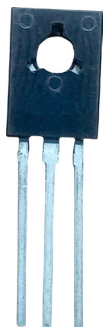


Single Bipolar Transistor multicomp^{PRO}



RoHS
Compliant

Description

Designed for use as Audio Amplifier and Drivers Utilizing

Applications

- Driver stages in hi-fi amplifier and television circuit.

Features

- This product is available in AEC-Q101 Qualified and PPAP Capable also.

Absolute Maximum Ratings (Ta = 25°C Unless otherwise specified)

Parameter	Symbol	BD137/BD138	BD139/BD140	Unit
Collector -Emitter Voltage	V _{CEO}	60	80	V
Collector -Emitter Voltage (R _{BE} =1kW)	V _{CER}		100	
Collector -Base Voltage	V _{CBO}			
Emitter Base Voltage	V _{EBO}	5		
Collector Current	I _C	1.5		A
Collector Peak Current	I _{CM}	2		
Base Current	I _B	0.5		
Power Dissipation @ Ta=25°C	P _D	1.25		W
Derate above 25°C		10		mW/°C
Power Dissipation @ Tc=25°C		12.5		W
Derate above 25°C		100		mW/°C
Power Dissipation @ Tc=70°C		8		W
Operating And Storage Junction Temperature Range	T _J , T _{STG}	-55 to +150		°C
Junction to Ambient in free air	R _{th (j-a)}	100		°C/W
Junction to Case	R _{th (j-c)}	10		

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Electrical Characteristics at (Ta = 25°C Unless otherwise specified)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Collector Emitter Sustaining Voltage	$V_{CEO(sus)1}$	$I_C=30mA, I_B=0$ BD137/BD138	40	--	--	V
		BD139/BD140	60	--	--	
Collector Cut off Current	I_{CBO}	$V_{CB}=30V,$	--	--	0.1	V
		$V_{CB}=30V, I_E=0, T_C=125^{\circ}C$	--	--	10	μA
Emitter Cut off Current	I_{EBO}	$V_{EB}=5V, I_C=0$	--	--	10	μA
DC Current Gain	h_{FE}^1	$I_C=0.005A, V_{CE}=2V$	25	--	--	μA
		$I_C=0.15A, V_{CE}=2V$	40	--	250	
		$I_C=0.5A, V_{CE}=2V$	25	--	--	
DC Current Gain		$I_C=0.15A, V_{CE}=2V$	-6	40	--	100
			-10	63	--	160
			-16	100	--	250
			-25	160	--	400
Collector Emitter Saturation Voltage		$I_C=0.5A, I_B=0.05A$	--	--	0.5	V
Base Emitter On Voltage		$I_C=0.5A, V_{CE}=2V$	--	--	1.0	V

Note:

1. Pulse test:- Pulse width=300 μs , duty cycle=2%
2. For PNP devices voltage and current values will be negative (-)

Typical Characteristics Curves

Fig 1: DC current Gain

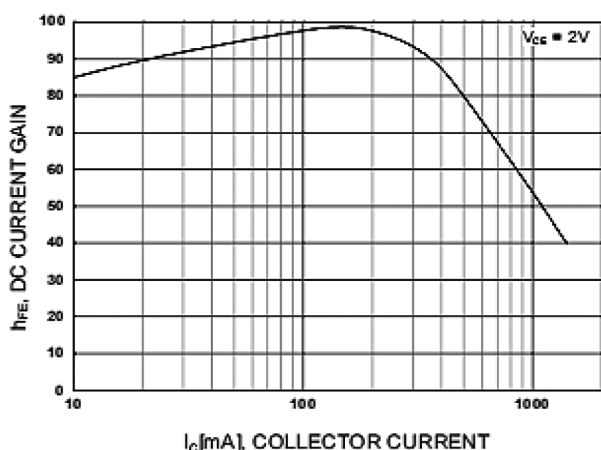
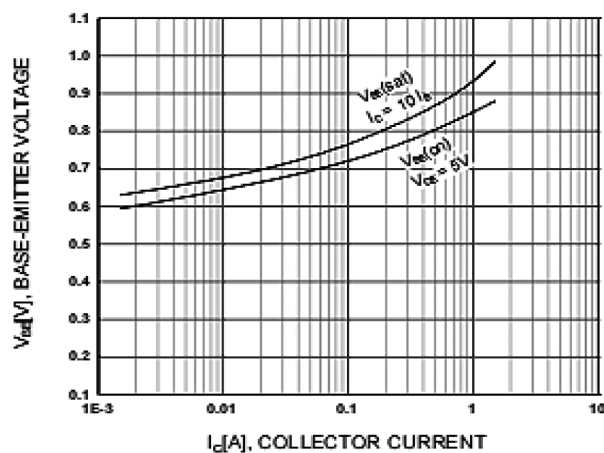


