

**10W - 28V - 1GHz**  
**GOLD METALIZED MULTI-PURPOSE**  
**SILICON DMOS RF FET**

**FEATURES**

- METAL GATE
- EXTRA LOW  $C_{rss}$
- BROAD BAND
- SIMPLE BIAS CIRCUITS
- LOW NOISE
- HIGH GAIN

**APPLICATIONS**

- HF/VHF/UHF COMMUNICATIONS  
from DC to 1 GHz

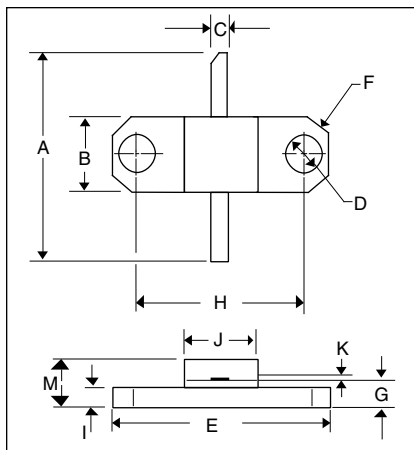
**ABSOLUTE MAXIMUM RATINGS**  
( $T_{CASE} = 25^{\circ}C$  unless otherwise stated)

$P_d$	Power Dissipation	42W
$BV_{DSS}$	Drain-source breakdown voltage	65V
$V_{GSS}$	Gate-source voltage	$\pm 20V$
$I_D$	Drain Current	4A
$T_{stg}$	Storage temperature	-65 to 150°C
$T_j$	Maximum operating junction temperature	200°C
$R_{\theta j-case}$	Thermal resistance junction-case	Max. 4.2°C/W

**ELECTRICAL CHARACTERISTICS** ( $T_{CASE} = 25^{\circ}C$  unless otherwise stated)

Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$BV_{DSS}$	Breakdown voltage, drain source $V_{GS}=0$ $I_D=10mA$	65			Vdc
$I_{DSS}$	Drain leakage current $V_{DS}=28V$ $V_{GS}=0$			0.8	mAdc
$I_{GSS}$	Gate leakage current $V_{GS}=20V$ $V_{DS}=0$			1	$\mu$ Adc
$V_{GS(th)}$	Gate threshold voltage $I_D=10mA$ $V_{DS}=V_{GS}$	1		7	Vdc
$g_{fs}$	Transconductance (300 $\mu$ s pulse) $V_{DS}=10V$ $I_D=0.8A$	0.72			Mhos
$G_{PS}$	Common source power gain $P_O=10W$	13			dB
$\eta$	Drain efficiency $V_{DS}=28V$ $I_{DQ}=0.8A$	50			%
VSWR	Load mismatch tolerance $f=1GHz$	20:1			
$C_{iss}$	Input capacitance $V_{DS}=0V$ $V_{GS}=-5V$ $f=1MHz$			48	pF
$C_{oss}$	Output capacitance $V_{DS}=28V$ $V_{GS}=0$ $f=1MHz$			24	pF
$C_{rss}$	Reverse transfer capacitance $V_{DS}=28V$ $V_{GS}=0$ $f=1MHz$			2	pF

**DIMENSIONS**

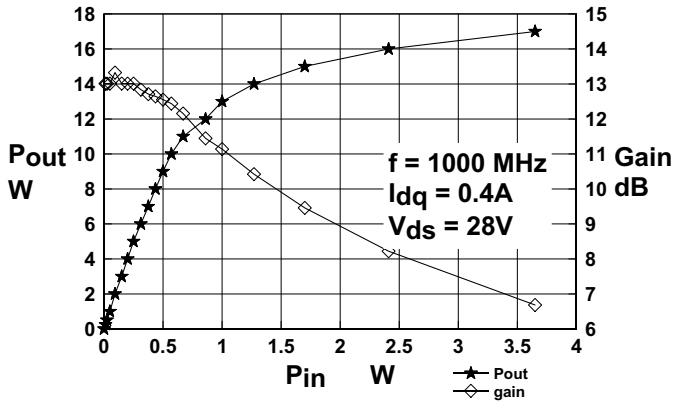


DM	Millimeter	TOL	Inches	TOL
A	16.51	.25	.650	.010
B	6.35	.13	.250	.005
C	1.52	.13	.060	.005
D	3.30	.13	.130	.005
E	18.92	.05	.745	.002
F	1.27 X 45°	.13	.030 X 45°	.005
G	2.16	.13	.085	.005
H	14.22	.05	.560	.002
I	1.52	.13	.060	.005
J	6.35	.13	.250	.005
K	0.10	.02	.004	.001
M	5.08	MAX	.200	MAX

