

Amplifier Transistors

NPN Silicon

MPS918*
MPS3563

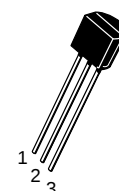
*ON Semiconductor Preferred Device

MAXIMUM RATINGS

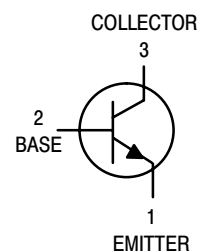
Rating	Symbol	MPS918	MPS3563	Unit
Collector–Emitter Voltage	V_{CEO}	15	12	Vdc
Collector–Base Voltage	V_{CBO}	30	30	Vdc
Emitter–Base Voltage	V_{EBO}	3.0	2.0	Vdc
Collector Current — Continuous	I_C	50		mAdc
Total Device Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	350	2.8	mW mW/ $^\circ\text{C}$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



CASE 29–10, STYLE 1
TO–92 (TO–226AL)



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

Characteristic	Symbol	Min	Max	Unit
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OFF CHARACTERISTICS

Collector–Emitter Breakdown Voltage ⁽²⁾ ($I_C = 3.0 \text{ mAdc}$, $I_E = 0$)	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

- $R_{\theta JA}$ is measured with the device soldered into a typical printed circuit board.
- Pulse Test: Pulse Width $\leq 300 \text{ }\mu\text{s}$; Duty Cycle $\leq 1.0\%$.

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

MPS918 MPS3563

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

Characteristic	Symbol	Min	Max	Unit
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ON CHARACTERISTICS

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

SMALL–SIGNAL CHARACTERISTICS

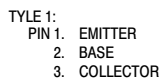
Current–Gain — Bandwidth Product ⁽²⁾ ($I_C = 4.0\text{ mA}$, $V_{CE} = 10\text{ Vdc}$, $f = 100\text{ MHz}$) ($I_C = 8.0\text{ mA}$, $V_{CE} = 10\text{ Vdc}$, $f = 100\text{ MHz}$)	MPS918 MPS3563	f_T	600 600	— 1500	MHz
Output Capacitance ($V_{CB} = 0\text{ Vdc}$, $I_E = 0$, $f = 1.0\text{ MHz}$) ($V_{CB} = 10\text{ Vdc}$, $I_E = 0$, $f = 1.0\text{ MHz}$) ($V_{CB} = 10\text{ Vdc}$, $I_E = 0$, $f = 1.0\text{ MHz}$)	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 ($I_C = 8.0\text{ mA}$, $V_{CE} = 10\text{ Vdc}$, $f = 1.0\text{ kHz}$)	MPS3563	h_{fe}	20	250	—
Noise Figure ($I_C = 1.0\text{ mA}$, $V_{CE} = 6.0\text{ Vdc}$, $R_S = 400\text{ k}\Omega$, $f = 60\text{ MHz}$)	MPS918	NF	—	6.0	dB

FUNCTIONAL TEST

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

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

TO-92 (TO-226)
CASE 29-10
ISSUE AL



1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. CONTOUR OF PACKAGE BEYOND DIMENSION R IS UNCONTROLLED.
4. DIMENSION F APPLIES BETWEEN P AND L. DIMENSIONS D AND J APPLY BETWEEN L AND K MINIMUM. LEAD DIMENSION IS UNCONTROLLED IN P AND BEYOND DIMENSION K MINIMUM.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.175	0.205	4.44	5.2
B	0.290	0.310	7.37	7.87
C	0.125	0.165	3.18	4.19
D	0.018	0.021	0.457	0.533
F	0.016	0.019	0.407	0.482
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	---

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