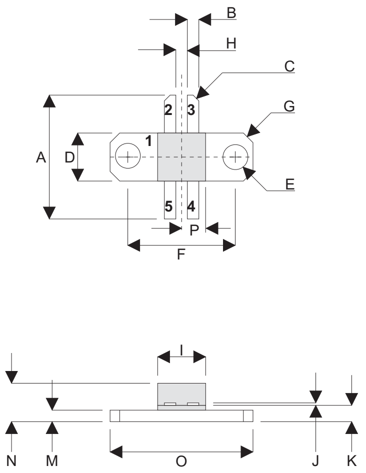
TetraFET

D1016UK

METAL GATE RF SILICON FET

MECHANICAL DATA

GOLD METALLISED MULTI-PURPOSE SILICON DMOS RF FET 40W – 28V – 500MHz PUSH–PULL



DQ

PIN 1	SOURCE (COMMON)	PIN 2	DRAIN 1
PIN 3	DRAIN 2	PIN 4	GATE 2
PIN 5	GATE 1		

DIM	mm	Tol.	Inches	Tol.
A	16.38	0.26	0.645	0.010
B	1.52	0.13	0.060	0.005
C	45°	5°	45°	5°
D	6.35	0.13	0.250	0.005
E	3.30	0.13	0.130	0.005
F	14.22	0.13	0.560	0.005
G	1.27 x 45°	0.13	0.05 x 45°	0.005
H	1.52	0.13	0.060	0.005
I	6.35	0.13	0.250	0.005
J	0.13	0.02	0.005	0.001
K	2.16	0.13	0.085	0.005
M	1.52	0.13	0.060	0.005
N	5.08	MAX	0.200	MAX
O	18.90	0.13	0.744	0.005
P	3.18	0.25	0.125	0.010

FEATURES

- SIMPLIFIED AMPLIFIER DESIGN
- SUITABLE FOR BROAD BAND APPLICATIONS
- VERY LOW C_{rss}
- USEFUL P_O AT 1GHz
- LOW NOISE
- HIGH GAIN – 13 dB MINIMUM

APPLICATIONS

- VHF/UHF COMMUNICATIONS
  from 1 MHz to 1 GHz

ABSOLUTE MAXIMUM RATINGS (T_{case} = 25°C unless otherwise stated)

P_D	Power Dissipation	100W
BV_{DSS}	Drain – Source Breakdown Voltage *	70V
BV_{GSS}	Gate – Source Breakdown Voltage *	±20V
$I_{D(sat)}$	Drain Current *	5A
T_{stg}	Storage Temperature	–65 to 150°C
T_j	Maximum Operating Junction Temperature	200°C

* Per Side

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

Parameter		Test Conditions			Min.	Typ.	Max.	Unit
		PER SIDE						
BV_{DSS}	Drain–Source Breakdown Voltage	V_{GS} = 0	I_D = 100mA		70			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 28V	V_{GS} = 0				1	mA
I_{GSS}	Gate Leakage Current	V_{GS} = 20V	V_{DS} = 0				1	µA
$V_{GS(th)}$	Gate Threshold Voltage*	I_D = 10mA	V_{DS} = V_{GS}		1		7	V
g_{fs}	Forward Transconductance*	V_{DS} = 10V	I_D = 1A		0.8			S
		TOTAL DEVICE						
G_{PS}	Common Source Power Gain	P_O = 40W			13			dB
η	Drain Efficiency	V_{DS} = 28V	I_{DQ} = 0.4A		50			%
VSWR	Load Mismatch Tolerance	f = 400MHz			20:1			—
		PER SIDE						
C_{iss}	Input Capacitance	V_{DS} = 28V	V_{GS} = –5V	f = 1MHz			60	pF
C_{oss}	Output Capacitance	V_{DS} = 28V	V_{GS} = 0	f = 1MHz			30	pF
C_{rss}	Reverse Transfer Capacitance	V_{DS} = 28V	V_{GS} = 0	f = 1MHz			2.5	pF

* Pulse Test: Pulse Duration = 300 µs , Duty Cycle ≤ 2%

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.

THERMAL DATA

$R_{THj–case}$	Thermal Resistance Junction – Case	Max. 1.75°C / W

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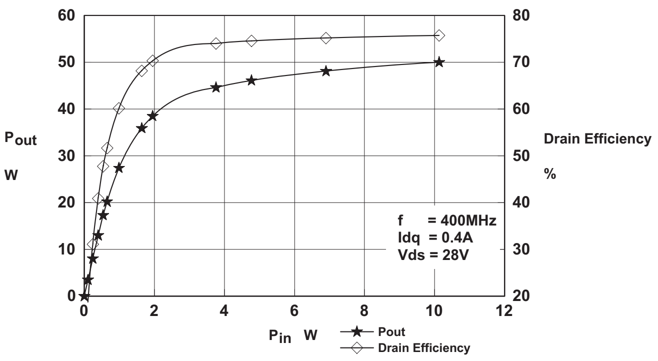


Figure 1

Power Output and efficiency vs. Power Input.

