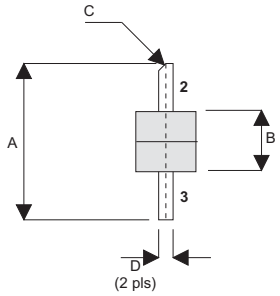
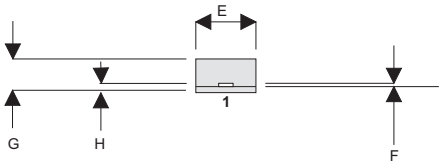
D2214UK

ROHS COMPLIANT METAL GATE RF SILICON FET

MECHANICAL DATA





DP

PIN 1 SOURCE PIN 2 DRAIN

PIN 3 GATE

DIM	mm	Tol.	Inches	Tol.
A	16.51	0.25	0.650	0.010
B	6.35	0.13	0.250	0.005
C	45°	5°	45°	5°
D	1.52	0.13	0.060	0.005
E	6.35	0.13	0.250	0.005
F	0.13	0.03	0.005	0.001
G	3.56	0.51	0.140	0.020
H	0.64	0.13	0.024	0.005

GOLD METALLISED MULTI-PURPOSE SILICON DMOS RF FET 10W – 12.5V – 1GHz SINGLE ENDED

FEATURES

- **SIMPLIFIED AMPLIFIER DESIGN**
- **SUITABLE FOR BROAD BAND APPLICATIONS**
- **LOW C_{rss}**
- **SIMPLE BIAS CIRCUITS**
- **LOW NOISE**
- **HIGH GAIN – 10 dB MINIMUM**

APPLICATIONS

- VHF/UHF COMMUNICATIONS from DC to 1 GHz

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

P_D	Power Dissipation	42W
BV_{DSS}	Drain – Source Breakdown Voltage	40V
BV_{GSS}	Gate – Source Breakdown Voltage	±20V
$I_{D(sat)}$	Drain Current	8A
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 = 10mA		40			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 12.5V	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}		0.5		7	V
g_{fs}	Forward Transconductance*	V_{DS} = 10V	I_D = 0.8A		0.72			S
G_{PS}	Common Source Power Gain	P_O = 10W			10			dB
η	Drain Efficiency	V_{DS} = 12.5V	I_{DQ} = 0.4A		40			%
VSWR	Load Mismatch Tolerance	f = 1GHz			20:1			—
C_{iss}	Input Capacitance	V_{DS} = 0	V_{GS} = –5V	f = 1MHz			48	pF
C_{oss}	Output Capacitance	V_{DS} = 12.5V	V_{GS} = 0	f = 1MHz			40	pF
C_{rss}	Reverse Transfer Capacitance	V_{DS} = 12.5V	V_{GS} = 0	f = 1MHz			4	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. 4.2°C / W

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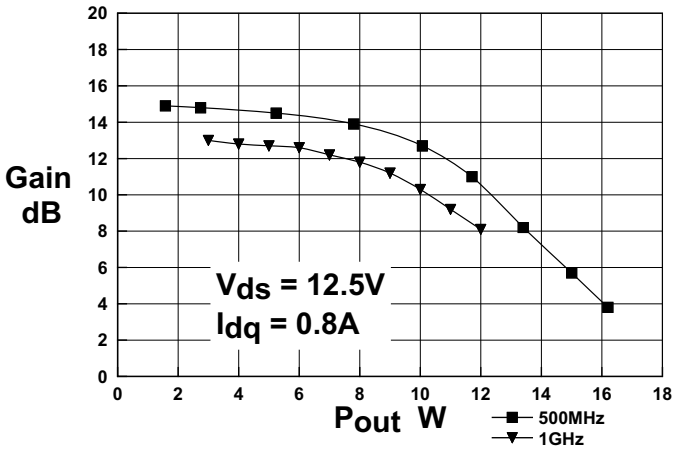

