

# MPSW01, MPSW01A

## 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 $25^\circ\text{C}$	$P_D$	1.0 8.0	W mW/ $^\circ\text{C}$
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	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

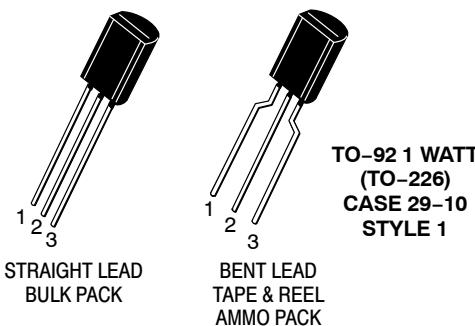
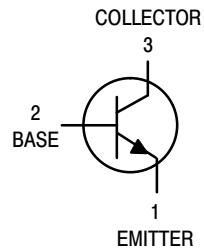
Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	125	$^\circ\text{C/W}$
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	50	$^\circ\text{C/W}$

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.

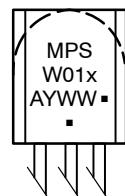


ON Semiconductor®

<http://onsemi.com>



#### MARKING DIAGRAM



x = 01A Devices  
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.

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

# MPSW01, MPSW01A

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

Characteristic	Symbol	Min	Max	Unit
<b>OFF CHARACTERISTICS</b>				
Collector–Emitter Breakdown Voltage (Note 1) ( $I_C = 10 \mu\text{Adc}$ , $I_B = 0$ ) MPSW01 MPSW01A	$V_{(\text{BR})\text{CEO}}$	30 40	—	Vdc
Collector–Base Breakdown Voltage ( $I_C = 100 \mu\text{Adc}$ , $I_E = 0$ ) MPSW01 MPSW01A	$V_{(\text{BR})\text{CBO}}$	40 50	—	Vdc
Emitter–Base Breakdown Voltage ( $I_E = 100 \mu\text{Adc}$ , $I_C = 0$ )	$V_{(\text{BR})\text{EBO}}$	5.0	—	Vdc
Collector Cutoff Current ( $V_{CB} = 30 \text{ Vdc}$ , $I_E = 0$ ) ( $V_{CB} = 40 \text{ Vdc}$ , $I_E = 0$ ) MPSW01 MPSW01A	$I_{\text{CBO}}$	— —	0.1 0.1	$\mu\text{Adc}$
Emitter Cutoff Current ( $V_{EB} = 3.0 \text{ Vdc}$ , $I_C = 0$ )	$I_{\text{EBO}}$	—	0.1	$\mu\text{Adc}$
<b>ON CHARACTERISTICS (Note 1)</b>				
DC Current Gain ( $I_C = 10 \mu\text{Adc}$ , $V_{CE} = 1.0 \text{ Vdc}$ ) ( $I_C = 100 \mu\text{Adc}$ , $V_{CE} = 1.0 \text{ Vdc}$ ) ( $I_C = 1000 \mu\text{Adc}$ , $V_{CE} = 1.0 \text{ Vdc}$ )	$h_{\text{FE}}$	55 60 50	— — —	—
Collector–Emitter Saturation Voltage ( $I_C = 1000 \mu\text{Adc}$ , $I_B = 100 \mu\text{Adc}$ )	$V_{CE(\text{sat})}$	—	0.5	Vdc
Base–Emitter On Voltage ( $I_C = 1000 \mu\text{Adc}$ , $V_{CE} = 1.0 \text{ Vdc}$ )	$V_{BE(\text{on})}$	—	1.2	Vdc
<b>SMALL-SIGNAL CHARACTERISTICS</b>				
Current–Gain — Bandwidth Product ( $I_C = 50 \mu\text{Adc}$ , $V_{CE} = 10 \text{ Vdc}$ , $f = 20 \text{ MHz}$ )	$f_T$	50	—	MHz
Output Capacitance ( $V_{CB} = 10 \text{ Vdc}$ , $I_E = 0$ , $f = 1.0 \text{ MHz}$ )	$C_{\text{obo}}$	—	20	pF

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

## ORDERING INFORMATION

Device	Package	Shipping <sup>†</sup>
MPSW01	TO-92	5000 Units / Bulk
MPSW01G	TO-92 (Pb-Free)	5000 Units / Bulk
MPSW01AG	TO-92 (Pb-Free)	5000 Units / Bulk
MPSW01ARLRRAG	TO-92 (Pb-Free)	2000 / Tape & Reel
MPSW01ARLRRPG	TO-92 (Pb-Free)	2000 / Tape & Ammo Box

<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.

