# MOSPEC

## DARLINGTON COPLEMENTARY SILICON POWER TRANSISTORS

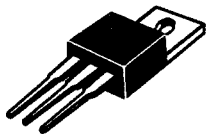
...designed for general-purpose amplifier and low speed switching applications

| NPN | PNP |
|---|---|
| BDX53 | BDX54 |
| BDX53A | BDX54A |
| BDX53B | BDX54B |
| BDX53C | BDX54C |

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

FEATURES:

* Collector-Emitter Sustaining Voltage-
  $V_{CEO(SUS)}$ = 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



TO-220

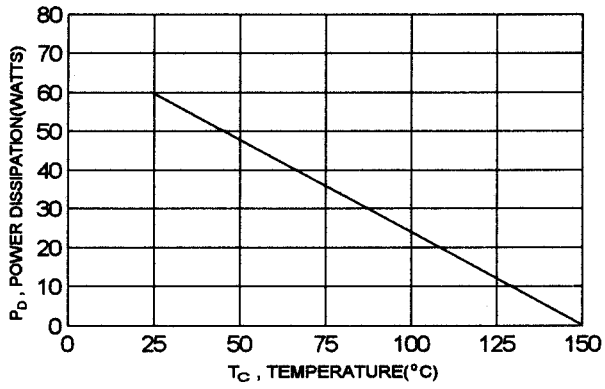
## MAXIMUM RATINGS

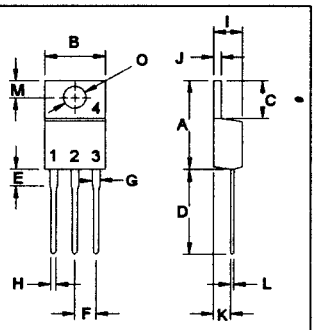
| Characteristic | Symbol | BDX53 BDX54 | BDX53A BDX54A | BDX53B BDX54B | BDX53C BDX54C | Unit |
|---|---|---|---|---|---|---|
| Collector-Emitter Voltage | $V_{CEO}$ | 45 | 60 | 80 | 100 | V |
| Collector-Base Voltage | $V_{CBO}$ | 45 | 60 | 80 | 100 | V |
| Emitter-Base Voltage | $V_{EBO}$ | 5.0 |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

## THERMAL CHARACTERISTICS

| Characteristic | Symbol | Max | Unit |
|---|---|---|---|
| Thermal Resistance Junction to Case | Rθjc | 2.08 | °C/W |

FIGURE -1 POWER DERATING




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

| 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 |

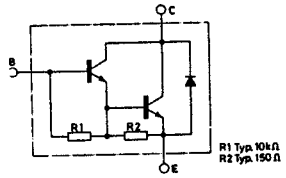
## ELECTRICAL CHARACTERISTICS ( $T_C$ = 25°C unless otherwise noted )

| Characteristic | | Symbol | Min | Max | Unit |
|---|---|---|---|---|---|
| **OFF CHARACTERISTICS** | | | | | |
| Collector-Emitter Sustaining Voltage(1)<br>( $I_C$= 100 mA, $I_B$= 0 ) | BDX53, BDX54<br>BDX53A, BDX54A<br>BDX53B, BDX54B<br>BDX53C, BDX54C | $V_{CEO(sus)}$ | 45<br>60<br>80<br>100 | | V |
| Collector Cutoff Current<br>( $V_{CE}$= 22 V, $I_B$= 0 )<br>( $V_{CE}$= 30 V, $I_B$= 0 )<br>( $V_{CE}$= 40 V, $I_B$= 0 )<br>( $V_{CE}$= 50 V, $I_B$= 0 ) | <br>BDX53, BDX54<br>BDX53A, BDX54A<br>BDX53B, BDX54B<br>BDX53C, BDX54C | $I_{CEO}$ | | <br>0.5<br>0.5<br>0.5<br>0.5 | mA |
| Collector-Base Cutoff Current<br>( $V_{CB}$= Rated $V_{CB}$, $I_E$= 0 ) | | $I_{CBO}$ | | 200 | uA |
| Emitter-Base Cutoff Current<br>( $V_{EB}$= 5.0 V, $I_C$= 0 ) | | $I_{EBO}$ | | 2.0 | mA |
| **ON CHARACTERISTICS** (1) | | | | | |
| DC Current Gain<br>( $I_C$= 3.0 A, $V_{CE}$= 3.0 V ) | | hFE | 750 | | |
| Collector-Emitter Saturation Voltag<br>( $I_C$= 3.0 A, $I_B$= 12 mA ) | | $V_{CE(sat)}$ | | 2.0 | V |
| Base-Emitter Saturation Voltage<br>( $I_C$= 3.0 A, $I_B$= 12 mA ) | | $V_{BE(sat)}$ | | 2.5 | V |
| Diode Forward-Voltage<br>( $I_F$= 3.0 A ) | | $V_F$ | | 2.5 | V |

