POINT NINE
Technologies, Inc.

D2001 TetraFET

2.5W- 28V- 1GHz
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

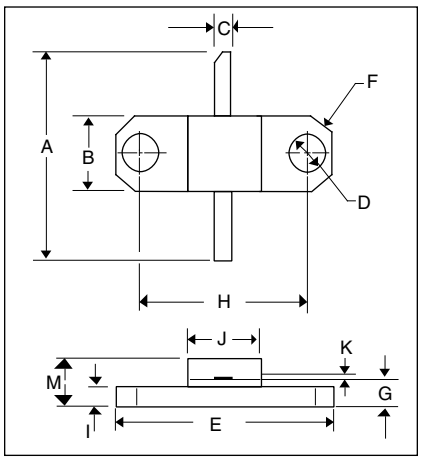
- **HF/VHF/UHF COMMUNICATIONS from DC to 2 GHz**

ABSOLUTE MAXIMUM RATINGS (T_{CASE} = 25°C unless otherwise stated)		
P_D	Power Dissipation	17.5W
BV_{DSS}	Drain-source breakdown voltage	65V
V_{GSS}	Gate-source voltage	±20V
I_D	Drain Current	1A
T_{stg}	Storage temperature	-65 to 150°C
T_j	Maximum operating junction temperature	200°C
$R_{THj\text{-}case}$	Thermal resistance junction-case	Max. 10°C/W

ELECTRICAL CHARACTERISTICS (T_{CASE} = 25°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			0.2	mAdc
I_{GSS}	Gate leakage current	V_{GS}=20V V_{DS}=0			1	µAdc
$V_{GS(th)}$	Gate threshold voltage	I_D=10mA V_{DS}=V_{GS}	1		7	Vdc
gfs	Transconductance (300µs pulse)	V_{DS}=10V I_D=0.2A	0.2			mhos
G_{PS}	Common source power gain	P_O=2.5W	13			dB
η	Drain efficiency	V_{DS}=28V I_{DQ}=0.2A	40			%
VSWR	Load mismatch tolerance	f=1GHz	20:1			
C_{iss}	Input capacitance	V_{DS}=0V V_{GS}=-5V f=1MHz			12	pF
C_{oss}	Output capacitance	V_{DS}=28V V_{GS}=0 f=1MHz			6	pF
C_{rss}	Reverse transfer capacitance	V_{DS}=28V V_{GS}=0 f=1MHz			0.5	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	18.92	.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

2697 Lavery Court #8 • Newbury Park, CA 91320 • (805) 375-6600 • Fax: (805) 375-6602 • www.point9.com • www.rfmosfet.com

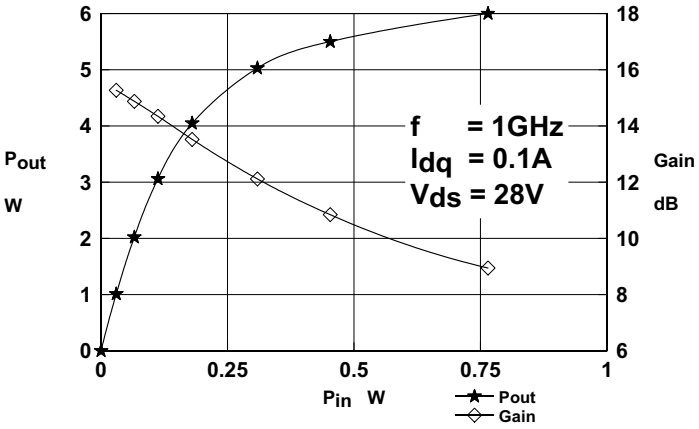


Figure 1
Output Power and Gain vs. Input Power.

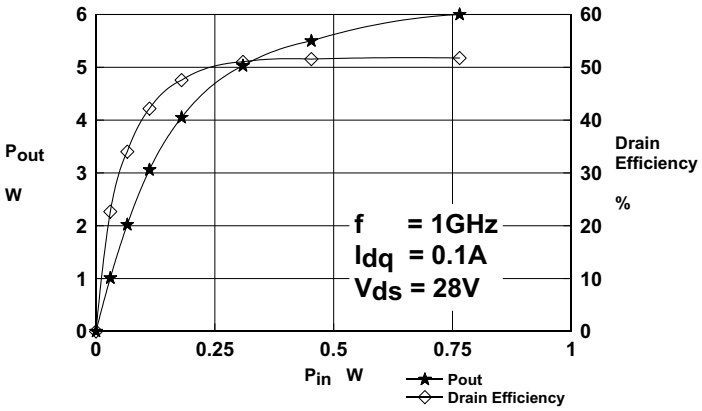


Figure 2
Output Power and Efficiency vs. Input Power .

