

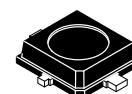
*Advance Information*  
**The RF Small Signal Line**  
**Gallium Arsenide PHEMT**  
**Pseudomorphic High Electron Mobility Transistor**

**MRF9822T1**

**31 dBm, 850 MHz**  
**HIGH FREQUENCY**  
**POWER TRANSISTOR**  
**GaAs PHEMT**

Designed for use in low voltage, moderate power amplifiers such as portable analog and digital cellular radios and PC RF modems.

- Performance Specifications at 3.5 V, 850 MHz:  
Output Power = 31 dBm Min  
Power Gain = 11 dB Typ  
Efficiency = 70% Min
- Guaranteed Ruggedness at Load VSWR = 20:1
- New Plastic Surface Mount Package
- Available in Tape and Reel Packaging Options:  
T1 suffix = 1,000 Units per Reel
- Device Marking = 9822



CASE 449-02, STYLE 1  
(PLD-1)

**MAXIMUM RATINGS**

Rating	Symbol	Value	Unit
Drain–Gate Voltage	$V_{DGO}$	12	Vdc
Gate–Source Voltage	$V_{GS}$	– 6	Vdc
Drain Current – Continuous	$I_D$	3	Adc
Total Device Dissipation @ $T_C = 50^\circ\text{C}$ Derate above $50^\circ\text{C}$	$P_D$	10 100	W mW/ $^\circ\text{C}$
Storage Temperature Range	$T_{stg}$	– 65 to +150	$^\circ\text{C}$
Operating Temperature Range	$T_J$	150	$^\circ\text{C}$

**THERMAL CHARACTERISTICS**

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	10	$^\circ\text{C}/\text{W}$

**ELECTRICAL CHARACTERISTICS** ( $T_C = 25^\circ\text{C}$  unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
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**OFF CHARACTERISTICS**

Drain–Gate Breakdown Voltage ( $I_D = 1.5 \text{ mA}$ )	$BV_{GDO}$	12	–	–	Vdc
Off–state Leakage Current ( $V_{DS} = 5.5 \text{ V}, V_{GS} = -2.6 \text{ V}$ )	$I_{DS(off)}$	–	–	3	mA
Gate–Source Leakage Current ( $V_{GS} = -2.6 \text{ V}$ )	$I_{GSS}$	–	–	10	$\mu\text{Adc}$

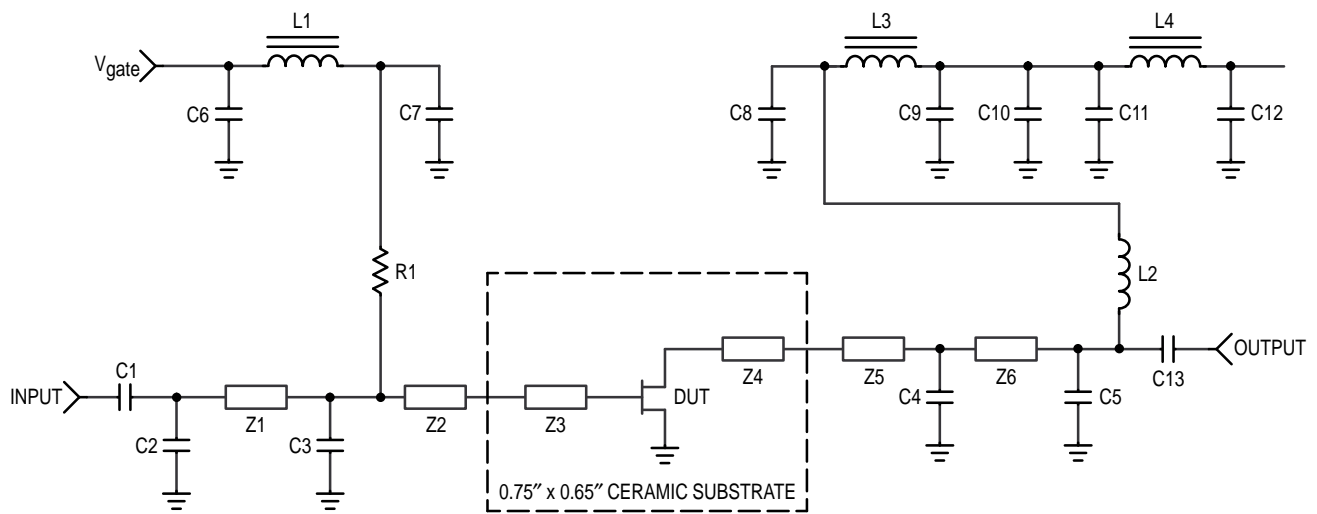
NOTE – **CAUTION** – MOS devices are susceptible to damage from electrostatic charge. Reasonable precautions in handling and packaging MOS devices should be observed.