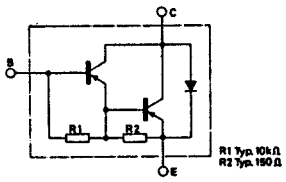
(1) Pulse Test: Pulse Width =300 us, Duty Cycle ≦ 2.0%

INTERNAL SCHEMATIC DIAGRAM

BDX53 Series NPN

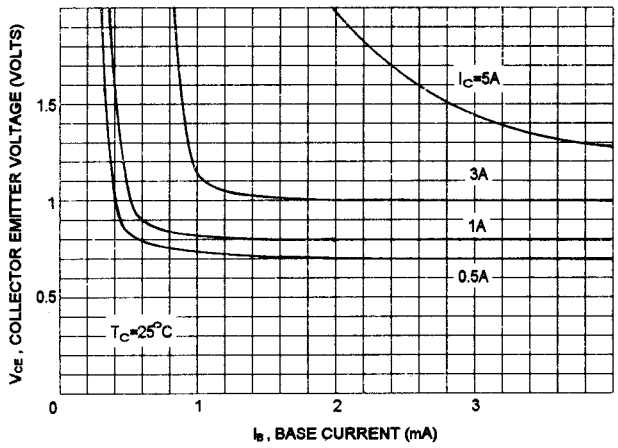



BDX54 Series PNP

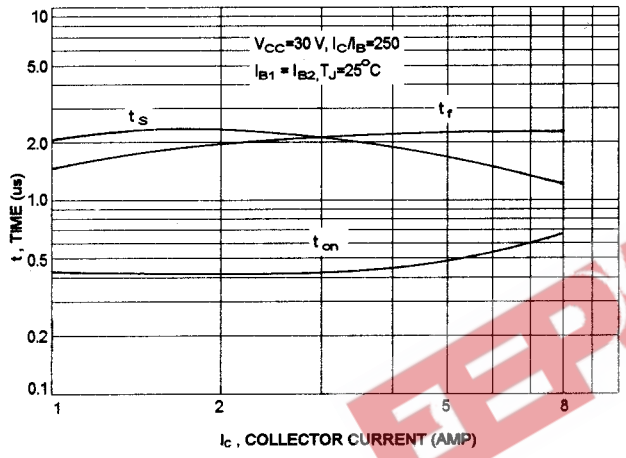


## NPN BDX53,A,B,C

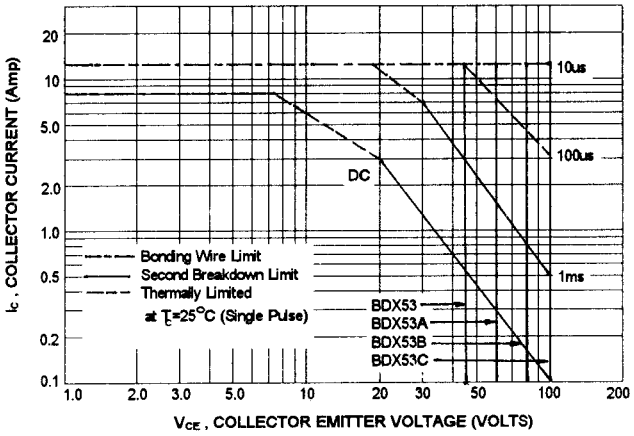
