New Jersey Semi-Conductor Products, Inc.

20 STERN AVE.
SPRINGFIELD, NEW JERSEY 07081
U.S.A.

TELEPHONE: (973) 376-2922
(212) 227-6005
FAX: (973) 376-8960

The RF MOSFET Line

RF Power Field Effect Transistors

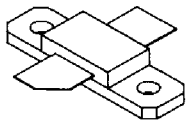
N-Channel Enhancement-Mode Lateral MOSFETs

MRF21010LR1
MRF21010LSR1

Designed for W-CDMA base station applications with frequencies from 2110 to 2170 MHz. Suitable for FM, TDMA, CDMA and multicarrier amplifier applications. To be used in Class AB for PCN-PCS/cellular radio and WLL applications.

- Typical W-CDMA Performance: -45 dBc ACPR, 2140 MHz, 28 Volts, 5 MHz Offset/4.096 MHz BW, 15 DTCH
  Output Power — 2.1 Watts
  Power Gain — 13.5 dB
  Efficiency — 21%
- High Gain, High Efficiency and High Linearity
- Integrated ESD Protection
- Designed for Maximum Gain and Insertion Phase Flatness
- Capable of Handling 10:1 VSWR @ 28 Vdc, 2170 MHz, 10 Watts CW Output Power
- Excellent Thermal Stability
- Characterized with Series Equivalent Large-Signal Impedance Parameters
- In Tape and Reel. R1 Suffix = 500 Units per 32 mm, 13 Inch Reel.
- Low Gold Plating Thickness on Leads. L Suffix Indicates 40μ" Nominal.

2170 MHz, 10 W, 28 V
LATERAL N-CHANNEL
BROADBAND
RF POWER MOSFETs



CASE 360B-05,
NI-360
MRF21010LR1

CASE 360C-05,
NI-360S
MRF21010LSR1

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	65	Vdc
Gate-Source Voltage	V_{GS}	- 0.5, +15	Vdc
Total Device Dissipation @ T_C = 25°C Derate above 25°C	P_D	43.75 0.25	W W/°C
Storage Temperature Range	T_{stg}	- 65 to +150	°C
Operating Junction Temperature	T_J	200	°C

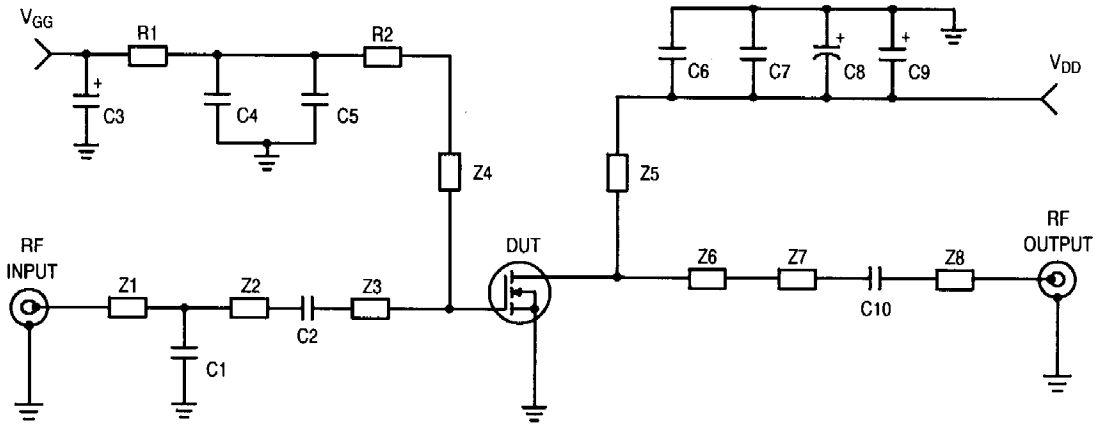
THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	5.5	°C/W

ESD PROTECTION CHARACTERISTICS

Test Conditions	Class
Human Body Model	1 (Minimum)
Machine Model	M1 (Minimum)

NOTE - **CAUTION** - MOS devices are susceptible to damage from electrostatic charge. Reasonable precautions in handling and packaging MOS devices should be observed.



