

## COMPLEMENTARY SILICON POWER TRANSISTORS

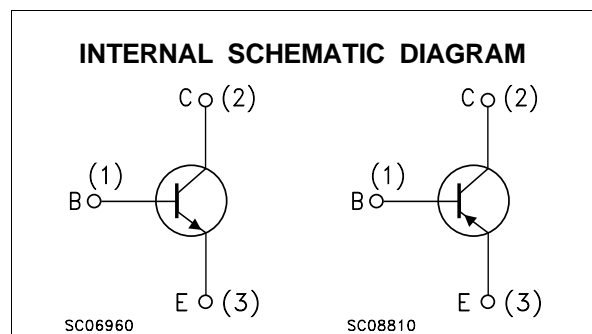
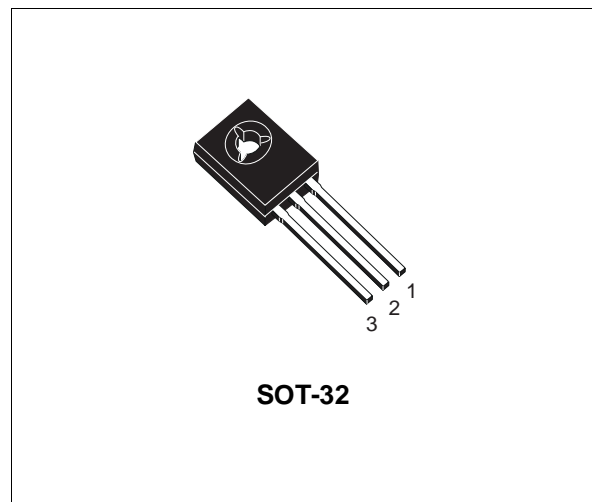
- SGS-THOMSON PREFERRED SALESTYPES
- COMPLEMENTARY PNP - NPN DEVICES

### DESCRIPTION

The BD433, BD435, and BD437 are silicon epitaxial-base NPN power transistors in Jedec SOT-32 plastic package, intended for use in medium power linear and switching applications.

The BD433 is especially suitable for use in car-radio output stages.

The complementary PNP types are BD434, BD436, and BD438 respectively.



### ABSOLUTE MAXIMUM RATINGS

| Symbol    | Parameter                                  | Value |            |       |       | Unit |
|-----------|--|-------|------------|-------|-------|------|
|           |  | NPN   | BD433      | BD435 | BD437 |      |
|           |  | PNP   | BD434      | BD436 | BD438 |      |
| $V_{CBO}$ | Collector-Base Voltage ( $I_E = 0$ )       |       | 22         | 32    | 45    | V    |
| $V_{CES}$ | Collector-Emitter Voltage ( $V_{BE} = 0$ ) |       | 22         | 32    | 45    | V    |
| $V_{CEO}$ | Collector-Emitter Voltage ( $I_B = 0$ )    |       | 22         | 32    | 45    | V    |
| $V_{EBO}$ | Emitter-Base Voltage ( $I_C = 0$ )         |       | 5          |       |       | V    |
| $I_C$     | Collector Current                          |       | 4          |       |       | A    |
| $I_{CM}$  | Collector Peak Current ( $t \leq 10$ ms)   |       | 7          |       |       | A    |
| $I_B$     | Base Current                               |       | 1          |       |       | A    |
| $P_{tot}$ | Total Dissipation at $T_c \leq 25$ °C      |       | 36         |       |       | W    |
| $T_{stg}$ | Storage Temperature                        |       | -65 to 150 |       |       | °C   |
| $T_j$     | Max. Operating Junction Temperature        |       | 150        |       |       | °C   |

For PNP types voltage and current values are negative.

## BD433/434/435/436/437/438

### THERMAL DATA

|                       |                                     |     |     |      |
|-----------------------|-------------------------------------|-----|-----|------|
| R <sub>thj-case</sub> | Thermal Resistance Junction-case    | Max | 3.5 | °C/W |
| R <sub>thj-amb</sub>  | Thermal Resistance Junction-ambient | Max | 100 | °C/W |

