

### NPN BDX53 - BDX53A - BDX53B - BDX53C

## SILICON POWER DARLINGTON TRANSISTORS

The BDX53, BDX53A, BDX53B and BDX53C are silicon epitaxial-base NPN transistors in monolithic Darlington configuration and are mounted in Jedec TO-220 plastic package. They are intented for use in audio amplifiers, medium power linear and switching applications. The complementary PNP types are the BDX54, BDX54A, BDX54B and BDX54C respectively. Compliance to RoHS.

## **ABSOLUTE MAXIMUM RATINGS**

| Symbol           | Ratings                   |                        |        | Value       | Unit |  |
|------------------|---------------------------|------------------------|--------|-------------|------|--|
| V <sub>CEO</sub> | Collector-Emitter Voltage | I <sub>B</sub> =0      | BDX53  | 45          |      |  |
|                  |                           |                        | BDX53A | 60          | \ /  |  |
|                  |                           |                        | BDX53B | 80          | V    |  |
|                  |                           |                        | BDX53C | 100         |      |  |
| V <sub>CBO</sub> | Collector-Base Voltage    | I <sub>E</sub> =0      | BDX53  | 45          |      |  |
|                  |                           |                        | BDX53A | 60          |      |  |
|                  |                           |                        | BDX53B | 80          | V    |  |
|                  |                           |                        | BDX53C | 100         | 1    |  |
| V <sub>EBO</sub> | Emitter-Base Voltage      | $I_{C}=0$              |        | 5           | V    |  |
| Ic               | Collector Current         |                        | 8      | ۸           |      |  |
|                  | Collector Current         | I <sub>CM</sub>        |        | 12          | Α    |  |
| I <sub>B</sub>   | Base Current              |                        |        | 0.2         | А    |  |
| P <sub>T</sub>   | Power Dissipation         | @ T <sub>C</sub> = 25° |        | 60          | W    |  |
| T <sub>J</sub>   | Junction Temperature      |                        |        | 150         | C    |  |
| Ts               | Storage Temperature       |                        |        | -65 to +150 |      |  |

#### **THERMAL CHARACTERISTICS**

| Symbol             | Ratings                              | Value | Unit |
|--------------------|--------------------------------------|-------|------|
| R <sub>thJ-C</sub> | Thermal Resistance, Junction to Case | 2.08  | .C\M |



