

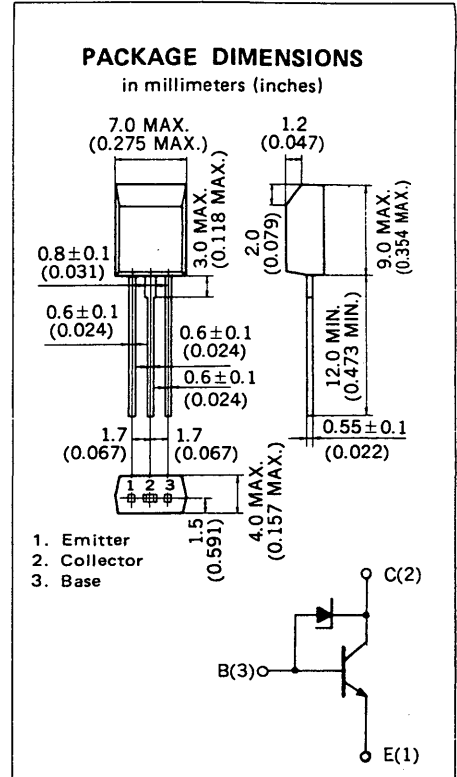
DESCRIPTION The 2SD1780 is high h_{FE} transistor, built-in a zener diode at B-C.
It is suitable for use to operate from IC without predriver, such as hammer or motor driver.

- FEATURES**
- Built in 60 V Zener Diode at B-C.
 - High DC Current Gain.
 $h_{FE} = 800$ to 3200 ($@V_{CE} = 5.0$ V, $I_C = 1.0$ A)
 - Wide "SOA".
 $V_{CEO} = 60 \pm 10$ V, $I_{C(DC)} = 2.0$ A
 - Low Collector Saturation Voltage.
 $V_{CE(sat)} = 0.20$ TYP. ($@I_C = 1.0$ A, $I_B = 10$ mA)

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 60 ± 10 V
 - V_{CEO} Collector to Emitter Voltage 60 ± 10 V
 - V_{EBO} Emitter to Base Voltage 15 V
 - I_C Collector Current (DC) 2.0 A
 - I_C^* Collector Current (pulse) 3.0 A

* $PW \leq 10$ ms, Duty Cycle ≤ 50 %



ELECTRICAL CHARACTERISTICS ($T_a = 25$ °C)

SYMBOL	CHARACTERISTIC	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
V_{CBO}	Collector to Base Voltage	50	60	70	V	$I_C = 1.0$ mA, $I_E = 0$
V_{CEO}	Collector to Emitter Voltage	50	60	70	V	$I_C = 10$ mA, $R_{BE} = \infty$
h_{FE1}^{**}	DC Current Gain	800	1500	3200	—	$V_{CE} = 5.0$ V, $I_C = 1.0$ A
h_{FE2}^{**}	DC Current Gain	500			—	$V_{CE} = 5.0$ V, $I_C = 2.0$ A
I_{CBO}	Collector Cutoff Current			100	nA	$V_{CB} = 40$ V, $I_E = 0$
I_{EBO}	Base Cutoff Current			100	nA	$V_{EB} = 12$ V, $I_C = 0$
$V_{CE(sat)1}^{**}$	Collector Saturation Voltage		0.1	0.2	V	$I_C = 0.5$ A, $I_B = 5.0$ mA
$V_{CE(sat)2}^{**}$	Collector Saturation Voltage		0.2	0.3	V	$I_C = 1.0$ A, $I_B = 10$ mA
$V_{BE(sat)}^{**}$	Base Saturation Voltage		0.8	1.2	V	$I_C = 1.0$ A, $I_B = 10$ mA
t_{on}	Turn On Time		0.8		μ s	$I_C = 1.0$ A $I_{B1} = -I_{B2} = 10$ mA $R_L = 20$ Ω , $V_{CC} = 20$ V
t_{stg}	Storage Time		2.0		μ s	
t_f	Fall Time		1.2		μ s	

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

Classification of h_{FE1}

Rank	M	L	K
Range	800 to 1600	1200 to 2400	2000 to 3200

Test Conditions: $V_{CE} = 5.0$ V, $I_C = 1.0$ A

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

