

# MPSW51, MPSW51A

## One Watt High Current Transistors

### PNP Silicon

#### Features

- Pb-Free Packages are Available\*

#### MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector - Emitter Voltage MPSW51 MPSW51A	$V_{CEO}$	-30 -40	Vdc
Collector - Base Voltage MPSW51 MPSW51A	$V_{CBO}$	-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	mW 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	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	50	$^\circ\text{C}/\text{W}$

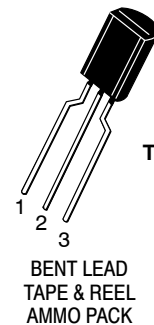
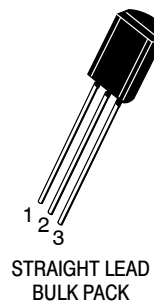
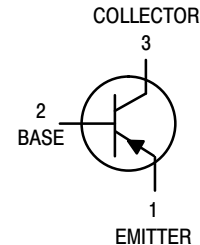
Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

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



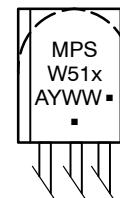
ON Semiconductor®

<http://onsemi.com>



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

#### MARKING DIAGRAM



- x = 51A 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.

# MPSW51, MPSW51A

## 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) (I <sub>C</sub> = -1.0 mAdc, I <sub>B</sub> = 0)	MPSW51 MPSW51A	V <sub>(BR)CEO</sub>	-30 -40	- -	Vdc
Collector - Base Breakdown Voltage (I <sub>C</sub> = -100 μAdc, I <sub>E</sub> = 0)	MPSW51 MPSW51A	V <sub>(BR)CBO</sub>	-40 -50	- -	Vdc
Emitter - Base Breakdown Voltage (I <sub>E</sub> = -100 μAdc, I <sub>C</sub> = 0)		V <sub>(BR)EBO</sub>	-5.0	-	Vdc
Collector Cutoff Current (V <sub>CB</sub> = -30 Vdc, I <sub>E</sub> = 0) (V <sub>CB</sub> = -40 Vdc, I <sub>E</sub> = 0)	MPSW51 MPSW51A	I <sub>CBO</sub>	- -	-0.1 -0.1	μAdc
Emitter Cutoff Current (V <sub>EB</sub> = -3.0 Vdc, I <sub>C</sub> = 0)		I <sub>EBO</sub>	-	-0.1	μAdc

## ON CHARACTERISTICS

DC Current Gain (I <sub>C</sub> = -10 mAdc, V <sub>CE</sub> = -1.0 Vdc) (I <sub>C</sub> = -100 mAdc, V <sub>CE</sub> = -1.0 Vdc) (I <sub>C</sub> = -1000 mAdc, V <sub>CE</sub> = -1.0 Vdc)		h <sub>FE</sub>	55 60 50	- - -	-
Collector - Emitter Saturation Voltage (I <sub>C</sub> = -1000 mAdc, I <sub>B</sub> = -100 mAdc)		V <sub>CE(sat)</sub>	-	-0.7	Vdc
Base - Emitter On Voltage (I <sub>C</sub> = -1000 mAdc, V <sub>CE</sub> = -1.0 Vdc)		V <sub>BE(on)</sub>	-	-1.2	Vdc

## SMALL-SIGNAL CHARACTERISTICS

Current-Gain - Bandwidth Product (I <sub>C</sub> = -50 mAdc, V <sub>CE</sub> = -10 Vdc, f = 20 MHz)		f <sub>T</sub>	50	-	MHz
Output Capacitance (V <sub>CB</sub> = -10 Vdc, I <sub>E</sub> = 0, f = 1.0 MHz)		C <sub>obo</sub>	-	30	pF

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

## ORDERING INFORMATION

Device	Package	Shipping <sup>†</sup>
MPSW51G	TO-92 (Pb-Free)	5000 Units / Bulk
MPSW51AG	TO-92 (Pb-Free)	5000 Units / Bulk
MPSW51RLRAG	TO-92 (Pb-Free)	2000 / Tape & Reel
MPSW51ARLRPG	TO-92 (Pb-Free)	2000 / Ammo Pack

<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.

