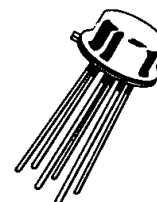


**UNITIZED DUAL NPN SILICON TRANSISTOR**
*Qualified per MIL-PRF-19500/270*
**Devices**
**2N2060**  
**2N2060L**
**Qualified Level**
**JAN**  
**JANTX**  
**JANTXV**
**MAXIMUM RATINGS**

| Ratings                                                                                                                 | Symbol         | 2N2060      |               | Unit               |
|-------------------------------------------------------------------------------------------------------------------------|----------------|-------------|---------------|--------------------|
| Collector-Emitter Voltage                                                                                               | $V_{CEO}$      | 60          |               | Vdc                |
| Collector-Base Voltage                                                                                                  | $V_{CBO}$      | 100         |               | Vdc                |
| Emitter-Base Voltage                                                                                                    | $V_{EBO}$      | 7.0         |               | Vdc                |
| Collector Current                                                                                                       | $I_C$          | 500         |               | mAdc               |
|                                                                                                                         |                | One Section | Both Sections |                    |
| Total Power Dissipation<br>@ $T_A = +25^{\circ}\text{C}$ <sup>(1)</sup><br>@ $T_C = +25^{\circ}\text{C}$ <sup>(2)</sup> | $P_T$          | 540         | 600           | mW                 |
|                                                                                                                         |                | 1.5         | 2.12          | W                  |
| Operating & Storage Junction Temperature Range                                                                          | $T_J, T_{stg}$ | -65 to +200 |               | $^{\circ}\text{C}$ |

1) Derate linearly 3.08 mW/ $^{\circ}\text{C}$  for  $T_A > 25^{\circ}\text{C}$  for one section, 3.48 mW/ $^{\circ}\text{C}$  for both sections

2) Derate linearly 8.6 mW/ $^{\circ}\text{C}$  for  $T_C > 25^{\circ}\text{C}$  for one section, 12.1 mW/ $^{\circ}\text{C}$  for both sections

**TO-78\***

\*See appendix A for package outline

**ELECTRICAL CHARACTERISTICS ( $T_A = +25^{\circ}\text{C}$  unless otherwise noted)**

| Characteristics                                                                                      | Symbol        | Min. | Max.      | Unit                                |
|------------------------------------------------------------------------------------------------------|---------------|------|-----------|-------------------------------------|
| <b>OFF CHARACTERISTICS</b>                                                                           |               |      |           |                                     |
| Collector-Emitter Breakdown Voltage <sup>(3)</sup><br>$R_{BE} \leq 10 \Omega, I_C = 10 \text{ mAdc}$ | $V_{(BR)CER}$ | 80   |           | Vdc                                 |
| Collector-Emitter Breakdown Voltage<br>$I_C = 30 \text{ mAdc}$                                       | $V_{(BR)CEO}$ | 60   |           | Vdc                                 |
| Collector-Base Cutoff Current<br>$V_{CB} = 100 \text{ Vdc}$<br>$V_{CB} = 80 \text{ Vdc}$             | $I_{CBO}$     |      | 10<br>2.0 | $\mu\text{Adc}$<br>$\eta\text{Adc}$ |
| Emitter-Base Cutoff Current<br>$V_{EB} = 7.0 \text{ Vdc}$<br>$V_{EB} = 5.0 \text{ Vdc}$              | $I_{EBO}$     |      | 10<br>2.0 | $\mu\text{Adc}$<br>$\eta\text{Adc}$ |

**ELECTRICAL CHARACTERISTICS (con't)**

| Characteristics                                                                                                                                                                                                                                        | Symbol        | Min.                 | Max.                   | Unit |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|----------------------|------------------------|------|
| <b>ON CHARACTERISTICS <sup>(3)</sup></b>                                                                                                                                                                                                               |               |                      |                        |      |
| Forward-Current Transfer Ratio<br>$I_C = 10 \mu\text{Adc}, V_{CE} = 5.0 \text{ Vdc}$<br>$I_C = 100 \mu\text{Adc}, V_{CE} = 5.0 \text{ Vdc}$<br>$I_C = 1.0 \text{ mAdc}, V_{CE} = 5.0 \text{ Vdc}$<br>$I_C = 10 \text{ mAdc}, V_{CE} = 5.0 \text{ Vdc}$ | $h_{FE}$      | 25<br>30<br>40<br>50 | 75<br>90<br>120<br>150 |      |
| Collector-Emitter Saturation Voltage<br>$I_C = 50 \text{ mAdc}, I_B = 5.0 \text{ mAdc}$                                                                                                                                                                | $V_{CE(sat)}$ |                      | 0.3                    | Vdc  |
| Base-Emitter Saturation Voltage<br>$I_C = 50 \text{ mAdc}, I_B = 5.0 \text{ mAdc}$                                                                                                                                                                     | $V_{BE(sat)}$ |                      | 0.9                    | Vdc  |

**DYNAMIC CHARACTERISTICS**

|                                                                                                                                                  |            |       |       |                  |
|--------------------------------------------------------------------------------------------------------------------------------------------------|------------|-------|-------|------------------|
| Common Emitter Small-Signal Short-Circuit Forward-Current Transfer ratio<br>$I_C = 50 \text{ mAdc}, V_{CE} = 10 \text{ Vdc}, f = 20 \text{ MHz}$ | $ h_{fe} $ | 3     | 25    |                  |
| Small-Signal Short-Circuit Input Impedance<br>$I_C = 1.0 \text{ mAdc}, V_{CB} = 5.0 \text{ Vdc}, f = 1.0 \text{ kHz}$                            | $h_{ib}$   | 20    | 30    | $\Omega$         |
| Small-Signal Short-Circuit Forward-Current Transfer Ratio<br>$I_C = 1.0 \text{ mAdc}, V_{CE} = 5.0 \text{ Vdc}, f = 1.0 \text{ kHz}$             | $h_{fe}$   | 50    | 150   |                  |
| Small-Signal Short-Circuit Input Impedance<br>$I_C = 1.0 \text{ mAdc}, V_{CE} = 5.0 \text{ Vdc}, f = 1.0 \text{ kHz}$                            | $h_{ie}$   | 1,000 | 4,000 | $\Omega$         |
| Small-Signal Open-Circuit Output Admittance<br>$I_C = 1.0 \text{ mAdc}, V_{CE} = 5.0 \text{ Vdc}, f = 1.0 \text{ kHz}$                           | $h_{oe}$   | 0     | 16    | $\mu\text{mhos}$ |
| Input Capacitance<br>$V_{EB} = 0.5 \text{ Vdc}, I_E = 0, 100 \text{ kHz} \leq f \leq 1.0 \text{ MHz}$                                            | $C_{ibo}$  |       | 85    | pF               |
| Output Capacitance<br>$V_{CB} = 10 \text{ Vdc}, I_E = 0, 100 \text{ kHz} \leq f \leq 1.0 \text{ MHz}$                                            | $C_{obo}$  |       | 15    | pF               |

(3)Pulse Test: Pulse Width 250 to 350 $\mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ .