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TECHNICAL DATA SHEET

NPN-SWITCHING SILICON TRANSISTOR

Qualified per MIL-PRF-19500/251

DEVICES

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

LEVELS

JAN
JANTX
JANTXV
JANS *

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

ABSOLUTE MAXIMUM RATINGS ***(T_C = +25°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 @ T_A = +25°C @ T_C = +25°C	P_T	0.8 3.0		W W
Operating & Storage Junction Temp. Range	T_{op}, T_{stg}	-55 to +200		°C

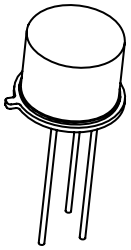
THERMAL CHARACTERISTICS

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

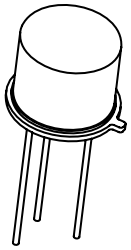
Note: (1) Derate linearly 4.6mW/°C above T_A > +25°C
(2) Derate linearly 17.0mW/°C above T_C > +25°C

ELECTRICAL CHARACTERISTICS ***(T_A = +25°C, unless otherwise noted)***

Parameters / Test Conditions		Symbol	Min.	Max.	Unit
OFF CHARACTERTICS					
Collector-Emitter Breakdown Voltage I_E = 10mAdc	2N2218; 2N2219 2N2218A; 2N2219A / AL	$V_{(BR)CEO}$	30 50		Vdc
Emitter-Base Cutoff Current V_{EB} = 5.0Vdc V_{EB} = 6.0Vdc V_{EB} = 4.0Vdc	2N2218; 2N2219 2N2218A; 2N2219A / AL All Types	I_{EBO}		10 10 10	µAdc ηAdc
Collector-Base Cutoff Current V_{CE} = 30Vdc V_{CE} = 50Vdc	2N2218; 2N2219 2N2218A; 2N2219A / AL	I_{CES}		10 10	ηAdc



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



TO-5
2N2218AL
2N2219AL

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ELECTRICAL CHARACTERISTICS ***(T_A = +25°C, unless otherwise noted) (Con't)***

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

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DYNAMIC CHARACTERISTICS

Parameters / Test Conditions	Symbol	Min.	Max.	Unit
Magnitude of Small-Signal Forward Current Transfer Ratio I_C = 20mAdc, V_{CE} = 20Vdc, f = 100MHz	$\|h_{fe}\|$	2.5	12	
Small-Signal Forward Current Transfer Ratio I_C = 1.0mAdc, V_{CE} = 10Vdc, f = 1.0kHz 2N2218 2N2219 2N2218A, AL 2N2219A, AL	h_{fe}	 25 50 35 75		
Output Capacitance V_{CB} = 10Vdc, I_E = 0, 100 kHz ≤ f ≤ 1.0MHz	C_{obo}		8.0	pF
Input Capacitance V_{EB} = 0.5Vdc, I_C = 0, 100 kHz ≤ f ≤ 1.0MHz	C_{ibo}		25	pF

SWITCHING CHARACTERISTICS

Parameters / Test Conditions	Symbol	Min.	Max.	Unit
V_{CC} = 30Vdc; I_C = 150mAdc; I_{B1} = 15mAdc				
Turn-On Time (See Figure 3 of MIL-PRF-19500/251) 2N2218, 2N2219 2N2218A, 2N2219A / AL	t_{on}		40 35	ηs
Turn-Off Time (See Figure 4 of MIL-PRF-19500/251) 2N2218, 2N2219 2N2218A, 2N2219A / AL	t_{off}		250 300	ηs

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

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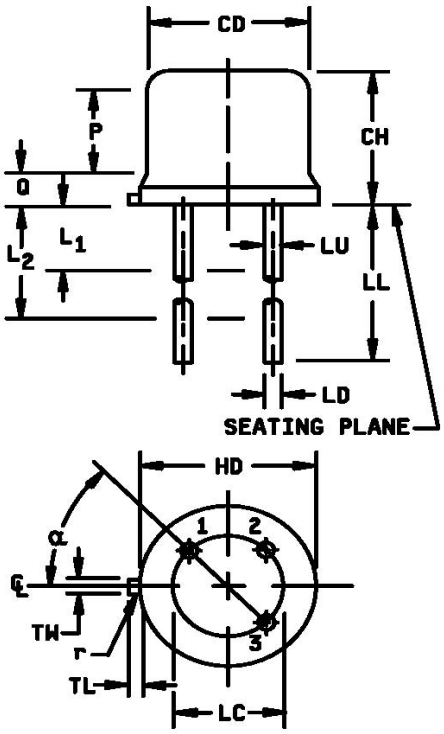
PACKAGE DIMENSIONS



Symbol	Dimensions				Notes
	Inches		Millimeters		
	Min	Max	Min	Max	
CD	.305	.335	7.75	8.51	
CH	.240	.260	6.10	6.60	
HD	.335	.370	8.51	9.40	
LC	.200 TP		5.08 TP		7
LD	.016	.019	0.41	0.48	8, 9
LL	See note 14				
LU	.016	.019	0.41	0.48	8, 9
L_1		.050		1.27	8, 9
L_2	.250		6.35		8, 9
P	.100		2.54		7
Q		.030		0.76	5
TL	.029	.045	0.74	1.14	3, 4
TW	.028	.034	0.71	0.86	3
r		.010		0.25	10
α	45° TP		45° TP		7

NOTES:

1. Dimensions are in inches.
2. Millimeters are given for general information only.
3. Beyond r (radius) maximum, TW shall be held for a minimum length of .011 (0.28 mm).
4. Dimension TL measured from maximum HD.
5. Body contour optional within zone defined by HD, CD, and Q.
6. CD shall not vary more than .010 inch (0.25 mm) in zone P. This zone is controlled for automatic handling.
7. Leads at gauge plane .054 +.001 -.000 inch (1.37 +0.03 -0.00 mm) below seating plane shall be within .007 inch (0.18 mm) radius of true position (TP) at maximum material condition (MMC) relative to tab at MMC.
8. Dimension LU applies between L1 and L2. Dimension LD applies between L2 and LL minimum. Diameter is uncontrolled in L1 and beyond LL minimum.
9. All three leads.
10. The collector shall be internally connected to the case.
11. Dimension r (radius) applies to both inside corners of tab.
12. In accordance with ASME Y14.5M, diameters are equivalent to φx symbology.
13. Lead 1 = emitter, lead 2 = base, lead 3 = collector.
14. For L suffix devices (TO-5), dimension LL = 1.5 inches (38.10 mm) min. and 1.75 inches (44.45 mm) max. For non-L suffix types (TO-39), dimension LL = .5 inch (12.70 mm) min. and .750 inch (19.05 mm) max.

FIGURE 1. Physical dimensions (similar to TO-39, TO-5).

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