# NPN BDX53 - BDX53A - BDX53B - BDX53C

### **ELECTRICAL CHARACTERISTICS**

TC=25℃ unless otherwise noted

| Symbol                                | Ratings  | Test Conditi                               | on(s)  | Min      | Тур  | Max | Unit   |
|---------------------------------------|--|--|--------|----------|------|-----|--------|
|                                       |  |  | BDX53  | 45       | -    | -   |        |
| V <sub>CEO(SUS)</sub>                 | Collector-Emitter<br>Breakdown Voltage (*)       | $I_{C}$ =100 mA<br>$I_{B}$ = 0             | BDX53A | 60       | -    |     | V      |
|                                       |  |  | BDX53B | 80       | -    |     |        |
|                                       |  |  | BDX53C | 100      | -    |     |        |
|                                       | 0-11-1-20-1-11-11-11-11-11-11-11-11-11-11-11-11- | $V_{CB}=22V, I_{B}=0$                      | BDX53  | -        | -    | 0.5 | 0.5 mA |
|                                       |  | $V_{CB} = 30V, I_B = 0$                    | BDX53A | -        | -    |     |        |
| I <sub>CEO</sub>                      | Collector Cutoff Current                         | $V_{CB} = 40V, I_B = 0$                    | BDX53B | -        | -    | 0.5 |        |
|                                       |  | $V_{CB} = 50V, I_B = 0$                    | BDX53C | -        | -    |     |        |
|                                       |  |  | BDX53  | <u>-</u> | -    | 2   | mA     |
|                                       | Emitter Cutoff Current                           |  | BDX53A |          |      |     |        |
| I <sub>EBO</sub>                      | Emilier Culon Current                            | V <sub>BE</sub> =5 V                       | BDX53B |          |      |     |        |
|                                       |  |  | BDX53C |          |      |     |        |
|                                       |  | $V_{CBO} = 45 \text{ V}, I_E = 0$          | BDX53  | -        | - 00 | A   |        |
| I <sub>CBO</sub>                      | Collector-Base Cutoff                            | $V_{CBO} = 60 \text{ V}, I_E = 0$          | BDX53A | -        |      |     |        |
|                                       | Current  | $V_{CBO} = 80 \text{ V}, I_E = 0$          | BDX53B | -        | -    | 0.2 | mA     |
|                                       |  | $V_{CBO} = 100 \text{ V}, I_E = 0$         | BDX53C | -        | -    |     |        |
|                                       | Collector-Emitter saturation Voltage (*)         | I <sub>C</sub> =3 A, I <sub>B</sub> =12 mA | BDX53  | -        | -    | 2   | · V    |
|                                       |  |  | BDX53A |          |      |     |        |
| V <sub>CE(SAT)</sub>                  |  |  | BDX53B |          |      |     |        |
|                                       |  |  | BDX53C |          |      |     |        |
|                                       | Base-Emitter saturation<br>Voltage (*)           | I <sub>C</sub> =3 A, I <sub>B</sub> =12 mA | BDX53  | -<br>-   | -    | 2.5 |        |
| V                                     |  |  | BDX53A |          |      |     |        |
| V <sub>BE(SAT)</sub>                  |  |  | BDX53B |          |      |     |        |
|                                       |  |  | BDX53C |          |      |     |        |
|                                       |  | I <sub>F</sub> =3 A                        | BDX53  |          |      | 4.0 | V      |
|                                       |  |  | BDX53A |          |      |     |        |
|                                       |  | IF=3 A                                     | BDX53B | _        | _    | 4.0 | V      |
| \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ | Forward Voltage (pulse method)                   |  | BDX53C |          |      |     |        |
| V <sub>F</sub>                        |  | I <sub>F</sub> =8 A                        | BDX53  |          | 1.8  | 2.5 | V      |
|                                       |  |  | BDX53A |          |      |     |        |
|                                       |  |  | BDX53B |          | 2.5  | -   |        |
|                                       |  |  | BDX53C |          |      |     |        |
| h <sub>FE</sub>                       | DC Current Gain (*)                              | $V_{CE}=3 V, I_{C}=3 A$                    | BDX53  | 750      | -    | -   | -      |
|                                       |  |  | BDX53A |          |      |     |        |
|                                       |  |  | BDX53B |          |      |     |        |
|                                       |  |  | BDX53C |          |      |     |        |

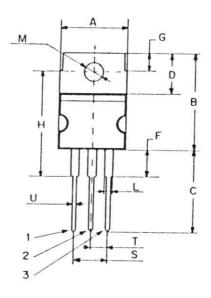
<sup>(\*)</sup> Pulse Width  $\approx 300~\mu s,$  Duty Cycle  $\angle$  1.5%

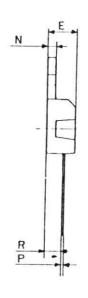


## NPN BDX53 - BDX53A - BDX53B - BDX53C

### **MECHANICAL DATA CASE TO-220**

| DIMENSIONS (mm)            |       |       |  |  |
|----------------------------|-------|-------|--|--|
|                            | Min.  | Max.  |  |  |
| A                          | 9,90  | 10,30 |  |  |
| B<br>C<br>D<br>E<br>F<br>G | 15,65 | 15,90 |  |  |
| С                          | 13,20 | 13,40 |  |  |
| D                          | 6,45  | 6,65  |  |  |
| E                          | 4,30  | 4,50  |  |  |
| F                          | 2,70  | 3,15  |  |  |
| G                          | 2,60  | 3,00  |  |  |
|                            | 15,75 | 17.15 |  |  |
| L                          | 1,15  | 1,40  |  |  |
| M                          | 3,50  | 3,70  |  |  |
| N<br>P                     | ı     | 1,37  |  |  |
|                            | 0,46  | 0,55  |  |  |
| R                          | 2,50  | 2,70  |  |  |
| S                          | 4,98  | 5,08  |  |  |
| S<br>T<br>U                | 2.49  | 2.54  |  |  |
| U                          | 0,70  | 0,90  |  |  |





| Pin 1 : | Base      |
|---------|-----------|
| Pin 2 : | Collector |
| Pin 3 : | Emitter   |
| Case :  | Collector |

#### Revised Decemberr 2012

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www.comsetsemi.com

info@comsetsemi.com