### COLLECTOR SATURATION REGION




### SWITCHING TIME

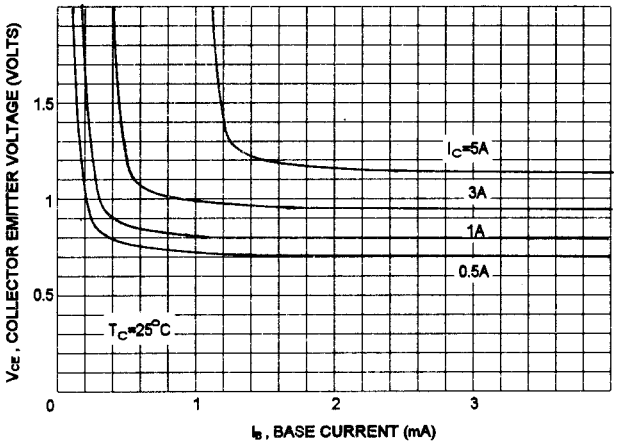



### SAFE OPERATING AREA

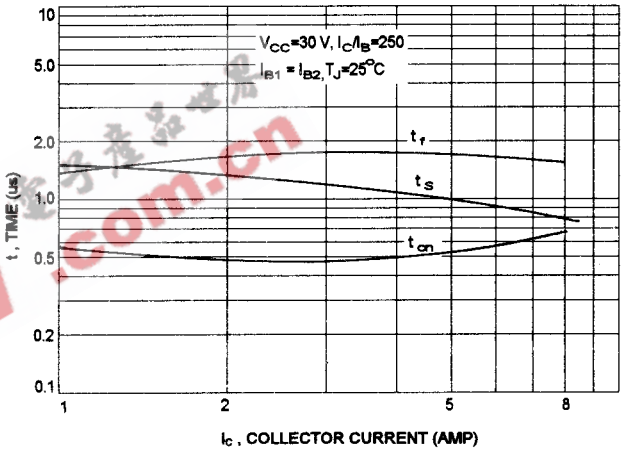



## PNP BDX54,A,B,C

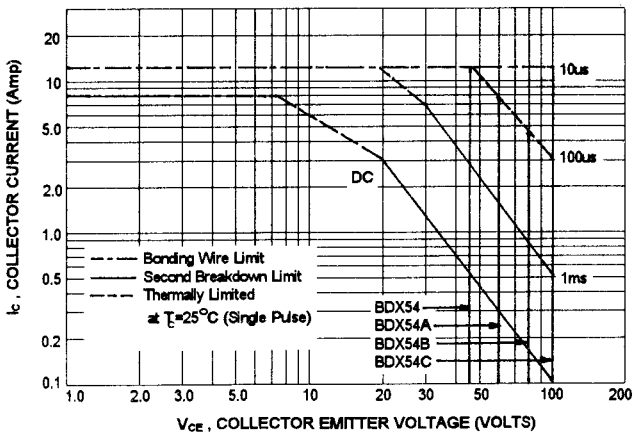
### COLLECTOR SATURATION REGION



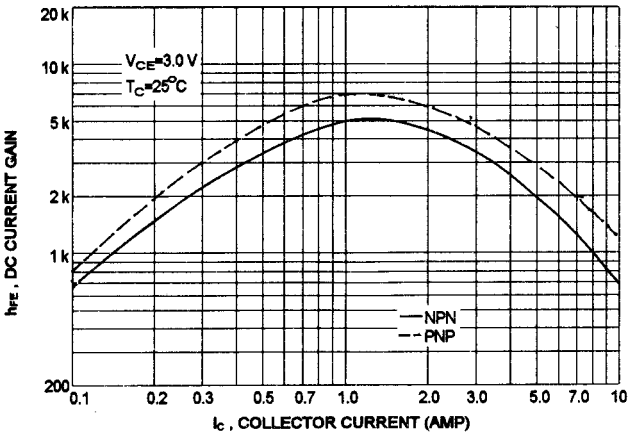

