

## 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         |        | mAdc |
| 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 |

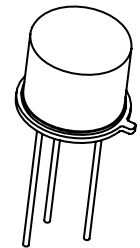
**Note:** \* Electrical characteristics for “S” suffix devices are identical to the “non S” corresponding devices.

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

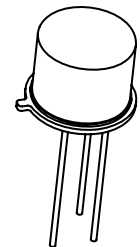
2/ Derate linearly 57.1mW/°C for  $T_C > +25^\circ\text{C}$

### 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<br>$I_C = 10\mu\text{Adc}$   | $V_{(BR)CEO}$ | 40   | 60                     | Vdc             |
| Collector-Base Cutoff Current<br>$V_{CB} = 40\text{Vdc}$<br>$V_{CB} = 60\text{Vdc}$  | $I_{CBO}$     |      | 100                    | $\mu\text{Adc}$ |
| Emitter-Base Cutoff Current<br>$V_{EB} = 4.0\text{Vdc}$  | $I_{EBO}$     |      | 100                    | $\mu\text{Adc}$ |
| Collector-Emitter Cutoff Current<br>$V_{CE} = 40\text{Vdc}$<br>$V_{CE} = 60\text{Vdc}$<br>$V_{CE} = 40\text{Vdc}, T_A = +150^\circ\text{C}$<br>$V_{CE} = 60\text{Vdc}, T_A = +150^\circ\text{C}$ | $I_{CEX}$     |      | 1.0<br>1.0<br>50<br>50 | $\mu\text{Adc}$ |



**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<br>$I_C = 500\text{mA}$ , $V_{CE} = 1.0\text{Vdc}$<br>2N3867, S<br>2N3868, S  | h <sub>FE</sub>      | 50          |                          |      |
| $I_C = 1.5\text{A}$ , $V_{CE} = 2.0\text{Vdc}$<br>2N3867, S<br>2N3868, S   |                      | 35          |                          |      |
| $I_C = 2.5\text{A}$ , $V_{CE} = 3.0\text{Vdc}$<br>2N3867, S<br>2N3868, S   |                      | 40          | 200                      |      |
| $I_C = 3.0\text{A}$ , $V_{CE} = 5.0\text{Vdc}$<br>2N3867, S<br>2N3868, S   |                      | 30          | 150                      |      |
| $I_C = 500\text{mA}$ , $V_{CE} = 1.0\text{Vdc}$ , $T_A = -55^\circ\text{C}$<br>2N3867, S<br>2N3868, S  |                      | 25          |                          |      |
| $I_C = 500\text{mA}$ , $V_{CE} = 1.0\text{Vdc}$ , $T_A = -55^\circ\text{C}$<br>2N3867, S<br>2N3868, S  |                      | 20          |                          |      |
| Collector-Emitter Saturation Voltage<br>$I_C = 500\text{mA}$ , $I_B = 50\text{mA}$<br>$I_C = 1.5\text{A}$ , $I_B = 150\text{mA}$<br>$I_C = 2.5\text{A}$ , $I_B = 250\text{mA}$ | V <sub>CE(sat)</sub> |             | 0.5<br>0.75<br>1.5       | Vdc  |
| Base-Emitter Saturation Voltage<br>$I_C = 500\text{mA}$ , $I_B = 50\text{mA}$<br>$I_C = 1.5\text{A}$ , $I_B = 150\text{mA}$<br>$I_C = 2.5\text{A}$ , $I_B = 250\text{mA}$      | V <sub>BE(sat)</sub> | 0.9<br>0.85 | 1.0<br>1.4<br>1.4<br>2.0 | Vdc  |

