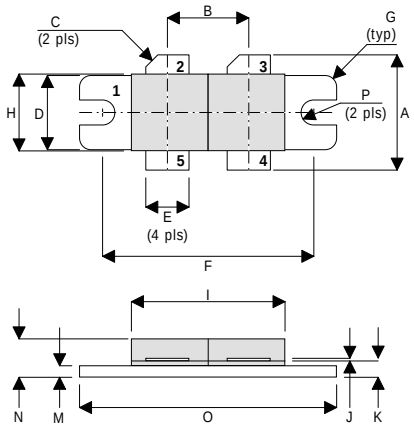
TetraFET

D5029UK

ROHS COMPLIANT METAL GATE RF SILICON FET

MECHANICAL DATA



DR

PIN 1	SOURCE (COMMON)	PIN 2	DRAIN 1
PIN 3	DRAIN 2	PIN 4	GATE 2
PIN 5	GATE 1		

DIM	Millimetres	Tol.	Inches	Tol.
A	19.05	0.50	0.75	0.020
B	10.77	0.13	0.424	0.005
C	45°	5°	45°	5°
D	9.78	0.13	0.385	0.005
E	5.71	0.13	0.225	0.005
F	27.94	0.13	1.100	0.005
G	1.52R	0.13	0.060R	0.005
H	10.16	0.13	0.400	0.005
I	22.22	MAX	0.875	MAX
J	0.13	0.02	0.005	0.001
K	2.72	0.13	0.107	0.005
M	1.70	0.13	0.067	0.005
N	5.08	0.50	0.200	0.020
O	34.03	0.13	1.340	0.005
P	1.61R	0.08	0.064R	0.003

GOLD METALLISED MULTI-PURPOSE SILICON DMOS RF FET 350W – 50V – 175MHz PUSH–PULL

FEATURES

- **SIMPLIFIED AMPLIFIER DESIGN**
- **SUITABLE FOR BROAD BAND APPLICATIONS**
- **LOW C_{rss}**
- **SIMPLE BIAS CIRCUITS**
- **LOW NOISE**
- **HIGH GAIN – 13 dB MINIMUM**

APPLICATIONS

- VHF/UHF COMMUNICATIONS from 1 MHz to 200 MHz

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

P_D	Power Dissipation	438W
BV_{DSS}	Drain – Source Breakdown Voltage*	125V
BV_{GSS}	Gate – Source Breakdown Voltage*	±20V
$I_{D(sat)}$	Drain Current*	21A
T_{stg}	Storage Temperature	–65 to 150°C
T_j	Maximum Operating Junction Temperature	200°C

* Per Side

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Document Number 4149
Issue 2

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ELECTRICAL CHARACTERISTICS (T_{case} = 25° C unless otherwise stated)

Parameter		Test Conditions		Min.	Typ.	Max.	Unit
PER SIDE							
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			7	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 = 3.5A	5.6			mhos
$V_{GS(th)match}$	Gate Threshold Voltage Matching Between Sides	I_D = 10mA	V_{DS} = V_{GS}			0.1	V
TOTAL DEVICE							
G_{PS}	Common Source Power Gain	P_O = 350W		13			dB
η	Drain Efficiency	V_{DS} = 50V	I_{DQ} = 1.4A	50			%
VSWR	Load Mismatch Tolerance	f = 175MHz		20:1			—
PER SIDE							
C_{iss}	Input Capacitance	V_{DS} = 50V	V_{GS} = –5V f = 1MHz			420	pF
C_{oss}	Output Capacitance	V_{DS} = 50V	V_{GS} = 0 f = 1MHz			175	pF
C_{rss}	Reverse Transfer Capacitance	V_{DS} = 50V	V_{GS} = 0 f = 1MHz			10.5	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. 0.4° C / W

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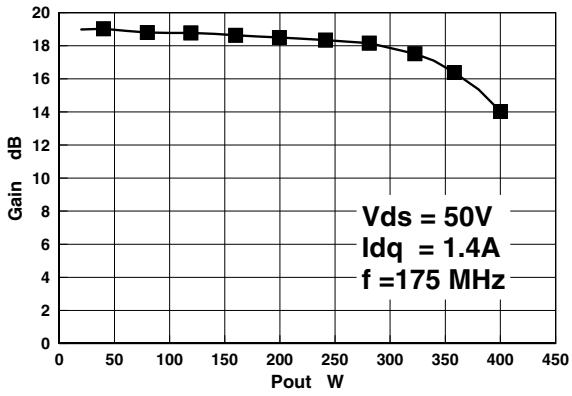

Figure 1 – Gain vs. Output Power.

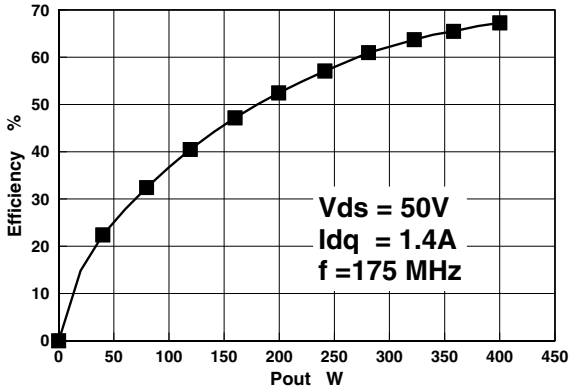

Figure 2 – Efficiency vs. Output Power.

