

## SILICON NPN TRANSISTORS

- SGS-THOMSON PREFERRED SALESTYPES
- NPN TRANSISTOR

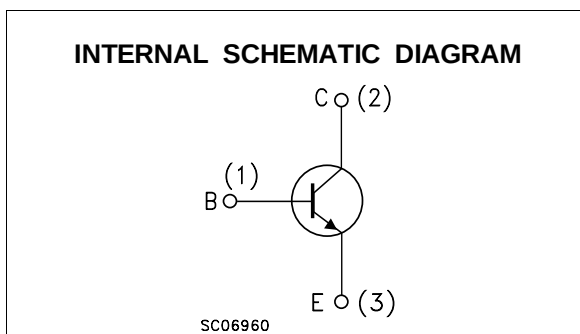
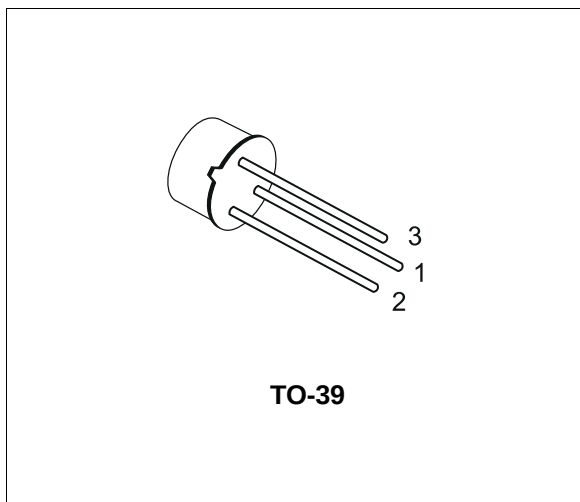
### APPLICATIONS

- GENERAL PURPOSE SWITCHING
- GENERAL PURPOSE AMPLIFIERS

### DESCRIPTION

The 2N5681, 2N5682 are high voltage silicon epitaxial planar NPN transistors in Jedec TO-39 metal case intended for use as drivers for high power transistors in general purpose, amplifier and switching applications.

The complementary PNP types are the 2N5679 and 2N5680 respectively.



### ABSOLUTE MAXIMUM RATINGS

| Symbol    | Parameter                                                      | Value      |        | Unit               |
|-----------|----------------------------------------------------------------|------------|--------|--------------------|
|           |                                                                | 2N5680     | 2N5682 |                    |
| $V_{CBO}$ | Collector-Base Voltage ( $I_E = 0$ )                           | 100        | 120    | V                  |
| $V_{CEO}$ | Collector-Emitter Voltage ( $I_B = 0$ )                        | 100        | 120    | V                  |
| $V_{EBO}$ | Emitter-Base Voltage ( $I_C = 0$ )                             | 4          |        | V                  |
| $I_C$     | Collector Current                                              | 1          |        | A                  |
| $I_B$     | Base Current                                                   | 0.5        |        | A                  |
| $P_{tot}$ | Total Dissipation at $T_c \leq 25\text{ }^{\circ}\text{C}$     | 10         |        | W                  |
| $P_{tot}$ | Total Dissipation at $T_{amb} \leq 50\text{ }^{\circ}\text{C}$ | 1          |        | W                  |
| $T_{stg}$ | Storage Temperature                                            | -65 to 200 |        | $^{\circ}\text{C}$ |
| $T_j$     | Max. Operating Junction Temperature                            | 200        |        | $^{\circ}\text{C}$ |

## 2N5681 / 2N5682

### THERMAL DATA

|                       |                                     |     |      |      |
|-----------------------|-------------------------------------|-----|------|------|
| R <sub>thj-case</sub> | Thermal Resistance Junction-case    | Max | 17.5 | °C/W |
| R <sub>thj-amb</sub>  | Thermal Resistance Junction-ambient | Max | 175  | °C/W |

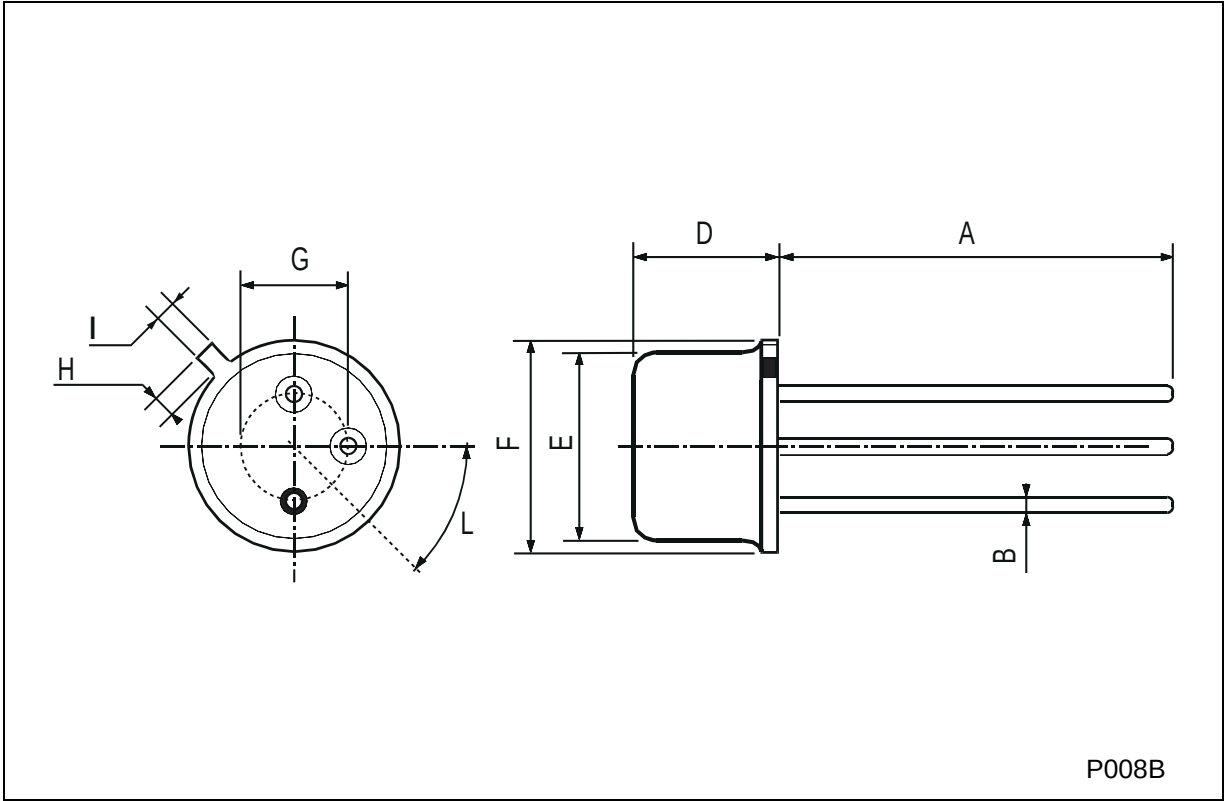
### ELECTRICAL CHARACTERISTICS (T<sub>case</sub> = 25 °C unless otherwise specified)