### SWITCHING TIME



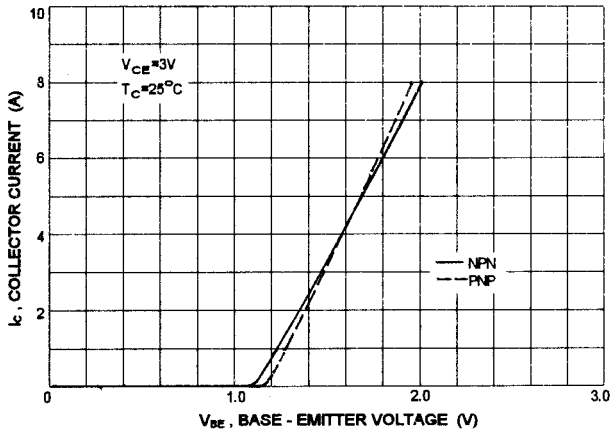

### SAFE OPERATING AREA



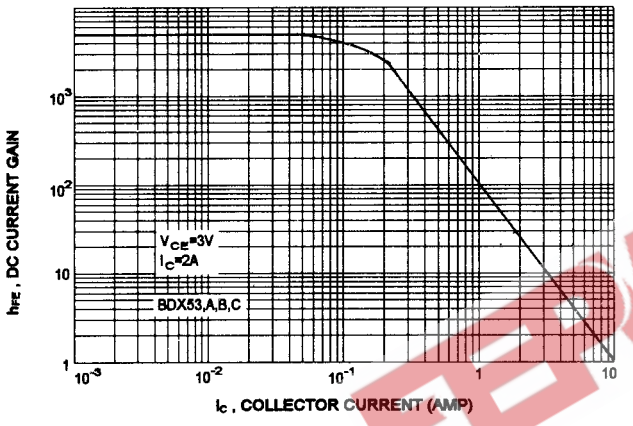
DC CURRENT GAIN



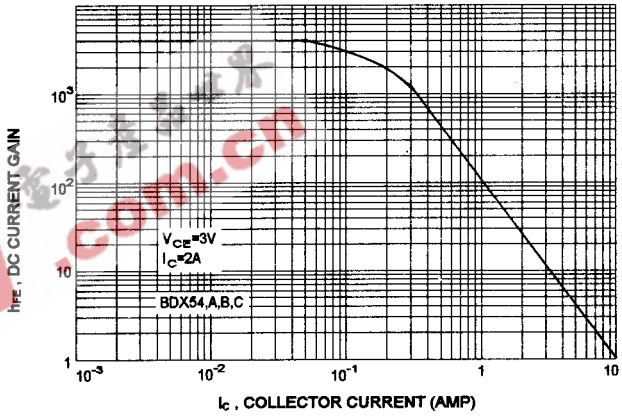

Ic - Vbe



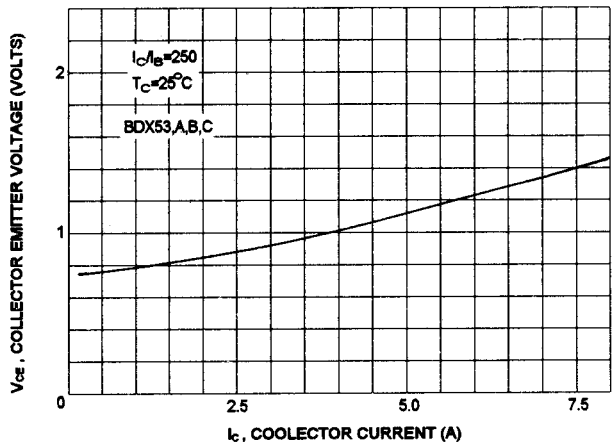

SMALL SIGNAL CURRENT GAIN




SMALL SIGNAL CURRENT GAIN




VCE(sat) - Ic




VCE(sat) - Ic