Features

Lead Formed for Surface Mount Applications in Plastic Sleeves (No Suffix)

Straight Lead Version in Plastic Sleeves ("−1" Suffix)

High Current Gain−Bandwidth Product

Epoxy Meets UL 94 V−0 @ 0.125 in

NJV Prefix for Automotive and Other Applications RequiringUnique Site and Control Change Requirements;

AEC−Q101 Qualified and PPAP Capable

These Devices are Pb−Free and are RoHS Compliant

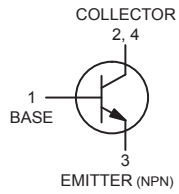
Product Summary

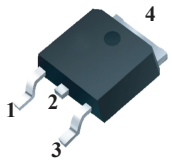
VCBO	VCEO	IC
70V	60V	10A

Applications

Designed for general purpose amplifier and low speed switching applications.

TO-252 Pin Configuration





TO-252

Maximum Ratings

Symbol	Parameter	Rating	Units
V_{CEO}	Collector−Emitter Voltage	60	Vdc
V_{CB}	Collector−Base Voltage	70	Vdc
V_{EB}	Emitter−Base Voltage	5	Vdc
I_C	Collector Current	10	Adc
I_B	Base Current	6	A
P_D†	Total Power Dissipation @ T_C = 25℃ Derate above 25°C	20 0.16	W W/℃
P_D	Total Power Dissipation (Note 1)@ T_A = 25°C Derate above 25°C	1.75 0.014	W W/℃
T_J, T_{stg}	Operating and Storage Junction, Temperature Range	−55 to +150	°C
HBM	ESD − Human Body Model	3B	V
MM	ESD − Machine Model	C	V

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.Safe Area Curves are indicated by Figure 1. Both limits are applicable and must be observed.

1. These ratings are applicable when surface mounted on the minimum pad sizes recommended.

Thermal Characteristics

Symbol	Characteristic	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient (Note 2)	---	71.4	℃/W
$R_{\theta JC}$	Thermal Resistance Junction -Case	---	6.25	℃/W

2. These ratings are applicable when surface mounted on the minimum pad sizes recommended.

Electrical Characteristics (T_C=25℃, unless otherwise noted)

OFF CHARACTERISTICS

Symbol	Characteristic	Min.	Max.	Unit
$V_{CEO\ (sus)}$	Collector−Emitter Sustaining Voltage (Note 3) (I_C = 30 mAdc, I_B = 0)	60	---	Vdc
I_{CEO}	Collector Cutoff Current (V_{CE} = 30 Vdc, I_B = 0)	---	50	μAdc
I_{CEX}	Collector Cutoff Current (V_{CE} = 70 Vdc, $V_{EB(off)}$ = 1.5 Vdc) (V_{CE} = 70 Vdc, $V_{EB(off)}$ = 1.5 Vdc, T_C =150℃)	--- ---	0.02 2	mAdc
I_{CBO}	Collector Cutoff Current (V_{CB} = 70 Vdc, I_E = 0) (V_{CB} = 70 Vdc, I_E = 0, T_C =150℃)	--- ---	0.02 2	mAdc
I_{EBO}	Emitter Cutoff Current (V_{BE} = 5Vdc, I_C = 0)	---	0.5	mAdc

ON CHARACTERISTICS

h_{FE}	DC Current Gain (Note 3) (I_C=4 Adc, V_{CE}= 4Vdc) (I_C=10 Adc, V_{CE}= 4Vdc)	20 5	100 ---	---
$V_{CE(sat)}$	Collector−Emitter Saturation Voltage (Note 3) (I_C=4Adc, I_B=0.4 Adc) (I_C=10Adc, I_B=3.3 Adc)	--- ---	1.1 8	Vdc
$V_{BE(on)}$	Base−Emitter On Voltage (Note 3) (I_C =4Adc, V_{CE}=4Vdc)	---	1.8	Vdc

DYNAMIC CHARACTERISTICS

f_T	Current−Gain − Bandwidth Product (I_C = 500 mAdc, V_{CE} = 10 Vdc, f = 500 kHz)	2	---	MHz

