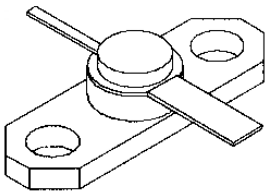
MS3023

RF & Microwave Transistors
General Purpose Amplifier Applications

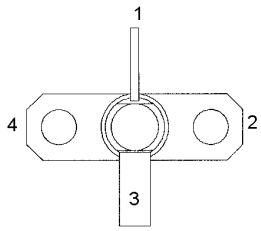
GENERAL DESCRIPTION

The **MS3023** is a common base, hermetically sealed silicon NPN microwave power transistor. This device is designed for Class-C applications in the 1 ~ 2 GHz frequency range. Gold metallization and emitter ballasting provide long-term reliability and superior ruggedness.



.250 2LFL (M210)

PIN CONNECTION



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

FEATURES

- GOLD METALLIZATIOM
- P_{OUT} = 3 W MINIMUN
- 2.0 GHz
- G_P = 7.8 dB
- INFINITE VSWR CAPABLE @ RATED CONDITIONS
- HERMETIC PACKAGE
- COMMON BASE CONFIGURATION

ABSOLUTE MAXIMUM RATINGS @ 25°C

SYMBOL	PARAMETER	VALUE	UNITS
P_{DISS}[1]	Power Dissipation	12.5	W
I_C[1]	Device Current	550	mA
V_{CC}	Collector Supply Voltage	35	V
T_J	Junction Temperature (Pulsed RF Operation)	+200	°C
T_{STG}	Storage Temperature	-65 to +150	°C
θjc[1]	Junction-Case Thermal Resistance	14.0	°C/W

NOTES: 1. At rated output power, pulse conditions and MSC fixture
Rev. A: Apr. 2010

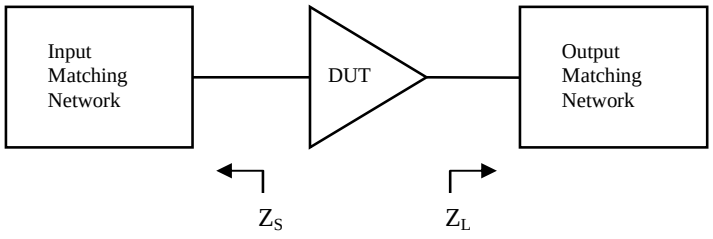
ELECTRICAL CHARACTERISTICS @ 25°C

SYMBOL	CHARACTERISTICS	TEST CONDITIONS	MIN	TYP	MAX	UNITS
BV_{CER}	Collector to Emitter Breakdown	I_C = 5 mA, R_{BE} = 10 Ω	45	-	-	V
BV_{CBO}	Collector to Base Breakdown	I_C = 1 mA, I_E = 0 mA	45	-	-	V
BV_{EBO}	Emitter to Base Breakdown	I_E = 1 mA, I_C = 0 mA	3.5	-	-	V
I_{CES}	Collector to Emitter Leakage	V_{BE} = 0 V, V_{CB} = 28V	-	-	1.0	mA
H_{FE}	DC – Current Gain	I_C = 200 mA, V_{CE} = 5 V	15	-	120	-

FUNCTIONAL CHARACTERISTICS @ 25°C

SYMBOL	CHARACTERISTICS	TEST CONDITIONS	MIN	TYP	MAX	UNITS
P_{OUT}	Power Out	F = 1.0 / 2.0 GHz	3.0	-	-	W
G_P	Power Gain	V_{CB} = 28V	7.8	-	-	dB
η_C	Collector Efficiency	P_{in} = 0.5W	35	-	-	%
C_{OB}	Output Capacitance	F = 1MHz V_{CB} = 28V	-	-	6.5	pF

