PNP
BDX66,A,B,C
NPN
BDX67,A,B,C

MOTOROLA

MEDIUM-POWER COMPLEMENTARY SILICON TRANSISTORS

. . . for use as output devices in complementary general purpose amplifiers applications.

- High DC current gain
  HFE = 4000 (typ) @ Ic = 5.0 Adc
- Monolithic Construction with Built-In Base-Emitter Shunt Resistors

16 AMPERES

DARLINGTON POWER TRANSISTORS COMPLEMENTARY SILICON

60, 80, 100, 120 VOLTS
150 WATTS

MAXIMUM RATINGS

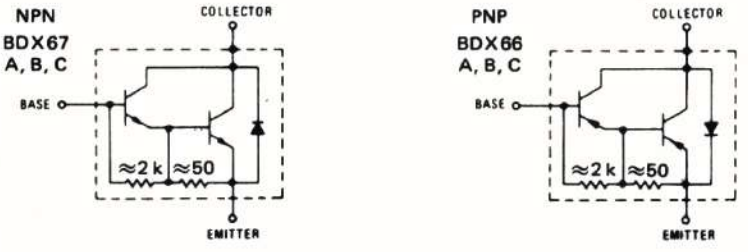
Rating	Symbol	BDX66 BDX67	BDX66A BDX67A	BDX66B BDX67B	BDX66C BDX67C	Unit
Collector-Emitter Voltage	$V_{CEO(sus)}$	60	80	100	120	Vdc
Collector-Emitter Voltage	V_{CBO}	60	80	100	120	Vdc
Emitter-Base Voltage	V_{EB}	5				Vdc
Collector Current - Continuous - Peak	I_C I_{CM}	16 20				Adc
Base Current	I_B	0.25				Adc
Total Device Dissipation @ T_C = 25°C Derate above 25°C	P_D	 150 0.85				Watts W/°C
Operating and Storage Junction Temperature Range	T_J, T_{stg}	−65 to 200				°C

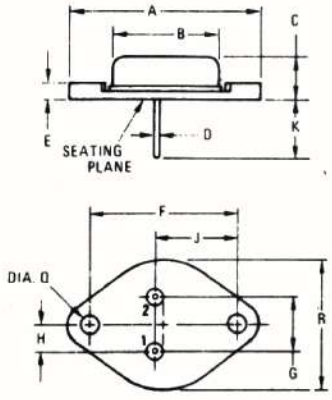
THERMAL CHARACTERISTICS

Characteristics	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	1.17	°C/W
Maximum Lead Temperature for Soldering Purposes: 1/8" from Case for 5 Seconds	T_L	275	°C

(1) Pulse Test: Pulse Width = 2 ms, Duty Cycle ≤ 10%.

FIGURE 1 – DARLINGTON CIRCUIT SCHEMATIC





STYLE 1:
PIN 1. BASE
2. EMITTER
CASE: COLLECTOR

DIM	MILLIMETERS MIN	MILLIMETERS MAX	INCHES MIN	INCHES MAX
A	–	39.37	–	1.550
B	–	21.08	–	0.830
C	6.35	7.62	0.250	0.300
D	0.99	1.09	0.039	0.043
E	–	3.43	–	0.135
F	29.90	30.40	1.177	1.197
G	10.67	11.18	0.420	0.440
H	5.33	5.59	0.210	0.220
J	16.64	17.15	0.655	0.675
K	11.18	12.19	0.440	0.480
Q	3.84	4.09	0.151	0.161
R	–	26.67	–	1.050

CASE 11
(TO-3)

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

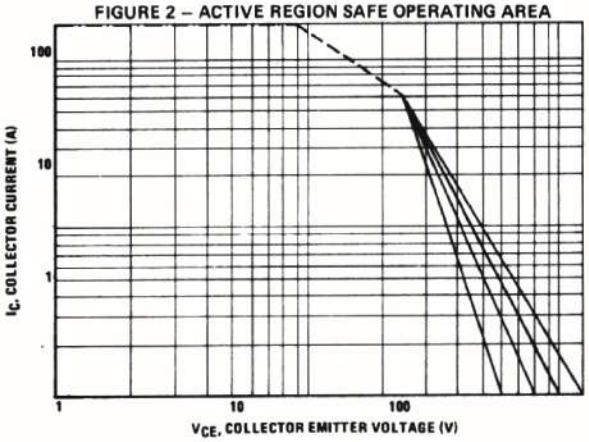
Characteristic		Symbol	Min.	Max.	Unit
OFF CHARACTERISTICS					
Collector-Emitter Breakdown Voltage (1)		$V_{CEO(sus)}$			Vdc
(I_C = 100 mAdc,)	BDX66, BDX67		60	–	
	BDX66A, BDX67A		80	–	
	BDX66B, BDX67B		100	–	
	BDX66C, BDX67C		120	–	
Collector-Emitter Cutoff Current		I_{CEO}			mAdc
(I_B = 0) V_{CE} = 30 V	BDX66, BDX67			3.0	
V_{CE} = 40 V	BDX66A, BDX67A			3.0	
V_{CE} = 50 V	BDX66B, BDX67B			3.0	
V_{CE} = 60 V	BDX66C, BDX67C			3.0	
Collector Cutoff Current		I_{CBO}			mAdc
(V_{CB} = rated V_{CBO}, I_E = 0) T_C = 25°C	ALL TYPES			1.0	
Collector Cutoff Current (T_j = 200°C)		I_{CBO}			mAdc
(I_E = 0) V_{CB} = 40 V	BDX66, BDX67			5.0	
V_{CB} = 50 V	BDX66A, BDX67A			5.0	
V_{CB} = 60 V	BDX66B, BDX67B			5.0	
V_{CB} = 70 V	BDX66C, BDX67C			5.0	
Emitter Cutoff Current		I_{EBO}			mAdc
(V_{BE} = 5 Vdc, I_C = 0)	ALL TYPES			5.0	

