



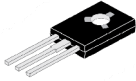
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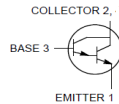


4Amp NPN PLASTIC POWER DARLINGTON TRANSISTORS

BD675 BD675A
BD677 BD677A
BD679 BD679A
BD681 BD683



TO-126



**TO-126 Leaded
 Plastic Package
 RoHS compliant**

FEATURES:

1. BD675, 675A, 677, 677A, 679, 679A, 681 are complementary with BD676, 676A, 678, 678A, 680, 680A, 682.
2. BD677, 677A, 679, 679A are equivalent to MJE 800, 801, 802, 803
3. This product is available in AEC-Q101 Qualified and PPAP Capable also.

Note: For AEC-Q101 qualified products, please use suffix -AQ in the part number while ordering.

ABSOLUTE MAXIMUM RATINGS (Ta = 25 °C Unless otherwise specified)

PARAMETER	SYMBOL	BD675 BD675A	BD677 BD677A	BD679 BD679A	BD681	BD683	UNIT
Collector Base Voltage	V_{CBO}	45	60	80	100	120	V
Collector Emitter Voltage	V_{CEO}	45	60	80	100	120	V
Emitter Base Voltage	V_{EBO}	5.0					V
Collector Current	I_C	4.0					A
Base Current	I_B	0.1					A
Total Power Dissipation@ Ta=25°C	P_D	1.25					W
Derate above 25°C		10					mW/°C
Total Power Dissipation@ Tc=25°C	P_D	40					W
Derate above 25°C		0.32					mW/°C
Operating & Storage Junction Temperature Range	T_J, T_{stg}	-55 to +150					°C

THERMAL RESISTANCE

From Junction to case	$R_{th(j-c)}$	3.13	°C/W
Junction to Ambient in free air	$R_{th(j-a)}$	100	°C/W

BD675_683

Rev04_07082023EM



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ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$; unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	VALUE			UNIT	
			Min.	Typ.	Max.		
Collector Emitter Voltage	V_{CEO}	$I_C=50\text{mA}, I_B=0$	BD675/BD675A	45	--	--	V
			BD677/BD677A	60	--	--	
			BD679/BD679A	80	--	--	
			BD681	100	--	--	
			BD683	120	--	--	
Collector-Cut off Current	I_{CEO}	$V_{CE}=\text{half rated } V_{CEO}, I_B=0$	--	--	500	μA	
	I_{CBO}	$V_{CB}=\text{rated } V_{CBO}, I_E=0$	--	--	0.2	mA	
	I_{CBO}	$V_{CB}=\text{rated } V_{CBO}, I_E=0 \text{ TC}=100^\circ\text{C}$	--	--	2.0		
Emitter cut off Current	I_{EBO}	$V_{EB}=5\text{V}, I_C=0$	--	--	2.0	mA	
Collector Emitter Saturation voltage	Non A	$V_{CE(\text{sat})}$	$I_C=1.5\text{A}, I_B=6\text{mA}$	--	--	2.5	V
	A	$V_{CE(\text{sat})}$	$I_C=2.0\text{A}, I_B=8\text{mA}$	--	--	2.8	
Base Emitter On Voltage	Non A	$V_{BE(\text{on})}$	$I_C=1.5\text{A}, V_{CE}=3\text{V}$	--	--	2.5	V
	A		$I_C=2\text{A}, V_{CE}=3\text{V}$	--	--	2.5	
DC Current Gain	Non A	h_{FE}	$I_C=1.5\text{A}, V_{CE}=3\text{V}$	750	--	--	
	A	h_{FE}	$I_C=2\text{A}, V_{CE}=3\text{V}$	750	--	--	
Small signal Current Gain	$ h_{fe} $	$I_C=1.5\text{A}, V_{CE}=3\text{V}, f=1\text{MHz}$	1.0	--	--		

Note:

1. Pulse test: Pulse Width $\leq 300\text{ms}$; Duty cycle $\leq 2\%$.

BD675_683
Rev04_07082023EM



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TYPICAL CHARACTERISTICS CURVES

