Plastic Medium-Power Silicon NPN Darlingtons

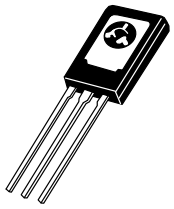
. . . for use as output devices in complementary general–purpose amplifier applications.

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

BD675
BD675A
BD677
BD677A
BD679
BD679A
BD681*

***Motorola Preferred Device**

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



CASE 77–08
TO–225AA TYPE

MAXIMUM RATINGS

Rating	Symbol	BD675 BD675A	BD677 BD677A	BD679 BD679A	BD681	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

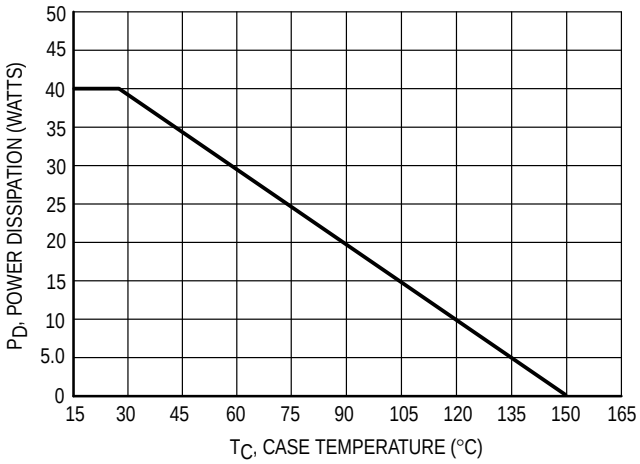


Figure 1. Power Temperature Derating

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

REV 7

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)	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(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(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(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%.

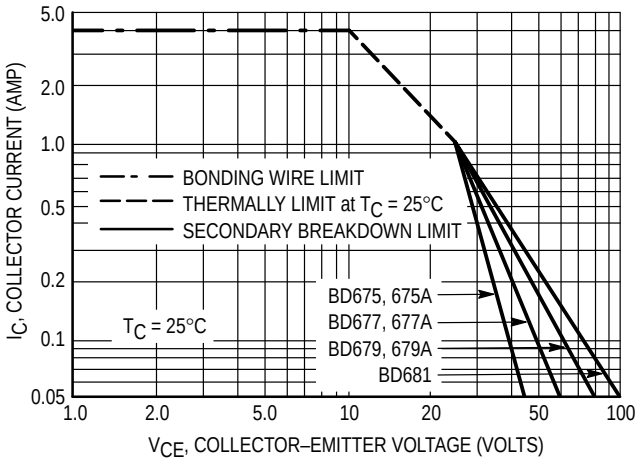


Figure 2. DC Safe Operating Area

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.

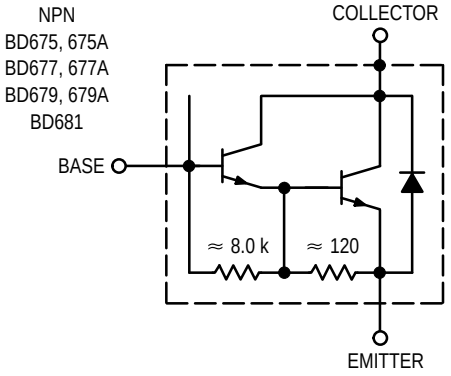
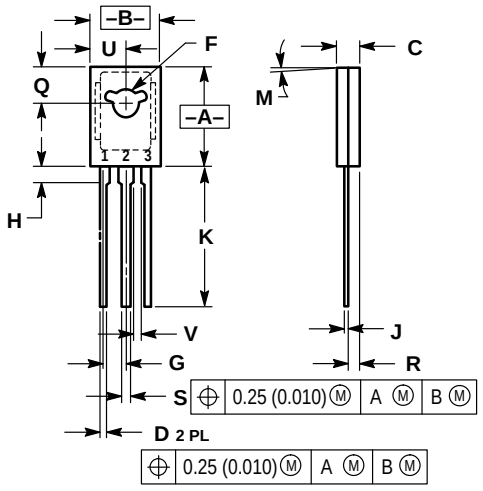


Figure 3. Darlington Circuit Schematic

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

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