

## Description

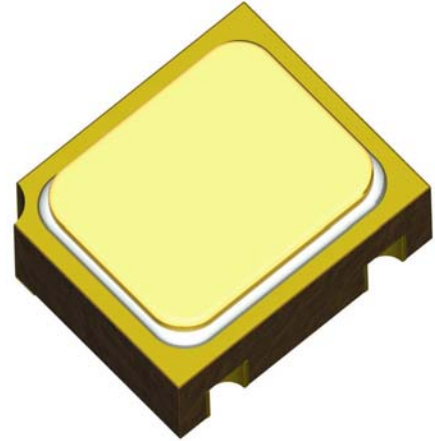
Semicoa Semiconductors offers:

- Screening and processing per MIL-PRF-19500 Appendix E
- JAN level (2N3501UBJ)
- JANTX level (2N3501UBJX)
- JANTXV level (2N3501UBJV)
- JANS level (2N3501UBJS)
- 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  
[www.SEMICOA.com](http://www.SEMICOA.com) or (714) 979-1900

## Applications

- General purpose
- Low power
- NPN silicon transistor



## Features

- Hermetically sealed TO-39 metal can
- Also available in chip configuration
- Chip geometry 5620
- Reference document: MIL-PRF-19500/366

## Benefits

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

| Absolute Maximum Ratings  |                 | $T_C = 25^\circ\text{C}$ unless otherwise specified |                           |
|---|-----------------|---|---------------------------|
| Parameter   | Symbol          | Rating  | Unit                      |
| Collector-Emitter Voltage   | $V_{CEO}$       | 150   | Volts                     |
| Collector-Base Voltage  | $V_{CBO}$       | 150   | Volts                     |
| Emitter-Base Voltage  | $V_{EBO}$       | 6   | Volts                     |
| Collector Current, Continuous   | $I_C$           | 300   | mA                        |
| Power Dissipation, $T_A = 25^\circ\text{C}$<br>Derate linearly above $25^\circ\text{C}$ | $P_T$           | .5<br>3.08  | W<br>mW/ $^\circ\text{C}$ |
| Thermal Resistance  | $R_{\theta JA}$ | 325   | $^\circ\text{C}/\text{W}$ |
| Operating Junction Temperature  | $T_J$           | -65 to +200   | $^\circ\text{C}$          |
| Storage Temperature   | $T_{STG}$       | -65 to +200   | $^\circ\text{C}$          |

## ELECTRICAL CHARACTERISTICS

characteristics specified at  $T_A = 25^\circ\text{C}$

| Off Characteristics                 |               |  |     |     |     |               |
|-------------------------------------|---------------|--|-----|-----|-----|---------------|
| Parameter                           | Symbol        | Test Conditions                                      | Min | Typ | Max | Units         |
| Collector-Emitter Breakdown Voltage | $V_{(BR)CEO}$ | $I_C = 10 \text{ mA}$                                | 150 |     |     | Volts         |
| Collector-Base Cutoff Current       | $I_{CBO1}$    | $V_{CB} = 150 \text{ Volts}$                         |     |     | 10  | $\mu\text{A}$ |
|                                     | $I_{CBO2}$    | $V_{CB} = 75 \text{ Volts}$                          |     |     | 50  | nA            |
|                                     | $I_{CBO3}$    | $V_{CB} = 75 \text{ Volts}, T_A = 150^\circ\text{C}$ |     |     | 50  | $\mu\text{A}$ |
| Collector-Emitter Cutoff Current    | $I_{CEO}$     | $V_{CE} = 120 \text{ Volts}$                         |     |     | 1   | $\mu\text{A}$ |
| Emitter-Base Cutoff Current         | $I_{EBO1}$    | $V_{EB} = 6 \text{ Volts}$                           |     |     | 10  | $\mu\text{A}$ |
|                                     | $I_{EBO2}$    | $V_{EB} = 4 \text{ Volts}$                           |     |     | 25  | nA            |

