

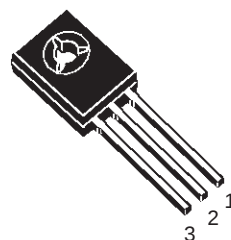
## NPN SILICON TRANSISTORS

- STMicroelectronics PREFERRED SALESTYPES

### DESCRIPTION

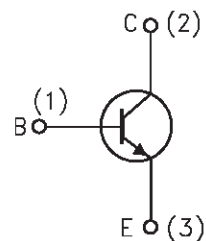
The BD135 and BD139 are silicon epitaxial planar NPN transistors in Jedec SOT-32 plastic package, designed for audio amplifiers and drivers utilizing complementary or quasi complementary circuits.

The complementary PNP types are BD136 and BD140 respectively.



**SOT-32**

### INTERNAL SCHEMATIC DIAGRAM



SC06960

### ABSOLUTE MAXIMUM RATINGS

| Symbol    | Parameter                                                      | Value      |       | Unit               |
|-----------|----------------------------------------------------------------|------------|-------|--------------------|
|           |                                                                | BD135      | BD139 |                    |
| $V_{CBO}$ | Collector-Base Voltage ( $I_E = 0$ )                           | 45         | 80    | V                  |
| $V_{CEO}$ | Collector-Emitter Voltage ( $I_B = 0$ )                        | 45         | 80    | V                  |
| $V_{EBO}$ | Emitter-Base Voltage ( $I_C = 0$ )                             | 5          |       | V                  |
| $I_C$     | Collector Current                                              | 1.5        |       | A                  |
| $I_{CM}$  | Collector Peak Current                                         | 3          |       | A                  |
| $I_B$     | Base Current                                                   | 0.5        |       | A                  |
| $P_{tot}$ | Total Dissipation at $T_c \leq 25\text{ }^{\circ}\text{C}$     | 12.5       |       | W                  |
| $P_{tot}$ | Total Dissipation at $T_{amb} \leq 25\text{ }^{\circ}\text{C}$ | 1.25       |       | W                  |
| $T_{stg}$ | Storage Temperature                                            | -65 to 150 |       | $^{\circ}\text{C}$ |
| $T_j$     | Max. Operating Junction Temperature                            | 150        |       | $^{\circ}\text{C}$ |

# BD135 / BD139

## THERMAL DATA

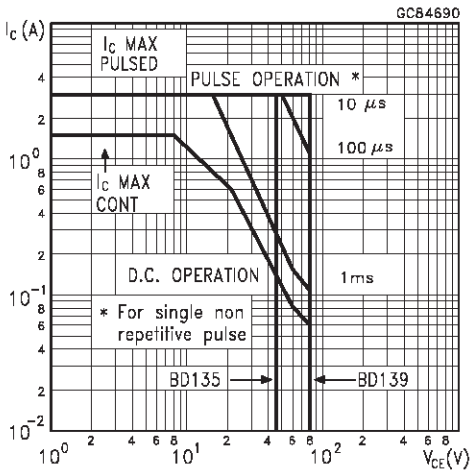
|                       |                                  |     |    |      |
|-----------------------|----------------------------------|-----|----|------|
| R <sub>thj-case</sub> | Thermal Resistance Junction-case | Max | 10 | °C/W |
|-----------------------|----------------------------------|-----|----|------|

## ELECTRICAL CHARACTERISTICS (T<sub>case</sub> = 25 °C unless otherwise specified)

| Symbol                 | Parameter                                      | Test Conditions                                                                                                                              | Min.           | Typ. | Max.      | Unit     |
|------------------------|------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|----------------|------|-----------|----------|
| I <sub>CBO</sub>       | Collector Cut-off Current (I <sub>E</sub> = 0) | V <sub>CB</sub> = 30 V<br>V <sub>CB</sub> = 30 V T <sub>C</sub> = 125 °C                                                                     |                |      | 0.1<br>10 | μA<br>μA |
| I <sub>EBO</sub>       | Emitter Cut-off Current (I <sub>C</sub> = 0)   | V <sub>EB</sub> = 5 V                                                                                                                        |                |      | 10        | μA       |
| V <sub>CEO(sus)*</sub> | Collector-Emitter Sustaining Voltage           | I <sub>C</sub> = 30 mA<br>for <b>BD135</b><br>for <b>BD139</b>                                                                               | 45<br>80       |      |           | V<br>V   |
| V <sub>CE(sat)*</sub>  | Collector-Emitter Saturation Voltage           | I <sub>C</sub> = 0.5 A I <sub>B</sub> = 0.05 A                                                                                               |                |      | 0.5       | V        |
| V <sub>BE*</sub>       | Base-Emitter Voltage                           | I <sub>C</sub> = 0.5 A V <sub>CE</sub> = 2 V                                                                                                 |                |      | 1         | V        |
| h <sub>FE*</sub>       | DC Current Gain                                | I <sub>C</sub> = 5 mA V <sub>CE</sub> = 2 V<br>I <sub>C</sub> = 0.5 A V <sub>CE</sub> = 2 V<br>I <sub>C</sub> = 150 mA V <sub>CE</sub> = 2 V | 25<br>25<br>40 |      | 250       |          |
| h <sub>FE</sub>        | h <sub>FE</sub> Groups                         | I <sub>C</sub> = 150 mA V <sub>CE</sub> = 2 V<br>for BD139 group 10                                                                          | 63             |      | 160       |          |

