

## BDT63-A-B-C

### SILICON DARLINGTON POWER TRANSISTORS

NPN epitaxial-base transistors in a monolithic Darlington circuit and housed in a TO-220 envelope. They are intended for output stages in audio equipment, general amplifiers, and analogue switching application.

PNP complements are BDT62-A-B-C

Compliance to RoHS.

#### ABSOLUTE MAXIMUM RATINGS

| Symbol    | Ratings                   |        | Value | Unit |
|-----------|---------------------------|--------|-------|------|
| $V_{CBO}$ | Collector-Base Voltage    | BDT63  | 60    | V    |
|           |                           | BDT63A | 80    |      |
|           |                           | BDT63B | 100   |      |
|           |                           | BDT63C | 120   |      |
| $V_{CEO}$ | Collector-Emitter Voltage | BDT63  | 60    | V    |
|           |                           | BDT63A | 80    |      |
|           |                           | BDT63B | 100   |      |
|           |                           | BDT63C | 120   |      |
| $V_{EBO}$ | Emitter-Base Voltage      | BDT63  | 5     | V    |
|           |                           | BDT63A |       |      |
|           |                           | BDT63B |       |      |
|           |                           | BDT63C |       |      |
| $I_C$     | Collector Current         | BDT63  | 10    | A    |
|           |                           | BDT63A |       |      |
|           |                           | BDT63B |       |      |
|           |                           | BDT63C |       |      |
| $I_{CM}$  | Collector Peak Current    | BDT63  | 15    | A    |
|           |                           | BDT63A |       |      |
|           |                           | BDT63B |       |      |
|           |                           | BDT63C |       |      |

## BDT63-A-B-C

### ABSOLUTE MAXIMUM RATINGS

| Symbol | Ratings                   |                       | Value  | Unit        |                  |
|--------|---------------------------|-----------------------|--------|-------------|------------------|
| $I_B$  | Base Current              |                       | BDT63  | 250         | mA               |
|        |                           |                       | BDT63A |             |                  |
|        |                           |                       | BDT63B |             |                  |
|        |                           |                       | BDT63C |             |                  |
| $P_T$  | Power Dissipation         | @ $T_{mb} < 25^\circ$ | BDT63  | 90          | W                |
|        |                           |                       | BDT63A |             |                  |
|        |                           |                       | BDT63B |             |                  |
|        |                           |                       | BDT63C |             |                  |
| $T_J$  | Junction Temperature      |                       | BDT63  | 150         | $^\circ\text{C}$ |
|        |                           |                       | BDT63A |             |                  |
|        |                           |                       | BDT63B |             |                  |
|        |                           |                       | BDT63C |             |                  |
| $T_s$  | Storage Temperature range |                       | BDT63  | -65 to +150 |                  |
|        |                           |                       | BDT63A |             |                  |
|        |                           |                       | BDT63B |             |                  |
|        |                           |                       | BDT63C |             |                  |

Limiting values in accordance with the Absolute Maximum System (IEC 134)

### THERMAL CHARACTERISTICS

| Symbol       | Ratings                              |        | Value | Unit |
|--------------|--------------------------------------|--------|-------|------|
| $R_{thJ-MB}$ | From junction to mounting base       | BDT63  | 1.39  | K/W  |
|              |                                      | BDT63A |       |      |
|              |                                      | BDT63B |       |      |
|              |                                      | BDT63C |       |      |
| $R_{thJ-A}$  | From junction to ambient in free air | BDT63  | 70    | K/W  |
|              |                                      | BDT63A |       |      |
|              |                                      | BDT63B |       |      |
|              |                                      | BDT63C |       |      |

