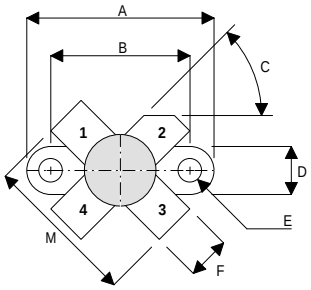
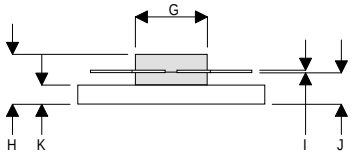
TetraFET

D5002UK

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 – 50V – 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/ 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	125V
BV_{GSS}	Gate – Source Breakdown Voltage	±20V
$I_{D(sat)}$	Drain Current	6A
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		125			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 50V	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 = 1A		1.6			S
G_{PS}	Common Source Power Gain	P_O = 40W			16			dB
η	Drain Efficiency	V_{DS} = 50V	I_{DQ} = 0.2A		50			%
VSWR	Load Mismatch Tolerance	f = 175MHz			20:1			—
C_{iss}	Input Capacitance	V_{DS} = 50V	V_{GS} = –5V	f = 1MHz			120	pF
C_{oss}	Output Capacitance	V_{DS} = 50V	V_{GS} = 0	f = 1MHz			50	pF
C_{rss}	Reverse Transfer Capacitance	V_{DS} = 50V	V_{GS} = 0	f = 1MHz			3	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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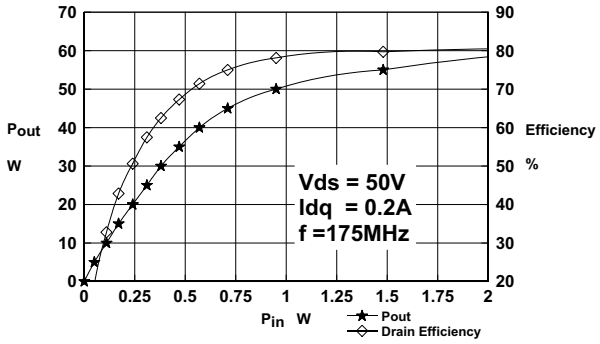

