

# MPSA42, MPSA43

## High Voltage Transistors

### NPN Silicon

#### Features

- These are Pb-Free Devices\*

#### MAXIMUM RATINGS

| Rating                                                                                    | Symbol         | Value          | Unit                       |
|-------------------------------------------------------------------------------------------|----------------|----------------|----------------------------|
| Collector–Emitter Voltage<br>MPSA43<br>MPSA42                                             | $V_{CEO}$      | 200<br>300     | Vdc                        |
| Collector–Base Voltage<br>MPSA43<br>MPSA42                                                | $V_{CBO}$      | 200<br>300     | Vdc                        |
| Emitter–Base Voltage                                                                      | $V_{EBO}$      | 6.0            | Vdc                        |
| Collector Current – Continuous                                                            | $I_C$          | 500            | mA <sub>dc</sub>           |
| Total Device Dissipation<br>@ $T_A = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$ | $P_D$          | 625<br>5.0     | mW<br>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<br>12      | W<br>mW/ $^\circ\text{C}$  |
| Operating and Storage Junction<br>Temperature Range                                       | $T_J, T_{stg}$ | –55 to<br>+150 | $^\circ\text{C}$           |

#### THERMAL CHARACTERISTICS

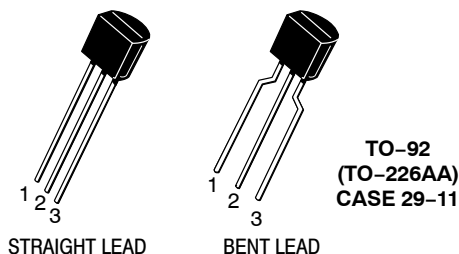
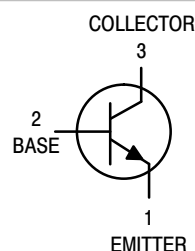
| Characteristic                             | Symbol          | Max  | Unit               |
|--------------------------------------------|-----------------|------|--------------------|
| Thermal Resistance,<br>Junction-to-Ambient | $R_{\theta JA}$ | 200  | $^\circ\text{C/W}$ |
| Thermal Resistance,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

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

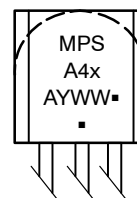


ON Semiconductor®

<http://onsemi.com>



#### MARKING DIAGRAM



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.

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

# MPSA42, MPSA43

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

| Characteristic | Symbol | Min | Max | Unit |
|----------------|--------|-----|-----|------|
|----------------|--------|-----|-----|------|

### OFF CHARACTERISTICS

|                                                                                                                    |                  |               |            |            |               |
|--------------------------------------------------------------------------------------------------------------------|------------------|---------------|------------|------------|---------------|
| Collector–Emitter Breakdown Voltage (Note 1)<br>( $I_C = 1.0\text{ mA}$ , $I_B = 0$ )                              | MPSA42<br>MPSA43 | $V_{(BR)CEO}$ | 300<br>200 | –<br>–     | Vdc           |
| Collector–Base Breakdown Voltage<br>( $I_C = 100\text{ }\mu\text{A}$ , $I_E = 0$ )                                 | MPSA42<br>MPSA43 | $V_{(BR)CBO}$ | 300<br>200 | –<br>–     | Vdc           |
| Emitter–Base Breakdown Voltage<br>( $I_E = 100\text{ }\mu\text{A}$ , $I_C = 0$ )                                   |                  | $V_{(BR)EBO}$ | 6.0        | –          | Vdc           |
| Collector Cutoff Current<br>( $V_{CB} = 200\text{ Vdc}$ , $I_E = 0$ )<br>( $V_{CB} = 160\text{ Vdc}$ , $I_E = 0$ ) | MPSA42<br>MPSA43 | $I_{CBO}$     | –<br>–     | 0.1<br>0.1 | $\mu\text{A}$ |
| Emitter Cutoff Current<br>( $V_{EB} = 6.0\text{ Vdc}$ , $I_C = 0$ )<br>( $V_{EB} = 4.0\text{ Vdc}$ , $I_C = 0$ )   | MPSA42<br>MPSA43 | $I_{EBO}$     | –<br>–     | 0.1<br>0.1 | $\mu\text{A}$ |