3. Pulse Test: Pulse Width ≤300 μs, Duty Cycle ≤2%.

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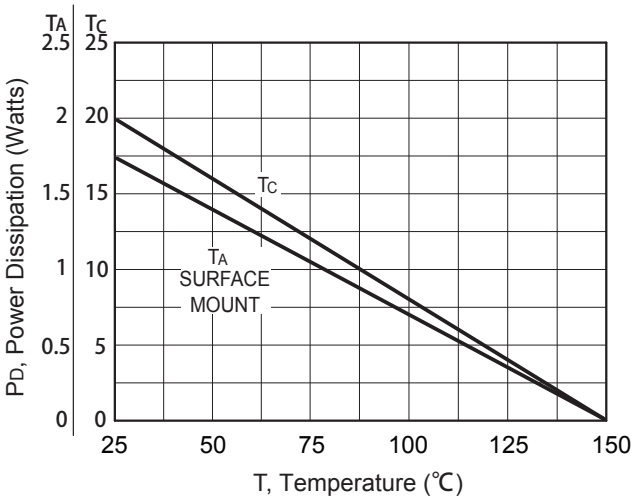
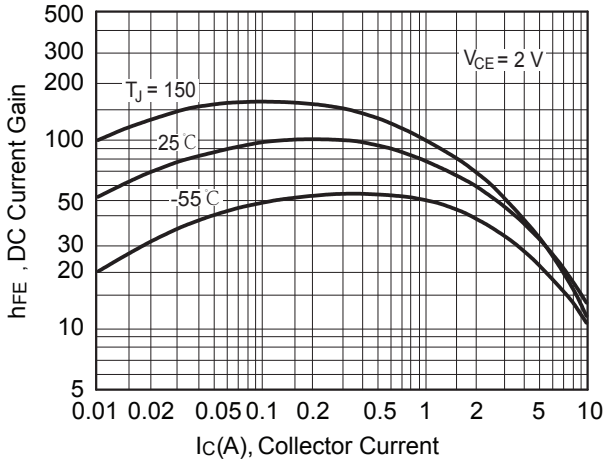
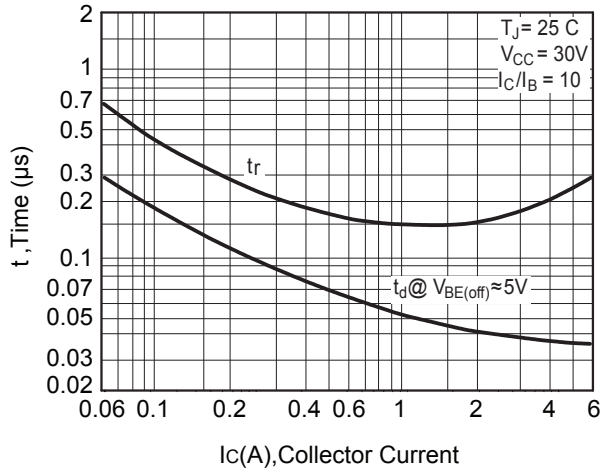
Typical Characteristics