## BDT63-A-B-C

### ELECTRICAL CHARACTERISTICS

TC=25°C unless otherwise noted

| Symbol        | Ratings                                  | Test Condition(s)                                                         |        | Min | Typ | Max | Unit |
|---------------|------------------------------------------|---------------------------------------------------------------------------|--------|-----|-----|-----|------|
| $I_{CBO}$     | Collector Cutoff Current                 | $I_E = 0, V_{CB} = V_{CBOmax}$                                            | BDT63  | -   | -   | 0.2 | mA   |
|               |                                          |                                                                           | BDT63A |     |     |     |      |
|               |                                          |                                                                           | BDT63B |     |     |     |      |
|               |                                          |                                                                           | BDT63C |     |     |     |      |
|               |                                          | $I_E = 0, V_{CB} = 1/2 V_{CBOmax}$<br>$T_J = 150\text{ }^{\circ}\text{C}$ | BDT63  | -   | -   | 2   | mA   |
|               |                                          |                                                                           | BDT63A |     |     |     |      |
|               |                                          |                                                                           | BDT63B |     |     |     |      |
|               |                                          |                                                                           | BDT63C |     |     |     |      |
| $I_{CEO}$     | Collector Cutoff Current                 | $I_E = 0, V_{CE} = 1/2 V_{CEOmax}$                                        | BDT63  | -   | -   | 0.5 | mA   |
|               |                                          |                                                                           | BDT63A |     |     |     |      |
|               |                                          |                                                                           | BDT63B |     |     |     |      |
|               |                                          |                                                                           | BDT63C |     |     |     |      |
| $I_{EBO}$     | Emitter Cutoff Current                   | $V_{EB} = 5\text{ V}, I_C = 0$                                            | BDT63  | -   | -   | 5.0 | mA   |
|               |                                          |                                                                           | BDT63A |     |     |     |      |
|               |                                          |                                                                           | BDT63B |     |     |     |      |
|               |                                          |                                                                           | BDT63C |     |     |     |      |
| $V_{CEO}$     | Collector-Emitter Breakdown Voltage      | $I_C = 30\text{ mA}, I_B = 0$                                             | BDT63  | 60  | -   | -   | V    |
|               |                                          |                                                                           | BDT63A | 80  | -   | -   |      |
|               |                                          |                                                                           | BDT63B | 100 | -   | -   |      |
|               |                                          |                                                                           | BDT63C | 120 | -   | -   |      |
| $V_{CE(SAT)}$ | Collector-Emitter saturation Voltage (*) | $I_C = 3\text{ A}, I_B = 12\text{ mA}$                                    | BDT63  | -   | -   | 2   | V    |
|               |                                          |                                                                           | BDT63A |     |     |     |      |
|               |                                          |                                                                           | BDT63B |     |     |     |      |
|               |                                          |                                                                           | BDT63C |     |     |     |      |
|               |                                          | $I_C = 8\text{ A}, I_B = 80\text{ mA}$                                    | BDT63  | -   | -   | 2.5 |      |
|               |                                          |                                                                           | BDT63A |     |     |     |      |
|               |                                          |                                                                           | BDT63B |     |     |     |      |
|               |                                          |                                                                           | BDT63C |     |     |     |      |