Z1	0.964″ x 0.087″ Microstrip	Z6	0.453″ x 1.118″ Microstrip
Z2	0.905″ x 0.087″ Microstrip	Z7	0.921″ x 0.154″ Microstrip
Z3	0.433″ x 0.512″ Microstrip	Z8	0.925″ x 0.087″ Microstrip
Z4	1.068″ x 0.087″ Microstrip	PCB	Taconic TLX8-0300, 0.030″, ε_r = 2.55
Z5	0.752″ x 0.087″ Microstrip		

Figure 1. MRF21010L Test Circuit Schematic

Table 1. MRF21010L Test Circuit Component Designations and Values

Part		Description	Value, P/N or DWG	Manufacturer
C1 *	(eared)	2.2 pF Chip Capacitor, B Case	100B2R2BW	ATC
	(earless)	1.8 pF Chip Capacitor, B Case	100B1R8BW	ATC
C2		0.5 pF Chip Capacitor, B Case	100B0R5BW	ATC
C3, C9		10 μF, 35 V Tantalum Chip Capacitors	293D106X9035D2T	Sprague-Vishay
C4, C7		1 nF Chip Capacitors, B Case	100B102JW	ATC
C5, C6		5.6 pF Chip Capacitors, B Case	100B5R6BW	ATC
C8		470 μF, 63 V Electrolytic Capacitor		
C10		10 pF Chip Capacitor, B Case	100B100GW	ATC
N1, N2		Type N Connector Flange Mounts	3052-1648-10	Macom
R1		1.0 kΩ Chip Resistor (0805)		
R2		12 Ω Chip Resistor (0805)		

* Piece part depending on eared / earless version of the device.

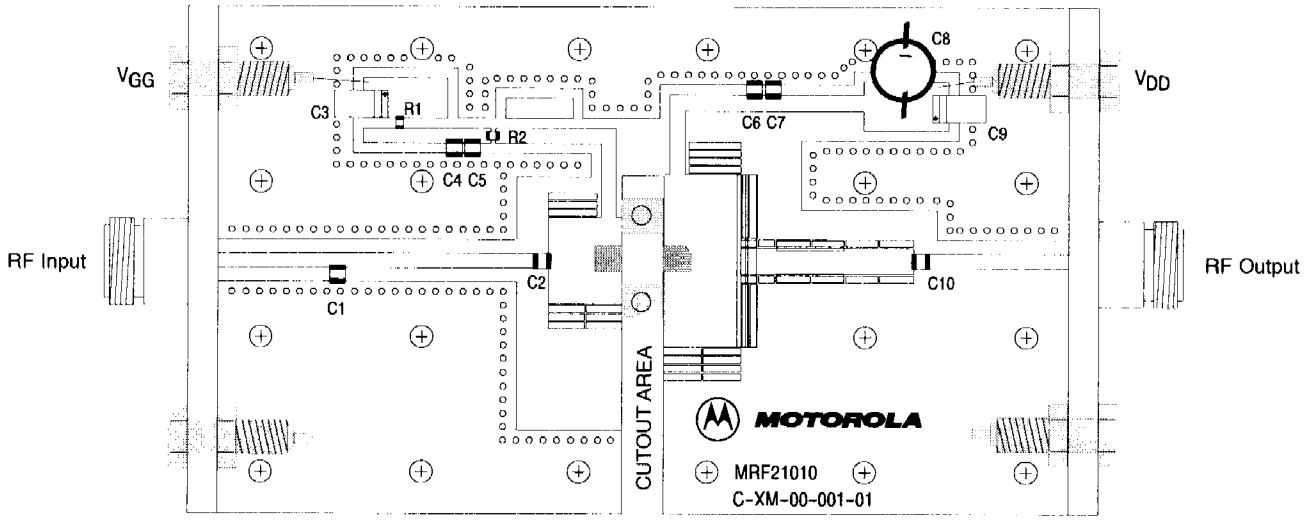
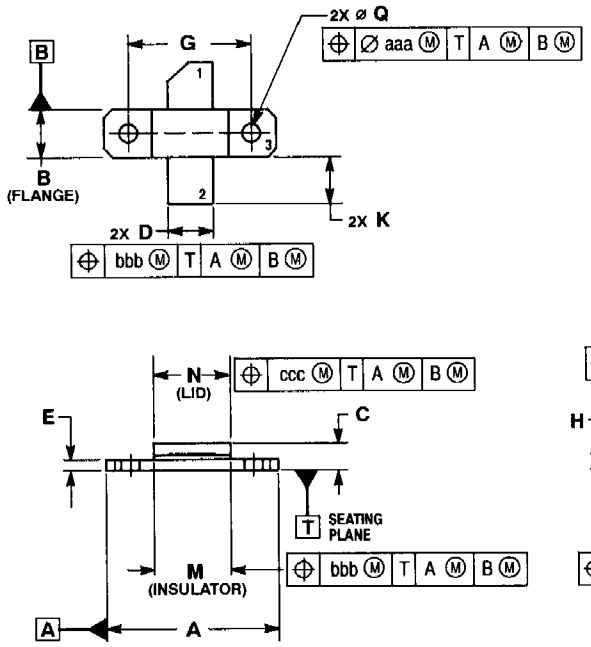


