

MPSW01, MPSW01A

MPSW01A is a Preferred Device

One Watt High Current Transistors

NPN Silicon

Features

- Pb-Free Packages are Available*

MAXIMUM RATINGS

| Rating | Symbol | Value | Unit |
|---|----------------|----------------|----------------------------|
| Collector–Emitter Voltage MPSW01 MPSW01A | V_{CEO} | 30 40 | Vdc |
| Collector–Base Voltage MPSW01 MPSW01A | V_{CBO} | 40 50 | Vdc |
| Emitter–Base Voltage | V_{EBO} | 5.0 | Vdc |
| Collector Current – Continuous | I_C | 1000 | mAdc |
| Total Device Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C | P_D | 1.0 8.0 | mW mW/ $^\circ\text{C}$ |
| Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C | P_D | 2.5 20 | W 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 | $^\circ\text{C}/\text{W}$ |

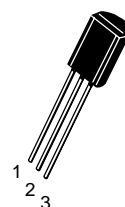
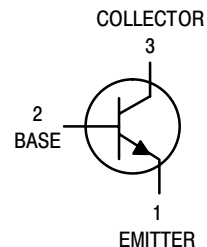
Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur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



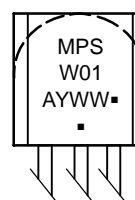
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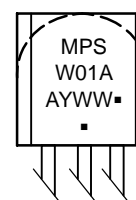


TO-92
(TO-226AE)
CASE 29-10
STYLE 1

MARKING DIAGRAMS



MPSW01



MPSW01A

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 2 of this data sheet.

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

MPSW01, MPSW01A

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

| Characteristic | | Symbol | Min | Max | Unit |
|--|-------------------|---------------|----------|------------|---------------|
| OFF CHARACTERISTICS | | | | | |
| Collector–Emitter Breakdown Voltage (Note 1) ($I_C = 10\text{ mA}$, $I_B = 0$) | MPSW01 MPSW01A | $V_{(BR)CEO}$ | 30 40 | – – | Vdc |
| Collector–Base Breakdown Voltage ($I_C = 100\text{ }\mu\text{A}$, $I_E = 0$) | MPSW01 MPSW01A | $V_{(BR)CBO}$ | 40 50 | – – | Vdc |
| Emitter–Base Breakdown Voltage ($I_E = 100\text{ }\mu\text{A}$, $I_C = 0$) | | $V_{(BR)EBO}$ | 5.0 | – | Vdc |
| Collector Cutoff Current ($V_{CB} = 30\text{ Vdc}$, $I_E = 0$) ($V_{CB} = 40\text{ Vdc}$, $I_E = 0$) | MPSW01 MPSW01A | I_{CBO} | – – | 0.1 0.1 | μA |
| Emitter Cutoff Current ($V_{EB} = 3.0\text{ Vdc}$, $I_C = 0$) | | I_{EBO} | – | 0.1 | μA |

ON CHARACTERISTICS (Note 1)

| | | | | | |
|--|--|---------------|----------------|-------------|-----|
| DC Current Gain ($I_C = 10\text{ mA}$, $V_{CE} = 1.0\text{ Vdc}$) ($I_C = 100\text{ mA}$, $V_{CE} = 1.0\text{ Vdc}$) ($I_C = 1000\text{ mA}$, $V_{CE} = 1.0\text{ Vdc}$) | | h_{FE} | 55 60 50 | – – – | – |
| Collector–Emitter Saturation Voltage ($I_C = 1000\text{ mA}$, $I_B = 100\text{ mA}$) | | $V_{CE(sat)}$ | – | 0.5 | Vdc |
| Base–Emitter On Voltage ($I_C = 1000\text{ mA}$, $V_{CE} = 1.0\text{ Vdc}$) | | $V_{BE(on)}$ | – | 1.2 | Vdc |

SMALL–SIGNAL CHARACTERISTICS

| | | | | | |
|---|--|-----------|----|----|-----|
| Current–Gain — Bandwidth Product ($I_C = 50\text{ mA}$, $V_{CE} = 10\text{ Vdc}$, $f = 20\text{ MHz}$) | | f_T | 50 | – | MHz |
| Output Capacitance ($V_{CB} = 10\text{ Vdc}$, $I_E = 0$, $f = 1.0\text{ MHz}$) | | C_{obo} | – | 20 | pF |

1. Pulse Test: Pulse Width $\leq 300\text{ }\mu\text{s}$, Duty Cycle $\leq 2.0\%$.

ORDERING INFORMATION

| Device | Package | Shipping† |
|--------------|--------------------|--------------------|
| MPSW01 | TO–92 | 5000 Units / Bulk |
| MPSW01G | TO–92 (Pb–Free) | 5000 Units / Bulk |
| MPSW01A | TO–92 | 5000 Units / Bulk |
| MPSW01AG | TO–92 (Pb–Free) | 5000 Units / Bulk |
| MPSW01ARLRA | TO–92 | 2000 / Tape & Reel |
| MPSW01ARLRAG | TO–92 (Pb–Free) | 2000 / Tape & Reel |
| MPSW01ARLRP | TO–92 | 2000 / Ammo Box |
| MPSW01ARLRPG | TO–92 (Pb–Free) | 2000 / Ammo Box |

†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.

