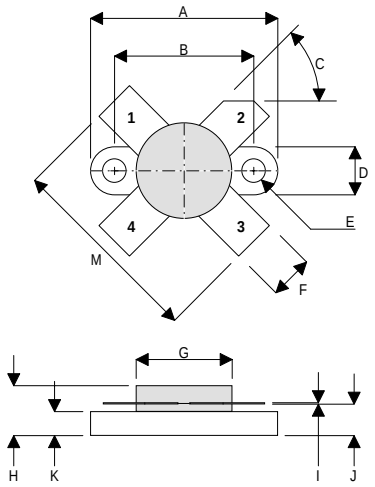
D5017UK

METAL GATE RF SILICON FET

MECHANICAL DATA



DM

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 Dia.	0.13	0.125 Dia.	0.005
F	5.71	0.13	0.225	0.005
G	12.7 Dia.	0.13	0.500 Dia.	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	3.17	0.13	0.125	0.005
M	26.16	0.25	1.03	0.010

GOLD METALLISED MULTI-PURPOSE SILICON DMOS RF FET 150W – 50V – 175MHz 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

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

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

P_D	Power Dissipation	220W
BV_{DSS}	Drain – Source Breakdown Voltage	125V
BV_{GSS}	Gate – Source Breakdown Voltage	±20V
$I_{D(sat)}$	Drain Current	18A
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				6	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 = 3A		4.8			S
G_{PS}	Common Source Power Gain	P_O = 150W			10			dB
η	Drain Efficiency	V_{DS} = 50V	I_{DQ} = 0.6A		50			%
VSWR	Load Mismatch Tolerance	f = 175MHz			20:1			—
C_{iss}	Input Capacitance	V_{DS} = 50V	V_{GS} = –5V	f = 1MHz			360	pF
C_{oss}	Output Capacitance	V_{DS} = 50V	V_{GS} = 0	f = 1MHz			150	pF
C_{rss}	Reverse Transfer Capacitance	V_{DS} = 50V	V_{GS} = 0	f = 1MHz			9	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. 0.8°C / W

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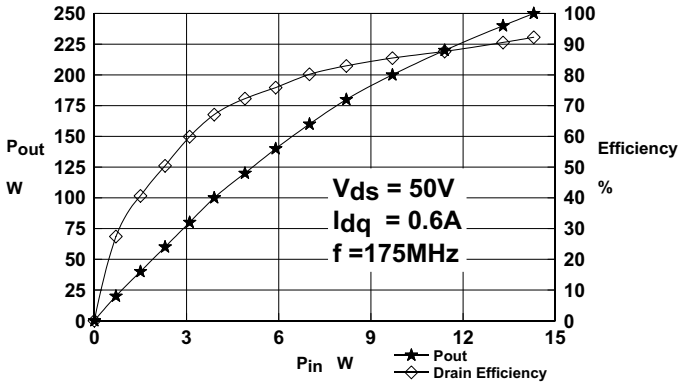

