



# Silicon Bipolar Low Noise Microwave Transistors

## MP42001

### Features

- Low Noise Figure (.8dB Typical @ 60 MHz)
- Large Dynamic Range (+25dBm @ 1Db Compression Point)
- Gold Metalization
- Hermetic and Surface Mount Packages Available
- Can be Screened to JANTX, JANTXV Equivalent Levels
- Low 1/f Noise (1.0dB Typical @ 10 KHz)

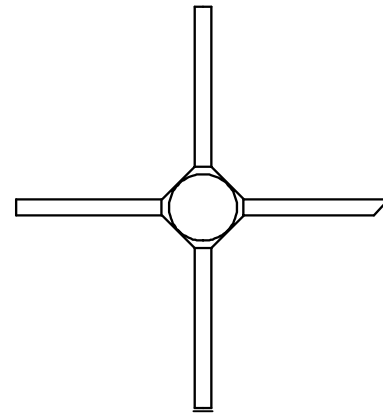
### Description

This series of NPN silicon transistors is designed to provide the low noise figure at frequencies from 10 to 1000 MHz. These transistors exhibit excellent noise figure vs. current characteristics which results in extremely low noise and wide dynamic range performance. These transistors find wide application in sophisticated radar and communications equipment at VHF/UHF.

### Applications

The MP42001 family of bipolar NPN transistors can be used for low noise, high associated gain. large dynamic range amplifiers up to approximately 1.0 GHz. These transistors can also be used as preamplifier or driver stages in the same frequency range.

### 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**  
**MP42001 Series**

Collector-Base Voltage	$V_{CB0}$	20 V
Collector-Emitter Voltage	$V_{CE0}$	15 V
Emitter-Base Voltage	$V_{EB0}$	1.5 V
Collector Current	$I_C$	125 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		450 mW
510 Case Style		1.2 W
35 Case Style		750 mW

**Electrical Specifications @ 25°C**  
**MP42001 Series**

Parameter of Test	Condition	Symbol	Units	MP4200100 Chip	MP4200135 Micro-X	MP42001-509 TO-72
Gain Bandwidth Product	$V_{CE} = 10$ volts $I_C = 35$ mA	$f_T$	GHz	2.3 typ	1.5 typ	1.5 typ
Insertion Power Gain	$V_{CE} = 10$ volts $I_C = 28$ mA $f = 100$ MHz $f = 450$ MHz	$ S_{21E} ^2$	dB	30 typ 16 typ	29 typ 14 min	26 typ 12 min
Noise Figure	$V_{CE} = 10$ volts $I_C = 5$ mA $f = 60$ MHz $f = 450$ GHz	NF	dB	1.2 typ 1.7 typ	1.4 typ 1.9 typ	1.5 typ 2.3 typ
Unilateral Gain	$V_{CE} = 10$ volts $I_C = 5$ mA $f = 60$ MHz	GTU (max)	dB	30 typ	28 typ	28 typ
Power Out at 1 dB Compression $Z=50$ Ohms	$V_{CE} = 10$ volts $I_C = 10$ mA $f = 60$ MHz $f = 450$ MHz	$P_{1dB}$	dBm	N/A N/A	+5 typ +2 typ	+7 typ +4 typ

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**Electrical Specifications @ 25°C**  
**MP42001 Series**

Parameter	Condition	Symbol	Min	Typical	Max	Units
Collector Cut-off Current	$V_{CB} = 10$ volts $I_E = 0$ $\mu$ A	$I_{CBO}$	—	—	10	nA
Emitter Cut-off Current	$V_{EB} = 1$ volt $I_C = 0$ $\mu$ A	$I_{EBO}$	—	—	1	$\mu$ A
Forward Current Gain	$V_{CE} = 8$ volts $I_C = 7$ mA	$h_{FE}$	30	125	250	—
Collector-Base Junction Capacitance	$V_{CB} = 15$ volts $f = 1$ MHz	$C_{CB}$	—	----	1.7 1.3 1.2	pF (509) pF (510) pF (511)

