BD676, BD676A, BD678, BD678A, BD680, BD680A, BD682, BD682T

Plastic Medium-Power Silicon PNP Darlingtons

This series of plastic, medium−power silicon PNP 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
- BD676, 676A, 678, 678A, 680, 680A, 682 are complementary with BD675, 675A, 677, 677A, 679, 679A, 681
- BD678, 678A, 680, 680A are equivalent to MJE 700, 701, 702, 703
- Pb−Free Package are Available*

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CEO}		Vdc
BD676, BD676A		45	
BD678, BD678A		60	
BD680, BD680A		80	
BD682		100	
Collector-Base Voltage	V_{CB}		Vdc
BD676, BD676A		45	
BD678, BD678A		60	
BD680, BD680A		80	
BD682		100	
Emitter-Base Voltage	V_{EB}	5.0	Vdc
Collector Current	I_C	4.0	Adc
Base Current	I_B	0.1	Adc
Total Device Dissipation	P_D		
@ T_C = 25°C		40	W
Derate above 25°C		0.32	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	$R_{\theta JC}$	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.

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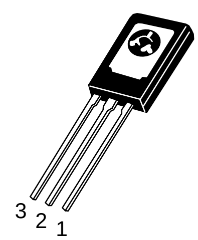
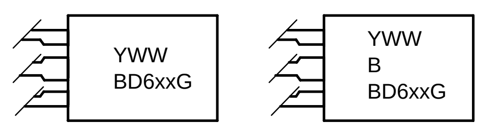
4.0 AMP DARLINGTON POWER TRANSISTORS PNP SILICON 45, 60, 80, 100 VOLT, 40 WATT



TO−225AA CASE 77 STYLE 1

MARKING DIAGRAMS



BD6xx = Device Code
xx = 76, 76A, 78, 78A, 80, 80A, 82, or 82T
Y = Year
WW = Work Week
G = Pb−Free Package

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 3 of this data sheet.

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)	BD676, 676A BD678, 678A BD680, 680A BD682	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 Current Gain (Note 1) (I_C = 1.5 Adc, V_{CE} = 3.0 Vdc) (I_C = 2.0 Adc, V_{CE} = 3.0 Vdc)	 BD676, 678, 680, 682 BD676A, 678A, 680A	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)	 BD678, 680, 682 BD676A, 678A, 680A	$V_{CE(sat)}$	 − −	 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)	 BD678, 680, 682 BD676A, 678A, 680A	$V_{BE(on)}$	 − −	 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%.

