

MPSW05, MPSW06

One Watt Amplifier Transistors

NPN Silicon

Features

- Pb-Free Packages are Available*

MAXIMUM RATINGS

| Rating | Symbol | Value | Unit | |
|--|------------------|----------------|-------------|---------------------------|
| Collector - Emitter Voltage | MPSW05 MPSW06 | V_{CEO} | 60 80 | Vdc |
| Collector - Base Voltage | MPSW05 MPSW06 | V_{CBO} | 60 80 | Vdc |
| Emitter - Base Voltage | | V_{EBO} | 4.0 | Vdc |
| Collector Current - Continuous | | I_C | 500 | mAdc |
| Total Device Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C | | P_D | 1.0 8.0 | W 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 | $^\circ\text{C}/\text{W}$ |

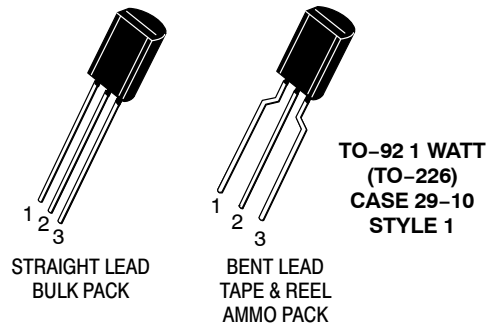
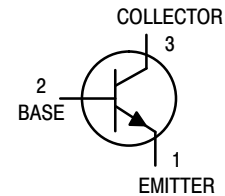
Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

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

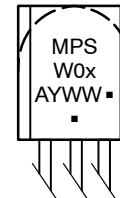


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MARKING DIAGRAM



- x = 5 or 6
- A = Assembly Location
- Y = Year
- WW = Work Week
- = Pb-Free Package

(Note: Microdot may be in either location)

ORDERING INFORMATION

| Device | Package | Shipping† |
|-------------|-----------------|------------------|
| MPSW05G | TO-92 (Pb-Free) | 5000 Units/Bulk |
| MPSW06G | TO-92 (Pb-Free) | 5000 Units/Bulk |
| MPSW06RLRA | TO-92 | 2000/Tape & Reel |
| MPSW06RLRAG | TO-92 (Pb-Free) | 2000/Tape & Reel |

†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.

MPSW05, MPSW06

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

| Characteristic | Symbol | Min | Max | Unit |
|--|---------------|----------|------------|-----------------|
| OFF CHARACTERISTICS | | | | |
| Collector - Emitter Breakdown Voltage (Note 1) ($I_C = 1.0\text{ mAdc}$, $I_B = 0$) | $V_{(BR)CEO}$ | 60 80 | - - | Vdc |
| Emitter - Base Breakdown Voltage ($I_E = 100\ \mu\text{Adc}$, $I_C = 0$) | $V_{(BR)EBO}$ | 4.0 | - | Vdc |
| Collector Cutoff Current ($V_{CE} = 40\text{ Vdc}$, $I_B = 0$) ($V_{CE} = 60\text{ Vdc}$, $I_B = 0$) | I_{CES} | - - | 0.5 0.5 | μAdc |
| Collector Cutoff Current ($V_{CB} = 40\text{ Vdc}$, $I_E = 0$) ($V_{CB} = 60\text{ Vdc}$, $I_E = 0$) | I_{CBO} | - - | 0.1 0.1 | μAdc |
| Emitter Cutoff Current ($V_{EB} = 3.0\text{ Vdc}$, $I_C = 0$) | I_{EBO} | - | 0.1 | μAdc |
| ON CHARACTERISTICS (Note 1) | | | | |
| DC Current Gain ($I_C = 50\text{ mAdc}$, $V_{CE} = 1.0\text{ Vdc}$) ($I_C = 250\text{ mAdc}$, $V_{CE} = 1.0\text{ Vdc}$) | h_{FE} | 80 60 | - - | - |
| Collector - Emitter Saturation Voltage ($I_C = 250\text{ mAdc}$, $I_B = 10\text{ mAdc}$) | $V_{CE(sat)}$ | - | 0.4 | Vdc |
| Base - Emitter Saturation Voltage ($I_C = 250\text{ mAdc}$, $V_{CE} = 5.0\text{ Vdc}$) | $V_{BE(sat)}$ | - | 1.2 | Vdc |
| SMALL - SIGNAL CHARACTERISTICS | | | | |
| Current - Gain - Bandwidth Product ($I_C = 200\text{ mAdc}$, $V_{CE} = 5.0\text{ Vdc}$, $f = 20\text{ MHz}$) | f_T | 50 | - | MHz |
| Output Capacitance ($V_{CB} = 10\text{ V}$, $f = 1.0\text{ MHz}$) | C_{obo} | - | 12 | pF |