Figure 2. MRF21010L Test Circuit Component Layout

ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Drain-Source Breakdown Voltage (V_{GS} = 0 Vdc, I_D = 10 μA)	$V_{(BR)DSS}$	65	—	—	Vdc
Zero Gate Voltage Drain Current (V_{DS} = 28 Vdc, V_{GS} = 0 Vdc)	I_{DSS}	—	—	10	μAdc
Gate-Source Leakage Current (V_{GS} = 5 Vdc, V_{DS} = 0 Vdc)	I_{GSS}	—	—	1	μAdc
ON CHARACTERISTICS					
Gate Threshold Voltage (V_{DS} = 10 V, I_D = 50 μA)	$V_{GS(th)}$	2.5	3	4	Vdc
Gate Quiescent Voltage (V_{DS} = 28 V, I_D = 100 mA)	$V_{GS(Q)}$	2.5	4	4.5	Vdc
Drain-Source On-Voltage (V_{GS} = 10 V, I_D = 0.5 A)	$V_{DS(on)}$	—	0.4	0.5	Vdc
Forward Transconductance (V_{DS} = 10 V, I_D = 1 A)	g_{fs}	—	0.95	—	S
DYNAMIC CHARACTERISTICS					
Reverse Transfer Capacitance (V_{DS} = 28 Vdc, V_{GS} = 0, f = 1 MHz)	C_{rss}	—	1	—	pF
FUNCTIONAL TESTS (In Motorola Test Fixture, 50 ohm system)					
Two-Tone Common Source Amplifier Power Gain (V_{DD} = 28 Vdc, P_{out} = 10 W PEP, I_{DQ} = 100 mA, f1 = 2110 MHz, f2 = 2170 MHz, Tone Spacing = 100 KHz)	G_{ps}	12	13.5	—	dB
Two-Tone Drain Efficiency (V_{DD} = 28 Vdc, P_{out} = 10 W PEP, I_{DQ} = 100 mA, f1 = 2110 MHz, f2 = 2170 MHz, Tone Spacing = 100 KHz)	η	31	35	—	%
Third Order Intermodulation Distortion (V_{DD} = 28 Vdc, P_{out} = 10 W PEP, I_{DQ} = 100 mA, f1 = 2110 MHz, f2 = 2170 MHz, Tone Spacing = 100 KHz)	IMD	—	-35	-30	dBc
Input Return Loss (V_{DD} = 28 Vdc, P_{out} = 10 W PEP, I_{DQ} = 100 mA, f1 = 2110 MHz, f2 = 2170 MHz, Tone Spacing = 100 KHz)	IRL	—	-12	-10	dB
Output Power, 1 dB Compression Point, CW (V_{DD} = 28 Vdc, I_{DQ} = 100 mA, f = 2170 MHz)	P1dB	—	11	—	W
Common-Source Amplifier Power Gain (V_{DD} = 28 Vdc, P_{out} = 10 W CW, I_{DQ} = 100 mA, f = 2170 MHz)	G_{ps}	—	12	—	dB
Drain Efficiency (V_{DD} = 28 Vdc, P_{out} = 10 W CW, I_{DQ} = 100 mA, f = 2170 MHz)	η	—	42	—	%
Output Mismatch Stress (V_{DD} = 28 Vdc, P_{out} = 10 W CW, I_{DQ} = 100 mA, f = 2170 MHz, VSWR = 10:1, All Phase Angles at Frequency of Tests)	Ψ	No Degradation In Output Power Before and After Test			

