

## 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

### 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

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

### ELECTRICAL CHARACTERISTICS ( $T_a = 25$ °C)

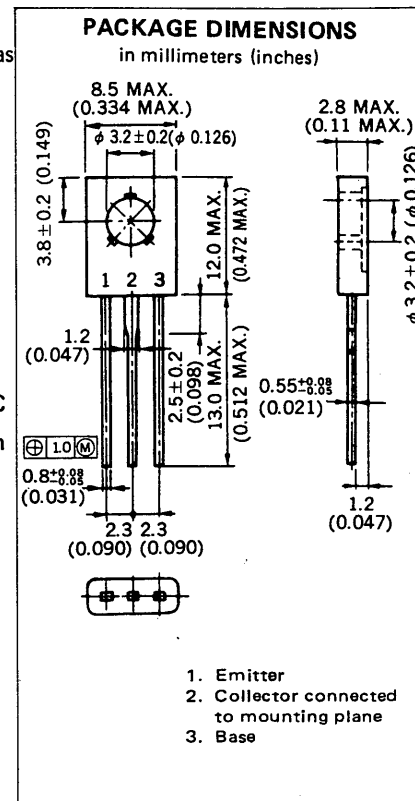
SYMBOL	CHARACTERISTIC	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
$h_{FE1}^{**}$	DC Current Gain	700	1400		—	$V_{CE} = 5.0$ V, $I_C = 50$ mA
$h_{FE2}^{**}$	DC Current Gain	800	1500	3200	—	$V_{CE} = 5.0$ V, $I_C = 0.5$ A
$h_{FE3}^{**}$	DC Current Gain	500	1200		—	$V_{CE} = 5.0$ V, $I_C = 3.0$ A
$t_{on}$	Turn-On Time		0.9	2.0	$\mu s$	$I_C = 2.0$ A, $I_{B1} = -I_{B2} = 20$ mA $R_L = 5$ $\Omega$ , $V_{CC} \approx 10$ V
$t_{stg}$	Storage Time		2.6	4.0	$\mu s$	
$t_f$	Fall Time		1.0	2.0	$\mu s$	
$V_{CE(sat)}^{**}$	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	$\mu A$	$V_{CB} = 60$ V, $I_E = 0$
$I_{EBO}$	Emitter Cutoff Current			10	$\mu A$	$V_{EB} = 5.0$ 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

\*\*  $PW \leq 350$   $\mu s$ , Duty Cycle  $\leq 2$  %

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

