

**20W - 28V - 500MHz  
GOLD METALLISED 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 500MHz

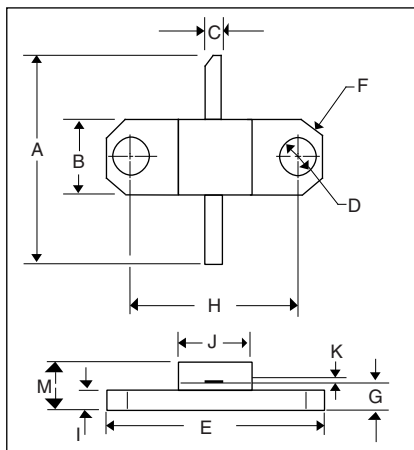
**ABSOLUTE MAXIMUM RATINGS**  
( $T_{CASE} = 25^{\circ}C$  unless otherwise stated)

$P_D$	Power Dissipation	87.5W
$BV_{DSS}$	Drain-source breakdown voltage	70V
$V_{GSS}$	Gate-source breakdown voltage	$\pm 20V$
$I_D$	Drain Current	5A
$T_{stg}$	Storage temperature	-65 to 150°C
$T_j$	Maximum operating junction temperature	200°C
$R_{THj-case}$	Thermal resistance junction-case	Max. 2.0°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 $V_{GS}=0$ $I_D=100mA$	70			Vdc
$I_{DSS}$	Drain leakage current $V_{DS}=28V$ $V_{GS}=0$			2	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) $V_{DS}=10V$ $I_D=2A$	1.6			Mhos
$G_{PS}$	Common source power gain $P_O=20W$	13			dB
$\eta$	Drain efficiency $V_{DS}=28V$ $I_{DQ}=0.2A$	60			%
VSWR	Load mismatch tolerance $f=400MHz$	20:1			
$C_{iss}$	Input capacitance $V_{DS}=0V$ $V_{GS}=-5V$ $f=1MHz$			120	pF
$C_{oss}$	Output capacitance $V_{DS}=28V$ $V_{GS}=0$ $f=1MHz$			50	pF
$C_{rss}$	Reverse transfer capacitance $V_{DS}=28V$ $V_{GS}=0$ $f=1MHz$			5	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	18.90	.13	.744	.005
F	1.27 X 45°	.13	.05 X 45°	.005
G	2.16	.13	.085	.005
H	14.22	.05	.560	.005
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

