

## COMPLEMENTARY SILICON POWER DARLINGTON TRANSISTORS

- SGS-THOMSON PREFERRED SALESTYPES
- COMPLEMENTARY PNP - NPN DEVICES
- MONOLITHIC DARLINGTON CONFIGURATION
- INTEGRATED ANTIPARALLEL COLLECTOR-EMITTER DIODE

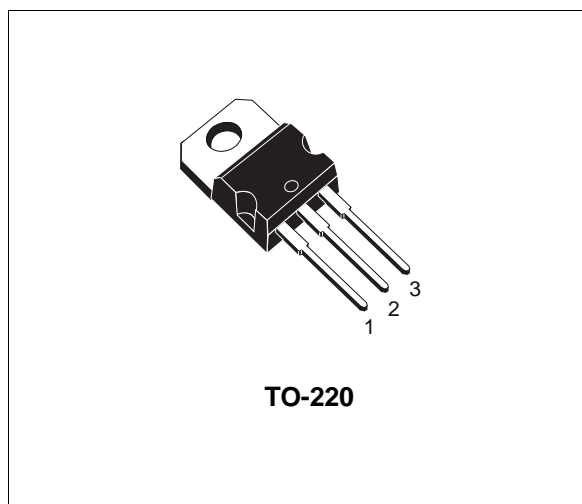
### APPLICATIONS

- LINEAR AND SWITCHING INDUSTRIAL EQUIPMENT

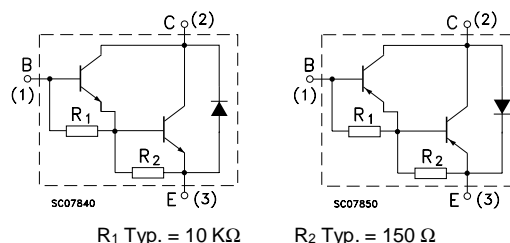
### DESCRIPTION

The BDX53F is a silicon epitaxial-base NPN power transistors in monolithic Darlington configuration and are mounted in Jedec TO-220 plastic package. It is intended for use in power linear and switching applications.

The complementary PNP types is BDX54F.



### INTERNAL SCHEMATIC DIAGRAM



### ABSOLUTE MAXIMUM RATINGS

| Symbol    | Parameter  | Value      |        | Unit             |
|-----------|--|------------|--------|------------------|
|           |  | NPN        | BDX53F |                  |
|           |  | PNP        | BDX54F |                  |
| $V_{CBO}$ | Collector-Base Voltage ( $I_E = 0$ )             | 160        |        | V                |
| $V_{CEO}$ | Collector-Emitter Voltage ( $I_B = 0$ )          | 160        |        | V                |
| $V_{EBO}$ | Emitter-base Voltage ( $I_C = 0$ )               | 5          |        | V                |
| $I_C$     | Collector Current                                | 8          |        | A                |
| $I_{CM}$  | Collector Peak Current                           | 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        |        | $^\circ\text{C}$ |

## BDX53F / BDX54F

### THERMAL DATA

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

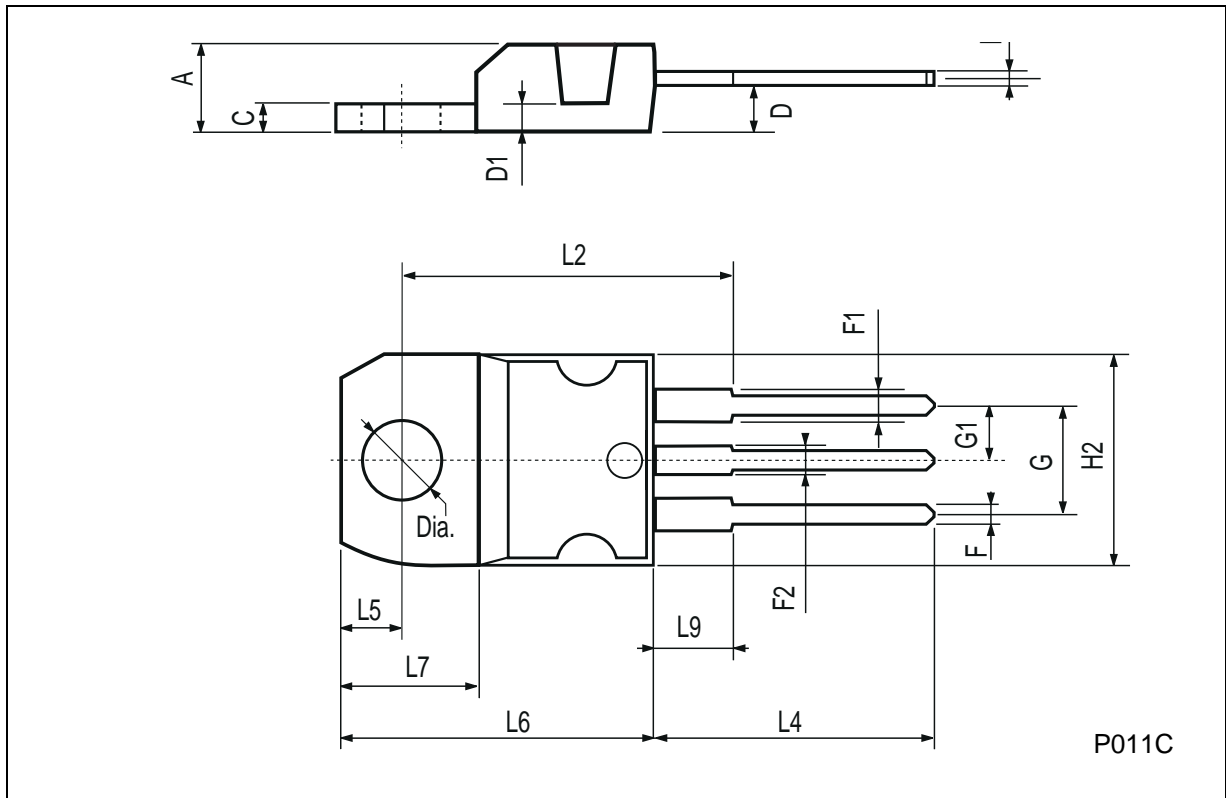
### ELECTRICAL CHARACTERISTICS ( $T_{case} = 25^{\circ}C$ unless otherwise specified)

