POINT NINE
Technologies, Inc.

D2003 TetraFET

5W - 28V - 1GHz

GOLD METALLISED MULTI-PURPOSE SILICON DMOS RF FET

FEATURES

- METAL GATE
- EXTRA LOW Crss
- BROAD BAND
- SIMPLE BIAS CIRCUITS
- LOW NOISE
- HIGH GAIN

APPLICATIONS

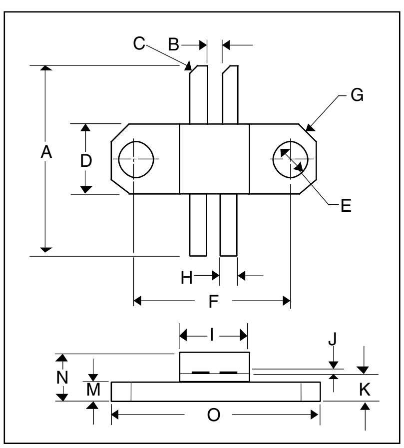
- HF/VHF/UHF COMMUNICATIONS from DC to 2 GHz

ABSOLUTE MAXIMUM RATINGS (T_{CASE} = 25°C unless otherwise stated)		
P_D	Power Dissipation	35W
BV_{DSS}	Drain-source breakdown voltage	65V
V_{GSS}	Gate-source voltage	±20V
I_D	Drain Current	2A
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. 5.0°C/W

ELECTRICAL CHARACTERISTICS (T_{CASE} = 25°C unless otherwise stated)

Parameter		Test Conditions	Min.	Typ.	Max.	Unit
		PER SIDE				
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=.2A	0.2			Mhos
		TOTAL DEVICE				
G_{PS}	Common source power gain	P_O=5W	13			dB
η	Drain efficiency	V_{DS}=28V I_{DQ}=.4A	40			%
VSWR	Load mismatch tolerance	f=1GHz	20:1			
		PER SIDE				
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	16.38	.26	.645	.010
B	1.52	.13	.060	.005
C	45°	5°	45°	5°
D	6.35	.13	.250	.005
E	3.30	.13	.130	.005
F	14.22	.13	.560	.005
G	x 45°	.13	.05 x 45°	.005
H	1.52	.13	.060	.005
I	6.35	.13	.250	.005
J	.13	.02	.005	.001
K	2.16	.13	.085	.005
M	1.52	.13	.060	.005
N	5.08	MAX	.200	MAX
O	18.90	5°	.744	.005

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

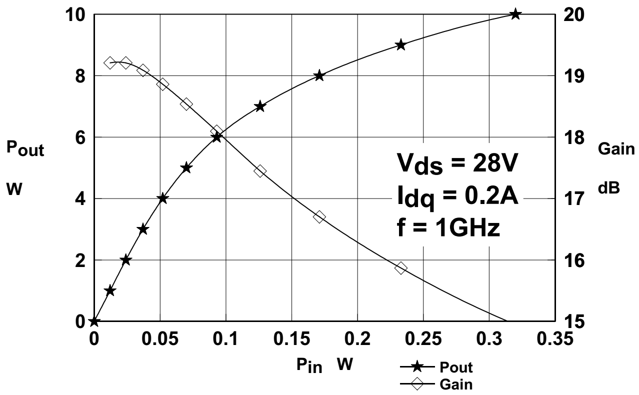


Figure 1 Output Power and Gain vs. Input power

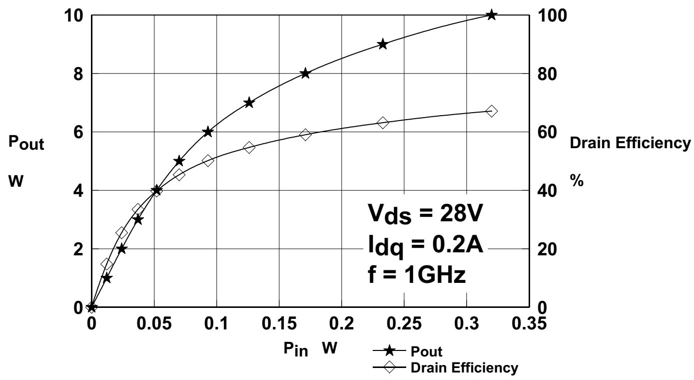


Figure 2 Output Power and Efficiency vs. Input Power

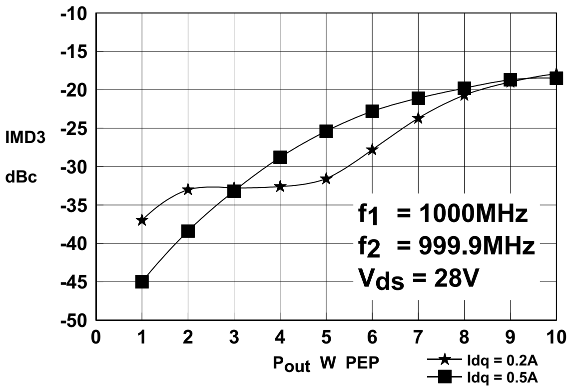


Figure 3 IMD Vs. Output Power.

