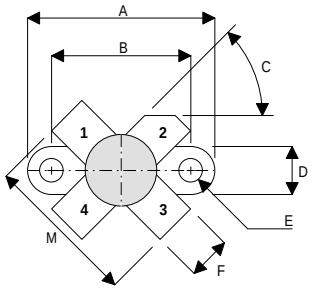
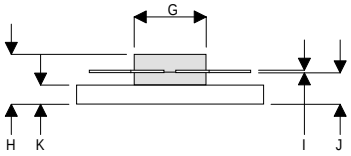
D1001UK

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 20W – 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	50W
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

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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			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
G_{PS}	Common Source Power Gain	P_O = 20W		16			dB
η	Drain Efficiency	V_{DS} = 28V	I_{DQ} = 0.1A	50			%
VSWR	Load Mismatch Tolerance	f = 175MHz		20:1			—
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
R_{dson}	Saturation Resistance	V_{GS} = 20V	I_{DS} = 2.5A		1		Ω

* 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. 3.5°C / W

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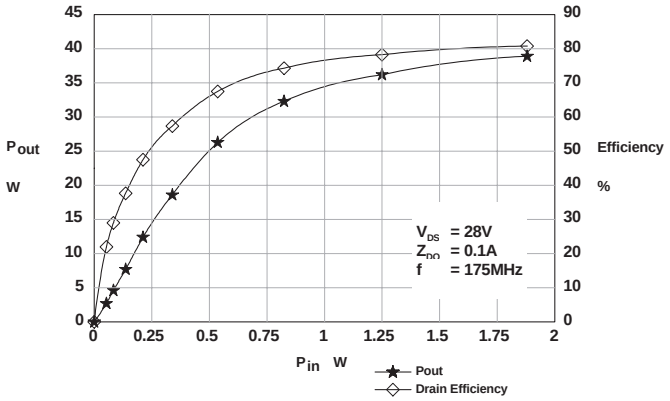

Figure 1 – Power Output and Efficiency vs. Power Input.

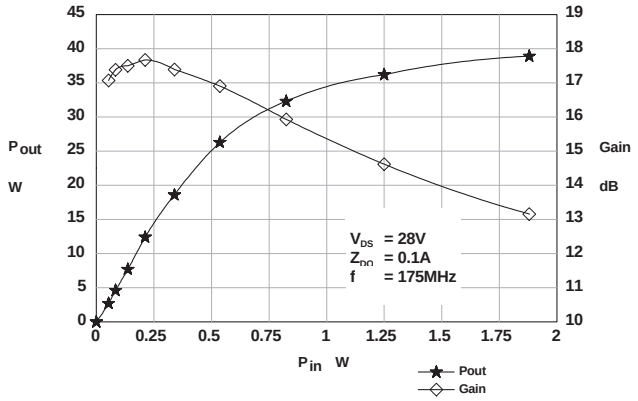

Figure 2 – Power Output & Gain vs. Power Input.

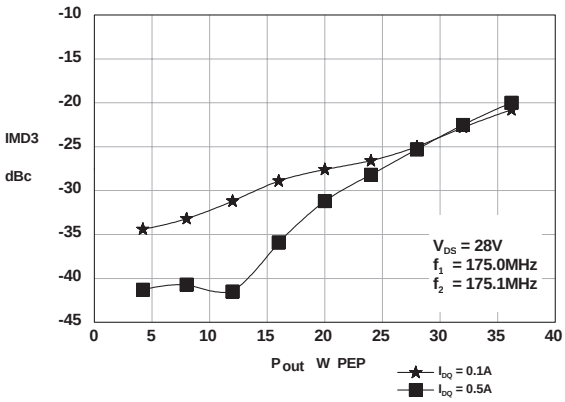

Figure 3 – IMD vs. Output Power.

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OPTIMUM SOURCE AND LOAD IMPEDANCE

Frequency MHz	Z_S Ω	Z_L Ω
175MHz	5 + j14	12 – j14

Typical S Parameters

! V_{DS} = 28V, I_{DQ} = 0.1A

MHZ S MA R 50

!Freq MHz	S11 mag	S11 ang	S21 mag	S21 ang	S12 mag	S12 ang	S22 mag	S22 ang
50	0.780	-116	18	112	0.034	25	0.642	-85
100	0.775	-135	9.312	85	0.030	11	0.577	-103
150	0.795	-149	6.077	68	0.022	14	0.613	-116
200	0.826	-159	4.193	53	0.017	44	0.669	-128
250	0.853	-169	3.216	43	0.023	74	0.715	-139
300	0.878	-179	2.566	35	0.039	89	0.759	-150
350	0.903	171	1.991	23	0.052	86	0.801	-161
400	0.923	161	1.655	18	0.070	84	0.839	-173
450	0.944	151	1.322	9	0.080	80	0.878	177
500	0.963	142	1.121	4	0.098	76	0.914	167
550	0.978	136	0.899	-2	0.108	72	0.945	159
600	0.985	131	0.762	-7	0.119	66	0.966	153