# MPSW51, MPSW51A

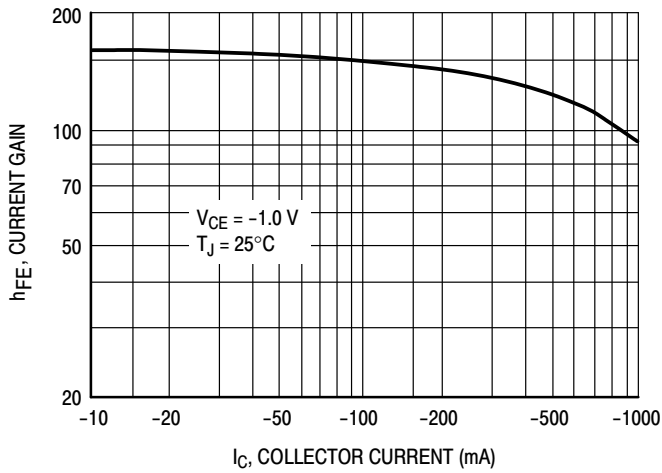


Figure 1. DC Current Gain

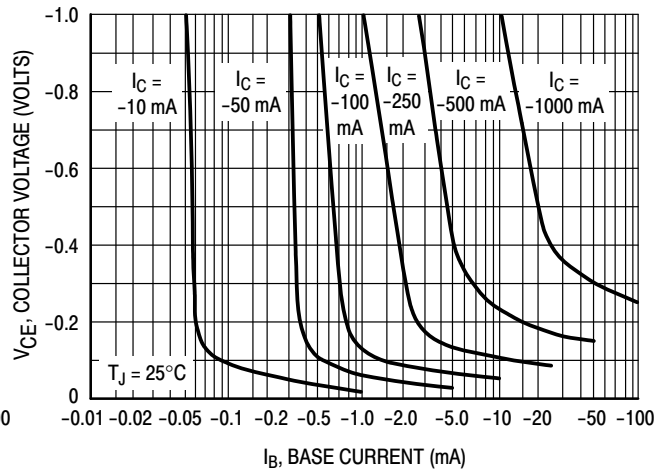


Figure 2. Collector Saturation Region

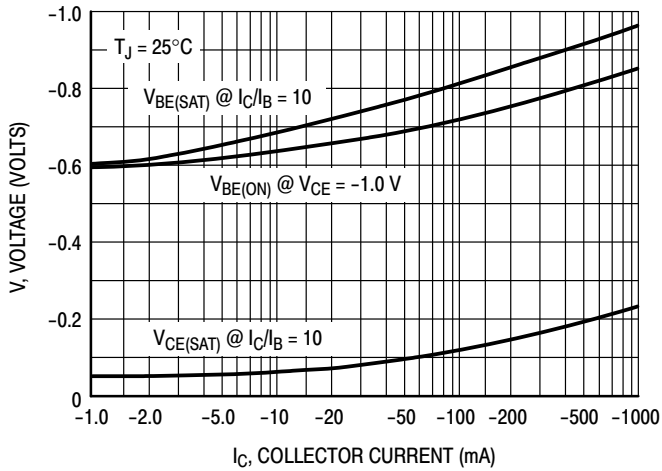


Figure 3. "ON" Voltages

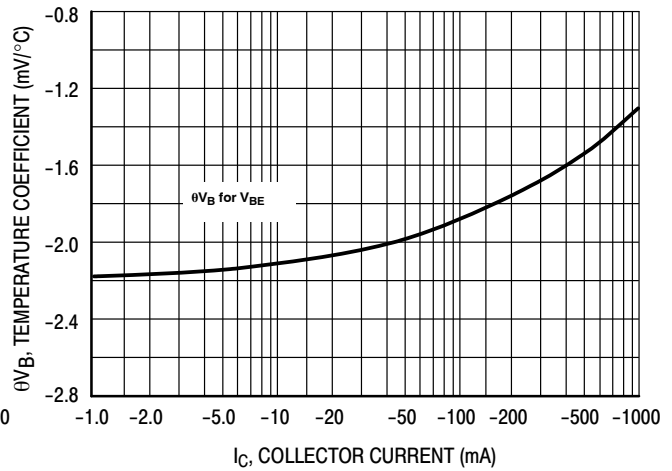
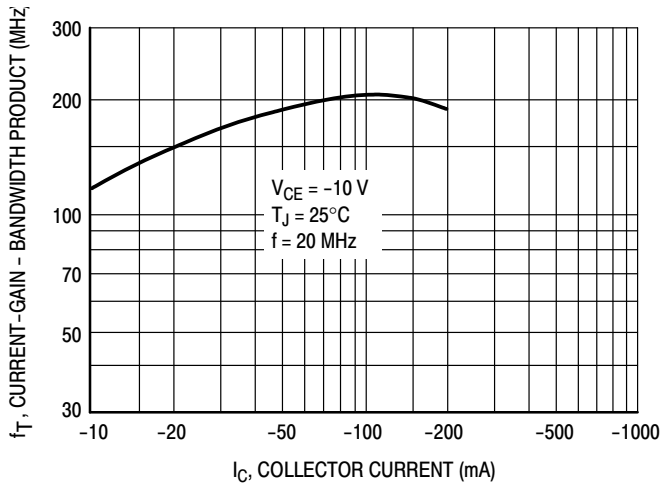
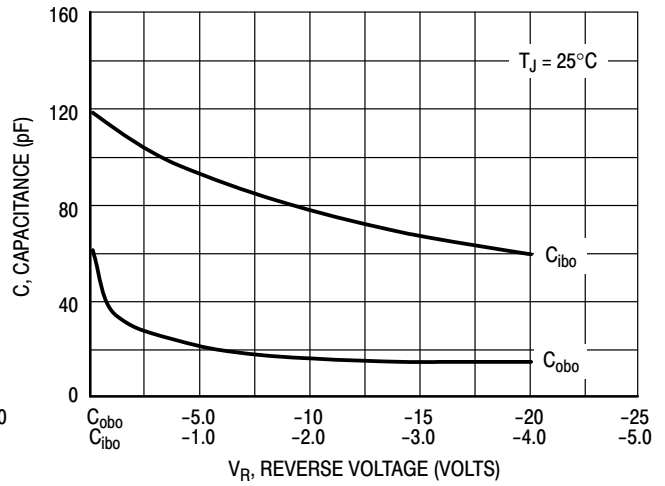