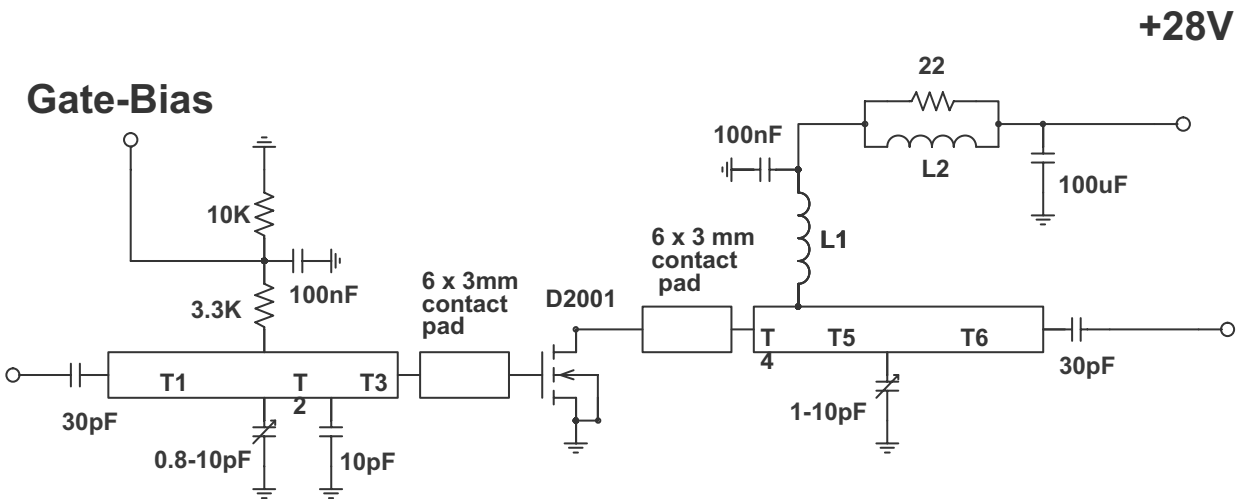
OPTIMUM SOURCE AND LOAD IMPEDANCE

Frequency MHz	Z_S Ω	Z_L Ω
1000MHZ	3.64 - j2.07	6.31 + j10.45

Typical S Parameters

! Vds=28V, Idq=0.2A
MHz S MA R 50

!Freq	S11		S21		S12		S22	
!MHz	mag	ang	mag	ang	mag	ang	mag	ang
100	0.966	-47	16.778	144	0.01479	56	0.923	-28
200	0.891	-81	12.882	118	0.02114	34	0.841	-48
300	0.841	-103	9.772	99	0.02213	20	0.794	-62
400	0.804	-120	7.674	84	0.01995	11	0.759	-73
500	0.804	-134	6.237	69	0.01641	6	0.75	-86
600	0.804	-143	4.955	59	0.01175	9	0.767	-97
700	0.822	-147	4.121	54	0.00906	41	0.776	-101
800	0.822	-154	3.631	45	0.01109	73	0.813	-107
900	0.841	-162	3.162	36	0.01718	88	0.813	-116
1000	0.832	-168	2.6	30	0.02344	94	0.804	-122



D2001 1GHz TEST FIXTURE

Substrate 0.8mm PTFE/glass, Er = 2.5
All microstrip lines W = 2.4mm

T1	35 mm
T2, T5	15 mm
T3	3 mm
T4	4 mm
T6	32 mm

L1	7 turns 24swg enamelled copper wire, 3mm i.d.
L2	1.5 turns 24swg enamelled copper wire on ferrite core

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*D2001

*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=0.2A

*       ____GATE
*       I   ____DRAIN
*       I   I   ____SOURCE
*       I   I   I
.SUBCKT D2001  10      20      30
LG      10      11      1.49N
RGATE   11      12      2.17
CG      10      30      0.49P
CRSS    12      17      0.5P
CISS    12      14      12P
LS      14      30      0.30N
CS      14      30      0.24P
LD      17      20      0.27N
CD      20      30      1.27P
R_RC    16      17      1079
C_RC    14      16      51.26P
MOS     13      12      14 15  D2001MOS  L=0.71U  W=0.010899  ;D G S B LEVEL1
JFET    17      14      13      D2001JF                       ;D G S
DBODY   14      17              D2001DB                       ;P N

.MODEL D2001MOS NMOS  (VTO=2 KP=3.5E-5 LAMBDA=0.1 RD=3 RS=2)
.MODEL D2001JF  NJF   (VTO=-5.8 BETA=0.025 LAMBDA=1)
.MODEL D2001DB  D     (CJO=14.5P RS=0.25 VJ=0.7 M=0.33 BV=65)
.ENDS
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D2001.s2p

```
!       Vds=28V, Idq=0.2A
#       MHz S MA R 50
```

!Freq	S11		S21		S12		S22	
!MHz	mag	ang	mag	ang	mag	ang	mag	ang
100	0.966	-47	16.778	144	0.01479	56	0.923	-28
200	0.891	-81	12.882	118	0.02114	34	0.841	-48
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