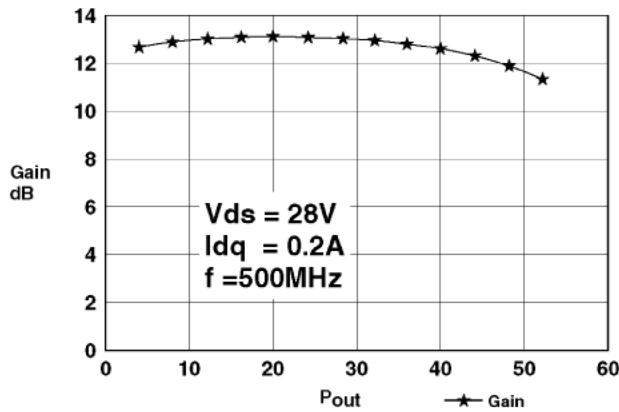


Figure 1- Gain vs. Power Output

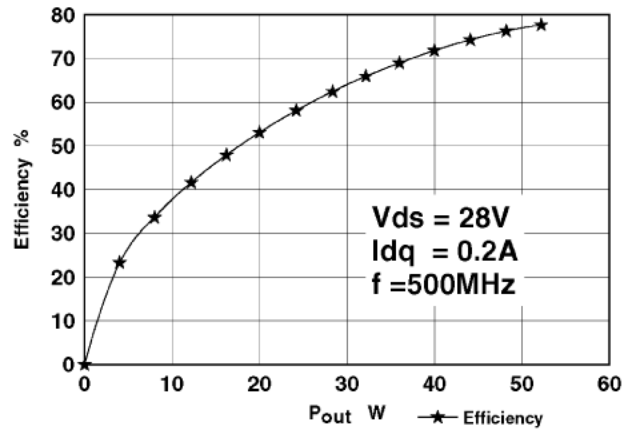


Figure 2 - Efficiency vs. Power Output

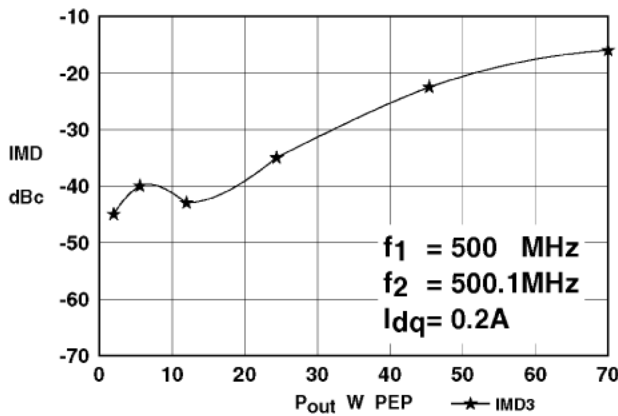


Figure 3 - IMD vs. Power Output

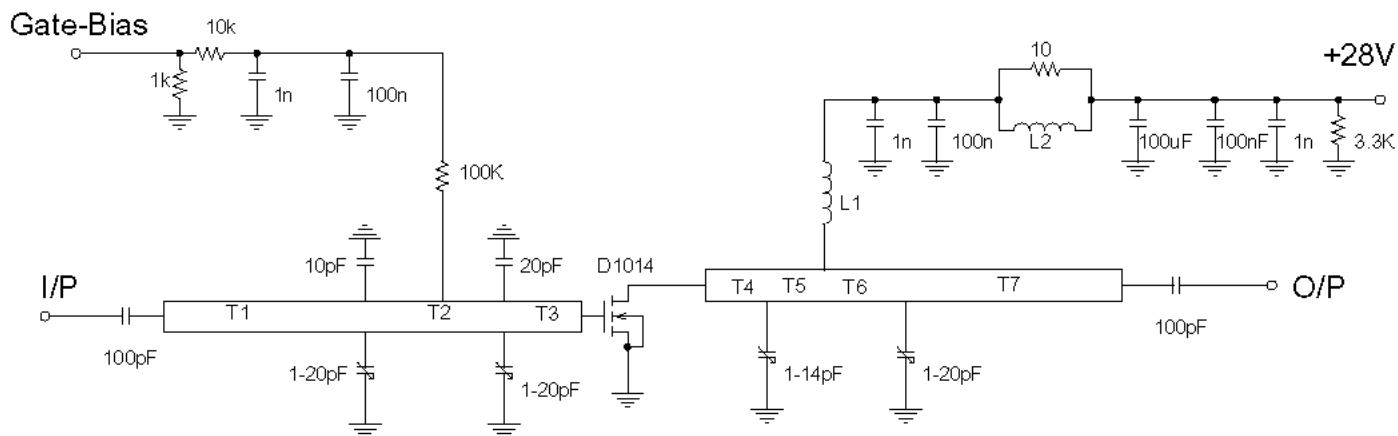
**OPTIMUM SOURCE AND LOAD IMPEDANCE**

Frequency MHz	$Z_S$ $\Omega$	$Z_L$ $\Omega$
500MHz	2.3 + j1.0	3.7 + j0.8

**Typical S Parameters**

!  $V_{DS} = 28V, I_{DQ} = 0.2A$   
# MHz S M A R 50

Freq MHz	S11		S21		S12		S22	
	mag	ang	mag	ang	mag	ang	mag	ang
100	0.79	-158	14.62	69	0.012	-7	0.61	-145
200	0.88	-167	5.82	42	0.006	3	0.79	-156
300	0.92	-171	3.02	28	0.007	60	0.87	-162
400	0.92	-176	1.82	18	0.117	77	0.90	-167
500	0.94	-179	1.44	15	0.017	76	0.92	-169
600	0.95	177	1.06	13	0.023	75	0.95	-171
700	0.97	174	0.68	10	0.029	74	0.97	-174
800	0.97	171	0.54	5	0.034	69	0.96	-177
900	0.98	167	0.45	1	0.039	64	0.97	178
1000	0.97	165	0.36	1	0.043	64	0.96	178



Substrate 0.8mm G200

All microstrips lines  $W=1.6\text{mm}$

T1 37.5mm

T2 14.2mm

T3 10mm

T4 7.2mm

T5 5.7mm

T6 7.4mm

T7 39.6mm

L1 5.5 turns 20swg enamelled copper wire, 7mm i.d.

L2 1.5 turns 24swg enamelled copper wire on Siemens B62152A7X2 2 hole core

## D1014 500MHz Test Fixture

\*D1014

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

\*TO GENERATE S PARAMETERS MATCHING DATA SHEET, SET VG=3.2V FOR IDQ=1A

```
*      ____GATE
*      I      ____DRAIN
*      I      I      ____SOURCE
*      I      I      I
.SUBCKT D1014 10 20 30
LG 10 11 1.71N
RGATE 11 12 0.78
CG 10 30 0.05P
CRSS 12 17 2.5P
CISS 12 14 60P
LS 14 30 0.30N
CS 14 30 0.1P
LD 17 20 0.85N
CD 20 30 1.44P
R_RC 16 17 35.73
C_RC 14 16 11.8P
MOS 13 12 14 15 D1014MOS L=0.71U W=0.056332 ;D G S B LEVEL1
JFET 17 14 13 D1014JF ;D G S
DBODY 14 17 D1014DB ;P N

.MODEL D1014MOS NMOS (VTO=2.2 KP=1.8E-5 LAMBDA=0.1 RD=0.25 RS=0.5)
.MODEL D1014JF NJF (VTO=-7.5 BETA=0.04 LAMBDA=1)
.MODEL D1014DB D (CJO=88.5P RS=0.25 VJ=0.7 M=0.33 BV=70)
.ENDS
```

D1014.s2p

```
!      Vds=28V, Idq=1A
#      MHz S MA R 50
```

!Freq	S11		S21		S12		S22	
!MHz	mag	ang	mag	ang	mag	ang	mag	ang
100	0.794	-158	14.622	69	0.0115	-7	0.61	-145
200	0.881	-167	5.821	42	0.0061	3	0.794	-156
300	0.923	-171	3.02	28	0.0068	60	0.871	-162
400	0.923	-176	1.82	18	0.117	77	0.902	-167
500	0.937	-179	1.439	15	0.0168	76	0.923	-169
600	0.952	177	1.057	13	0.0234	75	0.945	-171
700	0.966	174	0.676	10	0.0285	74	0.966	-174
800	0.966	171	0.543	5	0.0335	69	0.955	-177
900	0.977	167	0.447	1	0.0394	64	0.966	178
1000	0.966	165	0.359	1	0.0432	64	0.955	178