# MPSA42, MPSA43

**MPSA42 is a Preferred Device**

# High Voltage Transistors

## NPN Silicon

## Features

- Pb−Free Packages are Available*

**ON Semiconductor®**

**http://onsemi.com**

COLLECTOR
3

2
BASE

1
EMITTER

**TO−92
(TO−226AA)
CASE 29−11**



STRAIGHT LEAD
BULK PACK

BENT LEAD
TAPE & REEL
AMMO PACK

## MAXIMUM RATINGS

| Rating | Symbol | Value | Unit |
|---|---|---|---|
| Collector−Emitter Voltage MPSA43 MPSA42 | $V_{CEO}$ | 200 300 | Vdc |
| Collector−Base Voltage MPSA43 MPSA42 | $V_{CBO}$ | 200 300 | Vdc |
| Emitter−Base Voltage | $V_{EBO}$ | 6.0 | Vdc |
| Collector Current − Continuous | $I_C$ | 50 | mAdc |
| Total Device Dissipation @ $T_A = 25°C$ Derate above 25°C | $P_D$ | 625 5.0 | mW mW/°C |
| Total Device Dissipation @ $T_C = 25°C$ Derate above 25°C | $P_D$ | 1.5 12 | W mW/°C |
| Operating and Storage Junction Temperature Range | $T_J$, $T_{stg}$ | −55 to +150 | °C |

## THERMAL CHARACTERISTICS

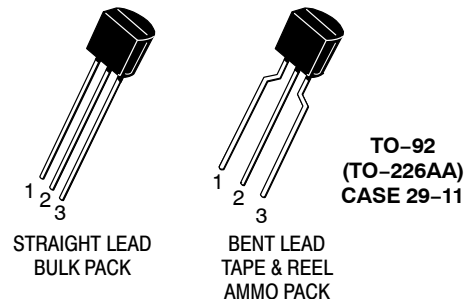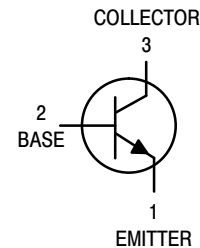| Characteristic | Symbol | Max | Unit |
|---|---|---|---|
| Thermal Resistance, Junction−to−Ambient | $R_{\theta JA}$ | 200 | °C/mW |
| Thermal Resistance, Junction−to−Case | $R_{\theta JC}$ | 83.3 | °C/mW |

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.

## MARKING DIAGRAM

MPS
A4x
AYWW■

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.

*For additional information on our Pb−Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.
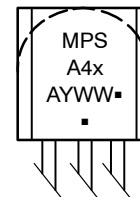
**March, 2009 − Rev. 4**

