

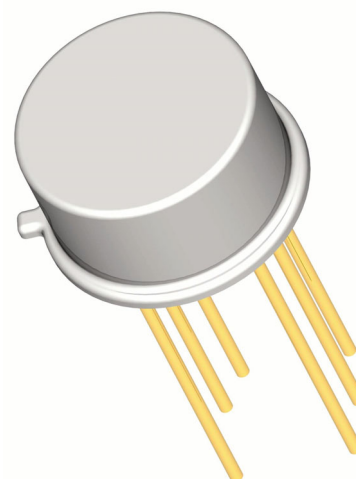
## Description

Semicoa Semiconductors offers:

- Screening and processing per MIL-PRF-19500 Appendix E
- JAN level (2N2060J)
- JANTX level (2N2060JX)
- JANTXV level (2N2060JV)
- QCI to the applicable level
- 100% die visual inspection per MIL-STD-750 method 2072 for JANTXV
- Radiation testing (total dose) upon request

## Applications

- Matched, Dual Transistors
- Low power
- NPN silicon transistor



## Features

- Hermetically sealed TO-77 metal can
- Also available in chip configuration
- Chip geometry 0410
- Reference document: MIL-PRF-19500/270

## Benefits

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

Please contact Semicoa for special configurations  
[www.SEMICOA.com](http://www.SEMICOA.com) or (714) 979-1900

| Absolute Maximum Ratings                                                                |                    | $T_C = 25^\circ\text{C}$ unless otherwise specified                            |                                                          |
|-----------------------------------------------------------------------------------------|--------------------|--------------------------------------------------------------------------------|----------------------------------------------------------|
| Parameter                                                                               | Symbol             | Rating                                                                         | Unit                                                     |
| Collector-Emitter Voltage                                                               | $V_{CEO}$          | 60                                                                             | Volts                                                    |
| Collector-Base Voltage                                                                  | $V_{CBO}$          | 100                                                                            | Volts                                                    |
| Emitter-Base Voltage                                                                    | $V_{EBO}$          | 7                                                                              | Volts                                                    |
| Collector Current, Continuous                                                           | $I_C$              | 500                                                                            | mA                                                       |
| Power Dissipation, $T_A = 25^\circ\text{C}$<br>Derate linearly above $25^\circ\text{C}$ | $P_T$              | 540 one section<br>600 both sections<br>3.08 one section<br>3.48 both sections | mW<br>mW<br>mW/ $^\circ\text{C}$<br>mW/ $^\circ\text{C}$ |
| Power Dissipation, $T_C = 25^\circ\text{C}$<br>Derate linearly above $25^\circ\text{C}$ | $P_T$              | 1.5 one section<br>2.12 both sections<br>8.6 one section<br>12.1 both sections | W<br>W<br>mW/ $^\circ\text{C}$<br>mW/ $^\circ\text{C}$   |
| Operating Junction Temperature<br>Storage Temperature                                   | $T_J$<br>$T_{STG}$ | -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 | $V_{(BR)CEO}$ | $I_C = 30\text{ mA}$                                   | 60  |     |     | Volts         |
| Collector-Emitter Breakdown Voltage | $V_{(BR)CER}$ | $I_C = 10\text{ mA}$ , $R_{BE} = 10\ \Omega$           | 80  |     |     | Volts         |
| Collector-Base Cutoff Current       | $I_{CBO1}$    | $V_{CB} = 100\text{ Volts}$                            |     |     | 10  | $\mu\text{A}$ |
|                                     | $I_{CBO2}$    | $V_{CB} = 80\text{ Volts}$                             |     |     | 2   | nA            |
|                                     | $I_{CBO3}$    | $V_{CB} = 80\text{ Volts}$ , $T_A = 150^\circ\text{C}$ |     |     | 10  | $\mu\text{A}$ |
| Collector-Emitter Cutoff Current    | $I_{CEO}$     | $V_{CE} = \text{xx Volts}$                             |     |     |     | $\mu\text{A}$ |
| Collector-Emitter Cutoff Current    | $I_{CEX}$     | $V_{CE} = \text{xx Volts}$ , $V_{EB} = x\text{ Volts}$ |     |     |     | $\mu\text{A}$ |
| Collector-Emitter Cutoff Current    | $I_{CES}$     | $V_{CE} = \text{xx Volts}$                             |     |     |     | nA            |
| Emitter-Base Cutoff Current         | $I_{EBO1}$    | $V_{EB} = 7\text{ Volts}$                              |     |     | 10  | $\mu\text{A}$ |
|                                     | $I_{EBO2}$    | $V_{EB} = 5\text{ Volts}$                              |     |     | 2   | 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                                           | $h_{FE1}$                                          | $I_C = 10\ \mu\text{A}$ , $V_{CE} = 5\text{ Volts}$                                                                                                                                                              | 25                                                                    |     | 75      |        |
|                                                           | $h_{FE2}$                                          | $I_C = 100\ \mu\text{A}$ , $V_{CE} = 5\text{ Volts}$                                                                                                                                                             | 30                                                                    |     | 90      |        |
|                                                           | $h_{FE3}$                                          | $I_C = 1\text{ mA}$ , $V_{CE} = 5\text{ Volts}$                                                                                                                                                                  | 40                                                                    |     | 120     |        |
|                                                           | $h_{FE4}$                                          | $I_C = 10\text{ mA}$ , $V_{CE} = 5\text{ Volts}$                                                                                                                                                                 | 50                                                                    |     | 150     |        |
|                                                           | $h_{FE5}$                                          | $I_C = 100\ \mu\text{A}$ , $V_{CE} = 5\text{ Volts}$<br>$T_A = -55^\circ\text{C}$                                                                                                                                | 10                                                                    |     |         |        |
| Base-Emitter Voltage Differential                         | $ V_{BE1} - V_{BE2} _1$<br>$ V_{BE1} - V_{BE2} _2$ | $V_{CE} = 5\text{ Volts}$ , $I_C = 100\ \mu\text{A}$<br>$V_{CE} = 5\text{ Volts}$ , $I_C = 1\text{ mA}$                                                                                                          |                                                                       |     | 5       | mVolts |
| Base-Emitter Voltage Differential change with temperature | $ V_{BE1} - V_{BE2} _1$<br>$ V_{BE1} - V_{BE2} _2$ | $V_{CE} = 5\text{ Volts}$ , $I_C = 100\ \mu\text{A}$<br>$T_A = 25^\circ\text{C}$ and $-55^\circ\text{C}$<br>$V_{CE} = 5\text{ Volts}$ , $I_C = 1\text{ mA}$<br>$T_A = 25^\circ\text{C}$ and $+125^\circ\text{C}$ |                                                                       |     | .8<br>1 | mVolts |

