NEC

PNP SILICON DARLINGTON TRANSISTOR

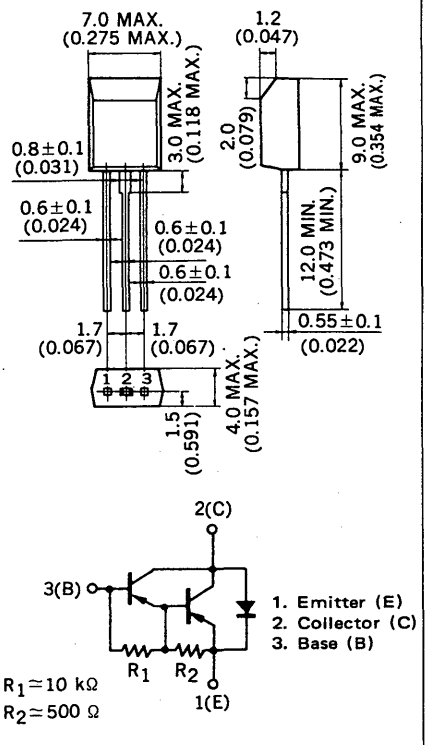
2SB1093

DESCRIPTION The 2SB1093 is a darlington transistor including a dumper diode at C-E.
It is suitable for general driving use, such as hammer, solenoid, lamp or motor.

FEATURES

- High DC current gain.
- High current capability, wide ASO and low collector saturation voltage.
- Includes a dumper diode at C-E.
- A complementary pair with NEC's 2SD1579.

PACKAGE DIMENSIONS
in millimeters (inches)



$R_1 \simeq 10$ kΩ
$R_2 \simeq 500$ Ω

ABSOLUTE MAXIMUM RATINGS

Maximum Temperatures
- Storage Temperature . . . . . −55 to +150 °C
- Junction Temperature . . . . . 150 °C Maximum

Maximum Power Dissipation (T_a = 25 °C)
- Total Power Dissipation . . . . . 1.0 W

Maximum Voltages and Currents (T_a = 25 °C)
- V_{CBO} Collector to Base Voltage . . . . . −80 V
- V_{CEO} Collector to Emitter Voltage . . . . . −80 V
- V_{EBO} Emitter to Base Voltage . . . . . −8.0 V
- I_C Collector Current (DC) . . . . . ∓1.5 A
- I_C Collector Current (Pulse)* . . . . . ∓3.0 A
- I_B Base Current (DC) . . . . . −0.15 A

*PW ≦ 300 μs, Duty Cycle ≦ 10 %

ELECTRICAL CHARACTERISTICS (T_a = 25 °C)

SYMBOL	CHARACTERISTIC	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
h_{FE1}	DC Current Gain	1000			–	V_{CE} = −2.0 V, I_C = −0.5 A
h_{FE2}	DC Current Gain	2000		30000	–	V_{CE} = −2.0 V, I_C = −1.0 A
t_{on}	Turn-On Time		0.5		μs	(I_C = −1.0 A, R_L = 50 Ω
t_{stg}	Storage Time		1.0		μs	I_{B1} = −I_{B2} = −1.0 mA, V_{CC} = −50 V
t_f	Fall Time		1.0		μs	See Test Circuit)
I_{CBO}	Collector Cutoff Current			−10	μA	V_{CB} = −80 V, I_E = 0
I_{CER}	Collector Cutoff Current			−1.0	mA	V_{CE} = −80 V, R_{BE} = 51 Ω, T_a = 125 °C
I_{CEX1}	Collector Cutoff Current			−10	μA	V_{CE} = −80 V, $V_{BE(off)}$ = −1.5 V
I_{CEX2}	Collector Cutoff Current			−1.0	mA	V_{CE} = −80 V, $V_{BE(off)}$ = −1.5 V, T_a = 125 °C
I_{EBO}	Emitter Cutoff Current			−1.0	mA	V_{EB} = −5.0 V, I_C = 0
$V_{CE(sat)}$	Collector Saturation Voltage			−1.5	V	I_C = −1.0 A, I_B = −1.0 mA
$V_{BE(sat)}$	Base Saturation Voltage			−2.0	V	
f_T	Gain Bandwidth Product		80		MHz	V_{CE} = −10 V, I_E = 1.0 A

