

# MPSW55, MPSW56

## One Watt Amplifier Transistors

### PNP Silicon

#### Features

- Pb-Free Packages are Available\*

#### MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage MPSW55 MPSW56	$V_{CEO}$	-60 -80	Vdc
Collector-Base Voltage MPSW55 MPSW56	$V_{CBO}$	-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 $25^\circ\text{C}$	$P_D$	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

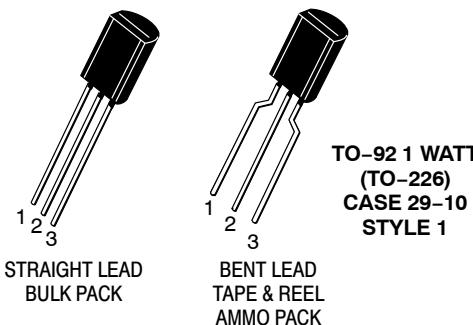
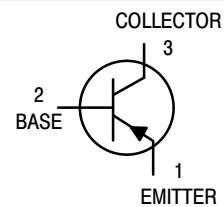
Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	125	$^\circ\text{C/W}$
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	50	$^\circ\text{C/W}$

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.

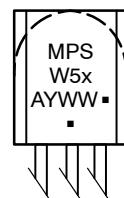
ON

ON Semiconductor®

<http://onsemi.com>



#### 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 <sup>†</sup>
MPSW55G	TO-92 (Pb-Free)	5000 Units/Bulk
MPSW55RLRAG	TO-92 (Pb-Free)	2000/Tape & Reel
MPSW56RLRP	TO-92	2000/Ammo Pack
MPSW56RLRPG	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.

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

# MPSW55, MPSW56

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) ( $I_C = -1.0 \text{ mA}_\text{dc}$ , $I_B = 0$ )	$V_{(\text{BR})\text{CEO}}$ MPSW55 MPSW56	-60 -80	-	V <sub>dc</sub>
Emitter-Base Breakdown Voltage ( $I_E = -100 \mu\text{A}_\text{dc}$ , $I_C = 0$ )	$V_{(\text{BR})\text{EBO}}$	-4.0	-	V <sub>dc</sub>
Collector Cutoff Current ( $V_{CE} = -40 \text{ Vdc}$ , $I_B = 0$ ) ( $V_{CE} = -60 \text{ Vdc}$ , $I_B = 0$ )	$I_{\text{CES}}$ MPSW55 MPSW56	- -	-0.5 -0.5	$\mu\text{A}_\text{dc}$
Collector Cutoff Current ( $V_{CB} = -40 \text{ Vdc}$ , $I_E = 0$ ) ( $V_{CB} = -60 \text{ Vdc}$ , $I_E = 0$ )	$I_{\text{CBO}}$ MPSW55 MPSW56	- -	-0.1 -0.1	$\mu\text{A}_\text{dc}$
Emitter Cutoff Current ( $V_{EB} = -3.0 \text{ Vdc}$ , $I_C = 0$ )	$I_{\text{EBO}}$	-	-0.1	$\mu\text{A}_\text{dc}$
<b>ON CHARACTERISTICS<sup>(1)</sup></b>				
DC Current Gain ( $I_C = -50 \text{ mA}_\text{dc}$ , $V_{CE} = -1.0 \text{ Vdc}$ ) ( $I_C = -250 \text{ mA}_\text{dc}$ , $V_{CE} = -1.0 \text{ Vdc}$ )	$h_{\text{FE}}$	100 50	-	-
Collector-Emitter Saturation Voltage ( $I_C = -250 \text{ mA}_\text{dc}$ , $I_B = -10 \text{ mA}_\text{dc}$ )	$V_{CE(\text{sat})}$	-	-0.5	V <sub>dc</sub>
Base-Emitter On Voltage ( $I_C = -250 \text{ mA}_\text{dc}$ , $V_{CE} = -5.0 \text{ Vdc}$ )	$V_{BE(\text{on})}$	-	-1.2	V <sub>dc</sub>
<b>SMALL-SIGNAL CHARACTERISTICS</b>				
Current-Gain — Bandwidth Product ( $I_C = -250 \text{ mA}_\text{dc}$ , $V_{CE} = -5.0 \text{ Vdc}$ , $f = 20 \text{ MHz}$ )	$f_T$	50	-	MHz
Output Capacitance ( $V_{CB} = -10 \text{ Vdc}$ , $f = 1.0 \text{ MHz}$ )	$C_{\text{obo}}$	-	15	pF

