



RF Power Field Effect Transistors

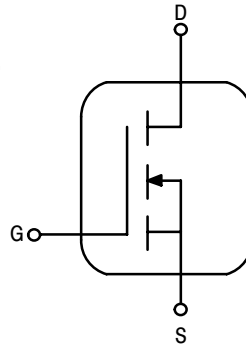
N-Channel Enhancement-Mode Lateral MOSFETs

Designed for broadband commercial and industrial applications with frequencies from 470 to 860 MHz. The high gain and broadband performance of these devices make them ideal for large-signal, common source amplifier applications in 28/32 volt transmitter equipment.

- Typical CW Performance at 860 MHz, 32 Volts, Narrowband Fixture
 Output Power — 75 Watts
 Power Gain — 18.2 dB
 Efficiency — 60%
- Capable of Handling 10:1 VSWR @ 32 Vdc, 860 MHz,
 75 Watts CW Output Power

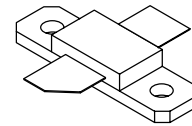
Features

- Integrated ESD Protection
- Excellent Thermal Stability
- Characterized with Series Equivalent Large-Signal Impedance Parameters
- Low Gold Plating Thickness on Leads. L Suffix Indicates 40μ" Nominal.
- RoHS Compliant
- In Tape and Reel. R1 = 500 units per 32 mm, 13 inch Reel.

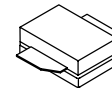


MRF373ALR1
MRF373ALSR1

470-860 MHz, 75 W, 32 V
LATERAL N-CHANNEL
BROADBAND
RF POWER MOSFETs



CASE 360B-05, STYLE 1
NI-360
MRF373ALR1



CASE 360C-05, STYLE 1
NI-360S
MRF373ALSR1

Table 1. Maximum Ratings

Rating	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	-0.5, +70	Vdc
Gate-Source Voltage	V_{GS}	-0.5, +15	Vdc
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	MRF373ALR1	197 W
		MRF373ALSR1	1.12 W/°C
			278 W
			1.59 W/°C
Storage Temperature Range	T_{stg}	-65 to +150	°C
Case Operating Temperature	T_C	150	°C
Operating Junction Temperature	T_J	200	°C

Table 2. Thermal Characteristics

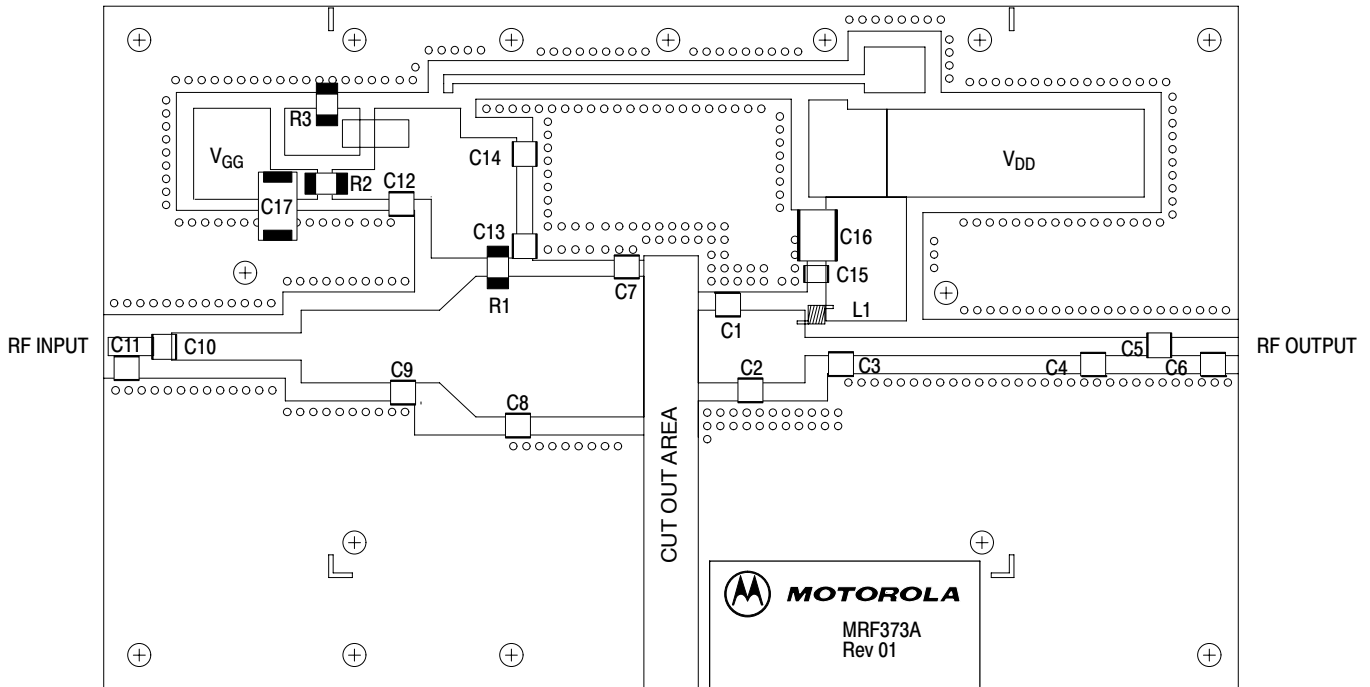
Characteristic	Symbol	Value	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	MRF373ALR1	0.89 °C/W
		MRF373ALSR1	0.63 °C/W

