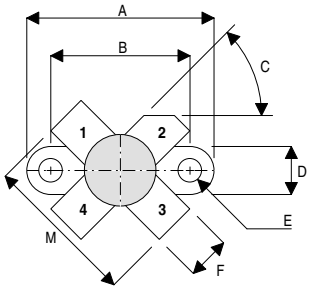
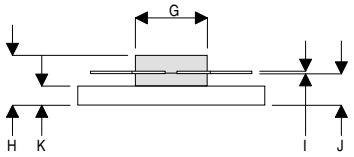
D5001UK

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 – 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	50W
BV_{DSS}	Drain – Source Breakdown Voltage	125V
BV_{GSS}	Gate – Source Breakdown Voltage	±20V
$I_{D(sat)}$	Drain Current	3A
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				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 = 0.5A		0.8			S
G_{PS}	Common Source Power Gain	P_O = 20W			16			dB
η	Drain Efficiency	V_{DS} = 50V	I_{DQ} = 0.1A		50			%
VSWR	Load Mismatch Tolerance	f = 175MHz			20:1			—
C_{iss}	Input Capacitance	V_{DS} = 50V	V_{GS} = –5V	f = 1MHz			60	pF
C_{oss}	Output Capacitance	V_{DS} = 50V	V_{GS} = 0	f = 1MHz			25	pF
C_{rss}	Reverse Transfer Capacitance	V_{DS} = 50V	V_{GS} = 0	f = 1MHz			1.5	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. 3.5°C / W

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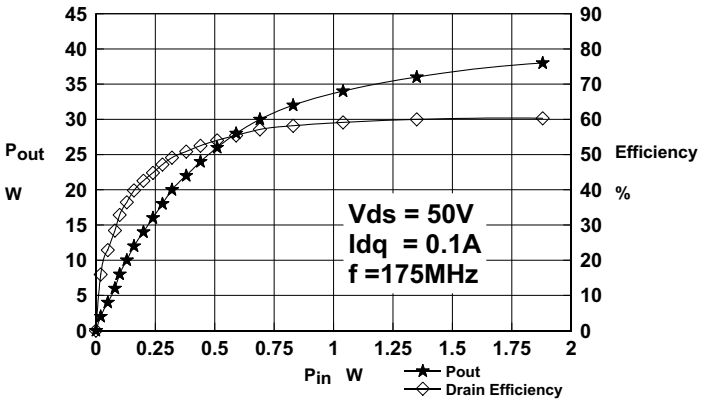

