

## NPN POWER SILICON SWITCHING TRANSISTOR

Qualified per MIL-PRF-19500/560

### DEVICES

2N5339      2N5339U3

### LEVELS

JAN  
JANTX  
JANTXV  
JANS

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

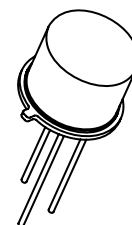
| Parameters / Test Conditions                                                                                                                                           | Symbol            | Value             | Unit               |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-------------------|--------------------|
| Collector-Emitter Voltage                                                                                                                                              | $V_{CEO}$         | 100               | Vdc                |
| Collector-Base Voltage                                                                                                                                                 | $V_{CBO}$         | 100               | Vdc                |
| Emitter-Base Voltage                                                                                                                                                   | $V_{EBO}$         | 6.0               | Vdc                |
| Base Current                                                                                                                                                           | $I_B$             | 1.0               | Adc                |
| Collector Current                                                                                                                                                      | $I_C$             | 5.0               | Adc                |
| Total Power Dissipation<br>@ $T_A = +25^\circ\text{C}$ <sup>(1)</sup><br>@ $T_C = +25^\circ\text{C}$ <sup>(2)</sup><br>@ $T_C = +25^\circ\text{C}$ <sup>(3)</sup> – U3 | $P_T$             | 1.0<br>17.5<br>75 | W                  |
| Operating & Storage Junction Temperature Range                                                                                                                         | $T_{op}, T_{stg}$ | -65 to +200       | $^\circ\text{C}$   |
| Thermal Resistance, Junction-to Air                                                                                                                                    | $R_{\theta JA}$   | 175               | $^\circ\text{C/W}$ |

### NOTES:

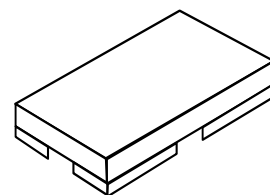
- 1) Derate linearly 5.71mW/ $^\circ\text{C}$  for  $T_A > 25^\circ\text{C}$
- 2) Derate linearly 100mW/ $^\circ\text{C}$  for  $T_C > 25^\circ\text{C}$
- 3) Derate linearly 434mW/ $^\circ\text{C}$  for  $T_C > 25^\circ\text{C} - U3$

### 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 Voltage<br>$I_C = 50\text{mA}$                             | $V_{(BR)CEO}$ | 100  |      | Vdc             |
| Collector-Emitter Cutoff Current<br>$V_{CE} = 100\text{Vdc}$                           | $I_{CEO}$     |      | 100  | $\mu\text{Adc}$ |
| Collector-Emitter Cutoff Current<br>$V_{CE} = 90\text{Vdc}$ , $V_{BE} = 1.5\text{Vdc}$ | $I_{CEX}$     |      | 1.0  | $\mu\text{Adc}$ |
| Collector-Base Cutoff Current<br>$V_{CB} = 100\text{Vdc}$                              | $I_{CBO}$     |      | 1.0  | $\mu\text{Adc}$ |
| Emitter-Base Cutoff Current<br>$V_{EB} = 6.0\text{Vdc}$                                | $I_{EBO}$     |      | 100  | $\mu\text{Adc}$ |



TO-39  
(TO-205AD)



U-3  
(TO-276AA)

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

| Parameters / Test Conditions                                                                                                                                                                                 | Symbol        | Min.           | Max.       | Unit |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|----------------|------------|------|
| <b>ON CHARACTERISTICS <sup>(3)</sup></b>                                                                                                                                                                     |               |                |            |      |
| Forward-Current Transfer Ratio<br>$I_C = 0.5\text{A}_{dc}$ , $V_{CE} = 2.0\text{V}_{dc}$<br>$I_C = 2.0\text{A}_{dc}$ , $V_{CE} = 2.0\text{V}_{dc}$<br>$I_C = 5.0\text{A}_{dc}$ , $V_{CE} = 2.0\text{V}_{dc}$ | $h_{FE}$      | 60<br>60<br>40 | 240        |      |
| Collector-Emitter Saturation Voltage<br>$I_C = 2.0\text{A}_{dc}$ , $I_B = 0.2\text{A}_{dc}$<br>$I_C = 5.0\text{A}_{dc}$ , $I_B = 0.5\text{A}_{dc}$                                                           | $V_{CE(sat)}$ |                | 0.7<br>1.2 | Vdc  |
| Base-Emitter Saturation Voltage<br>$I_C = 2.0\text{A}_{dc}$ , $I_B = 0.2\text{A}_{dc}$<br>$I_C = 5.0\text{A}_{dc}$ , $I_B = 0.5\text{A}_{dc}$                                                                | $V_{BE(sat)}$ |                | 1.2<br>1.8 | Vdc  |