Figure 1- Gain vs. Power Output

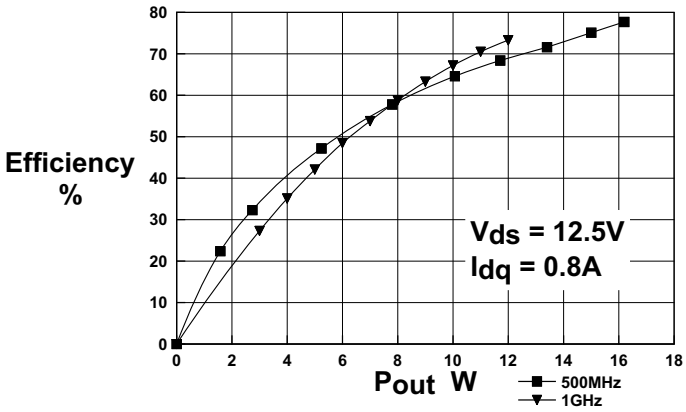

Figure 2 - Efficiency vs Output Power

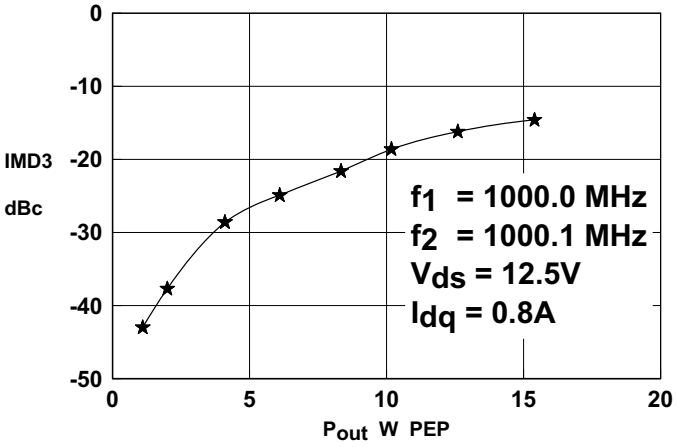

Figure 3 - IMD vs Power Output

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OPTIMUM SOURCE AND LOAD IMPEDANCE

Frequency MHz	Z_S Ω	Z_L Ω
1000MHz	0.9 – j4.9	1.9 – j7.3

Typical S Parameters

! V_{DS} = 12.5V, I_{DQ} = 0.8A

MHZ S MA R 50

!Freq !MHz	S11 mag	ang	S21 mag	ang	S12 mag	ang	S22 mag	ang
70	0.77	-124.6	19.6	100.6	0.020	10.0	0.58	-120.3
100	0.75	-136.7	14.7	89.0	0.020	2.0	0.60	-130.3
150	0.77	-148	9.3	72.2	0.017	-7.6	0.65	-140.3
200	0.80	-154.9	6.4	61.7	0.015	-10.3	0.71	-146.8
250	0.83	-160.2	4.7	52.8	0.012	-10.4	0.76	-151.4
300	0.85	-164.1	3.8	49.3	0.010	-4.1	0.79	-155.5
350	0.87	-167.8	3.0	39.7	0.007	8.7	0.82	-159.6
400	0.88	-170.9	2.5	39.0	0.006	29.4	0.85	-162.6
450	0.90	-174.5	2.0	33.8	0.007	56.1	0.87	-165.9
500	0.90	-177.5	1.8	31.5	0.009	73.1	0.87	-168.5
550	0.92	179.2	1.5	25.5	0.012	80.5	0.90	-171.7
600	0.92	176.5	1.4	20.4	0.016	81.4	0.90	-174.4
650	0.93	174.6	1.2	17.5	0.018	84.5	0.91	-176.5
700	0.94	172.2	1.1	11.7	0.021	81.5	0.92	-178.7
750	0.94	169.7	0.9	10.0	0.022	83.0	0.93	179.1
800	0.95	167.6	0.7	7.7	0.024	82.7	0.94	177.2
850	0.95	165.5	0.6	11.4	0.027	88.1	0.94	174.4
900	0.96	164.1	0.6	11.4	0.031	89.0	0.95	172.6
950	0.96	161.3	0.6	12.3	0.036	89.5	0.95	170.6
1000	0.96	158.6	0.5	8.7	0.040	86.0	0.95	169