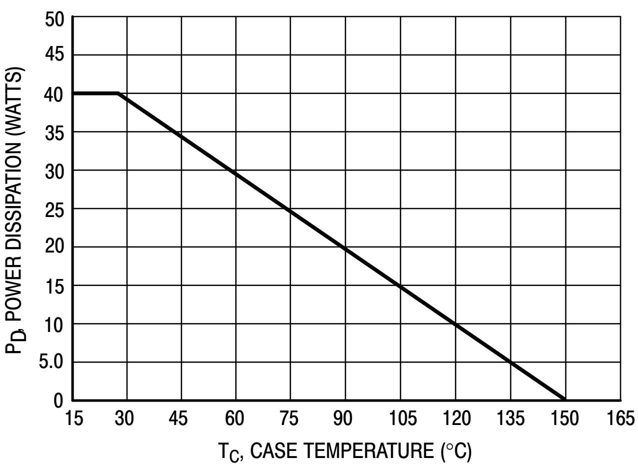


Figure 1. Power Temperature Derating

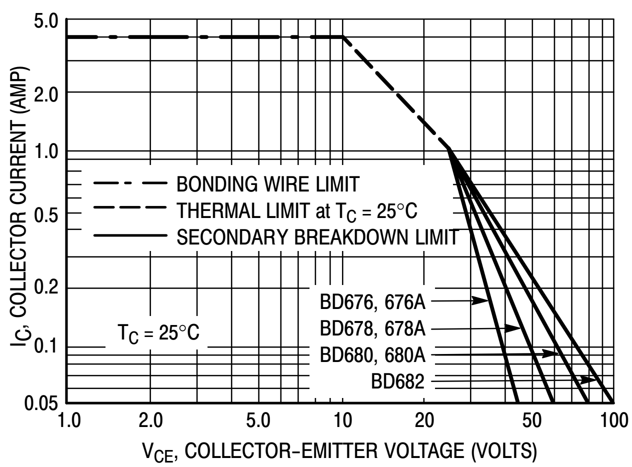


Figure 2. DC Safe Operating Area

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.

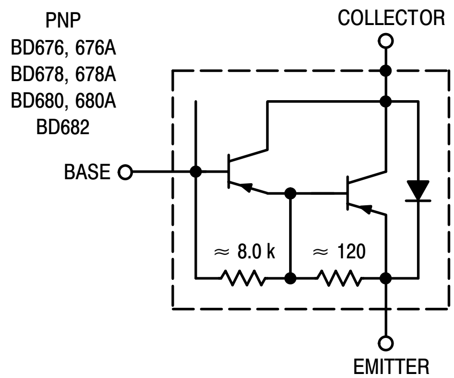


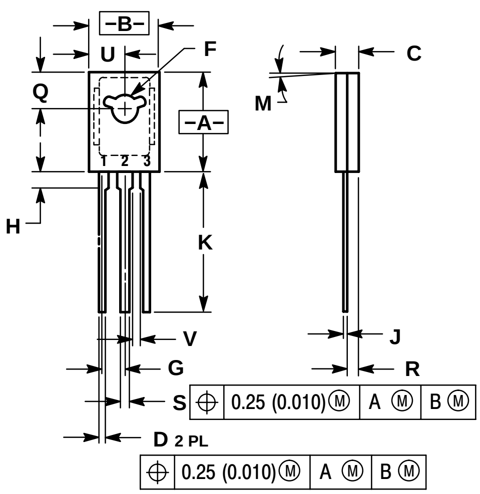
Figure 3. Darlington Circuit Schematic

ORDERING INFORMATION

Device	Package	Shipping
BD676	TO−225AA	500 Units / Box
BD676G	TO−225AA (Pb−Free)	500 Units / Box
BD676A	TO−225AA	500 Units / Box
BD676AG	TO−225AA (Pb−Free)	500 Units / Box
BD678	TO−225AA	500 Units / Box
BD678G	TO−225AA (Pb−Free)	500 Units / Box
BD678A	TO−225AA	500 Units / Box
BD678AG	TO−225AA (Pb−Free)	500 Units / Box
BD680	TO−225AA	500 Units / Box
BD680G	TO−225AA (Pb−Free)	500 Units / Box
BD680A	TO−225AA	500 Units / Box
BD680AG	TO−225AA (Pb−Free)	500 Units / Box
BD682	TO−225AA	500 Units / Box
BD682G	TO−225AA (Pb−Free)	500 Units / Box
BD682T	TO−225AA	50 Units / Rail
BD682TG	TO−225AA (Pb−Free)	50 Units / Rail

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

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
Literature Distribution Center for ON Semiconductor
P.O. Box 61312, Phoenix, Arizona 85082−1312 USA
Phone: 480−829−7710 or 800−344−3860 Toll Free USA/Canada
Fax: 480−829−7709 or 800−344−3867 Toll Free USA/Canada
Email: orderlit@onsemi.com

N. American Technical Support: 800−282−9855 Toll Free USA/Canada

Japan: ON Semiconductor, Japan Customer Focus Center
2−9−1 Kamimeguro, Meguro−ku, Tokyo, Japan 153−0051
Phone: 81−3−5773−3850

ON Semiconductor Website: http://onsemi.com

Order Literature: http://www.onsemi.com/litorder

For additional information, please contact your local Sales Representative.