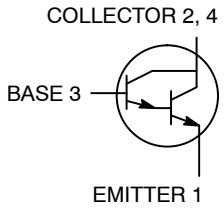
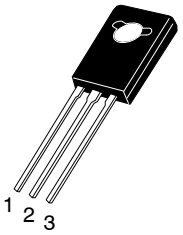
Plastic Medium-Power Silicon NPN Darlingtons

BD675G, BD675AG, BD677G, BD677AG, BD679G, BD679AG, BD681G

4.0 AMPERES
POWER TRANSISTORS
NPN SILICON
60, 80, 100 VOLTS, 40 WATTS

This series of plastic, medium−power silicon NPN Darlington transistors can be used as output devices in complementary general−purpose amplifier applications.





TO−225
CASE 77−09
STYLE 1

Features

- High DC Current Gain
- Monolithic Construction
- Complementary to BD676, 676A, 678, 678A, 680, 680A, 682
- BD677, 677A, 679, 679A are Equivalent to MJE 800, 801, 802, 803
- These Devices are Pb−Free and are RoHS Compliant*

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector−Emitter Voltage BD675G, BD675AG BD677G, BD677AG BD679G, BD679AG BD681G	V_{CEO}	 45 60 80 100	Vdc
Collector−Base Voltage BD675G, BD675AG BD677G, BD677AG BD679G, BD679AG BD681G	V_{CBO}	 45 60 80 100	Vdc
Emitter−Base Voltage	V_{EBO}	5.0	Vdc
Collector Current	I_C	4.0	Adc
Base Current	I_B	1.0	Adc
Total Device Dissipation @ T_C = 25°C Derate above 25°C	P_D	 40 0.32	 W W/°C
Operating and Storage Junction Temperature Range	T_J, T_{stg}	−55 to +150	°C

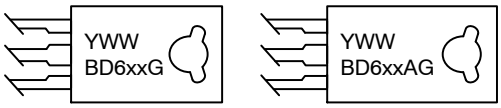
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction−to−Case	$R_{\theta JC}$	3.13	°C/W

*For additional information on our Pb-Free strategy and soldering details, please download the **onsemi** Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

MARKING DIAGRAMS



BD6xx/BD6xxA = Device Code
x = 75, 77, 79, 81
Y = Year
WW = Work Week
G = Pb−Free Package

ORDERING INFORMATION

See detailed ordering and shipping information on page 4 of this data sheet.

NOTE: Some of the devices on this data sheet have been **DISCONTINUED**. Please refer to the table on page 3.

ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector−Emitter Breakdown Voltage, (Note 1) (I_C = 50 mAdc, I_B = 0)	BV_{CEO}			Vdc
BD675G, BD675AG		45	–	
BD677G, BD677AG		60	–	
BD679G, BD679AG		80	–	
BD681G		100	–	
Collector Cutoff Current (V_{CE} = Half Rated V_{CEO}, I_B = 0)	I_{CEO}	–	500	μAdc
Collector Cutoff Current	I_{CBO}			mAdc
(V_{CB} = Rated BV_{CEO}, I_E = 0)		–	0.2	
(V_{CB} = Rated BV_{CEO}, I_E = 0, T_C = 100°C)		–	2.0	
Emitter Cutoff Current (V_{BE} = 5.0 Vdc, I_C = 0)	I_{EBO}	–	2.0	mAdc
ON CHARACTERISTICS				
DC Currert Gain, (Note 1) (I_C = 1.5 Adc,V_{CE} = 3.0 Vdc)	h_{FE}			–
BD675G, BD677G, BD679G, BD681G		750	–	
(I_C = 2.0 Adc, V_{CE} = 3.0 Vdc)				
BD675AG, BD677AG, BD679AG		750	–	
Collector−Emitter Saturation Voltage, (Note 1)	$V_{CE(sat)}$			Vdc
(I_C = 1.5 Adc, I_B = 30 mAdc)				
BD677G, BD679G, BD681G		–	2.5	
(I_C = 2.0 Adc, I_B = 40 mAdc)				
BD675AG, BD677AG, BD679AG		–	2.8	
Base−Emitter On Voltage, (Note 1)	$V_{BE(on)}$			Vdc
(I_C = 1.5 Adc, V_{CE} = 3.0 Vdc)				
BD677G, BD679G, BD681G		–	2.5	
(I_C = 2.0 Adc, V_{CE} = 3 0 Vdc)				
BD675AG, BD677AG, BD679AG		–	2.5	
DYNAMIC CHARACTERISTICS				
Small Signal Current Gain (I_C = 1.5 Adc, V_{CE} = 3.0 Vdc, f = 1.0 MHz)	h_{fe}	1.0	–	–