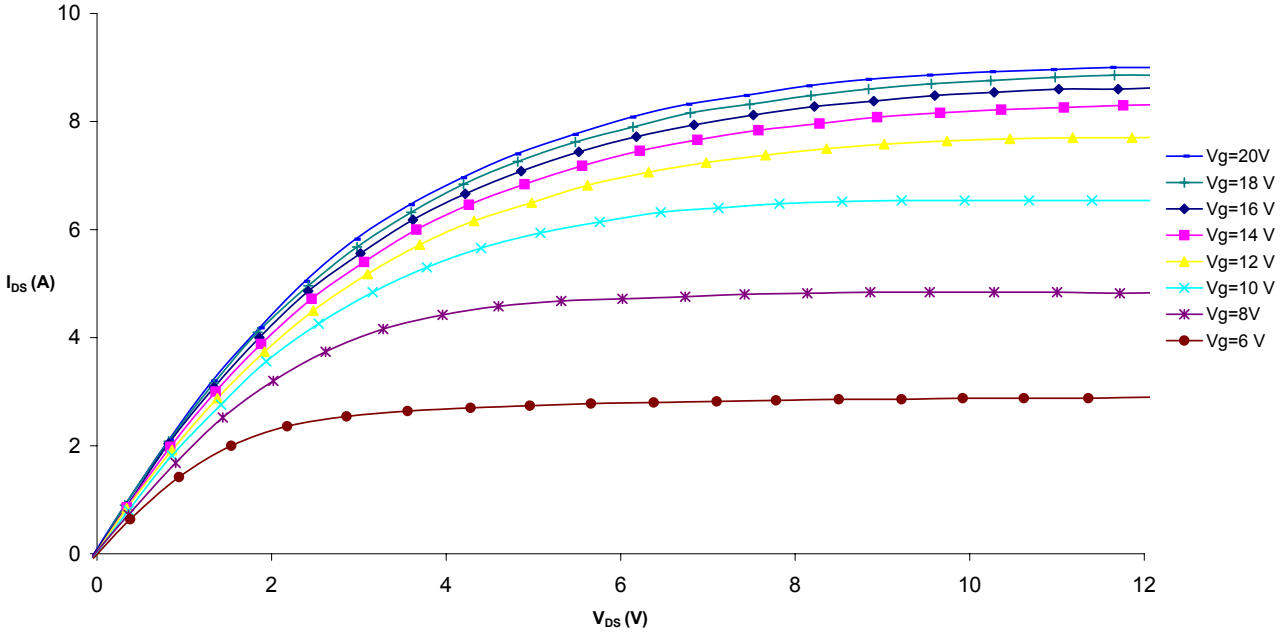

Figure 4 – Typical IV Characteristics.

