

*Advance Information*  
**The RF Small Signal Line  
Silicon Lateral FET  
N-Channel Enhancement-Mode MOSFET**

**MRF9745T1**

**30 dBm, 900 MHz  
HIGH FREQUENCY  
POWER TRANSISTOR  
LDMOS FET**

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

- Performance Specifications at 5.8 V, 900 MHz:  
Output Power = 30 dBm Min  
Power Gain = 10 dB Typ  
Efficiency = 50% Min
- Guaranteed Ruggedness at Load VSWR = 20:1
- New Plastic Surface Mount Package
- Available in Tape and Reel Packaging.  
T1 Suffix = 1,000 Units per 8 mm, 7 inch Reel
- Device Marking = 9745



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

**MAXIMUM RATINGS**

Rating	Symbol	Value	Unit
Drain-Source Voltage	$V_{DSS}$	35	Vdc
Drain-Gate Voltage ( $R_{GS} = 1 M\Omega$ )	$V_{DGO}$	25	Vdc
Gate-Source Voltage	$V_{GS}$	$\pm 10$	Vdc
Drain Current - Continuous	$I_D$	2	Adc
Total Device Dissipation @ $T_C = 50^\circ C$ Derate above $50^\circ C$	$P_D$	10 100	W mW/ $^\circ C$
Storage Temperature Range	$T_{stg}$	- 65 to +150	$^\circ C$
Operating Temperature Range	$T_J$	150	$^\circ C$

**THERMAL CHARACTERISTICS**

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

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

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

Drain-Source Leakage Current ( $V_{DS} = 35 V, V_{GS} = 0$ )	$I_{DSS}$	-	-	10	$\mu A_{dc}$
Gate-Source Leakage Current ( $V_{GS} = 5 V, V_{DS} = 0$ )	$I_{GSS}$	-	-	1	$\mu A_{dc}$

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 ( $V_{DS} = 6\text{ V}$ , $I_D = 25\ \mu\text{A}$ )	$V_{GS(th)}$	1	2	3	Vdc
Forward Transconductance ( $V_{DS} = 6\text{ V}$ , $I_D = 200\text{ mA}$ )	$g_{fs}$	–	550	–	mmhos
Resistance Drain–Source ( $V_{GS} = 4\text{ V}$ , $I_D = 100\text{ mA}$ )	$R_{DS(on)}$	–	1	2.5	$\Omega$

**DYNAMIC CHARACTERISTICS**

Input Capacitance ( $V_{DS} = 6\text{ V}$ , $V_{GS} = 0$ , $f = 1\text{ MHz}$ )	$C_{iss}$	–	14	–	pF
Output Capacitance ( $V_{DS} = 6\text{ V}$ , $V_{GS} = 0$ , $f = 1\text{ MHz}$ )	$C_{oss}$	–	11	–	pF
Feedback Capacitance ( $V_{DS} = 6\text{ V}$ , $V_{GS} = 0$ , $f = 1\text{ MHz}$ )	$C_{rss}$	–	1.8	–	pF

**FUNCTIONAL CHARACTERISTICS**

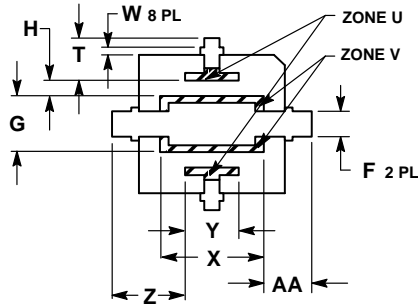
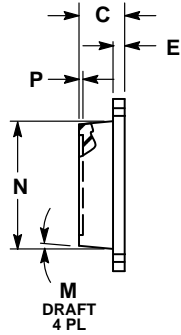
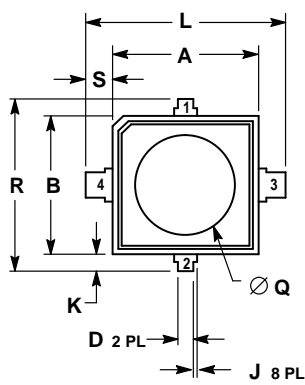
Power Gain ( $V_{DD} = 5.8\text{ Vdc}$ , $P_{in} = 20\text{ dBm}$ , $I_{DQ} = 150\text{ mA}$ , $f = 900\text{ MHz}$ )	$G_{ps}$	9.5	10	–	dB
Drain Efficiency ( $V_{DD} = 5.8\text{ Vdc}$ , $P_{in} = 20\text{ dBm}$ , $I_{DQ} = 150\text{ mA}$ , $f = 900\text{ MHz}$ )	$\eta_D$	50	55	–	%
Ruggedness Test ( $V_{DD} = 5.8\text{ Vdc}$ , $P_{in} = 20\text{ dBm}$ , $I_{DQ} = 150\text{ mA}$ , $f = 900\text{ MHz}$ , Load VSWR = 20:1, All Phase Angles at Frequency Test)	$\Psi$	No Degradation in Output Power after Test			

**Table 1. Large Signal Impedance**  
 $V_{DD} = 5.8\text{ V}$ ,  $P_{in} = 20\text{ dBm}$ ,  $I_{DQ} = 150\text{ mA}$

f MHz	$Z_{in}$ Ohms	$Z_{OL}^*$ Ohms
850	7.0 – j6.4	6.1 – j5.1
900	5.2 – j6.5	5.9 – j4.6
950	5.2 – j6.0	6.1 – j4.7

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

# PACKAGE DIMENSIONS




RESIN BLEED/FLASH ALLOWABLE

- 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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**How to reach us:**

**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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