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

1. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%.

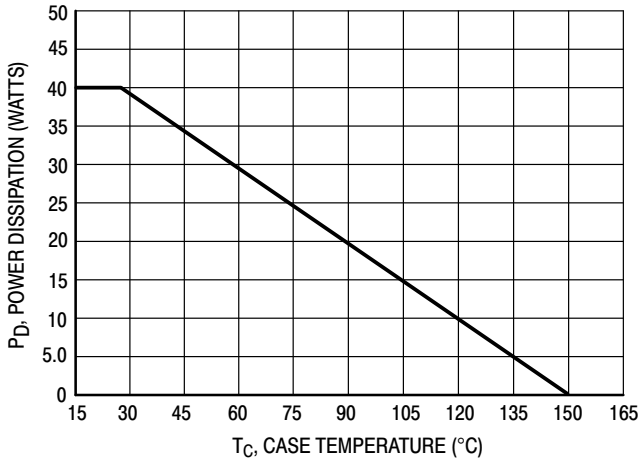


Figure 1. Power Temperature Derating

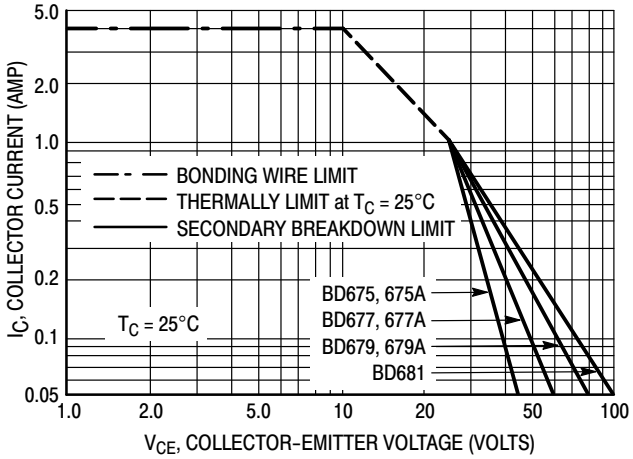


Figure 2. DC Safe Operating Area

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

At high case temperatures, thermal limitations will reduce the power that can be handled to values less than the limitations imposed by secondary breakdown.

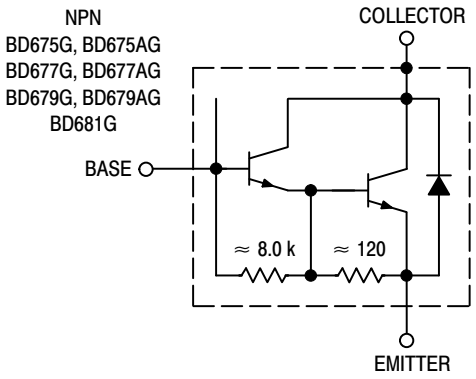


Figure 3. Darlington Circuit Schematic

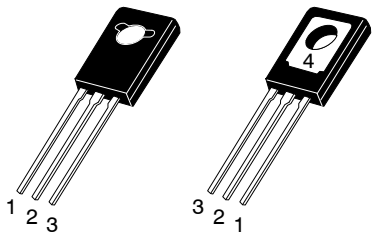
ORDERING INFORMATION

Device	Package	Shipping
BD681G	TO−225 (Pb−Free)	500 Units / Box

DISCONTINUED (Note 2)

BD675G	TO−225 (Pb−Free)	500 Units / Box
BD675AG	TO−225 (Pb−Free)	500 Units / Box
BD677G	TO−225 (Pb−Free)	500 Units / Box
BD677AG	TO−225 (Pb−Free)	500 Units / Box
BD679G	TO−225 (Pb−Free)	500 Units / Box
BD679AG	TO−225 (Pb−Free)	500 Units / Box

2. **DISCONTINUED:** These devices are not recommended for new design. Please contact your **onsemi** representative for information. The most current information on these devices may be available on www.onsemi.com.

