SEME LAB

D1024UK

ROHS COMPLIANT METAL GATE RF SILICON FET

MECHANICAL DATA

DD

PIN 1	SOURCE (COMMON)	PIN 2	DRAIN 1
PIN 3	DRAIN 2	PIN 4	SOURCE (COMMON)
PIN 5	SOURCE (COMMON)	PIN 6	GATE 2
PIN 7	GATE 1	PIN 8	SOURCE (COMMON)

DIM	mm	Tol.	Inches	Tol.
A	9.14	0.13	0.360	0.005
B	12.70	0.13	0.500	0.005
C	45°	5°	45°	5°
D	6.86	0.13	0.270	0.005
E	0.76	0.13	0.030	0.005
F	9.78	0.13	0.385	0.005
G	19.05	0.25	0.750	0.010
H	4.19	0.13	0.165	0.005
I	3.17	0.13	0.125	0.005
J	1.52R	0.13	0.060R	0.005
K	1.65R	0.13	0.065R	0.005
M	16.51	0.13	0.650	0.005
N	22.86	0.13	0.900	0.005
O	0.13	0.02	0.005	0.001
P	6.35	0.64	0.250	0.025
Q	10.77	0.13	0.424	0.005

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

FEATURES

• **SIMPLIFIED AMPLIFIER DESIGN**

• **SUITABLE FOR BROAD BAND APPLICATIONS**

• **LOW C_{rss}**

• **USEFUL P_O at 1 GHz**

• **LOW NOISE**

• **HIGH GAIN – 13 dB MINIMUM**

APPLICATIONS

• HF/VHF/UHF COMMUNICATIONS from 1 MHz to 500 MHz

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

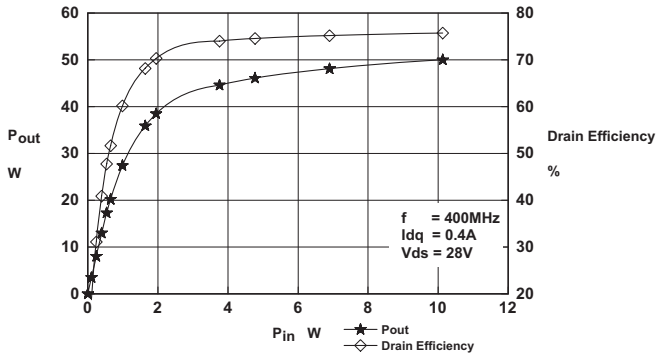| $R_{THj–case}$	Thermal Resistance Junction – Case	Max. 1.75°C / W

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Figure 1

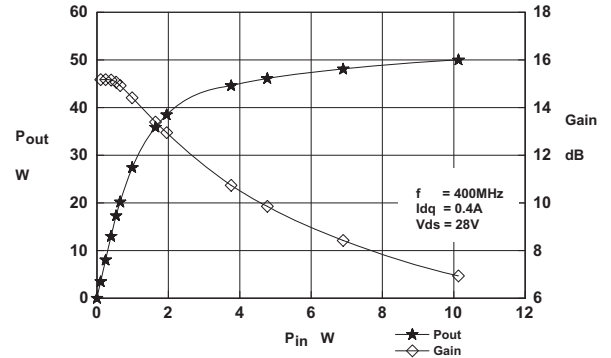**Power Output and efficiency vs. Power Input.**

Figure 2

Power Output and Gain vs. Power Input.
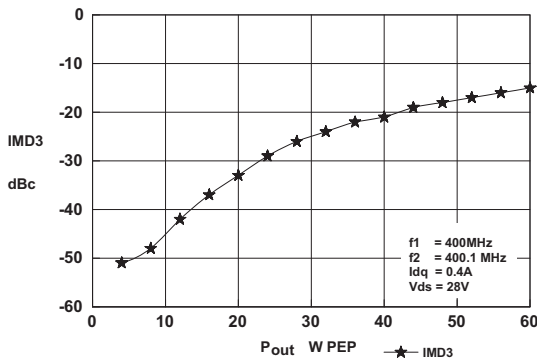
Figure 3

