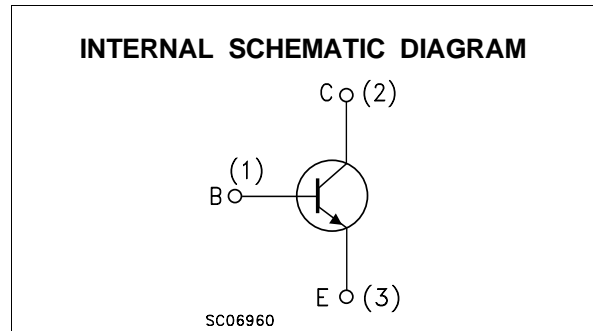
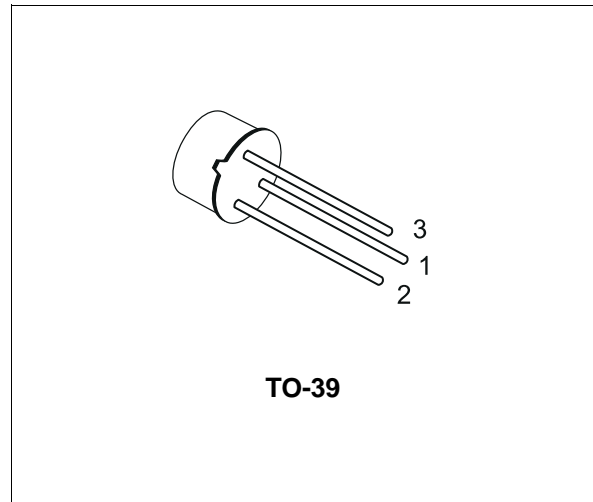


SMALL SIGNAL NPN TRANSISTOR

- GENERAL PURPOSE HIGH VOLTAGE DEVICE

DESCRIPTION

The 2N1893 is a Silicon Planar Epitaxial NPN transistor in Jedec TO-39 metal case, designed for use in high-performance amplifier, oscillator and switching circuits. It provides greater voltage swings in oscillator and amplifier circuits and more protection in inductive switching circuits due to its 120 V collector-to-base voltage rating.



ABSOLUTE MAXIMUM RATINGS

| Symbol | Parameter | Value | Unit |
|-----------|--|------------|------------------|
| V_{CBO} | Collector-Base Voltage ($I_E = 0$) | 120 | V |
| V_{CER} | Collector-Emitter Voltage ($R_{BE} \leq 10\Omega$) | 100 | V |
| V_{CEO} | Collector-Emitter Voltage ($I_B = 0$) | 80 | V |
| V_{EBO} | Emitter-Base Voltage ($I_C = 0$) | 7 | V |
| I_C | Collector Current | 0.5 | A |
| P_{tot} | Total Dissipation at $T_{amb} \leq 25^\circ\text{C}$ | 0.8 | W |
| | at $T_C \leq 25^\circ\text{C}$ | 3 | W |
| | at $T_C \leq 100^\circ\text{C}$ | 1.7 | W |
| T_{stg} | Storage Temperature | -65 to 175 | $^\circ\text{C}$ |
| T_j | Max. Operating Junction Temperature | 175 | $^\circ\text{C}$ |

THERMAL DATA

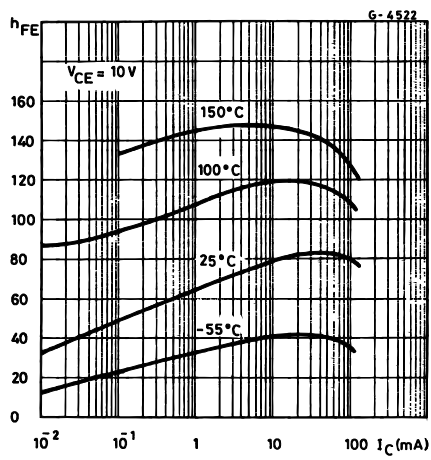
| | | | | |
|-----------------------|-------------------------------------|-----|-------|------|
| R _{thj-case} | Thermal Resistance Junction-Case | Max | 50 | °C/W |
| R _{thj-amb} | Thermal Resistance Junction-Ambient | Max | 187.5 | °C/W |