## BDT63-A-B-C

### ELECTRICAL CHARACTERISTICS

TC=25°C unless otherwise noted

| Symbol       | Ratings                   |                                                              |        | Min  | Typ  | Max | Unit |
|--------------|---------------------------|--------------------------------------------------------------|--------|------|------|-----|------|
| $V_{BE(on)}$ | Base-Emitter Voltage (*)  | $I_C= 3\text{ A}$ , $V_{CE}= 3\text{ V}$                     | BDT63  | -    | -    | 2.5 | V    |
|              |                           |                                                              | BDT63A |      |      |     |      |
|              |                           |                                                              | BDT63B |      |      |     |      |
|              |                           |                                                              | BDT63C |      |      |     |      |
| $h_{FE}$     | DC Current Gain (*)       | $V_{CE}= 3.0\text{ V}$ , $I_C= 3\text{ A}$                   | BDT63  | 1000 | -    | -   | -    |
|              |                           |                                                              | BDT63A |      |      |     |      |
|              |                           |                                                              | BDT63B |      |      |     |      |
|              |                           |                                                              | BDT63C |      |      |     |      |
|              |                           | $V_{CE}= 3.0\text{ V}$ , $I_C= 10\text{ A}$                  | BDT63  | -    | 3000 | -   |      |
|              |                           |                                                              | BDT63A |      |      |     |      |
|              |                           |                                                              | BDT63B |      |      |     |      |
|              |                           |                                                              | BDT63C |      |      |     |      |
| $V_{ECF}$    | C-E Diode Forward Voltage | $I_F= 3\text{ A}$                                            | BDT63  | -    | -    | 2   | V    |
|              |                           |                                                              | BDT63A |      |      |     |      |
|              |                           |                                                              | BDT63B |      |      |     |      |
|              |                           |                                                              | BDT63C |      |      |     |      |
| $C_{OB}$     | Output Capacitance        | $I_E= 0$ , $V_{CB}= 10\text{ V}$<br>$f_{test}= 1\text{ MHz}$ | BDT63  | -    | 100  | -   | pF   |
|              |                           |                                                              | BDT63A |      |      |     |      |
|              |                           |                                                              | BDT63B |      |      |     |      |
|              |                           |                                                              | BDT63C |      |      |     |      |

### SWITCHING TIMES

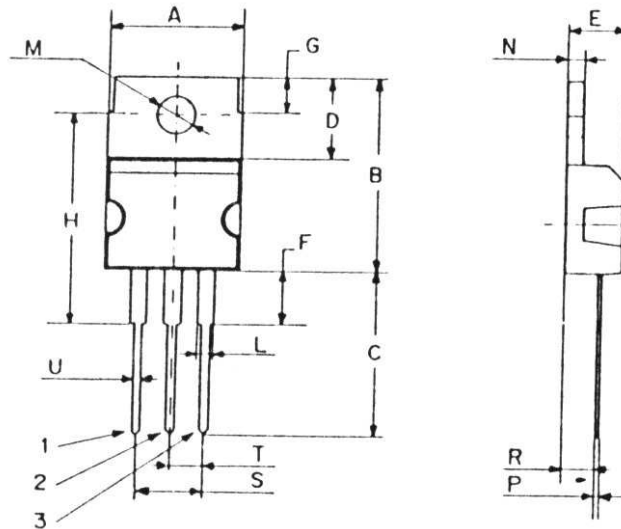
| Symbol    | Ratings       | Test Condition(s)                                                                | Min | Typ | Max | Unit          |
|-----------|---------------|----------------------------------------------------------------------------------|-----|-----|-----|---------------|
| $t_{on}$  | turn-on time  | $I_C = 3\text{ A}$ , $V_{CC} = 10\text{ V}$<br>$I_{B1} = -I_{B2} = 12\text{ mA}$ | -   | 1   | 2.5 | $\mu\text{s}$ |
| $t_{off}$ | turn-off time |                                                                                  | -   | 5   | 10  |               |

(\*) Pulse Width  $\approx 300\text{ }\mu\text{s}$ , Duty Cycle  $\angle 2.0\%$

## BDT63-A-B-C

### MECHANICAL DATA CASE TO-220

| DIMENSIONS (mm) |       |       |
|-----------------|-------|-------|
|                 | Min.  | Max.  |
| A               | 9,90  | 10,30 |
| B               | 15,65 | 15,90 |
| C               | 13,20 | 13,40 |
| D               | 6,45  | 6,65  |
| E               | 4,30  | 4,50  |
| F               | 2,70  | 3,15  |
| G               | 2,60  | 3,00  |
| H               | 15,75 | 17,15 |
| L               | 1,15  | 1,40  |
| M               | 3,50  | 3,70  |
| N               | -     | 1,37  |
| P               | 0,46  | 0,55  |
| R               | 2,50  | 2,70  |
| S               | 4,98  | 5,08  |
| T               | 2,49  | 2,54  |
| U               | 0,70  | 0,90  |



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

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