

# MS2209

## RF & MICROWAVE TRANSISTORS AVIONICS APPLICATIONS

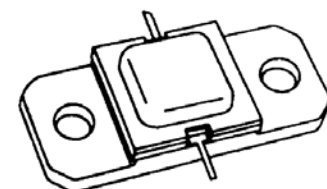
### Features

- 225 MHz BANDWIDTH
- COMMON BASE
- GOLD METALLIZATION
- CLASS C OPERATION
- POUT = 90 W MIN. WITH 8.4 dB GAIN

### DESCRIPTION:

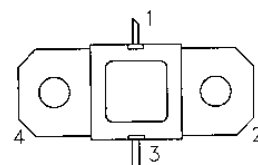
The MS2209 is a broadband, high peak pulse power silicon NPN bipolar device specifically designed for avionics applications requiring broad bandwidth with moderate duty cycles and pulse width constraints such as ground/ship based DME/TACAN.

This device is also designed for specialized applications including JTIDS applications when duty cycle is moderately higher. Gold metallization and emitter ballasting assure high reliability under Class C amplifier operation.



.400 x .400 2NLFL (M218)  
hermetically sealed

#### PIN CONNECTION



1. Collector      3. Emitter  
2. Base          4. Base

### ABSOLUTE MAXIMUM RATINGS (T<sub>case</sub> = 25°C)

Symbol	Parameter	Value	Unit
V <sub>CC</sub>	Collector Supply Voltage	50	V
I <sub>C</sub>	Device Current	7.0	A
P <sub>DISS</sub>	Power Dissipation	220	W
T <sub>J</sub>	Junction Temperature (RF Pulsed Operation)	+200	°C
T <sub>STG</sub>	Storage Temperature	-65 to +200	°C

### Thermal Data

R <sub>TH(J-C)</sub>	Junction-case Thermal Resistance	0.80	°C/W
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## ELECTRICAL SPECIFICATIONS (T<sub>case</sub> = 25°C)

### STATIC

Symbol	Test Conditions		Value			Unit
			Min.	Typ.	Max.	
BV <sub>CBO</sub>	I <sub>C</sub> = 40mA	I <sub>E</sub> = 0mA	65	---	---	V
BV <sub>EBO</sub>	I <sub>E</sub> = 10mA	I <sub>C</sub> = 0mA	3.0	---	---	V
BV <sub>CER</sub>	I <sub>C</sub> = 40mA	R <sub>BE</sub> = 10Ω	65	---	---	V
I <sub>CBO</sub>	V <sub>CB</sub> = 35 V		-----	---	12	mA
h <sub>FE</sub>	V <sub>CE</sub> = 5 V	I <sub>C</sub> = 2A	20	---	120	---

### DYNAMIC

Symbol	Test Conditions			Value			Unit
				Min.	Typ.	Max.	
P <sub>OUT</sub>	f = 960-1215MHz	V <sub>CC</sub> = 50V	P <sub>IN</sub> = 13W	90	100	---	W
G <sub>P</sub>	f = 960-1215MHz	V <sub>CC</sub> = 50V	P <sub>IN</sub> = 13W	8.4	---	---	dB
η <sub>C</sub>	f = 960-1215MHz	V <sub>CC</sub> = 50V	P <sub>IN</sub> = 13W	38	44	---	%
VSWR	f = 960MHz	V <sub>CC</sub> = 50V	P <sub>IN</sub> = 13W			10:1	

