

## NPN SWITCHING SILICON TRANSISTOR

Qualified per MIL-PRF-19500/251

### Devices

2N2218	2N2219
2N2218A	2N2219A
2N2218AL	2N2219AL

### Qualified Level

JAN  
JANTX  
JANTXV  
JANS

### MAXIMUM RATINGS

Ratings	Symbol	2N2218 2N2219	2N2218A; L 2N2219A; L	Unit
Collector-Emitter Voltage	$V_{CEO}$	30	50	Vdc
Collector-Base Voltage	$V_{CBO}$	60	75	Vdc
Emitter-Base Voltage	$V_{EBO}$	5.0	6.0	Vdc
Collector Current	$I_C$	800		mAdc
Total Power Dissipation	$P_T$	@ $T_A = +25^{\circ}\text{C}^{(1)}$	0.8	W
		@ $T_C = +25^{\circ}\text{C}^{(2)}$	3.0	W
Operating & Storage Junction Temp. Range	$T_{op}, T_{stg}$	-55 to +200		$^{\circ}\text{C}$

### THERMAL CHARACTERISTICS

Characteristics	Symbol	Max.	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	59	$^{\circ}\text{C}/\text{W}$

- 1) Derate linearly 4.6 mW/ $^{\circ}\text{C}$  above  $T_A > +25^{\circ}\text{C}$   
 2) Derate linearly 17.0 mW/ $^{\circ}\text{C}$  above  $T_C > +25^{\circ}\text{C}$



**TO- 39\* (TO-205AD)**  
2N2218, 2N2218A  
2N2219, 2N2219A



**TO-5\***  
2N2218AL,  
2N2219AL

\*See appendix A for package outline

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

Characteristics	Symbol	Min.	Max.	Unit
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### OFF CHARACTERISTICS

Collector-Emitter Breakdown Voltage $I_E = 10 \text{ mAdc}$	2N2218; 2N2219 2N2218A; L; 2N2219A; L	$V_{(BR)CEO}$	30 50	Vdc
Emitter-Base Cutoff Current $V_{EB} = 5.0 \text{ Vdc}$ $V_{EB} = 6.0 \text{ Vdc}$ $V_{EB} = 4.0 \text{ Vdc}$	2N2218; 2N2219 2N2218A; L; 2N2219A; L All Types	$I_{EBO}$	10 10 10	$\mu\text{Adc}$ $\eta\text{Adc}$
Collector-Base Cutoff Current $V_{CE} = 30 \text{ Vdc}$ $V_{CE} = 50 \text{ Vdc}$	2N2218; 2N2219 2N2218A; L; 2N2219A; L	$I_{CES}$	10 10	$\eta\text{Adc}$

**2N2218; A; AL; 2N2219; A; AL JAN SERIES**

**ELECTRICAL CHARACTERISTICS (con't)**

Characteristics	Symbol	Min.	Max.	Unit
Collector-Base Cutoff Current				
$V_{CB} = 50$ Vdc 2N2218; 2N2219	$I_{CBO}$		10	$\eta$ Adc $\mu$ Adc
$V_{CB} = 60$ Vdc 2N2218A; L; 2N2219A; L		10		
$V_{CB} = 60$ Vdc 2N2218; 2N2219		10		
$V_{CB} = 75$ Vdc 2N2218A; L; 2N2219A; L		10		

**ON CHARACTERISTICS (3)**

Forward-Current Transfer Ratio					
$I_C = 0.1$ mAdc, $V_{CE} = 10$ Vdc 2N2218 2N2219 2N2218A; 2N2218AL 2N2219A; 2N2219AL	$h_{FE}$	20 35 30 50			
$I_C = 1.0$ mAdc, $V_{CE} = 10$ Vdc 2N2218 2N2219 2N2218A; 2N2218AL 2N2219A; 2N2219AL		25 50 35 75	150 325 150 325		
$I_C = 10$ mAdc, $V_{CE} = 10$ Vdc 2N2218 2N2219 2N2218A; 2N2218AL 2N2219A; 2N2219AL		35 75 40 100			
$I_C = 150$ mAdc, $V_{CE} = 10$ Vdc 2N2218; A; 2N2218AL 2N2219; A; 2N2219AL		40 100	120 300		
$I_C = 500$ mAdc, $V_{CE} = 10$ Vdc 2N2218; A; 2N2218AL 2N2219; A; 2N2219AL		20 30			
Collector-Emitter Saturation Voltage					
$I_C = 150$ mAdc, $I_B = 15$ mAdc 2N2218; 2N2219 2N2218A; L; 2N2219A; L		$V_{CE(sat)}$		0.4 0.3	Vdc
$I_C = 500$ mAdc, $I_B = 50$ mAdc 2N2218; 2N2219 2N2218; L; 2N2219A; L			1.6 1.0		
Base-Emitter Saturation Voltage					
$I_C = 150$ mAdc, $I_B = 15$ mAdc 2N2218; 2N2219 2N2218A; L; 2N2219A, L		$V_{BE(sat)}$	0.6 0.6	1.3 1.2	Vdc
$I_C = 500$ mAdc, $I_B = 50$ mAdc 2N2218; 2N2219 2N2218A; L; 2N2219A; L			2.6 2.0		

**DYNAMIC CHARACTERISTICS**

Magnitude of Small-Signal Forward Current Transfer Ratio $I_C = 20$ mAdc, $V_{CE} = 20$ Vdc, $f = 100$ MHz	$ h_{fe} $	2.5	12	
Small-Signal Forward Current Transfer Ratio $I_C = 1.0$ mAdc, $V_{CE} = 10$ Vdc, $f = 1.0$ kHz 2N2218 2N2219 2N2218A, L 2N2219A, L	$h_{fe}$	25 50 35 75		
Output Capacitance $V_{CB} = 10$ Vdc, $I_E = 0$ , $100$ kHz $\leq f \leq 1.0$ MHz	$C_{obo}$		8.0	pF
Input Capacitance $V_{EB} = 0.5$ Vdc, $I_C = 0$ , $100$ kHz $\leq f \leq 1.0$ MHz	$C_{ibo}$		25	pF

**SWITCHING CHARACTERISTICS**

$V_{CC} = 30$  Vdc;  $I_C = 150$  mAdc;  $I_{B1} = 15$  mAdc

Turn-On Time (See Figure 3 of MIL-PRF-19500/251)	2N2218, 2N2219 2N2218A, L, 2N2219A, L	$t_{on}$	40 35	$\eta$ s
Turn-Off Time (See Figure 4 of MIL-PRF-19500/251)	2N2218, 2N2219 2N2218A, L, 2N2219A, L	$t_{off}$	250 300	$\eta$ s

(3) Pulse Test: Pulse Width = 300 $\mu$ s, Duty Cycle  $\leq 2.0\%$ .