

## COMPLEMENTARY SILICON POWER DARLINGTON TRANSISTORS

- BDX53B, BDX53C, BDX54B AND BDX54C ARE SGS-THOMSON PREFERRED SALESTYPES

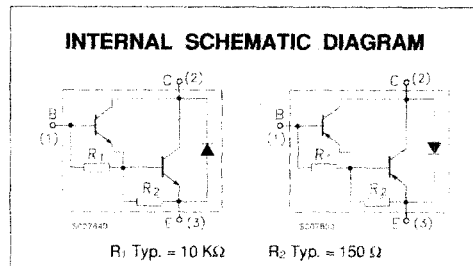
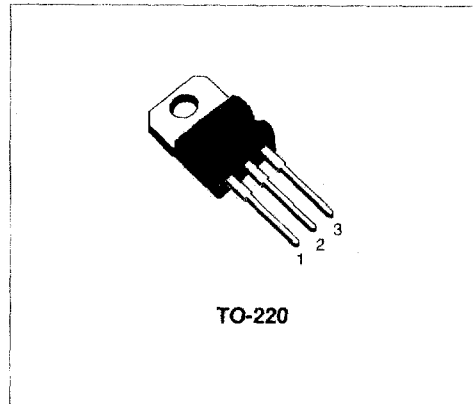
### APPLICATIONS

- AUDIO AMPLIFIERS
- LINEAR AND SWITCHING INDUSTRIAL EQUIPMENT

### DESCRIPTION

The BDX53A, BDX53B and BDX53C are silicon epitaxial-base NPN power transistors in monolithic Darlington configuration and are mounted in Jedec TO-220 plastic package. They are intended for use in hammer drivers, audio amplifiers and other medium power linear and switching applications.

The complementary PNP types for BDX53B and BDX53C are the BDX54B and BDX54C respectively.



### ABSOLUTE MAXIMUM RATINGS

| Symbol    | Parameter  | Value |            |        | Unit             |        |
|-----------|--|-------|------------|--------|------------------|--------|
|           |  | NPN   | BDX53A     | BDX53B |                  | BDX53C |
|           |  |       | PNP        | BDX54B |                  | BDX54C |
| $V_{CBO}$ | Collector-Base Voltage ( $I_E = 0$ )             | 60    | 80         | 100    | V                |        |
| $V_{CEO}$ | Collector-Emitter Voltage ( $I_B = 0$ )          | 60    | 80         | 100    | V                |        |
| $V_{EBO}$ | Emitter-base Voltage ( $I_C = 0$ )               |       | 5          |        | V                |        |
| $I_C$     | Collector Current                                |       | 8          |        | A                |        |
| $I_{CM}$  | Collector Peak Current (repetitive)              |       | 12         |        | A                |        |
| $I_B$     | Base Current                                     |       | 0.2        |        | A                |        |
| $P_{tot}$ | Total Dissipation at $T_c \leq 25^\circ\text{C}$ |       | 60         |        | W                |        |
| $T_{stg}$ | Storage Temperature                              |       | -65 to 150 |        | $^\circ\text{C}$ |        |
| $T_j$     | Max. Operating Junction Temperature              |       | 150        |        | $^\circ\text{C}$ |        |

**THERMAL DATA**

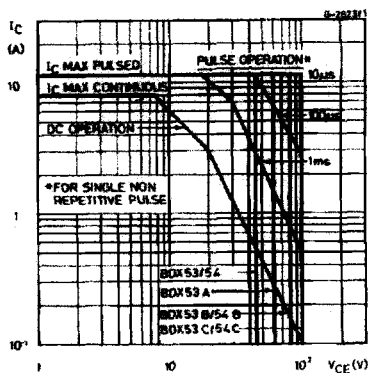
|                |                                     |     |      |               |
|----------------|-------------------------------------|-----|------|---------------|
| $R_{thj-case}$ | Thermal Resistance Junction-case    | Max | 2.08 | $^{\circ}C/W$ |
| $R_{thj-amb}$  | Thermal Resistance Junction-ambient | Max | 70   | $^{\circ}C/W$ |

