SGS-THOMSON MICROELECTRONICS

# 2N5681
# 2N5682

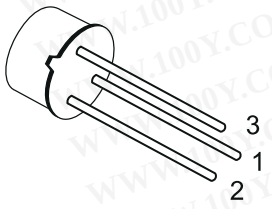
## SILICON NPN TRANSISTORS

- SGS-THOMSON PREFERRED SALESTYPES
- NPN TRANSISTOR

### APPLICATIONS
- GENERAL PURPOSE SWITCHING
- GENERAL PURPOSE AMPLIFIERS

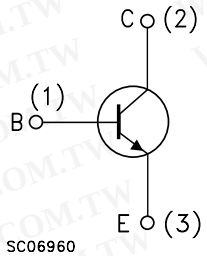
### DESCRIPTION
The 2N5681, 2N5682 are high voltage silicon epitaxial planar NPN transistors in Jedec TO-39 metal case intended for use as drivers for high power transistors in general purpose, amplifier and switching applications.

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




**TO-39**

**INTERNAL SCHEMATIC DIAGRAM**

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### 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 $T_c \leq 25\ ^oC$ | 10 | | W |
| $P_{tot}$ | Total Dissipation at $T_{amb} \leq 50\ ^oC$ | 1 | | W |
| $T_{stg}$ | Storage Temperature | -65 to 200 | | $^oC$ |
| $T_j$ | Max. Operating Junction Temperature | 200 | | $^oC$ |

## THERMAL DATA

| | | | | |
|---|---|---|---|---|
| $R_{thj\text{-}case}$ | Thermal Resistance Junction-case | Max | 17.5 | °C/W |
| $R_{thj\text{-}amb}$ | Thermal Resistance Junction-ambient | Max | 175 | °C/W |

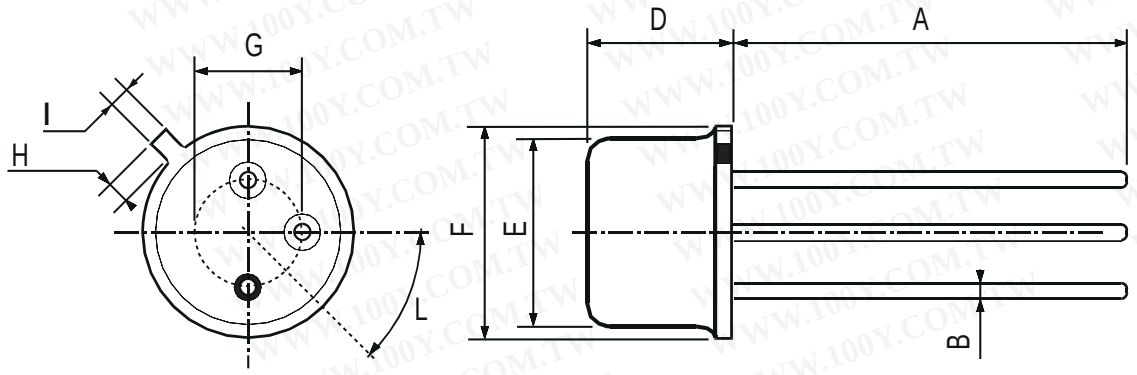
## ELECTRICAL CHARACTERISTICS ($T_{case}$ = 25 °C unless otherwise specified)

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $I_{CEV}$ | Collector Cut-off Current ($V_{BE}$ = -1.5V) | for **2N5681** $V_{CE}$ = 100 V<br>for **2N5682** $V_{CE}$ = 120 V<br>$T_c$ = 150 °C<br>for **2N5681** $V_{CE}$ = 100 V<br>for **2N5682** $V_{CE}$ = 120 V | | | 1<br>1<br><br>1<br>1 | µA<br>µA<br><br>µA<br>µA |
| $I_{CBO}$ | Collector Cut-off Current ($I_E$ = 0) | for **2N5681** $V_{CB}$ = 100 V<br>for **2N5682** $V_{CB}$ = 120 V | | | 1<br>1 | µA<br>µA |
| $I_{CEO}$ | Collector Cut-off Current ($I_B$ = 0) | for **2N5681** $V_{CB}$ = 70 V<br>for **2N5682** $V_{CB}$ = 80 V | | | 10<br>10 | µA<br>µA |
| $I_{EBO}$ | Emitter Cut-off Current ($I_C$ = 0) | $V_{EB}$ = 4 V | | | 1 | µA |
| $V_{CEO(sus)}$* | Collector-Emitter Sustaining Voltage | $I_C$ = 10 mA<br>for **2N5681**<br>for **2N5682** | <br>100<br>120 | | | <br>V<br>V |
| $V_{CE(sat)}$* | Collector-Emitter Saturation Voltage | $I_C$ = 250 mA $I_B$ = 25 mA<br>$I_C$ = 500 mA $I_B$ = 50 mA<br>$I_C$ = 1 A $I_B$ = 200 mA | | | 0.6<br>1<br>2 | V<br>V<br>V |
| $V_{BE}$* | Base-Emitter Voltage | $I_C$ = 250 mA $V_{CE}$ = 2 V | | | 1 | V |
| $h_{FE}$* | DC Current Gain | $I_C$ = 250 mA $V_{CE}$ = 2 V<br>$I_C$ = 1 A $V_{CE}$ = 2 V | 40<br>5 | | 150 | |
| $h_{fe}$ | Small Signal Current Gain | $I_C$ = 0.2 A $V_{CE}$ = 1.5 V f = 1KHz | 40 | | | |
| $f_T$ | Transition frequency | $I_C$ = 100 mA $V_{CE}$ = 10 V f =10MHz | 30 | | | MHz |
| $C_{CBO}$ | Collector Base Capacitance | $I_E$ = 0 $V_{CB}$ = 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 | $45^{o}$ (typ.) | | | | | |

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