

Amplifier Transistors

NPN Silicon

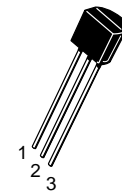
MPS918*

MPS3563

*ON Semiconductor Preferred Device

MAXIMUM RATINGS

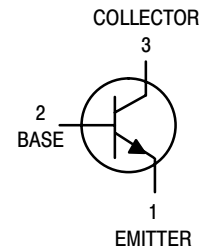
Rating	Symbol	MPS918	MPS3563	Unit
Collector–Emitter Voltage	V_{CEO}	15	12	Vdc
Collector–Base Voltage	V_{CBO}	30	30	Vdc
Emitter–Base Voltage	V_{EBO}	3.0	2.0	Vdc
Collector Current — Continuous	I_C	50		mAdc
Total Device Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	350		mW
		2.8		mW/ $^\circ\text{C}$
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	0.85		Watts
		6.8		mW/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	T_J, T_{stg}	–55 to +150		$^\circ\text{C}$



CASE 29–10, STYLE 1
TO-92 (TO-226AL)

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Ambient	$R_{\theta JA}^{(1)}$	357	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction to Case	$R_{\theta JC}$	147	$^\circ\text{C}/\text{W}$



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

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector–Emitter Breakdown Voltage ⁽²⁾ ($I_C = 3.0 \text{ mAdc}, I_E = 0$)	MPS918	15	—	Vdc
	MPS3563	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	30	—	Vdc
	MPS3563	30	—	Vdc
Emitter–Base Breakdown Voltage ($I_E = 10 \text{ }\mu\text{Adc}, I_C = 0$)	MPS918	3.0	—	Vdc
	MPS3563	2.0	—	Vdc
Collector Cutoff Current ($V_{CB} = 15 \text{ Vdc}, I_E = 0$)	I_{CBO}	—	10	nAdc
		—	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°C unless otherwise noted) (Continued)

Characteristic		Symbol	Min	Max	Unit
ON CHARACTERISTICS					
DC Current Gain ⁽²⁾ (I _C = 3.0 mA _{dc} , V _{CE} = 1.0 V _{dc}) (I _C = 8.0 mA _{dc} , V _{CE} = 10 V _{dc})	MPS918 MPS3563	h _{FE}	20 20	— 200	—
Collector–Emitter Saturation Voltage (I _C = 10 mA _{dc} , I _B = 1.0 mA _{dc})	MPS918	V _{CE(sat)}	—	0.4	V _{dc}
Base–Emitter Saturation Voltage (I _C = 10 mA _{dc} , I _B = 1.0 mA _{dc})	MPS918	V _{BE(sat)}	—	1.0	V _{dc}

SMALL–SIGNAL CHARACTERISTICS

Current–Gain — Bandwidth Product ⁽²⁾ (I _C = 4.0 mA _{dc} , V _{CE} = 10 V _{dc} , f = 100 MHz) (I _C = 8.0 mA _{dc} , V _{CE} = 10 V _{dc} , f = 100 MHz)	MPS918 MPS3563	f _T	600 600	— 1500	MHz
Output Capacitance (V _{CB} = 0 V _{dc} , I _E = 0, f = 1.0 MHz) (V _{CB} = 10 V _{dc} , I _E = 0, f = 1.0 MHz) (V _{CB} = 10 V _{dc} , I _E = 0, f = 1.0 MHz)	MPS918 MPS918 MPS3563	C _{obo}	— — —	3.0 1.7 1.7	pF
Input Capacitance (V _{EB} = 0.5 V _{dc} , I _C = 0, f = 1.0 MHz)	MPS918	C _{ibo}	—	2.0	pF
Small–Signal Current Gain (I _C = 8.0 mA _{dc} , V _{CE} = 10 V _{dc} , f = 1.0 kHz)	MPS3563	h _{fe}	20	250	—
Noise Figure (I _C = 1.0 mA _{dc} , V _{CE} = 6.0 V _{dc} , R _S = 400 kΩ, f = 60 MHz)	MPS918	NF	—	6.0	dB

FUNCTIONAL TEST

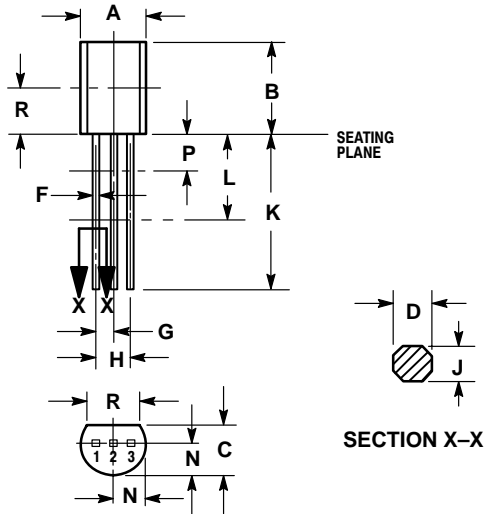
Common–Emitter Amplifier Power Gain (I _C = 6.0 mA _{dc} , V _{CB} = 12 V _{dc} , f = 200 MHz) (I _C = 8.0 mA _{dc} , V _{CE} = 10 V _{dc} , f = 200 MHz) (G _{fd} + G _{re} < –20 dB)	MPS918 MPS3563	G _{pe}	15 14	— —	dB
Power Output (I _C = 8.0 mA _{dc} , V _{CB} = 15 V _{dc} , f = 500 MHz)	MPS918	P _{out}	30	—	mW
Oscillator Collector Efficiency (I _C = 8.0 mA _{dc} , V _{CB} = 15 V _{dc} , P _{out} = 30 mW, f = 500 MHz)	MPS918	η	25	—	%

2. Pulse Test: Pulse Width ≤ 300 μs; Duty Cycle ≤ 1.0%.

MPS918 MPS3563

PACKAGE DIMENSIONS

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




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

NOTES:

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	5.21
B	0.290	0.310	7.37	7.87
C	0.125	0.165	3.18	4.19
D	0.018	0.021	0.457	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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