

# MPS918, MPS3563

MPS918 is a Preferred Device

## Amplifier Transistors

### NPN Silicon

#### Features

- Pb-Free Packages are Available\*

#### MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector–Emitter Voltage MPS918 MPS3563	$V_{CEO}$	15 12	Vdc
Collector–Base Voltage MPS918 MPS3563	$V_{CBO}$	30 30	Vdc
Emitter–Base Voltage MPS918 MPS3563	$V_{EBO}$	3.0 2.0	Vdc
Collector Current – Continuous	$I_C$	50	mAdc
Total Device Dissipation @ $T_A = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	350 2.8	mW mW/ $^\circ\text{C}$
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	0.85 6.8	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 (Note 1)	$R_{\theta JA}$	357	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction-to–Case	$R_{\theta JC}$	147	$^\circ\text{C}/\text{W}$

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

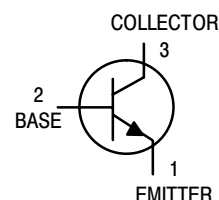
1.  $R_{\theta JA}$  is measured with the device soldered into a typical printed circuit board.

\*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®

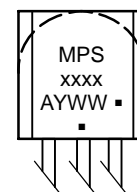
<http://onsemi.com>



#### MARKING DIAGRAM



TO-92  
CASE 29-11  
STYLE 1



MPSxxxx = Device Code  
xxxx = 918 or 3563  
A = Assembly Location  
Y = Year  
WW = Work Week  
▪ = Pb-Free Package  
(Note: Microdot may be in either location)

#### ORDERING INFORMATION

Device	Package	Shipping†
MPS918	TO-92	5000 Units/Box
MPS918G	TO-92 (Pb-Free)	5000 Units/Box
MPS3563	TO-92	5000 Units/Box
MPS3563G	TO-92 (Pb-Free)	5000 Units/Box
MPS3563RLRA	TO-92	2000/Tape & Reel
MPS3563RLRAG	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 Specification Brochure, BRD8011/D.

Preferred devices are recommended choices for future use and best overall value.

# MPS918, MPS3563

## 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 2) ( $I_C = 3.0\text{ mAdc}$ , $I_B = 0$ )	MPS918 MPS3563	$V_{(BR)CEO}$	15 12	– –	Vdc
Collector–Base Breakdown Voltage ( $I_C = 1.0\text{ }\mu\text{Adc}$ , $I_E = 0$ ) ( $I_C = 100\text{ }\mu\text{Adc}$ , $I_E = 0$ )	MPS918 MPS3563	$V_{(BR)CBO}$	30 30	– –	Vdc
Emitter–Base Breakdown Voltage ( $I_E = 10\text{ }\mu\text{Adc}$ , $I_C = 0$ )	MPS918 MPS3563	$V_{(BR)EBO}$	3.0 2.0	– –	Vdc
Collector Cutoff Current ( $V_{CB} = 15\text{ Vdc}$ , $I_E = 0$ )	MPS918 MPS3563	$I_{CBO}$	– –	10 50	nAdc

## ON CHARACTERISTICS

DC Current Gain (Note 2) ( $I_C = 3.0\text{ mAdc}$ , $V_{CE} = 1.0\text{ Vdc}$ ) ( $I_C = 8.0\text{ mAdc}$ , $V_{CE} = 10\text{ Vdc}$ )	MPS918 MPS3563	$h_{FE}$	20 20	– 200	–
Collector–Emitter Saturation Voltage ( $I_C = 10\text{ mAdc}$ , $I_B = 1.0\text{ mAdc}$ )	MPS918	$V_{CE(sat)}$	–	0.4	Vdc
Base–Emitter Saturation Voltage ( $I_C = 10\text{ mAdc}$ , $I_B = 1.0\text{ mAdc}$ )	MPS918	$V_{BE(sat)}$	–	1.0	Vdc

