

NPN SILICON TRANSISTOR

Qualified per MIL-PRF-19500/317

DEVICES

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

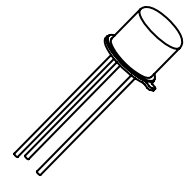
LEVELS

JAN
JANTX
JANTXV
JANS

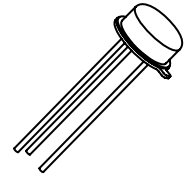
* Available to JANS quality level only.

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 @ $T_A = +25^\circ\text{C}$	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

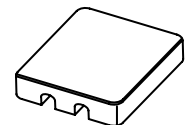
Parameters / Test Conditions	Symbol	Value	Unit
Thermal Resistance, Ambient-to-Case 2N2369A; 2N4449 UA, UB, UBC U	$R_{\theta JA}$	400 400 ⁽⁵⁾ 350	$^\circ\text{C}/\text{W}$

Note:

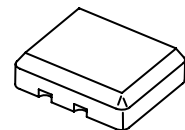
- Derate linearly 2.06 mW/ $^\circ\text{C}$ above $T_A = +25^\circ\text{C}$.
- Derate linearly 4.76 mW/ $^\circ\text{C}$ above $T_C = +95^\circ\text{C}$.
- Derate linearly 3.08 mW/ $^\circ\text{C}$ above $T_C = +70^\circ\text{C}$.
- Derate linearly 3.44 mW/ $^\circ\text{C}$ above $T_A = +54.5^\circ\text{C}$.
- 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)

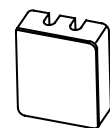
Parameters / Test Conditions	Symbol	Min.	Max.	Unit
OFF CHARACTERISTICS				
Collector-Emitter Breakdown Voltage $I_C = 10\text{mA}$	$V_{(BR)CEO}$	15		Vdc
Collector-Base Cutoff Current $V_{CE} = 20\text{Vdc}$	I_{CES}		0.4	μA



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 $\leq 2.0\%$.