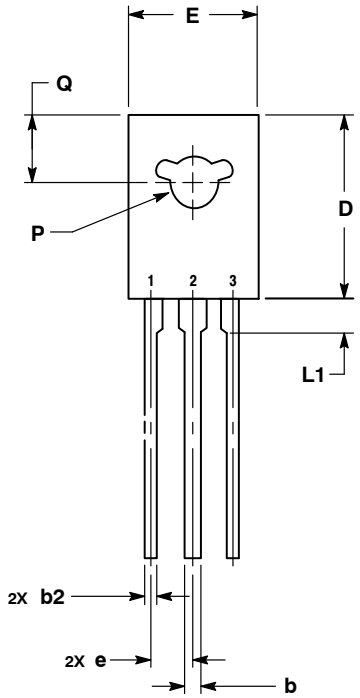


FRONT VIEW **BACK VIEW**

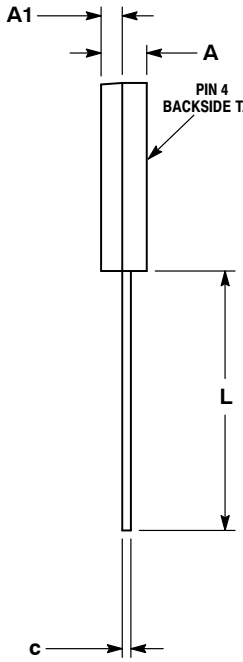
TO−225
CASE 77−09
ISSUE AD

DATE 25 MAR 2015

SCALE 1:1



FRONT VIEW

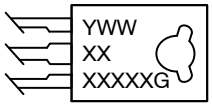


SIDE VIEW

NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. NUMBER AND SHAPE OF LUGS OPTIONAL.

	MILLIMETERS	
DIM	MIN	MAX
A	2.40	3.00
A1	1.00	1.50
b	0.60	0.90
b2	0.51	0.88
c	0.39	0.63
D	10.60	11.10
E	7.40	7.80
e	2.04	2.54
L	14.50	16.63
L1	1.27	2.54
P	2.90	3.30
Q	3.80	4.20

GENERIC MARKING DIAGRAM*



Y = Year
WW = Work Week
XXXXX = Device Code
G = Pb−Free Package

*This information is generic. Please refer to device data sheet for actual part marking. Pb−Free indicator, “G” or microdot “▪”, may or may not be present. Some products may not follow the Generic Marking.

STYLE 1:
PIN 1. EMITTER
2., 4. COLLECTOR
3. BASE

STYLE 2:
PIN 1. CATHODE
2., 4. ANODE
3. GATE

STYLE 3:
PIN 1. BASE
2., 4. COLLECTOR
3. EMITTER

STYLE 4:
PIN 1. ANODE 1
2., 4. ANODE 2
3. GATE

STYLE 5:
PIN 1. MT 1
2., 4. MT 2
3. GATE

STYLE 6:
PIN 1. CATHODE
2., 4. GATE
3. ANODE

STYLE 7:
PIN 1. MT 1
2., 4. GATE
3. MT 2

STYLE 8:
PIN 1. SOURCE
2., 4. GATE
3. DRAIN

STYLE 9:
PIN 1. GATE
2., 4. DRAIN
3. SOURCE

STYLE 10:
PIN 1. SOURCE
2., 4. DRAIN
3. GATE

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DESCRIPTION:	**TO−225**	**PAGE 1 OF 1**

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