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

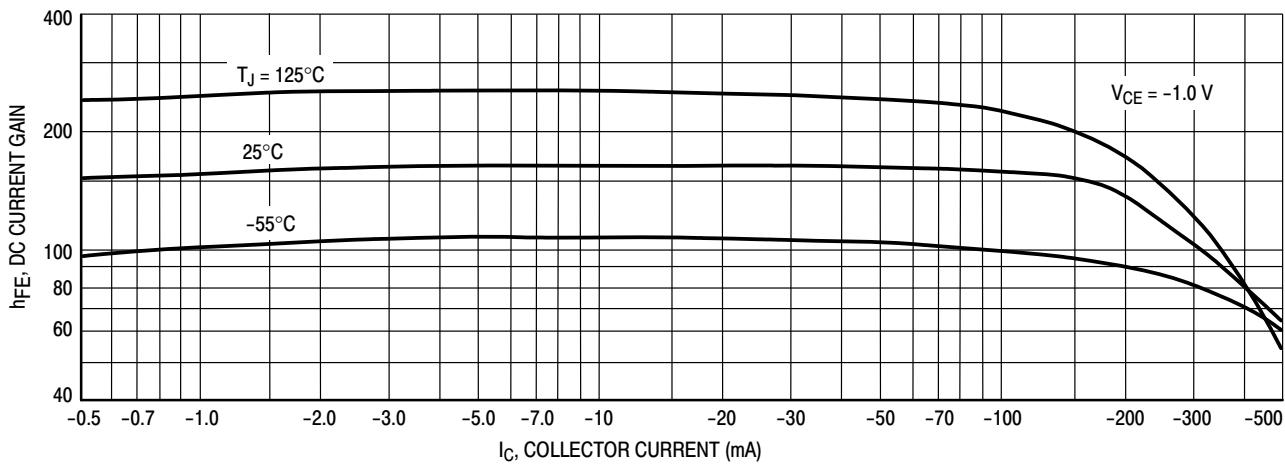


Figure 1. DC Current Gain

## MPSW55, MPSW56

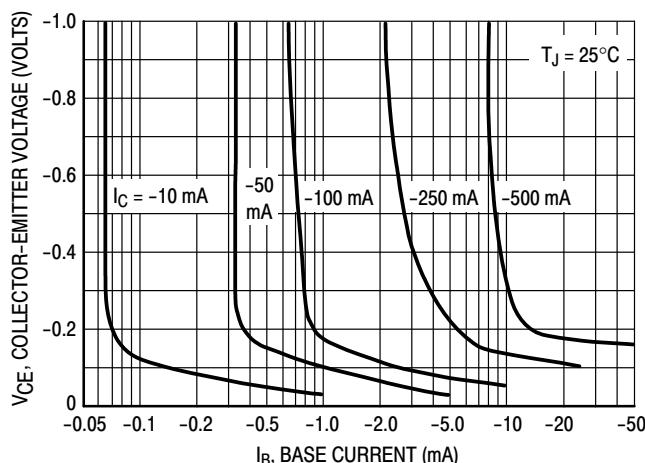


Figure 2. Collector Saturation Region

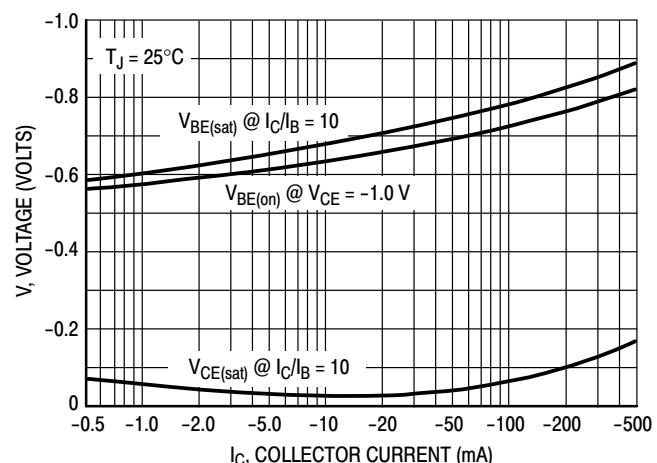


Figure 3. "On" Voltages

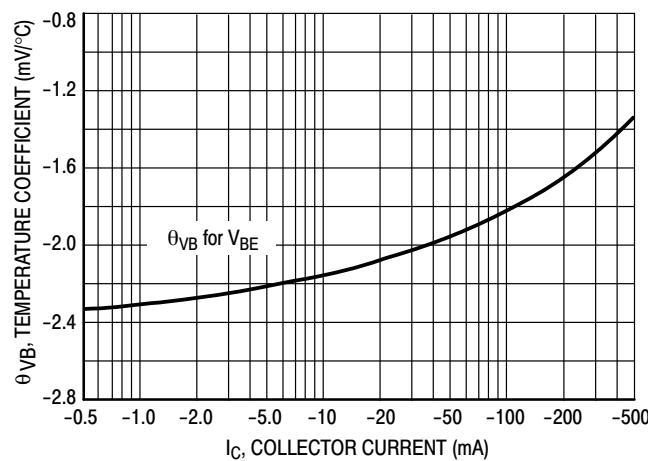


Figure 4. Base-Emitter Temperature Coefficient

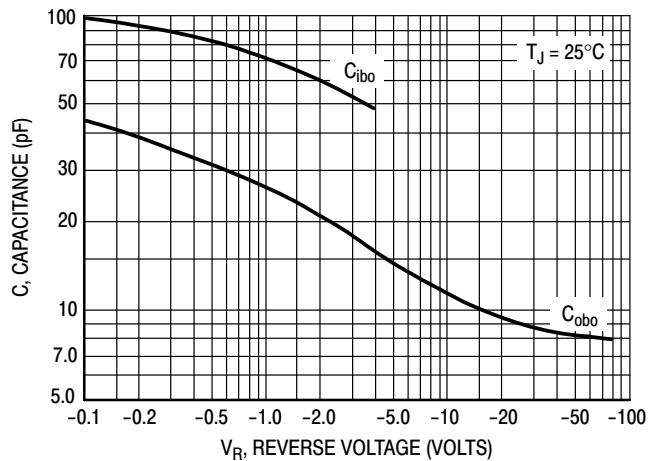


Figure 5. Capacitance

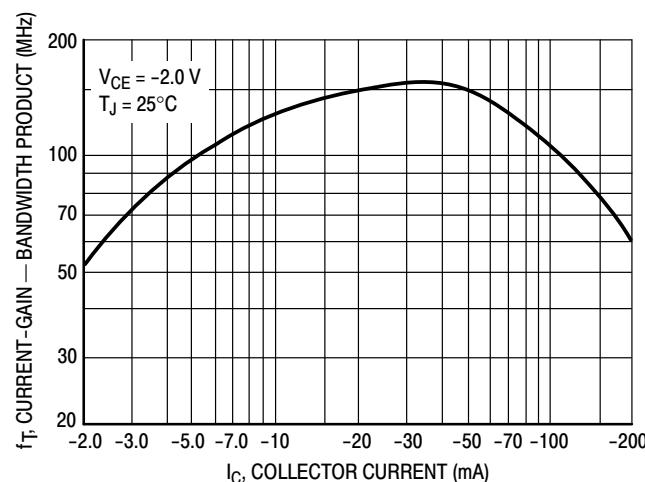


Figure 6. Current-Gain — Bandwidth Product

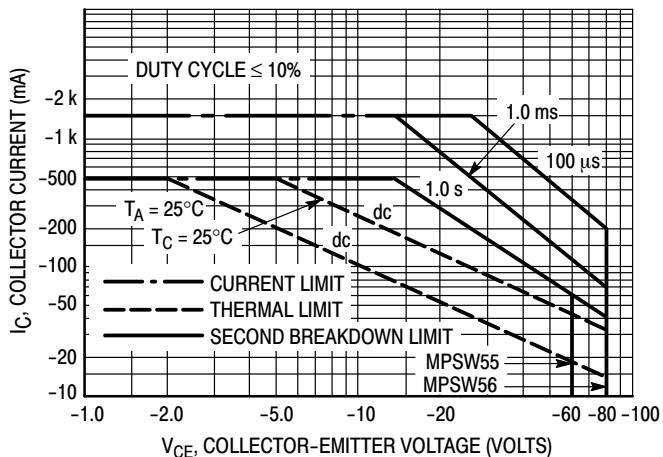
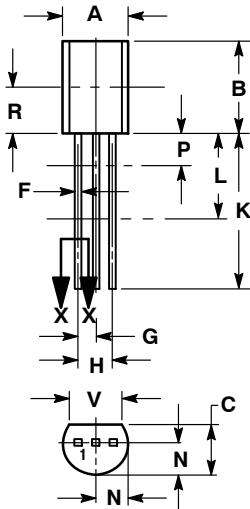


Figure 7. Active Region — Safe Operating Area

# MPSW55, MPSW56

## PACKAGE DIMENSIONS

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



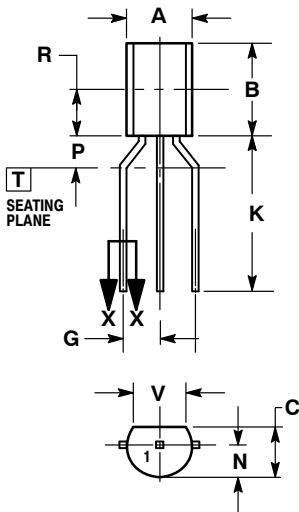
STRAIGHT LEAD  
BULK PACK

- 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

SECTION X-X