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 !MHz	S11 mag	ang	S21 mag	ang	S12 mag	ang	S22 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	0.0130	79	0.841	-151
500	0.882	-175	2.820	20	0.0210	78	0.875	-156
600	0.902	180	2.093	14	0.0285	78	0.910	-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
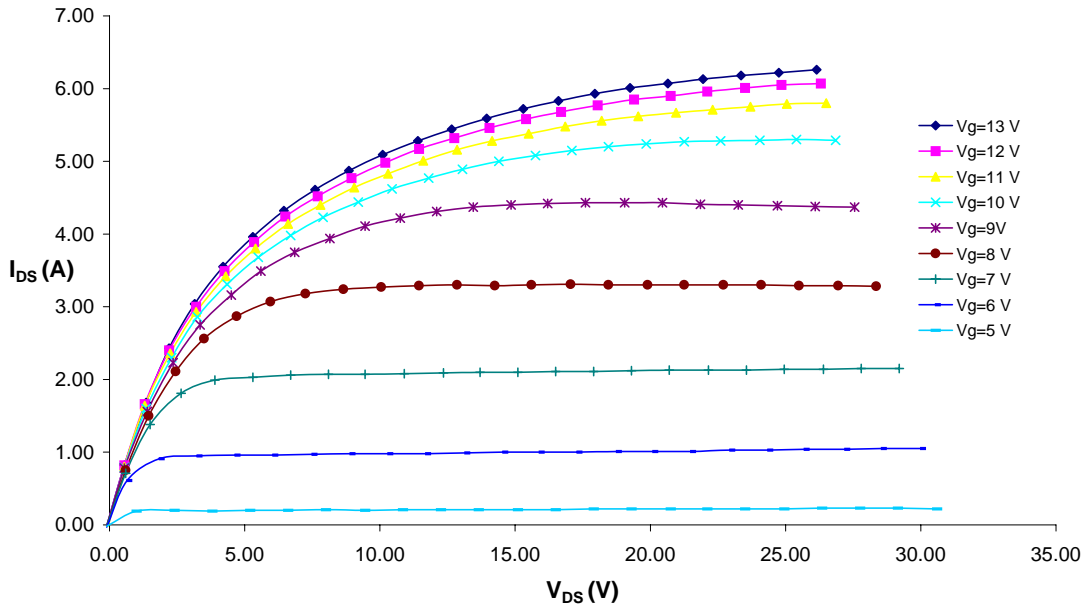
Figure 4 – Typical IV Characteristics.
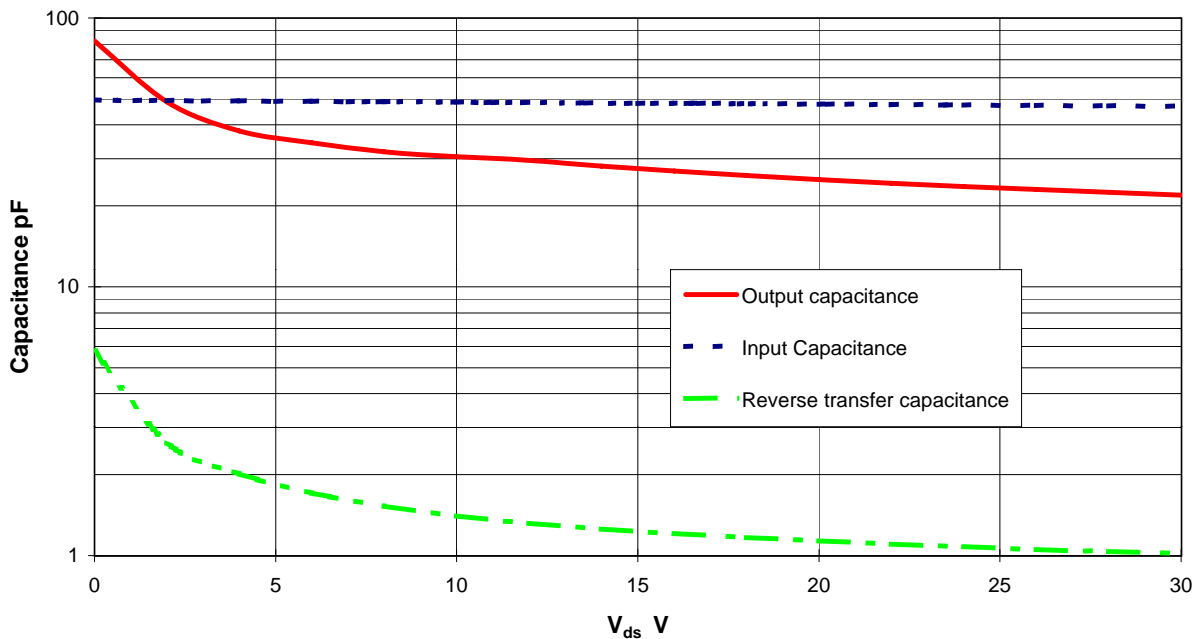
Figure 5 – Typical CV Characteristics.

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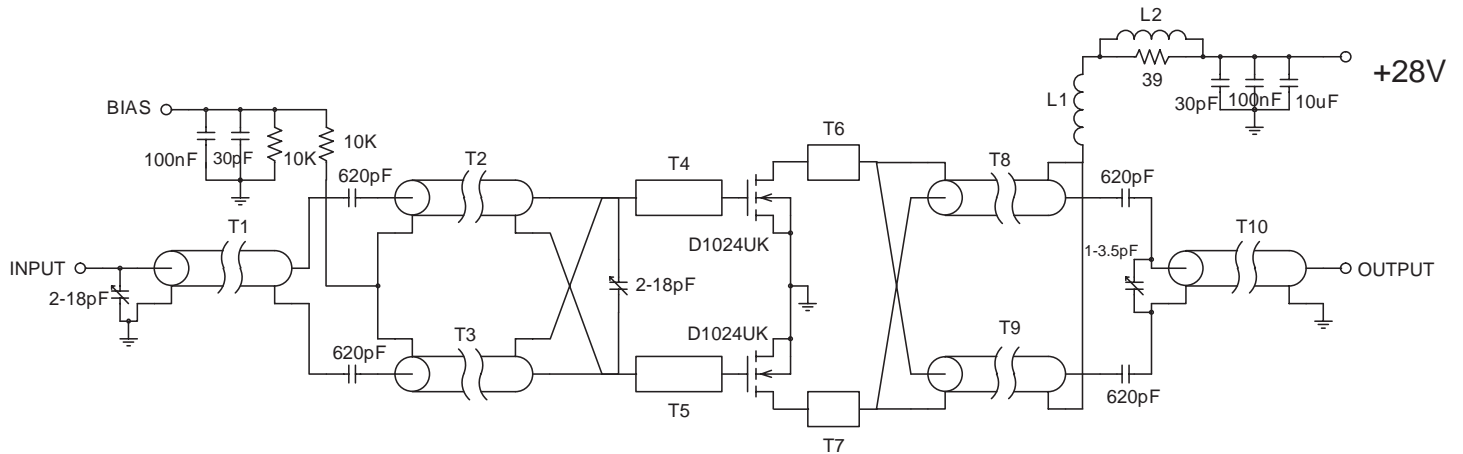
D1024UK TEST FIXTURE

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