

New Jersey Semi-Conductor Products, Inc.

20 STERN AVE.  
SPRINGFIELD, NEW JERSEY 07081  
U.S.A.

TELEPHONE: (973) 376-2922  
(212) 227-6005  
FAX: (973) 376-8960

## Amplifier Transistors NPN Silicon

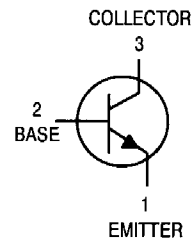
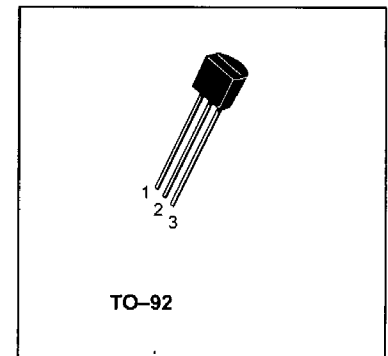
**MPS918\***  
**MPS3563**

### 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 $25^\circ\text{C}$	$P_D$	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	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	$^\circ\text{C/W}$



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

Characteristic	Symbol	Min	Max	Unit
Collector-Emitter Breakdown Voltage <sup>(2)</sup> ( $I_C = 3.0 \text{ mAdc}, I_E = 0$ )	$V_{(BR)CEO}$	15 12	— —	Vdc
Collector-Base Breakdown Voltage ( $I_C = 1.0 \text{ }\mu\text{Adc}, I_E = 0$ ) ( $I_C = 100 \text{ }\mu\text{Adc}, I_E = 0$ )	$V_{(BR)CBO}$	30 30	— —	Vdc
Emitter-Base Breakdown Voltage ( $I_E = 10 \text{ }\mu\text{Adc}, I_C = 0$ )	$V_{(BR)EBO}$	3.0 2.0	— —	Vdc
Collector Cutoff Current ( $V_{CB} = 15 \text{ Vdc}, I_E = 0$ )	$I_{CBO}$	— —	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  $\leq 1.0\%$ .

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Quality Semi-Conductors

# MPS918 MPS3563

## ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C unless otherwise noted) (Continued)

Characteristic	Symbol	Min	Max	Unit
<b>ON CHARACTERISTICS</b>				
DC Current Gain <sup>(2)</sup> (I <sub>C</sub> = 3.0 mA <sub>dc</sub> , V <sub>CE</sub> = 1.0 V <sub>dc</sub> ) (I <sub>C</sub> = 8.0 mA <sub>dc</sub> , V <sub>CE</sub> = 10 V <sub>dc</sub> )	h <sub>FE</sub>	20 20	— 200	—
Collector-Emitter Saturation Voltage (I <sub>C</sub> = 10 mA <sub>dc</sub> , I <sub>B</sub> = 1.0 mA <sub>dc</sub> )	V <sub>CE(sat)</sub>	—	0.4	V <sub>dc</sub>
Base-Emitter Saturation Voltage (I <sub>C</sub> = 10 mA <sub>dc</sub> , I <sub>B</sub> = 1.0 mA <sub>dc</sub> )	V <sub>BE(sat)</sub>	—	1.0	V <sub>dc</sub>

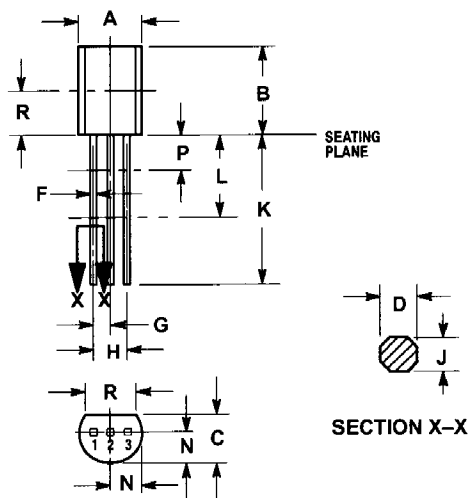
## SMALL-SIGNAL CHARACTERISTICS

Current-Gain — Bandwidth Product <sup>(2)</sup> (I <sub>C</sub> = 4.0 mA <sub>dc</sub> , V <sub>CE</sub> = 10 V <sub>dc</sub> , f = 100 MHz) (I <sub>C</sub> = 8.0 mA <sub>dc</sub> , V <sub>CE</sub> = 10 V <sub>dc</sub> , f = 100 MHz)	f <sub>T</sub>	600 600	— 1500	MHz
Output Capacitance (V <sub>CB</sub> = 0 V <sub>dc</sub> , I <sub>E</sub> = 0, f = 1.0 MHz) (V <sub>CB</sub> = 10 V <sub>dc</sub> , I <sub>E</sub> = 0, f = 1.0 MHz) (V <sub>CB</sub> = 10 V <sub>dc</sub> , I <sub>E</sub> = 0, f = 1.0 MHz)	C <sub>obo</sub>	— — —	3.0 1.7 1.7	pF
Input Capacitance (V <sub>EB</sub> = 0.5 V <sub>dc</sub> , I <sub>C</sub> = 0, f = 1.0 MHz)	C <sub>ibo</sub>	—	2.0	pF
Small-Signal Current Gain (I <sub>C</sub> = 8.0 mA <sub>dc</sub> , V <sub>CE</sub> = 10 V <sub>dc</sub> , f = 1.0 kHz)	h <sub>fe</sub>	20	250	—
Noise Figure (I <sub>C</sub> = 1.0 mA <sub>dc</sub> , V <sub>CE</sub> = 6.0 V <sub>dc</sub> , R <sub>S</sub> = 400 kΩ, f = 60 MHz)	NF	—	6.0	dB

## FUNCTIONAL TEST

Common-Emitter Amplifier Power Gain (I <sub>C</sub> = 6.0 mA <sub>dc</sub> , V <sub>CB</sub> = 12 V <sub>dc</sub> , f = 200 MHz) (I <sub>C</sub> = 8.0 mA <sub>dc</sub> , V <sub>CE</sub> = 10 V <sub>dc</sub> , f = 200 MHz) (G <sub>fd</sub> + G <sub>re</sub> < -20 dB)	G <sub>pe</sub>	15 14	— —	dB
Power Output (I <sub>C</sub> = 8.0 mA <sub>dc</sub> , V <sub>CB</sub> = 15 V <sub>dc</sub> , f = 500 MHz)	P <sub>out</sub>	30	—	mW
Oscillator Collector Efficiency (I <sub>C</sub> = 8.0 mA <sub>dc</sub> , V <sub>CB</sub> = 15 V <sub>dc</sub> , P <sub>out</sub> = 30 mW, f = 500 MHz)	η	25	—	%

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



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	0.085	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	---