# 2N2920

Silicon NPN Transistor

*Data Sheet*

## Description

Semicoa Semiconductors offers:

- Screening and processing per MIL-PRF-19500 Appendix E
- JAN level (2N2920J)
- JANTX level (2N2920JX)
- JANTXV level (2N2920JV)
- JANS level (2N2920JS)
- QCI to the applicable level
- 100% die visual inspection per MIL-STD-750 method 2072 for JANTXV and JANS
- Radiation testing (total dose) upon request

Please contact Semicoa for special configurations
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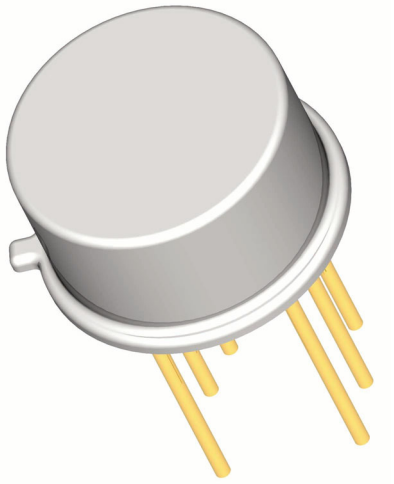
## Applications

- General purpose
- Matched Dual transistors
- NPN silicon transistor



## Features

- Hermetically sealed TO-78 metal can
- Also available in chip configuration
- Chip geometry 0307
- Reference document: MIL-PRF-19500/355

## Benefits

- Qualification Levels: JAN, JANTX, JANTXV and JANS
- Radiation testing available

## Absolute Maximum Ratings

$T_C$ = 25°C unless otherwise specified

| Parameter | Symbol | Rating | Unit |
|---|---|---|---|
| Collector-Emitter Voltage | $V_{CEO}$ | 60 | Volts |
| Collector-Base Voltage | $V_{CBO}$ | 70 | Volts |
| Emitter-Base Voltage | $V_{EBO}$ | 5 | Volts |
| Collector Current, Continuous | $I_C$ | 50 | mA |
| Power Dissipation, $T_A$ = 25°C<br>Derate linearly above 25°C | $P_T$ | 300 one section<br>600 both sections<br>1.71one section<br>3.43 both sections | mW<br>mW/°C |
| Power Dissipation, $T_C$ = 25°C<br>Derate linearly above 25°C | $P_T$ | 750 one section<br>1.5 both sections<br>4.286 one section<br>7.14 both sections | MW<br>W<br>mW/°C |
| Operating Junction Temperature<br>Storage Temperature | $T_J$<br>$T_{STG}$ | -65 to +200 | °C |

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## ELECTRICAL CHARACTERISTICS

characteristics specified at $T_A$ = 25°C

### Off Characteristics

| Parameter | Symbol | Test Conditions | Min | Typ | Max | Units |
|---|---|---|---|---|---|---|
| Collector-Emitter Breakdown Voltage | $V_{(BR)CEO}$ | $I_C$ = 10 mA | 60 | | | Volts |
| Collector-Base Cutoff Current | $I_{CBO1}$<br>$I_{CBO2}$<br>$I_{CBO3}$ | $V_{CB}$ = 70 Volts<br>$V_{CB}$ = 45 Volts<br>$V_{CB}$ = 45 Volts, $T_A$ = 150°C | | | 10<br>2<br>2.5 | µA<br>nA<br>µA |
| Collector-Emitter Cutoff Current | $I_{CEO}$ | $V_{CE}$ = 5 Volts | | | 2 | nA |
| Emitter-Base Cutoff Current | $I_{EBO1}$<br>$I_{EBO2}$ | $V_{EB}$ = 6 Volts<br>$V_{EB}$ = 5 Volts | | | 10<br>2 | µA<br>nA |