Figure 1
Power Output & Efficiency vs. Power Input

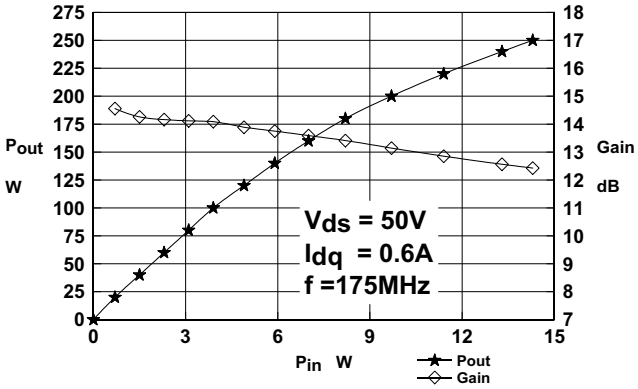

Figure 2
Power Output and Gain vs. Power Input

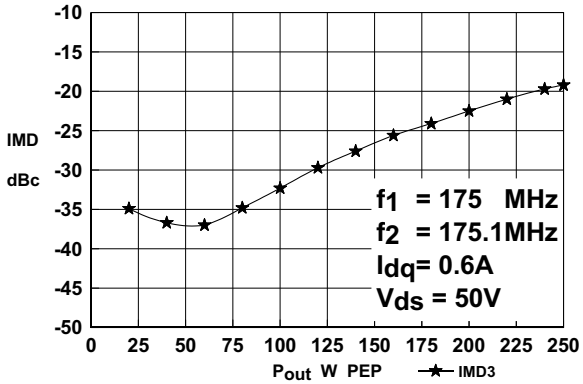

Figure 3
IMD3 vs Power Output

OPTIMUM SOURCE AND LOAD IMPEDANCE

Frequency MHz	Z_S Ω	Z_L Ω
175	2.6 + j1.8	4 + j1.2

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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	0.918	-167.2	5.927	98.5	0.01	29.1	0.713	-157.5
70	0.916	-168.2	5.073	91.8	0.01	29.2	0.713	-156.7
80	0.918	-168.7	4.541	86.3	0.009	29.3	0.719	-156.6
90	0.917	-170.3	3.985	79.7	0.009	31.5	0.732	-157.2
100	0.919	-170.8	3.634	75.6	0.009	35.2	0.742	-157.8
110	0.927	-171.8	3.224	69.3	0.008	40	0.762	-158.5
120	0.926	-172.6	2.933	65.4	0.008	45.2	0.771	-159.1
130	0.932	-173.3	2.612	61	0.008	51.9	0.79	-160.1
140	0.934	-173.7	2.384	57.1	0.009	57.5	0.799	-160.9
150	0.936	-174.8	2.136	52.9	0.009	63.2	0.815	-162
160	0.941	-175.3	1.968	49.7	0.01	67.3	0.827	-162.4
170	0.939	-176.2	1.766	46.3	0.011	72.2	0.837	-163.9
180	0.943	-177	1.594	43.5	0.011	76.4	0.849	-164.9
190	0.946	-177.5	1.482	42.2	0.012	80.5	0.857	-165.9
200	0.954	-177.8	1.347	39.6	0.013	82.4	0.871	-166.1
210	0.952	-178.8	1.253	39	0.014	85.4	0.881	-168
220	0.957	-179.3	1.169	37.8	0.016	86.8	0.889	-168.8
230	0.958	-179.4	1.102	36	0.017	87.8	0.891	-169.6
240	0.961	179.9	1.019	33	0.018	87.9	0.9	-170.6
250	0.965	179.2	0.957	31	0.019	88	0.899	-171.5
260	0.966	178.9	0.882	29.3	0.02	88.9	0.91	-172.4
270	0.962	178.2	0.84	28.2	0.021	89.9	0.913	-173
280	0.965	177.8	0.786	27.1	0.023	90.1	0.922	-173.3
290	0.969	177.5	0.733	26.7	0.024	91.1	0.927	-175.3
300	0.97	176.6	0.703	26.6	0.026	90.8	0.93	-175.2
310	0.97	176.6	0.669	25.3	0.027	90.2	0.934	-176.2
320	0.971	175.8	0.638	22.5	0.028	88.2	0.938	-177.1
330	0.972	175.7	0.598	20	0.029	86.7	0.939	-177.7
340	0.974	175	0.559	19.2	0.029	86.7	0.944	-178.4
350	0.976	175.1	0.516	17.8	0.03	87.5	0.944	-179.6
360	0.977	173.7	0.486	17.3	0.031	88.3	0.95	-180
370	0.976	173.3	0.455	17.8	0.032	89.6	0.952	179.3
380	0.975	173.4	0.437	18.2	0.034	89.8	0.952	178.4
390	0.977	172.8	0.413	18.8	0.035	89.5	0.958	177.5
400	0.976	172.2	0.402	20.5	0.037	90.4	0.959	177.7
410	0.979	172.2	0.396	19.4	0.039	89.6	0.962	176.3
420	0.978	171.6	0.377	17.6	0.04	88	0.962	176.3
430	0.977	171.3	0.362	16	0.04	86.3	0.965	175.4
440	0.982	170.7	0.341	14.9	0.041	86	0.966	174.5
450	0.979	170.4	0.327	15.1	0.041	86.4	0.966	174.4
460	0.978	170.5	0.31	15	0.042	86.5	0.97	174
470	0.98	169.9	0.3	15.9	0.043	87.3	0.967	173.2
480	0.982	169.6	0.289	16.3	0.045	87.4	0.972	172.6
490	0.979	169	0.28	16.5	0.046	87.7	0.968	171.7
500	0.98	168.8	0.271	16.6	0.047	87.4	0.969	171.7

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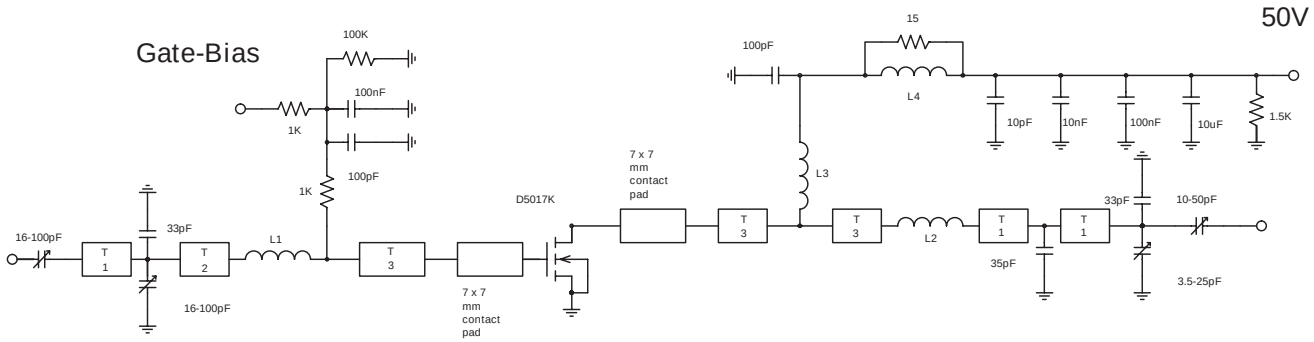

D5017UK 175MHz Test Fixture

Substrate 1.6mm PTFE/glass, Er = 2.5

All microstrip lines W= 5mm

T1 7.5mm

T2 12.5 mm

T3 6mm

L1 Hairpin loop 18 swg 10mm high, 6.5mm gap

L2 Hairpin loop 5mm wide ribbon, 7mm high, 3.5 mm gap

L3 9 turns 19swg enamelled copper wire, 6mm id.

L4 12 turns 19swg enamelled copper wire on Fair-Rite FT82 ferrite core

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