NEC

NPN SILICON POWER TRANSISTOR

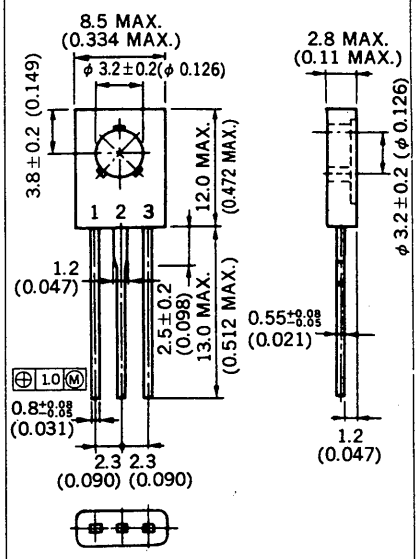
2SD1694

DESCRIPTION The 2SD1694 is High h_{FE} and Low $V_{CE(sat)}$ transistor.
It is suitable for use to operate from IC without predriver, such as hammer driver.

FEATURES

- High DC Current Gain : h_{FE} = 800 to 3200.
- Low Collector Saturation Voltage.
  $V_{CE(sat)}$ = 0.4 V MAX. (@ I_C/I_B = 2.0 A/20 mA)
- High Total Power Dissipation : P_T = 1.3 W

PACKAGE DIMENSIONS
in millimeters (inches)



1. Emitter
2. Collector connected to mounting plane
3. Base

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 °C) . . . . . 1.3 W
- Total Power Dissipation (T_c = 25 °C) . . . . . 20 W

Maximum Voltages and Currents (T_a = 25 °C)

- V_{CBO} Collector to Base Voltage . . . . . 60 V
- V_{CEO} Collector to Emitter Voltage . . . . . 60 V
- V_{EBO} Emitter to Base Voltage . . . . . 7.0 V
- $I_{C(DC)}$ Collector Current . . . . . 3.0 A
- $I_{C(pulse)}$* Collector Current . . . . . 5.0 A
- $I_{B(DC)}$ Base Current . . . . . 0.5 A

* PW ≦ 10 ms, Duty Cycle ≦ 50 %

ELECTRICAL CHARACTERISTICS (T_a = 25 °C)

SYMBOL	CHARACTERISTIC	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
h_{FE1}**	DC Current Gain	700	1400		–	V_{CE} = 5.0 V, I_C = 50 mA
h_{FE2}**	DC Current Gain	800	1500	3200	–	V_{CE} = 5.0 V, I_C = 0.5 A
h_{FE3}**	DC Current Gain	500	1200		–	V_{CE} = 5.0 V, I_C = 3.0 A
t_{on}	Turn-On Time		0.9	2.0	μs	I_C = 2.0 A, I_{B1} = −I_{B2} = 20 mA, R_L = 5 Ω, V_{CC} ≒ 10 V
t_{stg}	Storage Time		2.6	4.0	μs	
t_f	Fall Time		1.0	2.0	μs	
$V_{CE(sat)}$**	Collector Saturation Voltage		0.2	0.4	V	I_C = 2.0 A, I_B = 20 mA
$V_{BE(sat)}$**	Base Saturation Voltage		0.85	1.2	V	I_C = 2.0 A, I_B = 20 mA
I_{CBO}	Collector Cutoff Current			10	μA	V_{CB} = 60 V, I_E = 0
I_{EBO}	Emitter Cutoff Current			10	μA	V_{EB} = 5.0 V, I_C = 0
f_T	Gain Bandwidth Product	100	250		MHz	V_{CE} = 5.0 V, I_C = 1.0 A
C_{ob}	Output Capacitance		50	60	pF	V_{CB} = 10 V, I_E = 0, f = 1 MHz