Figure 4. Temperature Coefficient

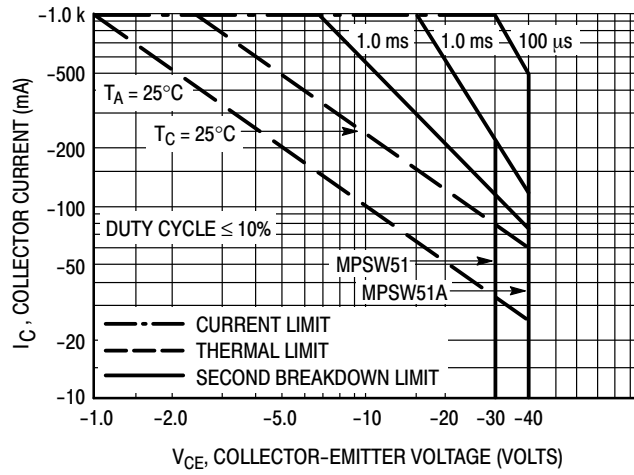
# MPSW51, MPSW51A



**Figure 5. Current Gain — Bandwidth Product**



**Figure 6. Capacitance**

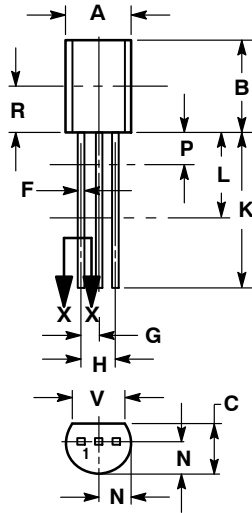


**Figure 7. Active Region — Safe Operating Area**

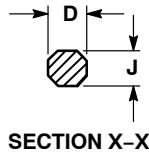
# MPSW51, MPSW51A

## PACKAGE DIMENSIONS

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



STRAIGHT LEAD  
BULK PACK



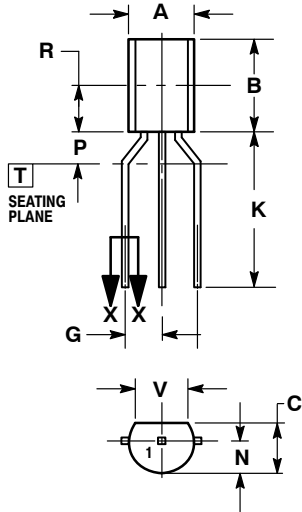
SECTION X-X

NOTES:

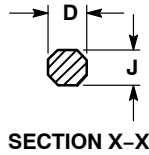
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1994.
2. CONTROLLING DIMENSION: INCHES.
3. CONTOUR OF PACKAGE BEYOND DIMENSION R IS UNCONTROLLED.
4. DIMENSION F APPLIES BETWEEN DIMENSIONS P AND L. DIMENSIONS D AND J APPLY BETWEEN DIMENSIONS L AND K MINIMUM. THE LEAD DIMENSIONS ARE UNCONTROLLED IN DIMENSION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