

## MS2209

### RF & MICROWAVE TRANSISTORS AVIONICS APPLICATIONS

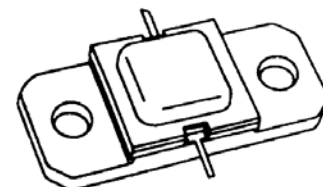
#### Features

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

#### DESCRIPTION:

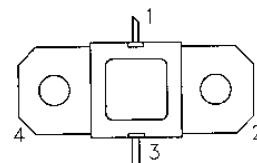
The MS2209 is a broadband, high peak pulse power silicon NPN bipolar device specifically designed for avionics applications requiring broad bandwidth with moderate duty cycles and pulse width constraints such as ground/ship based DME/TACAN.

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 (Tcase = 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 (Tcase = 25°C)**
**STATIC**

Symbol	Test Conditions	Value			Unit
		Min.	Typ.	Max.	
$BV_{CBO}$	$I_C = 40mA$ $I_E = 0mA$	65	---	---	V
$BV_{EBO}$	$I_E = 10mA$ $I_C = 0mA$	3.0	---	---	V
$BV_{CER}$	$I_C = 40mA$ $R_{BE} = 10\Omega$	65	---	---	V
$I_{CBO}$	$V_{CB} = 35 V$	-----	---	12	mA
$h_{FE}$	$V_{CE} = 5 V$ $I_C = 2A$	20	---	120	---

**DYNAMIC**

Symbol	Test Conditions	Value			Unit
		Min.	Typ.	Max.	
$P_{OUT}$	$f = 960-1215MHz$ $V_{CC} = 50V$ $P_{IN} = 13W$	90	100	---	W
$G_P$	$f = 960-1215MHz$ $V_{CC} = 50V$ $P_{IN} = 13W$	8.4	---	---	dB
$\eta_C$	$f = 960-1215MHz$ $V_{CC} = 50V$ $P_{IN} = 13W$	38	44	---	%
VSWR	$f = 960MHz$ $V_{CC} = 50V$ $P_{IN} = 13W$			10:1	

 Pulse Width = 10  $\mu s$ 

Duty Cycle = 10%

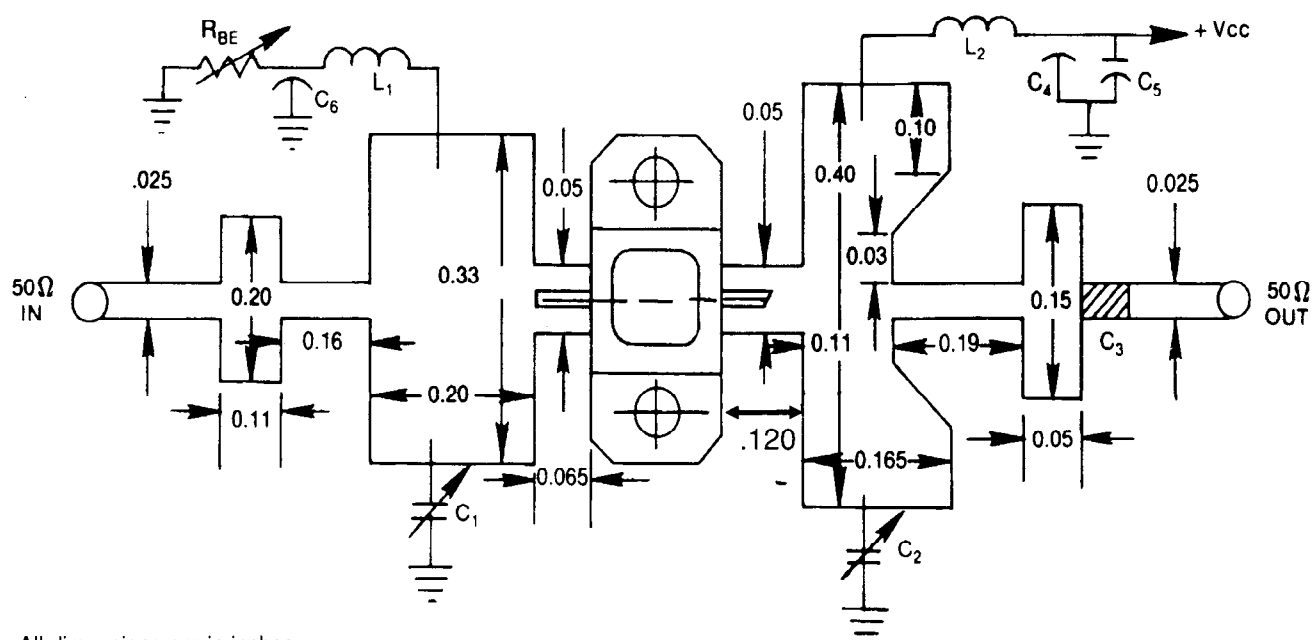
**IMPEDANCE DATA**

Freq	$Z_{in} (\Omega)$	$Z_{cl} (\Omega)$
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

 $V_{CC} = 50V$   
 $P_{out} = 90W$

## 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

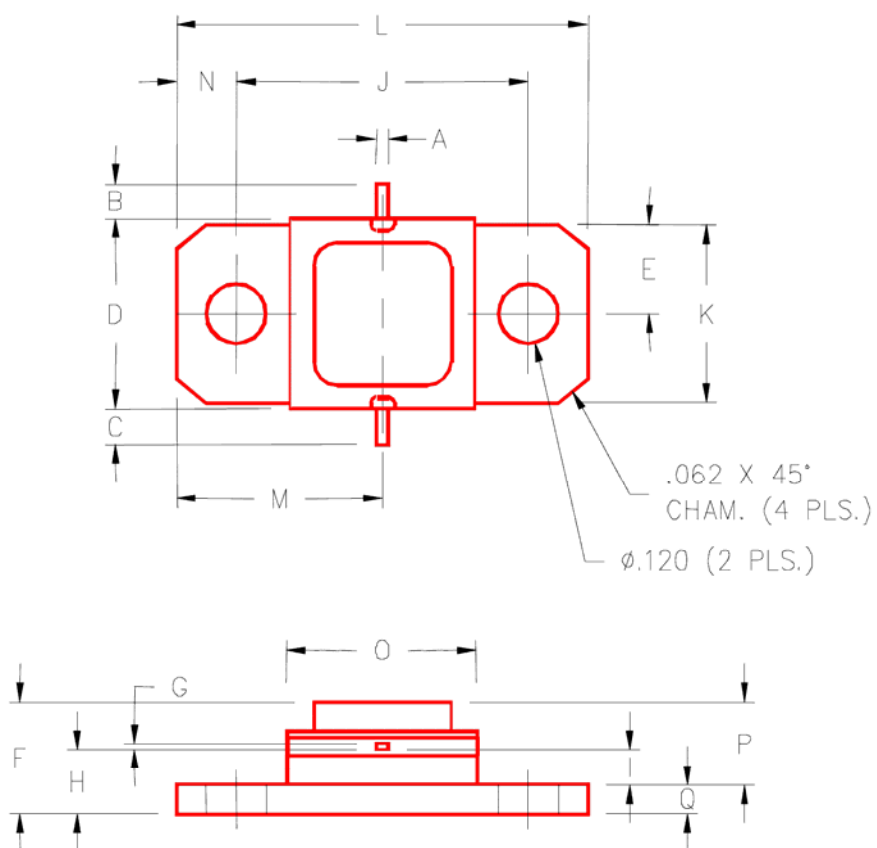
C5 : 100 MF, Electrolytic 50V

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				