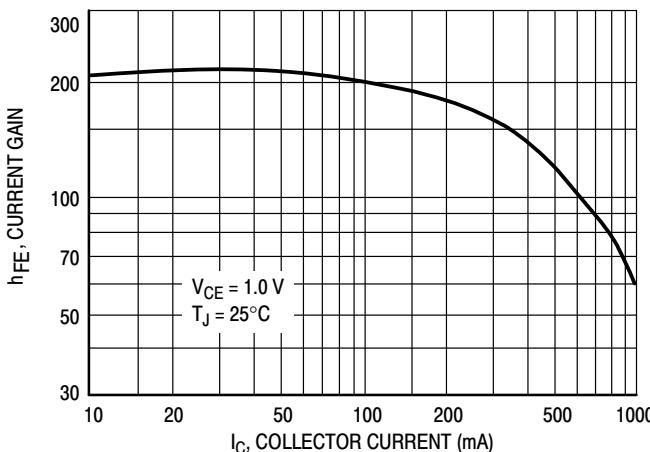


Figure 1. DC Current Gain

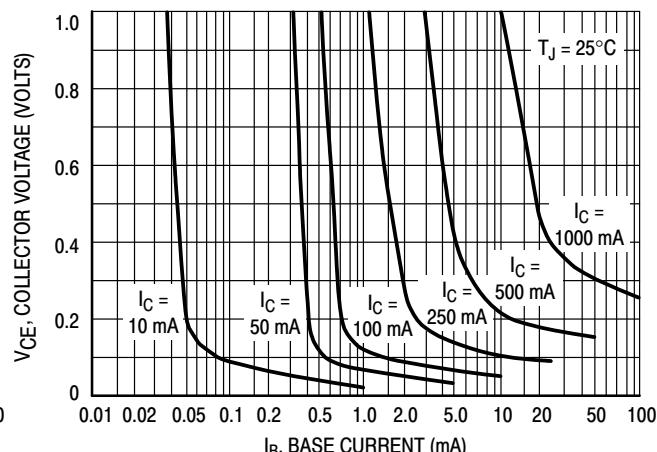


Figure 2. Collector Saturation Region

# MPSW01, MPSW01A

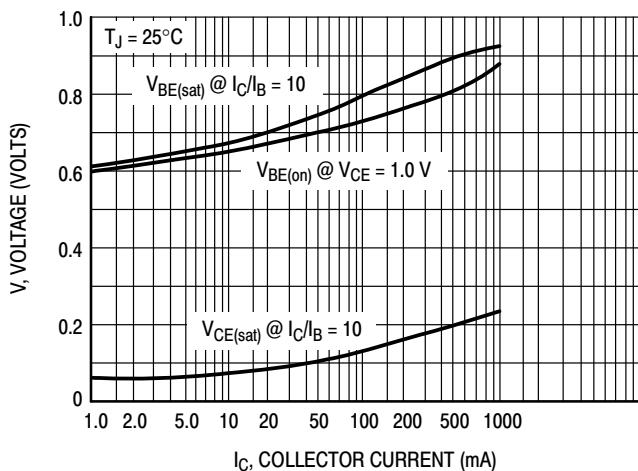


Figure 3. "ON" Voltages

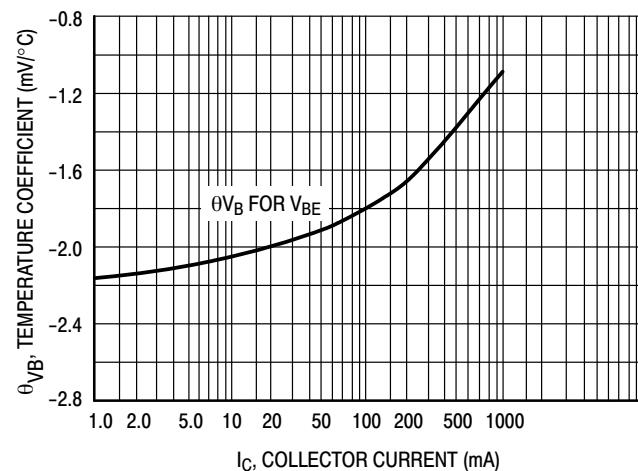


Figure 4. Temperature Coefficient

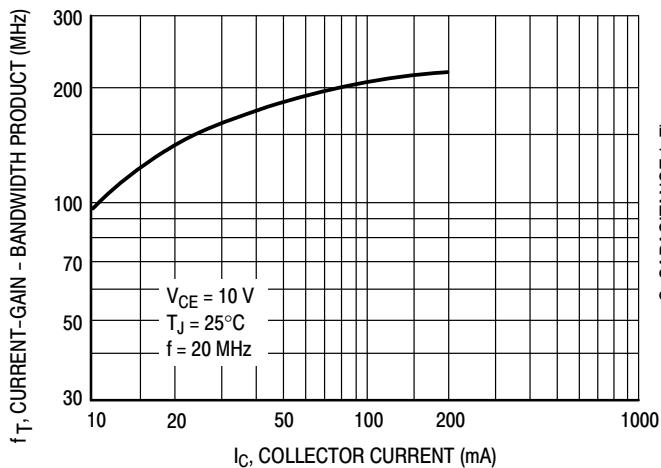


Figure 5. Current Gain — Bandwidth Product

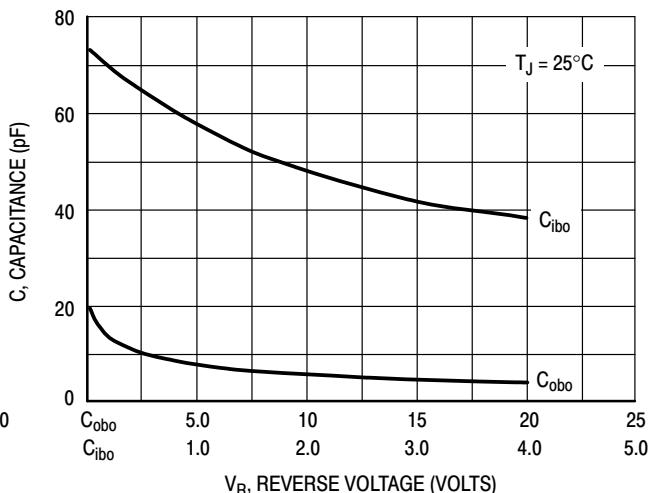


Figure 6. Capacitance

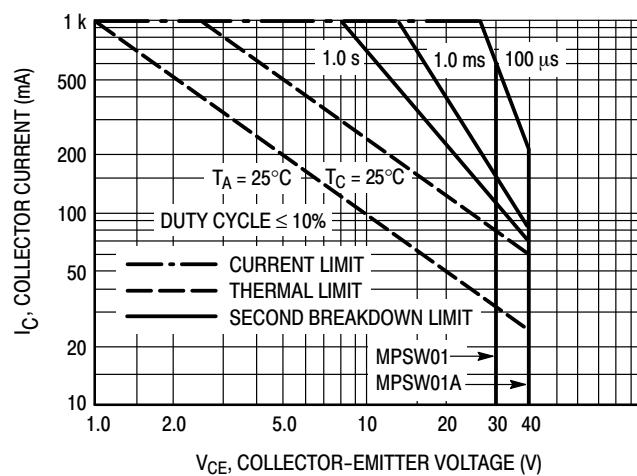
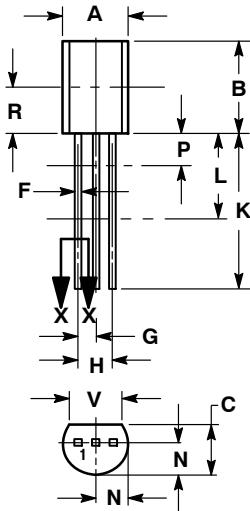


Figure 7. Active Region — Safe Operating Area

## PACKAGE DIMENSIONS

TO-92 (TO-226) 1 WATT  
CASE 29-10  
ISSUE OSTRAIGHT LEAD  
BULK PACK

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:  
1. Emitter  
2. Base  
3. Collector

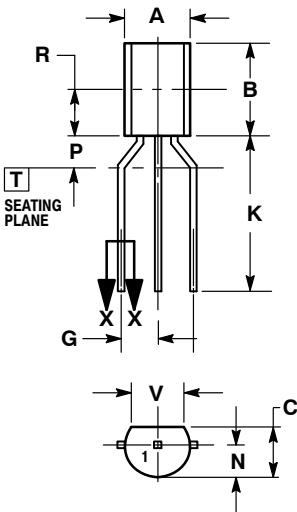
BENT LEAD  
TAPE & REEL  
AMMO PACK

NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME 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
G	0.094	0.102	2.40	2.80
J	0.018	0.024	0.46	0.61
K	0.500	---	12.70	---
L	0.080	0.105	2.04	2.66
N	0.080	0.105	2.04	2.66
P	---	0.100	---	2.54
R	0.135	---	3.43	---
V	0.135	---	3.43	---

SECTION X-X



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