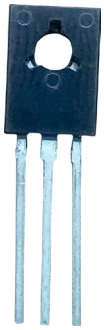
Single Bipolar Transistor



RoHS Compliant

Applications

- Intended for use in Medium Power Linear and Switching Applications

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

Parameter	Symbol	BD440	BD442	Unit
Collector Base Voltage	V_{CBO}	60	80	V
Collector Emitter Voltage	V_{CES}			
Collector Emitter Voltage	V_{CEO}			
Emitter Base Voltage	V_{EBO}	5		
Collector Current	I_C	4		A
Collector Peak Current (t=10ms)	I_{CM}	7		
Base Current	I_B	1		
Total Dissipation @ T_C=25ºC	P_{TOT}	36		W
Derate above 25ºC	P_D	10		mW/°C
Operating and Storage Junction Temperature Range	T_j, T_{stg}	-65 to +150		°C

Thermal Resistance

Description	Symbol	Value	Unit
Junction to Case	$R_{\theta(j-c)}$	3.5	ºC/W
Junction to Ambient in free air	$R_{\theta(j-a)}$	100	

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

Parameter	Symbol	Test Condition	Min./Min	BD440	BD442	Unit
Collector Cut off Current	I_{CBO}	V_{CB}=Rated, V_{CBO}, I_E=0	Max	100		µA
Collector Cut off Current	I_{CES}	V_{BE}=0, V_{CE}=Rated V_{CES}		100		
Emitter Cut off Current	I_{EBO}	V_{EB}=5V, I_C=0		1		mA
Collector Emitter Sustaining Voltage	$V_{CEO(SUS)}$[1]	I_C=100mA, I_B=0	Min	60	80	V
Collector Emitter Saturation Voltage	$V_{CE\ (sat)}$[1]	I_C=2.0A, I_B=0.2A	Max	0.8		
Base Emitter On Voltage	$V_{BE\ (on)}$[1]	I_C=10mA, V_{CE}=5V		(typ) 0.58		
		I_C=2.0A, V_{CE}=1V	Max	1.5		
DC Current Gain	h_{FE}[1]	I_C=10mA, V_{CE}=5V	Min	20	15	
		I_C=500mA,V_{CE}=1V		40		
		I_C=2.0A, V_{CE}=1V		25	15	
h_{FE1}[1] / h_{FE2}	Matched Pairs	I_C=500mA,V_{CE}=1V	Max	1.4		
Current Gain Bandwidth Product	f_T	I_C=250mA,V_{CE}=1V	Min	3		MHz

Note:
1. Pulsed Pulse Duration=300µs, Duty Cycle=1.5%

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

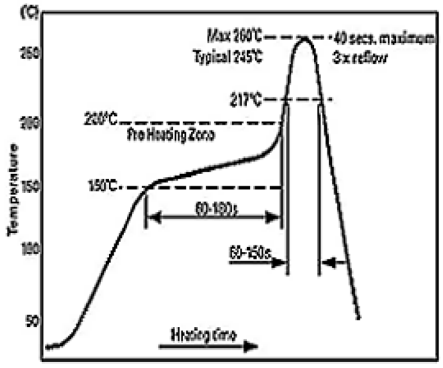
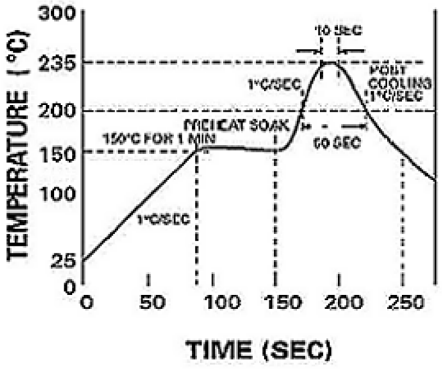


Figure 2

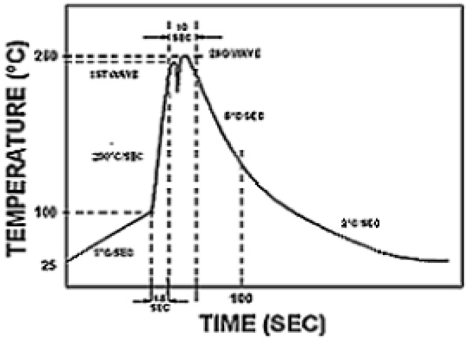


Reflow profiles in tabular form

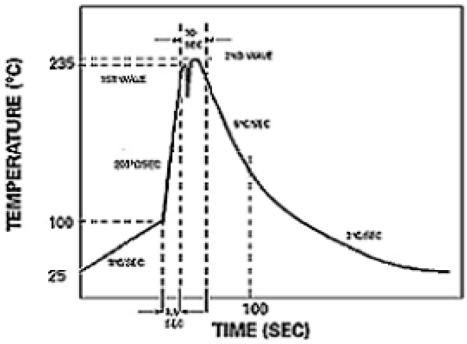
Profile Feature	Sn-Pb System	Pb-Free System
Average Ramp-Up Rate	~3°C/second	~3°C/second
Preheat – Temperature Range – Time	150-170°C 60-180 seconds	150-200°C 60-180 seconds
Time maintained above: – Temperature – Time	200°C 30-50 seconds	217°C 60-150 seconds
Peak Temperature	235°C	260°C max.
Time within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