Pulse Width = 10 μs

Duty Cycle = 10%

### IMPEDANCE DATA

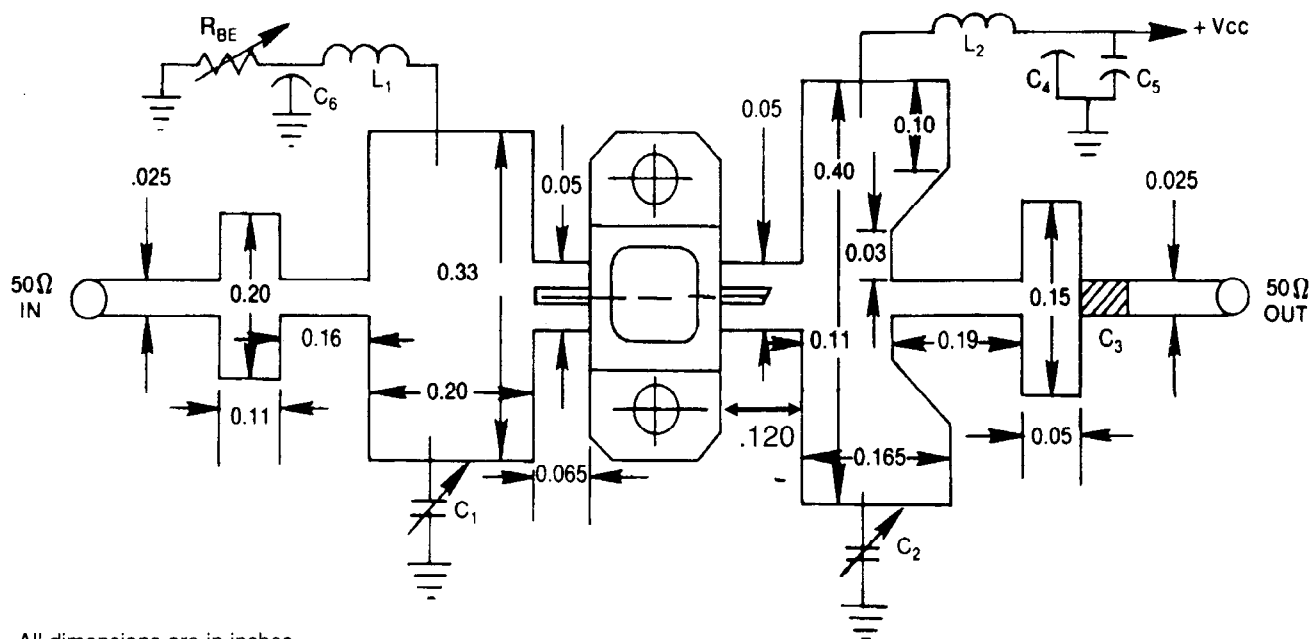
Freq	Z <sub>in</sub> (Ω)	Z <sub>cl</sub> (Ω)
960	5+j9.0	10.2-j8.8
1025	6+j8.0	9.5-j7.6
1090	6.8+j7.2	9.0-j6.2
1150	6.3+j7.0	8.4-j5.0
1215	5.8+j7.8	7.0-j3.7

V<sub>cc</sub>=50v  
 P<sub>out</sub>=90w

**MS2209**

**TEST CIRCUIT**

Ref. Dwg. No. J-313120



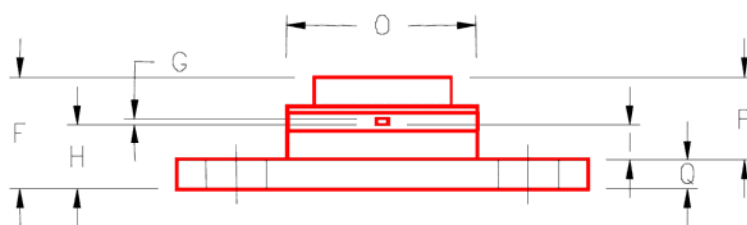
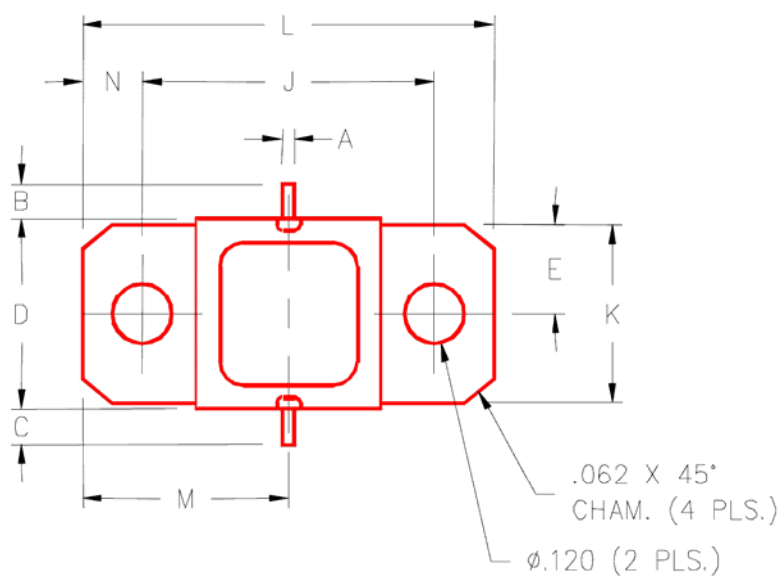
All dimensions are in inches.  
Substrate material: .025 thick Al<sub>2</sub>O<sub>3</sub>

C1,C2 : 0.3 - 3.5 pF Johanson Capacitors, or Equiv.  
C3 : 100 pF Chip Capacitor  
C4,C6 : 1500 pF RF Feedthru

C5 : 100 MF, Electrolytic 50V  
L1,L2 : No. 32 Wire, 4 Turn .062 I.D.  
RBE : 0 - 1.0 Ohm

## PACKAGE MECHANICAL DATA

### PACKAGE STYLE M218



	MINIMUM INCHES/MM	MAXIMUM INCHES/MM		MINIMUM INCHES/MM	MAXIMUM INCHES/MM
A	.025/0,64		J	.650/16,51	
B	.100/2,54		K	.386/9,80	
C	.100/2,54		L	.900/22,86	
D	.395/10,03	.407/10,34	M	.450/11,43	
E	.193/4,90		N	.125/3,18	
F		.230/5,84	O	.405/10,29	
G	.004/0,10	.007/0,18	P	.170/4,32	
H	.118/3,00	.131/3,33	Q	.062/1,58	
I	.063/1,60				