

# MPSW51, MPSW51A

## One Watt High Current Transistors

### PNP Silicon

#### Features

- These Devices are Pb-Free and are RoHS Compliant\*

#### 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	$^\circ\text{C}/\text{W}$

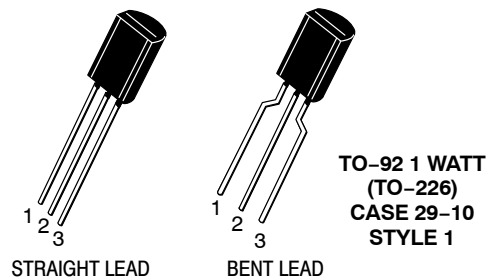
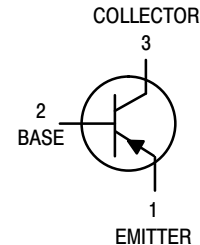
Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

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

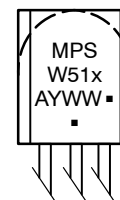


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#### MARKING DIAGRAM



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

## ON CHARACTERISTICS

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

## SMALL-SIGNAL CHARACTERISTICS

Current-Gain - Bandwidth Product (I <sub>C</sub> = -50 mA <sub>dc</sub> , V <sub>CE</sub> = -10 V <sub>dc</sub> , f = 20 MHz)		f <sub>T</sub>	50	-	MHz
Output Capacitance (V <sub>CB</sub> = -10 V <sub>dc</sub> , 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
MPSW51ARLRAG	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