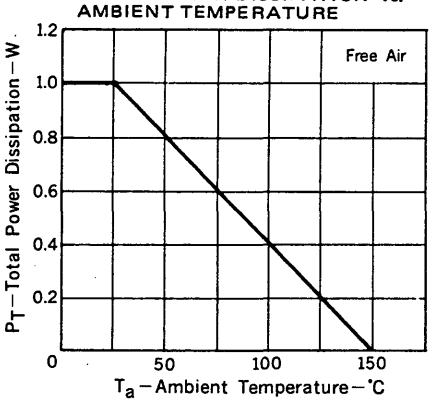
Classification of h_{FE2}

Rank	M	L	K
Range	2000 – 5000	4000 – 10000	8000 – 30000

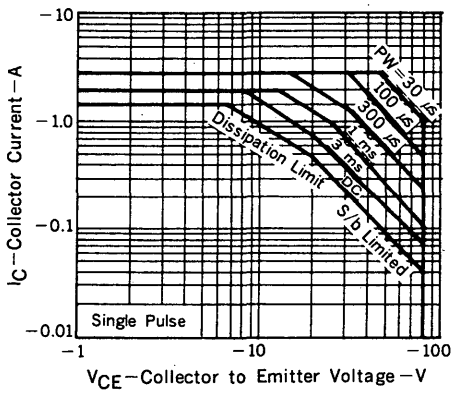
Test Conditions: V_{CE} = −2.0 V, I_C = −1.0 A

TYPICAL CHARACTERISTICS (T_a = 25 °C)

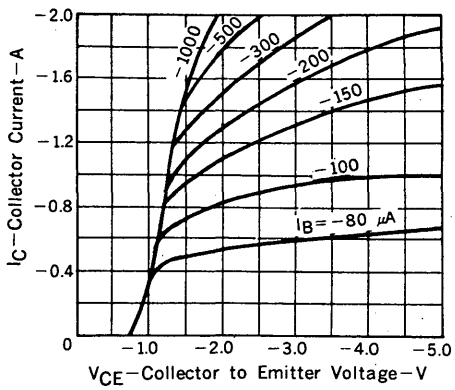
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



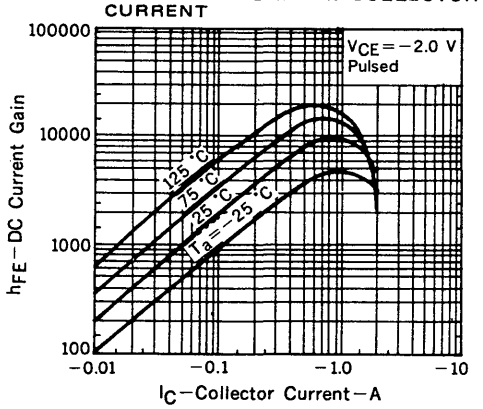
SAFE OPERATING AREAS



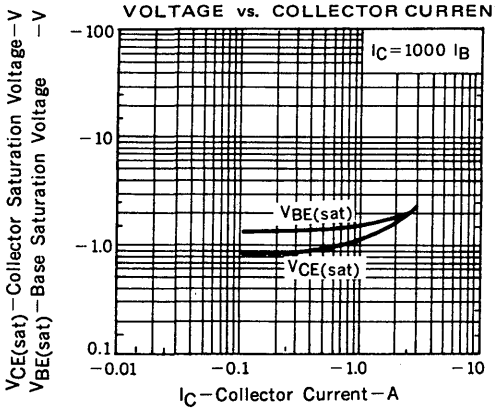
COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



DC CURRENT GAIN vs. COLLECTOR CURRENT



BASE AND COLLECTOR SATURATION VOLTAGE vs. COLLECTOR CURRENT



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