## DYNAMIC CHARACTERISTICS

| Parameters / Test Conditions                                                                                                                                           | Symbol     | Min. | Max.  | Unit |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|------|-------|------|
| Magnitude of Common Emitter Small-Signal Short-Circuit<br>Forward Current Transfer Ratio<br>$I_C = 0.5\text{A}_{dc}$ , $V_{CE} = 10\text{V}_{dc}$ , $f = 10\text{MHz}$ | $ h_{fe} $ | 3.0  | 15    |      |
| Output Capacitance<br>$V_{CB} = 10\text{V}_{dc}$ , $I_E = 0$ , $100\text{kHz} \leq f \leq 1.0\text{MHz}$                                                               | $C_{obo}$  |      | 250   | pF   |
| Input Capacitance<br>$V_{BE} = 2.0\text{V}_{dc}$ , $I_C = 0$ , $100\text{kHz} \leq f \leq 1.0\text{MHz}$                                                               | $C_{ibo}$  |      | 1,000 | pF   |

## SAFE OPERATING AREA

### DC Tests

$T_C = +25^\circ\text{C}$ , 1 Cycle,  $t \geq 0.5\text{s}$

#### Test 1

$V_{CE} = 2.0\text{V}_{dc}$ ,  $I_C = 5.0\text{A}_{dc}$

#### Test 2

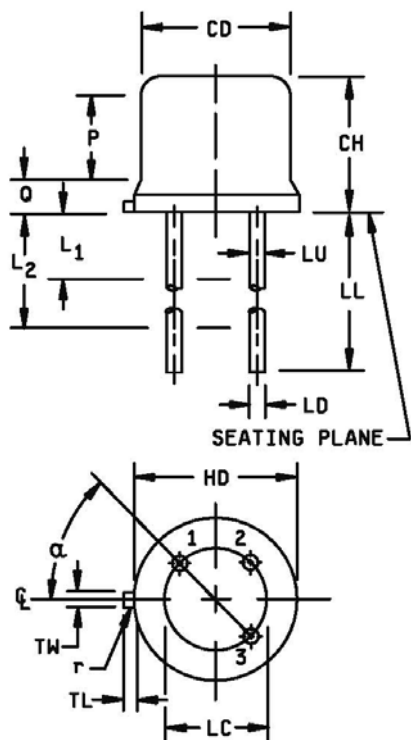
$V_{CE} = 5.0\text{V}_{dc}$ ,  $I_C = 2.0\text{A}_{dc}$

#### Test 3

$V_{CE} = 90\text{V}_{dc}$ ,  $I_C = 55\text{mA}_{dc}$

(3) Pulse Test: Pulse Width =  $300\mu\text{s}$ , Duty Cycle  $\leq 2.0\%$

## PACKAGE DIMENSIONS



| Symbol         | Dimensions |      |             |       | Note   |
|----------------|------------|------|-------------|-------|--------|
|                | Inches     |      | Millimeters |       |        |
|                | Min        | Max  | Min         | Max   |        |
| CD             | .305       | .355 | 7.75        | 9.02  | 5      |
| CH             | .240       | .260 | 6.10        | 6.60  |        |
| HD             | .335       | .370 | 8.51        | 9.40  | 3      |
| LC             | .200 TP    |      | 5.08 TP     |       | 6      |
| LD             | .016       | .021 | 0.41        | 0.53  | 7      |
| LL             | .500       | .750 | 12.70       | 19.05 | 7      |
| LU             | .016       | .019 | 0.41        | 0.48  | 7      |
| L <sub>1</sub> |            | .050 |             | 1.27  | 7      |
| L <sub>2</sub> | .250       |      | 6.35        |       | 7      |
| TL             | .029       | .045 | 0.74        | 1.14  | 3      |
| TW             | .028       | .034 | 0.71        | 0.86  | 10     |
| P              | .100       |      | 2.54        |       | 5      |
| Q              |            | .050 |             | 1.27  | 4      |
| r              |            | .010 |             | 0.25  | 10, 11 |
| α              | 45° TP     |      | 45° TP      |       | 6      |
| Notes          | 1, 2, 8, 9 |      | 1, 2, 8, 9  |       |        |

