

## PNP SILICON LOW POWER TRANSISTOR

Qualified per MIL-PRF-19500/350

### DEVICES

**2N3867**                      **2N3867S**  
**2N3868**                      **2N3868S**

**LEVELS**  
**JAN**  
**JANTX**  
**JANTXV**  
**JANS**

### ABSOLUTE MAXIMUM RATINGS ( $T_C = +25^\circ\text{C}$ unless otherwise noted)

Parameters / Test Conditions	Symbol	2N3867	2N3868	Unit
Collector-Base Voltage	$V_{CBO}$	40	60	Vdc
Collector-Emitter Voltage	$V_{CEO}$	40	60	Vdc
Emitter-Base Voltage	$V_{EBO}$	4.0		Vdc
Collector Current	$I_C$	3.0		mA
Total Power Dissipation @ $T_A = +25^\circ\text{C}$ <sup>(1)</sup>	$P_T$	1.0		W/°C
Operating & Storage Junction Temperature Range	$T_J, T_{stg}$	-65 to +200		°C

### THERMAL CHARACTERISTICS

Parameters / Test Conditions	Symbol	Max.	Unit
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	175	°C/mW

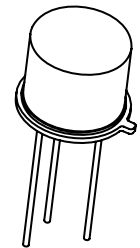
**Note:** \* Electrical characteristics for “S” suffix devices are identical to the “non S” corresponding devices.

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

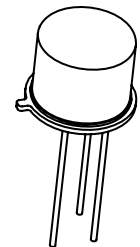
2/ Derate linearly 57.1mW/°C for  $T_C > +25^\circ\text{C}$

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

Parameters / Test Conditions	Symbol	Min.	Max.	Unit
<b>OFF CHARACTERISTICS</b>				
Collector-Emitter Breakdown Current $I_C = 10\mu\text{A}$	$V_{(BR)CEO}$	40	60	Vdc
Collector-Base Cutoff Current $V_{CB} = 40\text{Vdc}$ $V_{CB} = 60\text{Vdc}$	$I_{CBO}$		100	$\mu\text{A}$
Emitter-Base Cutoff Current $V_{EB} = 4.0\text{Vdc}$	$I_{EBO}$		100	$\mu\text{A}$
Collector-Emitter Cutoff Current $V_{CE} = 40\text{Vdc}$ $V_{CE} = 60\text{Vdc}$ $V_{CE} = 40\text{Vdc}, T_A = +150^\circ\text{C}$ $V_{CE} = 60\text{Vdc}, T_A = +150^\circ\text{C}$	$I_{CEX}$		1.0 1.0 50 50	$\mu\text{A}$



**TO-5 \***  
**2N3867, 2N3868**



**TO-39 \* (TP-205AD)**  
**2N3867S, 2N3868S**

**ELECTRICAL CHARACTERISTICS ( $T_A = +25^\circ\text{C}$ , unless otherwise noted) (CONT.)**

Parameters / Test Conditions	Symbol	Min.	Max.	Unit
<b>ON CHARACTERISTICS <sup>(2)</sup></b>				
Forward-Current Transfer Ratio $I_C = 500\text{mA}$ , $V_{CE} = 1.0\text{Vdc}$ 2N3867, S 2N3868, S	h <sub>FE</sub>	50		
$I_C = 1.5\text{A}$ , $V_{CE} = 2.0\text{Vdc}$ 2N3867, S 2N3868, S		35	200	
$I_C = 2.5\text{A}$ , $V_{CE} = 3.0\text{Vdc}$ 2N3867, S 2N3868, S		40	150	
$I_C = 3.0\text{A}$ , $V_{CE} = 5.0\text{Vdc}$ 2N3867, S 2N3868, S		25		
$I_C = 500\text{mA}$ , $V_{CE} = 1.0\text{Vdc}$ , $T_A = -55^\circ\text{C}$ 2N3867, S 2N3868, S		20		
$I_C = 500\text{mA}$ , $V_{CE} = 1.0\text{Vdc}$ , $T_A = -55^\circ\text{C}$ 2N3867, S 2N3868, S		17		
Collector-Emitter Saturation Voltage $I_C = 500\text{mA}$ , $I_B = 50\text{mA}$ $I_C = 1.5\text{A}$ , $I_B = 150\text{mA}$ $I_C = 2.5\text{A}$ , $I_B = 250\text{mA}$	V <sub>CE(sat)</sub>		0.5 0.75 1.5	Vdc
Base-Emitter Saturation Voltage $I_C = 500\text{mA}$ , $I_B = 50\text{mA}$ $I_C = 1.5\text{A}$ , $I_B = 150\text{mA}$ $I_C = 2.5\text{A}$ , $I_B = 250\text{mA}$ 2N3867, S 2N3868, S	V <sub>BE(sat)</sub>	0.9 0.85	1.0 1.4 1.4 2.0	Vdc

**DYNAMIC CHARACTERISTICS**

Parameters / Test Conditions	Symbol	Min.	Max.	Unit
Magnitude of Common Emitter Small-Signal Short Circuit Forward Current Transfer Ratio $I_C = 100\text{mA}$ , $V_{CE} = 5.0\text{Vdc}$ , $f = 20\text{MHz}$	h <sub>fc</sub>	3	12	kΩ
Output Capacitance $V_{CB} = 10\text{Vdc}$ , $I_E = 0$ , $100\text{kHz} \leq f \leq 1.0\text{MHz}$	C <sub>obo</sub>		120	pF
Input Capacitance $V_{EB} = 3.0\text{Vdc}$ , $I_C = 0$ , $100\text{kHz} \leq f \leq 1.0\text{MHz}$	C <sub>ibo</sub>		800	pF

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

## SWITCHING CHARACTERISTICS

Parameters / Test Conditions	Symbol	Min.	Max.	Unit
Delay Time Rise Time $V_{CC} = -30\text{dc}, V_{EB} = 0$ $I_C = 1.5\text{Adc}, I_{B1} = 150\text{mAdc}$	$t_d$ $t_r$		35 65	nS
Storage Time Fall Time $V_{CC} = -30\text{dc}, V_{EB} = 0$ $I_C = 1.5\text{Adc}, I_{B1} = I_{B2} = 150\text{mAdc}$	$t_s$ $t_f$		500 100	nS
Turn-On Time $V_{CC} = 30, I_C = 1.5\text{Adc}, I_B = 150\text{mA}$	$t_{on}$		100	nS
Turn-Off Time $V_{CC} = 30, I_C = 1.5\text{Adc}, I_B = 150\text{mA}$	$t_{off}$		600	nS

## SAFE OPERATING AREA

### DC Test

$T_C = 25^\circ\text{C}, 1 \text{ cycle}, t = 1.0\text{s}$

### Test 1

$V_{CE} = 3.33\text{Vdc}, I_C = 3.0\text{Adc}$

### Test 2

$V_{CE} = 40\text{Vdc}, I_C = 160\text{mAdc}$       2N3867,  
 $V_{CE} = 60\text{Vdc}, I_C = 80\text{mAdc}$       2N3868, S