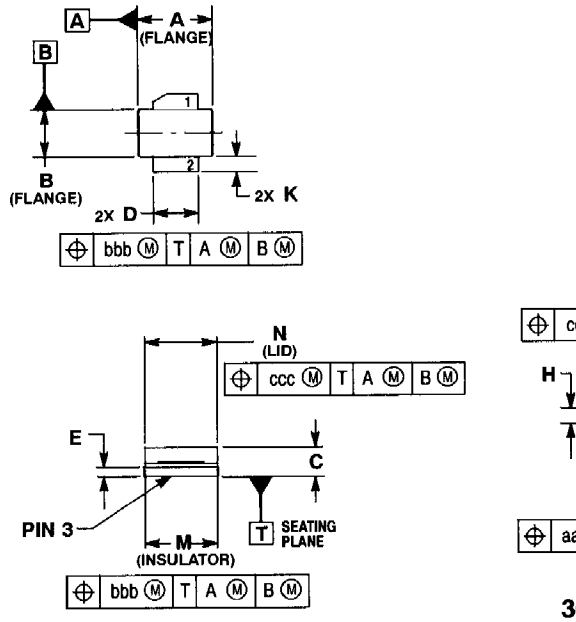


NOTES:
1. INTERPRET DIMENSIONS AND TOLERANCES PER ASME Y14.5M–1994.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION H IS MEASURED 0.030 (0.762) AWAY FROM PACKAGE BODY.

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	0.795	0.805	20.19	20.45
B	0.225	0.235	5.72	5.97
C	0.125	0.175	3.18	4.45
D	0.210	0.220	5.33	5.59
E	0.055	0.065	1.40	1.65
F	0.004	0.006	0.10	0.15
G	0.562 BSC		14.28 BSC	
H	0.077	0.087	1.96	2.21
K	0.220	0.250	5.59	6.35
M	0.355	0.365	9.02	9.27
N	0.357	0.363	9.07	9.22
Q	0.125	0.135	3.18	3.43
R	0.227	0.233	5.77	5.92
S	0.225	0.235	5.72	5.97
aaa	0.005 REF		0.13 REF	
bbb	0.010 REF		0.25 REF	
ccc	0.015 REF		0.38 REF	

STYLE 1:
PIN 1. DRAIN
2. GATE
3. SOURCE

CASE 360B-05
ISSUE F
NI-360
MRF21010LR1



NOTES:
1. INTERPRET DIMENSIONS AND TOLERANCES PER ASME Y14.5M–1994.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION H IS MEASURED 0.030 (0.762) AWAY FROM PACKAGE BODY.

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	0.375	0.385	9.53	9.78
B	0.225	0.235	5.72	5.97
C	0.105	0.155	2.67	3.94
D	0.210	0.220	5.33	5.59
E	0.035	0.045	0.89	1.14
F	0.004	0.006	0.10	0.15
H	0.057	0.067	1.45	1.70
K	0.085	0.115	2.16	2.92
M	0.355	0.365	9.02	9.27
N	0.357	0.363	9.07	9.22
R	0.227	0.23	5.77	5.92
S	0.225	0.235	5.72	5.97
aaa	0.005 REF		0.13 REF	
bbb	0.010 REF		0.25 REF	
ccc	0.015 REF		0.38 REF	

STYLE 1:
PIN 1. DRAIN
2. GATE
3. SOURCE

360C-05
ISSUE D
NI-360S
MRF21010LSR1