

# MPSW42

## One Watt High Voltage Transistor

### NPN Silicon

#### Features

- Pb-Free Packages are Available\*

#### MAXIMUM RATINGS

| Rating   | Symbol         | Value       | Unit                      |
|--|----------------|-------------|---------------------------|
| Collector - Emitter Voltage  | $V_{CEO}$      | 300         | Vdc                       |
| Collector - Base Voltage   | $V_{CBO}$      | 300         | Vdc                       |
| Emitter - Base Voltage   | $V_{EBO}$      | 6.0         | Vdc                       |
| Collector Current - Continuous   | $I_C$          | 500         | mAdc                      |
| Total Device Dissipation @ $T_A = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$ | $P_D$          | 1.0<br>8.0  | W<br>mW/ $^\circ\text{C}$ |
| Total Device Dissipation @ $T_C = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$ | $P_D$          | 2.5<br>20   | W<br>mW/ $^\circ\text{C}$ |
| Operating and Storage Junction Temperature Range                                       | $T_J, T_{stg}$ | -55 to +150 | $^\circ\text{C}$          |

#### THERMAL CHARACTERISTICS

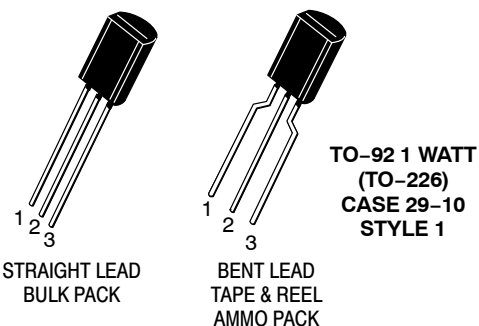
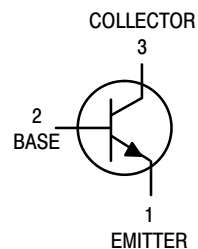
| Characteristic                          | Symbol          | Max | Unit                      |
|---|-----------------|-----|---------------------------|
| Thermal Resistance, Junction-to-Ambient | $R_{\theta JA}$ | 125 | $^\circ\text{C}/\text{W}$ |
| Thermal Resistance, Junction-to-Case    | $R_{\theta JC}$ | 50  | $^\circ\text{C}/\text{W}$ |

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.

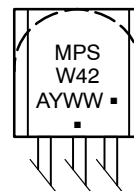


ON Semiconductor®

<http://onsemi.com>



#### MARKING DIAGRAM



MPSW42 = 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†        |
|-------------|--------------------|------------------|
| MPSW42      | TO-92              | 5000 Units/Box   |
| MPSW42G     | TO-92<br>(Pb-Free) | 5000 Units/Box   |
| MPSW42RLRA  | TO-92              | 2000/Tape & Reel |
| MPSW42RLRAG | TO-92<br>(Pb-Free) | 2000/Tape & Reel |

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

†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.

# MPSW42

## 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)   | V <sub>(BR)CEO</sub> | 300            | –           | V <sub>dc</sub>  |
| Collector–Base Breakdown Voltage<br>(I <sub>C</sub> = 100 μA <sub>dc</sub> , I <sub>E</sub> = 0)   | V <sub>(BR)CBO</sub> | 300            | –           | 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)   | I <sub>CBO</sub>     | –              | 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)   | I <sub>EBO</sub>     | –              | 0.1         | μA <sub>dc</sub> |
| <b>ON CHARACTERISTICS</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> )  | V <sub>CE(sat)</sub> | –              | 0.5         | 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 = 20 MHz)   | f <sub>T</sub>       | 50             | –           | MHz              |
| Collector Capacitance<br>(V <sub>CB</sub> = 20 V <sub>dc</sub> , I <sub>E</sub> = 0, f = 1.0 MHz)  | C <sub>cb</sub>      | –              | 3.0         | pF               |

