

**SEMICONDUCTOR  
TECHNICAL DATA**

**2N869A  
2N4453**

**PNP Silicon  
Small-Signal Transistor**

... designed for high-speed switching applications.

CRYSTALONCS  
2805 Veterans Highway  
Suite 14  
Ronkonkoma, N.Y. 11779

*2N869AJAN Device is on Product Discontinuance Notice*

MAXIMUM RATINGS				
Rating	Symbol	Value	Unit	
Collector-Emitter Voltage	V <sub>CEO</sub>	18	Vdc	
Collector-Base Voltage	V <sub>CBO</sub>	25	Vdc	
Emitter-Base Voltage	V <sub>EBO</sub>	5.0	Vdc	
Collector Current — Continuous	I <sub>C</sub>	200	mAdc	
Total Device Dissipation	P <sub>T</sub>			
@ T <sub>A</sub> = 25°C	2N869A	360	mW	
	2N4453	300		
Derate above 25°C	2N869A	2.1	mW/°C	
	2N4453	1.71		
Operating Junction and Storage Temperature Range	T <sub>J</sub> , T <sub>stg</sub>	-65 to 200	°C	

ELECTRICAL CHARACTERISTICS (T <sub>A</sub> = 25°C unless otherwise noted.)				
Characteristic	Symbol	Min	Max	Unit
<b>OFF CHARACTERISTICS</b>				
Collector-Emitter Breakdown Voltage <sup>(1)</sup> (I <sub>C</sub> = 10 mAdc, I <sub>E</sub> = 0)	V <sub>(BR)CEO</sub>	18	—	Vdc
Collector-Emitter Breakdown Voltage <sup>(1)</sup> (I <sub>C</sub> = 10 μAdc, V <sub>BE</sub> = 0)	V <sub>(BR)CES</sub>	25	—	Vdc
Collector-Base Breakdown Voltage (I <sub>C</sub> = 10 μAdc, I <sub>E</sub> = 0)	V <sub>(BR)CBO</sub>	25	—	Vdc
Emitter-Base Breakdown Voltage (I <sub>E</sub> = 10 μAdc, I <sub>C</sub> = 0)	V <sub>(BR)EBO</sub>	5.0	—	Vdc
Collector Cutoff Current (V <sub>CE</sub> = 15 Vdc, V <sub>BE</sub> = 0)	I <sub>CES</sub>	—	0.01	μAdc
(V <sub>CE</sub> = 15 Vdc, V <sub>BE</sub> = 0, T <sub>A</sub> = 150°C)		—	10	
Emitter Cutoff Current (V <sub>EB</sub> = 3.5 Vdc, I <sub>C</sub> = 0)	I <sub>EBO</sub>	—	0.01	μAdc

<sup>(1)</sup> Pulsed. Pulse Width 250 to 350 μs. Duty Cycle 1.0 to 2.0%.

(continued)



CASE 22-03, STYLE 1  
TO-206AA (TO-18)  
2N869A



CASE 26-03, STYLE 1  
TO-206AB (TO-48)  
2N4453

2N869AJAN, 2N4453JAN SERIES

ELECTRICAL CHARACTERISTICS — continued ( $T_A = 25^\circ\text{C}$ unless otherwise noted.)				
Characteristic	Symbol	Min	Max	Unit
<b>ON CHARACTERISTICS</b>				
DC Current Gain ( $I_C = 10\text{ mAdc}$ , $V_{CE} = 0.3\text{ Vdc}$ ) ( $I_C = 10\text{ mAdc}$ , $V_{CE} = 5.0\text{ Vdc}$ ) ( $I_C = 30\text{ mAdc}$ , $V_{CE} = 0.5\text{ Vdc}$ ) ( $I_C = 100\text{ mAdc}$ , $V_{CE} = 1.0\text{ Vdc}$ ) <sup>(1)</sup> ( $I_C = 30\text{ mAdc}$ , $V_{CE} = 0.5\text{ Vdc}$ , $T_A = -55^\circ\text{C}$ )	$h_{FE}$	30 40 40 25 17	— 120 120 — —	—
Collector-Emitter Saturation Voltage ( $I_C = 10\text{ mAdc}$ , $I_B = 1.0\text{ mAdc}$ ) ( $I_C = 100\text{ mAdc}$ , $I_B = 10\text{ mAdc}$ )	$V_{CE(sat)}$	— —	0.15 0.5	Vdc
Base-Emitter Saturation Voltage ( $I_C = 10\text{ mAdc}$ , $I_B = 1.0\text{ mAdc}$ ) ( $I_C = 100\text{ mAdc}$ , $I_B = 10\text{ mAdc}$ )	$V_{BE(sat)}$	0.7 —	0.98 1.7	Vdc
<b>SMALL-SIGNAL CHARACTERISTICS</b>				
Output Capacitance ( $V_{CB} = 5.0\text{ Vdc}$ , $I_E = 0$ , $f = 0.1$ to $1.0\text{ MHz}$ )	$C_{obo}$	—	6.0	pF
Input Capacitance ( $V_{CB} = 0.5\text{ Vdc}$ , $I_E = 0$ , $f = 0.1$ to $1.0\text{ MHz}$ )	$C_{ibo}$	—	6.0	pF
Current Gain ( $I_C = 1.0\text{ mAdc}$ , $V_{CE} = 5.0\text{ Vdc}$ ) ( $I_C = 5.0\text{ mAdc}$ , $V_{CE} = 5.0\text{ Vdc}$ )	$h_{fe}$	30 30	— —	—
Small-Signal Current Transfer Ratio, Magnitude ( $I_C = 10\text{ mAdc}$ , $V_{CE} = 15\text{ Vdc}$ , $f = 100\text{ MHz}$ )	$ h_{fe} $	4.0	10	—
Noise Figure ( $I_C = 0.5\text{ mAdc}$ , $V_{CE} = 5.0\text{ Vdc}$ , $R_G = 1.0\text{ kohm}$ , $f = 1.0\text{ MHz}$ , $BW < 200\text{ kHz}$ )	NF	—	6.0	dB
<b>SWITCHING CHARACTERISTICS</b> (See Figure 36) ( $V_{CC} = 2.0\text{ Vdc}$ , $I_C = 30\text{ mAdc}$ , $I_B = 1.5\text{ mAdc}$ )				
Turn-On Time	$t_{(on)}$	—	50	ns
Turn-Off Time	$t_{(off)}$	—	80	ns

ASSURANCE TESTING (Pre/Post Burn-In)				
Burn-In Conditions: $T_A = 25 \pm 3^\circ\text{C}$ , $V_{CB} = 12\text{ Vdc}$				
P <sub>T</sub> = 360 mW 2N869A, 300 mW 2N4453				
Characteristics Tested	Symbol	Initial and End Point Limits		Unit
		Min	Max	
Collector Cutoff Current ( $V_{CE} = 15\text{ Vdc}$ )	$I_{CES}$	—	10	nAdc
DC Current Gain ( $I_C = 10\text{ mAdc}$ , $V_{CE} = 5.0\text{ Vdc}$ )	$h_{FE}$	40	120	—

Delta from Pre-Burn-In Measured Values		Min	Max	
Delta Collector Cutoff Current	$\Delta I_{CES}$	—	±100 or ±5.0 whichever is greater	% of Initial Value nAdc
Delta DC Current Gain	$\Delta h_{FE}$	—	+15	% of Initial Value

(1) Pulsed. Pulse Width 250 to 350  $\mu\text{s}$ . Duty Cycle 1.0 to 2.0%.