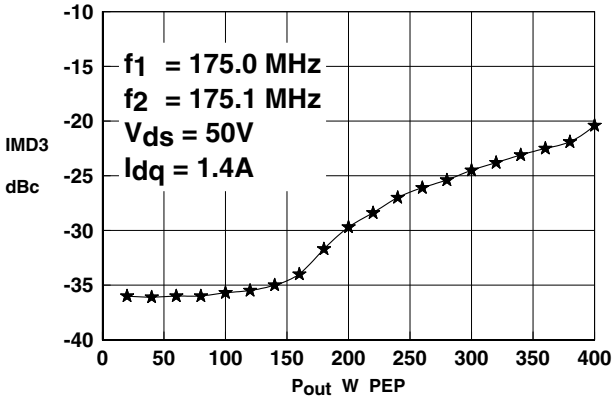

Figure 3 – IMD vs. Output Power.

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OPTIMUM SOURCE AND LOAD IMPEDANCE
@ 350W / 50V

Frequency MHz	Z_S Ω	Z_L Ω
175	1.0 + j1.2	2.6 + j1.3

Typical S Parameters

! V_{DS} = 50V, I_{DQ} = 1.4A
MHZ S MA R 50

Freq	S11		S21		S12		S22	
MHz	mag	ang	mag	ang	mag	ang	mag	ang
50	0.83	-165.3	20.29	69.4	0.007	-9.2	0.63	-150.7
100	0.89	-170.0	8.28	48.6	0.004	-6.0	0.78	-156.6
150	0.93	-173.2	4.42	35.6	0.003	50.0	0.86	-162.0
200	0.95	-175.7	2.71	27.2	0.005	82.4	0.91	-166.2
250	0.97	-177.8	1.82	21.3	0.008	88.8	0.94	-169.4
300	0.98	-179.7	1.30	17.0	0.011	90.0	0.95	-171.9
350	0.98	178.7	0.97	13.8	0.014	89.6	0.97	-174.0
400	0.98	177.3	0.76	11.4	0.017	88.9	0.97	-175.7
450	0.99	175.9	0.61	9.5	0.020	87.9	0.98	-177.3
500	0.99	174.7	0.50	8.1	0.023	86.9	0.98	-178.6
550	0.99	173.5	0.42	7.1	0.026	85.9	0.98	-179.8
600	0.99	172.3	0.35	6.5	0.028	84.9	0.99	179.0

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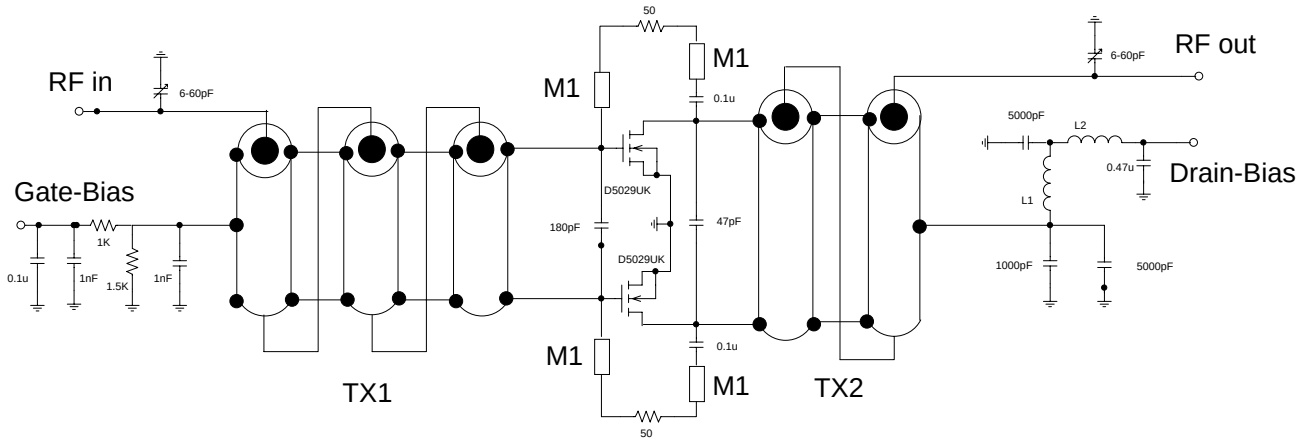

TX1 9:1 transformer. 3 turns of 062-25 semi-rigid coax around 75-26 powdered iron core

TX2 4:1 transformer. 2 turns of 090-25 semi-rigid coax around 100-8 powedered iron core

L1 10 turns 16 awg enamelled wire, 5mm internal diameter

L2 0.5 turns 16 awg enamelled wire on A1 x 1 2-hole core

M1 microstrip line, 20mm long, 1mm wide on 0.062in thick G10 substrate

D5029UK 175MHz TEST FIXTURE

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