Table 3. ESD Protection Characteristics

Test Conditions	Class
Human Body Model	1 (Minimum)
Machine Model	M2 (Minimum)
	M1 (Minimum)

Table 4. Electrical Characteristics ($T_C = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
Off Characteristics					
Drain-Source Breakdown Voltage ($V_{GS} = 0 \text{ Vdc}$, $I_D = 1 \mu\text{A}$)	$V_{(BR)DSS}$	70	—	—	Vdc
Zero Gate Voltage Drain Current ($V_{DS} = 32 \text{ Vdc}$, $V_{GS} = 0 \text{ Vdc}$)	I_{DSS}	—	—	1	μAdc
Gate-Source Leakage Current ($V_{GS} = 5 \text{ Vdc}$, $V_{DS} = 0 \text{ Vdc}$)	I_{GSS}	—	—	1	μAdc
On Characteristics					
Gate Threshold Voltage ($V_{DS} = 10 \text{ V}$, $I_D = 200 \mu\text{A}$)	$V_{GS(th)}$	2	2.9	4	Vdc
Gate Quiescent Voltage ($V_{DS} = 32 \text{ V}$, $I_D = 100 \text{ mA}$)	$V_{GS(Q)}$	2.5	3.3	4.5	Vdc
Drain-Source On-Voltage ($V_{GS} = 10 \text{ V}$, $I_D = 3 \text{ A}$)	$V_{DS(on)}$	—	0.41	0.45	Vdc
Dynamic Characteristics					
Input Capacitance ($V_{DS} = 32 \text{ V}$, $V_{GS} = 0$, $f = 1 \text{ MHz}$)	C_{iss}	—	98.5	—	pF
Output Capacitance ($V_{DS} = 32 \text{ V}$, $V_{GS} = 0$, $f = 1 \text{ MHz}$)	C_{oss}	—	49	—	pF
Reverse Transfer Capacitance ($V_{DS} = 32 \text{ V}$, $V_{GS} = 0$, $f = 1 \text{ MHz}$)	C_{rss}	—	2	—	pF
Functional Characteristics (50 ohm system)					
Common Source Power Gain ($V_{DD} = 32 \text{ V}$, $P_{out} = 75 \text{ W CW}$, $I_{DQ} = 200 \text{ mA}$, $f = 860 \text{ MHz}$)	G_{ps}	16.5	18.2	—	dB
Drain Efficiency ($V_{DD} = 32 \text{ V}$, $P_{out} = 75 \text{ W CW}$, $I_{DQ} = 200 \text{ mA}$, $f = 860 \text{ MHz}$)	η	56	60	—	%