**ELECTRICAL CHARACTERISTICS – continued** ( $T_C = 25^\circ\text{C}$  unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
<b>ON CHARACTERISTICS</b>					
Gate Threshold Voltage ( $V_{DS} = 3.5\text{ V}$ , $I_D = 150\text{ mA}$ )	$V_{GS(th)}$	-1.5	-	-0.5	Vdc
Forward Transconductance ( $V_{DS} = 6\text{ V}$ , $I_D = 200\text{ mA}$ )	$g_{fs}$	-	1.5	-	mhos
Saturation Drain-Current ( $V_{GS} = 0.0\text{ V}$ , $V_{DS} = 1.5\text{ V}$ )	$I_{DSS}$	1.8	2.5	-	A

**FUNCTIONAL CHARACTERISTICS**

Power Gain ( $V_{DD} = 3.5\text{ Vdc}$ , $P_{in} = 20\text{ dBm}$ , $I_{DQ} = 150\text{ mA}$ , $f = 850\text{ MHz}$ )	$G_{ps}$	10.5	11	-	dB
Drain Efficiency ( $V_{DD} = 3.5\text{ Vdc}$ , $P_{in} = 20\text{ dBm}$ , $I_{DQ} = 150\text{ mA}$ , $f = 850\text{ MHz}$ )	$\eta_D$	65	70	-	%



C1, C13	1000 pF, ATC "B" Series	L2	7 Turns, AWG #18, 0.09" I.D., Close Wound
C2	2.7 pF, ATC "B" Series	L3	3 Ferrite Beads on 1/2" AWG #16
C3	2.7 pF, ATC "B" Series	R1	680 $\Omega$ , 1/8 Watt Leaded
C4	7.5 pF, ATC "B" Series	Z1	0.075" x 0.790" Microstrip
C5	33 pF, ATC "B" Series	Z2	0.075" x 0.09" Microstrip
C6, C12	47 $\mu\text{F}$ , Ceramic	Z3, Z4	0.075" x 0.25" Microstrip
C7, C8, C9, C10, C11	0.05 $\mu\text{F}$ Chip	Z5	0.075" x 0.09" Microstrip
L1, L4	VK-200 4 Turn Ferrite Bead	Z6	0.075" x 0.53" Microstrip

Substrate Material: 0.05, Teflon/Glass,  $\epsilon_r = 2.55$ , 2 oz. cu.

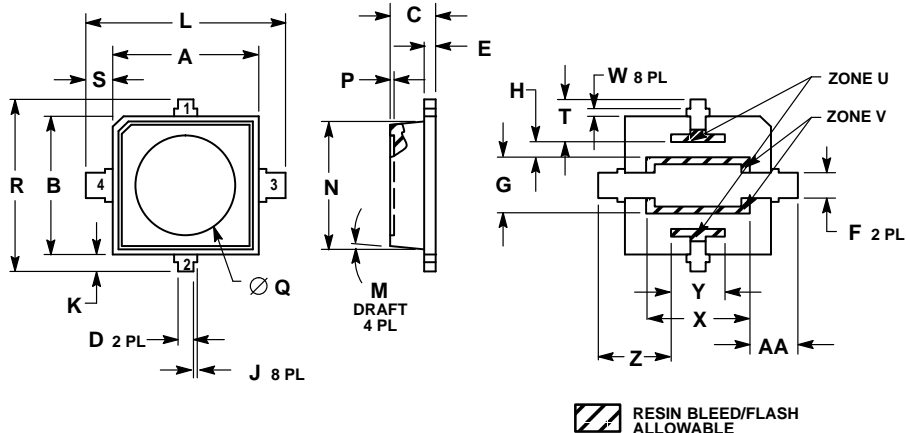
**Figure 1. 850 MHz Test Fixture Schematic**

**Table 1. Large Signal Impedance**  
 $V_{DD} = 3.5\text{ V}$ ,  $P_{in} = 20\text{ dBm}$ ,  $I_{DQ} = 150\text{ mA}$

f MHz	$Z_{in}$ Ohms	$Z_{OL}^*$ Ohms
850	$5.0 - j6.3$	$5.5 - j1.2$

$Z_{OL}^*$  is the conjugate of the optimum load impedance into which the device output operates at a given output power, voltage and frequency.

## PACKAGE DIMENSIONS




- NOTES:  
 1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.  
 2. CONTROLLING DIMENSION: INCH.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.185	0.195	4.70	4.95
B	0.175	0.185	4.44	4.70
C	0.058	0.064	1.47	1.63
D	0.017	0.023	0.43	0.58
E	0.014	0.017	0.36	0.43
F	0.027	0.033	0.69	0.84
G	0.071	0.077	1.80	1.96
H	0.017	0.023	0.43	0.58
J	0.000	0.007	0.00	0.18
K	0.018	0.026	0.46	0.66
L	0.253	0.263	6.43	6.68
M	5° REF		5° REF	
N	1.75 REF		4.44 REF	
P	0.000	0.006	0.00	0.15
Q	0.120	0.130	3.05	3.30
R	0.220	0.230	5.59	5.84
S	0.030	0.038	0.76	0.97
T	0.050	0.060	1.27	1.52
U	0.000	0.018	0.00	0.46
V	0.000	0.014	0.00	0.36
W	0.004	0.016	0.10	0.41
X	0.131	0.141	3.33	3.58
Y	0.065	0.075	1.65	1.90
Z	0.089	0.099	2.26	2.51
AA	0.056	0.066	1.42	1.67

**CASE 449-02  
ISSUE A**

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

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**USA/EUROPE/Locations Not Listed:** Motorola Literature Distribution;  
P.O. Box 5405, Denver, Colorado 80217. 303-675-2140 or 1-800-441-2447

**JAPAN:** Nippon Motorola Ltd.; Tatsumi-SPD-JLDC, 6F Seibu-Butsuryu-Center,  
3-14-2 Tatsumi Koto-Ku, Tokyo 135, Japan. 81-3-3521-8315

**Mfax™:** RMFAX0@email.sps.mot.com – TOUCHTONE 602-244-6609  
**INTERNET:** <http://www.mot.com/sp/>

**ASIA/PACIFIC:** Motorola Semiconductors H.K. Ltd.; 8B Tai Ping Industrial Park,  
51 Ting Kok Road, Tai Po, N.T., Hong Kong. 852-26629298



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**MRF9822/D**