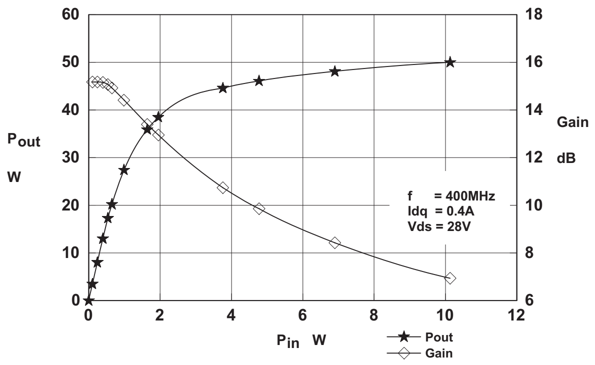


Figure 2

Power Output and Gain vs. Power Input.

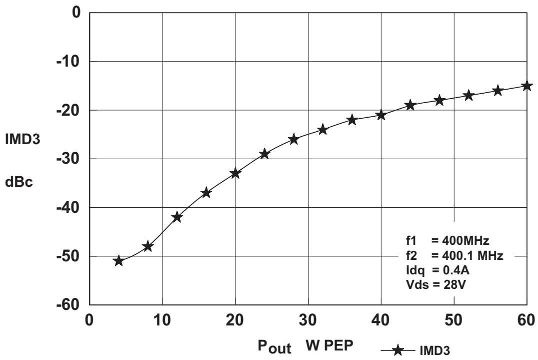


Figure 3

IMD vs. Output Power.

OPTIMUM SOURCE AND LOAD IMPEDANCE

Frequency MHz	Z_S Ω	Z_L Ω
400MHZ	10.7 - j35.4	13.8 - j22.2

Typical S Parameters

! V_{DS} = 28V, I_{DQ} = 1A

MHZ S MA R 50

!Freq	S11		S21		S12		S22	
!MHz	mag	ang	mag	ang	mag	ang	mag	ang
100	0.767	-135	22.646	88	0.0155	9	0.531	-103
200	0.813	-153	10.116	57	0.0099	4	0.692	-131
300	0.841	-161	5.623	39	0.0076	49	0.794	-143
400	0.861	-169	3.548	25	0.013	79	0.841	-151
500	0.882	-175	2.82	20	0.021	78	0.875	-156
600	0.902	180	2.093	14	0.0285	78	0.91	-161
700	0.923	174	1.365	9	0.0376	77	0.944	-166
800	0.912	170	1.096	2	0.0457	66	0.944	-170
900	0.923	164	0.902	-3	0.0484	66	0.933	-176
1000	0.923	161	0.724	-4	0.0596	64	0.944	-177

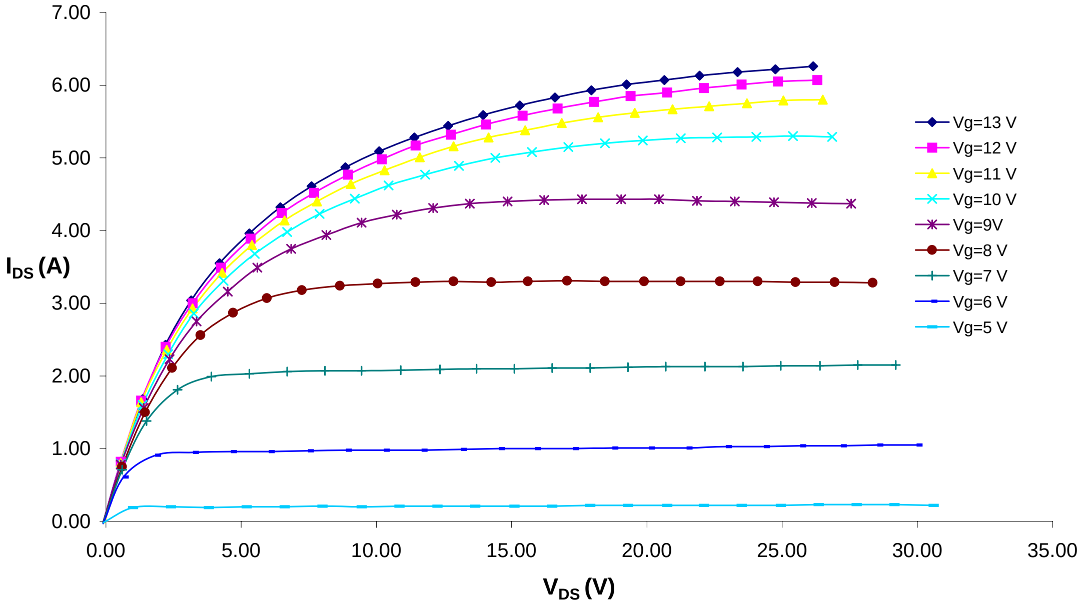


Figure 4 – Typical IV Characteristics.

