

## DARLINGTON COMPLEMENTARY SILICON POWER TRANSISTORS

...designed for general-purpose amplifier and low speed switching applications

### FEATURES:

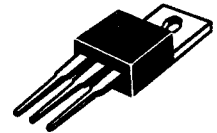
- \* Collector-Emitter Sustaining Voltage-  
 $V_{CE(SUS)}$  = 45 V (Min) - BDX53, BDX54  
 = 60 V (Min) - BDX53A, BDX54A  
 = 80 V (Min) - BDX53B, BDX54B  
 = 100 V (Min) - BDX53C, BDX54C
- \* Monolithic Construction with Built-in Base-Emitter Shunt Resistor

NPN	PNP
BDX53	BDX54
BDX53A	BDX54A
BDX53B	BDX54B
BDX53C	BDX54C

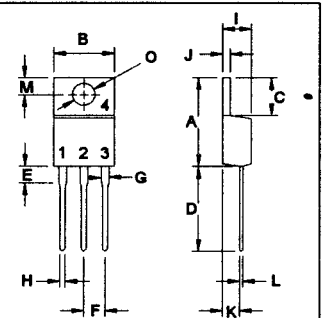
8 AMPERE  
DARLINGTON  
COMPLEMENTARY SILICON  
POWER TRANSISTORS  
45-100 VOLTS  
60 WATTS

### MAXIMUM RATINGS

Characteristic	Symbol	BDX53 BDX54	BDX53A BDX54A	BDX53B BDX54B	BDX53C BDX54C	Unit
Collector-Emitter Voltage	$V_{CEO}$	45	60	80	100	V
Collector-Base Voltage	$V_{CBO}$	45	60	80	100	V
Emitter-Base Voltage	$V_{EBO}$	5.0				V
Collector Current - Continuous	$I_C$	8.0				A
Peak	$I_{CM}$	12				
Base Current	$I_B$	0.2				A
Total Power Dissipation @ $T_C = 25^\circ C$ Derate above $25^\circ C$	$P_D$	60 0.48				W W/ $^\circ C$
Operating and Storage Junction Temperature Range	$T_J, T_{STG}$	-65 to +150				$^\circ C$



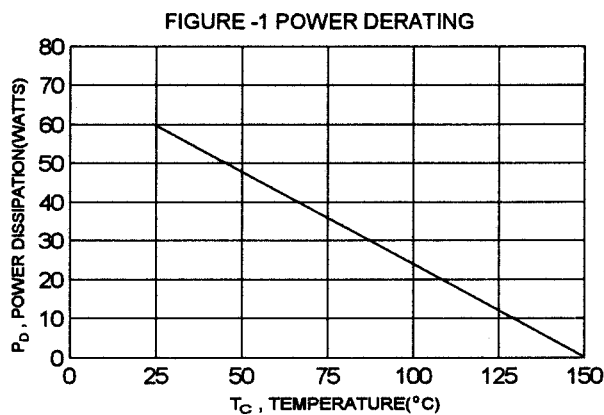
TO-220



PIN 1. BASE  
2. COLLECTOR  
3. EMITTER  
4. COLLECTOR (CASE)

### THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance Junction to Case	$R_{\theta jc}$	2.08	$^\circ C/W$



DIM	MILLIMETERS	
	MIN	MAX
A	14.68	15.31
B	9.78	10.42
C	5.01	6.52
D	13.06	14.62
E	3.57	4.07
F	2.42	3.66
G	1.12	1.36
H	0.72	0.96
I	4.22	4.98
J	1.14	1.38
K	2.20	2.97
L	0.33	0.55
M	2.48	2.98
O	3.70	3.90