| Symbol                 | Parameter                                           | Test Conditions                                                                                                                                                                                             | Min.       | Typ. | Max.                 | Unit                     |
|------------------------|-----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|------|----------------------|--------------------------|
| I <sub>CEV</sub>       | Collector Cut-off Current (V <sub>BE</sub> = -1.5V) | for <b>2N5681</b> V <sub>CE</sub> = 100 V<br>for <b>2N5682</b> V <sub>CE</sub> = 120 V<br>T <sub>c</sub> = 150 °C<br>for <b>2N5681</b> V <sub>CE</sub> = 100 V<br>for <b>2N5682</b> V <sub>CE</sub> = 120 V |            |      | 1<br>1<br><br>1<br>1 | μA<br>μA<br><br>μA<br>μA |
| I <sub>CBO</sub>       | Collector Cut-off Current (I <sub>E</sub> = 0)      | for <b>2N5681</b> V <sub>CB</sub> = 100 V<br>for <b>2N5682</b> V <sub>CB</sub> = 120 V                                                                                                                      |            |      | 1<br>1               | μA<br>μA                 |
| I <sub>CEO</sub>       | Collector Cut-off Current (I <sub>B</sub> = 0)      | for <b>2N5681</b> V <sub>CB</sub> = 70 V<br>for <b>2N5682</b> V <sub>CB</sub> = 80 V                                                                                                                        |            |      | 10<br>10             | μA<br>μA                 |
| I <sub>EBO</sub>       | Emitter Cut-off Current (I <sub>C</sub> = 0)        | V <sub>EB</sub> = 4 V                                                                                                                                                                                       |            |      | 1                    | μA                       |
| V <sub>CEO(sus)*</sub> | Collector-Emitter Sustaining Voltage                | I <sub>C</sub> = 10 mA<br>for <b>2N5681</b><br>for <b>2N5682</b>                                                                                                                                            | 100<br>120 |      |                      | V<br>V                   |
| V <sub>CE(sat)*</sub>  | Collector-Emitter Saturation Voltage                | I <sub>C</sub> = 250 mA I <sub>B</sub> = 25 mA<br>I <sub>C</sub> = 500 mA I <sub>B</sub> = 50 mA<br>I <sub>C</sub> = 1 A I <sub>B</sub> = 200 mA                                                            |            |      | 0.6<br>1<br>2        | V<br>V<br>V              |
| V <sub>BE*</sub>       | Base-Emitter Voltage                                | I <sub>C</sub> = 250 mA V <sub>CE</sub> = 2 V                                                                                                                                                               |            |      | 1                    | V                        |
| h <sub>FE*</sub>       | DC Current Gain                                     | I <sub>C</sub> = 250 mA V <sub>CE</sub> = 2 V<br>I <sub>C</sub> = 1 A V <sub>CE</sub> = 2 V                                                                                                                 | 40<br>5    |      | 150                  |                          |
| h <sub>fe</sub>        | Small Signal Current Gain                           | I <sub>C</sub> = 0.2 A V <sub>CE</sub> = 1.5 V f = 1KHz                                                                                                                                                     | 40         |      |                      |                          |
| f <sub>T</sub>         | Transition frequency                                | I <sub>C</sub> = 100 mA V <sub>CE</sub> = 10 V f = 10MHz                                                                                                                                                    | 30         |      |                      | MHz                      |
| C <sub>CBO</sub>       | Collector Base Capacitance                          | I <sub>E</sub> = 0 V <sub>CB</sub> = 20 V f = 1MHz                                                                                                                                                          |            |      | 50                   | pF                       |

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

TO-39 MECHANICAL DATA

| DIM. | mm         |      |      | inch  |      |       |
|------|------------|------|------|-------|------|-------|
|      | MIN.       | TYP. | MAX. | MIN.  | TYP. | MAX.  |
| A    | 12.7       |      |      | 0.500 |      |       |
| B    |            |      | 0.49 |       |      | 0.019 |
| D    |            |      | 6.6  |       |      | 0.260 |
| E    |            |      | 8.5  |       |      | 0.334 |
| F    |            |      | 9.4  |       |      | 0.370 |
| G    | 5.08       |      |      | 0.200 |      |       |
| H    |            |      | 1.2  |       |      | 0.047 |
| I    |            |      | 0.9  |       |      | 0.035 |
| L    | 45° (typ.) |      |      |       |      |       |



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