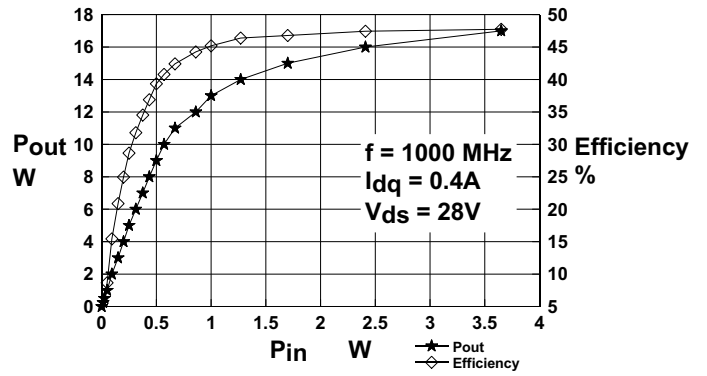
**HAZARDOUS MATERIAL WARNING**

The ceramic portion of the device between leads and metal flange is beryllium oxide. Beryllium oxide dust is highly toxic and care must be taken during handling and mounting to avoid damage to this area. THESE DEVICES MUST NEVER BE THROWN AWAY WITH GENERAL INDUSTRIAL OR DOMESTIC WASTE.

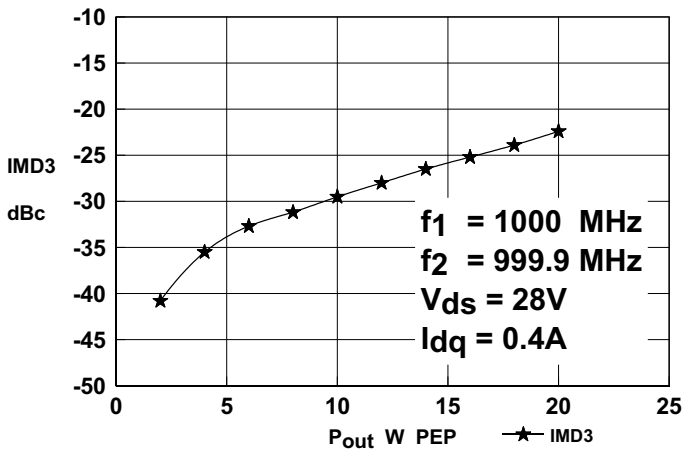
U.S. PATENTS 5,121,176 & 5,179,032  
GLOBAL PATENTS PENDING