**BDX53,A,B,C NPN / BDX54,A,B,C PNP**

**ELECTRICAL CHARACTERISTICS (  $T_c = 25^\circ\text{C}$  unless otherwise noted )**

Characteristic	Symbol	Min	Max	Unit
----------------	--------	-----	-----	------

**OFF CHARACTERISTICS**

Collector-Emitter Sustaining Voltage(1) ( $I_c = 100\text{ mA}$ , $I_B = 0$ )	BDX53, BDX54 BDX53A, BDX54A BDX53B, BDX54B BDX53C, BDX54C	$V_{CEO(sus)}$	45 60 80 100	V
Collector Cutoff Current ( $V_{CE} = 22\text{ V}$ , $I_B = 0$ ) ( $V_{CE} = 30\text{ V}$ , $I_B = 0$ ) ( $V_{CE} = 40\text{ V}$ , $I_B = 0$ ) ( $V_{CE} = 50\text{ V}$ , $I_B = 0$ )	BDX53, BDX54 BDX53A, BDX54A BDX53B, BDX54B BDX53C, BDX54C	$I_{CEO}$		0.5 0.5 0.5 0.5 mA
Collector-Base Cutoff Current ( $V_{CB} = \text{Rated } V_{CB}$ , $I_E = 0$ )		$I_{CBO}$		200 $\mu\text{A}$
Emitter-Base Cutoff Current ( $V_{EB} = 5.0\text{ V}$ , $I_c = 0$ )		$I_{EBO}$		2.0 mA

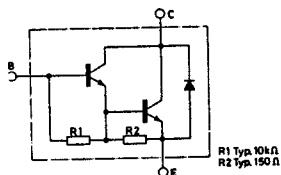
**ON CHARACTERISTICS (1)**

DC Current Gain ( $I_c = 3.0\text{ A}$ , $V_{CE} = 3.0\text{ V}$ )		$h_{FE}$	750	
Collector-Emitter Saturation Voltage ( $I_c = 3.0\text{ A}$ , $I_B = 12\text{ mA}$ )		$V_{CE(sat)}$		2.0 V
Base-Emitter Saturation Voltage ( $I_c = 3.0\text{ A}$ , $I_B = 12\text{ mA}$ )		$V_{BE(sat)}$		2.5 V
Diode Forward-Voltage ( $I_F = 3.0\text{ A}$ )		$V_F$		2.5 V

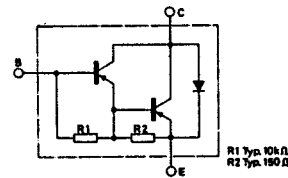
(1) Pulse Test: Pulse Width = 300  $\mu\text{s}$ , Duty Cycle  $\leq 2.0\%$

