



# Silicon Bipolar Low Noise Microwave Transistors

# MP42141

## Features

- Low Intrinsic Noise Figure (2.3dB Typical @ 1.0 GHz)
- High Power Gain At 1.0 GHz – 18.0 dB Typical
- Gold Metalization
- Hermetic and Surface Mount Packages Available
- Can be Screened to JANTX, JANTXV Equivalent Levels
- ION Implanted arsenic Emitter for Consistent Performance

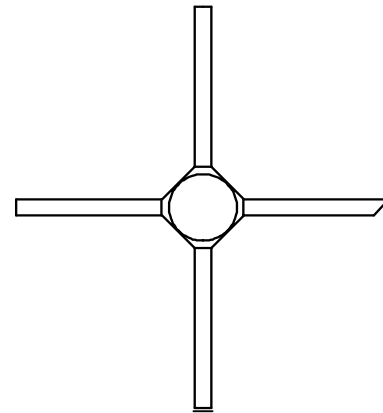
## Description

This NPN Silicon transistor finds applications in low noise and medium power microwave amplifier circuitry. The MP42141 exhibits an excellent noise figure characteristic over the frequency range of .5 to 2 GHz. This transistor also features good high frequency current gain at medium current levels.

## Applications

RF amplifiers and low level oscillators.

## Case Styles



**Micro-X**

Specification Subject to Change Without Notice

**M-Pulse Microwave**  
576 Charcot Avenue, San Jose, California 95131

Tel (408) 432-1480

Fax (408) 432-3440

**Absolute Maximum Ratings**  
**MP42141 Series**

Collector-Base Voltage	$V_{CB0}$	27 V
Collector-Emitter Voltage	$V_{CEO}$	20 V
Emitter-Base Voltage	$V_{EBO}$	1.5 V
Collector Current	$I_C$	50 mA
Junction Operating Temperature	$T_j$	200°C
Storage Temperature Chip or Ceramic Packages Plastic Packages		-65°C to +200°C -65°C to +125°C
Total Power Dissipation at 25°C		
509 Case Style		400 mW
510 Case Style		700 mW
35 Case Style		700 mW

**Electrical Specifications @ 25°C**  
**MP42141 Series**

Parameter of Test	Condition	Symbol	Units	MP4214100 Chip	MP4214135 Micro-X	MP42141-509 TO-72
Gain Bandwidth Product	$V_{CE} = 10$ volts $f_m = 1.0$ GHz $I_C = 15$ mA	$f_T$	GHz	4.1 typ	-----	-----
Insertion Power Gain	$V_{CE} = 15$ volts $I_C = 15$ mA $f = 1$ GHz $f = 2$ GHz	$ S_{21E} ^2$	dB	13 typ 7 typ	13 typ 7 min	11 typ 5 typ
Noise Figure	$V_{CE} = 10$ volts $I_C = 5$ mA $f = 1$ GHz $f = 2$ GHz	NF	dB	2.0 typ 3.4 typ	2.0 typ 3.4 typ	2.3 typ 3.6 typ
Unilateral Gain	$V_{CE} = 10$ volts $I_C = 15$ mA $f = 1$ GHz	GTU (max)	dB	17 typ	17 typ	14 typ
Power Out at 1 dB Compression Z=OPT	$V_{CE} = 10$ volts $I_C = 10$ mA $f = 1$ GHz	$P_{1dB}$	dBm	N/A	+7 typ	+4 typ

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**Electrical Specifications @ 25°C**  
**MP42141 Series**

Parameter	Condition	Symbol	Min	Typical	Max	Units
Collector Cut-off Current	$V_{CB} = 10$ volts $I_E = 0$ $\mu$ A	$I_{CBO}$	—	—	100	nA
Emitter Cut-off Current	$V_{EB} = 1$ volt $I_C = 0$ $\mu$ A	$I_{EBO}$	—	—	1	$\mu$ A
Forward Current Gain	$V_{CE} = 10$ volts $I_C = 5$ mA	$h_{FE}$	20	125	250	—
Collector-Base Junction Capacitance	$V_{CB} = 15$ volts $f = 1$ MHz	$C_{CB}$	—	----	1.0	pF (35)

**Typical Scattering Parameters**  
**MP42141-511,  $V_{CE} = 10$  Volts,  $I_C = 5$  mA**

Frequency (MHz)	$S_{11E}$		$S_{21E}$		$S_{12E}$		$S_{22E}$	
	Mag.	Angle	Mag.	Angle	Mag.	Angle	Mag	Angle
400	.626	-112.9	7.563	110.3	.044	43.0	.726	-34.3
500	.618	-125.0	6.425	102.1	.046	38.9	.660	-32.9
800	.577	-150.8	4.363	84.7	.054	34.3	.616	-38.6
1200	.566	-170.1	3.073	67.7	.062	32.9	.577	-43.1
1600	.661	-175.9	2.344	54.1	.069	32.6	.578	-50.4
2000	.561	166.2	1.894	43.2	.078	32.6	.571	-63.6
2400	.597	156.6	1.608	30.6	.084	30.3	.572	-70.8
2800	.506	147.8	1.408	17.9	.093	27.0	.565	-81.4
3200	.630	141.1	1.200	6.8	.099	24.6	.583	-90.7
3600	.651	133.7	1.072	-4.6	.106	21.7	.597	-102.6
4000	.643	132.9	.933	-6.5	.109	24.7	.599	-109.2
4400	.643	127.7	.796	-18.4	.112	21.4	.637	-121.6
4800	.656	122.7	.702	-28.8	.123	17.0	.686	-135.2
5000	.652	120.1	.657	-34.1	.123	14.0	.693	-142.1