| On Characteristics  |              |  |     |     |     |       |
|---|--------------|--|-----|-----|-----|-------|
| Pulse Test: Pulse Width = 300 $\mu\text{s}$ , Duty Cycle $\leq 2.0\%$ |              |  |     |     |     |       |
| Parameter   | Symbol       | Test Conditions                                    | Min | Typ | Max | Units |
| DC Current Gain   | $h_{FE1}$    | $I_C = 0.1 \text{ mA}, V_{CE} = 10 \text{ Volts}$  | 35  |     |     |       |
|   | $h_{FE2}$    | $I_C = 1.0 \text{ mA}, V_{CE} = 10 \text{ Volts}$  | 50  |     |     |       |
|   | $h_{FE3}$    | $I_C = 10 \text{ mA}, V_{CE} = 10 \text{ Volts}$   | 75  |     |     |       |
|   | $h_{FE4}$    | $I_C = 1500 \text{ mA}, V_{CE} = 10 \text{ Volts}$ | 100 |     | 300 |       |
|   | $h_{FE5}$    | $I_C = 300 \text{ mA}, V_{CE} = 10 \text{ Volts}$  | 20  |     |     |       |
|   | $h_{FE6}$    | $I_C = 150 \text{ mA}, V_{CE} = 10 \text{ Volts}$  | 45  |     |     |       |
|   | $h_{FE7}$    | $T_A = -55^\circ\text{C}$                          |     |     |     |       |
| Base-Emitter Saturation Voltage                                       | $V_{BEsat1}$ | $I_C = 10 \text{ mA}, I_B = 1 \text{ mA}$          |     |     | 0.8 | Volts |
|   | $V_{BEsat2}$ | $I_C = 150 \text{ mA}, I_B = 15 \text{ mA}$        |     |     | 1.2 | Volts |
| Collector-Emitter Saturation Voltage                                  | $V_{CEsat1}$ | $I_C = 10 \text{ mA}, I_B = 1 \text{ mA}$          |     |     | 0.2 | Volts |
|   | $V_{CEsat2}$ | $I_C = 150 \text{ mA}, I_B = 15 \text{ mA}$        |     |     | 0.4 | Volts |

| Dynamic Characteristics  |            |  |     |     |     |       |
|--|------------|--|-----|-----|-----|-------|
| Parameter  | Symbol     | Test Conditions  | Min | Typ | Max | Units |
| Magnitude – Common Emitter, Short Circuit Forward Current Transfer Ratio | $ h_{FE} $ | $V_{CE} = 20 \text{ Volts}, I_C = 20 \text{ mA}, f = 100 \text{ MHz}$                          | 1.5 |     | 8   |       |
| Small Signal Short Circuit Forward Current Transfer Ratio                | $h_{FE}$   | $V_{CE} = 10 \text{ Volts}, I_C = 10 \text{ mA}, f = 1 \text{ kHz}$                            | 75  |     | 375 |       |
| Open Circuit Output Capacitance  | $C_{OBO}$  | $V_{CB} = 10 \text{ Volts}, I_E = 0 \text{ mA}, 100 \text{ kHz} < f < 1 \text{ MHz}$           |     |     | 8   | pF    |
| Open Circuit Input Capacitance   | $C_{IBO}$  | $V_{EB} = 0.5 \text{ Volts}, I_C = 0 \text{ mA}, 100 \text{ kHz} < f < 1 \text{ MHz}$          |     |     | 80  | pF    |
| Noise Figure   | $NF_1$     | $V_{CE} = 10 \text{ Volts}, I_C = 0.5 \text{ mA}, f = 1 \text{ kHz}, R_g = 1 \text{ k}\Omega$  |     |     | 16  | dB    |
|  | $NF_2$     | $V_{CE} = 10 \text{ Volts}, I_C = 0.5 \text{ mA}, f = 10 \text{ kHz}, R_g = 1 \text{ k}\Omega$ |     |     | 6   | dB    |

| Switching Characteristics |           |  |     |     |       |       |
|---------------------------|-----------|--|-----|-----|-------|-------|
| Parameter                 | Symbol    | Test Conditions  | Min | Typ | Max   | Units |
| Saturated Turn-On Time    | $t_{ON}$  | $V_{EB} = 5 \text{ Volts}, I_C = 150 \text{ mA}, I_{B1} = 15 \text{ mA}$ |     |     | 115   | ns    |
| Saturated Turn-Off Time   | $t_{OFF}$ | $I_C = 150 \text{ mA}, I_{B1}=I_{B2}=15 \text{ mA}$                      |     |     | 1,150 | ns    |

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