

NPN MEDIUM POWER SILICON TRANSISTOR

Qualified per MIL-PRF-19500/393

Devices

2N3418	2N3419	2N3420	2N3421
2N3814S	2N3419S	2N3420S	2N3421S

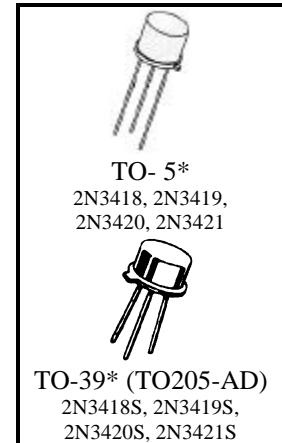
Qualified Level

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
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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	μAdc
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	μAdc
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	μAdc

ELECTRICAL CHARACTERISTICS

Characteristics	Symbol	Min.	Max.	Unit
DC CHARACTERISTICS				
Forward-Current Transfer Ratio I _C = 100 mA _{dc} , V _{CE} = 2.0 V _{dc} 2N3418, S; 2N3419, S 2N3420, S; 2N3421, S	h _{FE}	20	60	
I _C = 1.0 A _{dc} , V _{CE} = 2.0 V _{dc} 2N3418, S; 2N3419, S 2N3420, S; 2N3421, S		40		
I _C = 2.0 A _{dc} , V _{CE} = 2.0 V _{dc} 2N3418, S; 2N3419, S 2N3420, S; 2N3421, S		15		
I _C = 5.0 A _{dc} , V _{CE} = 5.0 V _{dc} 2N3418, S; 2N3419, S 2N3420, S; 2N3421, S		30		
Base-Emitter Saturation Voltage I _C = 1.0 A _{dc} , I _B = 0.1 A _{dc} I _C = 2.0 A _{dc} , I _B = 0.2 A _{dc}	V _{BE(sat)}	0.6	1.2	V _{dc}
Collector-Emitter Saturation Voltage I _C = 1.0 A _{dc} , I _B = 0.1 A _{dc} I _C = 2.0 A _{dc} , I _B = 0.2 A _{dc}	V _{CE(sat)}	0.7	1.4	V _{dc}
			0.25	V _{dc}
			0.5	V _{dc}

DYNAMIC CHARACTERISTICS

Magnitude of Common Emitter Small-Signal Short Circuit Forward Current Transfer Ratio I _C = 0.1 A _{dc} , V _{CE} = 10 V _{dc} , f = 20 MHz	h _{fe}	1.3	8.0	
Output Capacitance V _{CB} = 10 V _{dc} , I _E = 0, 100 kHz ≤ f ≤ 1.0 MHz	C _{obo}		150	pF

SWITCHING CHARACTERISTICS

Delay Time V _{BE(off)} = -3.7 V _{dc}	t _d		0.08	μs
Rise Time I _C = 1.0 A _{dc} , I _{B1} = 100 mA _{dc}	t _r		0.22	μs
Storage Time V _{BE(off)} = -3.7 V _{dc}	t _s		1.10	μs
Fall Time I _C = 1.0 A _{dc} , I _{B2} = -100 mA _{dc}	t _f		0.20	μs

SAFE OPERATING AREA

DC Tests				
T _C = 100°C, 1 Cycle, t = 1.0 s				
Test 1				
V _{CE} = 5.0 V _{dc} , I _C = 3.0 A _{dc}				
Test 2				
V _{CE} = 37 V _{dc} , I _C = 0.4 A _{dc}				
TEST 3				
V _{CE} = 60 V _{dc} , I _C = 0.185 A _{dc}	2N3418, S; 2N3420, S			
V _{CE} = 80 V _{dc} , I _C = 0.12 A _{dc}	2N3419, S; 2N3421, S			
Clamped Switching				
T _A = 25°C, I _B = 0.5 A _{dc} , I _C = 3.0 A _{dc}				