

# isc Silicon NPN Darlington Power Transistor

## BD643F

### DESCRIPTION

- High DC Current Gain
- Low Saturation Voltage
- Complement to Type BD644F
- Minimum Lot-to-Lot variations for robust device performance and reliable operation

### APPLICATIONS

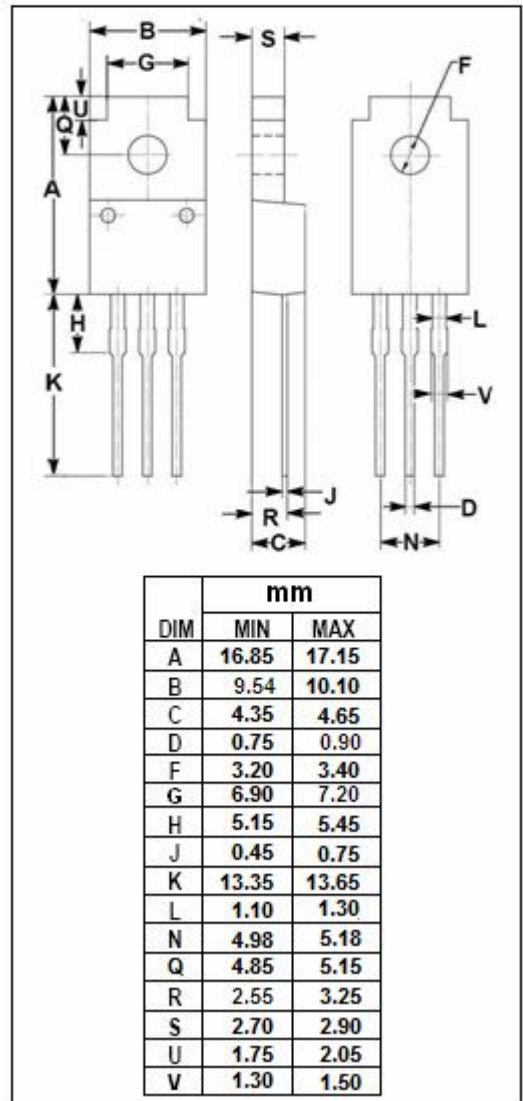
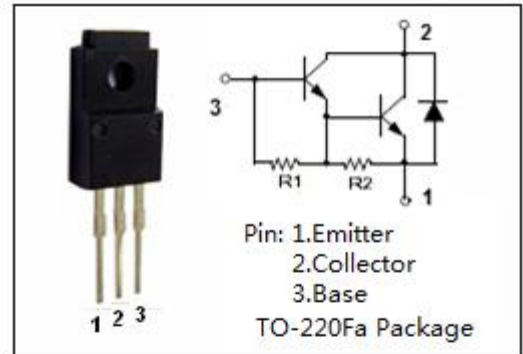
- Designed for use as complementary AF push-pull output stage applications

### ABSOLUTE MAXIMUM RATINGS( $T_a=25^{\circ}\text{C}$ )

| SYMBOL    | PARAMETER                                                 | VALUE   | UNIT               |
|-----------|-----------------------------------------------------------|---------|--------------------|
| $V_{CBO}$ | Collector-Base Voltage                                    | 60      | V                  |
| $V_{CEO}$ | Collector-Emitter Voltage                                 | 45      | V                  |
| $V_{EBO}$ | Emitter-Base Voltage                                      | 5       | V                  |
| $I_C$     | Collector Current-Continuous                              | 8       | A                  |
| $I_{CP}$  | Collector Current-Peak                                    | 12      | A                  |
| $I_B$     | Base Current-Continuous                                   | 0.15    | A                  |
| $P_C$     | Collector Power Dissipation<br>@ $T_a=25^{\circ}\text{C}$ | 20      | W                  |
|           | Collector Power Dissipation<br>@ $T_c=25^{\circ}\text{C}$ | 32      |                    |
| $T_J$     | Junction Temperature                                      | 150     | $^{\circ}\text{C}$ |
| $T_{stg}$ | Storage Temperature Range                                 | -65~150 | $^{\circ}\text{C}$ |

### THERMAL CHARACTERISTICS

| SYMBOL        | PARAMETER                               | MAX  | UNIT                 |
|---------------|-----------------------------------------|------|----------------------|
| $R_{th\ j-c}$ | Thermal Resistance, Junction to Case    | 1.6  | $^{\circ}\text{C/W}$ |
| $R_{th\ j-a}$ | Thermal Resistance, Junction to Ambient | 6.25 | $^{\circ}\text{C/W}$ |



**isc Silicon NPN Darlington Power Transistor****BD643F****ELECTRICAL CHARACTERISTICS****T<sub>C</sub>=25°C unless otherwise specified**

| SYMBOL                 | PARAMETER                            | CONDITIONS                                                        | MIN | TYP. | MAX | UNIT |
|------------------------|--------------------------------------|-------------------------------------------------------------------|-----|------|-----|------|
| V <sub>CEO(SUS)</sub>  | Collector-Emitter Breakdown Voltage  | I <sub>C</sub> = 30mA; I <sub>B</sub> = 0                         | 45  |      |     | V    |
| V <sub>CE(sat)-1</sub> | Collector-Emitter Saturation Voltage | I <sub>C</sub> = 4A; I <sub>B</sub> = 16mA                        |     |      | 2.0 | V    |
| V <sub>CE(sat)-2</sub> | Collector-Emitter Saturation Voltage | I <sub>C</sub> = 5A; I <sub>B</sub> = 50mA                        |     |      | 2.5 | V    |
| V <sub>BE(sat)</sub>   | Base-Emitter Saturation Voltage      | I <sub>C</sub> = 5A; I <sub>B</sub> = 50mA                        |     |      | 3.0 | V    |
| V <sub>BE(on)</sub>    | Base-Emitter On Voltage              | I <sub>C</sub> = 4A ; V <sub>CE</sub> = 3V                        |     |      | 2.5 | V    |
| I <sub>CBO</sub>       | Collector Cutoff Current             | V <sub>CB</sub> = 45V; I <sub>E</sub> = 0                         |     |      | 0.1 | mA   |
|                        |                                      | V <sub>CB</sub> = 30V; I <sub>E</sub> = 0; T <sub>C</sub> = 150°C |     |      | 1.0 |      |
| I <sub>CEO</sub>       | Collector Cutoff Current             | V <sub>CE</sub> = 25V; I <sub>B</sub> = 0                         |     |      | 0.2 | mA   |
| I <sub>EBO</sub>       | Emitter Cutoff Current               | V <sub>EB</sub> = 5V; I <sub>C</sub> = 0                          |     |      | 5   | mA   |
| h <sub>FE-1</sub>      | DC Current Gain                      | I <sub>C</sub> = 0.5A ; V <sub>CE</sub> = 3V                      |     | 1900 |     |      |
| h <sub>FE-2</sub>      | DC Current Gain                      | I <sub>C</sub> = 4A ; V <sub>CE</sub> = 3V                        | 750 |      |     |      |
| h <sub>FE-3</sub>      | DC Current Gain                      | I <sub>C</sub> = 8A ; V <sub>CE</sub> = 3V                        |     | 1800 |     |      |

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