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	---
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

ON Semiconductor and  are registered trademarks of Semiconductor Components Industries, LLC (SCILLC). SCILLC reserves the right to make changes without further notice to any products herein. SCILLC makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does SCILLC assume any liability, including without limitation special, consequential or incidental damages. "Typical" parameters which may be provided in SCILLC data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. SCILLC does not convey any license under its patent rights nor the rights of others. SCILLC products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the SCILLC product could create a situation where personal injury or death may occur. Should Buyer purchase or use SCILLC products for any such unintended or unauthorized application, Buyer shall indemnify and hold SCILLC and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that SCILLC was negligent regarding the design or manufacture of the part. SCILLC is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

## PUBLICATION ORDERING INFORMATION

### LITERATURE FULFILLMENT:

Literature Distribution Center for ON Semiconductor  
P.O. Box 5163, Denver, Colorado 80217 USA  
Phone: 303-675-2175 or 800-344-3860 Toll Free USA/Canada  
Fax: 303-675-2176 or 800-344-3867 Toll Free USA/Canada  
Email: [orderlit@onsemi.com](mailto:orderlit@onsemi.com)

N. American Technical Support: 800-282-9855 Toll Free

USA/Canada

Europe, Middle East and Africa Technical Support:

Phone: 421 33 790 2910

Japan Customer Focus Center

Phone: 81-3-5773-3850

ON Semiconductor Website: [www.onsemi.com](http://www.onsemi.com)

Order Literature: <http://www.onsemi.com/orderlit>

For additional information, please contact your local  
Sales Representative