

## PNP SWITCHING SILICON TRANSISTOR

Qualified per MIL-PRF-19500/350

### Devices

2N3867  
2N3867S

2N3868  
2N3868S

### Qualified Level

JAN  
JANTX  
JANTXV

### MAXIMUM RATINGS

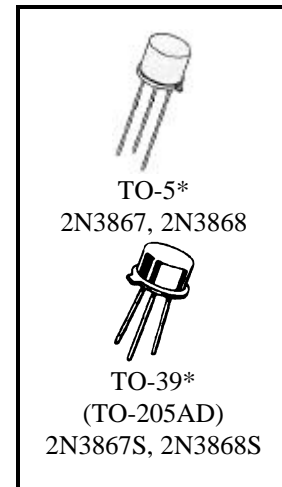
Ratings	Symbol	2N3867 2N3867S	2N3868 2N3868S	Unit
Collector-Emitter Voltage	$V_{CEO}$	40	60	Vdc
Collector-Base Voltage	$V_{CBO}$	40	60	Vdc
Emitter-Base Voltage	$V_{EBO}$	4.0		Vdc
Collector Current -- Continuous	$I_C$	3.0		Adc
Total Power Dissipation	$P_T$	@ $T_A = 25^{\circ}\text{C}^{(1)}$	1.0	W
		@ $T_C = 25^{\circ}\text{C}^{(2)}$	10	W
Operating & Storage Temperature Range	$T_{OP}, T_{STG}$	-55 to +200		$^{\circ}\text{C}$

### THERMAL CHARACTERISTICS

Characteristics	Symbol	Max.	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	17.5	$^{\circ}\text{C}/\text{W}$

1) Derate linearly 5.71 mW/ $^{\circ}\text{C}$  for  $T_A > +25^{\circ}\text{C}$

2) Derate linearly 57.1 mW/ $^{\circ}\text{C}$  for  $T_C > +25^{\circ}\text{C}$



\*See Appendix A for  
Package Outline

### ELECTRICAL CHARACTERISTICS ( $T_A = 25^{\circ}\text{C}$ unless otherwise noted)

Characteristics	Symbol	Min.	Max.	Unit
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### OFF CHARACTERISTICS

Collector-Base Breakdown Voltage $I_C = 100 \mu\text{Adc}$	2N3867, S 2N3868, S	$V_{(BR)CBO}$	40 60	Vdc
Collector-Emitter Breakdown Voltage $I_C = 20 \text{mAdc}$	2N3867, S 2N3868, S	$V_{(BR)CEO}$	40 60	Vdc
Emitter-Base Breakdown Voltage $I_E = 100 \mu\text{Adc}$		$V_{(BR)EBO}$	4.0	Vdc
Collector-Emitter Cutoff Current $V_{EB} = 2.0 \text{Vdc}, V_{CE} = 40 \text{Vdc}$ $V_{EB} = 2.0 \text{Vdc}, V_{CE} = 60 \text{Vdc}$	2N3867, S 2N3868, S	$I_{CEX}$	1.0 1.0	$\mu\text{Adc}$
Collector-Base Cutoff Current $V_{CB} = 40 \text{Vdc}$ $V_{CB} = 60 \text{Vdc}$	2N3867, S 2N3868, S	$I_{CBO}$	100	$\mu\text{Adc}$
Emitter-Base Cutoff Current $V_{EB} = 4 \text{Vdc}$		$I_{EBO}$	100	$\mu\text{Adc}$