**INTERNAL SCHEMATIC DIAGRAM**

**BDX53 Series NPN**

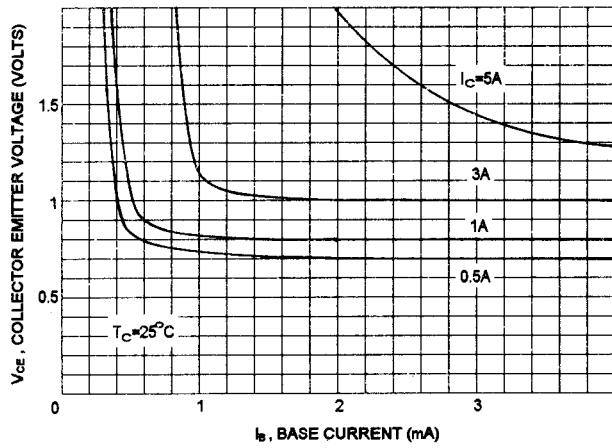


**BDX54 Series PNP**

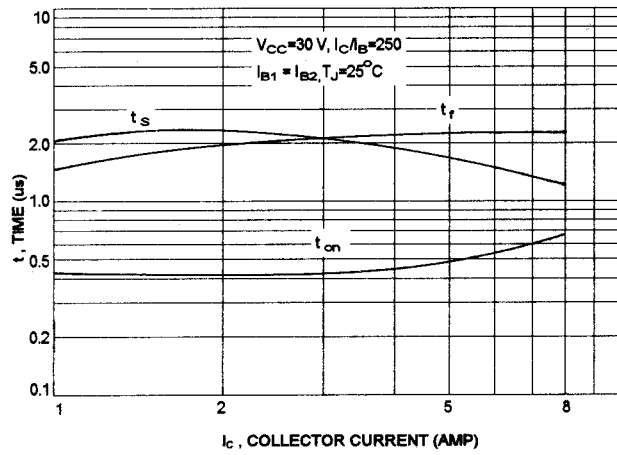


NPN BDX53,A,B,C

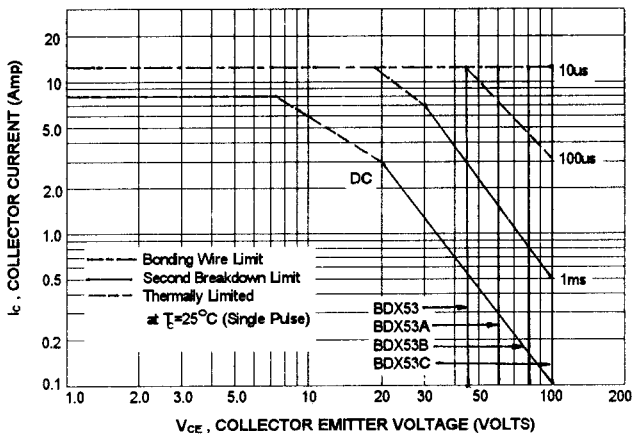
COLLECTOR SATURATION REGION



SWITCHING TIME

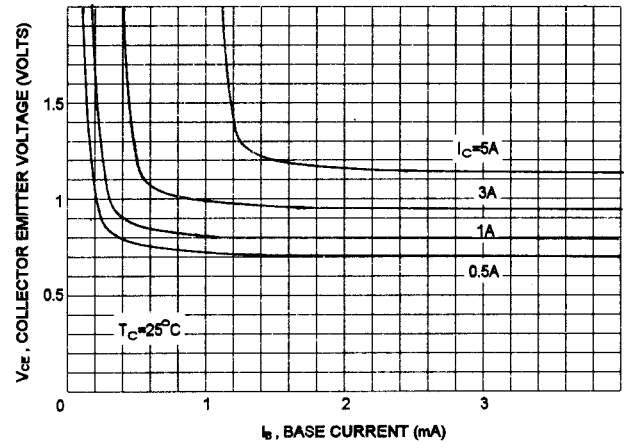


SAFE OPERATING AREA

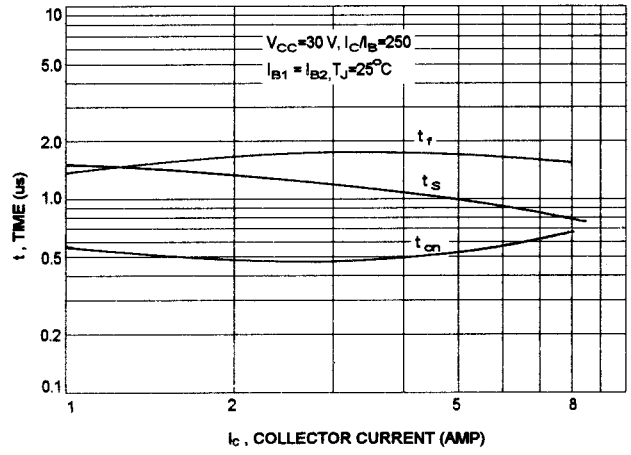


PNP BDX54,A,B,C

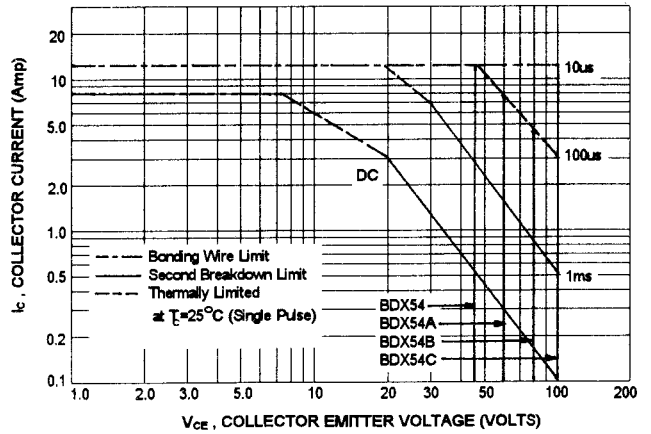
