

BD777



Plastic Darlington Complementary Silicon Power Transistors

Plastic Darlington complementary silicon power transistors designed for general purpose amplifier and high-speed switching applications.

- High DC Current Gain
 $h_{FE} = 1400$ (Typ) @ I_C
 $= 2.0$ Adc
- Collector–Emitter Sustaining Voltage — @ 10 mAcd
 $V_{CEO(sus)} = 45$ Vdc (Min) — BD776
 $= 60$ Vdc (Min) — BD777, 778
 $= 80$ Vdc (Min) — BD780
- Reverse Voltage Protection Diode
- Monolithic Construction with Built-in Base–Emitter output Resistor

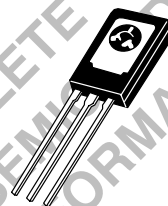
ON Semiconductor®

<http://onsemi.com>

**DARLINGTON
4-AMPERE
COMPLEMENTARY SILICON
POWER TRANSISTORS
45, 60, 80 VOLTS
15 WATTS**

MAXIMUM RATINGS

Rating	Symbol	BD776	BD777 BD778	BD780	Unit
Collector–Emitter Voltage	V_{CEO}	45	60	80	Vdc
Collector–Base Voltage	V_{CB}	45	60	80	Vdc
Emitter–Base Voltage	V_{EB}	5.0			Vdc
Collector Current — Continuous Peak	I_C	4.0 6.0			Adc
Base Current	I_B	100			mAdc
Total Device Dissipation $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	15 0.12			W W/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	T_J, T_{stg}	–65 to +150			$^\circ\text{C}$



CASE 77–08
TO–225AA TYPE

THERMAL CHARACTERISTICS

Characteristics	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	8.34	$^\circ\text{C/W}$
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	83.3	$^\circ\text{C/W}$

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

BD777

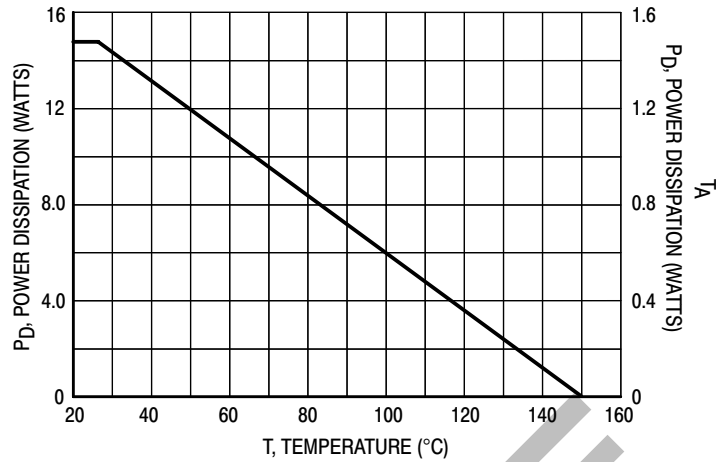


Figure 1. Power Derating

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

Characteristic	Symbol	Min	Max	Unit	
OFF CHARACTERISTICS					
Collector–Emitter Sustaining Voltage (1) (I _O = 10 mA, I _B = 0)	BD776 BD777, BD778 BD780	V _{CEO(sus)}	45 60 80	— — —	Vdc
Collector Cutoff Current (V _{CE} = 20 Vdc, I _B = 0) (V _{CE} = 30 Vdc, I _B = 0) (V _{CE} = 40 Vdc, I _B = 0)	BD776 BD777, BD778 BD780	I _{CEO}	— — —	100 100 100	μA
Collector Cutoff Current (V _{CB} = Rated, V _{CEO(sus)} , I _E = 0) (V _{CB} = Rated, V _{CEO(sus)} , I _E = 0, I _C = 100°C)		I _{CBO}	— —	1.0 100	μA
Emitter Cutoff Current (V _{BE} = 5.0 Vdc, I _C = 0)		I _{EBO}	—	1.0	μA
ON CHARACTERISTICS					
DC Current Gain (I _C = 2.0 A, V _{CE} = 3.0 Vdc)		H _{FE}	750	—	
Collector–Emitter Saturation Voltage (I _C = 1.5 A, I _B = 6 mA)		V _{CE(Sat)}	—	1.5	Vdc
Base Emitter Saturation Voltage (I _C = 1.5 A, I _B = 6 mA)		V _{BE(Sat)}	—	2.5	Vdc
Base–Emitter On Voltage (I _C = 1.5 A, V _{CE} = 3 Vdc)		V _{BE(On)}	—	2.3	Vdc
Output Diode Voltage Drop (I _{EC} = 2.0 A)		V _{EC}	—	2.0	Vdc
DYNAMIC CHARACTERISTICS					
Current Gain Bandwidth Product (I _C = 1.0 A, V _{CE} = 2.0 Vdc)		f _T	20	—	MHz
		Symbol	Min	Typ	Unit
Turn–On Time (I _C = 250 mA, V _{CE} = 2 V)	BD775–777 BD776–778–780	t _{on}	— —	250 150	ns
Turn–Off Time (I _C = 250 mA, V _{CE} = 2 V)	BD775–777 BD776–778–780	t _{off}	— —	600 400	ns