Figure 1
Power Output and Efficiency vs. Power input

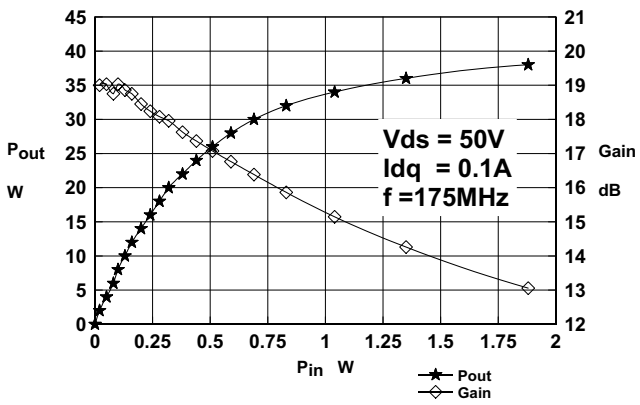

Figure 2
Power Output and Gain vs Power Input

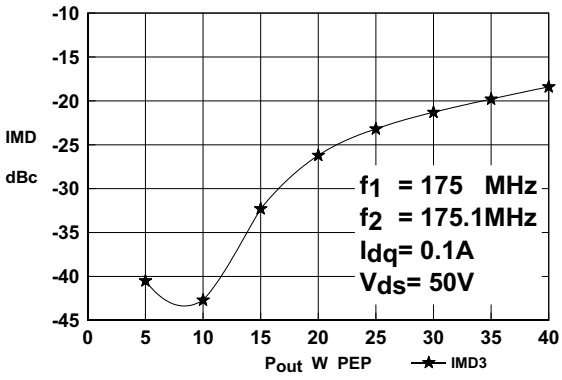

Figure 3
IMD3 vs Power Output

OPTIMUM SOURCE AND LOAD IMPEDANCE

Frequency MHz	Z_S Ω	Z_L Ω
175	9.5 + j14.1	12.3 + j10.2

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Typical S Parameters

! Vds=50V Idq=0.6A
MHZ S MA R 50

!Freq	S11		S21		S12		S22	
!Mhz	mag	ang	mag	ang	mag	ang	mag	ang
60	0.837	-113.1	10.72	137.1	0.02	55.2	0.699	-72.6
70	0.835	-116	9.915	130	0.021	50.7	0.689	-74.4
80	0.833	-118	9.28	125.4	0.022	47.6	0.678	-78.1
90	0.831	-120	8.645	119.1	0.023	44.6	0.673	-80.6
100	0.829	-123.3	8.177	115.4	0.023	42.7	0.671	-83.6
110	0.828	-125.2	7.747	110.3	0.023	40.5	0.671	-85.3
120	0.825	-127.4	7.361	105.2	0.023	40.2	0.669	-87.9
130	0.823	-130	6.915	100.7	0.023	39.8	0.665	-88.6
140	0.82	-131.9	6.564	96.3	0.022	39.9	0.664	-89.6
150	0.816	-135	6.126	91.8	0.021	40.6	0.663	-91.4
160	0.81	-137.6	5.839	88.4	0.021	41.9	0.664	-92.6
170	0.807	-139.8	5.396	84.8	0.02	44.2	0.665	-94.2
180	0.803	-142.8	5.034	80.6	0.019	48	0.665	-96.8
190	0.804	-144.7	4.753	78.4	0.019	52	0.667	-98.6
200	0.806	-147.3	4.479	75.2	0.019	57.2	0.671	-101.2
210	0.803	-149.2	4.273	73.7	0.019	62.2	0.672	-103
220	0.808	-151.5	4.173	71.9	0.02	68.2	0.671	-103.5
230	0.802	-153.1	4.04	69.8	0.02	71.6	0.677	-105.6
240	0.807	-155.2	3.823	66.8	0.021	76.1	0.685	-107.9
250	0.811	-156.7	3.647	64.4	0.022	79.4	0.687	-109.9
260	0.812	-158.9	3.446	61.4	0.023	84.1	0.698	-111.9
270	0.814	-160.4	3.301	59.2	0.025	87.4	0.706	-113.7
280	0.818	-161.7	3.129	56.9	0.027	91.3	0.716	-116.2
290	0.823	-164	2.972	55.4	0.029	95.1	0.722	-119.2
300	0.828	-165.4	2.876	54.7	0.032	97	0.724	-120
310	0.828	-166.3	2.809	53.3	0.035	98.2	0.726	-122.1
320	0.829	-168.2	2.764	50.9	0.038	97.5	0.735	-123.7
330	0.832	-169.5	2.661	47.5	0.04	96.9	0.743	-125.4
340	0.835	-170.9	2.547	45.7	0.042	97.3	0.747	-127.4
350	0.838	-171.9	2.392	42.6	0.044	97.7	0.756	-130
360	0.843	-173.6	2.271	40.2	0.045	98.3	0.761	-130.8
370	0.843	-174.9	2.134	39.2	0.048	100.3	0.767	-133.3
380	0.845	-175.5	2.04	38.4	0.051	100.7	0.772	-134.4
390	0.852	-176.8	1.919	38.2	0.055	101.6	0.779	-137
400	0.857	-178.2	1.877	39.6	0.059	102.6	0.788	-138.4
410	0.862	-178.9	1.858	38.6	0.062	101.6	0.793	-139.8
420	0.862	179.2	1.817	36.5	0.066	99.6	0.797	-141.6
430	0.861	178.7	1.768	34.4	0.068	98.7	0.801	-143.8
440	0.873	177.3	1.697	32.6	0.07	97.2	0.809	-145.3
450	0.868	176.3	1.639	31.4	0.072	96.9	0.814	-147
460	0.871	174.9	1.566	29.4	0.074	96.8	0.822	-148
470	0.875	175.2	1.519	28.6	0.077	97.3	0.821	-149.6
480	0.875	174.4	1.456	28.1	0.08	96.9	0.83	-150.6
490	0.878	172.8	1.417	27.7	0.083	97.1	0.829	-152.2
500	0.882	171.6	1.367	27.2	0.086	96.5	0.841	-153.6

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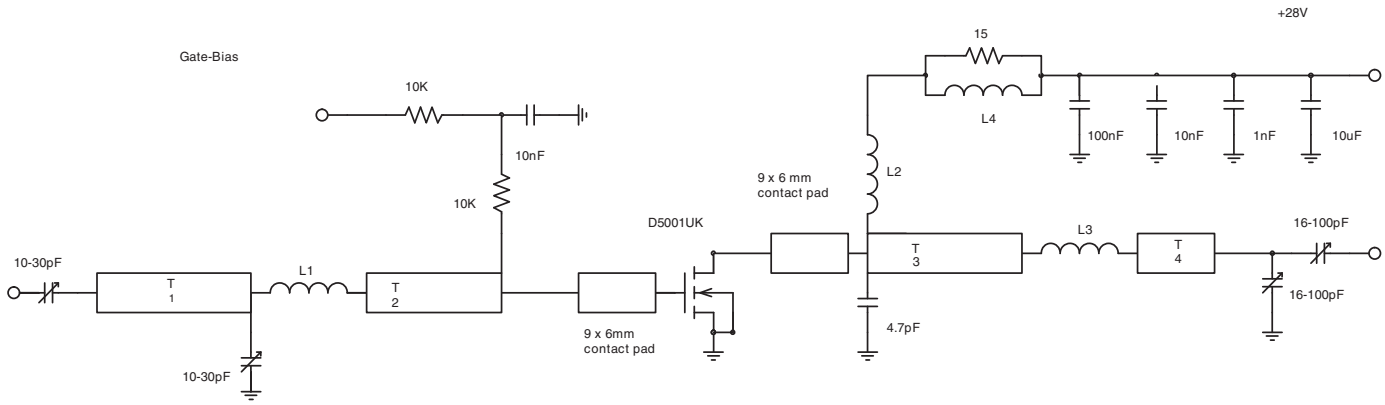

D5001UK 175MHz TEST FIXTURE

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 id.

L2 10 turns 19swg enamelled copper wire , 6mm id.

L3 1.5 turns 22swg enamelled copper wire, 6mm id.

L4 13.5 turns 19swg enamelled copper wire on Siemens B64920A618x830 ferrite core

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