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

# MPSW42

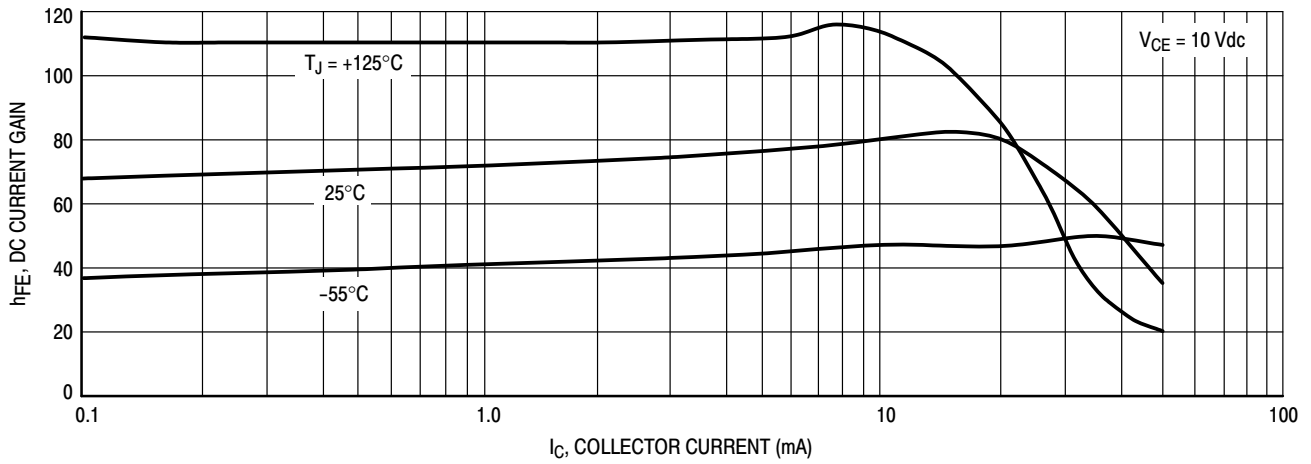


Figure 1. DC Current Gain

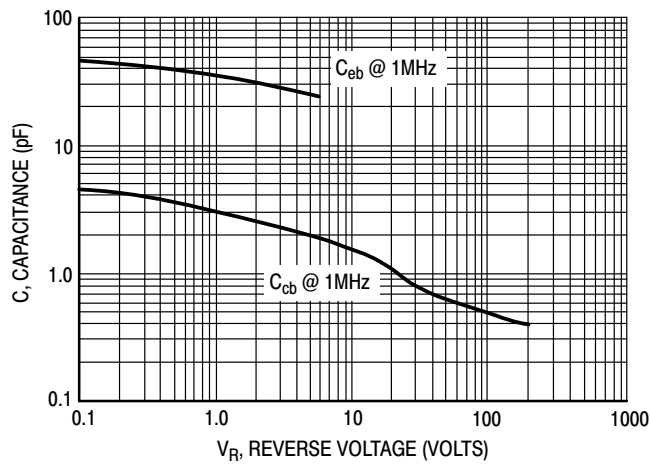


Figure 2. Capacitance

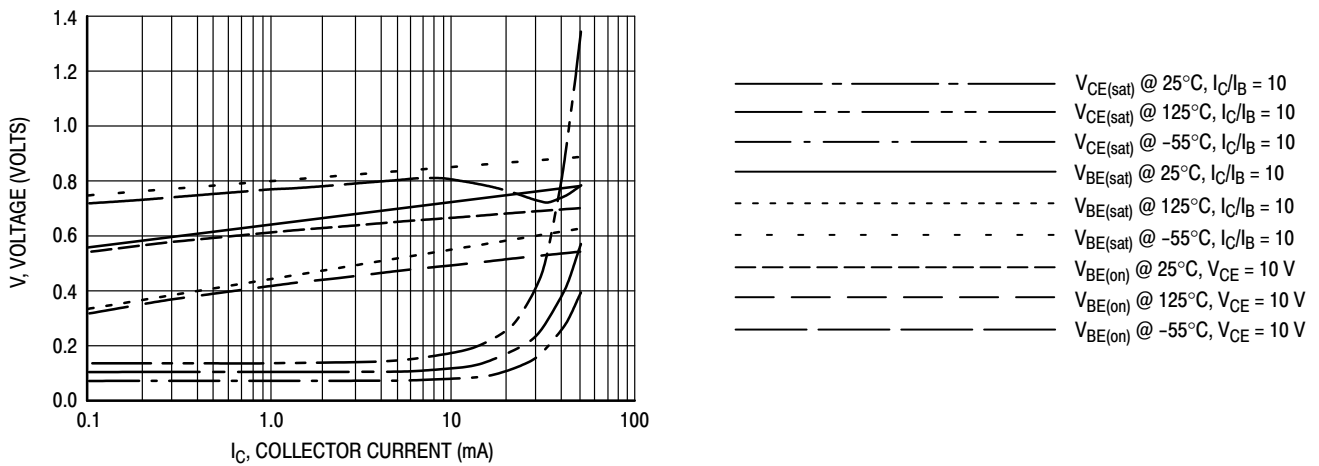
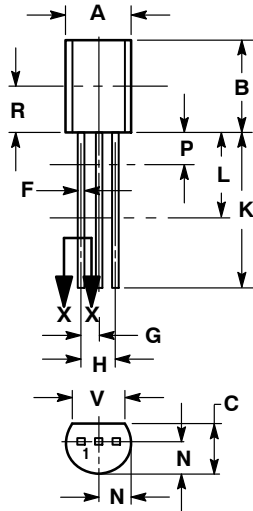


