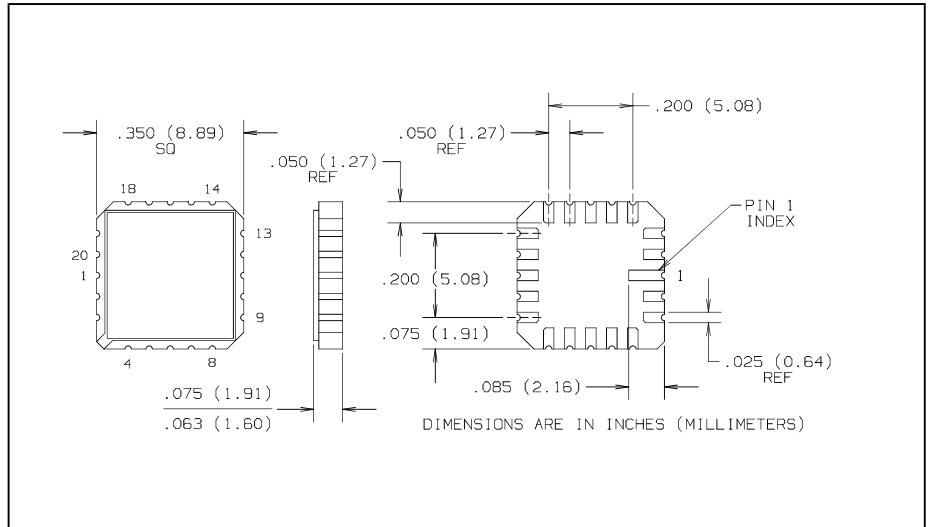


# Surface Mount Quad NPN Transistor

## Type JANTX, JANTXV, 2N6989U



### Features

- Ceramic surface mount package
- Hermetically sealed
- Small package minimizes circuit board area required
- Electrical performance similar to a 2N2222A
- Qualification per MIL-PRF-19500/559

### Description

The JANTX2N6989U is a hermetically sealed, ceramic surface-mount device, consisting of four individual silicon NPN transistors. The 20 pin ceramic package is ideal for designs where board space and device weight are important design considerations.

Typical screening and lot acceptance tests are provided on page 13-4. The burn-in condition is  $V_{CB} = 30\text{ V}$ ,  $P_D = 250\text{ mW}$  each transistor,  $T_A = 25^\circ\text{ C}$ . Refer to MIL-PRF-19500/559 for complete requirements.

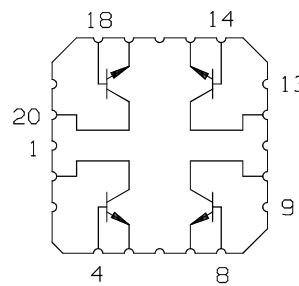
When ordering parts without processing, do not use a JAN prefix.

### Absolute Maximum Ratings ( $T_A = 25^\circ\text{ C}$ unless otherwise noted)

|   |   |
|---|---|
| Collector-Base Voltage  | 75 V  |
| Collector-Emitter Voltage   | 50 V  |
| Emitter-Base Voltage  | 6.0 V   |
| Collector Current-Continuous  | 800 mA  |
| Operating Junction Temperature ( $T_J$ )                                  | $-65^\circ\text{ C}$ to $+200^\circ\text{ C}$ |
| Storage Junction Temperature ( $T_{stg}$ )                                | $-65^\circ\text{ C}$ to $+200^\circ\text{ C}$ |
| Power Dissipation (single transistor, no heat sink)                       | 0.5 W   |
| Power Dissipation $T_A = 25^\circ\text{ C}$ (four devices driven equally) | 1.0 W <sup>(1)</sup>                          |
| Isolation Voltage   | 500 Vdc                                       |

#### Notes:

(1) Derate linearly 8.57 mW/°C above 25° C.



TOP VIEW

# Type JANTX, JANTXV, 2N6989U

Electrical Characteristics ( $T_A = 25^\circ\text{C}$  unless otherwise noted)

