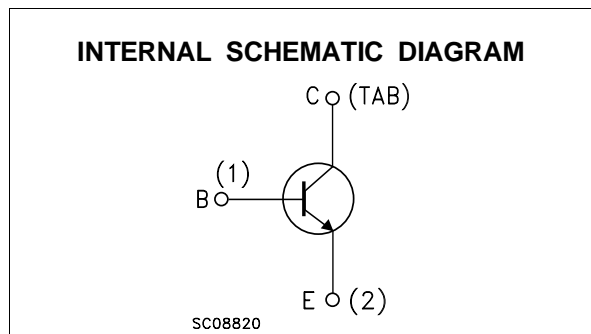
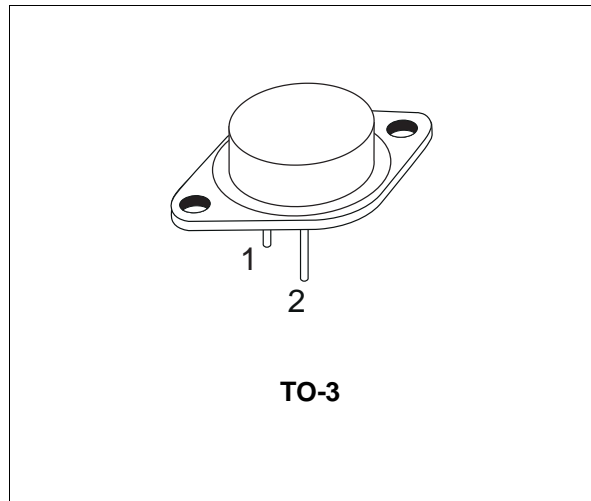


HIGH CURRENT NPN SILICON TRANSISTOR

- SGS-THOMSON PREFERRED SALESTYPE
- NPN TRANSISTOR

DESCRIPTION

The 2N5038 is a silicon planar multiepitaxial NPN transistors in Jedec TO-3 metal case. They are especially intended for high current and switching applications.



ABSOLUTE MAXIMUM RATINGS

| Symbol | Parameter | Value | Unit |
|-----------|---------------------------------------------------------------------|------------|------------|
| V_{CBO} | Collector-Base Voltage ($I_E = 0$) | 150 | V |
| V_{CEX} | Collector-Emitter Voltage ($V_{BE} = -1.5V$ $R_{BE} = 100\Omega$) | 150 | V |
| V_{CER} | Collector-Emitter Voltage ($R_{BE} < 50\Omega$) | 110 | V |
| V_{CEO} | Collector-Emitter Voltage ($I_B = 0$) | 90 | V |
| V_{EBO} | Emitter-Base Voltage ($I_C = 0$) | 7 | V |
| I_C | Collector Current | 20 | A |
| I_{CM} | Collector Peak Current | 30 | A |
| I_B | Base Current | 5 | A |
| P_{tot} | Total Dissipation at $T_c \leq 25^\circ C$ | 140 | W |
| T_{stg} | Storage Temperature | -65 to 200 | $^\circ C$ |
| T_j | Max. Operating Junction Temperature | 200 | $^\circ C$ |

THERMAL DATA

| | | | | |
|-----------------------|----------------------------------|-----|------|------|
| R _{thj-case} | Thermal Resistance Junction-case | Max | 1.25 | °C/W |
|-----------------------|----------------------------------|-----|------|------|

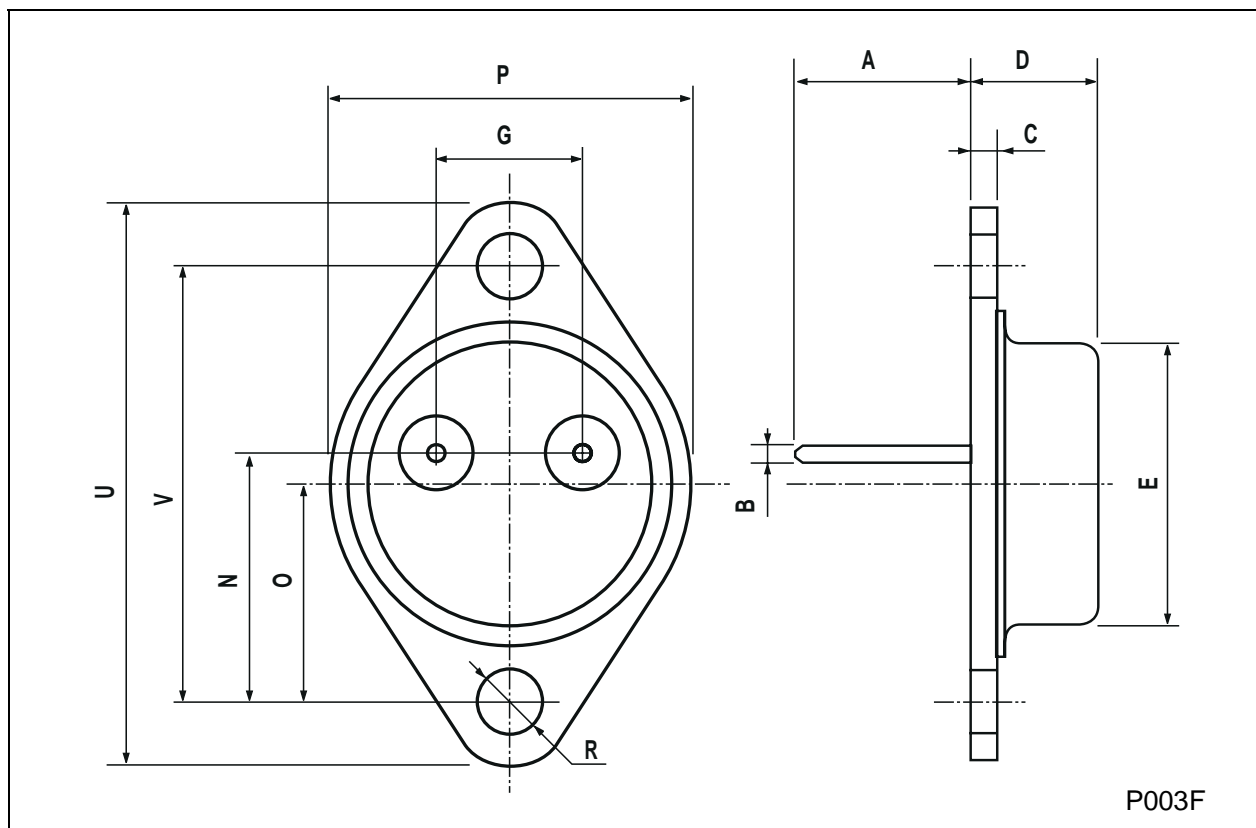
ELECTRICAL CHARACTERISTICS (T_{case} = 25 °C unless otherwise specified)

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------------------|----------|------|------------|----------|
| I _{CEV} | Collector Cut-off Current (V _{BE} = -1.5V) | V _{CE} = 140 V V _{CE} = 100 V T _C = 150 °C | | | 50 10 | mA mA |
| I _{CEO} | Collector Cut-off Current (I _B = 0) | V _{CE} = 70 V | | | 20 | mA |
| I _{EBO} | Emitter Cut-off Current (I _C = 0) | V _{EB} = 7 V V _{EB} = 5 V | | | 50 5 | mA mA |
| V _{CEO(sus)*} | Collector-Emitter Sustaining Voltage | I _C = 0.2 A | 90 | | | V |
| V _{CER(sus)*} | Collector-Emitter Sustaining Voltage | I _C = 0.2 A R _{BE} = 50 Ω | 110 | | | V |
| V _{CEx(sus)*} | Collector-Emitter Sustaining Voltage | I _C = 0.2 A R _{BE} = 100 Ω V _{BE} = -1.5V | 150 | | | V |
| V _{CE(sat)*} | Collector-Emitter Saturation Voltage | I _C = 12 A I _B = 1.2 A I _C = 20 A I _B = 5 A | | | 1 2.5 | V V |
| V _{BE(sat)*} | Collector-Emitter Saturation Voltage | I _C = 20 A I _B = 5 A | | | 3.3 | V |
| V _{BE*} | Base-Emitter Voltage | I _C = 12 A V _{CE} = 5 V | | | 1.8 | V |
| h _{FE*} | DC Current Gain | I _C = 2 A V _{CE} = 5 V I _C = 12 A V _{CE} = 5 V | 50 20 | | 250 100 | |
| h _{fe} | Small Signal Current Gain | I _C = 2 A V _{CE} = 10 V f = 5 MHz | 12 | | | |
| C _{CBO} | Collector-Base Capacitance | I _E = 0 V _{CB} = 10 V f = 1 MHz | | | 300 | pF |
| t _r | Rise Time | I _C = 12 A V _{CC} = 30 V I _{B1} = -I _{B2} = 1.2A | | | 0.5 | μs |
| t _s | Storage Time | | | | 1.5 | μs |
| t _f | Fall Time | | | | 0.5 | μs |
| I _{s/b**} | Second Breakdown Collector Current | V _{CE} = 28 V V _{CE} = 45 V | 5 0.9 | | | A A |
| E _{s/b} | Second Breakdown Energy | V _{BE} = -4 V R _{BE} = 20 Ω L = 180μH | 13 | | | mJ |

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

TO-3 MECHANICAL DATA

| DIM. | mm | | | inch | | |
|------|-------|------|-------|-------|------|-------|
| | MIN. | TYP. | MAX. | MIN. | TYP. | MAX. |
| A | 11.00 | | 13.10 | 0.433 | | 0.516 |
| B | 0.97 | | 1.15 | 0.038 | | 0.045 |
| C | 1.50 | | 1.65 | 0.059 | | 0.065 |
| D | 8.32 | | 8.92 | 0.327 | | 0.351 |
| E | 19.00 | | 20.00 | 0.748 | | 0.787 |
| G | 10.70 | | 11.10 | 0.421 | | 0.437 |
| N | 16.50 | | 17.20 | 0.649 | | 0.677 |
| P | 25.00 | | 26.00 | 0.984 | | 1.023 |
| R | 4.00 | | 4.09 | 0.157 | | 0.161 |
| U | 38.50 | | 39.30 | 1.515 | | 1.547 |
| V | 30.00 | | 30.30 | 1.187 | | 1.193 |



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