

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 @ $T_A = +25^{\circ}\text{C}^{(1)}$	P_T	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	$^{\circ}\text{C/W}$

- 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	μAdc ηAdc
Collector-Base Cutoff Current $V_{CE} = 30 \text{ Vdc}$ $V_{CE} = 50 \text{ Vdc}$	2N2218; 2N2219 2N2218A; L; 2N2219A; L	I_{CES}	10 10	ηAdc

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

ELECTRICAL CHARACTERISTICS (con't)

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

ON CHARACTERISTICS (3)

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

DYNAMIC CHARACTERISTICS

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

SWITCHING CHARACTERISTICS

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

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

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