

# 2N3418(S) - 2N3421(S) Series

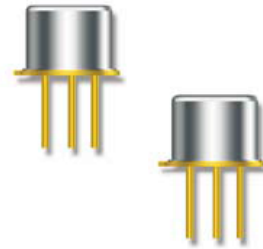


## NPN Medium Power Silicon Transistor

Rev. V1

### Features

- Available in JAN, JANTX, JANTXV, JANS and JANSR 100K rads(Si) per MIL-PRF-19500/393
- TO-5 & TO-39 (TO-205AD) Package



### Electrical Characteristics

Parameter	Test Conditions	Symbol	Units	Min.	Max.
<b>Off Characteristics</b>					
Collector - Emitter Breakdown Voltage	$I_C = 50 \text{ mAdc}$ 2N3418, S, 2N3420, S 2N3419, S, 2N3421, S	$V_{(BR)CEO}$	Vdc	60 80	—
Collector - Emitter Cutoff Current	$V_{CE} = 80 \text{ Vdc}, V_{BE} = -0.5 \text{ Vdc}$ 2N3418, S, 2N3420, S $V_{CE} = 120 \text{ Vdc}, V_{BE} = -0.5 \text{ Vdc}$ 2N3419, S, 2N3421, S	$I_{CEX}$	$\mu\text{Adc}$	—	0.3 0.3
Collector - Emitter Cutoff Current	$V_{CE} = 45$ 2N3418, S, 2N3420, S $V_{CE} = 60$ 2N3419, S, 2N3421, S	$I_{CEO}$	$\mu\text{Adc}$	—	5.0 5.0
Emitter - Base Cutoff Current	$V_{EB} = 6 \text{ Vdc}, I_C = 0$ $V_{EB} = 8 \text{ Vdc}, I_C = 0$	$I_{EBO}$	$\mu\text{Adc}$	—	0.5 10.0
<b>On Characteristics<sup>1</sup></b>					
Forward Current Transfer Ratio	$I_C = 100 \text{ mAdc}, V_{CE} = 2 \text{ Vdc}$ 2N3418, S, 2N3419, S 2N3420, S, 2N3421, S	$H_{FE}$	-	20 40	— —
	$I_C = 1 \text{ Adc}, V_{CE} = 2 \text{ Vd}$ 2N3418, S, 2N3419, S 2N3420, S, 2N3421, S			20 40	60 120
	$I_C = 2 \text{ Adc}, V_{CE} = 2 \text{ Vdc}$ 2N3418, S, 2N3419, S 2N3420, S, 2N3421, S			15 30	— —
	$I_C = 5 \text{ Adc}, V_{CE} = 5 \text{ Vdc}$ 2N3418, S, 2N3419, S 2N3420, S, 2N3421, S			10 15	— —
	Base - Emitter Voltage			$I_C = 1 \text{ Adc}, I_B = 0.1 \text{ Adc}$ $I_C = 2 \text{ Adc}, I_B = 0.2 \text{ Adc}$	$V_{BE(SAT)}$
Collector - Emitter Saturation Voltage	$I_C = 1 \text{ Adc}, I_B = 0.1 \text{ Adc}$ $I_C = 2 \text{ Adc}, I_B = 0.2 \text{ Adc}$	$V_{CE(SAT)}$	Vdc	—	0.25 0.50

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Parameter	Test Conditions	Symbol	Units	Min.	Max.
<b>Dynamic Characteristics</b>					
Magnitude of Common Emitter Small-Signal Short-Circuit Forward Current Transfer Ratio	$I_C = 0.1 \text{ Adc}$ , $V_{CE} = 10 \text{ Vdc}$ , $f = 20 \text{ MHz}$	$ H_{FE} $	-	1.3	8.0
Output Capacitance	$V_{CB} = 10 \text{ Vdc}$ , $I_E = 0$ , $100 \text{ kHz} \leq f \leq 1 \text{ MHz}$	$C_{OBO}$	pF	—	150
<b>Switching Characteristics</b>					
Delay Time	$V_{BE(OFF)} = -3.7 \text{ Vdc}$ ; $I_C = 1 \text{ Adc}$ ; $I_{B2} = 100 \text{ mAdc}$	$T_D$	$\mu\text{s}$	—	0.08
Rise Time	$V_{BE(OFF)} = -3.7 \text{ Vdc}$ ; $I_C = 1 \text{ Adc}$ ; $I_{B2} = 100 \text{ mAdc}$	$T_R$	$\mu\text{s}$	—	0.22
Storage Time	$V_{BE(OFF)} = -3.7 \text{ Vdc}$ ; $I_C = 1 \text{ Adc}$ ; $I_{B2} = 100 \text{ mAdc}$	$T_S$	$\mu\text{s}$	—	1.10
Fall Time	$V_{BE(OFF)} = -3.7 \text{ Vdc}$ ; $I_C = 1 \text{ Adc}$ ; $I_{B2} = 100 \text{ mAdc}$	$T_F$	$\mu\text{s}$	—	0.20
<b>Safe Operating Area</b>					
DC Tests:	$T_C = +100 \text{ }^\circ\text{C}$ , 1 Cycle, $t = 1.0 \text{ s}$				
Test 1:	$V_{CE} = 5 \text{ Vdc}$ , $I_C = 3.0 \text{ Adc}$				
Test 2:	$V_{CE} = 37 \text{ Vdc}$ , $I_C = 0.4 \text{ Adc}$				
Test 3:	$V_{CE} = 60 \text{ Vdc}$ , $I_C = 0.185 \text{ mAdc}$ 2N3418, S; 2N3420, S				
	$V_{CE} = 80 \text{ Vdc}$ , $I_C = 0.120 \text{ mAdc}$ 2N3419, S; 2N3421, S				