** PW ≦ 350 μs, Duty Cycle ≦ 2 %

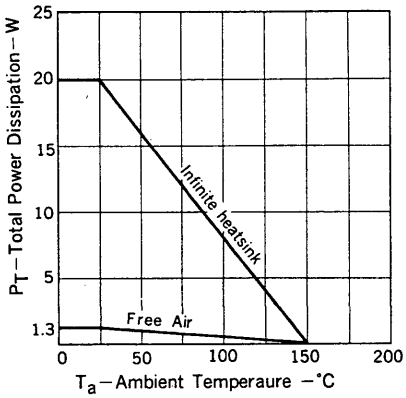
Classification of h_{FE2}

Rank	M	L	K
Range	800 to 1600	1000 to 2000	1600 to 3200

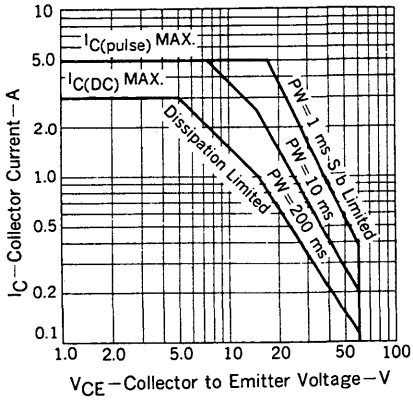
Test Conditions: V_{CE} = 5.0 V, I_C = 0.5 A

TYPICAL CHARACTERISTICS (T_a = 25 °C)

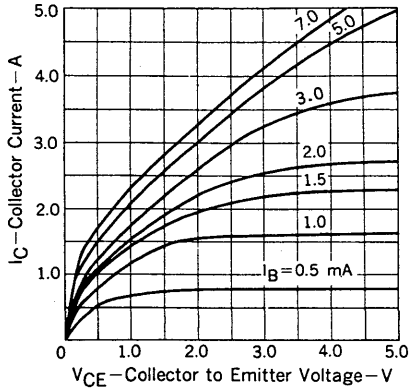
TOTAL POWER DISSIPATION vs. AMBINET TEMPERATURE



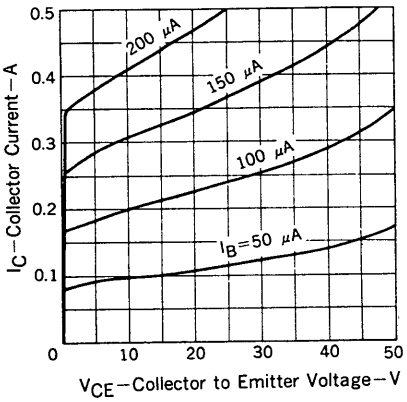
SAFE OPERATING AREA



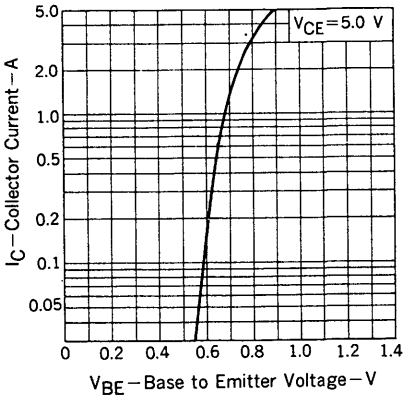
COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



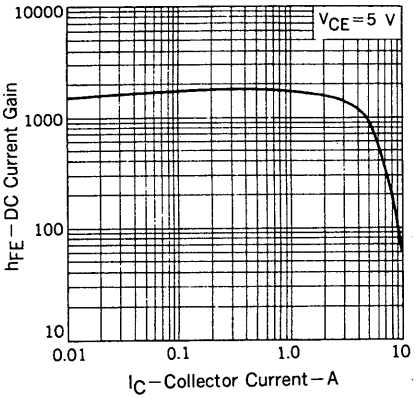
COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



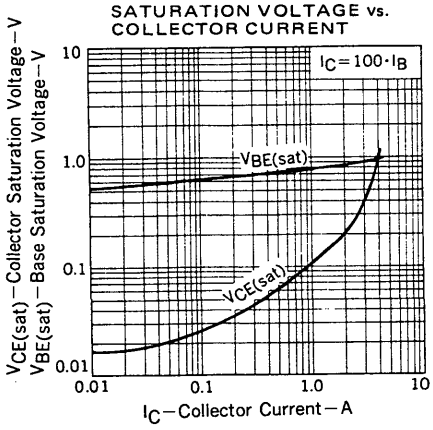
COLLECTOR CURRENT vs. BASE TO EMITTER VOLTAGE



DC CURRENT GAIN vs. COLLECTOR CURRENT



BASE AND COLLECTOR SATURATION VOLTAGE vs. COLLECTOR CURRENT



GAIN BANDWIDTH PRODUCT vs. COLLECTOR CURRENT