Figure 1. Power Temperature Derating

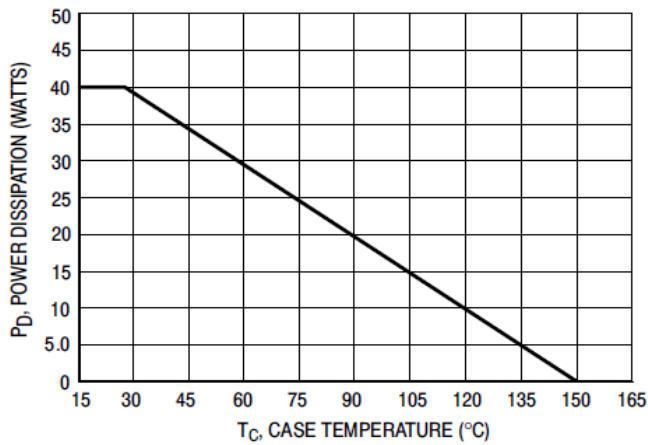
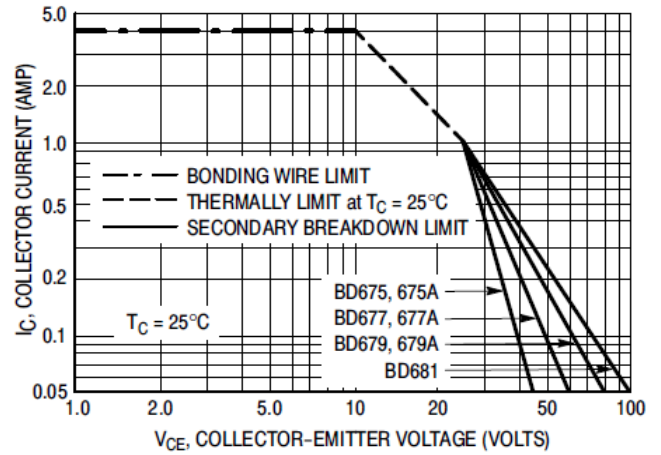


Figure 2. DC Safe Operating Area

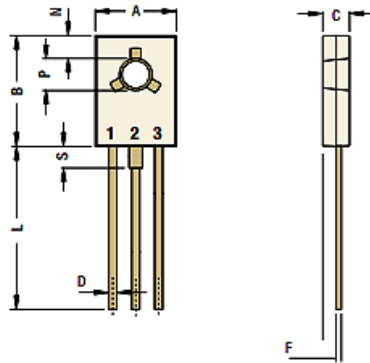
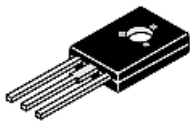


BD675_683
Rev04_07082023EM

Package Details

TO-126 Leaded Plastic Package

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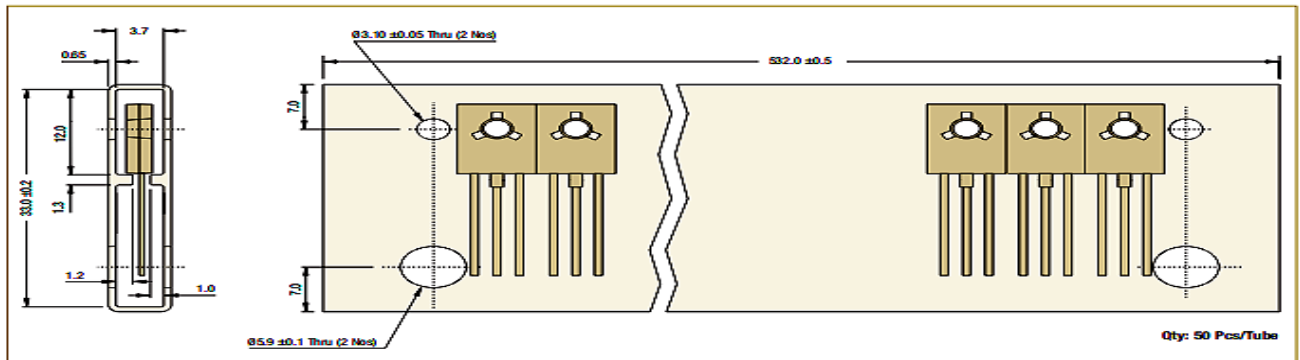
DIM	Min	Max
A	7.12	8.38
B	10.16	11.43
C	2.29	3.04
D	0.64	0.88
E	2.040	2.285
F	0.39	0.63