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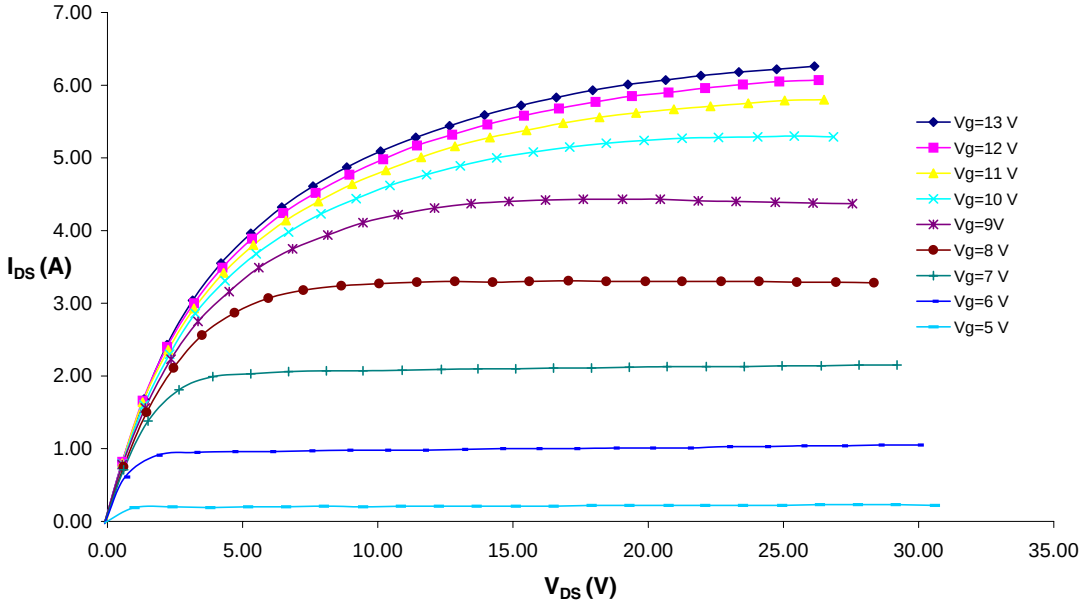

Figure 4 – Typical IV Characteristics.

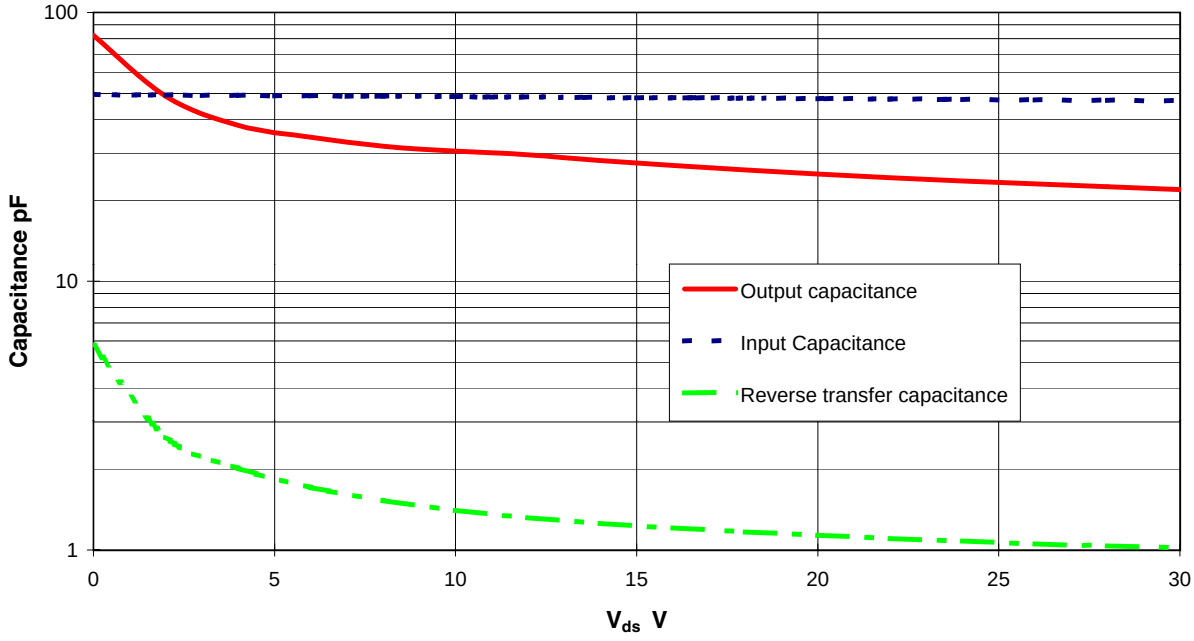

Figure 5 – Typical CV Characteristics.

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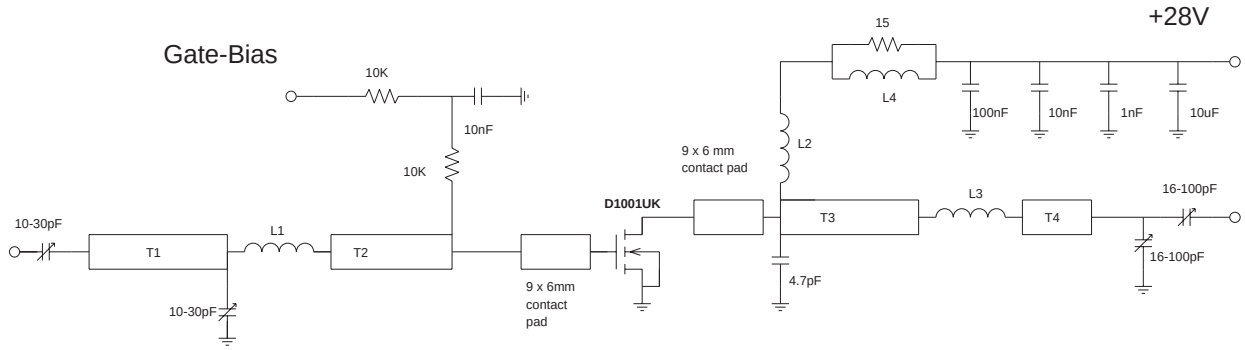

D1001UK 175MHz TEST FIXTURE

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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