### ON CHARACTERISTICS (Note 1)

|                                                                                                                                                                                       |                  |               |                |             |     |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|---------------|----------------|-------------|-----|
| DC Current Gain<br>( $I_C = 1.0\text{ mA}$ , $V_{CE} = 10\text{ Vdc}$ )<br>( $I_C = 10\text{ mA}$ , $V_{CE} = 10\text{ Vdc}$ )<br>( $I_C = 30\text{ mA}$ , $V_{CE} = 10\text{ Vdc}$ ) |                  | $h_{FE}$      | 25<br>40<br>40 | –<br>–<br>– | –   |
| Collector–Emitter Saturation Voltage<br>( $I_C = 20\text{ mA}$ , $I_B = 2.0\text{ mA}$ )                                                                                              | MPSA42<br>MPSA43 | $V_{CE(sat)}$ | –<br>–         | 0.5<br>0.4  | Vdc |
| Base–Emitter Saturation Voltage<br>( $I_C = 20\text{ mA}$ , $I_B = 2.0\text{ mA}$ )                                                                                                   |                  | $V_{BE(sat)}$ | –              | 0.9         | Vdc |

### SMALL–SIGNAL CHARACTERISTICS

|                                                                                                                |                  |          |        |            |     |
|----------------------------------------------------------------------------------------------------------------|------------------|----------|--------|------------|-----|
| Current–Gain – Bandwidth Product<br>( $I_C = 10\text{ mA}$ , $V_{CE} = 20\text{ Vdc}$ , $f = 100\text{ MHz}$ ) |                  | $f_T$    | 50     | –          | MHz |
| Collector–Base Capacitance<br>( $V_{CB} = 20\text{ Vdc}$ , $I_E = 0$ , $f = 1.0\text{ MHz}$ )                  | MPSA42<br>MPSA43 | $C_{cb}$ | –<br>– | 3.0<br>4.0 | pF  |

1. Pulse Test: Pulse Width  $\leq 300\text{ }\mu\text{s}$ , Duty Cycle  $\leq 2\%$ .

## MPSA42, MPSA43

### ORDERING INFORMATION

| Device      | Package            | Shipping <sup>†</sup> |
|-------------|--------------------|-----------------------|
| MPSA42G     | TO-92<br>(Pb-Free) | 5000 Units / Box      |
| MPSA42RL1G  | TO-92<br>(Pb-Free) | 2000 / Tape & Reel    |
| MPSA42RLRAG | TO-92<br>(Pb-Free) | 2000 / Tape & Reel    |
| MPSA42RLRMG | TO-92<br>(Pb-Free) | 2000 / Ammo Pack      |
| MPSA42RLRPG | TO-92<br>(Pb-Free) | 2000 / Ammo Pack      |
| MPSA42ZL1G  | TO-92<br>(Pb-Free) | 2000 / Ammo Pack      |

