

## NPN-SWITCHING SILICON TRANSISTOR

Qualified per MIL-PRF-19500/251

### DEVICES

<b>2N2218</b>	<b>2N2219</b>
<b>2N2218A</b>	<b>2N2219A</b>
<b>2N2218AL</b>	<b>2N2219AL</b>

### LEVELS

**JAN**  
**JANTX**  
**JANTXV**  
**JANS \***

\* Also available in Radiation Hardened versions. See datasheet for JANSR2N2218 & JANSR2N2219

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

Parameters / Test Conditions	Symbol	2N2218 2N2219	2N221A; 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		mA
Total Power Dissipation	$P_T$	@ $T_A = +25^\circ\text{C}$	0.8	W
		@ $T_C = +25^\circ\text{C}$	3.0	W
Operating & Storage Junction Temp. Range	$T_{op}, T_{stg}$	-55 to +200		$^\circ\text{C}$

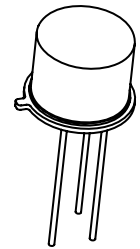
### THERMAL CHARACTERISTICS

Parameters / Test Conditions	Symbol	Value	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	59	$^\circ\text{C}/\text{W}$

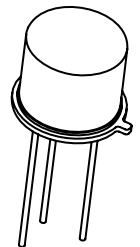
**Note:** (1) Derate linearly 4.6mW/ $^\circ\text{C}$  above  $T_A > +25^\circ\text{C}$   
 (2) Derate linearly 17.0mW/ $^\circ\text{C}$  above  $T_C > +25^\circ\text{C}$

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

Parameters / Test Conditions	Symbol	Min.	Max.	Unit
<b>OFF CHARACTERISTICS</b>				
Collector-Emitter Breakdown Voltage $I_E = 10\text{mA}$	$V_{(BR)CEO}$	30	50	Vdc
2N2218; 2N2219 2N2218A; 2N2219A / AL				
Emitter-Base Cutoff Current $V_{EB} = 5.0\text{Vdc}$	$I_{EBO}$		10	$\mu\text{A}$
$V_{EB} = 6.0\text{Vdc}$				
$V_{EB} = 4.0\text{Vdc}$				
Collector-Base Cutoff Current $V_{CE} = 30\text{Vdc}$	$I_{CES}$		10	$\eta\text{A}$
$V_{CE} = 50\text{Vdc}$				



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



**TO-5**  
 2N2218AL  
 2N2219AL

**ELECTRICAL CHARACTERISTICS ( $T_A = +25^\circ\text{C}$ , unless otherwise noted) (Con't)**

Parameters / Test Conditions	Symbol	Min.	Max.	Unit	
Collector-Base Cutoff Current					
$V_{CB} = 50\text{Vdc}$ 2N2218; 2N2219	$I_{CBO}$		10	$\eta\text{Adc}$	
$V_{CB} = 60\text{Vdc}$ 2N2218; 2N2219			10	$\mu\text{Adc}$	
$V_{CB} = 60\text{Vdc}$ 2N2218A; 2N2219A / AL			10	$\eta\text{Adc}$	
$V_{CB} = 75\text{Vdc}$ 2N2218A; 2N2219A / AL			10	$\mu\text{Adc}$	
<b>ON CHARACTERISTICS (3)</b>					
Forward-Current Transfer Ratio					
$I_C = 0.1\text{mA}$ , $V_{CE} = 10\text{Vdc}$ 2N2218 2N2219 2N2218A; 2N2218AL 2N2219A; 2N2219AL	$h_{FE}$	20 35 30 50			
$I_C = 1.0\text{mA}$ , $V_{CE} = 10\text{Vdc}$ 2N2218 2N2219 2N2218A; 2N2218AL 2N2219A; 2N2219AL		25 50 35 75	150 325 150 325		
$I_C = 10\text{mA}$ , $V_{CE} = 10\text{Vdc}$ 2N2218 2N2219 2N2218A; 2N2218AL 2N2219A; 2N2219AL		35 75 40 100			
$I_C = 150\text{mA}$ , $V_{CE} = 10\text{Vdc}$ 2N2218; A; AL 2N2219; A; AL		40 100	120 300		
$I_C = 500\text{mA}$ , $V_{CE} = 10\text{Vdc}$ 2N2218; A; AL 2N2219; A; AL		20 30			
Collector-Emitter Saturation Voltage					
$I_C = 150\text{mA}$ , $I_B = 15\text{mA}$ 2N2218; 2N2219 2N2218A; 2N2219A / AL		$V_{CE(sat)}$		0.4 0.3	Vdc
$I_C = 500\text{mA}$ , $I_B = 50\text{mA}$ 2N2218; 2N2219 2N2218A; 2N2219A / AL				1.6 1.0	
Base-Emitter Saturation Voltage					
$I_C = 150\text{mA}$ , $I_B = 15\text{mA}$ 2N2218; 2N2219 2N2218A; 2N2219A / AL		$V_{BE(sat)}$	0.6 0.6	1.3 1.2	Vdc
$I_C = 500\text{mA}$ , $I_B = 50\text{mA}$ 2N2218; 2N2219 2N2218A; 2N2219A / AL				2.6 2.0	

## DYNAMIC CHARACTERISTICS

Parameters / Test Conditions	Symbol	Min.	Max.	Unit
Magnitude of Small-Signal Forward Current Transfer Ratio $I_C = 20\text{mA}$ , $V_{CE} = 20\text{V}$ , $f = 100\text{MHz}$	$ h_{fe} $	2.5	12	
Small-Signal Forward Current Transfer Ratio $I_C = 1.0\text{mA}$ , $V_{CE} = 10\text{V}$ , $f = 1.0\text{kHz}$	$h_{fe}$	25		
		50		
		35		
		75		
Output Capacitance $V_{CB} = 10\text{V}$ , $I_E = 0$ , $100\text{kHz} \leq f \leq 1.0\text{MHz}$	$C_{obo}$		8.0	pF
Input Capacitance $V_{EB} = 0.5\text{V}$ , $I_C = 0$ , $100\text{kHz} \leq f \leq 1.0\text{MHz}$	$C_{ibo}$		25	pF

## SWITCHING CHARACTERISTICS

Parameters / Test Conditions	Symbol	Min.	Max.	Unit
$V_{CC} = 30\text{V}$ ; $I_C = 150\text{mA}$ ; $I_{B1} = 15\text{mA}$				
Turn-On Time (See Figure 3 of MIL-PRF-19500/251)	$t_{on}$		40	$\eta\text{s}$
			35	
Turn-Off Time (See Figure 4 of MIL-PRF-19500/251)	$t_{off}$		250	$\eta\text{s}$
			300	

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