BD675, BD675A, BD677, BD677A, BD679, BD679A, BD681

BD681 is a Preferred Device

Plastic Medium-Power Silicon NPN Darlingtons

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

Features

- High DC Current Gain:
  h_{FE} = 750 (Min) @ I_C
  = 1.5 and 2.0 Adc
- Monolithic Construction
- BD675, 675A, 677, 677A, 679, 679A, 681 are complementary with BD676, 676A, 678, 678A, 680, 680A, 682
- BD677, 677A, 679, 679A are equivalent to MJE 800, 801, 802, 803
- Pb−Free Packages are Available*

MAXIMUM RATINGS

Rating		Symbol	Value	Unit
Collector−Emitter Voltage	BD675, A BD677, A BD679, A BD681	V_{CEO}	45 60 80 100	Vdc
Collector−Base Voltage	BD675, A BD677, A BD679, A BD681	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

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction−to−Case	θ_{JC}	3.13	°C/W

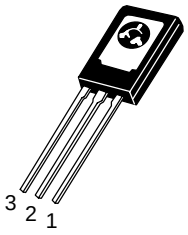
Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

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

ON Semiconductor®

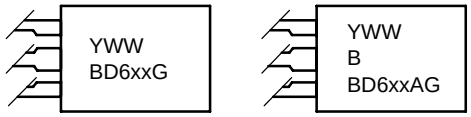
http://onsemi.com

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



TO−225AA
CASE 77
STYLE 1

MARKING DIAGRAMS



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

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 4 of this data sheet.

Preferred devices are recommended choices for future use and best overall value.

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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)	BD675, 675A BD677, 677A BD679, 679A BD681	BV_{CEO}	45 60 80 100	− − − −	Vdc
Collector Cutoff Current (V_{CE} = Half Rated V_{CEO}, I_B = 0)		I_{CEO}	−	500	μAdc
Collector Cutoff Current (V_{CB} = Rated BV_{CEO}, I_E = 0) (V_{CB} = Rated BV_{CEO}, I_E = 0, T_C = 100'C)		I_{CBO}	 − −	 0.2 2.0	mAdc
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) (I_C = 2.0 Adc, V_{CE} = 3.0 Vdc)	 BD675, 677, 679, 681 BD675A, 677A, 679A	h_{FE}	 750 750	 − −	−
Collector−Emitter Saturation Voltage, (Note 1) (I_C = 1.5 Adc, I_B = 30 mAdc) (I_C = 2.0 Adc, I_B = 40 mAdc)	 BD677, 679, 681 BD675A, 677A, 679A	$V_{CE(sat)}$	 − −	 2.5 2.8	Vdc
Base−Emitter On Voltage, (Note 1) (I_C = 1.5 Adc, V_{CE} = 3.0 Vdc) (I_C = 2.0 Adc, V_{CE} = 3 0 Vdc)	 BD677, 679, 681 BD675A, 677A, 679A	$V_{BE(on)}$	 − −	 2.5 2.5	Vdc
DYNAMIC CHARACTERISTICS					
Small Signal Current Gain (I_C = 1.5 Adc, V_{CE} = 3.0 Vdc, f = 1.0 MHz)		h_{fe}	1.0	−	−