**Typical Scattering Parameters in the TO-72 Can Package**  
**MP42001-509,  $V_{CE} = 10$  Volts,  $I_C = 5$  mA**

Frequency (MHz)	$S_{11E}$		$S_{21E}$		$S_{12E}$		$S_{22E}$	
	Mag.	Angle	Mag.	Angle	Mag.	Angle	Mag	Angle
110	0.667	-83	8.74	122.6	0.040	48.9	0.765	-21.7
200	0.551	-116	6.02	104.7	0.054	45.7	0.649	-25.8
300	0.496	-138	4.32	92.4	0.064	48.1	0.597	-28.4
400	0.475	-155	3.45	83.1	0.070	50.9	0.578	-30.7
500	0.466	-167	2.79	75.0	0.080	55.8	0.570	-32.4
600	0.467	-178	2.38	69.1	0.088	59.9	0.551	-35.6
700	0.470	174	2.13	62.1	0.098	63.3	0.528	-38.6
800	0.474	167	1.87	57.3	0.114	65.4	0.511	-44.3
900	0.469	161	1.72	52.4	0.127	67.1	0.506	-50.4
1000	0.464	153	1.58	46.3	0.145	70.0	0.503	-56.4

**MP42001-510,  $V_{CE} = 10$  Volts,  $I_C = 60$  mA**

Frequency (MHz)	$S_{11E}$		$S_{21E}$		$S_{12E}$		$S_{22E}$	
	Mag.	Angle	Mag.	Angle	Mag.	Angle	Mag	Angle
100	0.76	-143	30.01	111	0.01	45	0.49	-30
200	0.80	-164	14.54	96	0.01	43	0.34	-22
300	0.81	-174	8.81	86	0.02	46	0.32	-20
400	0.82	-178	6.38	80	0.02	50	0.31	-21
500	0.84	178	4.92	75	0.02	56	0.31	-23
600	0.82	174	4.11	68	0.03	59	0.32	-26
700	0.82	172	3.38	63	0.03	63	0.32	-29
800	0.85	168	2.82	58	0.03	61	0.33	-33
900	0.92	172	2.32	59	0.03	64	0.34	-37
1000	0.83	162	2.28	49	0.04	64	0.35	-40

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Performance Curves

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**Case Styles**

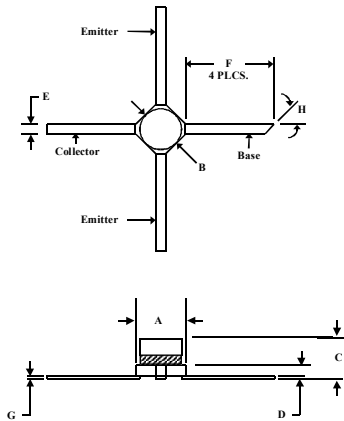
**MP4200135  
Micro-X**

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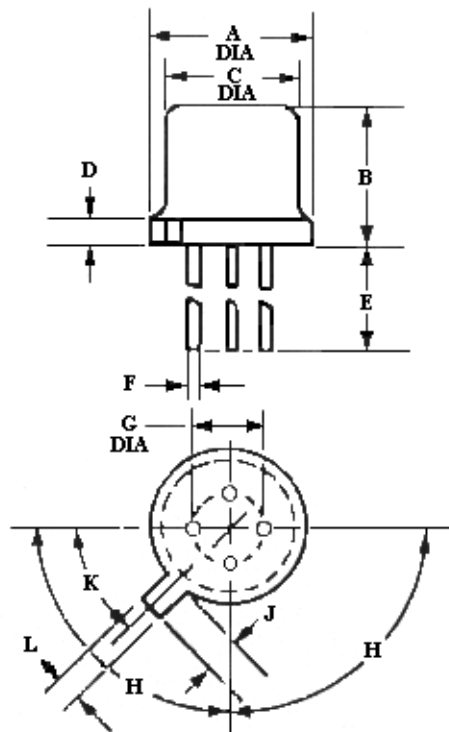
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MP4200135

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°	

MP42001-509  
TO-72



MP42001-509

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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Case Styles (Cont'd)

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