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Figure 1. MRF373ALR1/ALSR1 Narrowband Test Circuit Component Layout

Table 5. MRF373ALR1/ALSR1 Narrowband Test Circuit Component Layout Designations and Values

Designation	Description
C1, C2	18 pF Chip Capacitors, ATC
C3	12 pF Chip Capacitor, ATC
C4	1.8 pF Chip Capacitor, ATC
C5, C10	51 pF Chip Capacitors, ATC
C6	0.3 pF Chip Capacitor, ATC (Used only on the MRF373AS)
C7	15 pF Chip Capacitor, ATC
C8	10 pF Chip Capacitor, ATC
C9	2.7 pF Chip Capacitor, ATC
C11	0.5 pF Chip Capacitor, ATC
C12	1000 pF Chip Capacitor, ATC
C13	39 pF Chip Capacitor, ATC
C14, C15	470 pF Chip Capacitors, ATC
C16	2.2 μ F, 100 V Chip Capacitor, Vishay #VJ3640Y225KXBAT
C17	10 μ F, 35 V Tantalum Capacitor, Kemet #T491D106K35AS
L1A	12 nH, Coilcraft #A04T
R1, R2	390 Ω , 1/2 Ω Chip Resistors, Vishay Dale (2010)
R3	1 k Ω , 1/2 Ω Chip Resistor, Vishay Dale (2010)
PCB	Arlon GX-0300-55, 30 mils, $\epsilon_r = 2.55$