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

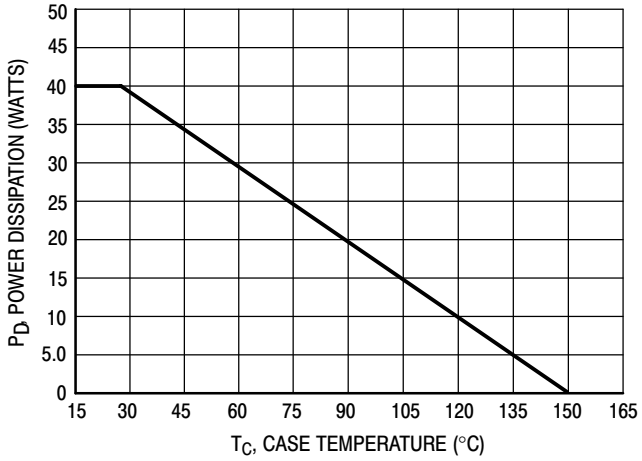


Figure 1. Power Temperature Derating

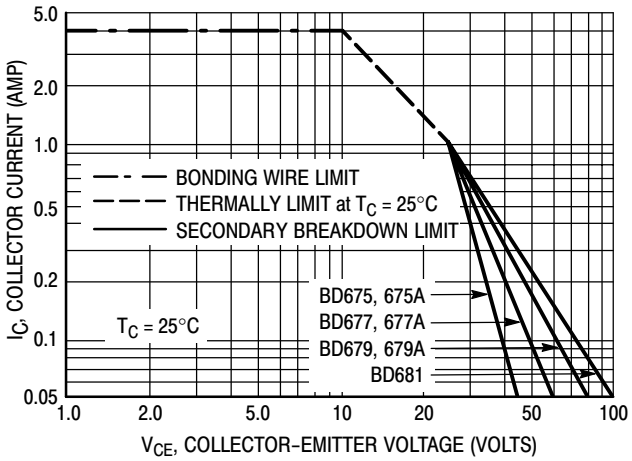


Figure 2. DC Safe Operating Area

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.

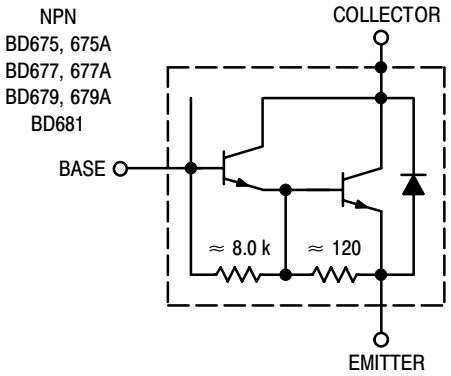


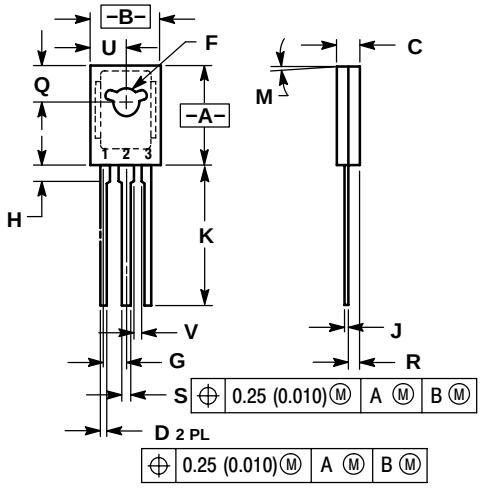
Figure 3. Darlington Circuit Schematic

ORDERING INFORMATION

Device	Package	Shipping
BD675	TO−225AA	500 Units / Box
BD675G	TO−225AA (Pb−Free)	500 Units / Box
BD675A	TO−225AA	500 Units / Box
BD675AG	TO−225AA (Pb−Free)	500 Units / Box
BD677	TO−225AA	500 Units / Box
BD677G	TO−225AA (Pb−Free)	500 Units / Box
BD677A	TO−225AA	500 Units / Box
BD677AG	TO−225AA (Pb−Free)	500 Units / Box
BD679	TO−225AA	500 Units / Box
BD679G	TO−225AA (Pb−Free)	500 Units / Box
BD679A	TO−225AA	500 Units / Box
BD679AG	TO−225AA (Pb−Free)	500 Units / Box
BD681	TO−225AA	500 Units / Box
BD681G	TO−225AA (Pb−Free)	500 Units / Box

PACKAGE DIMENSIONS

TO−225AA
CASE 77−09
ISSUE Z



NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. 077−01 THRU −08 OBSOLETE, NEW STANDARD 077−09.

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	0.425	0.435	10.80	11.04
B	0.295	0.305	7.50	7.74
C	0.095	0.105	2.42	2.66
D	0.020	0.026	0.51	0.66
F	0.115	0.130	2.93	3.30
G	0.094 BSC		2.39 BSC	
H	0.050	0.095	1.27	2.41
J	0.015	0.025	0.39	0.63
K	0.575	0.655	14.61	16.63
M	5° TYP		5° TYP	
Q	0.148	0.158	3.76	4.01
R	0.045	0.065	1.15	1.65
S	0.025	0.035	0.64	0.88
U	0.145	0.155	3.69	3.93
V	0.040	---	1.02	---

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

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