DIM	Min	Max
G	4.07	5.08
L	15.00	16.63
M	0.89	1.65
N	3.31	4.44
P	2.54	3.30
S	—	2.54

Pin Configurations

1. Emitter
2. Collector
3. Base

TO-126 Series Packaging Tube



Packaging Specifications

T & A: Tape and Ammo Pack; T & R: Tape and Reel; Bulk: Loose in Poly Bags; Tube: Tube and Carton; K: 1,000

Package / Case Type	Packaging Type	Std. Packing	Inner Carton			Outer Carton		
			Qty	Qty	Size L x W x H (cm)	Gross Weight (Kg)	Qty	Size L x W x H (cm)
TO-126	Bulk	2,000	2K	19 x 19 x 8	1.4	20K	46 x 38 x 22	15.6
	Tube	1,000 (50 pcs/tube)	1K	55 x 8 x 10	1.5	10K	55 x 35 x 27	16.3

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

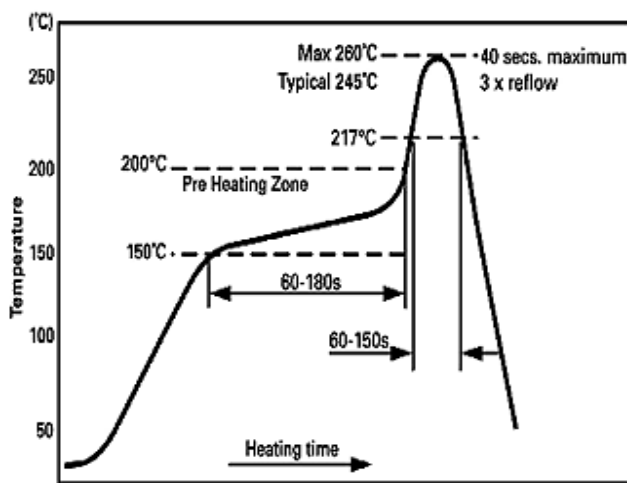
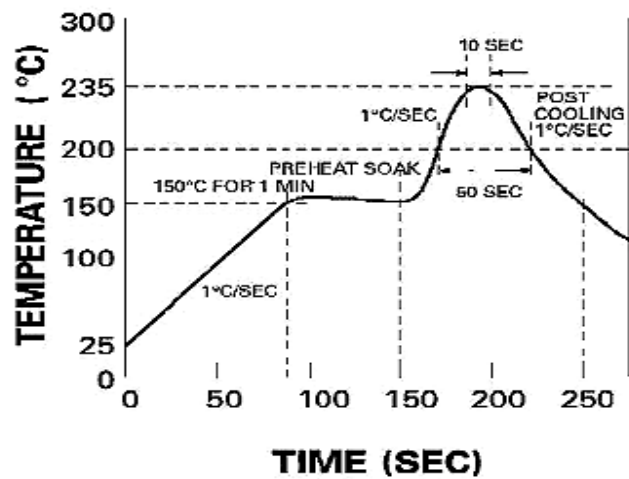


