

## NPN MEDIUM POWER SILICON TRANSISTOR

Qualified per MIL-PRF-19500/393

### Devices

<b>2N3418</b>	<b>2N3419</b>	<b>2N3420</b>	<b>2N3421</b>
<b>2N3814S</b>	<b>2N3419S</b>	<b>2N3420S</b>	<b>2N3421S</b>

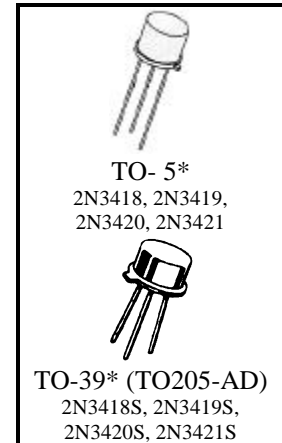
### Qualified Level

**JAN**  
**JANTX**  
**JANTXV**

### MAXIMUM RATINGS

Ratings	Symbol	2N3418, S 2N3420, S	2N3419, S 2N3421, S	Unit
Collector-Emitter Voltage	$V_{CEO}$	60	80	Vdc
Collector-Base Voltage	$V_{CBO}$	85	125	Vdc
Emitter-Base Voltage	$V_{EBO}$	8.0		Vdc
Collector Current $t_p \leq 1.0$ ms, duty cycle $\leq 50\%$	$I_C$	3.0 5.0		Adc
Total Power Dissipation @ $T_A = +25^\circ\text{C}^{(1)}$ @ $T_C = +100^\circ\text{C}^{(2)}$	$P_T$	1.0 15		W W/ $^\circ\text{C}$
Operating & Storage Temperature Range	$T_{op}, T_{stg}$	-65 to +200		$^\circ\text{C}$

- 1) Derate linearly 5.72 mW/ $^\circ\text{C}$  for  $T_A > 25^\circ\text{C}$   
2) Derate linearly 150 mW/ $^\circ\text{C}$  for  $T_C > 100^\circ\text{C}$



\*See Appendix A for  
Package Outline

### ELECTRICAL CHARACTERISTICS

Characteristics	Symbol	Min.	Max.	Unit
-----------------	--------	------	------	------

#### OFF CHARACTERISTICS

Collector-Emitter Breakdown Current $I_C = 50$ mAdc, $I_B = 0$	2N3418, S; 2N3420, S 2N3419, S; 2N3421, S	$V_{(BR)CEO}$	60 80	Vdc
Collector-Emitter Cutoff Current $V_{BE} = -0.5$ Vdc, $V_{CE} = 80$ Vdc $V_{BE} = -0.5$ Vdc, $V_{CE} = 120$ Vdc	2N3418, S; 2N3420, S 2N3419, S; 2N3421, S	$I_{CEX}$	0.3 0.3	$\mu\text{Adc}$
Collector-Emitter Cutoff Current $V_{CE} = 45$ Vdc, $I_B = 0$ $V_{CE} = 60$ Vdc, $I_B = 0$	2N3418, S; 2N3420, S 2N3419, S; 2N3421, S	$I_{CEO}$	5.0 5.0	$\mu\text{Adc}$
Emitter-Base Cutoff Current $V_{EB} = 6.0$ Vdc, $I_C = 0$ $V_{EB} = 8.0$ Vdc, $I_C = 0$		$I_{EBO}$	0.5 10	$\mu\text{Adc}$

**ELECTRICAL CHARACTERISTICS**

Characteristics	Symbol	Min.	Max.	Unit
<b>DC CHARACTERISTICS</b>				
Forward-Current Transfer Ratio $I_C = 100 \text{ mAdc}, V_{CE} = 2.0 \text{ Vdc}$ 2N3418, S; 2N3419, S 2N3420, S; 2N3421, S	$h_{FE}$	20	60	
$I_C = 1.0 \text{ Adc}, V_{CE} = 2.0 \text{ Vdc}$ 2N3418, S; 2N3419, S 2N3420, S; 2N3421, S		40		
$I_C = 2.0 \text{ Adc}, V_{CE} = 2.0 \text{ Vdc}$ 2N3418, S; 2N3419, S 2N3420, S; 2N3421, S		15		
$I_C = 5.0 \text{ Adc}, V_{CE} = 5.0 \text{ Vdc}$ 2N3418, S; 2N3419, S 2N3420, S; 2N3421, S		30		
Base-Emitter Saturation Voltage $I_C = 1.0 \text{ Adc}, I_B = 0.1 \text{ Adc}$ $I_C = 2.0 \text{ Adc}, I_B = 0.2 \text{ Adc}$	$V_{BE(sat)}$	0.6 0.7	1.2 1.4	Vdc
Collector-Emitter Saturation Voltage $I_C = 1.0 \text{ Adc}, I_B = 0.1 \text{ Adc}$ $I_C = 2.0 \text{ Adc}, I_B = 0.2 \text{ Adc}$	$V_{CE(sat)}$		0.25 0.5	Vdc

**DYNAMIC CHARACTERISTICS**

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 $V_{CB} = 10 \text{ Vdc}, I_E = 0, 100 \text{ kHz} \leq f \leq 1.0 \text{ MHz}$	$C_{obo}$		150	pF

**SWITCHING CHARACTERISTICS**

Delay Time $V_{BE(off)} = -3.7 \text{ Vdc}$	$t_d$		0.08	$\mu\text{s}$
Rise Time $I_C = 1.0 \text{ Adc}, I_{B1} = 100 \text{ mAdc}$	$t_r$		0.22	$\mu\text{s}$
Storage Time $V_{BE(off)} = -3.7 \text{ Vdc}$	$t_s$		1.10	$\mu\text{s}$
Fall Time $I_C = 1.0 \text{ Adc}, I_{B2} = -100 \text{ mAdc}$	$t_f$		0.20	$\mu\text{s}$

**SAFE OPERATING AREA**

<b>DC Tests</b> $T_C = 100^\circ\text{C}, 1 \text{ Cycle}, t = 1.0 \text{ s}$	
<b>Test 1</b> $V_{CE} = 5.0 \text{ Vdc}, I_C = 3.0 \text{ Adc}$	
<b>Test 2</b> $V_{CE} = 37 \text{ Vdc}, I_C = 0.4 \text{ Adc}$	
<b>TEST 3</b> $V_{CE} = 60 \text{ Vdc}, I_C = 0.185 \text{ Adc}$ 2N3418, S; 2N3420, S $V_{CE} = 80 \text{ Vdc}, I_C = 0.12 \text{ Adc}$ 2N3419, S; 2N3421, S	
<b>Clamped Switching</b>	
$T_A = 25^\circ\text{C}, I_B = 0.5 \text{ Adc}, I_C = 3.0 \text{ Adc}$	



LittleDiode supplies new, hard to find or obsolete electronic components and semiconductors all over the world.

With over two million different components listed you are sure to find the part you need.

Feel free to visit us today at our online store:

[LittleDiode.com](http://LittleDiode.com)

Looking forward to providing you with the best possible service.