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

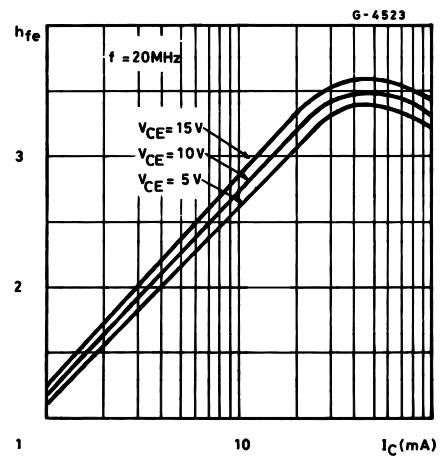
| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|-----------------------|--|---|----------------------|----------------------|------------|----------|
| I _{CBO} | Collector Cut-off Current (I _E = 0) | V _{CB} = 90 V V _{CB} = 90 V T _C = 150 °C | | | 10 15 | nA μA |
| I _{EBO} | Emitter Cut-off Current (I _C = 0) | V _{EB} = 5 V | | | 10 | nA |
| V _{(BR)CBO} | Collector-Base Breakdown Voltage (I _E = 0) | I _C = 100 μA | 120 | | | V |
| V _{(BR)CER*} | Collector-Emitter Breakdown Voltage (R _{BE} ≤ 10 Ω) | I _C = 10 mA | 100 | | | V |
| V _{(BR)CEO*} | Collector-Emitter Breakdown Voltage (I _B = 0) | I _C = 10 mA | 80 | | | V |
| V _{(BR)EBO} | Emitter-Base Breakdown Voltage (I _C = 0) | I _E = 100 μA | 7 | | | V |
| V _{CE(sat)*} | Collector-Emitter Saturation Voltage | I _C = 50 mA I _B = 5 mA I _C = 150 mA I _B = 15 mA | | | 1.2 5 | V V |
| V _{BE(sat)*} | Base-Emitter Saturation Voltage | I _C = 50 mA I _B = 5 mA I _C = 150 mA I _B = 15 mA | | 0.82 0.96 | 0.9 1.3 | V V |
| h _{FE*} | DC Current Gain | I _C = 0.1 mA V _{CE} = 10 V I _C = 10 mA V _{CE} = 10 V I _C = 150 mA V _{CE} = 10 V I _C = 10 mA V _{CE} = 10 V T _C = -55 °C | 20 35 40 20 | 50 80 80 40 | 120 | |
| h _{fe*} | Small Signal Current Gain | I _C = 1 mA V _{CE} = 5 V f = 1KHz I _C = 5 mA V _{CE} = 10 V f = 1KHz | 30 45 | 70 85 | 150 | |
| f _T | Transition Frequency | I _C = 50 mA V _{CE} = 10 V f = 20MHz | 50 | 70 | | MHz |
| C _{CBO} | Collector-Base Capacitance | I _E = 0 V _{CB} = 10 V f = 1MHz | | 13 | 15 | pF |
| C _{EBO} | Emitter-Base Capacitance | I _C = 0 V _{EB} = 0.5 V f = 1MHz | | 55 | 85 | pF |

* Pulsed: Pulse duration = 300 μs, duty cycle ≤ 1 %

DC Current Gain

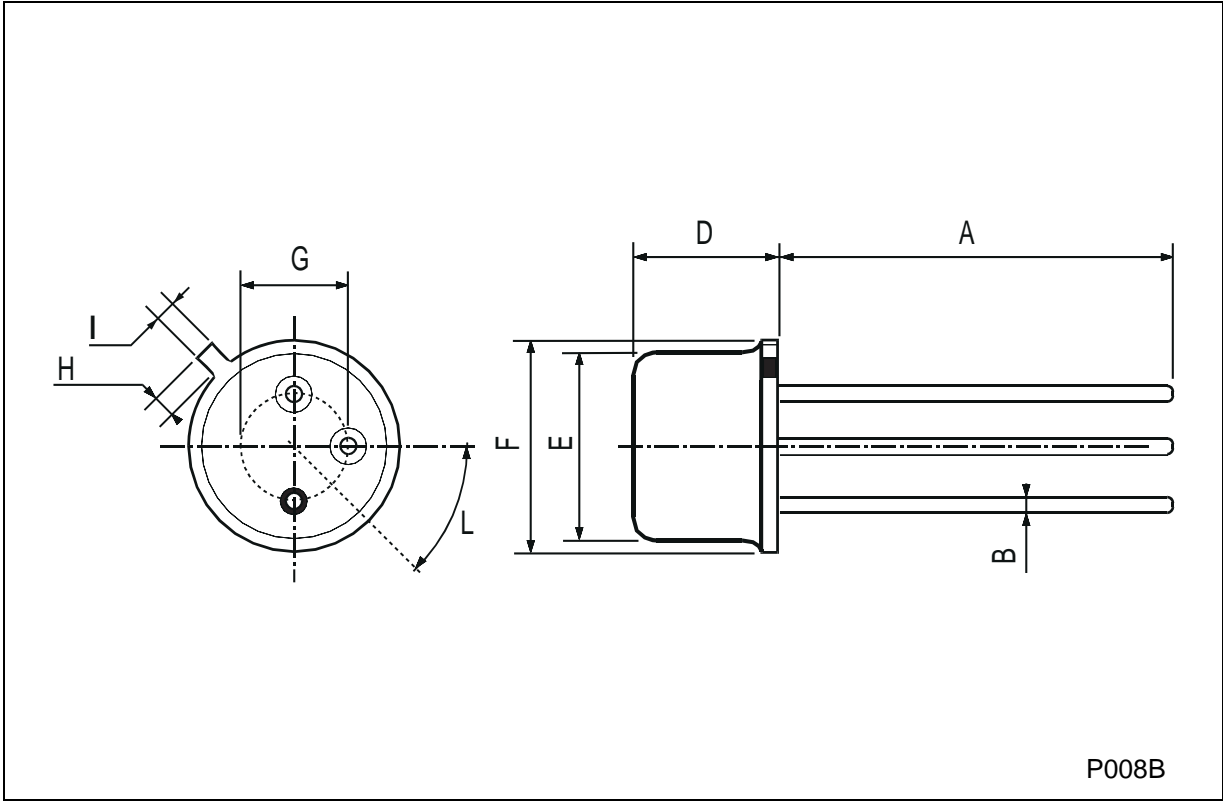


DC Current Gain



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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