| Dynamic Characteristics                                                  |                 |                                                                                                 |     |     |     |                  |
|--------------------------------------------------------------------------|-----------------|-------------------------------------------------------------------------------------------------|-----|-----|-----|------------------|
| Parameter                                                                | Symbol          | Test Conditions                                                                                 | Min | Typ | Max | Units            |
| Magnitude – Common Emitter, Short Circuit Forward Current Transfer Ratio | $ h_{FE} $      | $V_{CE} = 10 \text{ Volts}, I_C = 50 \text{ mA}, f = 20 \text{ MHz}$                            | 3   |     | 25  |                  |
| Small Signal Short Circuit Forward Current Transfer Ratio                | $h_{FE}$        | $V_{CE} = 5 \text{ Volts}, I_C = 1 \text{ mA}, f = 1 \text{ kHz}$                               | 50  |     | 150 |                  |
| Open Circuit Output Capacitance                                          | $C_{OBO}$       | $V_{CB} = 10 \text{ Volts}, I_E = 0 \text{ mA}, 100 \text{ kHz} < f < 1 \text{ MHz}$            |     |     | 15  | pF               |
| Open Circuit Input Capacitance                                           | $C_{IBO}$       | $V_{EB} = 0.5 \text{ Volts}, I_C = 0 \text{ mA}, 100 \text{ kHz} < f < 1 \text{ MHz}$           |     |     | 85  | pF               |
| Noise Figure                                                             | NF <sub>1</sub> | $V_{CE} = 10 \text{ Volts}, I_C = 300 \mu\text{A}, f = 1 \text{ kHz}, R_g = 510 \Omega$         |     |     | 8   | dB               |
|                                                                          | NF <sub>2</sub> | $V_{CE} = 10 \text{ Volts}, I_C = 300 \mu\text{A}, f = 10 \text{ kHz}, R_g = 1 \text{ k}\Omega$ |     |     | 8   |                  |
| Short Circuit Input Impedance                                            | $h_{ib}$        | $V_{CB} = 5\text{V}, I_C = 1\text{mA}, f = 1\text{kHz}$                                         | 20  |     | 30  | $\Omega$         |
| Short Circuit Input Impedance                                            | $h_{ie}$        | $V_{CB} = 5\text{V}, I_C = 1\text{mA}, f = 1\text{kHz}$                                         | 1   |     | 4   | k $\Omega$       |
| Open Circuit Output Admittance                                           | $h_{oe}$        | $V_{CB} = 5\text{V}, I_C = 1\text{mA}, f = 1\text{kHz}$                                         |     |     | 16  | $\mu\text{mhos}$ |