

# MPSA27

## Darlington Transistor

### NPN Silicon

#### Features

- Pb-Free Packages are Available\*

#### MAXIMUM RATINGS

| Rating   | Symbol         | Value       | Unit        |
|--|----------------|-------------|-------------|
| Collector–Emitter Voltage  | $V_{CES}$      | 60          | Vdc         |
| Emitter–Base Voltage   | $V_{EBO}$      | 10          | Vdc         |
| Collector Current – Continuous   | $I_C$          | 500         | mAdc        |
| Total Device Dissipation @ $T_A = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$ | $P_D$          | 625<br>5.0  | mW<br>mW/°C |
| Operating and Storage Junction<br>Temperature Range                                    | $T_J, T_{stg}$ | -55 to +150 | °C          |

#### THERMAL CHARACTERISTICS

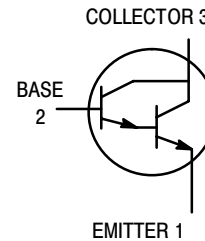
| Characteristic                          | Symbol          | Max | Unit |
|---|-----------------|-----|------|
| Thermal Resistance, Junction–to–Ambient | $R_{\theta JA}$ | 200 | °C/W |

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

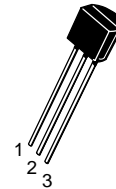


ON Semiconductor®

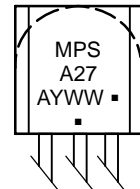
<http://onsemi.com>



#### MARKING DIAGRAM



TO-92  
CASE 29-11  
STYLE 1



MPSA27 = Device Code  
A = Assembly Location  
Y = Year  
WW = Work Week  
▪ = Pb-Free Package

(Note: Microdot may be in either location)

#### ORDERING INFORMATION

| Device      | Package            | Shipping†        |
|-------------|--------------------|------------------|
| MPSA27      | TO-92              | 5000 Units/Box   |
| MPSA27G     | TO-92<br>(Pb-Free) | 5000 Units/Box   |
| MPSA27RLRA  | TO-92              | 2000/Tape & Reel |
| MPSA27RLRAG | TO-92<br>(Pb-Free) | 2000/Tape & Reel |
| MPSA27RLRM  | TO-92              | 2000/Ammo Pack   |
| MPSA27RLRMG | TO-92<br>(Pb-Free) | 2000/Ammo Pack   |

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

\*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

# MPSA27

## ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C unless otherwise noted)

| Characteristic  | Symbol               | Min              | Typ    | Max    | Unit |
|---|----------------------|------------------|--------|--------|------|
| <b>OFF CHARACTERISTICS</b>  |                      |                  |        |        |      |
| Collector – Emitter Breakdown Voltage<br>(I <sub>C</sub> = 100 μAdc, V <sub>BE</sub> = 0)   | V <sub>(BR)CES</sub> | 60               | –      | –      | Vdc  |
| Collector – Base Breakdown Voltage<br>(I <sub>C</sub> = 100 μAdc, I <sub>E</sub> = 0)   | V <sub>(BR)CBO</sub> | 60               | –      | –      | Vdc  |
| Collector Cutoff Current<br>(V <sub>CB</sub> = 30 V, I <sub>E</sub> = 0)<br>(V <sub>CB</sub> = 40 V, I <sub>E</sub> = 0)<br>(V <sub>CB</sub> = 50 V, I <sub>E</sub> = 0)    | I <sub>CBO</sub>     | –                | –      | 100    | nAdc |
| Collector Cutoff Current<br>(V <sub>CE</sub> = 30 V, V <sub>BE</sub> = 0)<br>(V <sub>CE</sub> = 40 V, V <sub>BE</sub> = 0)<br>(V <sub>CE</sub> = 50 V, V <sub>BE</sub> = 0) | I <sub>CES</sub>     | –                | –      | 500    | nAdc |
| Emitter Cutoff Current<br>(V <sub>EB</sub> = 10 Vdc)  | I <sub>EBO</sub>     | –                | –      | 100    | nAdc |
| <b>ON CHARACTERISTICS (Note 1)</b>  |                      |                  |        |        |      |
| DC Current Gain<br>(I <sub>C</sub> = 10 mA, V <sub>CE</sub> = 5.0 V)<br>(I <sub>C</sub> = 100 mA, V <sub>CE</sub> = 5.0 V)  | h <sub>FE</sub>      | 10,000<br>10,000 | –<br>– | –<br>– | –    |
| Collector – Emitter Saturation Voltage<br>(I <sub>C</sub> = 100 mA, I <sub>B</sub> = 0.1 mAdc)  | V <sub>CE(sat)</sub> | –                | –      | 1.5    | Vdc  |
| Base – Emitter On Voltage<br>(I <sub>C</sub> = 100 mA, V <sub>CE</sub> = 5.0 Vdc)   | V <sub>BE(on)</sub>  | –                | –      | 2.0    | Vdc  |
| <b>SMALL-SIGNAL CHARACTERISTICS</b>   |                      |                  |        |        |      |
| Small Signal Current Gain<br>(I <sub>C</sub> = 10 mA, V <sub>CE</sub> = 5.0 V, f = 100 MHz)   | h <sub>fe</sub>      | 1.25             | 2.4    | –      | –    |

1. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%.

# MPSA27

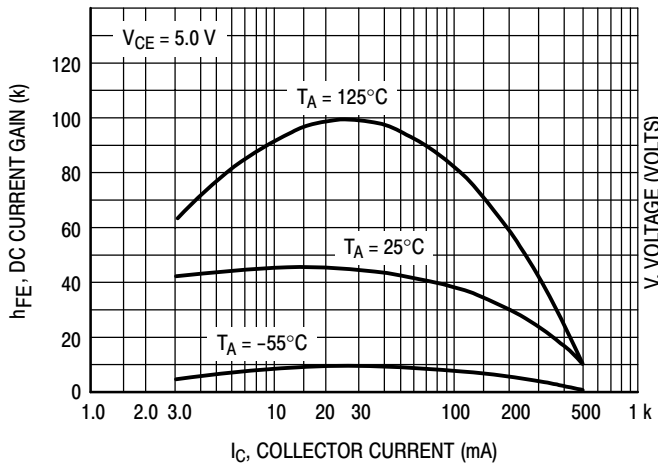


Figure 1. DC Current Gain

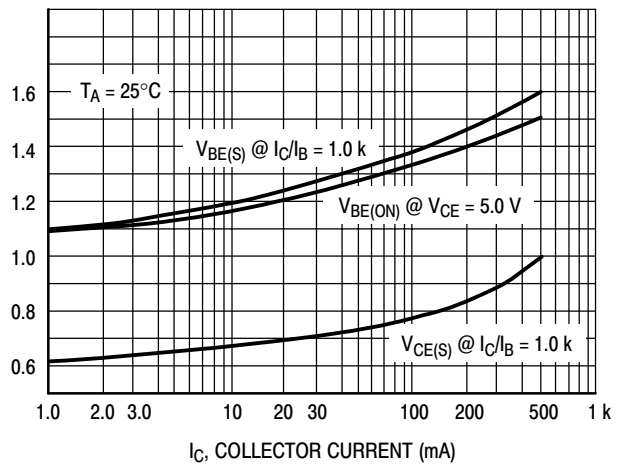


Figure 2. "ON" Voltages

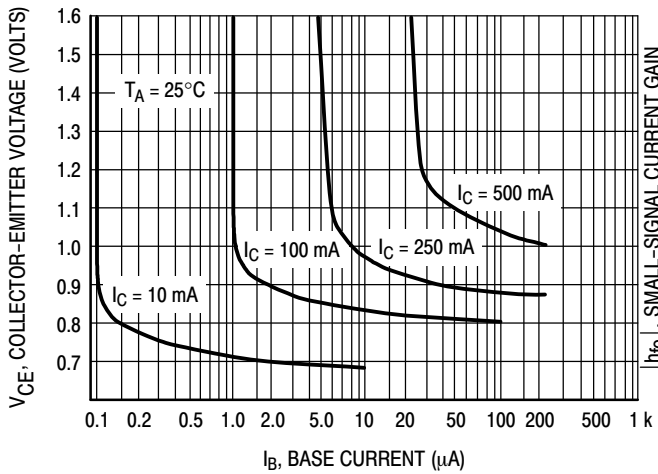


Figure 3. Collector Saturation Region

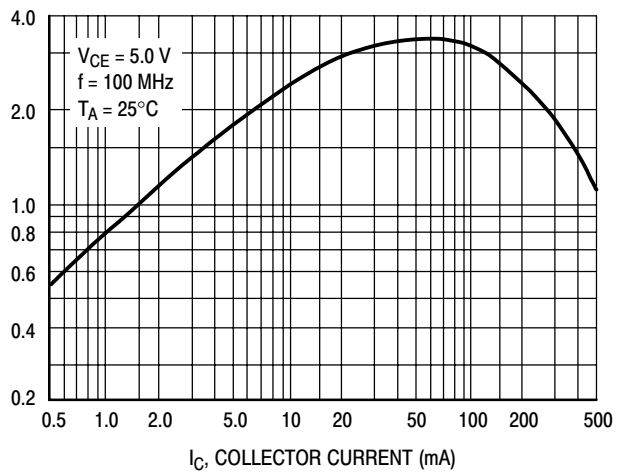


Figure 4. High Frequency Current Gain

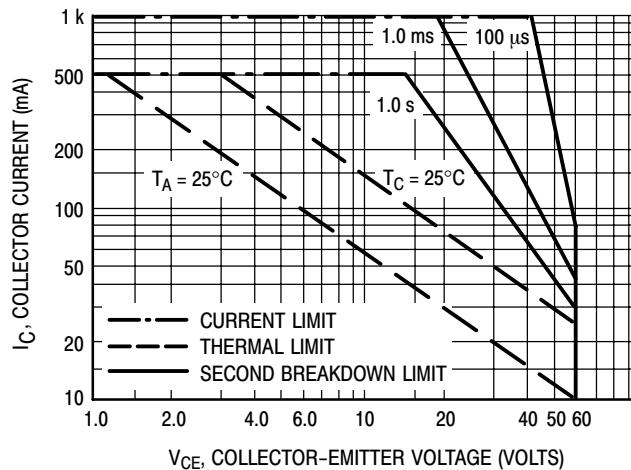
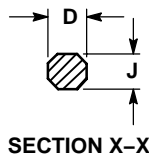
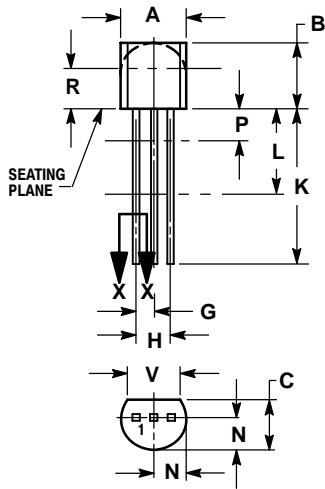


Figure 5. Active Region - Safe Operating Area

# MPSA27

## PACKAGE DIMENSIONS

TO-92 (TO-226)  
CASE 29-11  
ISSUE AL



### NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. CONTOUR OF PACKAGE BEYOND DIMENSION R IS UNCONTROLLED.
4. LEAD DIMENSION IS UNCONTROLLED IN P AND BEYOND DIMENSION K MINIMUM.

| DIM | INCHES |       | MILLIMETERS |       |
|-----|--------|-------|-------------|-------|
|     | MIN    | MAX   | MIN         | MAX   |
| A   | 0.175  | 0.205 | 4.45        | 5.20  |
| B   | 0.170  | 0.210 | 4.32        | 5.33  |
| C   | 0.125  | 0.165 | 3.18        | 4.19  |
| D   | 0.016  | 0.021 | 0.407       | 0.533 |
| G   | 0.045  | 0.055 | 1.15        | 1.39  |
| H   | 0.095  | 0.105 | 2.42        | 2.66  |
| J   | 0.015  | 0.020 | 0.39        | 0.50  |
| K   | 0.500  | ---   | 12.70       | ---   |
| L   | 0.250  | ---   | 6.35        | ---   |
| N   | 0.080  | 0.105 | 2.04        | 2.66  |
| P   | ---    | 0.100 | ---         | 2.54  |
| R   | 0.115  | ---   | 2.93        | ---   |
| V   | 0.135  | ---   | 3.43        | ---   |

### STYLE 1:

1. PIN 1. EMITTER
2. BASE
3. COLLECTOR

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**MPSA27/D**