

# MPSA42, MPSA43

MPSA42 is a Preferred Device

## High Voltage Transistors

### NPN Silicon

#### Features

- Pb-Free Packages are Available\*

#### MAXIMUM RATINGS

| Rating  | Symbol         | Value          | Unit                 |
|---|----------------|----------------|----------------------|
| Collector–Emitter Voltage   | $V_{CE0}$      | 200            | Vdc                  |
|   |                | 300            |                      |
| Collector–Base Voltage  | $V_{CBO}$      | 200            | Vdc                  |
|   |                | 300            |                      |
| Emitter–Base Voltage  | $V_{EBO}$      | 6.0            | Vdc                  |
| Collector Current – Continuous  | $I_C$          | 500            | mAdc                 |
| Total Device Dissipation<br>@ $T_A = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$ | $P_D$          | 625            | mW                   |
|   |                | 5.0            | mW/ $^\circ\text{C}$ |
| Total Device Dissipation<br>@ $T_C = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$ | $P_D$          | 1.5            | W                    |
|   |                | 12             | mW/ $^\circ\text{C}$ |
| Operating and Storage Junction<br>Temperature Range                                       | $T_J, T_{stg}$ | –55 to<br>+150 | $^\circ\text{C}$     |

#### THERMAL CHARACTERISTICS

| Characteristic                             | Symbol          | Max  | Unit                       |
|--|-----------------|------|----------------------------|
| Thermal Resistance,<br>Junction–to–Ambient | $R_{\theta JA}$ | 200  | $^\circ\text{C}/\text{mW}$ |
| Thermal Resistance,<br>Junction–to–Case    | $R_{\theta JC}$ | 83.3 | $^\circ\text{C}/\text{mW}$ |

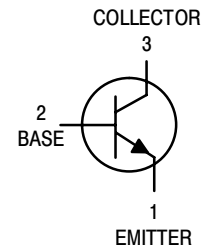
Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur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

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

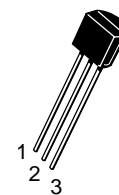


ON Semiconductor®

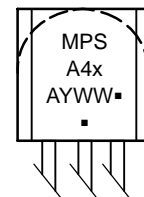
<http://onsemi.com>



#### MARKING DIAGRAM



TO-92  
(TO-226AA)  
CASE 29-11



x = 2 or 3  
A = Assembly Location  
Y = Year  
WW = Work Week  
▪ = Pb-Free Package  
(Note: Microdot may be in either location)

#### ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 3 of this data sheet.

**Preferred** devices are recommended choices for future use and best overall value.

# MPSA42, MPSA43

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

| Characteristic   |                  | Symbol               | Min            | Max         | Unit             |
|--|------------------|----------------------|----------------|-------------|------------------|
| <b>OFF CHARACTERISTICS</b>   |                  |                      |                |             |                  |
| Collector–Emitter Breakdown Voltage (Note 1)<br>(I <sub>C</sub> = 1.0 mA <sub>dc</sub> , I <sub>B</sub> = 0)   | MPSA42<br>MPSA43 | V <sub>(BR)CEO</sub> | 300<br>200     | –<br>–      | V <sub>dc</sub>  |
| Collector–Base Breakdown Voltage<br>(I <sub>C</sub> = 100 μA <sub>dc</sub> , I <sub>E</sub> = 0)   | MPSA42<br>MPSA43 | V <sub>(BR)CBO</sub> | 300<br>200     | –<br>–      | V <sub>dc</sub>  |
| Emitter–Base Breakdown Voltage<br>(I <sub>E</sub> = 100 μA <sub>dc</sub> , I <sub>C</sub> = 0)   |                  | V <sub>(BR)EBO</sub> | 6.0            | –           | V <sub>dc</sub>  |
| Collector Cutoff Current<br>(V <sub>CB</sub> = 200 V <sub>dc</sub> , I <sub>E</sub> = 0)<br>(V <sub>CB</sub> = 160 V <sub>dc</sub> , I <sub>E</sub> = 0)   | MPSA42<br>MPSA43 | I <sub>CBO</sub>     | –<br>–         | 0.1<br>0.1  | μA <sub>dc</sub> |
| Emitter Cutoff Current<br>(V <sub>EB</sub> = 6.0 V <sub>dc</sub> , I <sub>C</sub> = 0)<br>(V <sub>EB</sub> = 4.0 V <sub>dc</sub> , I <sub>C</sub> = 0)   | MPSA42<br>MPSA43 | I <sub>EBO</sub>     | –<br>–         | 0.1<br>0.1  | μA <sub>dc</sub> |
| <b>ON CHARACTERISTICS (Note 1)</b>   |                  |                      |                |             |                  |
| DC Current Gain<br>(I <sub>C</sub> = 1.0 mA <sub>dc</sub> , V <sub>CE</sub> = 10 V <sub>dc</sub> )<br>(I <sub>C</sub> = 10 mA <sub>dc</sub> , V <sub>CE</sub> = 10 V <sub>dc</sub> )<br>(I <sub>C</sub> = 30 mA <sub>dc</sub> , V <sub>CE</sub> = 10 V <sub>dc</sub> ) |                  | h <sub>FE</sub>      | 25<br>40<br>40 | –<br>–<br>– | –                |
| Collector–Emitter Saturation Voltage<br>(I <sub>C</sub> = 20 mA <sub>dc</sub> , I <sub>B</sub> = 2.0 mA <sub>dc</sub> )  | MPSA42<br>MPSA43 | V <sub>CE(sat)</sub> | –<br>–         | 0.5<br>0.4  | V <sub>dc</sub>  |
| Base–Emitter Saturation Voltage<br>(I <sub>C</sub> = 20 mA <sub>dc</sub> , I <sub>B</sub> = 2.0 mA <sub>dc</sub> )   |                  | V <sub>BE(sat)</sub> | –              | 0.9         | V <sub>dc</sub>  |
| <b>SMALL–SIGNAL CHARACTERISTICS</b>  |                  |                      |                |             |                  |
| Current–Gain – Bandwidth Product<br>(I <sub>C</sub> = 10 mA <sub>dc</sub> , V <sub>CE</sub> = 20 V <sub>dc</sub> , f = 100 MHz)  |                  | f <sub>T</sub>       | 50             | –           | MHz              |
| Collector–Base Capacitance<br>(V <sub>CB</sub> = 20 V <sub>dc</sub> , I <sub>E</sub> = 0, f = 1.0 MHz)   | MPSA42<br>MPSA43 | C <sub>cb</sub>      | –<br>–         | 3.0<br>4.0  | pF               |

1. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2%.

## MPSA42, MPSA43

### ORDERING INFORMATION

| Device      | Package            | Shipping†          |
|-------------|--------------------|--------------------|
| MPSA42      | TO-92              | 5000 Units / Box   |
| MPSA42G     | TO-92<br>(Pb-Free) | 5000 Units / Box   |
| MPSA42RL1   | TO-92              | 2000 / Tape & Reel |
| MPSA42RL1G  | TO-92<br>(Pb-Free) | 2000 / Tape & Reel |
| MPSA42RLRA  | TO-92              | 5000 Units / Box   |
| MPSA42RLRAG | TO-92<br>(Pb-Free) | 5000 Units / Box   |
| MPSA42RLRF  | TO-92              | 5000 Units / Box   |
| MPSA42RLRFG | TO-92<br>(Pb-Free) | 5000 Units / Box   |
| MPSA42RLRM  | TO-92              | 2000 / Ammo Pack   |
| MPSA42RLRMG | TO-92<br>(Pb-Free) | 2000 / Ammo Pack   |
| MPSA42RLRP  | TO-92              | 2000 / Ammo Pack   |
| MPSA42RLRPG | TO-92<br>(Pb-Free) | 2000 / Ammo Pack   |
| MPSA42ZL1   | TO-92              | 2000 / Ammo Pack   |
| MPSA42ZL1G  | TO-92<br>(Pb-Free) | 2000 / Ammo Pack   |
| MPSA43      | TO-92              | 5000 Units / Box   |
| MPSA43G     | TO-92<br>(Pb-Free) | 5000 Units / Box   |
| MPSA43RLRA  | TO-92              | 2000 / Tape & Reel |
| MPSA43RLRAG | TO-92<br>(Pb-Free) | 2000 / Tape & Reel |
| MPSA43ZL1   | TO-92              | 2000 / Ammo Pack   |
| MPSA43ZL1G  | 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.

