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TECHNICAL DATA SHEET

PNP SILICON LOW POWER TRANSISTOR

Qualified per MIL-PRF-19500/350

DEVICES

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

LEVELS

JAN
JANTX
JANTXV
JANS

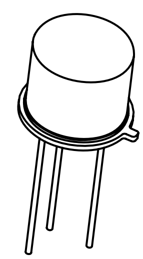
ABSOLUTE MAXIMUM RATINGS *(T_C = +25°C unless otherwise noted)*

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		mAdc
Total Power Dissipation @ T_A = +25°C (1)	P_T	1.0		W/°C
Operating & Storage Junction Temperature Range	T_J, T_{stg}	-65 to +200		°C

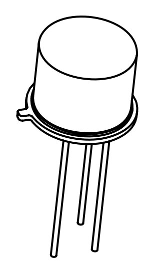
THERMAL CHARACTERISTICS

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°C
2/ Derate linearly 57.1mW/°C for T_C > +25°C



TO-5 *
2N3867, 2N3868



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

ELECTRICAL CHARACTERISTICS *(T_A = +25°C, unless otherwise noted)*

Parameters / Test Conditions	Symbol	Min.	Max.	Unit
OFF CHARACTERTICS				
Collector-Emitter Breakdown Current I_C = 10µAdc 2N3867, S 2N3868, S	$V_{(BR)CEO}$	40 60		Vdc
Collector-Base Cutoff Current V_{CB} = 40Vdc 2N3867, S V_{CB} = 60Vdc 2N3868, S	I_{CBO}		100	µAdc
Emitter-Base Cutoff Current V_{EB} = 4.0Vdc	I_{EBO}		100	µAdc
Collector-Emitter Cutoff Current V_{CE} = 40Vdc 2N3867, S V_{CE} = 60Vdc 2N3868, S V_{CE} = 40Vdc, T_A = +150°C 2N3867, S V_{CE} = 60Vdc, T_A = +150°C 2N3868, S	I_{CEX}		1.0 1.0 50 50	µAdc

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ELECTRICAL CHARACTERISTICS ***(T_A = +25°C, unless otherwise noted) (CONT.)***

Parameters / Test Conditions		Symbol	Min.	Max.	Unit
ON CHARACTERTICS (2)					
Forward-Current Transfer Ratio					
I_C = 500mAdc, V_{CE} = 1.0Vdc	2N3867, S	h_{FE}	50		
	2N3868, S		35		
I_C = 1.5Adc, V_{CE} = 2.0Vdc	2N3867, S		40	200	
	2N3868, S		30	150	
I_C = 2.5Adc, V_{CE} = 3.0Vdc	2N3867, S		25		
	2N3868, S		20		
I_C = 3.0Adc, V_{CE} = 5.0Vdc	2N3867, S		20		
	2N3868, S		20		
I_C = 500mAdc, V_{CE} = 1.0Vdc, T_A = -55°C	2N3867, S		25		
	2N3868, S		17		
Collector-Emitter Saturation Voltage		$V_{CE(sat)}$			Vdc
I_C = 500mAdc, I_B = 50mAdc				0.5	
I_C = 1.5Adc, I_B = 150mAdc				0.75	
I_C = 2.5Adc, I_B = 250mAdc				1.5	
Base-Emitter Saturation Voltage		$V_{BE(sat)}$			Vdc
I_C = 500mA, I_B = 50mAdc				1.0	
I_C = 1.5A, I_B = 150mAdc	2N3867, S		0.9	1.4	
	2N3868, S		0.85	1.4	
I_C = 2.5A, I_B = 250mAdc				2.0	

DYNAMIC CHARACTERISTICS

Parameters / Test Conditions	Symbol	Min.	Max.	Unit
Magnitude of Common Emitter Small-Signal Short Circuit Forward Current Transfer Ratio I_C = 100mAdc, V_{CE} = 5.0Vdc, f = 20MHz	$\|h_{fe}\|$	3	12	kΩ
Output Capacitance V_{CB} = 10Vdc, I_E = 0, 100 kHz ≤ f ≤ 1.0MHz	C_{obo}		120	pF
Iutput Capacitance V_{EB} = 3.0Vdc, I_C = 0, 100 kHz ≤ f ≤ 1.0MHz	C_{ibo}		800	pF

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

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SWITCHING CHARACTERISTICS

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

SAFE OPERATING AREA

DC Test
T_C = 25°C, 1 cycle, t = 1.0s

Test 1
V_{CE} = 3.33Vdc, I_C = 3.0Adc

Test 2

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

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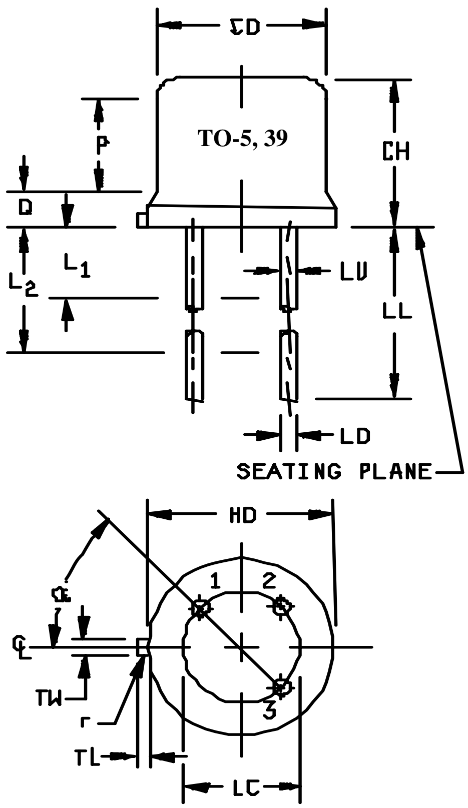
PACKAGE DIMENSIONS



Symbol	Dimensions				Note
	Inches		Millimeters		
	Min	Max	Min	Max	
CD	.305	.335	7.75	8.51	5, 6
CH	.240	.260	6.10	6.60	
HD	.335	.370	8.51	9.40	4, 5
LC	.200 TP		5.08 TP		7
LD	.016	.019	0.41	0.48	8,9
LL	See note 8, 14				
LU	.016	.019	0.41	0.48	8,9
L_1		.050		1.27	8,9
L_2	.250		6.35		8,9
P	.100		2.54		7
Q		.030		0.76	5
TL	.029	.045	0.74	1.14	3,4
TW	.028	.034	0.71	0.86	3
R		.010		0.25	10
α	45° TP		45° TP		7
1, 2, 10, 12, 13, 14					

NOTES:

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 .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_1 and L_2. Dimension LD applies between L_2 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 ϕx symbology.
13. Lead 1 = emitter, lead 2 = base, lead 3 = collector.
14. For non-S-suffix devices (TO-5), dimension LL = 1.5 inches (38.10 mm) min. and 1.75 inches (44.45 mm) max. For S-suffix types (TO-39), dimension LL = .5 inch (12.70 mm) min. and .750 inch (19.05 mm) max.

FIGURE 1. Physical dimensions (similar to TO-5, TO-39)