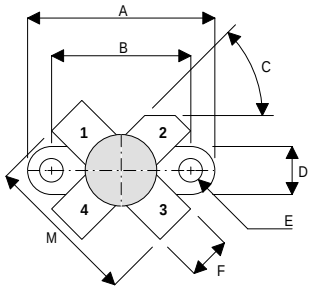
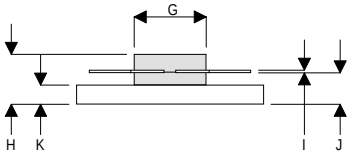
D1002UK

ROHS COMPLIANT METAL GATE RF SILICON FET

MECHANICAL DATA





DA

PIN 1	SOURCE	PIN 2	DRAIN
PIN 3	SOURCE	PIN 4	GATE

DIM	mm	Tol.	Inches	Tol.
A	24.76	0.13	0.975	0.005
B	18.42	0.13	0.725	0.005
C	45°	5°	45°	5°
D	6.35	0.13	0.25	0.005
E	3.17	0.13	0.125 DIA	0.005
F	5.71	0.13	0.225	0.005
G	9.52	0.13	0.375	0.005
H	6.60	REF	0.260	REF
I	0.13	0.02	0.005	0.001
J	4.32	0.13	0.170	0.005
K	2.54	0.13	0.100	0.005
M	20.32	0.25	0.800	0.010

GOLD METALLISED MULTI-PURPOSE SILICON DMOS RF FET 40W – 28V – 175MHz SINGLE ENDED

FEATURES

- **SIMPLIFIED AMPLIFIER DESIGN**
- **SUITABLE FOR BROAD BAND APPLICATIONS**
- **LOW C_{rss}**
- **SIMPLE BIAS CIRCUITS**
- **LOW NOISE**
- **HIGH GAIN – 16 dB MINIMUM**

APPLICATIONS

- HF/VHF/UHF COMMUNICATIONS from 1 MHz to 175 MHz

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

P_D	Power Dissipation	87W
BV_{DSS}	Drain – Source Breakdown Voltage	70V
BV_{GSS}	Gate – Source Breakdown Voltage	±20V
$I_{D(sat)}$	Drain Current	10A
T_{stg}	Storage Temperature	–65 to 150°C
T_j	Maximum Operating Junction Temperature	200°C

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

Parameter		Test Conditions		Min.	Typ.	Max.	Unit
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			2	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 = 2A	1.6			S
G_{PS}	Common Source Power Gain	P_O = 40W		16			dB
η	Drain Efficiency	V_{DS} = 28V	I_{DQ} = 0.2A	50			%
VSWR	Load Mismatch Tolerance	f = 175MHz		20:1			—
C_{iss}	Input Capacitance	V_{DS} = 28V	V_{GS} = –5V f = 1MHz			120	pF
C_{oss}	Output Capacitance	V_{DS} = 28V	V_{GS} = 0 f = 1MHz			60	pF
C_{rss}	Reverse Transfer Capacitance	V_{DS} = 28V	V_{GS} = 0 f = 1MHz			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. 2.0° C / W

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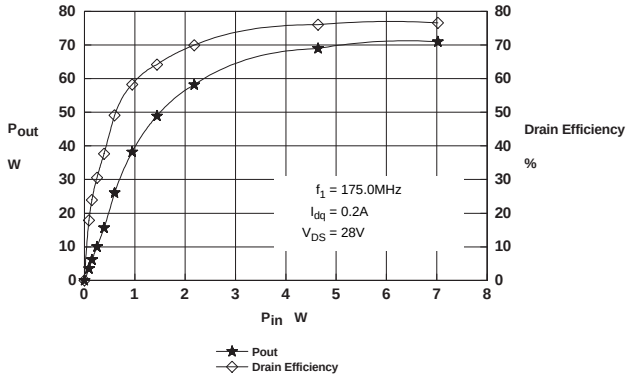

Figure 1 – Power Output and Efficiency vs. Power Input.

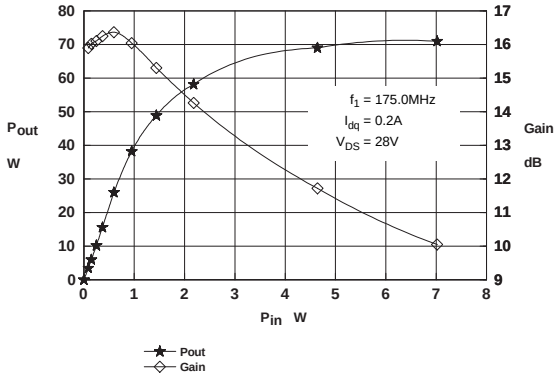

Figure 2 – Power Output & Gain vs. Power Input.