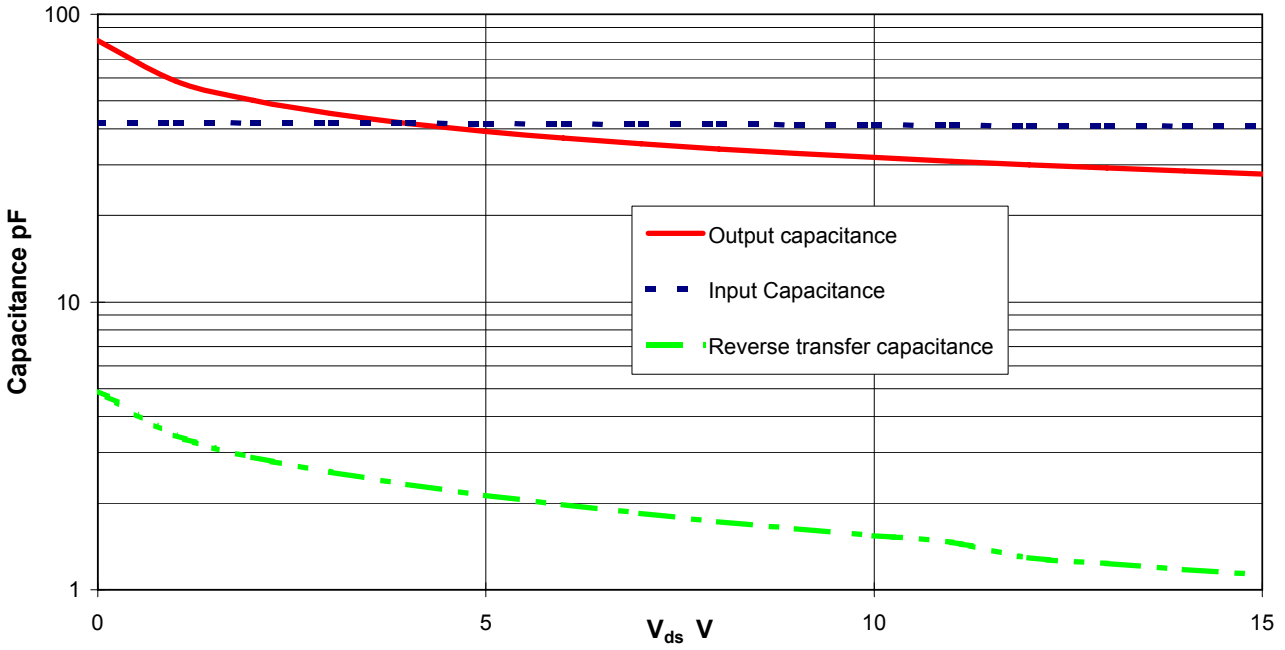

Figure 5 – Typical CV Characteristics.

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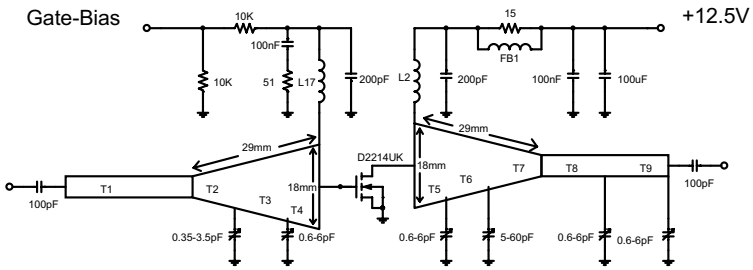


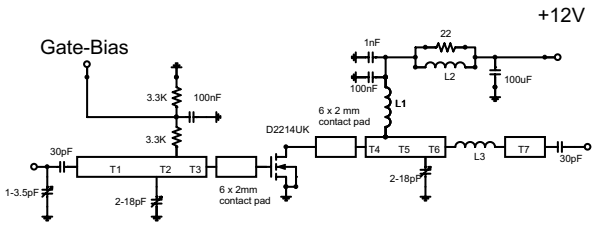
Substrate 0.8mm PTFE/glass

T1 28mm 50 Ohms
T2 11mm
T3 11mm
T4 7mm
T5 5mm
T6 14mm
T7 10mm
T8 11mm 50 Ohms
T9 17mm 50 Ohms

FB1 Murata BL02RN1-R62

L1,L2 10 turns 22swg enamelled copper wire, 6mm i.d.

Figure 6 - 1GHz Test Fixture



Substrate 0.8mm PTFE/glass, Er=2.5

All microstrip lines W=2.2mm

T1 32mm

T2 4mm

T3 5mm

T4 3mm

T5 9mm

T6 7.5mm

T7 13mm

L1 6 turns 0.5mm dia enamelled copper wire, 3mm i.d.

L2 1.5 turns 0.5mm enamelled copper wire on Siemens B62152A7 2 hole ferrite core

L3 1/16" dia wire hairpin loop 15mm long

Figure 7 - 500MHz Test Fixture