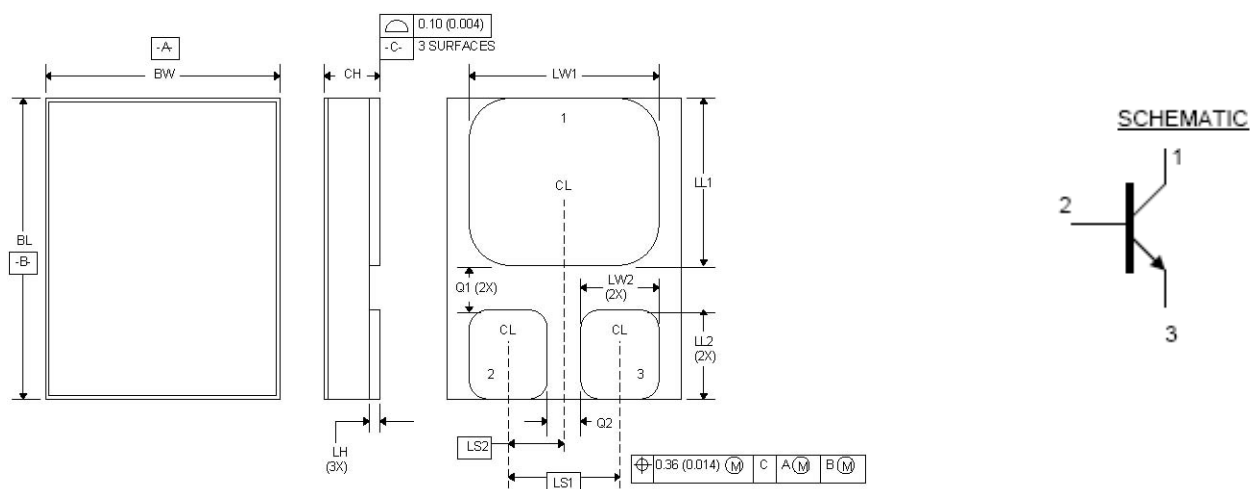
### NOTES:

- Dimensions are in inches.
- Millimeters are given for general information only.
- Symbol TL is measured from HD maximum.
- Details of outline in this zone are optional.
- Symbol CD shall not vary more than .010 (0.25 mm) in zone P. This zone is controlled for automatic handling.
- Leads at gauge plane .054 inch (1.37 mm) +.001 inch (0.03 mm) -.000 inch (0.00 mm) below seating plane shall be within .007 inch (0.18 mm) radius of true position (TP) relative to tab. Device may be measured by direct methods or by gauge.
- Symbol LD applies between L<sub>1</sub> and L<sub>2</sub>. Dimension LD applies between L<sub>2</sub> and LL minimum.
- Lead designation, depending on device type, shall be as follows:

| Lead number | TO-39     |
|-------------|-----------|
| 1           | Emitter   |
| 2           | Base      |
| 3           | Collector |

- Lead number three is electrically connected to case.
- Beyond r maximum, TW shall be held for a minimum length of .011 inch (0.28 mm).
- Symbol r applied to both inside corners of tab.
- In accordance with ASME Y14.5M, diameters are equivalent to øx symbology.

**FIGURE 1.** Physical dimensions (TO-39)



## NOTES:

1. Dimensions are in inches.
2. Millimeters are given for general information only.
3. In accordance with ASME Y14.5M, diameters are equivalent to  $\phi x$  symbology.
4. Terminal 1 - collector, terminal 2 - base, terminal 3 - emitter.

| Ltr             | Dimensions |       |             |       |
|-----------------|------------|-------|-------------|-------|
|                 | Inches     |       | Millimeters |       |
|                 | Min        | Max   | Min         | Max   |
| BL              | .395       | .405  | 10.03       | 10.29 |
| BW              | .291       | .301  | 7.40        | 7.65  |
| CH              | .1085      | .1205 | 2.76        | 3.06  |
| LH              | .010       | .020  | 0.25        | 0.51  |
| LW <sub>1</sub> | .281       | .291  | 7.14        | 7.39  |
| LW <sub>2</sub> | .090       | .100  | 2.29        | 2.54  |
| LL <sub>1</sub> | .220       | .230  | 5.59        | 5.84  |
| LL <sub>2</sub> | .115       | .125  | 2.92        | 3.18  |
| LS <sub>1</sub> | .150 BSC   |       | 3.81 BSC    |       |
| LS <sub>2</sub> | .075 BSC   |       | 1.91 BSC    |       |
| Q <sub>1</sub>  | .030       |       | 0.762       |       |
| Q <sub>2</sub>  | .030       |       | 0.762       |       |

**FIGURE 2.** Physical dimensions and configuration (U3) (SMD 5) (TO-276AA)



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

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- 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.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- 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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