# MPSA42, MPSA43

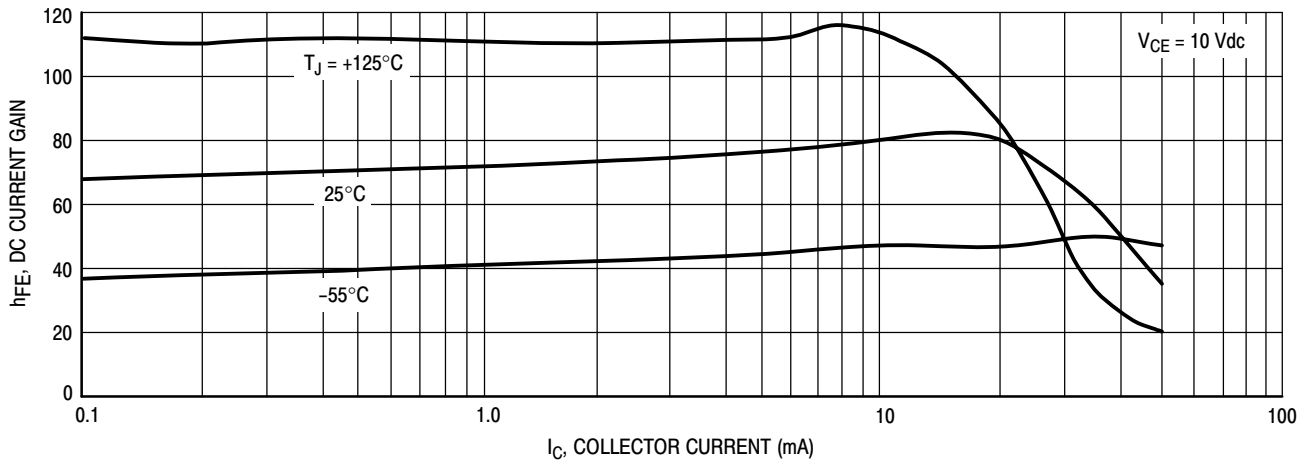


Figure 1. DC Current Gain

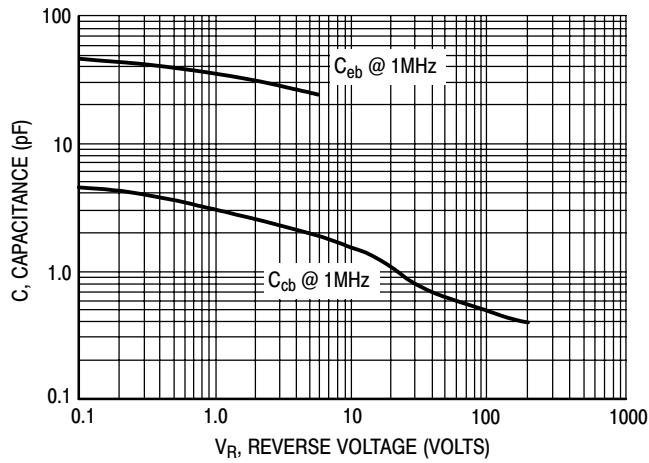


Figure 2. Capacitance

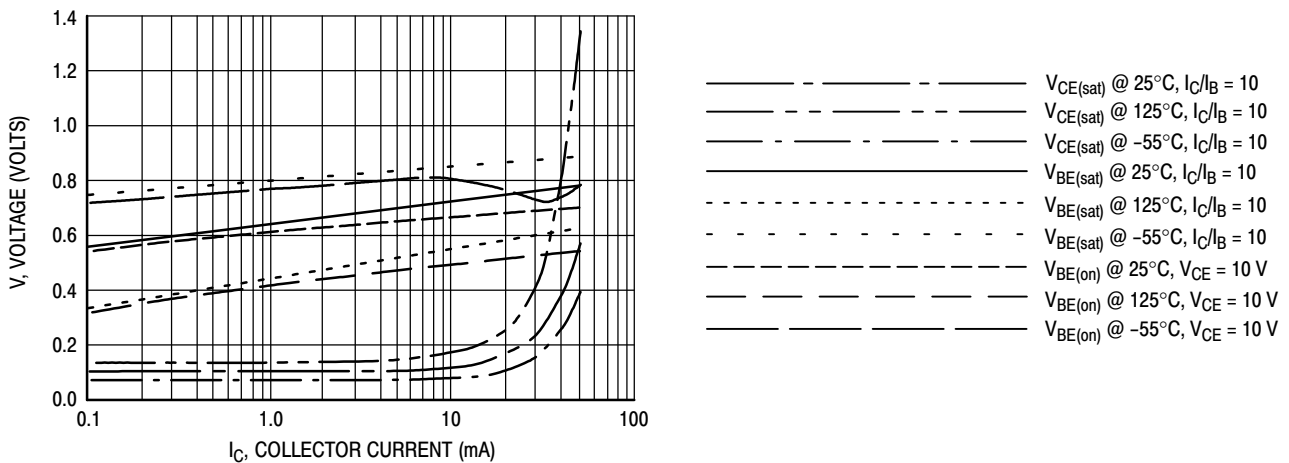
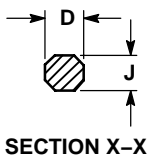
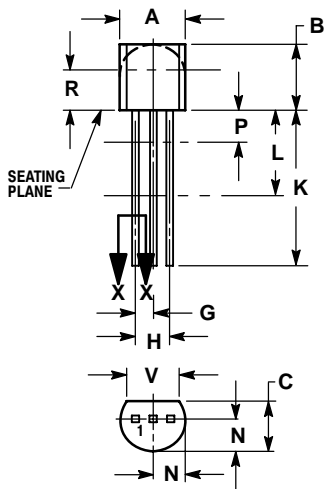


Figure 3. "ON" Voltages

# MPSA42, MPSA43

## PACKAGE DIMENSIONS

TO-92  
TO-226AA  
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:  
PIN 1. EMITTER  
2. BASE  
3. COLLECTOR
- STYLE 14:  
PIN 1. EMITTER  
2. COLLECTOR  
3. BASE

# MPSA42, MPSA43

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