COLLECTOR SATURATION REGION



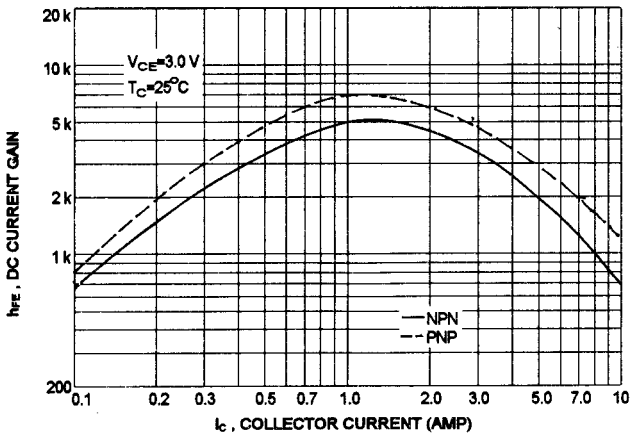
SWITCHING TIME



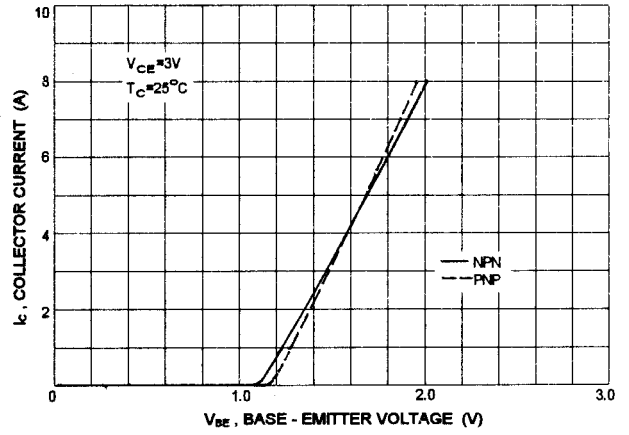
SAFE OPERATING AREA



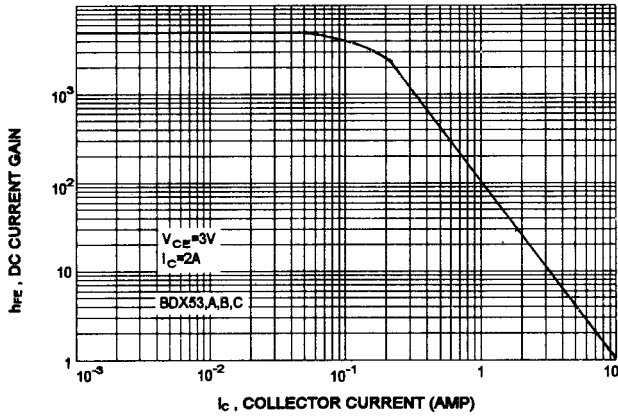
DC CURRENT GAIN



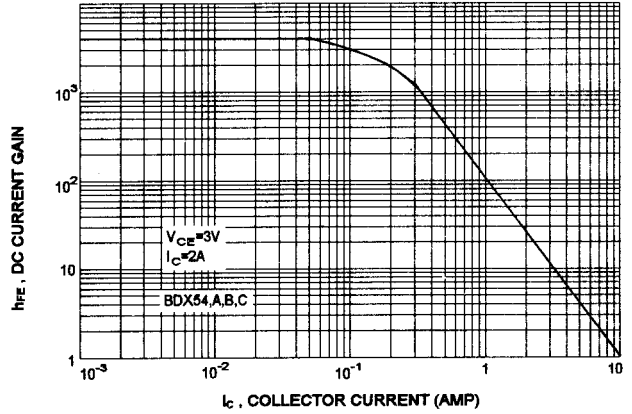
$I_C - V_{BE}$



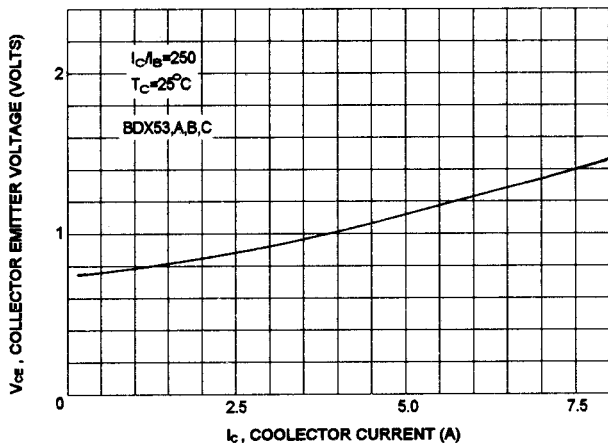
SMALL SIGNAL CURRENT GAIN



SMALL SIGNAL CURRENT GAIN



$V_{CE(sat)} - I_C$



$V_{CE(sat)} - I_C$

