

NPN SILICON TRANSISTOR

Qualified per MIL-PRF-19500/317

DEVICES

2N2369A 2N2369AUB 2N4449
 2N2369AU 2N2369AUBC *
 2N2369AUA

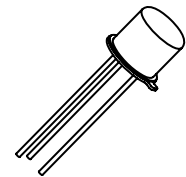
LEVELS

JAN
 JANTX
 JANTXV
 JANS

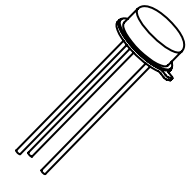
* Available to JANS quality level only.

ABSOLUTE MAXIMUM RATINGS ($T_C = +25^\circ\text{C}$ unless otherwise noted)

| Parameters / Test Conditions | Symbol | Value | Unit |
|---|-------------------|---|------------------|
| Collector-Emitter Voltage 2N2369A / U / UA 2N4449 / UB / UBC | V_{CEO} | 15 20 | Vdc |
| Emitter-Base Voltage 2N2369A / U / UA 2N4449 / UB / UBC | V_{EBO} | 4.5 6.0 | Vdc |
| Collector-Base Voltage | V_{CBO} | 40 | Vdc |
| Collector-Emitter Voltage | I_{CES} | 40 | Vdc |
| Total Power Dissipation @ $T_A = +25^\circ\text{C}$ 2N2369A; 2N4449 UA, UB, UBC U | P_T | 0.36 ⁽¹⁾ 0.36 ^(1,5) 0.50 ⁽⁴⁾ | W |
| Operating & Storage Junction Temperature Range | T_{op}, T_{stg} | -65 to +200 | $^\circ\text{C}$ |



TO-18 (TO-206AA)
2N2369A



TO-46 (TO-206AB)
2N4449

THERMAL CHARACTERISTICS

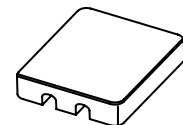
| Parameters / Test Conditions | Symbol | Value | Unit |
|--|-----------------|----------------------------------|---------------------------|
| Thermal Resistance, Ambient-to-Case 2N2369A; 2N4449 UA, UB, UBC U | $R_{\theta JA}$ | 400 400 ⁽⁵⁾ 350 | $^\circ\text{C}/\text{W}$ |

Note:

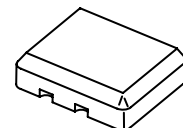
- Derate linearly 2.06 mW/ $^\circ\text{C}$ above $T_A = +25^\circ\text{C}$.
- Derate linearly 4.76 mW/ $^\circ\text{C}$ above $T_C = +95^\circ\text{C}$.
- Derate linearly 3.08 mW/ $^\circ\text{C}$ above $T_C = +70^\circ\text{C}$.
- Derate linearly 3.44 mW/ $^\circ\text{C}$ above $T_A = +54.5^\circ\text{C}$.
- Mounted on FR-4 PCB (10z. Cu) with contacts 20 mils larger than package pads.

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

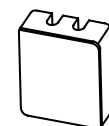
| Parameters / Test Conditions | Symbol | Min. | Max. | Unit |
|--|---------------|------|------|---------------|
| OFF CHARACTERISTICS | | | | |
| Collector-Emitter Breakdown Voltage $I_C = 10\text{mA}$ | $V_{(BR)CEO}$ | 15 | | Vdc |
| Collector-Base Cutoff Current $V_{CE} = 20\text{Vdc}$ | I_{CES} | | 0.4 | μA |



SURFACE MOUNT
UA



SURFACE MOUNT
UB & UBC
(UBC = Ceramic Lid Version)



SURFACE MOUNT
U (Dual Transistor)

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

| Parameters / Test Conditions | Symbol | Min. | Max. | Unit |
|--|---------------|----------------------|--------------------------|-----------------|
| OFF CHARACTERISTICS | | | | |
| Emitter-Base Breakdown Voltage $V_{EB} = 4.5\text{Vdc}$ Emitter-Base Cutoff Current $V_{EB} = 4.0\text{Vdc}$ | I_{EBO} | | 10 0.25 | μAdc |
| Collector- Base Breakdown Voltage $V_{CB} = 40\text{Vdc}$ Collector-Base Cutoff Current $V_{CB} = 32\text{Vdc}$ | I_{CBO} | | 10 0.2 | μAdc |
| ON CHARACTERISTICS ⁽¹⁾ | | | | |
| Forward-Current Transfer Ratio $I_C = 10\text{mAdc}$, $V_{CE} = 0.35\text{Vdc}$ $I_C = 30\text{mAdc}$, $V_{CE} = 0.4\text{Vdc}$ $I_C = 10\text{mAdc}$, $V_{CE} = 1.0\text{Vdc}$ $I_C = 100\text{mAdc}$, $V_{CE} = 1.0\text{Vdc}$ | h_{FE} | 40 30 40 20 | 120 120 120 120 | |
| Collector-Emitter Saturation Voltage $I_C = 10\text{mAdc}$, $I_B = 1.0\text{mAdc}$ $I_C = 30\text{mAdc}$, $I_B = 3.0\text{mAdc}$ $I_C = 100\text{mAdc}$, $I_B = 10\text{mAdc}$ | $V_{CE(sat)}$ | | 0.20 0.25 0.45 | Vdc |
| Base-Emitter Saturation Voltage $I_C = 10\text{mAdc}$, $I_B = 1.0\text{mAdc}$ $I_C = 30\text{mAdc}$, $I_B = 3.0\text{mAdc}$ $I_C = 100\text{mAdc}$, $I_B = 10\text{mAdc}$ | $V_{BE(sat)}$ | 0.70 0.80 | 0.85 0.90 1.20 | Vdc |

DYNAMIC CHARACTERISTICS

| Parameters / Test Conditions | Symbol | Min. | Max. | Unit |
|---|------------|------|------|------|
| Forward Current Transfer Ratio $I_C = 10\text{mAdc}$, $V_{CE} = 10\text{Vdc}$, $f = 100\text{MHz}$ | $ h_{fe} $ | 5.0 | 10 | |
| Output Capacitance $V_{CB} = 5.0\text{Vdc}$, $I_E = 0$, $100\text{kHz} \leq f \leq 1.0\text{MHz}$ | C_{obo} | | 4.0 | pF |
| Input Capacitance $V_{EB} = 0.5\text{Vdc}$, $I_C = 0$, $100\text{kHz} \leq f \leq 1.0\text{MHz}$ | C_{ibo} | | 5.0 | pF |

SWITCHING CHARACTERISTICS

| Parameters / Test Conditions | Symbol | Min. | Max. | Unit |
|--|-----------|------|------|----------------|
| Turn-On Time $I_C = 10\text{mAdc}$; $I_{B1} = 3.0\text{mAdc}$, $I_{B2} = -1.5\text{mAdc}$ | t_{on} | | 12 | ηs |
| Turn-Off Time $I_C = 10\text{mAdc}$; $I_{B1} = 3.0\text{mAdc}$, $I_{B2} = -1.5\text{mAdc}$ | t_{off} | | 18 | ηs |
| Charge Storage Time $I_C = 10\text{mAdc}$; $I_{B1} = 10\text{mAdc}$, $I_{B2} = 10\text{mAdc}$ | t_s | | 13 | ηs |

(1) Pulse Test: Pulse Width = 300 μs , Duty Cycle $\leq 2.0\%$.