Fig 2: Base-Emitter Voltage



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Fig 3: . Power Derating

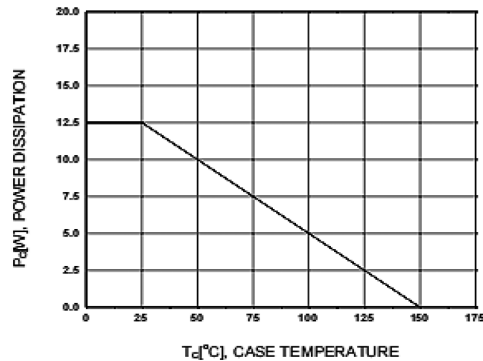


Fig 4: Collector-Emitter Saturation Voltage

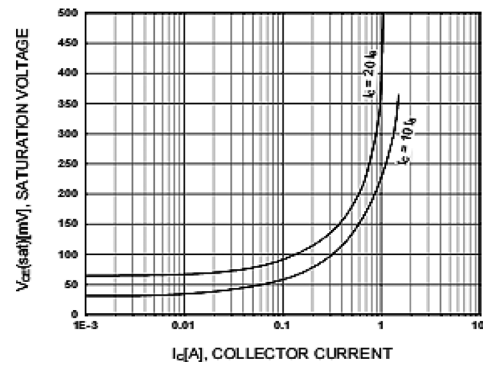
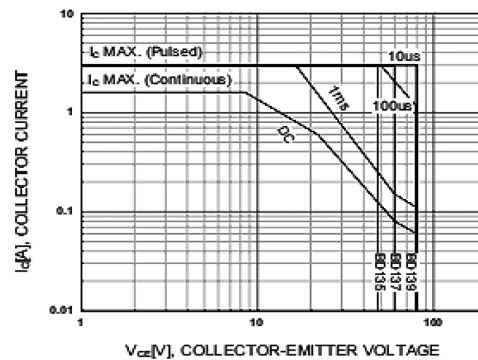
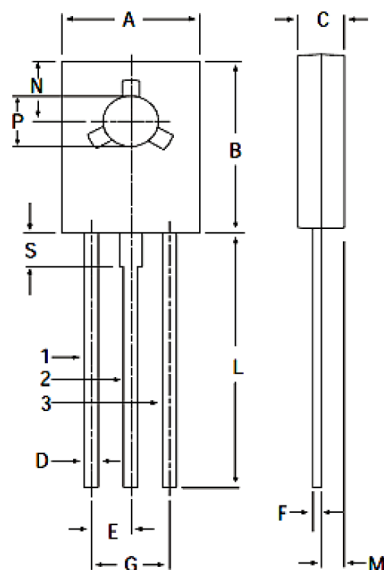


Fig 5: Safe Operating Area



TO-18 Lead Plastic Package



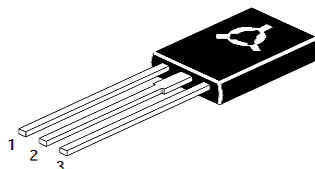
DIM	MIN.	TYP	MAX.
A	7.4		7.8
B	10.5		10.8
C	2.4	--	2.7
D	0.7		0.9
E	--	2.25	--
F	0.49	--	0.75
G		4.5	
L		15.7	
M	--	1.27	--
N		3.75	
P	3	--	3.2
S	--	2.5	--

Dimensions : Millimetres

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PIN CONFIGURATION

1. EMITTER
2. COLLECTOR
3. BASE



Recommended Reflow Solder Profiles

The recommended reflow solder profiles for Pb and Pb-free devices are shown below.

Figure 1 shows the recommended solder profile for devices that have Pb-free terminal plating, and where a Pb free solder is used.

Figure 2 shows the recommended solder profile for devices with Pb-free terminal plating used with leaded solder, or for devices with leaded terminal plating used with a leaded solder.