**DYNAMIC CHARACTERISTICS**

| Parameters / Test Conditions  | Symbol           | Min. | Max. | Unit |
|---|------------------|------|------|------|
| Magnitude of Common Emitter Small-Signal Short Circuit Forward Current Transfer Ratio<br>$I_C = 100\text{mA}$ , $V_{CE} = 5.0\text{Vdc}$ , $f = 20\text{MHz}$ | h <sub>fc</sub>  | 3    | 12   | kΩ   |
| Output Capacitance<br>$V_{CB} = 10\text{Vdc}$ , $I_E = 0$ , $100\text{kHz} \leq f \leq 1.0\text{MHz}$   | C <sub>obo</sub> |      | 120  | pF   |
| Input Capacitance<br>$V_{EB} = 3.0\text{Vdc}$ , $I_C = 0$ , $100\text{kHz} \leq f \leq 1.0\text{MHz}$   | 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<br>Rise Time<br>$V_{CC} = -30\text{dc}, V_{EB} = 0$<br>$I_C = 1.5\text{Adc}, I_{B1} = 150\text{mAdc}$            | $t_d$<br>$t_r$ |      | 35<br>65   | nS   |
| Storage Time<br>Fall Time<br>$V_{CC} = -30\text{dc}, V_{EB} = 0$<br>$I_C = 1.5\text{Adc}, I_{B1} = I_{B2} = 150\text{mAdc}$ | $t_s$<br>$t_f$ |      | 500<br>100 | nS   |
| Turn-On Time<br>$V_{CC} = 30, I_C = 1.5\text{Adc}, I_B = 150\text{mA}$  | $t_{on}$       |      | 100        | nS   |
| Turn-Off Time<br>$V_{CC} = 30, I_C = 1.5\text{Adc}, I_B = 150\text{mA}$   | $t_{off}$      |      | 600        | nS   |

## SAFE OPERATING AREA

### DC Test

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

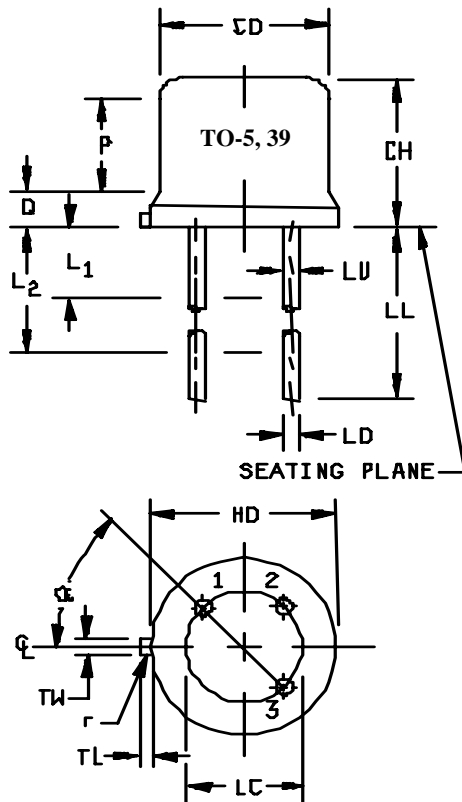
### Test 1

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

### 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

## 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 <sub>1</sub>       |                | .050 |             | 1.27 | 8,9  |
| L <sub>2</sub>       | .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:

- Dimensions are in inches.
- Millimeters are given for general information only.
- Beyond r (radius) maximum, TW shall be held for a minimum length of .011 (0.28 mm).
- Dimension TL measured from maximum HD.
- Body contour optional within zone defined by HD, CD, and Q.
- CD shall not vary more than .010 inch (0.25 mm) in zone P. This zone is controlled for automatic handling.
- 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.
- Dimension LU applies between L<sub>1</sub> and L<sub>2</sub>. Dimension LD applies between L<sub>2</sub> and LL minimum. Diameter is uncontrolled in and beyond LL minimum.
- All three leads.
- The collector shall be internally connected to the case.
- Dimension r (radius) applies to both inside corners of tab.
- In accordance with ASME Y14.5M, diameters are equivalent to  $\phi x$  symbology.
- Lead 1 = emitter, lead 2 = base, lead 3 = collector.
- 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)



Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

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- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

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- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



#### Как с нами связаться

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