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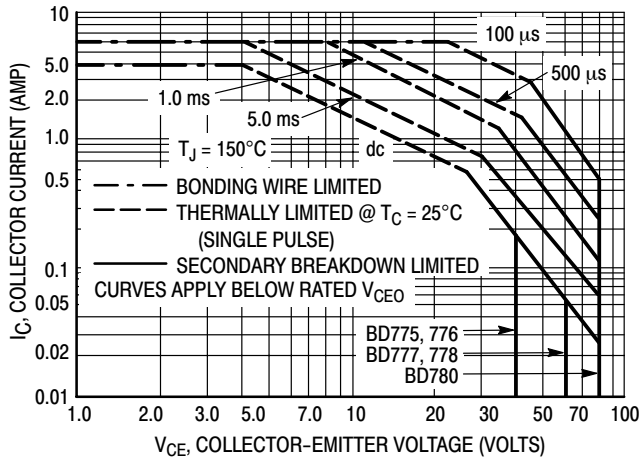


Figure 2. Active Region Safe Operating Area

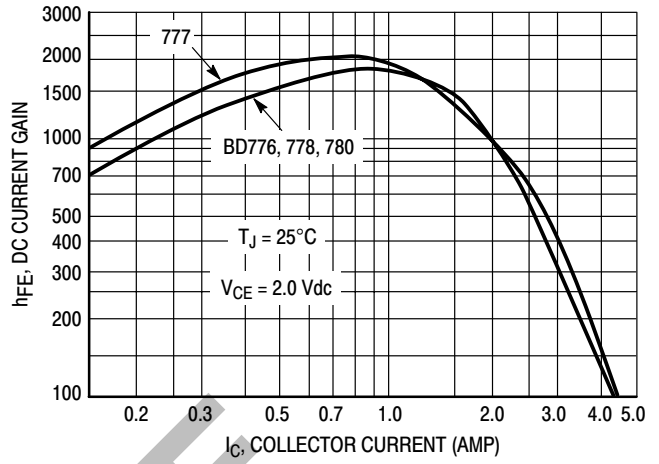


Figure 3. Typical DC Current Gain

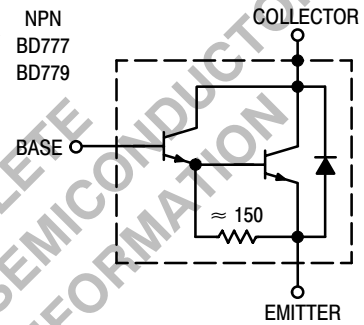
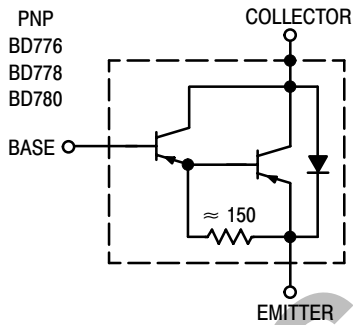
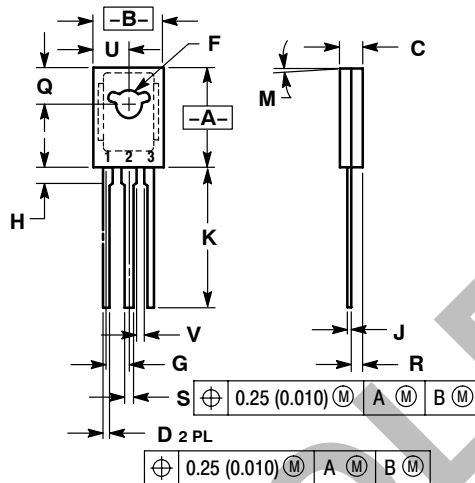


Figure 4. Darlington Circuit Schematic

BD777

PACKAGE DIMENSIONS

CASE 77-08 TO-225AA TYPE ISSUE V



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

DIM	INCHES		MILLIMETERS	
	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

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