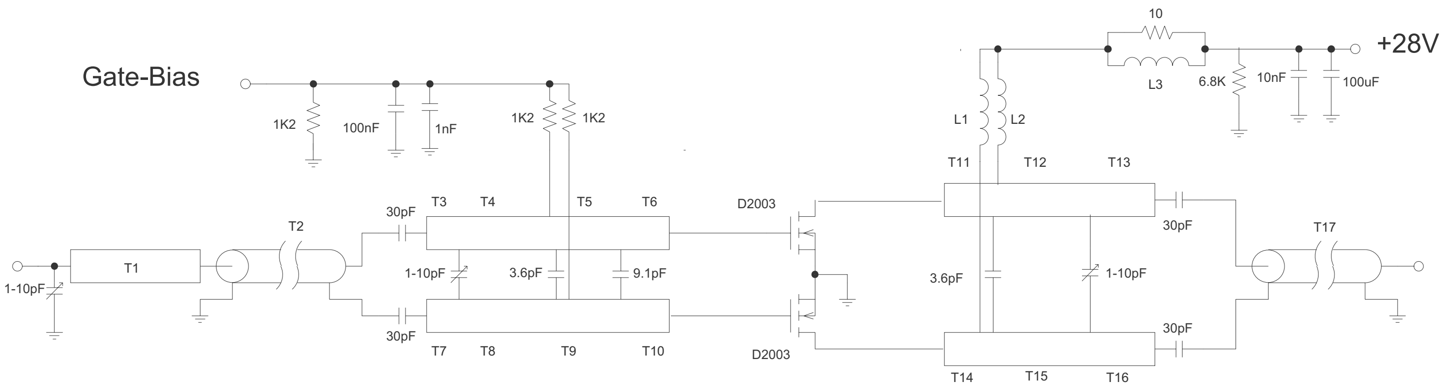
OPTIMUM SOURCE AND LOAD IMPEDANCE

Frequency MHz	Z_S Ω	Z_L Ω
1000MHZ	1.1 - j2.5	5.1 - j17.1

Typical S Parameters

! Vds=28V, Idq=0.1A
MHZ S MA R 50

!Freq	S11		S21		S12		S22	
!MHz	mag	ang	mag	ang	mag	ang	mag	ang
70	0.97	-36.4	15.8	156.6	0.017	67.2	0.91	-23.2
100	0.94	-48.0	14.1	146.3	0.021	58.1	0.88	-30.1
150	0.88	-65.3	12.3	129.9	0.027	45.5	0.81	-40.3
200	0.84	-78.5	10.2	114.7	0.029	34.8	0.77	-48.1
250	0.82	-88.4	8.8	106.0	0.029	28.1	0.75	-54.2
300	0.79	-97.1	7.7	98.3	0.029	27.3	0.73	-59.1
350	0.78	-105.5	6.9	88.5	0.028	22.2	0.72	-64.3
400	0.77	-113.3	6.0	84.5	0.026	24.2	0.71	-69.3
450	0.77	-121.8	5.4	77.8	0.024	23.3	0.70	-75.2
500	0.77	-128.9	4.9	75.3	0.022	29.6	0.70	-80.4
550	0.78	-136.7	4.6	68.3	0.020	35.0	0.70	-86.5
600	0.78	-144.0	4.4	65.4	0.020	46.6	0.70	-93.6
650	0.78	-150.8	4.0	57.2	0.020	57.6	0.70	-99.6
700	0.79	-156.7	3.7	52.3	0.022	68.5	0.71	-105.8
750	0.79	-160.9	3.4	46.7	0.025	76.6	0.70	-111.3
800	0.78	-164.2	3.0	41.4	0.028	81.6	0.69	-115.6
850	0.78	-166.3	2.7	39.5	0.032	87.8	0.68	-117.0
900	0.79	-168.5	2.6	38.4	0.036	92.3	0.68	-119.3
950	0.78	-170.3	2.5	36.8	0.044	97.4	0.70	-121.0
1000	0.79	-172.5	2.4	33.0	0.053	97.4	0.70	-124.2



1000MHz TEST FIXTURE

Substrate 0.8mm thick PTFE/glass
All microstrip lines W = 2.7mm

T1	15.7
T2, T17	45mm 50 OHM UT 34 semi-rigid coax
T3, T7	7mm
T4, T8	15mm
T5, T9	7.6mm
T6, T10	8mm
T11,T14	8mm
T12,T15	11.2mm
T13,T16	7mm

L1, L2	6 turns 24swg enamelled copper wire, 3mm i.d.
L3	1.5 turn 24swg enamelled copper wire on Siemens B62152-A7X 2 hole core

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

```
*D2003

*PSPICE MODEL FOR POINT NINE RF N-CHANNEL VERTICAL DMOS POWER FET
*May 2004


*                  ____GATE
*                  I   ____DRAIN
*                  I   I   ____SOURCE
*                  I   I   I
.SUBCKT D2003  10  20  30
*Cin1,Cin2 & Lin model the input side of the package
Cin1   10    30    0.38p
Lin    10    11    0.71n
Cin2   11    30    0.38p

LG    11    12    1n        ;Gate bond wire inductance
CGS   12    13    10.6p     ;Gate-source capacitance
MOS   14    12    13   13   D2003 L=0.9U W=0.0109    ;D G S B LEVEL1
JFET  16    13    14        D2003                  ;D G S
DBODY 13    16              D2003                  ;P N
LS    13    30    0.5n      ;Source bond wire inductance
CGD   12    16    0.3p      ;Gate-drain feedback capacitance

*Cout1,Cout2 & Lout model the output side of the package
Cin1   10    30    0.38p
Lin    10    11    0.71n
Cin2   11    30    0.38p

.MODEL D2003  NMOS (VTO=3.52 KP=7.77E-4 LAMBDA=0.0224 RD=0.6 RS=2.7)
.MODEL D2003  NJF  (VTO=-5.8 BETA=0.0366 LAMBDA=1.357)
.MODEL D2003  D    (CJO=15P RS=0.25 VJ=0.7 M=0.33 BV=70)

.ENDS
```