| SYMBOL                                    | PARAMETER  | MIN | MAX  | UNITS         | TEST CONDITIONS  |
|---|--|-----|------|---------------|--|
| <b>Off Characteristics</b>                |  |     |      |               |  |
| $V_{(BR)CBO}$                             | Collector-Base Breakdown Voltage                                       | 75  |      | V             | $I_C = 10\ \mu\text{A}$  |
| $V_{(BR)CEO}$                             | Collector-Emitter Breakdown Voltage                                    | 50  |      | V             | $I_C = 10\ \text{mA}^{(2)}$  |
| $V_{(BR)EBO}$                             | Emitter-Base Breakdown Voltage   | 6   |      | V             | $I_E = 10\ \mu\text{A}$  |
| $I_{CBO}$                                 | Collector-Base Cutoff Current  |     | 10   | nA            | $V_{CB} = 60\ \text{V}$  |
| $I_{CBO2}$                                | Collector-Base Cutoff Current  |     | 10   | $\mu\text{A}$ | $V_{CB} = 60\ \text{V}, T_A = 150^\circ\text{C}$                               |
| $I_{EBO}$                                 | Emitter-Base Cutoff Current  |     | 10   | nA            | $V_{EB} = 4\ \text{V}$   |
| <b>On Characteristics</b>                 |  |     |      |               |  |
| $h_{FE1}$                                 | Forward Current Transfer Ratio   | 50  |      |               | $V_{CE} = 10\ \text{V}, I_C = 0.1\ \text{mA}$                                  |
| $h_{FE2}$                                 | Forward Current Transfer Ratio   | 75  | 325  |               | $V_{CE} = 10\ \text{V}, I_C = 1.0\ \text{mA}$                                  |
| $h_{FE3}$                                 | Forward Current Transfer Ratio   | 100 |      |               | $V_{CE} = 10\ \text{V}, I_C = 10\ \text{mA}^{(2)}$                             |
| $h_{FE4}$                                 | Forward Current Transfer Ratio   | 100 | 300  |               | $V_{CE} = 10\ \text{V}, I_C = 150\ \text{mA}^{(2)}$                            |
| $h_{FE5}$                                 | Forward Current Transfer Ratio   | 30  |      |               | $V_{CE} = 10\ \text{V}, I_C = 500\ \text{mA}^{(2)}$                            |
| $h_{FE6}$                                 | Forward Current Transfer Ratio   | 35  |      |               | $V_{CE} = 10\ \text{V}, I_C = 10\ \text{mA}, T_A = 55^\circ\text{C}^{(2)}$     |
| $V_{CE(SAT)1}$                            | Collector-Emitter Saturation Voltage                                   |     | 0.3  | V             | $I_C = 150\ \text{mA}, I_B = 15\ \text{mA}^{(2)}$                              |
| $V_{CE(SAT)2}$                            | Collector-Emitter Saturation Voltage                                   |     | 1.0  | V             | $I_C = 500\ \text{mA}, I_B = 50\ \text{mA}^{(2)}$                              |
| $V_{CE(SAT)3}$                            | Collector-Emitter Saturation Voltage                                   |     | 0.45 | V             | $I_C = 150\ \text{mA}, I_B = 15\ \text{mA}, T_A = 150^\circ\text{C}^{(2)}$     |
| $V_{BE(SAT)1}$                            | Base-Emitter Saturation Voltage  | 0.6 | 1.2  | V             | $I_C = 150\ \text{mA}, I_B = 15\ \text{mA}^{(2)}$                              |
| $V_{BE(SAT)2}$                            | Base-Emitter Saturation Voltage  |     | 2.0  | V             | $I_C = 500\ \text{mA}, I_B = 50\ \text{mA}^{(2)}$                              |
| $V_{BE(SAT)3}$                            | Base-Emitter Saturation Voltage  |     | 1.4  | V             | $I_C = 150\ \text{mA}, I_B = 15\ \text{mA}, T_A = 55^\circ\text{C}^{(2)}$      |
| <b>Small-Signal Characteristics</b>       |  |     |      |               |  |
| $ h_{fe} $                                | Magnitude of Small-Signal Short-Circuit Forward Current Transfer Ratio | 2.5 | 8.0  |               | $V_{CE} = 10\ \text{V}, I_C = 20\ \text{mA}, f = 100\ \text{MHz}$              |
| $h_{fe}$                                  | Small-Signal Short Circuit Forward Current Transfer Ratio              | 50  |      |               | $V_{CE} = 10\ \text{V}, I_C = 1\ \text{mA}, f = 1\ \text{kHz}$                 |
| $C_{obo}$                                 | Open Circuit Output Capacitance  |     | 8    | pF            | $V_{CB} = 10\ \text{V}, I_E = 0, 100\ \text{kHz} \leq f \leq 1\ \text{MHz}$    |
| $C_{ibo}$                                 | Input Capacitance  |     | 33   | pF            | $V_{EB} = 0.5\ \text{V}, I_C = 0, 100\ \text{kHz} \leq f \leq 1\ \text{MHz}$   |
| <b>Switching Characteristics</b>          |  |     |      |               |  |
| $t_{on}$                                  | Turn-On Time   |     | 35   | ns            | $V_{CC} = 30\ \text{V}, I_C = 150\ \text{mA}, I_B = 15\ \text{mA}$             |
| $t_{off}$                                 | Turn-Off Time  |     | 300  | ns            | $V_{CC} = 30\ \text{V}, I_C = 150\ \text{mA}, I_{B1} = I_{B2} = 15\ \text{mA}$ |
| <b>Transistor to Transistor Isolation</b> |  |     |      |               |  |
| $R_{t-t}$                                 | Isolation Resistance   | 10k |      | $M\Omega$     | $V_{t-t} = 500\ \text{V}$  |

(2) Pulsed Test: Pulse Width =  $300\ \mu\text{s} \pm 50$ , 1-2 % Duty Cycle.

HI-REL  
SURFACE  
MOUNT