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SEMICOA SEMICONDUCTORS

Data Sheet No. 2N3019S

# Type 2N3019S

**Geometry 4500**
**Polarity NPN**
**Qual Level: JAN - JANS**

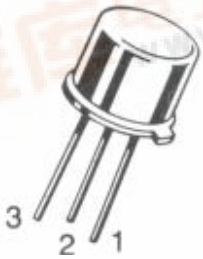
**Generic Part Number: 2N3019**

**REF: MIL-PRF-19500/391**

## Features:

Request Quotation

- General-purpose transistor for switching and amplifier applica-tons.
- Housed in a TO-39 case.
- Also available in chip form using the 4500 chip geometry.
- The Min and Max limits shown are per MIL-PRF-19500/391 which Semicoa meets in all cases.
- Radiation Graphs available.



TO-39

## Maximum Ratings

$T_C$ = 25°C unless otherwise specified

| Rating | Symbol | Rating | Unit |
|---|---|---|---|
| Collector-Emitter Voltage | $V_{CEO}$ | 80 | V |
| Collector-Base Voltage | $V_{CBO}$ | 140 | V |
| Emitter-Base Voltage | $V_{EBO}$ | 7.0 | V |
| Collector Current, Continuous | $I_C$ | 1.0 | mA |
| Operating Junction Temperature | $T_J$ | -55 to +175 | °C |
| Storage Temperature | $T_{STG}$ | -55 to +175 | °C |

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## Electrical Characteristics

$T_C = 25^oC$ unless otherwise specified

| OFF Characteristics | Symbol | Min | Max | Unit |
|---|---|---|---|---|
| Collector-Base Breakdown Voltage<br>$I_C = 100\ \mu A$ | $V_{(BR)CBO}$ | 140 | --- | V |
| Collector-Emitter Breakdown Voltage<br>$I_C = 30$ mA | $V_{(BR)CEO}$ | 80 | --- | V |
| Emitter-Base Breakdown Voltage<br>$I_E = 100\ \mu A$ | $V_{(BR)EBO}$ | 7.0 | --- | V |
| Collector-Emitter Cutoff Current<br>$V_{CE} = 90$ V | $I_{CES}$ | --- | 10 | nA |
| Emitter-Base Cutoff Current<br>$V_{EB} = 5$ V | $I_{EBO}$ | --- | 10 | nA |

| ON Characteristics | Symbol | Min | Max | Unit |
|---|---|---|---|---|
| ***DC Current Gain*** | | | | |
| $I_C = 150$ mA, $V_{CE} = 10$ V | $h_{FE1}$ | 100 | 300 | --- |
| $I_C = 0.1$ mA, $V_{CE} = 10$ V | $h_{FE2}$ | 50 | 200 | --- |
| $I_C = 10$ mA, $V_{CE} = 10$ V (pulse test) | $h_{FE3}$ | 90 | --- | --- |
| $I_C = 500$ mA, $V_{CE} = 10$ V (pulse test) | $h_{FE4}$ | 50 | 200 | --- |
| $I_C = 1$ A, $V_{CE} = 10$ V (pulse test) | $h_{FE5}$ | 15 | --- | --- |
| ***Collector-Emitter Saturation Voltage*** | | | | |
| $I_C = 150$ mA, $I_B = 15$ mA (pulse test) | $V_{CE(sat)1}$ | --- | 0.2 | V dc |
| $I_C = 500$ mA, $I_B = 50$ mA (pulse test) | $V_{CE(sat)2}$ | --- | 0.5 | V dc |
| ***Base-Emitter Saturation Voltage*** | | | | |
| $I_C = 150$ mA, $I_B = 15$ mA (pulse test) | $V_{BE(sat)}$ | --- | 1.1 | V dc |

| Small Signal Characteristics | Symbol | Min | Max | Unit |
|---|---|---|---|---|
| *Short Circuit Forward Current Transfer Ratio*<br>$I_C = 1$ mA, $V_{CE} = 5$ V, f = 1 kHz | AC $h_{FE}$ | 80 | 400 | --- |
| *Magnitude of Common Emitter Short Circuit*<br>Forward Current Transfer Ratio<br>$V_{CE} = 10$ V, $I_C = 50$ mA, f = 200 MHz | $\|h_{FE}\|$ | 5.0 | 20 | --- |
| *Open Circuit Output Capacitance*<br>$V_{CB} = 10$ V, $I_E = 0$, 100 kHz < f < 1 MHz | $C_{OBO}$ | --- | 12 | pF |
| *Input Capacitance, Output Open Circuited*<br>$V_{EB} = 2.0$ V, $I_C = 0$, 100 kHz < f < 1 MHz | $C_{IBO}$ | --- | 60 | pF |
| *Collecor-Base Time Constant*<br>$V_{CE} = 10$ V, $I_C = 10$ mA, f = 79.8 MHz | $r_{b'}C_C$ | --- | 400 | ps |
| *Noise Figure*<br>$V_{CE} = 10$ V, $I_C = 100\ \mu A$, $R_g = 1$ kOhm | NF | --- | 4 | dB |

| Switching Characteristics | Symbol | Min | Max | Unit |
|---|---|---|---|---|
| *Pulse Response*<br>15 ns, 50 ohm input pulse | $t_{ON+}\ t_{OFF}$ | --- | 30 | ns |