MPSW01, MPSW01A

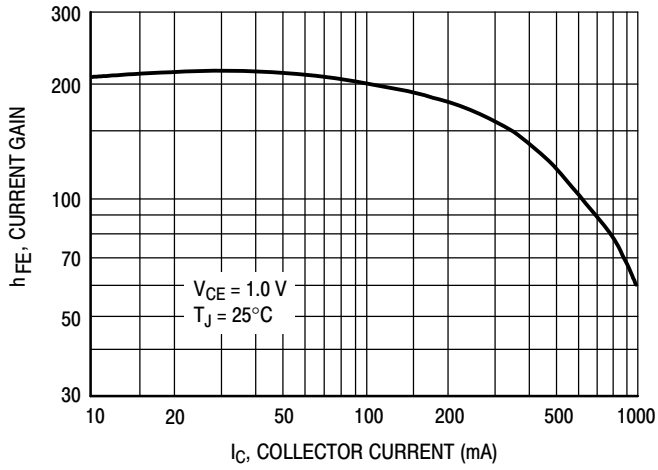


Figure 1. DC Current Gain

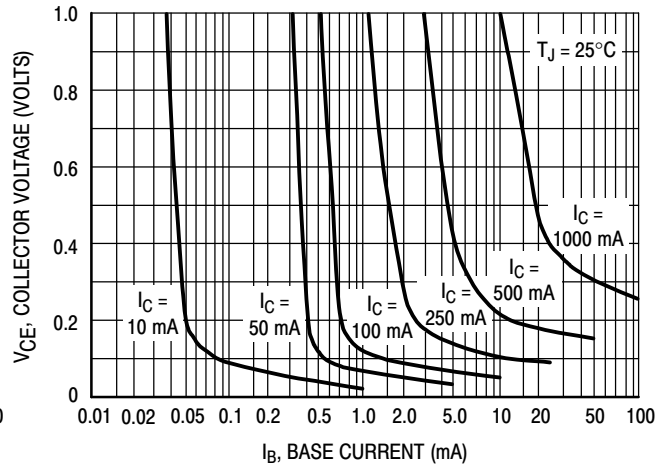


Figure 2. Collector Saturation Region

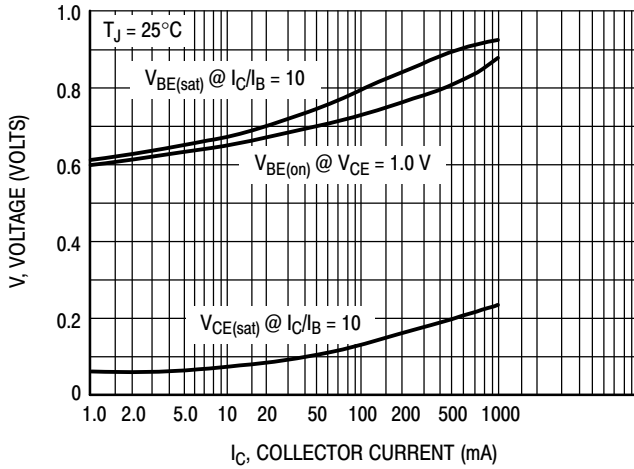


Figure 3. "ON" Voltages

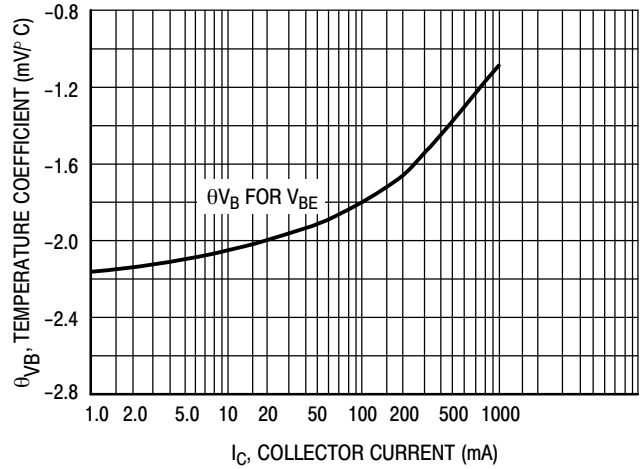


Figure 4. Temperature Coefficient

MPSW01, MPSW01A

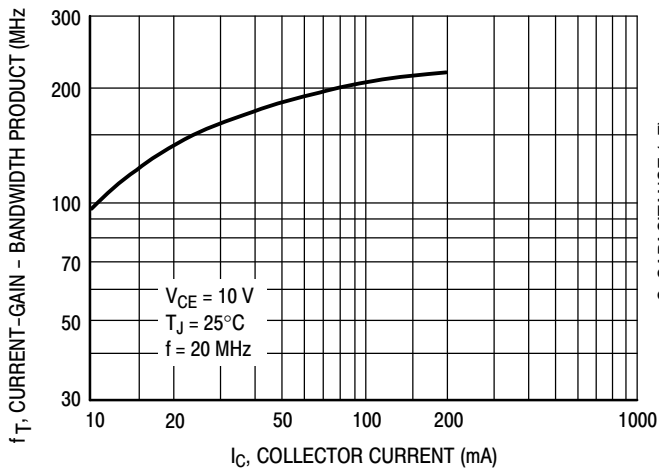


Figure 5. Current Gain — Bandwidth Product

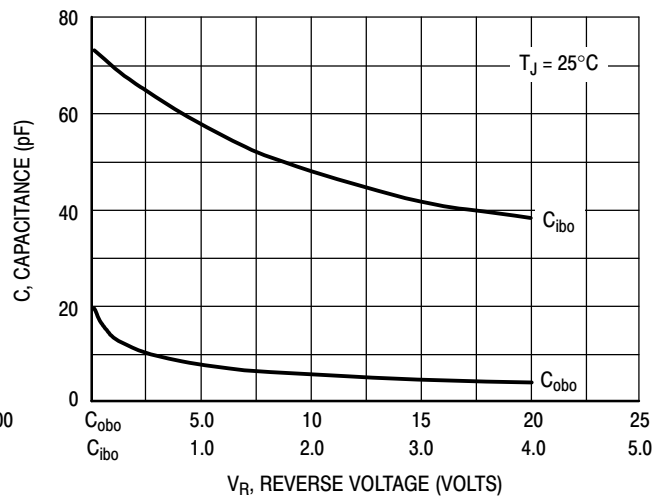


Figure 6. Capacitance

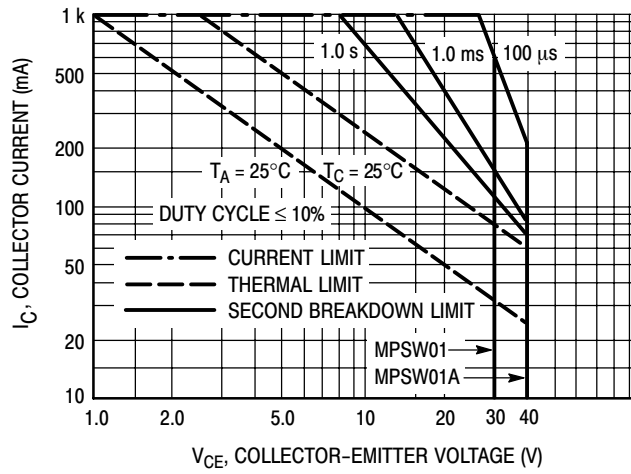
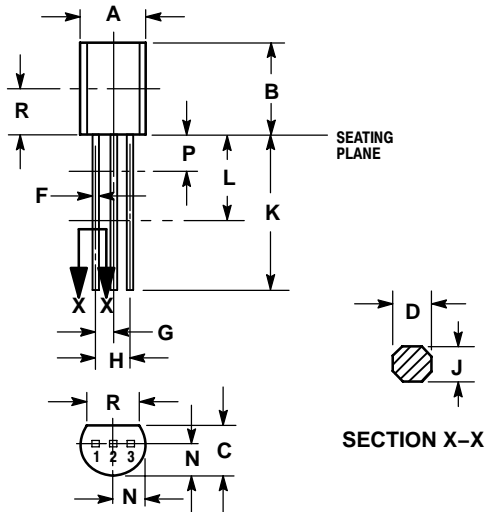


Figure 7. Active Region — Safe Operating Area

MPSW01, MPSW01A

PACKAGE DIMENSIONS

TO-92 (TO-226)
CASE 29-10
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. DIMENSION F APPLIES BETWEEN P AND L. DIMENSIONS D AND J APPLY BETWEEN L AND K MINIMUM. LEAD DIMENSION IS UNCONTROLLED IN 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 | 0.457 | 0.533 |
| F | 0.016 | 0.019 | 0.407 | 0.482 |
| 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 | --- |

STYLE 1:

1. EMITTER
2. BASE
3. COLLECTOR

MPSW01, MPSW01A

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