### On Characteristics

Pulse Test: Pulse Width = 300 µs, Duty Cycle ≤ 2.0%

| Parameter | Symbol | Test Conditions | Min | Typ | Max | Units |
|---|---|---|---|---|---|---|
| DC Current Gain | $h_{FE1}$<br>$h_{FE2}$<br>$h_{FE3}$<br>$h_{FE4}$<br><br>$h_{FE2-1}/h_{FE2-2}$ | $I_C$ = 10 µA, $V_{CE}$ = 5 Volts<br>$I_C$ = 100 µA, $V_{CE}$ = 5 Volts<br>$I_C$ = 1 mA, $V_{CE}$ = 5 Volts<br>$I_C$ = 10 µA, $V_{CE}$ = 5 Volts<br>$T_A$ = -55°C<br>$I_C$ = 100 µA, $V_{CE}$ = 5 Volts | 175<br>235<br>300<br>50<br><br>0.9 | | 600<br>800<br>1,000<br><br><br>1.0 | |
| Base-Emitter Voltage differential | $\|V_{BE1}-V_{BE2}\|_1$<br>$\|V_{BE1}-V_{BE2}\|_2$<br>$\|V_{BE1}-V_{BE2}\|_3$ | $V_{CE}$ = 5 Volts, $I_C$ = 10 µA<br>$V_{CE}$ = 5 Volts, $I_C$ = 100 µA<br>$V_{CE}$ = 5 Volts, $I_C$ = 1 mA | | | 5<br>3<br>5 | mVolts |
| Base-Emitter Voltage differential at temperature | $\|V_{BE1}-V_{BE2}\|_1$<br>$\|V_{BE1}-V_{BE2}\|_2$ | $V_{CE}$ = 5 Volts, $I_C$ = 100 µA<br>$T_A$ = 25 °C and -55°C<br>$T_A$ = 25 °C and +125°C | | | 0.8<br>1 | mVolts |
| Base-Emitter Saturation Voltage | $V_{BEsat1}$ | $I_C$ = 1 mA, $I_B$ = 100 µA | 0.5 | | 1.0 | Volts |
| Collector-Emitter Saturation Voltage | $V_{CEsat1}$ | $I_C$ = 1 mA, $I_B$ = 100 µA | | | 0.3 | Volts |

### Dynamic Characteristics

| Parameter | Symbol | Test Conditions | Min | Typ | Max | Units |
|---|---|---|---|---|---|---|
| Magnitude – Common Emitter, Short Circuit Forward Current Transfer Ratio | $\|h_{FE1}\|$ | $V_{CE}$ = 5 Volts, $I_C$ = 500 µA, f = 20 MHz | 3 | | 20 | |
| Small Signal Short Circuit Forward Current Transfer Ratio | $h_{FE}$ | $V_{CE}$ = 10 Volts, $I_C$ = 1 mA, f = 1 kHz | 150 | | 600 | |
| Open Circuit Output Capacitance | $C_{OBO}$ | $V_{CB}$ = 5 Volts, $I_E$ = 0 mA, 100 kHZ < f < 1 MHz | | | 5 | pF |
| Noise Figure | $NF_1$<br>$NF_2$<br>$NF_3$ | $V_{CE}$ = 5 Volts, $I_C$ = 10 µA, $R_g$ = 10 kΩ<br>f = 100 Hz<br>f = 1 kHz<br>f = 10 kHz | | | 5<br>3<br>3 | dB |
| Short Circuit Input Impedance | $h_{ie}$ | $V_{CB}$ =5V, $I_C$ =1mA, f =1kHz | 3 | | 30 | kΩ |
| Open Circuit Output Admittance | $h_{oe}$ | $V_{CB}$ =5V, $I_C$ =1mA, f =1kHz | | | 60 | µmhos |
| Open Circuit reverse Voltage Transfer Ratio | $h_{re}$ | $V_{CB}$ =5V, $I_C$=100µA, f=1kHz | | | $1x10^{-3}$ | |




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