## TYPICAL CHARACTERISTICS

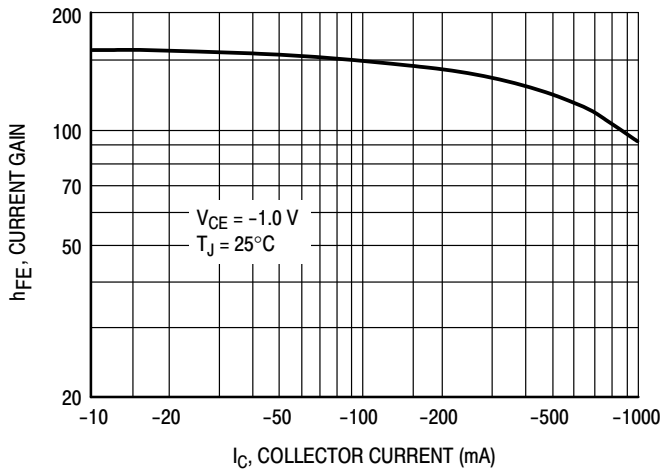


Figure 1. DC Current Gain

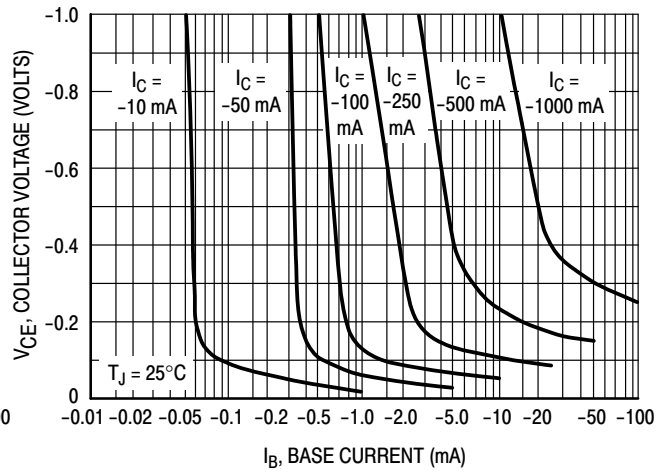


Figure 2. Collector Saturation Region

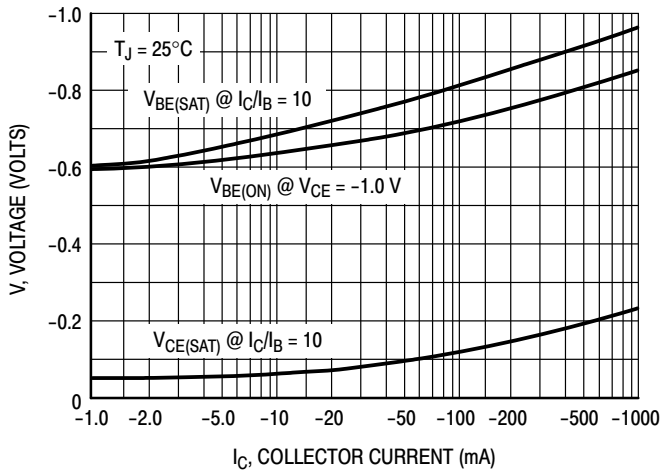


Figure 3. "ON" Voltages

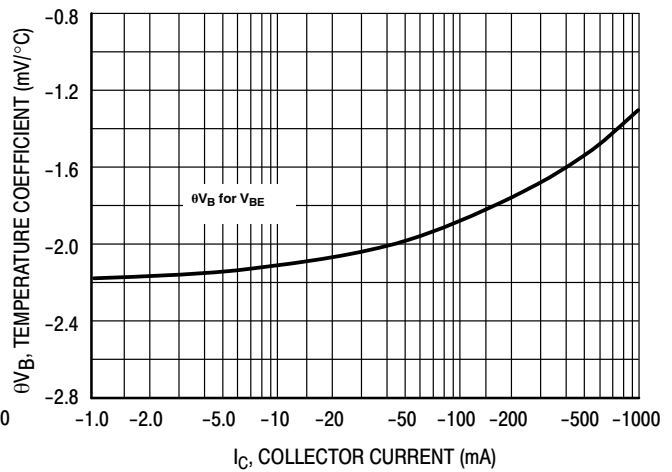


Figure 4. Temperature Coefficient

# MPSW51, MPSW51A

## TYPICAL CHARACTERISTICS

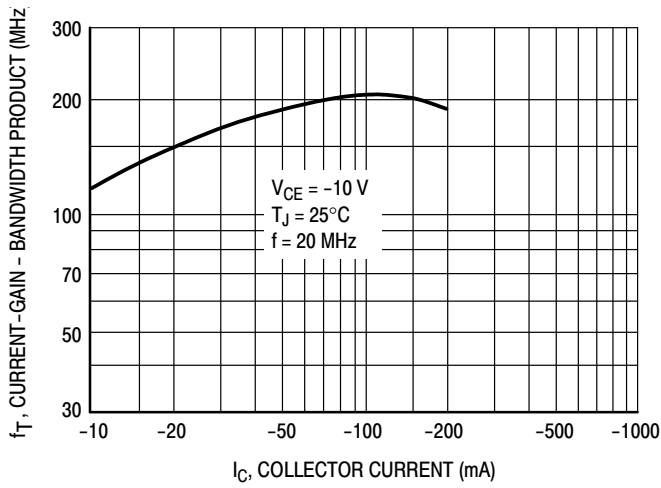


Figure 5. Current Gain — Bandwidth Product

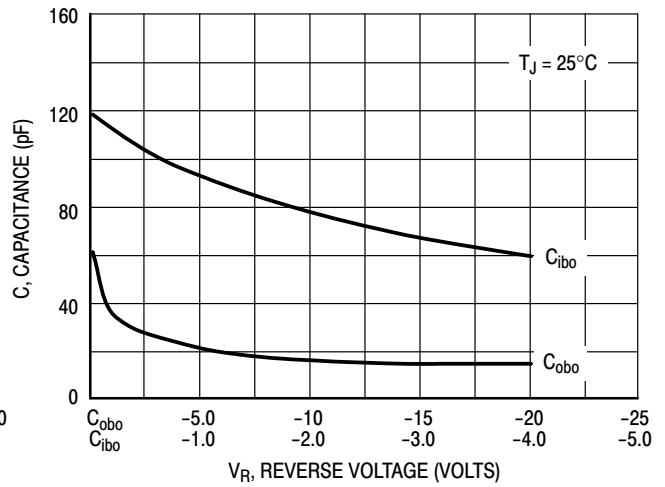


Figure 6. Capacitance

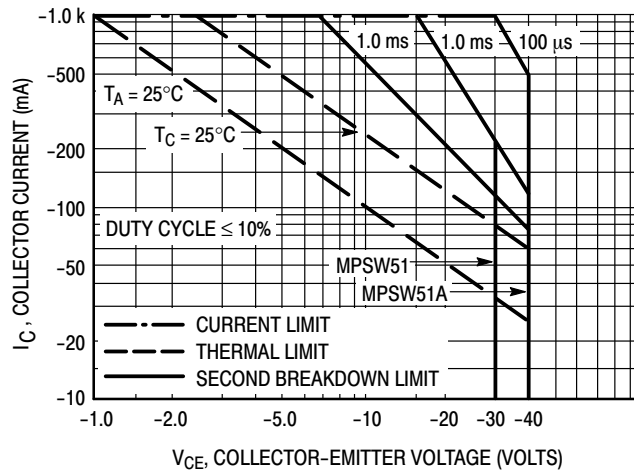
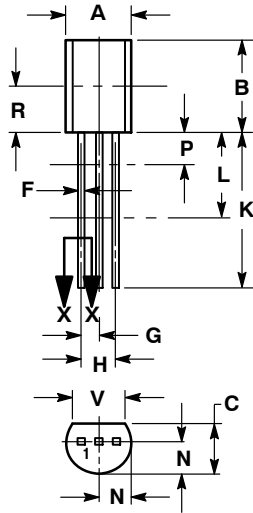


Figure 7. Active Region — Safe Operating Area

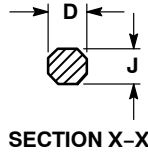
# MPSW51, MPSW51A

## PACKAGE DIMENSIONS

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



STRAIGHT LEAD



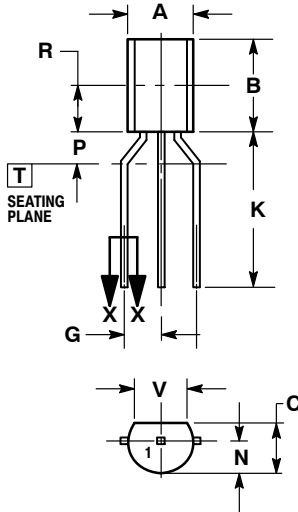
SECTION X-X

NOTES:

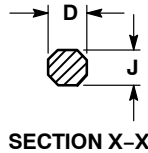
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2. CONTROLLING DIMENSION: INCHES.
3. CONTOUR OF PACKAGE BEYOND DIMENSION R IS UNCONTROLLED.
4. DIMENSION F APPLIES BETWEEN DIMENSIONS P AND L. DIMENSIONS D AND J APPLY BETWEEN DIMENSIONS L AND K MINIMUM. THE LEAD DIMENSIONS ARE UNCONTROLLED IN DIMENSION 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



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.
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.

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	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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