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:

 $h_{FE} = 750 \text{ (Min)} \otimes I_{C}$ = 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		Ic	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	θЈС	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.



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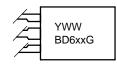
http://onsemi.com

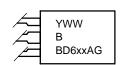
4.0 AMPERES
POWER TRANSISTORS
NPN SILICON
60, 80, 100 VOLTS, 40 WATTS



TO-225AA CASE 77 STYLE 1

MARKING DIAGRAMS





BD6xx = Device Code

x = 75, 77, 79, 81 Y = YearWW = 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.

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

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

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

Characteristic		Symbol	Min	Max	Unit
FF CHARACTERISTICS					•
Collector–Emitter Breakdown Voltage, (Note 1) $(I_C = 50 \text{ mAdc}, I_B = 0)$	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	mAdo
ON CHARACTERISTICS					
DC Currert Gain, (Note 1) ($I_C = 1.5 \text{ Adc}, V_{CE} = 3.0 \text{ Vdc}$) ($I_C = 2.0 \text{ Adc}, V_{CE} = 3.0 \text{ Vdc}$)	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 \text{ Adc}, V_{CE} = 3.0 \text{ Vdc}) $ $ (I_C = 2.0 \text{ Adc}, V_{CE} = 3.0 \text{ Vdc}) $	BD677, 679, 681 BD675A, 677A, 679A	V _{BE(on)}	- -	2.5 2.5	Vdc
DYNAMIC CHARACTERISTICS					
Small Signal Current Gain (Ic = 1.5 Adc. Vc= = 3.0 Vdc. f = 1.0 MHz)		h _{fo}	1.0	_	_

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

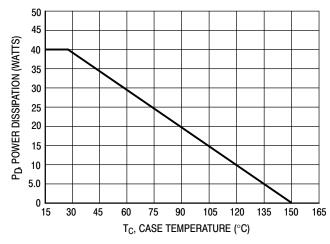


Figure 1. Power Temperature Derating

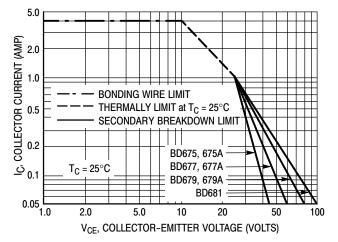


Figure 2. DC Safe Operating Area

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.

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

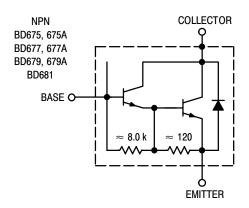


Figure 3. Darlington Circuit Schematic

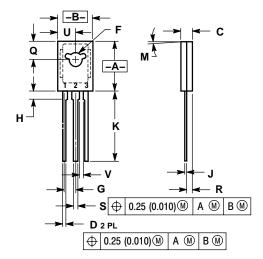
ORDERING INFORMATION

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	

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

PACKAGE DIMENSIONS

TO-225AA CASE 77-09 ISSUE Z



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

	INCHES		MILLIN	IETERS	
DIM	MIN	MAX	MIN	MAX	
Α	0.425	0.435	10.80	11.04	
В	0.295	0.305	7.50	7.74	
С	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		
Н	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°	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	
٧	0.040		1.02		

STYLE 1:

PIN 1. EMITTER

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