**1**

# MPSA42, MPSA43

**ELECTRICAL CHARACTERISTICS** ($T_A$ = 25°C unless otherwise noted)

| Characteristic | | Symbol | Min | Max | Unit |
|---|---|---|---|---|---|
| **OFF CHARACTERISTICS** | | | | | |
| Collector – Emitter Breakdown Voltage (Note 1)<br>($I_C$ = 1.0 mAdc, $I_B$ = 0)     MPSA42<br>MPSA43 | | $V_{(BR)CEO}$ | 300<br>200 | –<br>– | Vdc |
| Collector – Base Breakdown Voltage<br>($I_C$ = 100 μAdc, $I_E$ = 0)     MPSA42<br>MPSA43 | | $V_{(BR)CBO}$ | 300<br>200 | –<br>– | Vdc |
| Emitter – Base Breakdown Voltage<br>($I_E$ = 100 μAdc, $I_C$ = 0) | | $V_{(BR)EBO}$ | 6.0 | – | Vdc |
| Collector Cutoff Current<br>($V_{CB}$ = 200 Vdc, $I_E$ = 0)     MPSA42<br>($V_{CB}$ = 160 Vdc, $I_E$ = 0)     MPSA43 | | $I_{CBO}$ | –<br>– | 0.1<br>0.1 | μAdc |
| Emitter Cutoff Current<br>($V_{EB}$ = 6.0 Vdc, $I_C$ = 0)     MPSA42<br>($V_{EB}$ = 4.0 Vdc, $I_C$ = 0)     MPSA43 | | $I_{EBO}$ | –<br>– | 0.1<br>0.1 | μAdc |
| **ON CHARACTERISTICS** (Note 1) | | | | | |
| DC Current Gain<br>($I_C$ = 1.0 mAdc, $V_{CE}$ = 10 Vdc)<br>($I_C$ = 10 mAdc, $V_{CE}$ = 10 Vdc)<br>($I_C$ = 30 mAdc, $V_{CE}$ = 10 Vdc) | | $h_{FE}$ | 25<br>40<br>40 | –<br>–<br>– | – |
| Collector – Emitter Saturation Voltage<br>($I_C$ = 20 mAdc, $I_B$ = 2.0 mAdc)     MPSA42<br>MPSA43 | | $V_{CE(sat)}$ | –<br>– | 0.5<br>0.4 | Vdc |
| Base–Emitter Saturation Voltage<br>($I_C$ = 20 mAdc, $I_B$ = 2.0 mAdc) | | $V_{BE(sat)}$ | – | 0.9 | Vdc |
| **SMALL–SIGNAL CHARACTERISTICS** | | | | | |
| Current – Gain – Bandwidth Product<br>($I_C$ = 10 mAdc, $V_{CE}$ = 20 Vdc, f = 100 MHz) | | $f_T$ | 50 | – | MHz |
| Collector–Base Capacitance<br>($V_{CB}$ = 20 Vdc, $I_E$ = 0, f = 1.0 MHz)     MPSA42<br>MPSA43 | | $C_{cb}$ | –<br>– | 3.0<br>4.0 | pF |

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

**ORDERING INFORMATION**

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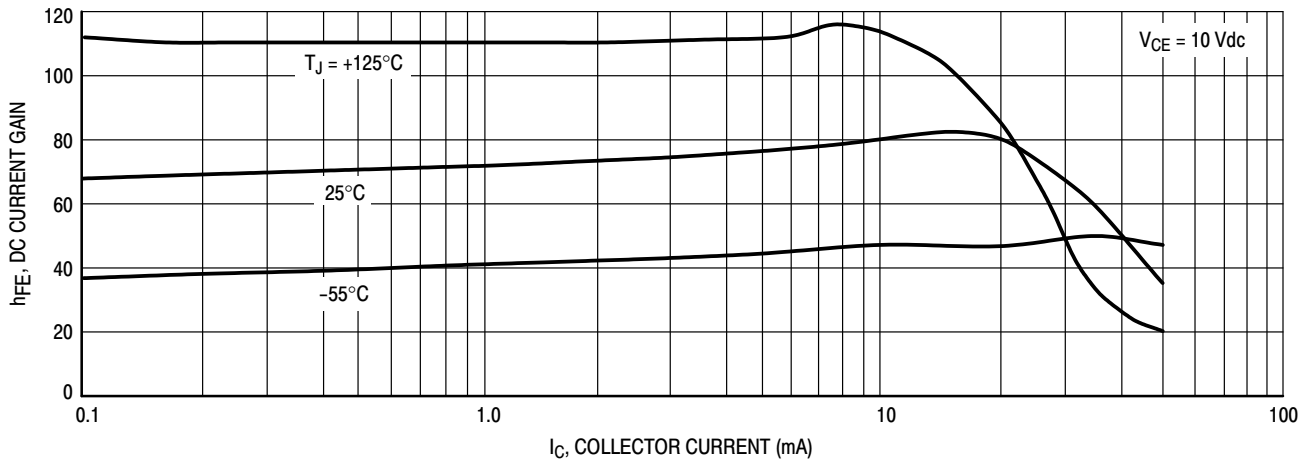