<sup>†</sup>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

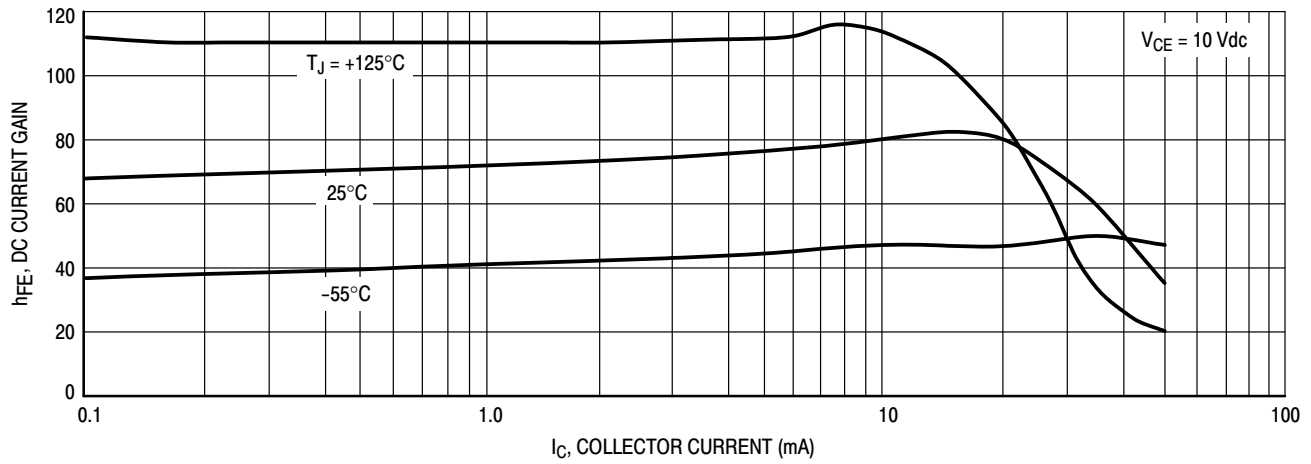


Figure 1. DC Current Gain

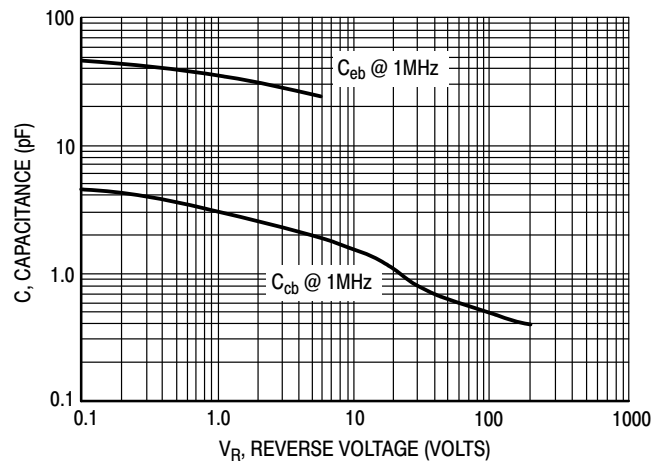


Figure 2. Capacitance

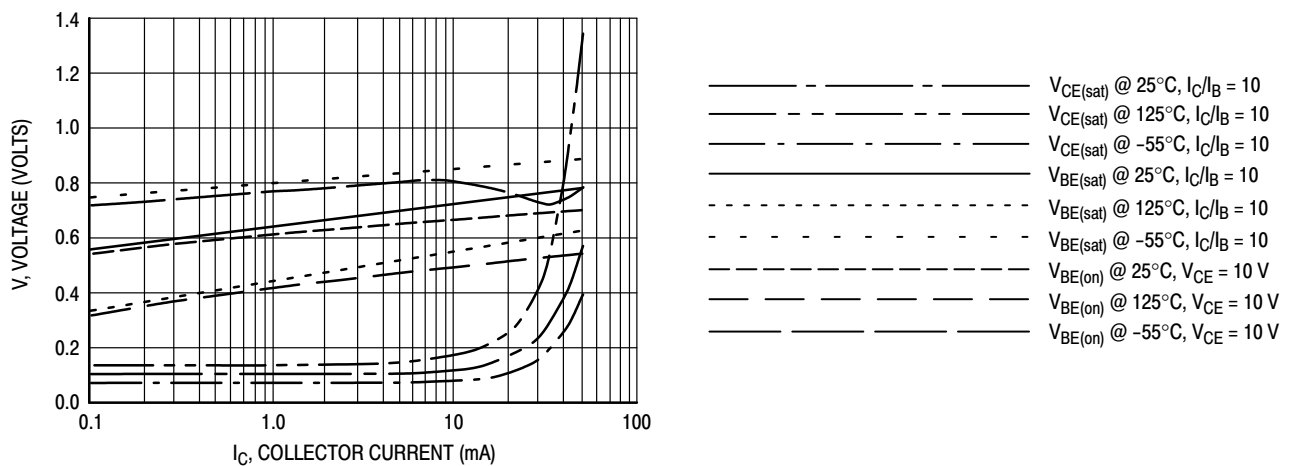
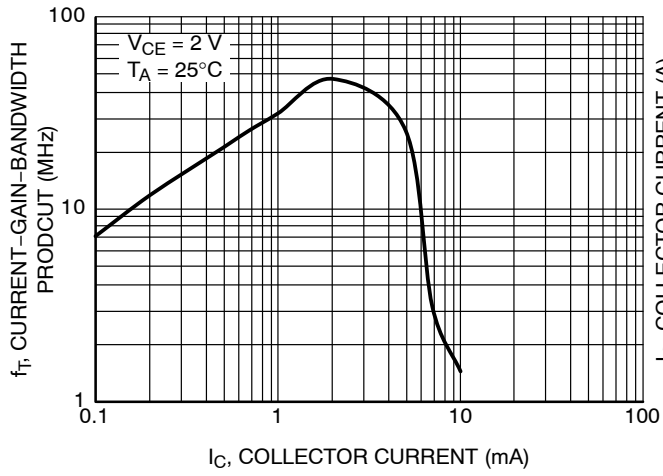
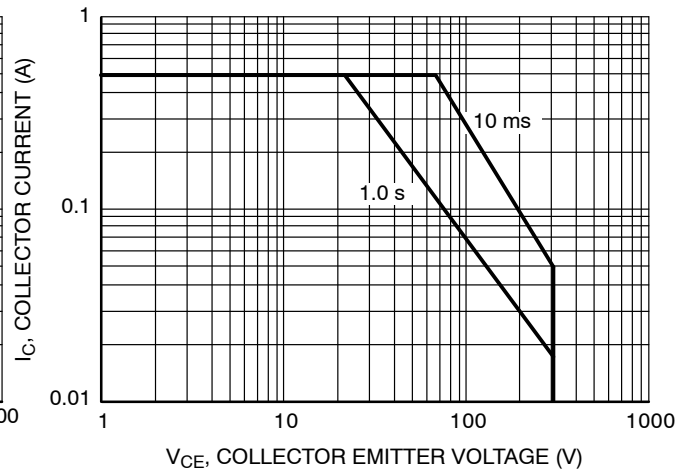


