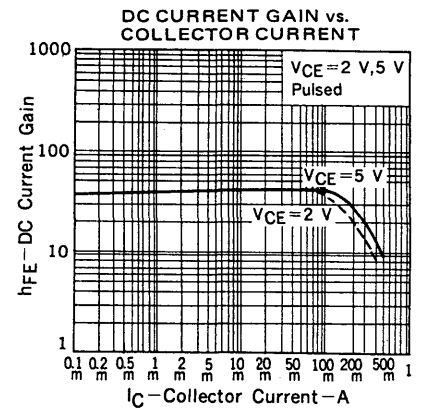
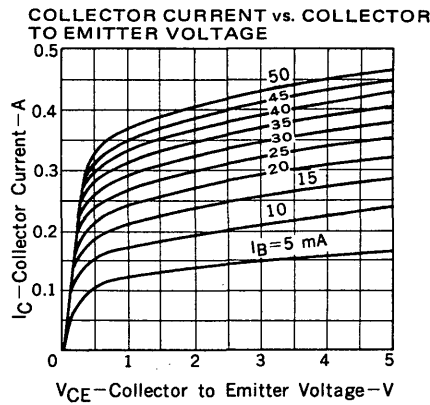
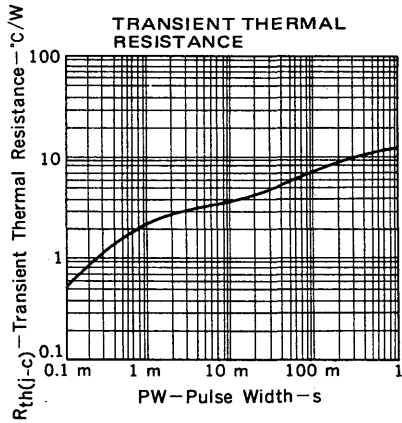
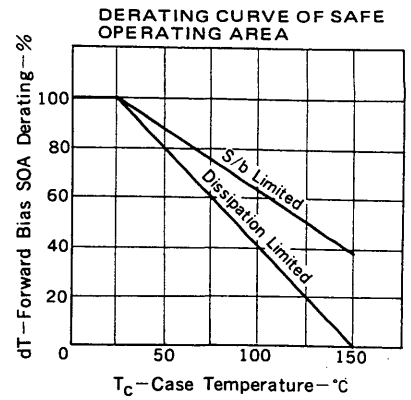
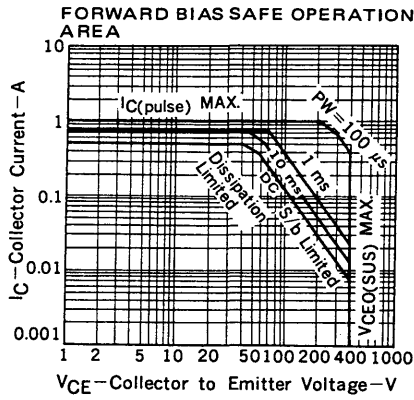
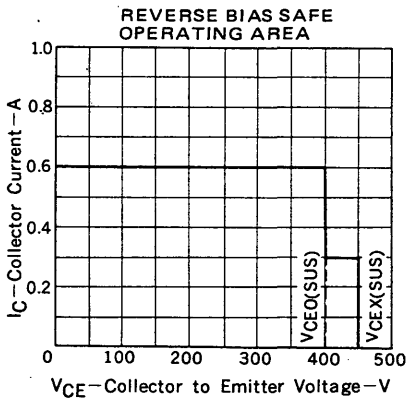


TABLE 1. — TEST CONDITIONS FOR DYNAMIC PERFORMANCE

|                  | V <sub>CEO</sub> (SUS)  | V <sub>CEX</sub> (SUS)   | RESISTIVE SWITCHING                                  |
|------------------|---|--|--|
| INPUT CONDITIONS | <p>PW Varied to Attain I<sub>C</sub> = 10 A</p>   | <p>PW Varied to Attain I<sub>C</sub> = 10 A Duty Cycle ≤ 2% Q<sub>1</sub> = 2SA959</p>   |  |
| CIRCUIT VALUES   | <p>L<sub>coil</sub> = 10 mH, V<sub>CC</sub> = 10 V<br/>                     R<sub>coil</sub> ≤ 0.5 Ω<br/>                     V<sub>clamp</sub> (Unclamped)</p> | <p>L<sub>coil</sub> = 10 mH, V<sub>CC</sub> = 20 V<br/>                     R<sub>coil</sub> ≤ 0.5 Ω<br/>                     V<sub>clamp</sub> = Rated V<sub>CEX</sub> Value</p>                                    | <p>R<sub>L</sub> = 500 Ω, V<sub>CC</sub> ≈ 150 V</p> |
| TEST CIRCUITS    | <p>INDUCTIVE TEST CIRCUIT</p>   | <p>OUTPUT WAVEFORM</p> <p> <math>t_1</math> Adjust to Obtain I<sub>C</sub><br/> <math>t_1 = \frac{L_{coil} (I_C \text{ pk})}{V_{CC}}</math><br/> <math>t_2 = \frac{L_{coil} (I_C \text{ pk})}{V_{clamp}}</math> </p> | <p>RESISTIVE TEST CIRCUIT</p>                        |