TYPICAL CHARACTERISTICS

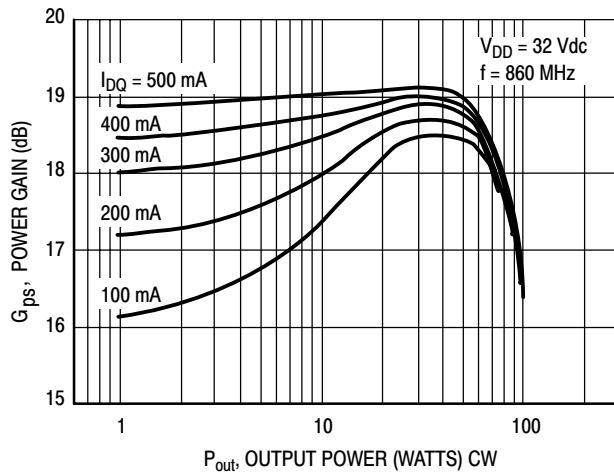


Figure 2. Power Gain versus Output Power

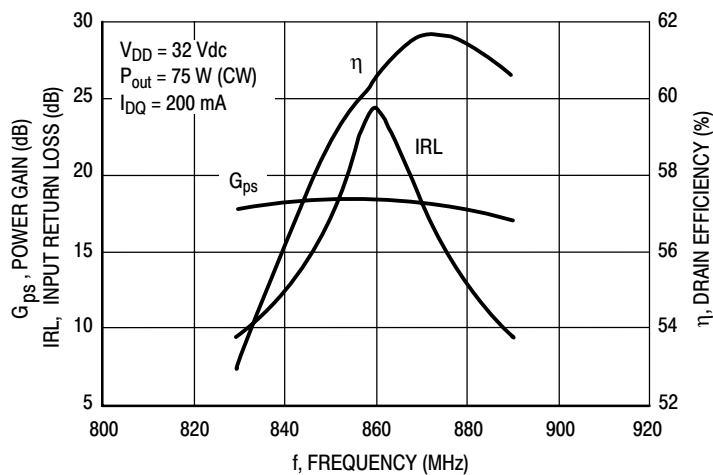


Figure 3. Performance in Narrowband Circuit

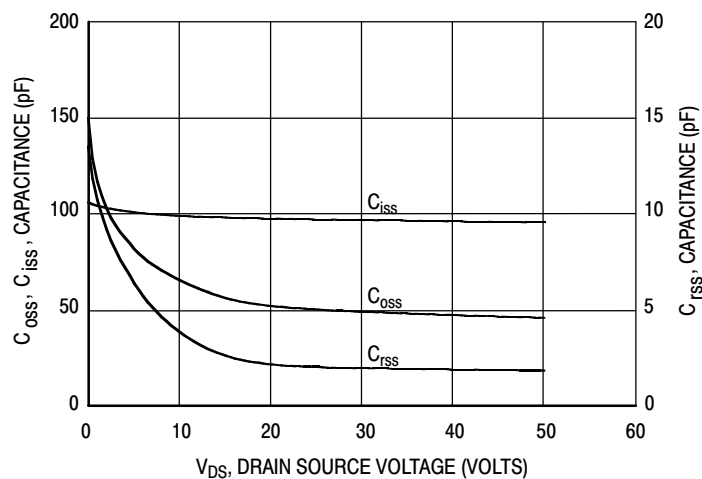
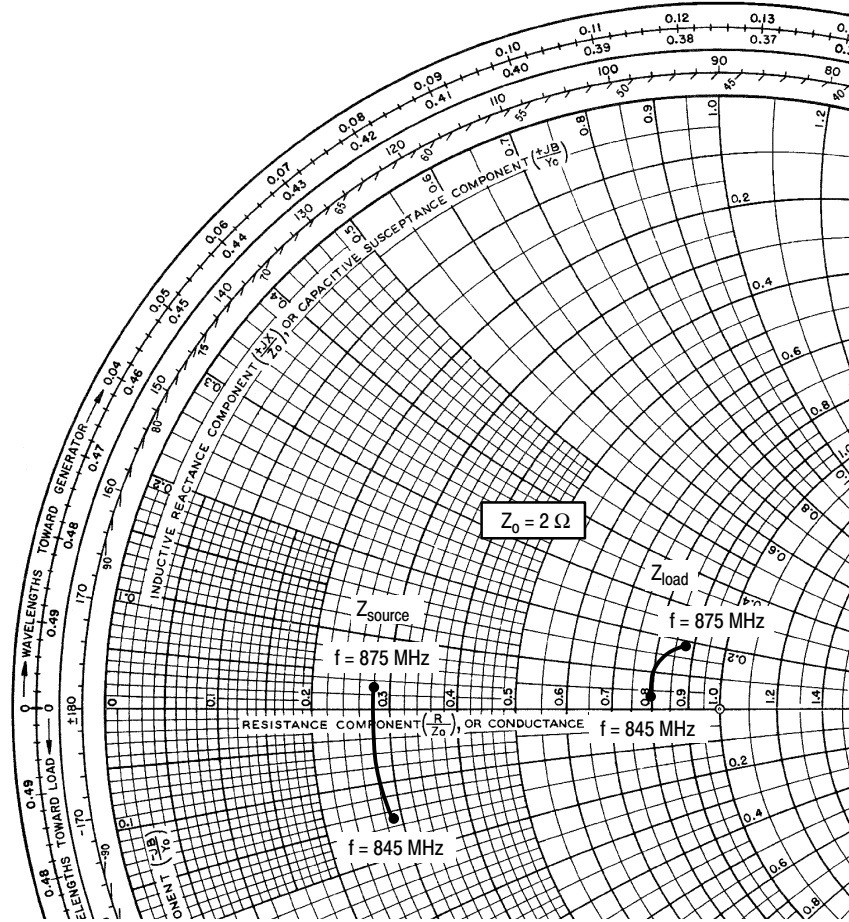


Figure 4. Capacitance versus Voltage



$V_{DD} = 32\text{ V}$, $I_{DQ} = 200\text{ mA}$, $P_{out} = 75\text{ W CW}$

f MHz	Z_{source} Ω	Z_{load} Ω
845	$0.58 - j0.29$	$1.60 + j0.07$
860	$0.56 - j0.11$	$1.65 + j0.22$
875	$0.56 + j0.06$	$1.79 + j0.38$

Z_{source} = Test circuit impedance as measured from gate to ground.