### Absolute Maximum Ratings

Ratings	Symbol	Value 2N3418, S 2N3420, S	Value 2N3419, S 2N3421, S
Collector - Emitter Voltage	$V_{CEO}$	60 Vdc	80 Vdc
Collector - Base Voltage	$V_{CBO}$	85 Vdc	125 Vdc
Emitter - Base Voltage	$V_{EBO}$	8 Vdc	
Collector Current	$I_C$	3 Adc	5 Adc
$T_P \leq 1 \text{ ms}$ , duty cycle $\leq 50\%$			
Total Power Dissipation	$P_T$	1 W	5 W
@ $T_A = 25^\circ\text{C}$			
@ $T_C = 100^\circ\text{C}$			
Operating & Storage Temperature Range	$T_{OP}$ , $T_{STG}$	-65°C to +200°C	

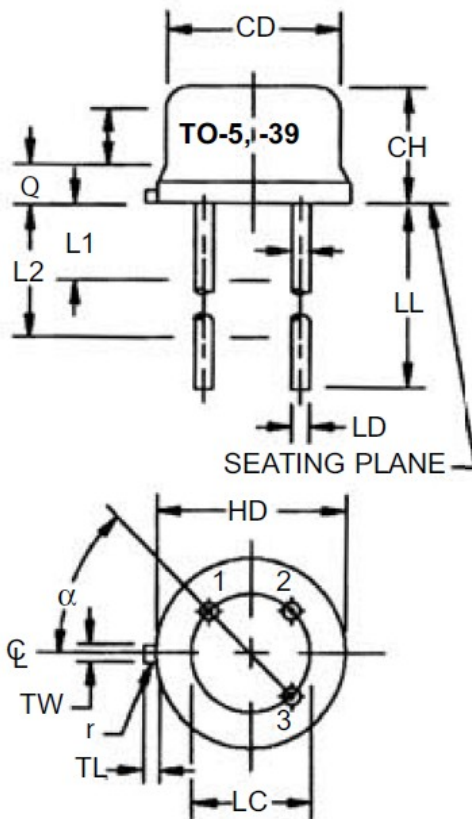
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### Outline Drawing (TO-5 & TO-39)



LTR	Dimensions				Note
	Inches		Millimeters		
	MIN	MAX	MIN	MAX	
CD	0.305	0.335	7.75	8.51	—
CH	0.240	0.260	6.10	6.60	—
HD	0.335	0.370	8.51	9.40	—
LC	0.200 TP		5.08 TP		7
LD	0.016	0.019	0.041	0.048	8, 9
LL	0.500	0.750	12.7	19.05	—
LU	0.016	0.019	0.041	0.048	8, 9
L1	—	0.050	—	1.27	8, 9
L2	0.250	—	6.35	—	8, 9
P	0.100	—	2.54	—	7
Q	—	0.030	—	0.76	5
TL	0.029	0.045	0.74	1.14	—
TW	0.028	0.034	0.71	0.86	—
r	—	0.010	—	0.25	10
a	45° TP		45° TP		7
1, 2, 10, 12, 13, 14					

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 0.007 inch (0.18 mm) radius of true position (TP) at maximum material condition (MMC) relative to tab at MMC. The device may be measured by direct methods or by gauging procedure.
8. Dimension LU applies between L, and L<sub>1</sub>. Dimension LD applies between L, and LL minimum. Diameter is uncontrolled in 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  $\Phi$ x symbology.
13. Lead 1 = emitter, lead 2 = base, lead 3 = collector.
14. For non-S-suffix devices (T0-5), dimension LL = 1.5 inches (38.10 mm) min. and 1.75 inches (44.45 mm) max. For S-suffix types (T0-39), dimension LL = 0.5 inch (12.70 mm) min. and 750 inch (19.05 mm) max.

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