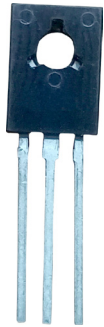


Single Bipolar Transistor multicomp^{PRO}



RoHS
Compliant

Applications

- Intended for use in Medium Power Linear Switching Applications

Features

- This product is available in AEC-Q101 Compliant and PPAP Capable also.
- Note: For AEC-Q101 compliant products, please use suffix -AQ in the part number while ordering.

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

Parameter	Symbol	BD233 BD234	BD235 BD236	Unit
Collector Base Voltage	V _{CBO}	45	60	V
Collector Emitter Voltage	V _{CEO}			
Collector Emitter Voltage (R _{BE} =1KΩ)	V _{CER}			
Emitter Base Voltage	V _{EBO}	5		A
Collector Current	I _C	2		
Collector Peak Current	I _{CM}	6		
Total Dissipation @ T _C =25°C	P _D	50		W
Total Dissipation @ T _a =25°C		1.25		
Derate above 25°C			10	
Operating and Storage Junction Temperature Range	T _J , T _{stg}	-65 to +150		°C

Thermal Resistance

Description	Symbol	Value	Unit
Junction to Case	R _{th (j-c)}	5	°C/W
Junction to Ambient in free air	R _{th (j-a)}	100	

Newark.com/multicom-p-pro
Farnell.com/multicom-p-pro
sg.element14.com/b/multicom-p-pro

multicom^{PRO}

Single Bipolar Transistor multcomp^{PRO}

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

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Collector Cut off Current	BD233/234	$V_{CB}=45V, I_E=0$	--	--	100	μA
	BD235/236	$V_{CB}=60V, I_E=0$				
Collector Cut off Current	BD233/234	$V_{CB}=45V, I_E=0$			2	mA
TC = 150°C	BD235/236	$V_{CB}=60V, I_E=0$			1	
Emitter Cut off Current	I_{EBO}	$V_{EB}=5V, I_C=0$				
Collector Emitter Sustaining Voltage	BD233/234	$I_C=0.1A, I_B=0$	45	--	--	V
	BD235/236		60			
Collector Emitter Saturation Voltage	$V_{CE(sat)}^1$	$I_C=1.0A, I_B=0.1A$	--		0.6	
Base Emitter Voltage	$V_{BE(on)}^1$	$I_C=1.0A, V_{CE}=2V$	--		1.3	
DC Current Gain	h_{FE}^1	$I_C=150mA, V_{CE}=2V$	40	--	--	
		$I_C=1.0A, V_{CE}=2V$	25			
Current Gain Bandwidth Product	f_T	$I_C=250mA, V_{CE}=10V$	3			
h_{FE1}^1 / h_{FE2}	Matched Pairs	$I_C=150mA, V_{CE}=2V$	--		1.6	

Note:

1. Pulsed Pulse Duration=300 μs , 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

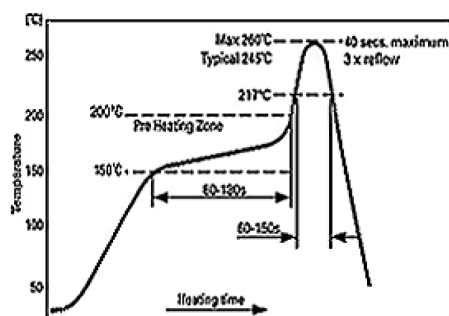
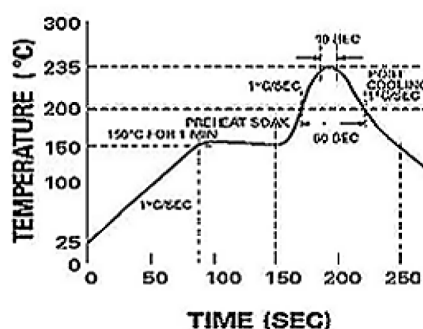


Figure 2



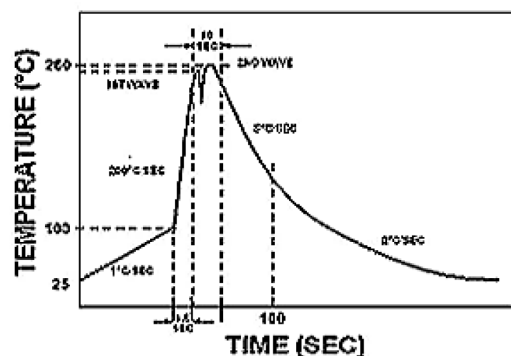
Single Bipolar Transistor multicomp^{PRO}

Reflow profiles in tabular form

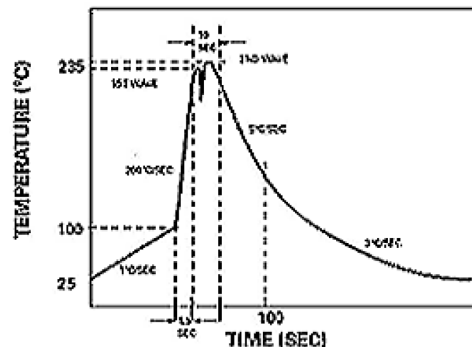
Profile Feature	Sn-Pb System	Pb-Free System
Average Ramp-Up Rate	~3°C/second	~3°C/second
Preheat – Temperature Range – Time	150-170°C 60-180 seconds	150-200°C 60-180 seconds
Time maintained above: – Temperature – Time	200°C 30-50 seconds	217°C 60-150 seconds
Peak Temperature	235°C	260°C max.
Time within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