**Figure 1**  
Output Power and Gain vs. Input Power



**Figure 2**  
Output Power and Efficiency vs. Input Power



**Figure 3**  
Output Power and Efficiency vs. Input Power

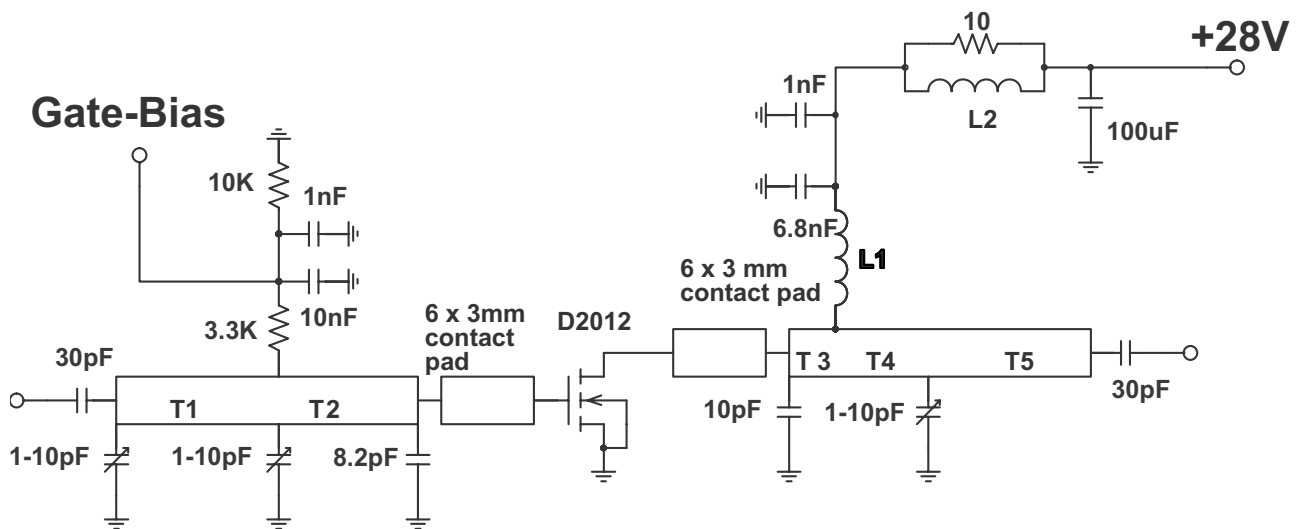
**OPTIMUM SOURCE AND LOAD IMPEDANCE**

Frequency MHz	Z <sub>S</sub> Ω	Z <sub>L</sub> Ω
1000	5.0 - j7.2	2.4 - j7.1

**Typical S Parameters**

! Vds=28V, Idq=0.8A  
# MHz S MA R 50

!Freq !MHz	S11		S21		S12		S22	
	mag	ang	mag	ang	mag	ang	mag	ang
100	0.841	-122	24.547	98	0.01318	13	0.49	-94
200	0.871	-146	11.482	69	0.01	0	0.61	-125
300	0.891	-156	6.683	52	0.00653	10	0.708	-137
400	0.902	-163	4.365	40	0.00596	49	0.767	-146
500	0.923	-170	3.055	27	0.00891	71	0.813	-155
600	0.933	-174	2.113	22	0.01349	79	0.851	-165
700	0.955	-175	1.758	19	0.01862	85	0.881	-166
800	0.955	-177	1.413	12	0.02344	82	0.902	-170
900	0.966	179	1.161	5	0.02851	80	0.902	-177
1000	0.955	177	0.944	3	0.03236	80	0.902	-179



## 1GHz Test Fixture

Substrate 0.8mm PTFE/glass,  $\epsilon_r = 2.5$

All microstrip lines  $W = 2.2\text{mm}$

T1 35mm

T2 15mm

T3 4mm

T4 14mm

T5 32mm

L1 7.5 turns 24swg enamelled copper wire, 3mm i.d.

L2 1.5 turns 24swg enamelled copper wire on ferrite core

\*D2012

\*PSPICE MODEL FOR POINT NINE TECHNOLOGIES, Inc RF N-CHANNEL VERTICAL DMOS POWER FET  
\*PRELIMINARY DATA, JULY 1995

\*TO GENERATE S PARAMETERS MATCHING DATA SHEET, SET VG??V FOR IDQ=0.8A

```
*      ____GATE
*      I      ____DRAIN
*      I      I      ____SOURCE
*      I      I      I
.SUBCKT D2012 10 20 30
LG 10 11 0.37N
RGATE 11 12 0.54
CG 10 30 0.49P
CRSS 12 17 2P
CISS 12 14 48P
LS 14 30 0.075N
CS 14 30 0.24P
LD 17 20 0.32N
CD 20 30 1.27P
R_RC 16 17 1079
C_RC 14 16 51.26P
MOS 13 12 14 15 D2012MOS L=0.71U W=0.043596 ;D G S B LEVEL1
JFET 17 14 13 D2012JF ;D G S
DBODY 14 17 D2012DB ;P N

.MODEL D2012MOS NMOS (VTO=2 KP=3.5E-5 LAMBDA=0.1 RD=0.5 RS=0.75)
.MODEL D2012JF NJF (VTO=-5.8 BETA=0.025 LAMBDA=1)
.MODEL D2012DB D (CJO=58P RS=0.25 VJ=0.7 M=0.33 BV=65)
.ENDS
```

D2012.s2p

```
!      Vds=28V, Idq=0.8A
#      MHz S MA R 50
```

!Freq	S11		S21		S12		S22	
!MHz	mag	ang	mag	ang	mag	ang	mag	ang
100	0.841	-122	24.547	98	0.01318	13	0.49	-94
200	0.871	-146	11.482	69	0.01000	0	0.61	-125
300	0.891	-156	6.683	52	0.00653	10	0.708	-137
400	0.902	-163	4.365	40	0.00596	49	0.767	-146
500	0.923	-170	3.055	27	0.00891	71	0.813	-155
600	0.933	-174	2.113	22	0.01349	79	0.851	-165
700	0.955	-175	1.758	19	0.01862	85	0.881	-166
800	0.955	-177	1.413	12	0.02344	82	0.902	-170
900	0.966	179	1.161	5	0.02851	80	0.902	-177
1000	0.955	177	0.944	3	0.03236	80	0.902	-179