**ELECTRICAL CHARACTERISTICS** ( $T_{case} = 25^{\circ}C$  unless otherwise specified)

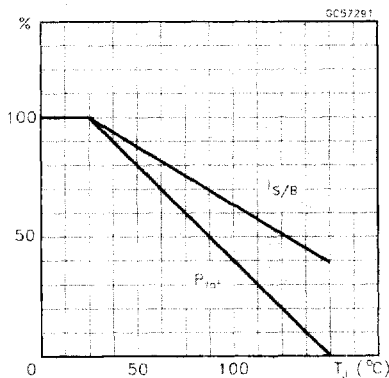
| Symbol          | Parameter  | Test Conditions   |   | Min.            | Typ.       | Max.              | Unit           |
|-----------------|--|---|---|-----------------|------------|-------------------|----------------|
| $I_{CBO}$       | Collector Cut-off Current ( $I_E = 0$ )            | for <b>BDX53A</b><br>for <b>BDX53B/54B</b><br>for <b>BDX53C/54C</b> | $V_{CB} = 60 V$<br>$V_{CB} = 80 V$<br>$V_{CB} = 100V$               |                 |            | 0.2<br>0.2<br>0.2 | mA<br>mA<br>mA |
| $I_{CEO}$       | Collector Cut-off Current ( $I_B = 0$ )            | for <b>BDX53A</b><br>for <b>BDX53B/54B</b><br>for <b>BDX53C/54C</b> | $V_{CB} = 30 V$<br>$V_{CB} = 40 V$<br>$V_{CB} = 50V$                |                 |            | 0.5<br>0.5<br>0.5 | mA<br>mA<br>mA |
| $I_{EBO}$       | Emitter Cut-off Current ( $I_C = 0$ )              | $V_{EB} = 5 V$  |   |                 |            | 2                 | mA             |
| $V_{CE(sus)}^*$ | Collector-Emitter Sustaining Voltage ( $I_B = 0$ ) | $I_C = 100 mA$  | for <b>BDX53A</b><br>for <b>BDX53B/54B</b><br>for <b>BDX53C/54C</b> | 60<br>80<br>100 |            |                   | V<br>V<br>V    |
| $V_{CE(sat)}^*$ | Collector-emitter Saturation Voltage               | $I_C = 3 A$   | $I_B = 12 mA$   |                 |            | 2                 | V              |
| $V_{BE(sat)}^*$ | Base-emitter Saturation Voltage                    | $I_C = 3 A$   | $I_B = 12 mA$   |                 |            | 2.5               | V              |
| $h_{FE}^*$      | DC Current Gain                                    | $I_C = 3 A$   | $V_{CE} = 3 V$  | 750             |            |                   |                |
| $V_F^*$         | Parallel-diode Forward Voltage                     | $I_F = 3 A$<br>$I_F = 8 A$  |   |                 | 1.8<br>2.5 | 2.5               | V<br>V         |

\* Pulsed: Pulse duration = 300  $\mu s$ , duty cycle 1.5 %  
For PNP types voltage and current values are negative.

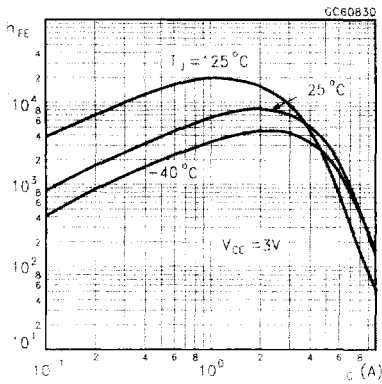
**Safe Operating Area**



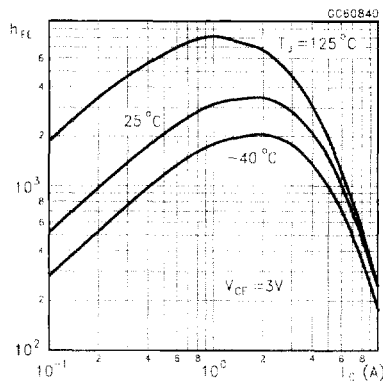
**Derating Curve**



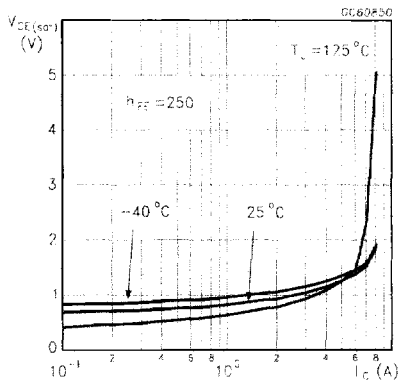
DC Current Gain (NPN type)



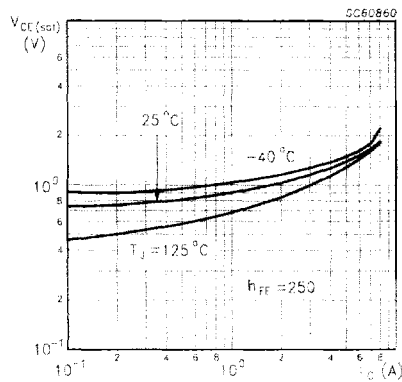
DC Current Gain (PNP type)



