

NPN SILICON DARLINGTON POWER TRANSISTORS

2SD985, 2SD986

DESCRIPTION The 2SD985, 2SD986 are darlington transistors built-in dumper diodes at E-C. They are suitable for use to operate from IC without predriver, such as hammer driver.

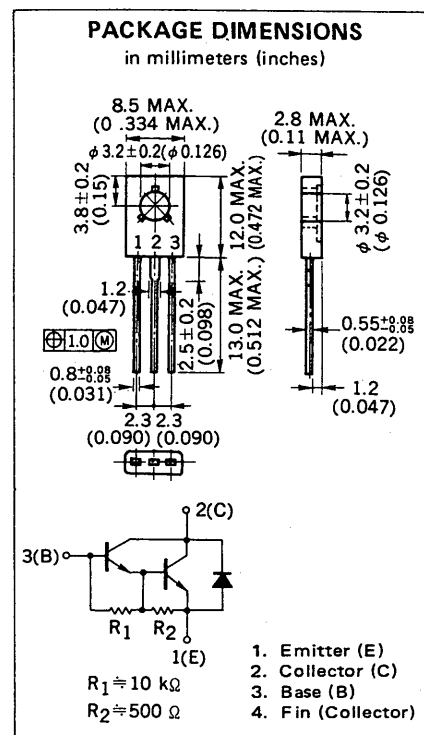
- FEATURES**
- High DC Current Gain.
 - Low Collector Saturation Voltage.
 - Built-in a dumper diode at E-C.
 - Complementary to the NEC 2SB794, 2SB795 PNP Transistors.

ABSOLUTE MAXIMUM RATINGS

Maximum Temperatures
 Storage Temperature -55 to +150 °C
 Junction Temperature +150 °C Maximum
 Maximum Power Dissipations
 Total Power Dissipation ($T_a = 25\text{ °C}$) 1.0 W
 Total Power Dissipation ($T_c = 25\text{ °C}$) 10 W
 Maximum Voltages and Currents ($T_a = 25\text{ °C}$)

| | | 2SD985 | 2SD986 | |
|------------------|---------------------------------|--------|--------|---|
| V_{CBO} | Collector to Base Voltage. . . | 150 | 150 | V |
| V_{CEO} | Collector to Emitter Voltage. . | 60 | 80 | V |
| V_{EBO} | Emitter to Base Voltage. . . | 8.0 | | V |
| $I_{C(DC)}$ | Collector Current. | ±1.5 | | A |
| $I_{C(pulse)}^*$ | Collector Current. | ±3.0 | | A |
| $I_{B(DC)}$ | Base Current. | 0.15 | | A |

* $PW \leq 10\text{ ms}$, Duty Cycle $\leq 50\%$



ELECTRICAL CHARACTERISTICS ($T_a = 25\text{ °C}$)

| SYMBOL | CHARACTERISTIC | MIN. | TYP. | MAX. | UNIT | TEST CONDITIONS |
|--------------------|------------------------------|------|------|-------|---------------|-------------------------------------------------------------|
| h_{FE1}^{**} | DC Current Gain | 1000 | | | — | $V_{CE} = 2.0\text{ V}$, $I_C = 0.5\text{ A}$ |
| h_{FE2}^{**} | DC Current Gain | 2000 | | 30000 | — | $V_{CE} = 2.0\text{ V}$, $I_C = 1.0\text{ A}$ |
| t_{on} | Turn On Time | | 0.5 | | μs | $I_C = 1.0\text{ A}$, $R_L = 50\text{ }\Omega$ |
| t_{stg} | Storage Time | | 1.0 | | μs | $I_{B1} = -I_{B2} = 1.0\text{ mA}$, $V_{CC} = 50\text{ V}$ |
| t_f | Fall Time | | 1.0 | | μs | See Test Circuit |
| I_{CBO} | Collector Cutoff Current | | | 10 | μA | $V_{CB} = 60/80\text{ V}$, $I_E = 0$ |
| I_{EBO} | Emitter Cutoff Current | | | 1.0 | mA | $V_{EB} = 5.0\text{ V}$, $I_C = 0$ |
| $V_{CE(sat)}^{**}$ | Collector Saturation Voltage | | | 1.5 | V | $I_C = 1.0\text{ A}$, $I_B = 1.0\text{ mA}$ |
| $V_{BE(sat)}^{**}$ | Base Saturation Voltage | | | 2.0 | V | $I_C = 1.0\text{ A}$, $I_B = 1.0\text{ mA}$ |