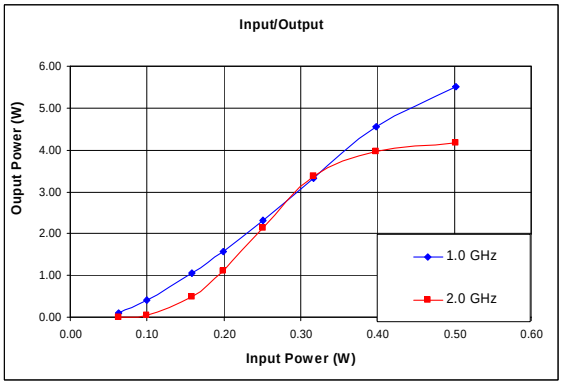
Typical Impedance Values

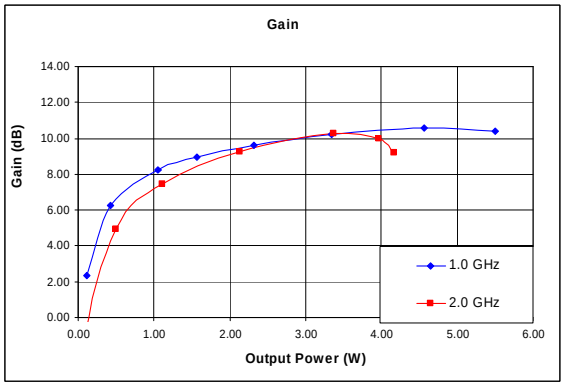


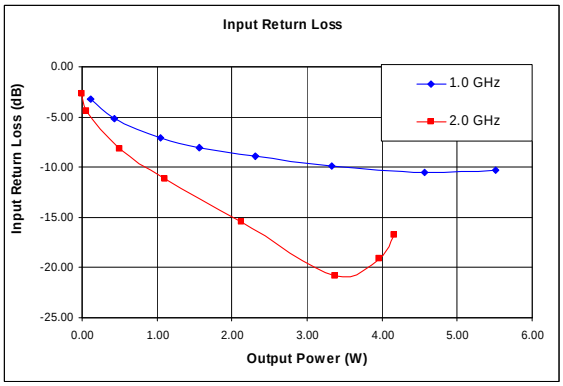
Frequency (GHz)	Z_S (Ω)	Z_L (Ω)
1.0	**4.4 – j5.5**	**9.6 + j16.0**
1.5	**4.5 – j9.0**	**4.3 + j7.0**
2.0	**4.6 – j12.5**	**3.0 + j1.0**

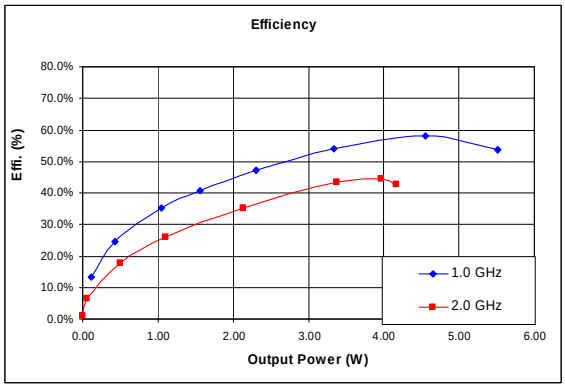
* V_{CC} = 28V, P_{IN} = 0.5W, P_{OUT} > 3W

Typical Performance (@ 1.0GHz / 2.0GHz)



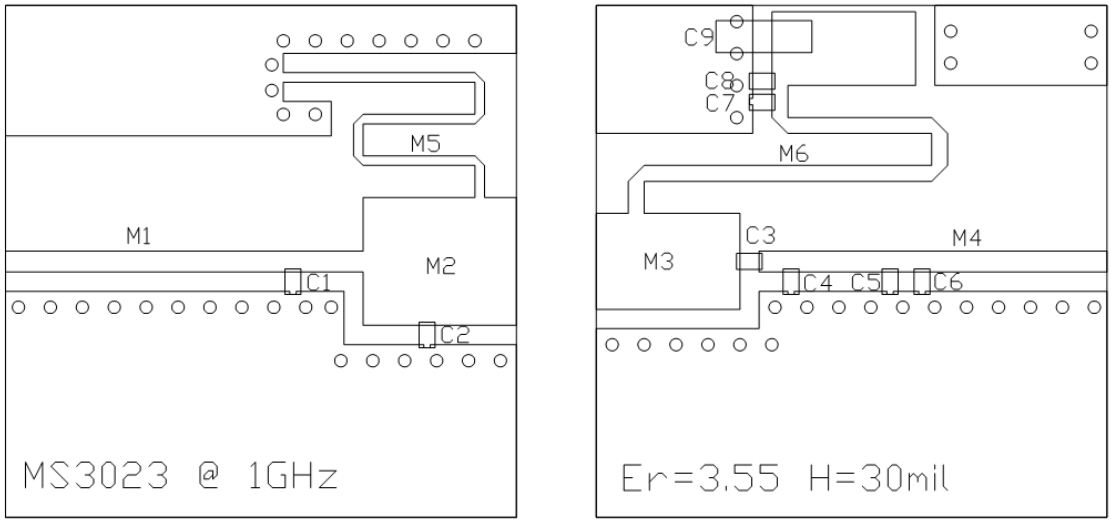






NOTES: The fixture is not broad-band.
The unit is tested with 1.0 GHz fixture and 2.0 GHz fixture.