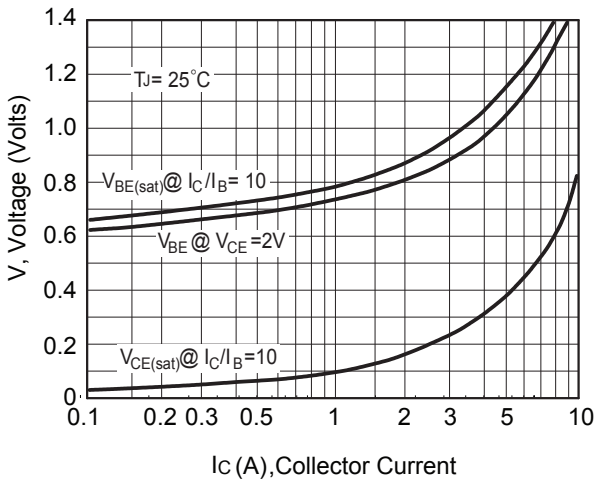
Power Derating



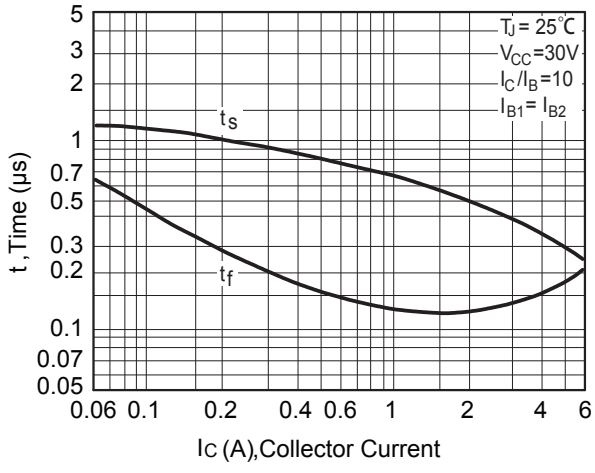
DC current Gain



Turn-On Time

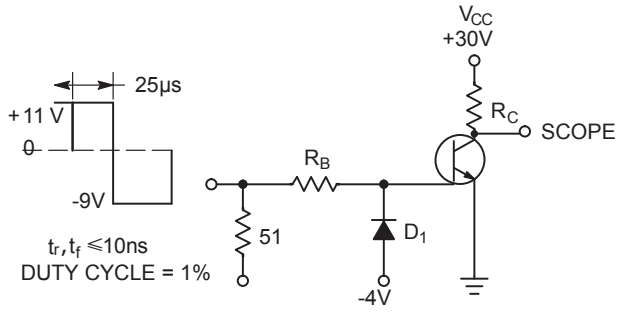


"On" Voltages



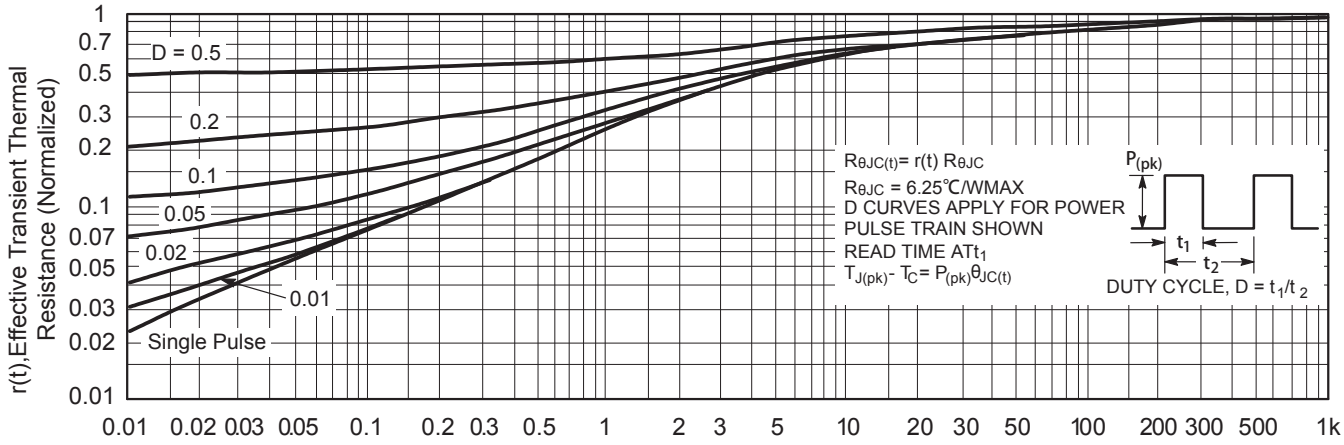
Turn-Off Time

Typical Characteristics

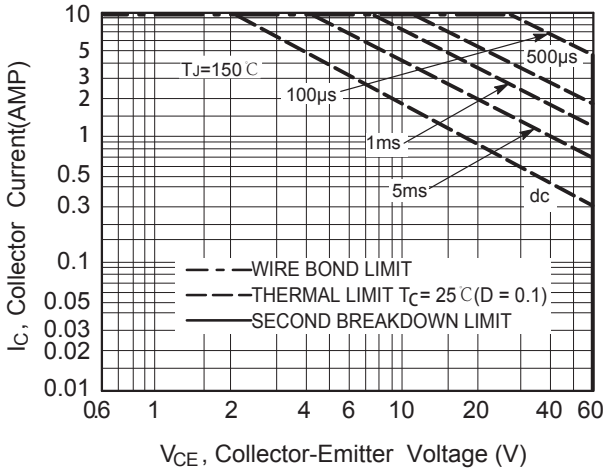


R_B and R_C VARIED TO OBTAIN DESIRED CURRENT LEVELS
D_1 MUST BE FAST RECOVERY TYPE, eg:
1N5825 USED ABOVE IB ≈100mA
MSD6100 USED BELOW IB ≈100mA

Switching Time Test Circuit



Thermal Response



Maximum Forward Bias Safe Operating Area

Forward Bias Safe Operating Area Information

There are two limitations on the power handling ability of a transistor: average junction temperature and second breakdown. Safe operating area curves indicate $I_C - V_{CE}$ limits of the transistor that must be observed for reliable operation; i.e., the transistor must not be subjected to greater dissipation than the curves indicate.

The data of Figure 9 is based on $T_{J(pk)}$ = 150℃; T_C is variable depending on conditions. Second breakdown pulse limits are valid for duty cycles to 10% provided $T_{J(pk)} \leq 150℃$. $T_{J(pk)}$ may be calculated from the data in Figure 8. At high case temperatures, thermal limitations will reduce the power that can be handled to values less than the limitations imposed by second breakdown.

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