## SMALL–SIGNAL CHARACTERISTICS

Current–Gain – Bandwidth Product (Note 2) ( $I_C = 4.0\text{ mAdc}$ , $V_{CE} = 10\text{ Vdc}$ , $f = 100\text{ MHz}$ ) ( $I_C = 8.0\text{ mAdc}$ , $V_{CE} = 10\text{ Vdc}$ , $f = 100\text{ MHz}$ )	MPS918 MPS3563	$f_T$	600 600	– 1500	MHz
Output Capacitance ( $V_{CB} = 0\text{ Vdc}$ , $I_E = 0$ , $f = 1.0\text{ MHz}$ ) ( $V_{CB} = 10\text{ Vdc}$ , $I_E = 0$ , $f = 1.0\text{ MHz}$ ) ( $V_{CB} = 10\text{ Vdc}$ , $I_E = 0$ , $f = 1.0\text{ MHz}$ )	MPS918 MPS918 MPS3563	$C_{obo}$	– – –	3.0 1.7 1.7	pF
Input Capacitance ( $V_{EB} = 0.5\text{ Vdc}$ , $I_C = 0$ , $f = 1.0\text{ MHz}$ )	MPS918	$C_{ibo}$	–	2.0	pF
Small–Signal Current Gain ( $I_C = 8.0\text{ mAdc}$ , $V_{CE} = 10\text{ Vdc}$ , $f = 1.0\text{ kHz}$ )	MPS3563	$h_{fe}$	20	250	–
Noise Figure ( $I_C = 1.0\text{ mAdc}$ , $V_{CE} = 6.0\text{ Vdc}$ , $R_S = 400\text{ k}\Omega$ , $f = 60\text{ MHz}$ )	MPS918	NF	–	6.0	dB

## FUNCTIONAL TEST

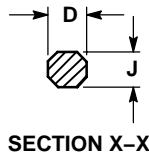
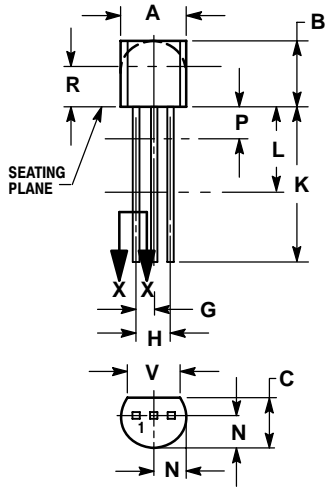
Common–Emitter Amplifier Power Gain ( $I_C = 6.0\text{ mAdc}$ , $V_{CB} = 12\text{ Vdc}$ , $f = 200\text{ MHz}$ ) ( $I_C = 8.0\text{ mAdc}$ , $V_{CE} = 10\text{ Vdc}$ , $f = 200\text{ MHz}$ ) ( $G_{fd} + G_{re} < -20\text{ dB}$ )	MPS918 MPS3563	$G_{pe}$	15 14	– –	dB
Power Output ( $I_C = 8.0\text{ mAdc}$ , $V_{CB} = 15\text{ Vdc}$ , $f = 500\text{ MHz}$ )	MPS918	$P_{out}$	30	–	mW
Oscillator Collector Efficiency ( $I_C = 8.0\text{ mAdc}$ , $V_{CB} = 15\text{ Vdc}$ , $P_{out} = 30\text{ mW}$ , $f = 500\text{ MHz}$ )	MPS918	$\eta$	25	–	%

2. Pulse Test: Pulse Width  $\leq 300\text{ }\mu\text{s}$ ; Duty Cycle  $\leq 1.0\%$ .

# MPS918, MPS3563

## PACKAGE DIMENSIONS

TO-92 (TO-226)  
CASE 29-11  
ISSUE AL



NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. CONTOUR OF PACKAGE BEYOND DIMENSION R IS UNCONTROLLED.
4. LEAD DIMENSION IS UNCONTROLLED IN P AND BEYOND DIMENSION K MINIMUM.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.175	0.205	4.45	5.20
B	0.170	0.210	4.32	5.33
C	0.125	0.165	3.18	4.19
D	0.016	0.021	0.407	0.533
G	0.045	0.055	1.15	1.39
H	0.095	0.105	2.42	2.66
J	0.015	0.020	0.39	0.50
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	0.115	---	2.93	---
V	0.135	---	3.43	---

STYLE 1:

1. PIN 1. EMITTER
2. BASE
3. COLLECTOR

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