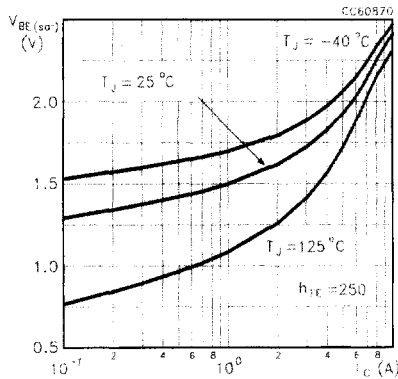
Collector Emitter Saturation Voltage (NPN type)



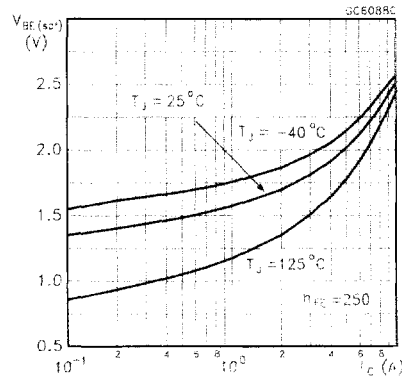
Collector Emitter Saturation Voltage (PNP type)



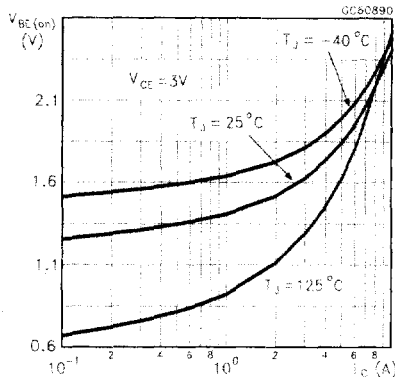
Base Emitter Saturation Voltage (NPN type)



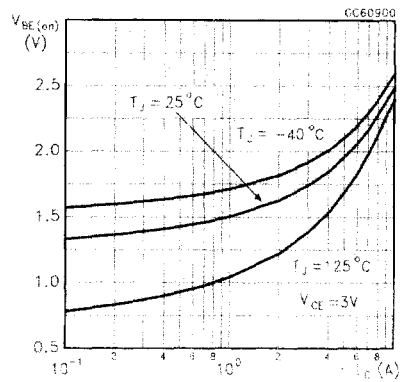
Base Emitter Saturation Voltage (PNP type)



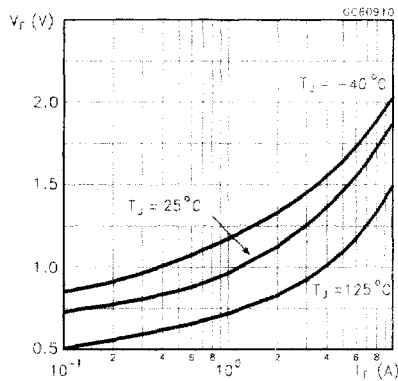
Base Emitter On Voltage (NPN type)



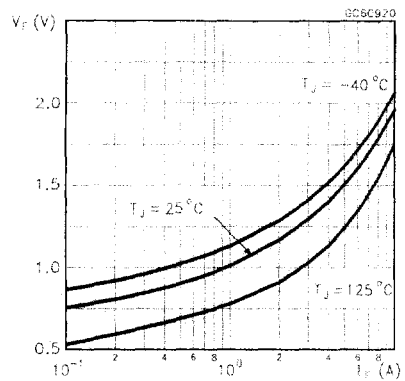
Base Emitter On Voltage (PNP type)



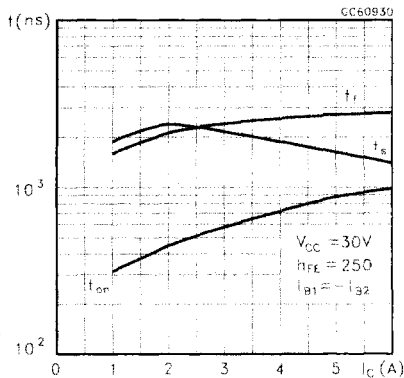
Freewheel Diode Forward Voltage (NPN type)



Freewheel Diode Forward Voltage (PNP type)



Switching Time Resistive Load (NPN type)



Switching Time resistive Load (PNP type)