Z_{load} = Test circuit impedance as measured from drain to ground.

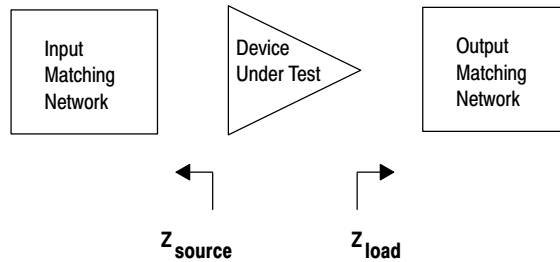
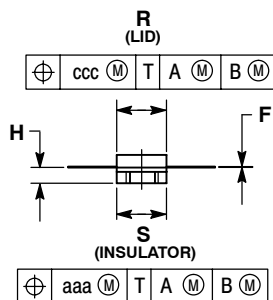
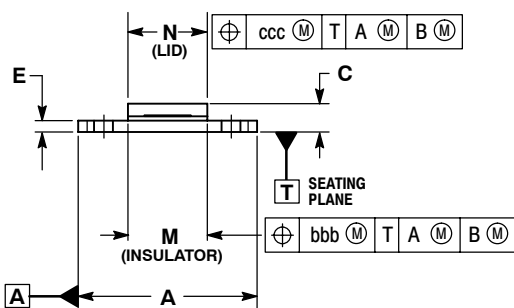
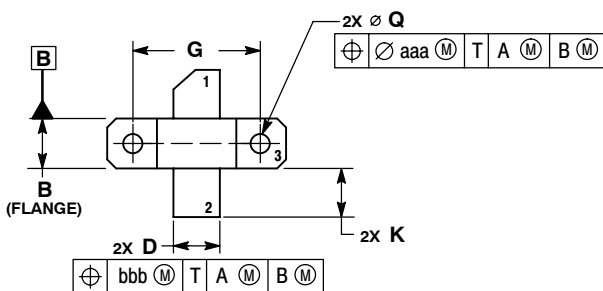


Figure 5. Series Equivalent Source and Load Impedance

NOTES

PACKAGE DIMENSIONS

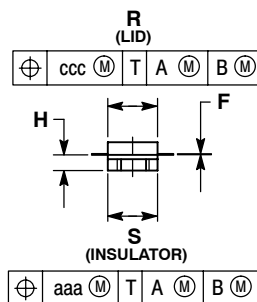
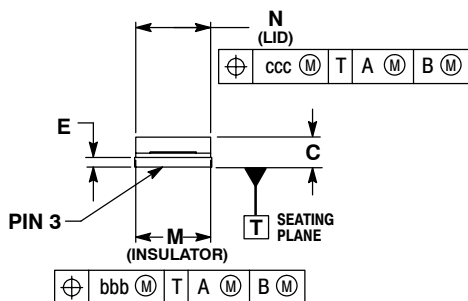
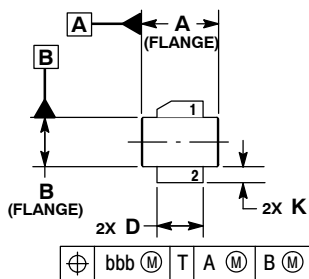


**CASE 360B-05
ISSUE G
NI-360
MRF373ALR1**

- 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.

DIM	INCHES		MILLIMETERS	
	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 360C-05
ISSUE E
NI-360S
MRF373ALSR1**

- 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.

DIM	INCHES		MILLIMETERS	
	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

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