Single Bipolar Transistor multcomp^{PRO}

Typical Characteristics Curves

Fig 1: DC current Gain

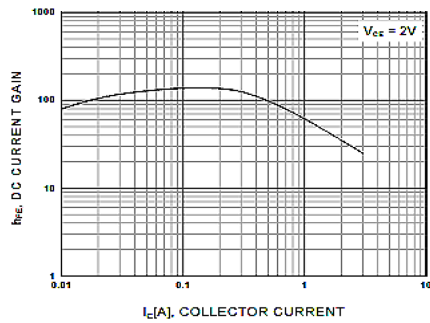


Fig 3: Base-Emitter Saturation Voltage
Collector-Emitter Saturation Voltage

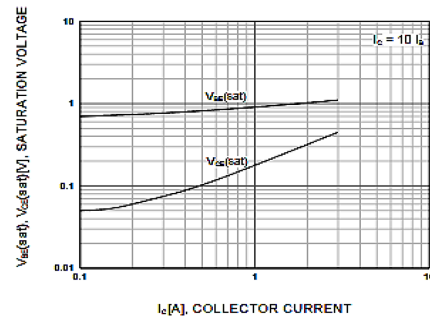


Fig 2: Safe Operating Area

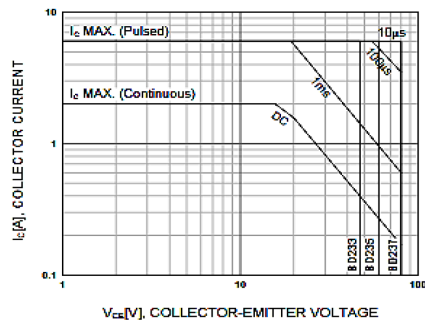
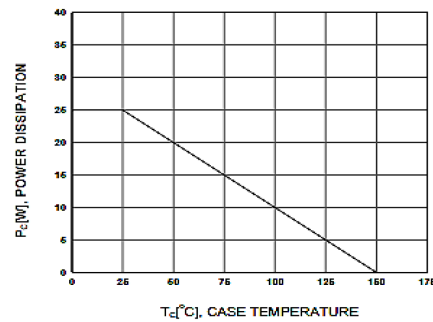
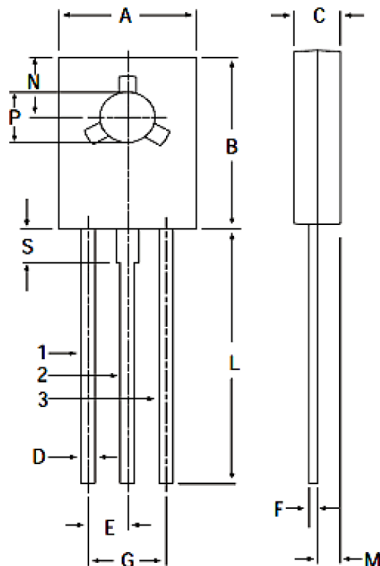


Fig 4: Power Derating



TO-18 Leaded Plastic Package

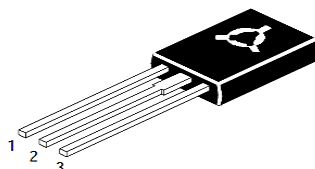


DIM	MIN	MAX
A	7.4	7.8
B	10.5	10.8
C	2.4	2.7
D	0.7	0.9
E	2.25 TYP.	
F	0.49	0.75
G	4.5 TYP.	
L	15.7 TYP.	
M	1.27 TYP.	
N	3.75 TYP.	
P	3	3.2
S	2.5 TYP.	

Single Bipolar Transistor multicomp^{PRO}

PIN CONFIGURATION

1. EMITTER
2. COLLECTOR
3. BASE



Part Number Table

Description	Part Number
Single Bipolar Transistor, NPN, 45V, 2000mA, 50W, TO-126	BD233
Single Bipolar Transistor, PNP, 45V, 2000mA, 50W, TO-126	BD234
Single Bipolar Transistor, NPN, 60V, 2000mA, 50W, TO-126	BD235
Single Bipolar Transistor, PNP, 60V, 2000mA, 50W, TO-126	BD236

Dimensions : Millimetres

Important Notice : This data sheet and its contents (the "Information") belong to the members of the AVNET group of companies (the "Group") or are licensed to it. No licence is granted for the use of it other than for information purposes in connection with the products to which it relates. No licence of any intellectual property rights is granted. The Information is subject to change without notice and replaces all data sheets previously supplied. The Information supplied is believed to be accurate but the Group assumes no responsibility for its accuracy or completeness, any error in or omission from it or for any use made of it. Users of this data sheet should check for themselves the Information and the suitability of the products for their purpose and not make any assumptions based on information included or omitted. Liability for loss or damage resulting from any reliance on the Information or use of it (including liability resulting from negligence or where the Group was aware of the possibility of such loss or damage arising) is excluded. This will not operate to limit or restrict the Group's liability for death or personal injury resulting from its negligence. Multicomp Pro is the registered trademark of Premier Farnell Limited 2019.

Newark.com/multicomp-pro
Farnell.com/multicomp-pro
sg.element14.com/b/multicomp-pro

multicomp^{PRO}