ON CHARACTERISTICS (1)

DC Current Gain		h_{FE}			–
(V_{CE} = 3 Vdc, I_C = 10 A) (c)	ALL TYPES		1000	–	
Collector-Emitter Saturation Voltage		$V_{CE(sat)}$			Vdc
(I_C = 10 Adc, I_B = 0.4 Adc)			–	2.0	
Base Emitter On Voltage		$V_{BE(on)}$			Vdc
(I_C = 10 Adc, I_B = 3.0 Adc)			–	2.5	

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

FIGURE 2 – ACTIVE REGION SAFE OPERATING AREA



There are two limitations on the power handling ability of a transistor: average junction temperature and second breakdown. Safe operating area curves indicate I_C-V_{CE} limits of the transistor that must be observed for reliable operation i.e., the transistor must not be subjected to greater dissipation than the curves indicate.

The data of figure 2 is based on $T_C = 25°C$; $T_{J(pk)}$ is variable depending on power level. Second breakdown limitations do not derate the same as thermal limitations. At high case temperatures, thermal limitations will reduce the power that can handled to values less than the limitations imposed by second breakdown. (See AN415A)

FIGURE 3 – "ON" VOLTAGES

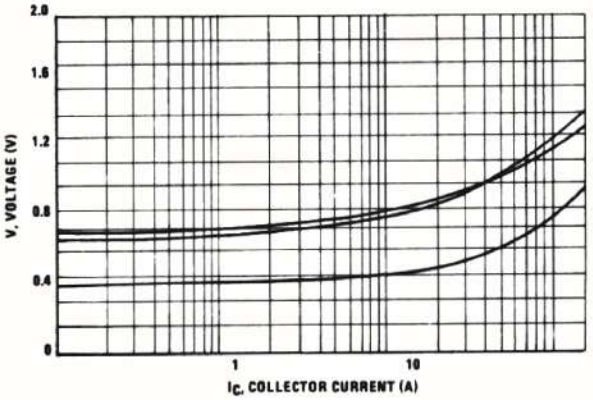


FIGURE 5 – SMALL SIGNAL CURRENT GAIN

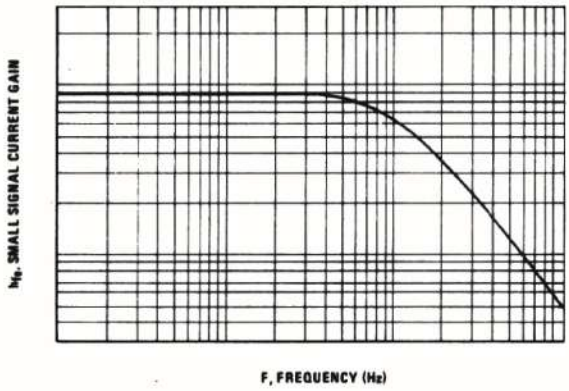


FIGURE 4 – DC CURRENT GAIN

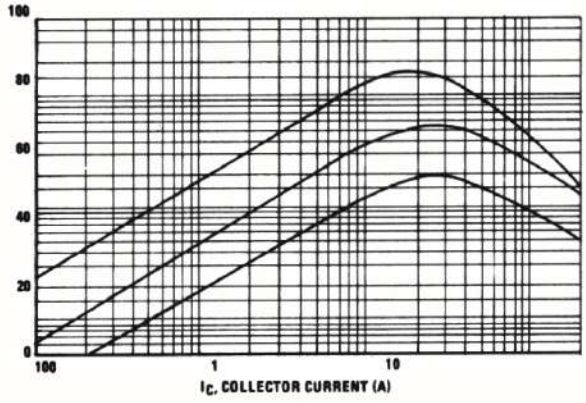


FIGURE 6 – POWER DERATING