**MP42141-511,  $V_{CE} = 15$  Volts,  $I_C = 15$  mA**

Frequency (MHz)	$S_{11E}$		$S_{21E}$		$S_{12E}$		$S_{22E}$	
	Mag.	Angle	Mag.	Angle	Mag.	Angle	Mag	Angle
400	.537	-143.2	10.294	100.9	.026	45.4	.608	-31.2
500	.547	-152.2	8.564	93.7	.028	46.0	.569	-29.3
800	.548	-170.2	5.694	79.2	.036	47.2	.562	-33.5
1200	.550	-176.9	3.867	65.9	.046	48.7	.532	-37.3
1600	.562	166.4	2.946	53.6	.056	48.0	.539	-43.9
2000	.579	158.8	2.383	43.8	.067	47.2	.539	-56.9
2400	.601	150.8	2.010	32.1	.074	43.4	.537	-63.4
2800	.608	143.3	1.755	20.0	.083	39.7	.530	-73.5
3200	.643	137.0	1.505	10.4	.091	36.6	.553	-82.5
3600	.657	130.1	1.338	-0	.098	33.5	.560	-94.1
4000	.654	129.7	1.188	-1.4	.104	36.2	.565	-99.8
4400	.648	124.6	1.017	-13.3	.107	32.5	.600	-112.7
4800	.665	120.1	.905	-23.4	.120	27.5	.648	-125.9
5000	.650	117.2	.849	-28.9	.121	24.4	.657	-133.0

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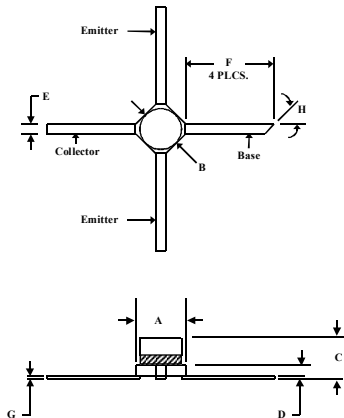
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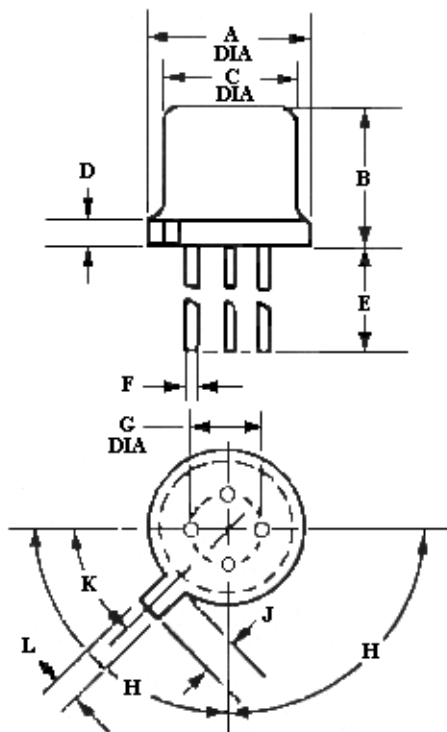
**MP4214135**  
Micro-X



**MP4214135**

DIM.	INCHES		MILLIMETERS	
	MIN.	MAX.	MIN.	MAX.
A	0.092	0.108	2.34	2.74
B	0.079	0.087	2.01	2.21
C	—	0.070	—	1.78
D	0.019	0.025	0.48	0.64
E	0.018	0.022	0.46	0.56
F	0.150	—	3.81	—
G	0.003	0.006	0.08	0.15
H	45°		45°	

**MP42141-509**  
TO-72



**MP42141-509**

DIM	INCHES		MILLIMETERS	
	MIN.	MAX.	MIN.	MAX.
A	0.350	0.370	8,89	9,40
B	0.240	0.260	6,11	6,60
C	0.315	0.335	8,00	8,51
D		0.040		1,02
E	0.500		12,70	
F	0.016	0.021	0,41	0,53
G	0.190	0.210	4,83	5,33
H	89 DEG	91 DEG	89 DEG	91 DEG
J	0.029	0.043	0,74	1,09
K	43 DEG	47 DEG	43 DEG	47 DEG
L	0.028	0.034	0,71	0,86

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