Figure 2

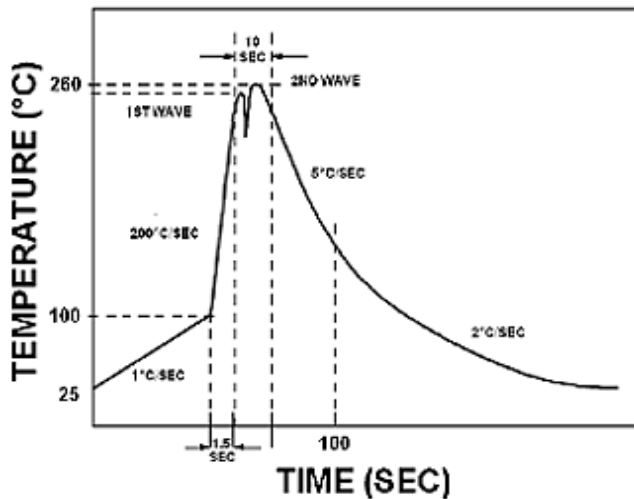


Reflow profiles in tabular form

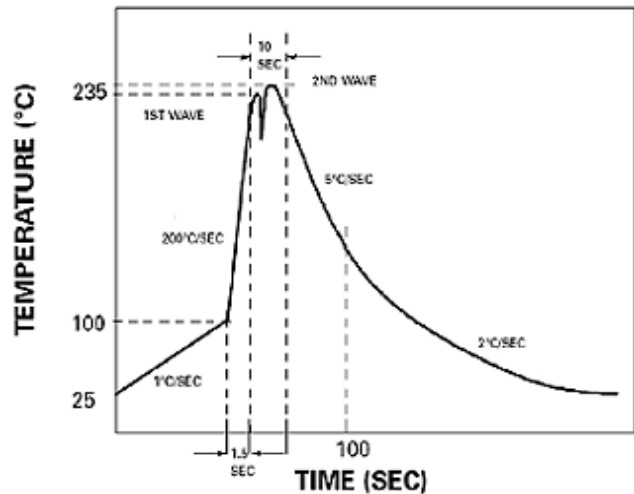
Profile Feature	Sn-Pb System	Pb-Free System
Average Ramp-Up Rate	~3°C/second	~3°C/second
Preheat		
– Temperature Range	150-170°C	150-200°C
– Time	60-180 seconds	60-180 seconds
Time maintained above:		
– Temperature	200°C	217°C
– Time	30-50 seconds	60-150 seconds
Peak Temperature	235°C	260°C max.
Time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



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Recommended Product Storage Environment for Discrete Semiconductor Devices

This storage environment assumes that the Diodes and transistors are packed properly inside the original packing supplied by CDIL.

- Temperature 5 °C to 30 °C
- Humidity between 40 to 70 %RH
- Air should be clean.
- Avoid harmful gas or dust.
- Avoid outdoor exposure or storage in areas subject to rain or water spraying .
- Avoid storage in areas subject to corrosive gas or dust. Product shall not be stored in areas exposed to direct sunlight.
- Avoid rapid change of temperature.
- Avoid condensation.
- Mechanical stress such as vibration and impact shall be avoided.
- The product shall not be placed directly on the floor.
- The product shall be stored on a plane area. They should not be turned upside down. They should not be placed against the wall.

Shelf Life of CDIL Products

The shelf life of products is the period from product manufacture to shipment to customers. The product can be unconditionally shipped within this period. The period is defined as 2 years.

If products are stored longer than the shelf life of 2 years the products shall be subjected to quality check as per CDIL quality procedure.

The products are further warranted for another one year after the date of shipment subject to the above conditions in CDIL original packing.

Floor Life of CDIL Products and MSL Level

When the products are opened from the original packing, the floor life will start.

For this, the following JEDEC table may be referred:

JEDEC MSL Level		
Level	Time	Condition
1	Unlimited	≤30 °C / 85% RH
2	1 Year	≤30 °C / 60% RH
2a	4 Weeks	≤30 °C / 60% RH
3	168 Hours	≤30 °C / 60% RH
4	72 Hours	≤30 °C / 60% RH
5	48 Hours	≤30 °C / 60% RH
5a	24 Hours	≤30 °C / 60% RH
6	Time on Label(TOL)	≤30 °C / 60% RH

BD675_683

Rev04_07082023EM



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Customer Notes

Component Disposal Instructions

1. CDIL Semiconductor Devices are RoHS compliant, customers are requested to please dispose as per prevailing Environmental Legislation of their Country.
2. In Europe, please dispose as per EU Directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE).

Disclaimer

The product information and the selection guides facilitate selection of the Coil's Semiconductor Device(s) best suited for application in your product(s) as per your requirement. It is recommended that you completely review our Data Sheet(s) so as to confirm that the Device(s) meet functionality parameters for your application. The information furnished in the Data Sheet and on the CDIL Web Site/CD are believed to be accurate and reliable. CDIL however, does not assume responsibility for inaccuracies or incomplete information. Furthermore, CDIL does not assume liability whatsoever, arising out of the application or use of any CDIL product; neither does it convey any license under its patent rights nor rights of others. These products are not designed for use in life saving/support appliances or systems. CDIL customers selling these products (either as individual Semiconductor Devices or incorporated in their end products), in any life saving/support appliances or systems or applications do so at their own risk and CDIL will not be responsible for any damages resulting from such sale(s).

CDIL strives for continuous improvement and reserves the right to change the specifications of its products without prior notice.



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BD675_683

Rev04_07082023EM