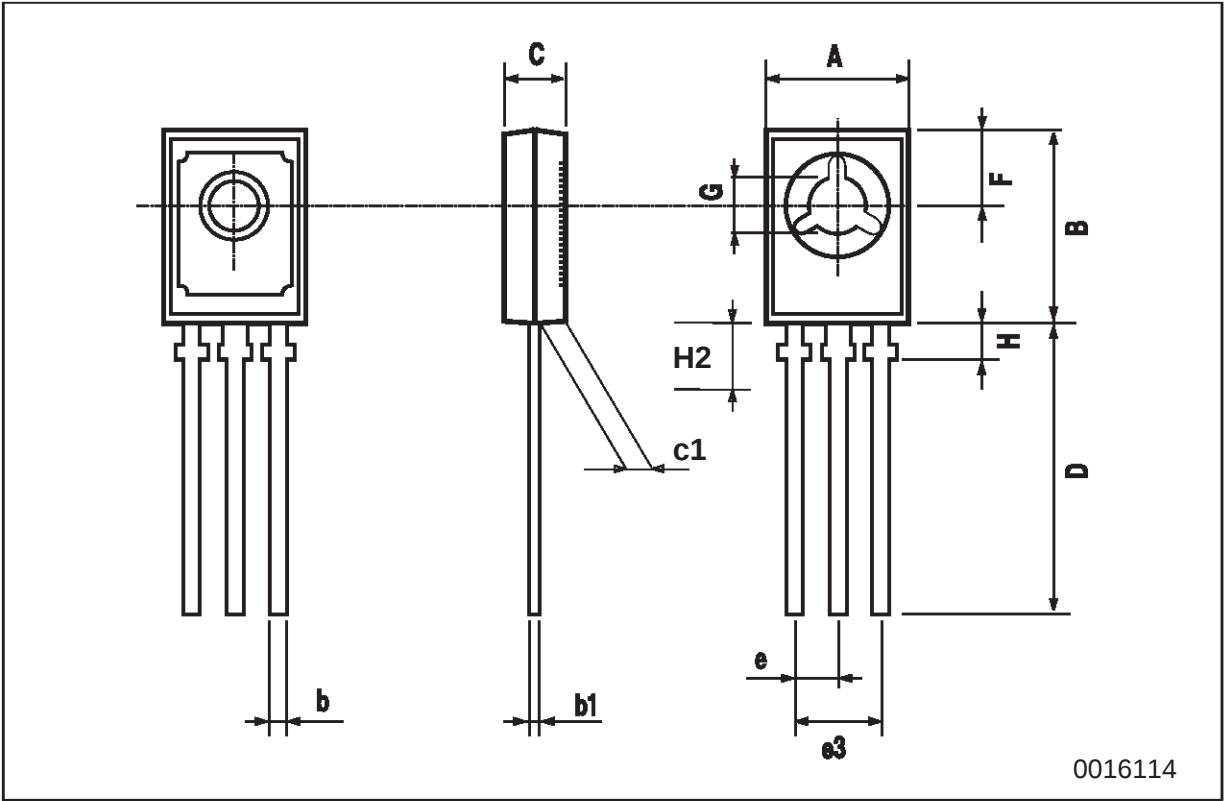
\* Pulsed: Pulse duration = 300 μs, duty cycle 1.5 %

## Safe Operating Area



SOT-32 (TO-126) MECHANICAL DATA

| DIM. | mm   |      |      | inch  |       |       |
|------|------|------|------|-------|-------|-------|
|      | MIN. | TYP. | MAX. | MIN.  | TYP.  | MAX.  |
| A    | 7.4  |      | 7.8  | 0.291 |       | 0.307 |
| B    | 10.5 |      | 10.8 | 0.413 |       | 0.445 |
| b    | 0.7  |      | 0.9  | 0.028 |       | 0.035 |
| b1   | 0.49 |      | 0.75 | 0.019 |       | 0.030 |
| C    | 2.4  |      | 2.7  | 0.040 |       | 0.106 |
| c1   | 1.0  |      | 1.3  | 0.039 |       | 0.050 |
| D    | 15.4 |      | 16.0 | 0.606 |       | 0.629 |
| e    |      | 2.2  |      |       | 0.087 |       |
| e3   | 4.15 |      | 4.65 | 0.163 |       | 0.183 |
| F    |      | 3.8  |      |       | 0.150 |       |
| G    | 3    |      | 3.2  | 0.118 |       | 0.126 |
| H    |      |      | 2.54 |       |       | 0.100 |



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