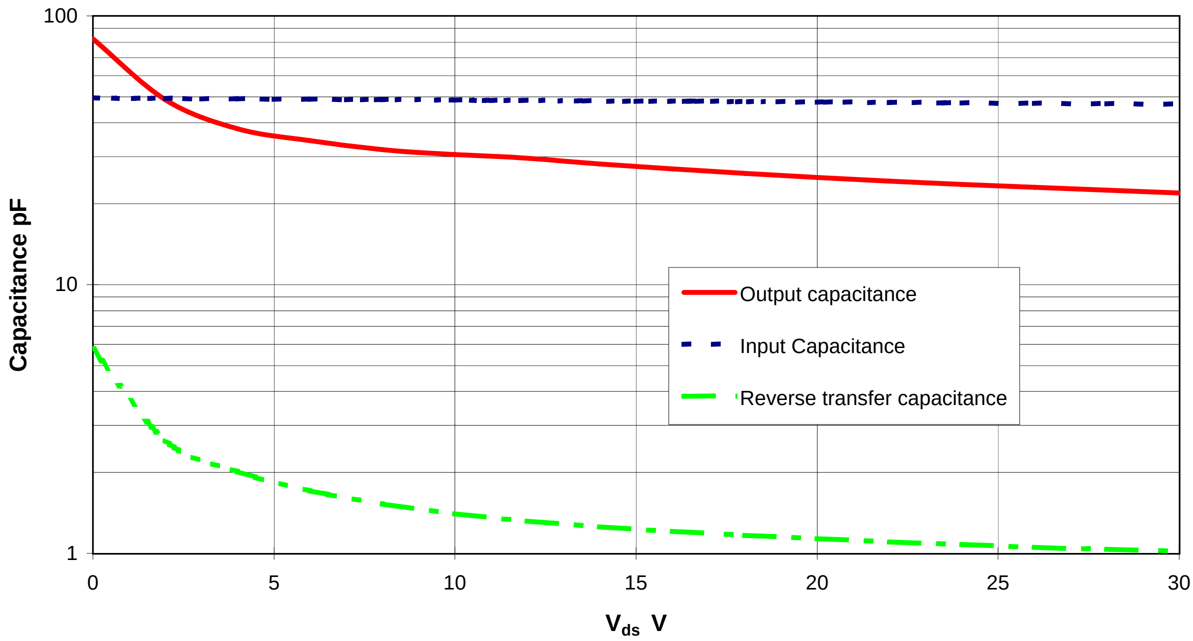
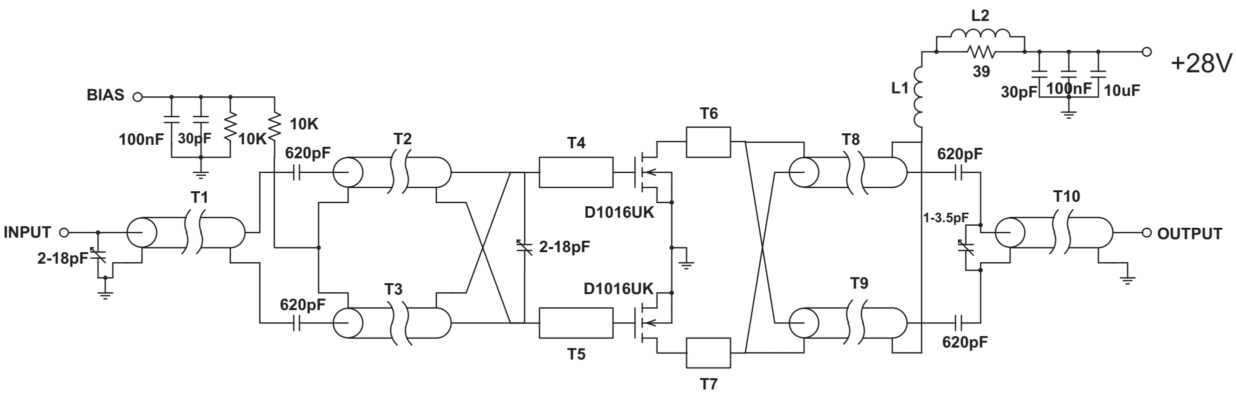


Figure 5 – Typical CV Characteristics.



TEST FIXTURE

Substrate 1.6mm FR4
All microstrip lines W = 2.5mm

T1	45mm 50 OHM UT34 semi-rigid coax
T2, T3	55mm 50 OHM UT 34 semi-rigid coax
T4, T5	25mm microstrip line
T6, T7	10mm microstrip line
T8, T9	45mm 25 OHM UT 34-25 semi-rigid coax
T10	60mm 50OHM UT34 semi-rigid coax
L1	4 turns 19swg enamelled copper wire, 7mm i.d.
L2	2.5 turns of 19swg enamelled copper wire on T50-6 ferrite toroid

Semelab plc. Telephone +44(0)1455 556565. Fax +44(0)1455 552612.
E-mail: sales@semelab.co.uk Website: http://www.semelab.co.uk

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