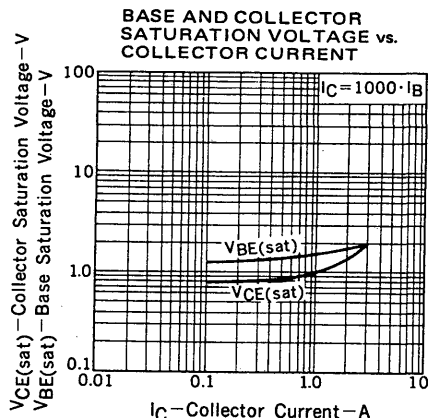
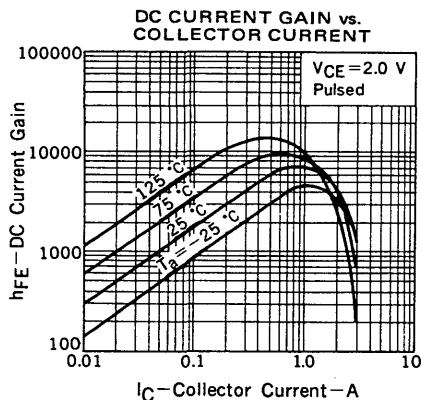
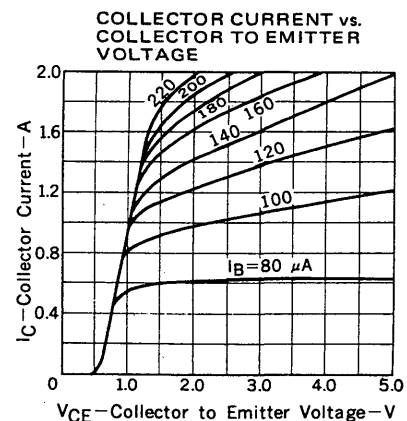
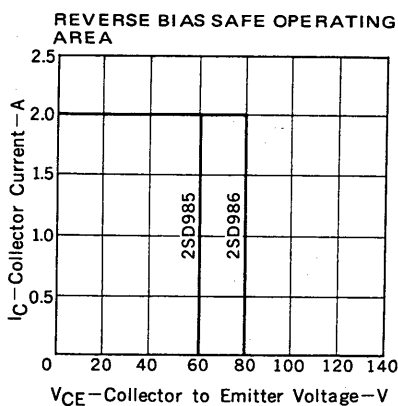
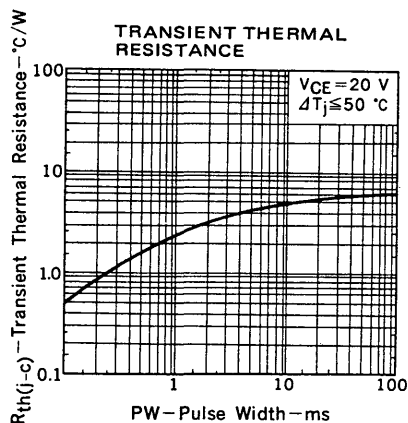
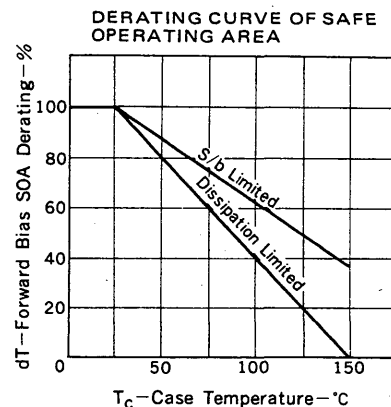
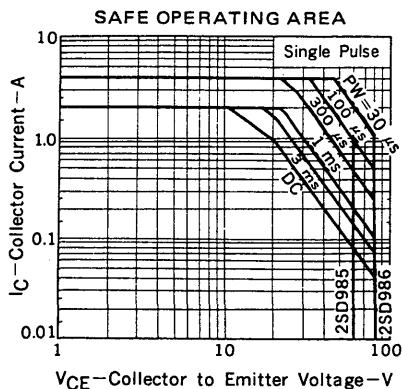
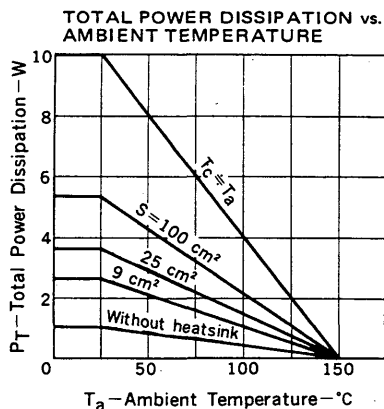
** Pulsed / $PW \leq 350\text{ }\mu\text{s}$, Duty Cycle $\leq 2\%$

Classification of h_{FE2}

| Rank | M | L | K |
|-------|--------------|---------------|---------------|
| Range | 2000 to 5000 | 4000 to 10000 | 8000 to 30000 |

Test Conditions: $V_{CE} = 2.0\text{ V}$, $I_C = 1.0\text{ A}$

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



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