Figure 1
Power Output and Efficiency vs. Power input

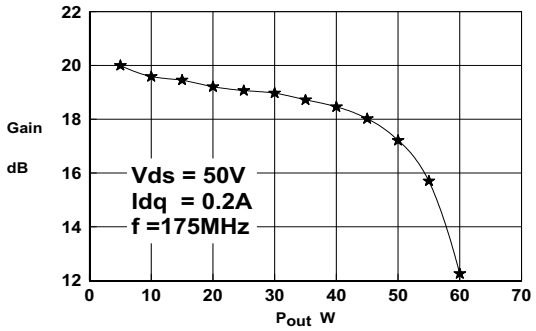

Figure 2
Power Output and Gain vs Power Input

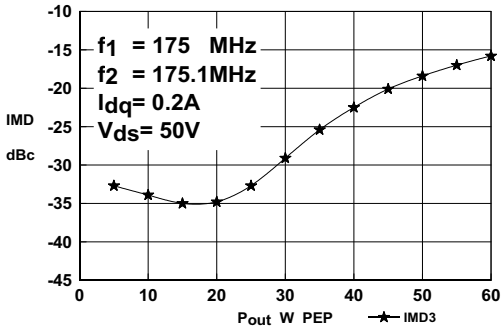

Figure 3
IMD3 vs Power Output

OPTIMUM SOURCE AND LOAD IMPEDANCE

Frequency MHz	Z_S Ω	Z_L Ω
175	3.3 + j7.1	10.9 + j10.5

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Typical S Parameters

! Vds=50V Idq=0.2A
MHZ S MA R 50

!Freq	S11		S21		S12		S22	
!Mhz	mag	ang	mag	ang	mag	ang	mag	ang
30	0.869	-127.8	10.81	166.3	0.01	79.5	0.565	-96.1
40	0.868	-131.2	10.45	153.6	0.012	70.2	0.569	-99.8
50	0.86	-138.6	9.931	142.9	0.014	63.2	0.578	-102.1
60	0.858	-140.1	9.241	133.3	0.015	57.4	0.582	-105.5
70	0.855	-141.9	8.544	126	0.015	54.8	0.587	-107.1
80	0.85	-143.5	7.896	118.7	0.016	52.2	0.598	-109.2
90	0.847	-146	7.336	112.5	0.016	50.8	0.606	-111.8
100	0.851	-148.8	6.819	106.8	0.016	50.9	0.622	-114.8
110	0.847	-151.1	6.402	101.4	0.016	51.3	0.626	-115.8
120	0.845	-153.2	5.988	96.2	0.016	53.2	0.63	-116.8
130	0.844	-155.1	5.563	91.1	0.015	55.9	0.637	-118.5
140	0.846	-157.1	5.198	87.3	0.015	59.5	0.645	-119.7
150	0.846	-160	4.696	80.8	0.016	65.6	0.655	-123.4
160	0.848	-161.3	4.37	76.3	0.016	69.6	0.67	-124.1
170	0.851	-162.5	4.069	72.4	0.016	74.9	0.676	-126.4
180	0.849	-164.8	3.786	69.2	0.017	79.5	0.683	-128.6
190	0.859	-166.1	3.537	66.8	0.019	84.6	0.697	-130.1
200	0.858	-166.8	3.289	64.2	0.02	88.6	0.708	-132.2
210	0.865	-168.8	3.103	62.7	0.022	93.2	0.716	-134.3
220	0.867	-170.1	2.991	60.3	0.024	94.6	0.725	-135.7
230	0.873	-171.2	2.837	58.3	0.026	96	0.737	-137.4
240	0.877	-172.4	2.699	55.3	0.028	96.5	0.749	-139.3
250	0.877	-173.7	2.555	52.6	0.03	97.2	0.75	-140.6
260	0.884	-174.5	2.419	49.5	0.032	97.5	0.766	-142.2
270	0.889	-175.4	2.296	47.4	0.034	99.1	0.778	-144
280	0.882	-176.9	2.182	44.8	0.037	99.6	0.786	-145.3
290	0.891	-177.4	2.081	44.6	0.04	101	0.794	-147.2
300	0.892	-178.3	2.001	42.8	0.043	100.9	0.805	-148.4
310	0.896	-179.5	1.928	40.9	0.046	100	0.809	-150
320	0.905	179.3	1.854	38.5	0.049	98.8	0.82	-151.1
330	0.902	179.2	1.761	35.6	0.051	97.2	0.825	-153.4
340	0.908	178	1.661	32.9	0.052	96.1	0.832	-154.1
350	0.908	176.3	1.556	31.4	0.054	95.7	0.837	-156
360	0.913	175.7	1.461	29.6	0.055	95.7	0.845	-156.4
370	0.917	174.8	1.379	29.1	0.058	96.6	0.849	-158.1
380	0.914	174.4	1.321	28.7	0.062	96.8	0.847	-159.6
390	0.919	173.2	1.259	28.5	0.067	96.6	0.858	-161.7
400	0.92	172.9	1.226	27.1	0.07	95.3	0.872	-162.3
410	0.923	171.8	1.183	26	0.073	93.3	0.874	-163.6
420	0.921	171.1	1.143	24.1	0.075	91.7	0.88	-165.1
430	0.929	170	1.092	21.5	0.075	89.7	0.883	-165.7
440	0.93	169.7	1.036	20	0.076	89.4	0.891	-167.2
450	0.928	168.8	0.985	19.2	0.077	89.3	0.894	-167.8
460	0.928	168.1	0.936	18.1	0.079	89.4	0.896	-169.5
470	0.928	167.3	0.898	18.5	0.081	90.1	0.899	-169.7
480	0.937	167.2	0.868	18.3	0.084	90	0.904	-170.8
490	0.937	166.7	0.841	18.5	0.087	90.4	0.905	-172
500	0.932	166	0.818	18.5	0.09	90.2	0.909	-172.8

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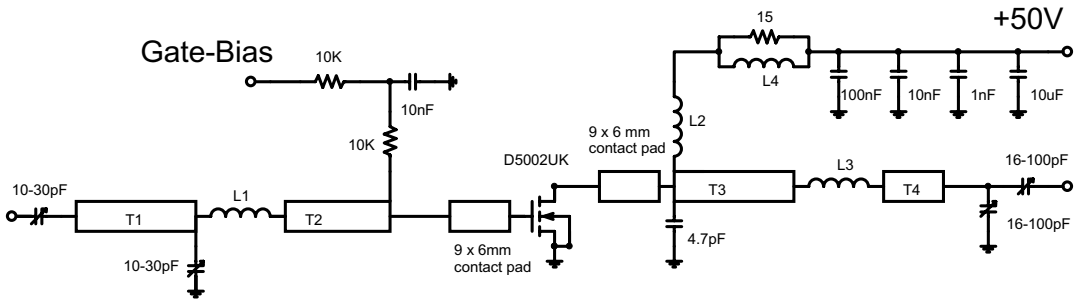

Substrate 1.6mm PTFE/glass, Er=2.5

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

D5002UK 175MHz TEST FIXTURE

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