**Figure 1. DC Current Gain**
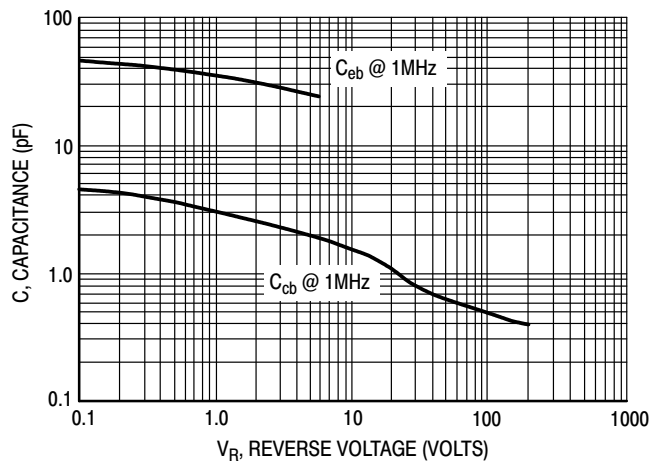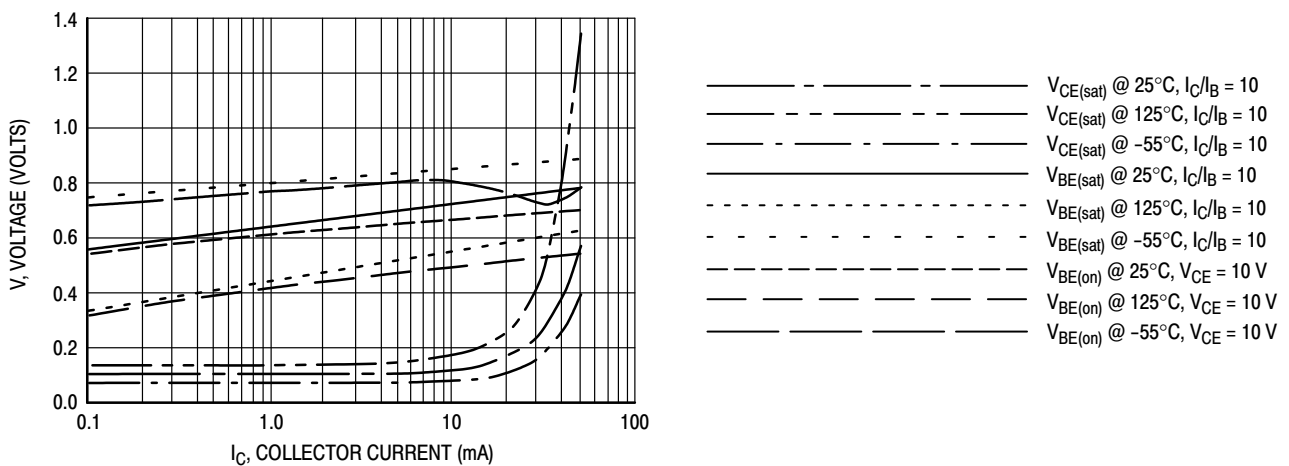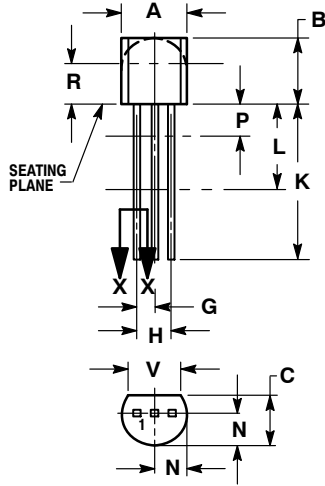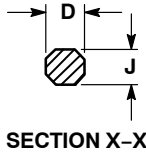


**Figure 2. Capacitance**



**Figure 3. "ON" Voltages**

$V_{CE(sat)}$ @ 25°C, $I_C/I_B$ = 10
$V_{CE(sat)}$ @ 125°C, $I_C/I_B$ = 10
$V_{CE(sat)}$ @ −55°C, $I_C/I_B$ = 10
$V_{BE(sat)}$ @ 25°C, $I_C/I_B$ = 10
$V_{BE(sat)}$ @ 125°C, $I_C/I_B$ = 10
$V_{BE(sat)}$ @ −55°C, $I_C/I_B$ = 10
$V_{BE(on)}$ @ 25°C, $V_{CE}$ = 10 V
$V_{BE(on)}$ @ 125°C, $V_{CE}$ = 10 V
$V_{BE(on)}$ @ −55°C, $V_{CE}$ = 10 V

## PACKAGE DIMENSIONS

### TO−92 (TO−226)
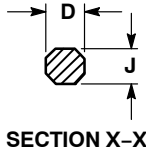CASE 29−11
ISSUE AM

STRAIGHT LEAD
BULK PACK

SECTION X−X

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

BENT LEAD
TAPE & REEL
AMMO PACK

SECTION X−X

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   | ---    |