

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°C	P_D	350 2.8	mW mW/ $^\circ\text{C}$
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°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.

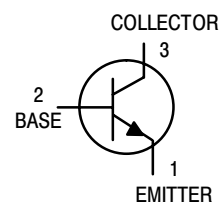
1. $R_{\theta JA}$ is measured with the device soldered into a typical printed circuit board.

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



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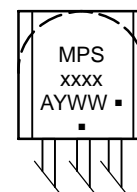
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MARKING DIAGRAM



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.

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

Characteristic		Symbol	Min	Max	Unit
OFF CHARACTERISTICS					
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

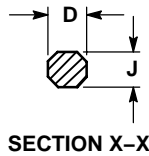
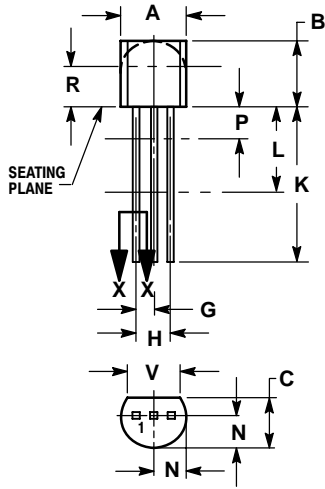
Common–Emitter Amplifier Power Gain ($I_C = 6.0\text{ mAdc}$, $V_{CB} = 12\text{ Vdc}$, $f = 200\text{ MHz}$) ($I_C = 8.0\text{ mAdc}$, $V_{CE} = 10\text{ Vdc}$, $f = 200\text{ MHz}$) ($G_{fd} + G_{re} < -20\text{ dB}$)	MPS918 MPS3563	G_{pe}	15 14	– –	dB
Power Output ($I_C = 8.0\text{ mAdc}$, $V_{CB} = 15\text{ Vdc}$, $f = 500\text{ MHz}$)	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	η	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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