Advance Information

The RF Small Signal Line

Gallium Arsenide PHEMT

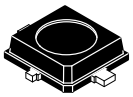
Pseudomorphic High Electron Mobility Transistor

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°C Derate above 50°C	P_D	10 100	W mW/°C
Storage Temperature Range	T_{stg}	– 65 to +150	°C
Operating Temperature Range	T_J	150	°C

THERMAL CHARACTERISTICS

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

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

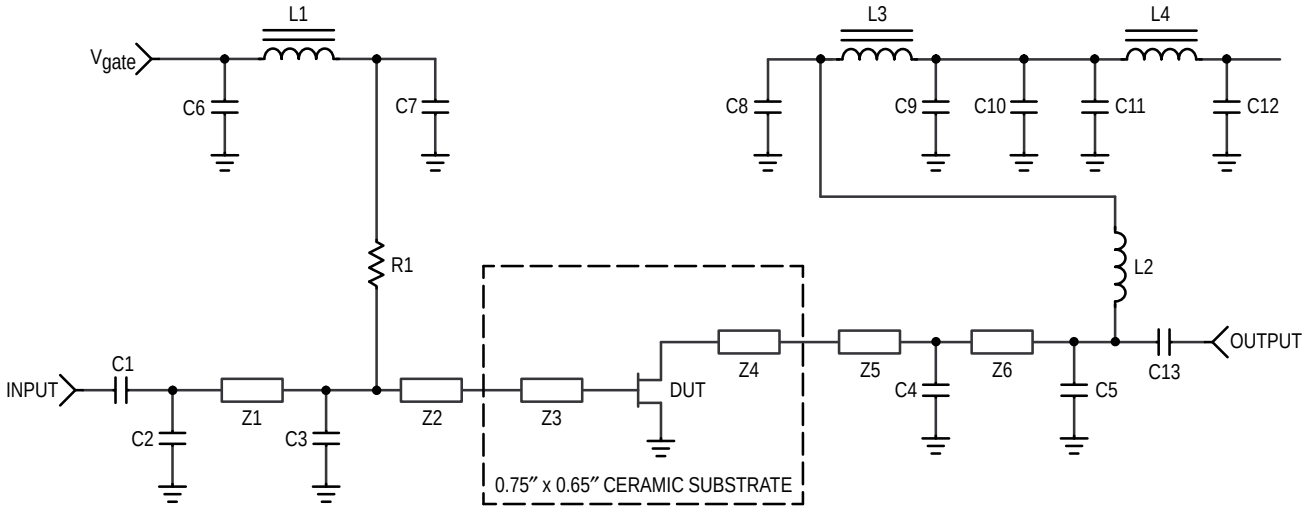
Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Drain–Gate Breakdown Voltage (I_D = 1.5 mA)	BV_{GDO}	12	–	–	Vdc
Off–state Leakage Current (V_{DS} = 5.5 V, V_{GS} = –2. 6 V)	$I_{DS(off)}$	–	–	3	mA
Gate–Source Leakage Current (V_{GS} = –2. 6 V)	I_{GSS}	–	–	10	μAdc

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

MOTOROLA

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

Characteristic	Symbol	Min	Typ	Max	Unit
ON CHARACTERISTICS					
Gate Threshold Voltage (V_{DS} = 3.5 V, I_D = 150 mA)	$V_{GS(th)}$	–1.5	–	–0.5	Vdc
Forward Transconductance (V_{DS} = 6 V, I_D = 200 mA)	g_{fs}	–	1.5	–	mhos
Saturation Drain–Current (V_{GS} = 0.0 V, V_{DS} = 1.5 V)	I_{DSS}	1.8	2.5	–	A
FUNCTIONAL CHARACTERISTICS					
Power Gain (V_{DD} = 3.5 Vdc, P_{in} = 20 dBm, I_{DQ} = 150 mA, f = 850 MHz)	G_{ps}	10.5	11	–	dB
Drain Efficiency (V_{DD} = 3.5 Vdc, P_{in} = 20 dBm, I_{DQ} = 150 mA, f = 850 MHz)	η_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 Ω, 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 µF, Ceramic	Z3, Z4	0.075″ x 0.25″ Microstrip
C7, C8, C9, C10, C11	0.05 µF 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, ε_r = 2.55, 2 oz. cu.	

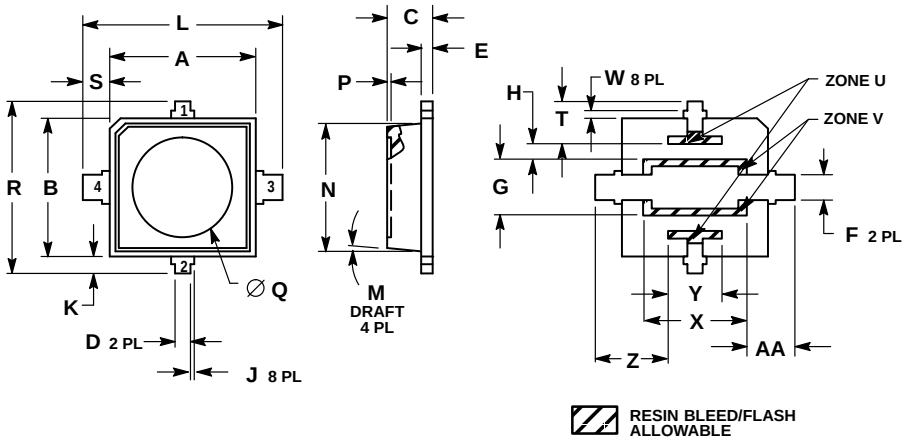
Figure 1. 850 MHz Test Fixture Schematic

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

	INCHES		MILLIMETERS	
DIM	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

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

CASE 449–02
ISSUE A

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