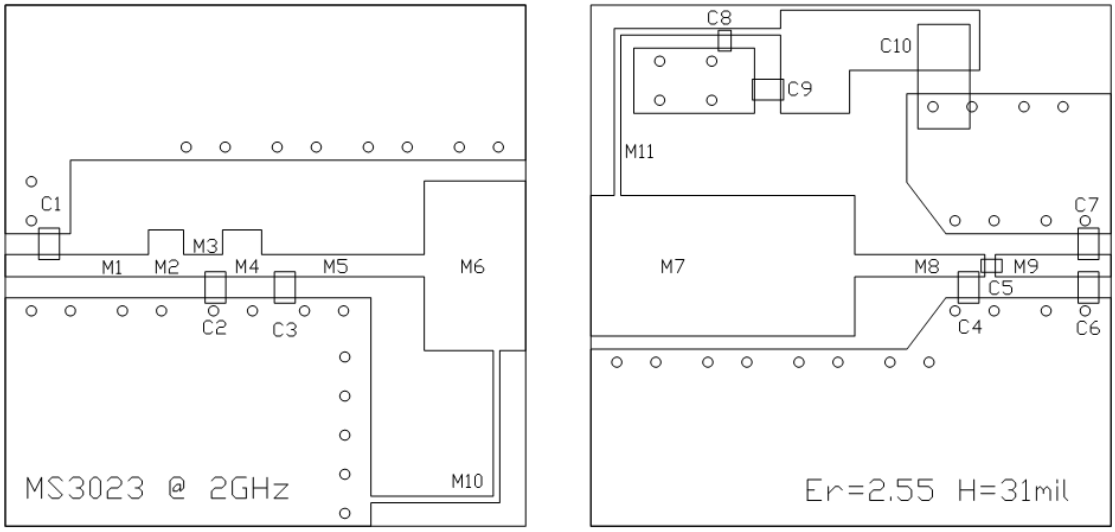
MS3023 Test Circuit Layout @ 1.0 GHz



MS3023 Test Circuit Component Designations and Values @ 1.0 GHz

Part	Description	Part	Description
C1	1.0pF Chip Capacitor (ATC 600F)	C4	2.4pF Chip Capacitor (ATC 600F)
C2, C5, C6	4.7pF Chip Capacitor (ATC 600F)	C3, C7, C8	100pF Chip Capacitor (ATC 600F)
C8	47uF 63V Electrolytic Capacitor	PCB	RF-35, ε_r=3.55, 30mils, 1oz
M1	66 x 1120 mils (W x L)	M2	400 x 480 mils (W x L)
M3	300 x 450 mils (W x L)	M4	66 x 1090 mils (W x L)
M5	30 x 1706 mils (W x L)	M6	50 x 1740 mils (W x L)

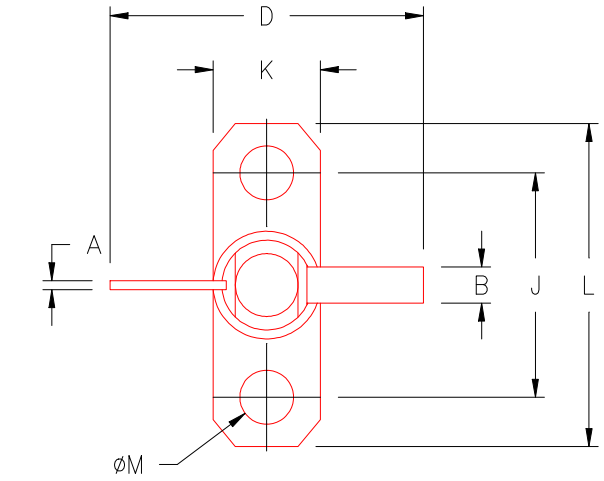
MS3023 Test Circuit Layout @ 2.0 GHz

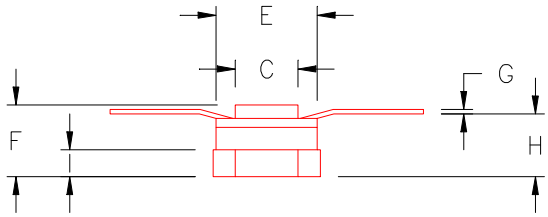


MS3023 Test Circuit Component Designations and Values @ 2.0 GHz

Part	Description	Part	Description
C1	0.2pF Chip Capacitor (ATC 200B)	C2	1.7pF Chip Capacitor (ATC 200B)
C3	1.5pF Chip Capacitor (ATC 200B)	C4	2.2pF Chip Capacitor (ATC 200B)
C5, C8	39pF Chip Capacitor (ATC 200A)	C6	0.4pF Chip Capacitor (ATC 200B)
C7	0.3pF Chip Capacitor (ATC 200B)	C9	100pF Chip Capacitor (ATC 200B)
C10	47uF 63V Electrolytic Capacitor	PCB	Arlon, ε_r=2.55, 31mils, 1oz
M1	86 x 550 mils (W x L)	M2	180 x 135 mils (W x L)
M3	86 x 150 mils (W x L)	M4	180 x 150 mils (W x L)
M5	86 x 625 mils (W x L)	M6	650 x 390 mils (W x L)
M7	540 x 1015 mils (W x L)	M8	86 x 500 mils (W x L)
M9	86 x 445 mils (W x L)	M10	25 x 1055 mils (W x L)
M11	25 x 1040 mils (W x L)		

PACKAGE STYLE M210





	MINIMUM INCHES/MM	MAXIMUM INCHES/MM		MINIMUM INCHES/MM	MAXIMUM INCHES/MM
A	.028/0,71	.032/0,81	J	.560/14,22	.570/14,48
B	.110/2,80	.117/2,97	K	.245/6,22	.255/6,48
C	.165/4,19	.185/4,70	L	.790/20,07	.810/20,57
D	.740/18,80		M	.128/3,25	.132/3,35
E	.225/5,72	.235/5,97			
F	.149/2,30	.187/4,75			
G	.003/0,08	.007/0,18			
H	.117/2,97	.133/3,38			
I	.058/1,47	.068/1,73			