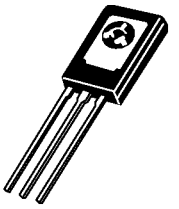
Plastic Medium-Power Silicon PNP Darlingtons

. . . for use as output devices in complementary general–purpose amplifier applications.

- 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
- BD 678, 678A, 680, 680A are equivalent to MJE 700, 701, 702, 703

BD676
BD676A
BD678
BD678A
BD680
BD680A
BD682

4.0 AMPERE
DARLINGTON
POWER TRANSISTORS
PNP SILICON
45, 60, 80, 100 VOLTS
40 WATTS



CASE 77–08
TO–225AA TYPE

MAXIMUM RATING

Rating	Symbol	BD676 BD676A	BD678 BD678A	BD680 BD680A	BD682	Unit
Collector–Emitter Voltage	V_{CEO}	45	60	80	100	Vdc
Collector–Base Voltage	V_{CB}	45	60	80	100	Vdc
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 @ T_C = 25 °C Derate above 25 °C	P_D	40 0.32				Watts W/°C
Operating and Storage Junction Temperating 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

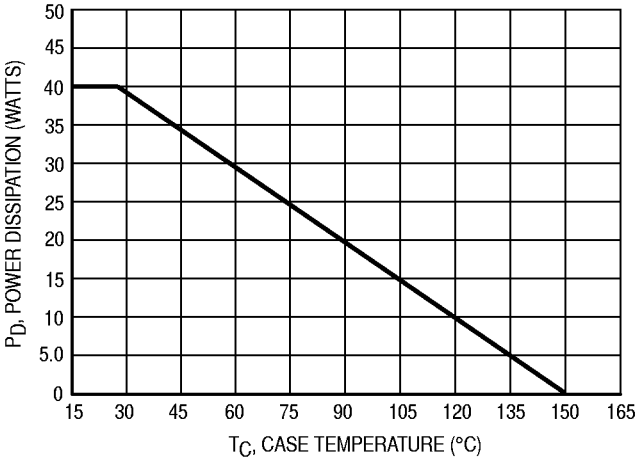


Figure 1. Power Temperature Derating

REV 7

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

Characteristic		Symbol	Min	Max	Unit
OFF CHARACTERISTICS					
Collector–Emitter Breakdown Voltage(1) (I_C = 50 mAdc, I_B = 0)	BD676, 676A	BV_{CEO}	45	—	Vdc
	BD678, 678A		60	—	
	BD680, 680A		80	—	
	BD682		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 Current Gain(1)		h_{FE}			
(I_C = 1.5 Adc, V_{CE} = 3.0 Vdc)	BD676, 678, 680, 682		750	—	
(I_C = 2.0 Adc, V_{CE} = 3.0 Vdc)	BD676A, 678A, 680A		750	—	
Collector–Emitter Saturation Voltage(1)					
(I_C = 1.5 Adc, I_B = 30 mAdc)	BD678, 680, 682	$V_{CE(sat)}$	—	2.5	Vdc
(I_C = 2.0 Adc, I_B = 40 mAdc)	BD676A, 678A, 680A		—	2.8	
Base–Emitter On Voltage(1)		$V_{BE(on)}$			Vdc
(I_C = 1.5 Adc, V_{CE} = 3.0 Vdc)	BD678, 680, 682		—	2.5	
(I_C = 2.0 Adc, V_{CE} = 3.0 Vdc)	BD676A, 678A, 680A		—	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	—	—

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

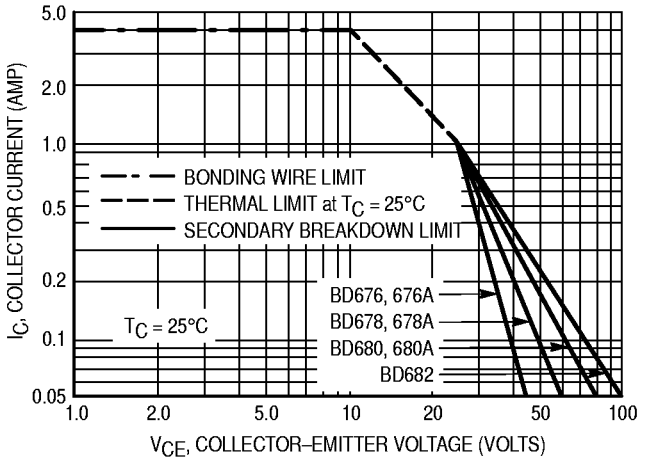


Figure 2. DC Safe Operating Area

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.

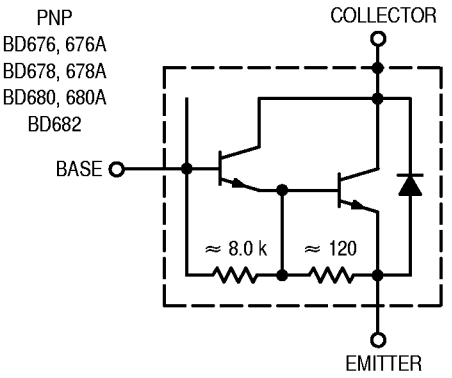
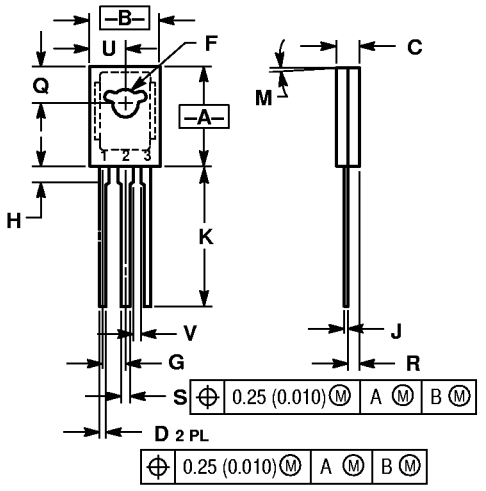


Figure 3. Darlington Circuit Schematic

PACKAGE DIMENSIONS



NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.

	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	0.055	1.15	1.39
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

CASE 77–08
TO–225AA TYPE
ISSUE V