Figure 3. "ON" Voltages

## MPSA42, MPSA43



**Figure 4. Current-Gain-Bandwidth Product**

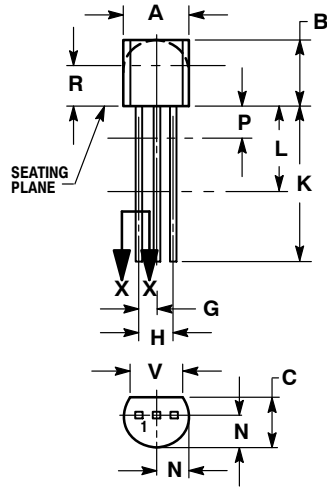


**Figure 5. Safe Operating Area**

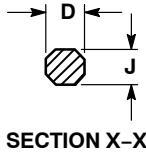
# MPSA42, MPSA43

## PACKAGE DIMENSIONS

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



STRAIGHT LEAD



### 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        | ---   |

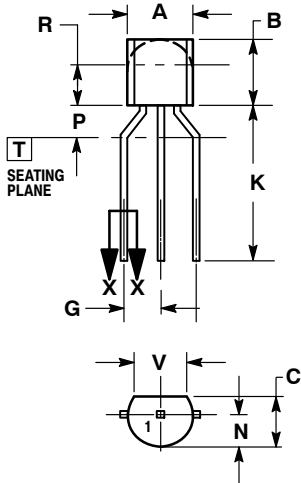
### STYLE 1:

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

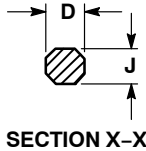
### NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. CONTOUR OF PACKAGE BEYOND DIMENSION R IS UNCONTROLLED.
4. LEAD DIMENSION IS UNCONTROLLED IN P AND BEYOND DIMENSION K MINIMUM.

| DIM | MILLIMETERS |      |
|-----|-------------|------|
|     | MIN         | MAX  |
| A   | 4.45        | 5.20 |
| B   | 4.32        | 5.33 |
| C   | 3.18        | 4.19 |
| D   | 0.40        | 0.54 |
| G   | 2.40        | 2.80 |
| J   | 0.39        | 0.50 |
| K   | 12.70       | ---  |
| N   | 2.04        | 2.66 |
| P   | 1.50        | 4.00 |
| R   | 2.93        | ---  |
| V   | 3.43        | ---  |



BENT LEAD



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