Figure 1

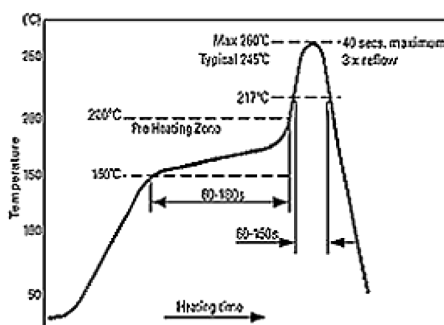
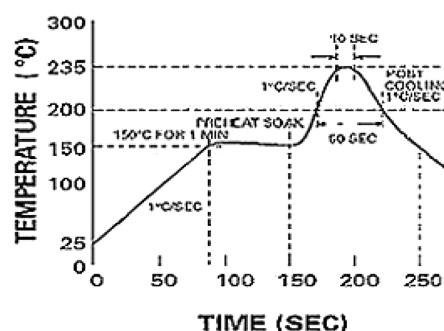


Figure 2



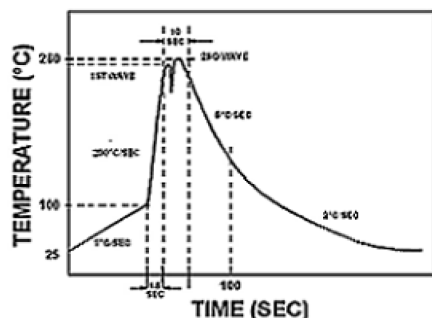
Reflow profiles in tabular form

Profile Feature	Sn-Pb System	Pb-Free System
Average Ramp-Up Rate	~3°C/second	~3°C/second
Preheat – Temperature Range – Time	150-170°C 60-180 seconds	150-200°C 60-180 seconds
Time maintained above: – Temperature – Time	200°C 30-50 seconds	217°C 60-150 seconds
Peak Temperature	235°C	260°C max.
Time within +0 -5°C of actual Peak	10 seconds	40 seconds
Ramp-Down Rate	3°C/second max.	6°C/second max.

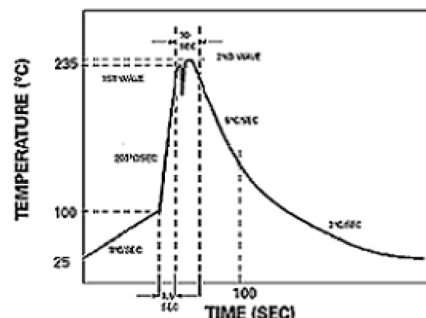
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Recommended Wave Solder Profiles

The Recommended solder Profile For Devices with Pb-free terminal plating where a Pb-free solder is used



The Recommended solder Profile For Devices with Pb-free terminal plating used with leaded solder, or for devices with leaded terminal plating used with leaded solder



Wave Profiles in Tabular Form

Profile Feature	Sn-Pb System	Pb-Free System
Average Ramp-Up Rate	~200°C/second	~200°C/second
Heating rate during preheat	Typical 1-2, Max 4°C/sec	Typical 1-2, Max 4°C/Sec
Final preheat Temperature	Within 125°C of Solder Temp	Within 125°C of Solder Temp
Peak Temperature	235°C	260°C max.
Time within +0 -5°C of actual Peak	10 seconds	10 seconds
Ramp-Down Rate	5°C/second max.	5°C/second max.

Part Number Table

Description	Part Number
Single Bipolar Transistor, NPN, 60V, 1500mA, 12.5W, TO-126	BD137
Single Bipolar Transistor, NPN, 60V, 1500mA, 12.5W, 10A DC, TO-126	BD137-10
Single Bipolar Transistor, NPN, 60V, 1500mA, 12.5W, 16A DC, TO-126	BD137-16
Single Bipolar Transistor, PNP, 60V, 1500mA, 12.5W, TO-126	BD138
Single Bipolar Transistor, PNP, 60V, 1500mA, 12.5W, 10A DC, TO-126	BD138-10
Single Bipolar Transistor, PNP, 60V, 1500mA, 12.5W, 16A DC, TO-126	BD138-16
Single Bipolar Transistor, NPN, 80V, 1500mA, 12.5W TO-126	BD139
Single Bipolar Transistor, NPN, 80V, 1500mA, 12.5W, 16A DC, TO-126	BD139-16
Single Bipolar Transistor, PNP, 80V, 1500mA, 12.5W, 16A DC, TO-126	BD140-16
Single Bipolar Transistor, PNP, 80V, 1500mA, 12.5W, 25A DC, TO-126	BD140-25

Dimensions : Millimetres

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