| Symbol           | Parameter  | Test Conditions  | Min.       | Typ. | Max. | Unit |
|------------------|--|--|------------|------|------|------|
| $I_{CEO}$        | Collector Cut-off Current ( $I_E = 0$ )            | $V_{CB} = 80 V$  |            |      | 0.5  | mA   |
| $I_{CBO}$        | Collector Cut-off Current ( $I_B = 0$ )            | $V_{CB} = 160 V$   |            |      | 0.2  | mA   |
| $I_{EBO}$        | Emitter Cut-off Current ( $I_C = 0$ )              | $V_{EB} = 5 V$   |            |      | 5    | mA   |
| $V_{CEO(sus)}^*$ | Collector-Emitter Sustaining Voltage ( $I_B = 0$ ) | $I_C = 50 mA$  | 160        |      |      | V    |
| $V_{CE(sat)}^*$  | Collector-emitter Saturation Voltage               | $I_C = 2 A$ $I_B = 10 mA$                                |            |      | 2    | V    |
| $V_{BE(sat)}^*$  | Base-emitter Saturation Voltage                    | $I_C = 2 A$ $I_B = 10 mA$                                |            |      | 2.5  | V    |
| $h_{FE}^*$       | DC Current Gain                                    | $I_C = 2 A$ $V_{CE} = 5 V$<br>$I_C = 3 A$ $V_{CE} = 5 V$ | 500<br>150 |      |      |      |
| $V_F^*$          | Parallel Diode Forward Voltage                     | $I_F = 2 A$  |            |      | 2.5  | V    |
| $h_{fe}^*$       | Small Signal Current Gain                          | $I_C = 0.5 A$<br>$f = 1MHz$ $V_{CE} = 2 V$               |            | 20   |      |      |

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

**TO-220 MECHANICAL DATA**

| DIM. | mm    |      |       | inch  |       |       |
|------|-------|------|-------|-------|-------|-------|
|      | MIN.  | TYP. | MAX.  | MIN.  | TYP.  | MAX.  |
| A    | 4.40  |      | 4.60  | 0.173 |       | 0.181 |
| C    | 1.23  |      | 1.32  | 0.048 |       | 0.051 |
| D    | 2.40  |      | 2.72  | 0.094 |       | 0.107 |
| D1   |       | 1.27 |       |       | 0.050 |       |
| E    | 0.49  |      | 0.70  | 0.019 |       | 0.027 |
| F    | 0.61  |      | 0.88  | 0.024 |       | 0.034 |
| F1   | 1.14  |      | 1.70  | 0.044 |       | 0.067 |
| F2   | 1.14  |      | 1.70  | 0.044 |       | 0.067 |
| G    | 4.95  |      | 5.15  | 0.194 |       | 0.203 |
| G1   | 2.4   |      | 2.7   | 0.094 |       | 0.106 |
| H2   | 10.0  |      | 10.40 | 0.393 |       | 0.409 |
| L2   |       | 16.4 |       |       | 0.645 |       |
| L4   | 13.0  |      | 14.0  | 0.511 |       | 0.551 |
| L5   | 2.65  |      | 2.95  | 0.104 |       | 0.116 |
| L6   | 15.25 |      | 15.75 | 0.600 |       | 0.620 |
| L7   | 6.2   |      | 6.6   | 0.244 |       | 0.260 |
| L9   | 3.5   |      | 3.93  | 0.137 |       | 0.154 |
| DIA. | 3.75  |      | 3.85  | 0.147 |       | 0.151 |



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