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 platingused with leaded solder

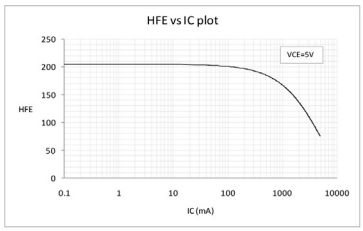


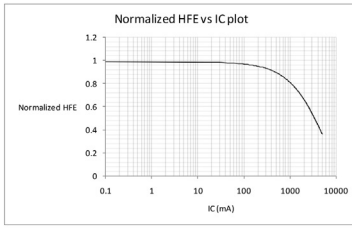
Wave Profiles in Tabular Form

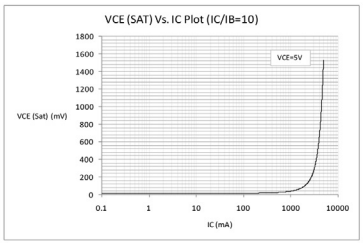
Profile Feature	Sn-Pb System	Pb-Free System
Average Ramp-Up Rate	~200°C/second	~200°C/second
Heating rate during preheat	Typical 1-2, Max 4°C/sec	Typical 1-2, Max 4°C/Sec
Final preheat Temperature	Within 125°C of Solder Temp	Within 125°C of Solder Temp
Peak Temperature	235°C	260°C max.
Time within +0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

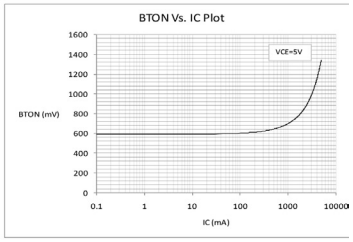
Dimensions : Millimetres

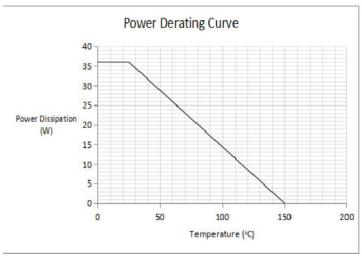
Typical Characteristics Curves

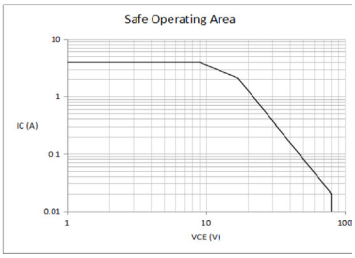




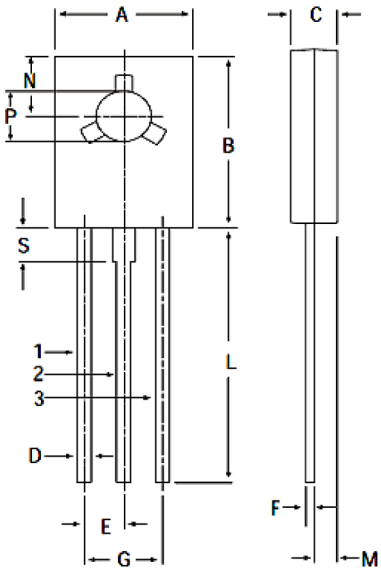








TO-126 Leaded Plastic Package

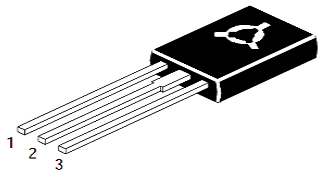


DIM	MIN	MAX
A	7.4	7.8
B	10.5	10.8
C	2.4	2.7
D	0.7	0.9
E	2.25 TYP.	
F	0.49	0.75
G	4.5 TYP.	
L	15.7 TYP.	
M	1.27 TYP.	
N	3.75 TYP.	
P	3	3.2
S	2.5 TYP.	

Single Bipolar Transistor

PIN CONFIGURATION

1. EMITTER
2. COLLECTOR
3. BASE



Part Number Table

Description	Part Number
Single Bipolar Transistor, PNP, 60V, 4000mA, 36W, TO-126	BD440
Single Bipolar Transistor, PNP, 80V, 4000mA, 36W, TO-126	BD442

Dimensions : Millimetres

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