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

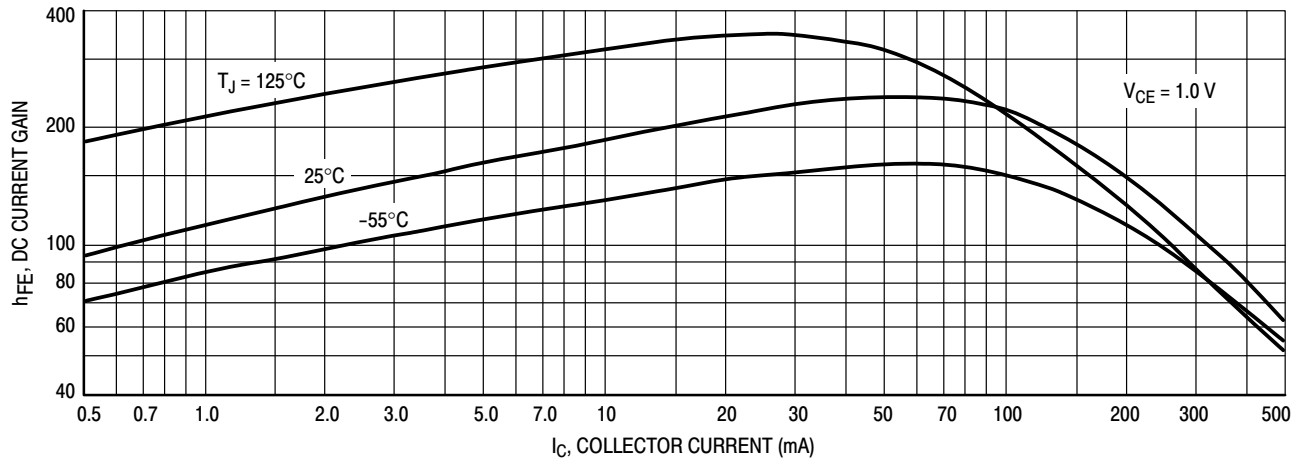


Figure 1. DC Current Gain

MPSW05, MPSW06

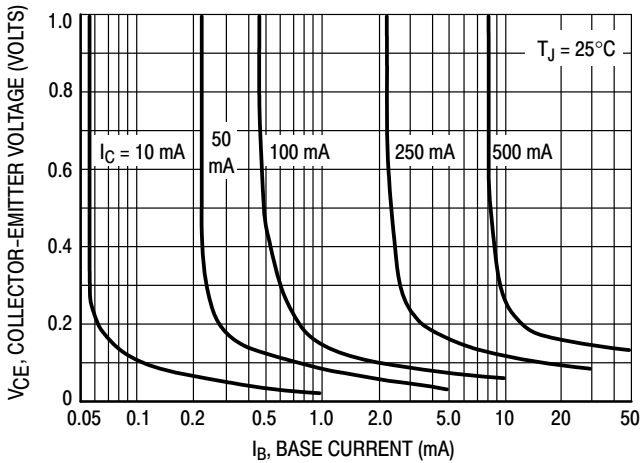


Figure 2. Collector Saturation Region

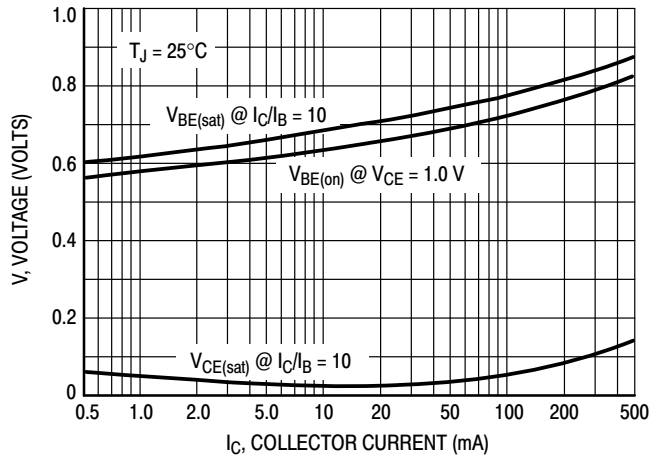


Figure 3. "On" Voltages

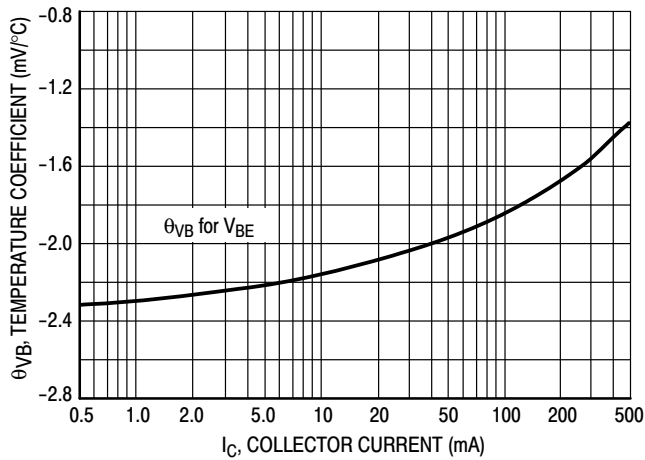


Figure 4. Base-Emitter Temperature Coefficient

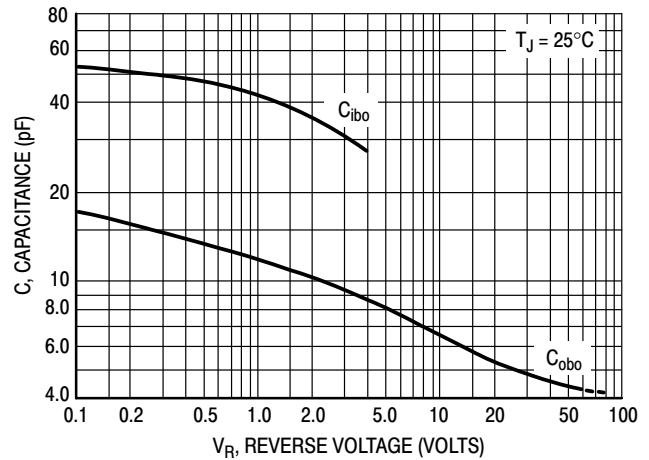


Figure 5. Capacitance

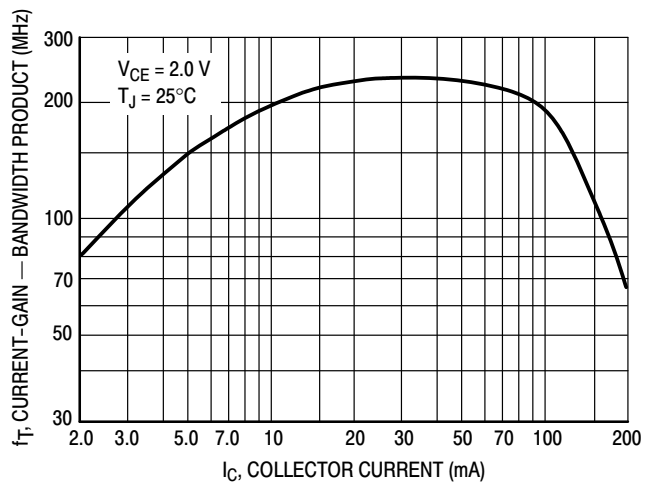


Figure 6. Current-Gain - Bandwidth Product

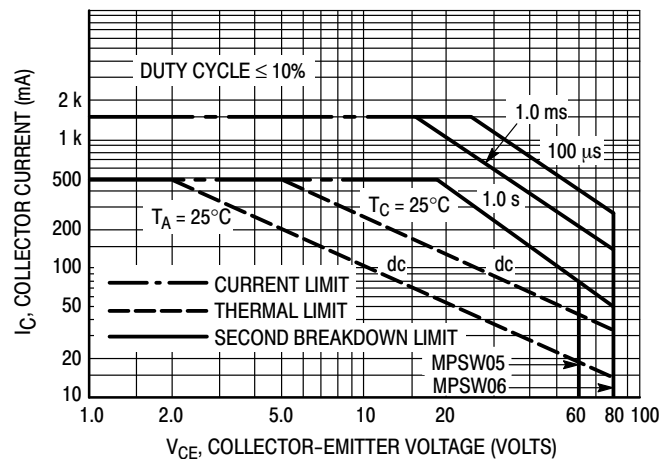
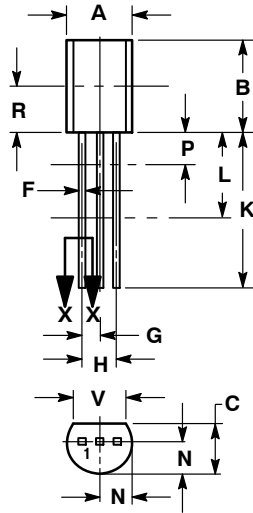


Figure 7. Active Region - Safe Operating Area

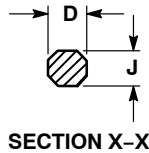
MPSW05, MPSW06

PACKAGE DIMENSIONS

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



STRAIGHT LEAD
BULK PACK



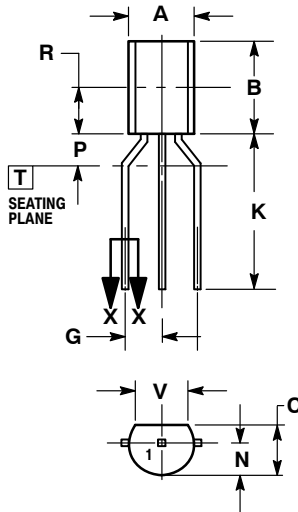
SECTION X-X

NOTES:

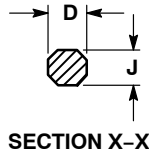
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1994.
2. CONTROLLING DIMENSION: INCHES.
3. CONTOUR OF PACKAGE BEYOND DIMENSION R IS UNCONTROLLED.
4. DIMENSION F APPLIES BETWEEN DIMENSIONS P AND L. DIMENSIONS D AND J APPLY BETWEEN DIMENSIONS L AND K MINIMUM. THE LEAD DIMENSIONS ARE UNCONTROLLED IN DIMENSION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

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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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