**ELECTRICAL CHARACTERISTICS (con't)**

Characteristics	Symbol	Min.	Max.	Unit
<b>ON CHARACTERISTICS <sup>(3)</sup></b>				
Forward-Current Transfer Ratio I <sub>C</sub> = 500 mA <sub>dc</sub> , V <sub>CE</sub> = 1.0 V <sub>dc</sub> 2N3867, S 2N3868, S	h <sub>FE</sub>	50	200	
I <sub>C</sub> = 1.5 A <sub>dc</sub> , V <sub>CE</sub> = 2.0 V <sub>dc</sub> 2N3867, S 2N3868, S		40		
I <sub>C</sub> = 2.5 A <sub>dc</sub> , V <sub>CE</sub> = 3.0 V <sub>dc</sub> 2N3867, S 2N3868, S		30		
I <sub>C</sub> = 3.0 A <sub>dc</sub> , V <sub>CE</sub> = 5.0 V <sub>dc</sub> All Types		25		
		20		
Collector-Emitter Saturation Voltage I <sub>C</sub> = 500 mA <sub>dc</sub> , I <sub>B</sub> = 50 mA <sub>dc</sub> I <sub>C</sub> = 1.5 A <sub>dc</sub> , I <sub>B</sub> = 150 mA <sub>dc</sub> I <sub>C</sub> = 2.5 A <sub>dc</sub> , I <sub>B</sub> = 250 mA <sub>dc</sub>	V <sub>CE(sat)</sub>		0.5 0.75 1.5	V <sub>dc</sub>
Base-Emitter Saturation Voltage I <sub>C</sub> = 500 mA <sub>dc</sub> , I <sub>B</sub> = 50 mA <sub>dc</sub> I <sub>C</sub> = 1.5 A <sub>dc</sub> , I <sub>B</sub> = 150 mA <sub>dc</sub> I <sub>C</sub> = 2.5 A <sub>dc</sub> , I <sub>B</sub> = 250 mA <sub>dc</sub>	V <sub>BE(sat)</sub>	0.9	1.0 1.4 2.0	V <sub>dc</sub>

**DYNAMIC CHARACTERISTICS**

Magnitude of Common Emitter Small-Signal Short Circuit Forward Current Transfer Ratio I <sub>C</sub> = 100 mA <sub>dc</sub> , V <sub>CE</sub> = 5.0 V <sub>dc</sub> , f = 20 MHz	h <sub>fe</sub>	3.0	12	
Output Capacitance V <sub>CB</sub> = 10 V <sub>dc</sub> , I <sub>E</sub> = 0, 100 kHz ≤ f ≤ 1.0 MHz	C <sub>obo</sub>		120	pF
Input Capacitance V <sub>EB</sub> = 3.0 V <sub>dc</sub> , I <sub>C</sub> = 0, 100 kHz ≤ f ≤ 1.0 MHz	C <sub>ibo</sub>		800	pF

**SWITCHING CHARACTERISTICS**

Delay Time V <sub>CC</sub> = -30 V <sub>dc</sub> , V <sub>EB</sub> = 0,	t <sub>d</sub>		35	ns
Rise Time I <sub>C</sub> = 1.5 A <sub>dc</sub> , I <sub>B1</sub> = 150 mA <sub>dc</sub>	t <sub>r</sub>		65	ns
Storage Time V <sub>CC</sub> = -30 V <sub>dc</sub> , V <sub>EB</sub> = 0,	t <sub>s</sub>		500	ns
Fall Time I <sub>C</sub> = 1.5 A <sub>dc</sub> , I <sub>B1</sub> = I <sub>B2</sub> = 150 mA <sub>dc</sub>	t <sub>f</sub>		100	ns
Turn-On Time V <sub>CC</sub> = 30, I <sub>C</sub> = 1.5 A <sub>dc</sub> , I <sub>B</sub> = 150 mA <sub>dc</sub>	t <sub>on</sub>		100	ns
Turn-Off Time V <sub>CC</sub> = 30, I <sub>C</sub> = 1.5 A <sub>dc</sub> , I <sub>B</sub> = 150 mA <sub>dc</sub>	t <sub>off</sub>		600	ns

**SAFE OPERATING AREA**

<b>DC Tests</b> T <sub>C</sub> = 25°C, 1 Cycle, t = 1.0 s				
<b>Test 1</b> V <sub>CE</sub> = 3.33 V <sub>dc</sub> , I <sub>C</sub> = 3.0 A <sub>dc</sub>				
<b>Test 2</b> V <sub>CE</sub> = 40 V <sub>dc</sub> , I <sub>C</sub> = 160 mA <sub>dc</sub> 2N3867, S V <sub>CE</sub> = 60 V <sub>dc</sub> , I <sub>C</sub> = 80 mA <sub>dc</sub> 2N3868, S				

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