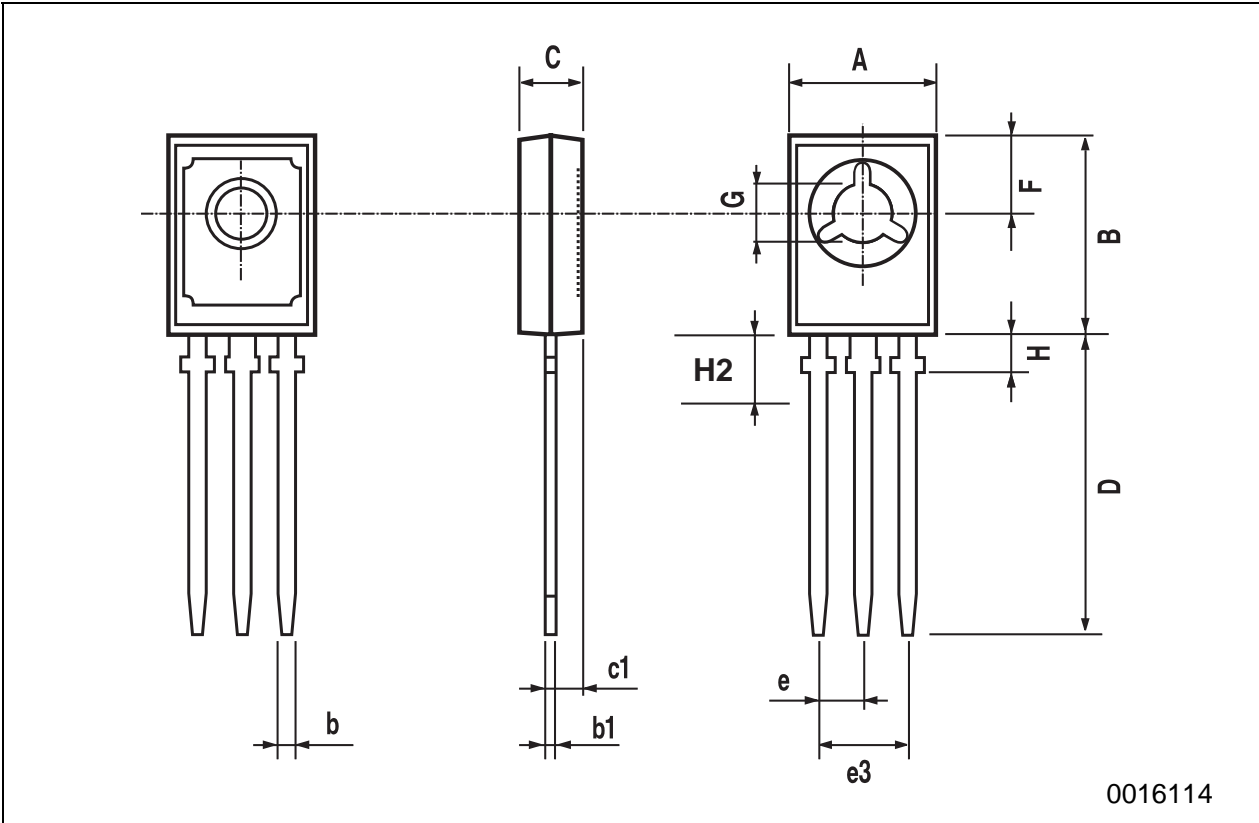
### ELECTRICAL CHARACTERISTICS (T<sub>case</sub> = 25 °C unless otherwise specified)

| Symbol                               | Parameter   | Test Conditions   | Min.  | Typ.                                   | Max.                     | Unit           |
|--------------------------------------|---|---|---|--|--------------------------|----------------|
| I <sub>CBO</sub>                     | Collector Cut-off Current (I <sub>E</sub> = 0)            | for <b>BD433/434</b> V <sub>CB</sub> = 22 V<br>for <b>BD435/436</b> V <sub>CB</sub> = 32 V<br>for <b>BD437/438</b> V <sub>CB</sub> = 45 V |   |  | 100<br>100<br>100        | μA<br>μA<br>μA |
| I <sub>CES</sub>                     | Collector Cut-off Current (V <sub>BE</sub> = 0)           | for <b>BD433/434</b> V <sub>CE</sub> = 22 V<br>for <b>BD435/436</b> V <sub>CE</sub> = 32 V<br>for <b>BD437/438</b> V <sub>CE</sub> = 45 V |   |  | 100<br>100<br>100        | μA<br>μA<br>μA |
| I <sub>EBO</sub>                     | Emitter Cut-off Current (I <sub>C</sub> = 0)              | V <sub>EB</sub> = 5 V   |   |  | 1                        | mA             |
| V <sub>CEO(sus)*</sub>               | Collector-Emitter Sustaining Voltage (I <sub>B</sub> = 0) | I <sub>C</sub> = 100 mA   | for <b>BD433/434</b> 22<br>for <b>BD435/436</b> 32<br>for <b>BD437/438</b> 45   |  |                          | V<br>V<br>V    |
| V <sub>CE(sat)*</sub>                | Collector-Emitter Saturation Voltage                      | I <sub>C</sub> = 2 A  | I <sub>B</sub> = 0.2 A<br>for <b>BD433/434</b><br>for <b>BD435/436</b><br>for <b>BD437/438</b>  | 0.2<br>0.2<br>0.2                      | 0.5<br>0.5<br>0.6        | V<br>V<br>V    |
| V <sub>BE*</sub>                     | Base-Emitter Voltage                                      | I <sub>C</sub> = 10 mA<br>I <sub>C</sub> = 2 A  | V <sub>CE</sub> = 5 V<br>V <sub>CE</sub> = 1 V<br>for <b>BD433/434</b><br>for <b>BD435/436</b><br>for <b>BD437/438</b>  | 0.58                                   | 1.1<br>1.1<br>1.2        | V<br>V<br>V    |
| h <sub>FE*</sub>                     | DC Current Gain   | I <sub>C</sub> = 10 mA<br><br>I <sub>C</sub> = 500 mA<br>I <sub>C</sub> = 2 A   | V <sub>CE</sub> = 5 V<br>for <b>BD433/434</b><br>for <b>BD435/436</b><br>for <b>BD437/438</b><br>V <sub>CE</sub> = 1 V<br>V <sub>CE</sub> = 1 V<br>for <b>BD433/434</b><br>for <b>BD435/436</b><br>for <b>BD437/438</b> | 40<br>40<br>30<br>85<br>50<br>50<br>40 | 130<br>130<br>130<br>140 |                |
| h <sub>FE1</sub> /h <sub>FE2</sub> * | Matched Pair  | I <sub>C</sub> = 500 mA   | V <sub>CE</sub> = 1 V   |  | 1.4                      |                |
| f <sub>T</sub>                       | Transition frequency                                      | I <sub>C</sub> = 250 mA   | V <sub>CE</sub> = 1 V   | 3                                      |                          | MHz            |

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

**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 |
| H2   |      | 2.15 |      |       | 0.084 |       |



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