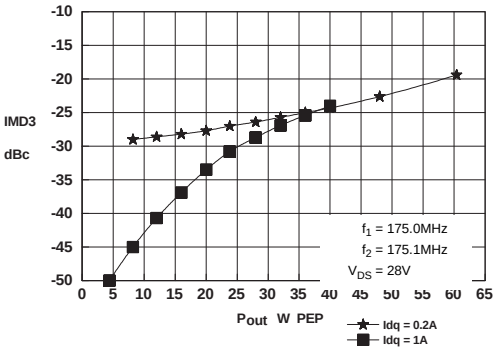

Figure 3 – IMD vs. Output Power.

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OPTIMUM SOURCE AND LOAD IMPEDANCE

Frequency MHz	Z_S Ω	Z_L Ω
175MHz	3.8 + j6.5	4.6 + j0.4

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
50	0.76	-144	15.6	86	0.026	1	0.58	-119
100	0.79	-155	7.1	61	0.021	-9	0.66	-132
150	0.84	-163	4.2	43	0.012	-3	0.74	-144
200	0.87	-169	2.7	33	0.009	47	0.81	-154
250	0.90	-176	1.9	23	0.016	76	0.85	-163
300	0.92	177	1.5	20	0.025	87	0.88	-172
350	0.94	170	1.1	11	0.033	85	0.91	-180
400	0.96	163	0.9	6	0.046	82	0.94	172
450	0.97	156	0.7	-2	0.051	78	0.96	165
500	0.98	150	0.6	-8	0.062	76	0.98	157
550	0.98	144	0.4	-12	0.068	74	0.98	152
600	0.98	141	0.4	-14	0.078	67	0.98	148

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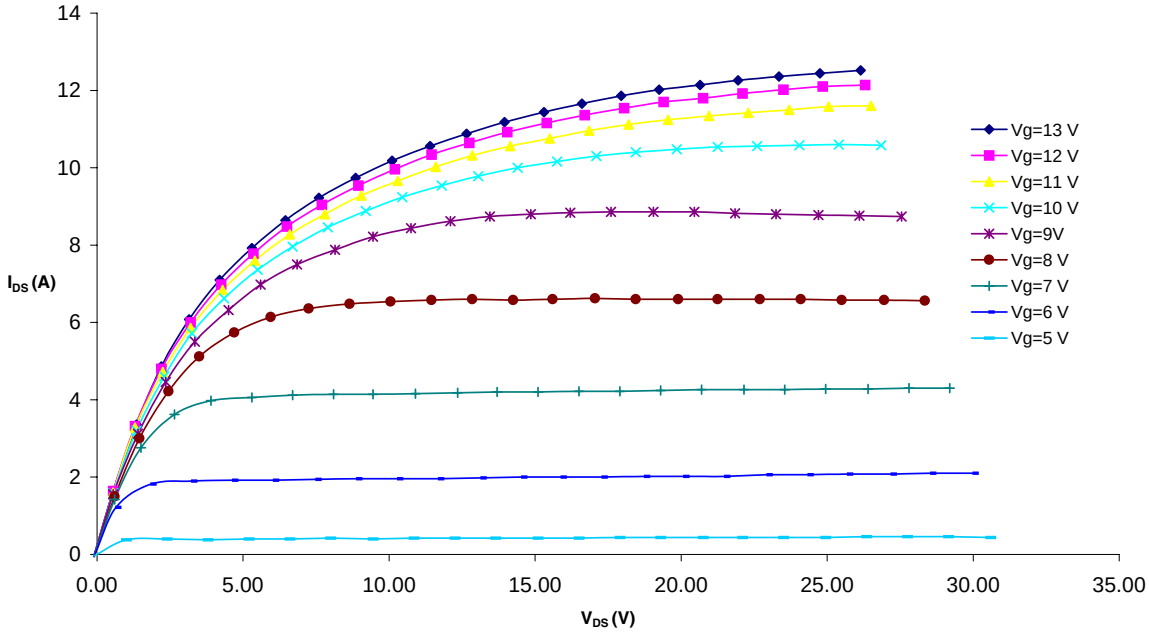

Figure 4 – Typical IV Characteristics.

