

NPN-SWITCHING SILICON TRANSISTOR

Qualified per MIL-PRF-19500/251

DEVICES

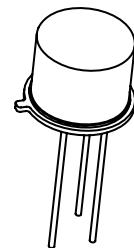
2N2218	2N2219
2N2218A	2N2219A
2N2218AL	2N2219AL

LEVELS
JAN
JANTX
JANTXV
JANS *

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

ABSOLUTE MAXIMUM RATINGS ($T_C = +25^\circ\text{C}$ 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 @ $T_A = +25^\circ\text{C}$	P_T	0.8		W
Total Power Dissipation @ $T_C = +25^\circ\text{C}$		3.0		W
Operating & Storage Junction Temp. Range	T_{op}, T_{stg}	-55 to +200		°C



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

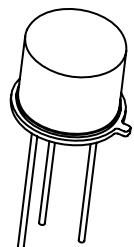
THERMAL CHARACTERISTICS

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 $T_A > +25^\circ\text{C}$
 (2) Derate linearly 17.0mW/°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
OFF CHARACTERISTICS				
Collector-Emitter Breakdown Voltage $I_E = 10\text{mA dc}$	$V_{(BR)CEO}$	30 50		Vdc
Emitter-Base Cutoff Current $V_{EB} = 5.0\text{Vdc}$	I_{EBO}	10		$\mu\text{A dc}$
$V_{EB} = 6.0\text{Vdc}$		10		$\eta\text{A dc}$
$V_{EB} = 4.0\text{Vdc}$		10		
All Types				
Collector-Base Cutoff Current $V_{CE} = 30\text{Vdc}$	I_{CES}	10		$\eta\text{A dc}$
$V_{CE} = 50\text{Vdc}$		10		
2N2218; 2N2219 2N2218A; 2N2219A / AL				
2N2218; 2N2219 2N2218A; 2N2219A / AL				



TO-5
 2N2218AL
 2N2219AL



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TECHNICAL DATA SHEET

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

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

DYNAMIC CHARACTERISTICS

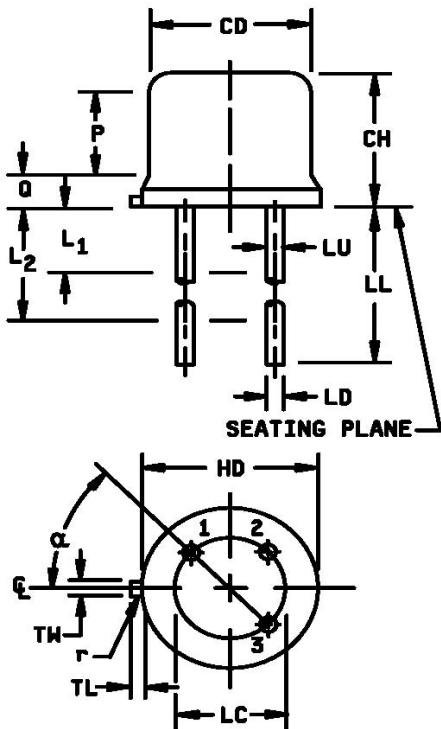
Parameters / Test Conditions	Symbol	Min.	Max.	Unit
Magnitude of Small-Signal Forward Current Transfer Ratio $I_C = 20\text{mA}_\text{dc}$, $V_{CE} = 20\text{V}_\text{dc}$, $f = 100\text{MHz}$	$ h_{fe} $	2.5	12	
Small-Signal Forward Current Transfer Ratio $I_C = 1.0\text{mA}_\text{dc}$, $V_{CE} = 10\text{V}_\text{dc}$,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

SWITCHING CHARACTERISTICS

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

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

► 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).