Figure 3. "ON" Voltages

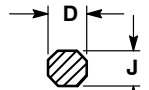
# MPSW42

## PACKAGE DIMENSIONS

TO-92 (TO-226) 1 WATT  
CASE 29-10  
ISSUE O



STRAIGHT LEAD  
BULK PACK



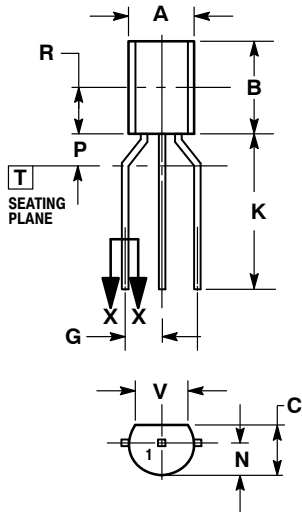
SECTION X-X

NOTES:

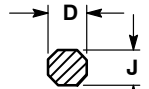
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1994.
2. CONTROLLING DIMENSION: INCHES.
3. CONTOUR OF PACKAGE BEYOND DIMENSION R IS UNCONTROLLED.
4. DIMENSION F APPLIES BETWEEN DIMENSIONS P AND L. DIMENSIONS D AND J APPLY BETWEEN DIMENSIONS L AND K MINIMUM. THE LEAD DIMENSIONS ARE UNCONTROLLED IN DIMENSION P AND BEYOND DIMENSION K MINIMUM.

| DIM | INCHES |       | MILLIMETERS |      |
|-----|--------|-------|-------------|------|
|     | MIN    | MAX   | MIN         | MAX  |
| A   | 0.175  | 0.205 | 4.44        | 5.21 |
| B   | 0.290  | 0.310 | 7.37        | 7.87 |
| C   | 0.125  | 0.165 | 3.18        | 4.19 |
| D   | 0.018  | 0.021 | 0.46        | 0.53 |
| F   | 0.016  | 0.019 | 0.41        | 0.48 |
| G   | 0.045  | 0.055 | 1.15        | 1.39 |
| H   | 0.095  | 0.105 | 2.42        | 2.66 |
| J   | 0.018  | 0.024 | 0.46        | 0.61 |
| 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   | 0.135  | ---   | 3.43        | ---  |
| V   | 0.135  | ---   | 3.43        | ---  |

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



BENT LEAD  
TAPE & REEL  
AMMO PACK



SECTION X-X

NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
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| DIM | INCHES |       | MILLIMETERS |      |
|-----|--------|-------|-------------|------|
|     | MIN    | MAX   | MIN         | MAX  |
| A   | 0.175  | 0.205 | 4.44        | 5.21 |
| B   | 0.290  | 0.310 | 7.37        | 7.87 |
| C   | 0.125  | 0.165 | 3.18        | 4.19 |
| D   | 0.018  | 0.021 | 0.46        | 0.53 |
| G   | 0.094  | 0.102 | 2.40        | 2.80 |
| J   | 0.018  | 0.024 | 0.46        | 0.61 |
| K   | 0.500  | ---   | 12.70       | ---  |
| N   | 0.080  | 0.105 | 2.04        | 2.66 |
| P   | ---    | 0.100 | ---         | 2.54 |
| R   | 0.135  | ---   | 3.43        | ---  |
| V   | 0.135  | ---   | 3.43        | ---  |

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