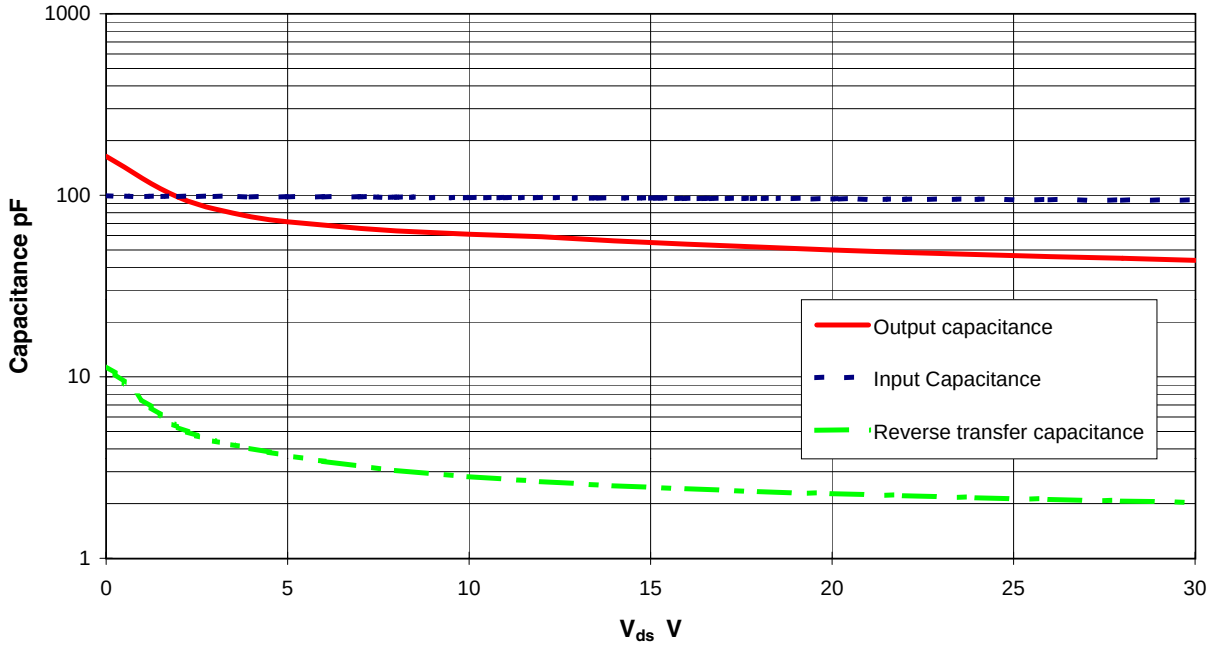

Figure 5 – Typical CV Characteristics.

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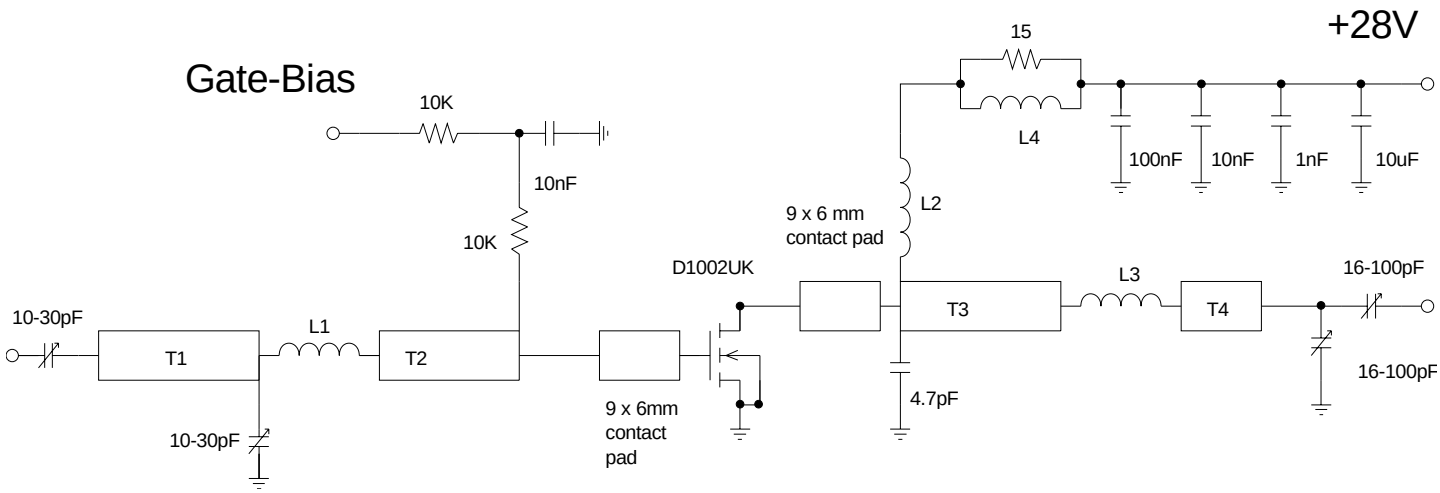

D1002UK 175MHz TEST FIXTURE

Substrate 1.6mm PTFE/glass, Er=2.5
All microstrip lines W=4.4mm

T1	10mm
T2	13mm
T3	12mm
T4	4mm

L1	1.5 turns 22swg enamelled copper wire, 6mm i.d.
L2	10 turns 19swg enamelled copper wire, 6mm i.d.
L3	1.5 turns 22swg enamelled copper wire, 6mm i.d.
L4	13.5 turns 19swg enamelled copper wire on Siemens B64920A618X830 ferrite core

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