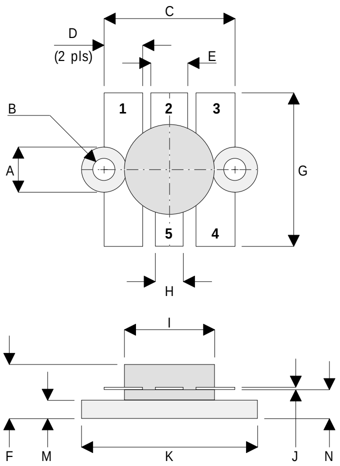
TetraFET

D1023UK

ROHS COMPLIANT METAL GATE RF SILICON FET

MECHANICAL DATA



DT

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

DIM	mm	Tol.	Inches	Tol.
A	6.35 DIA	0.13	0.250 DIA	0.005
B	3.17 DIA	0.13	0.125 DIA	0.005
C	18.41	0.25	0.725	0.010
D	5.46	0.13	0.215	0.005
E	5.21	0.13	0.205	0.005
F	7.62	MAX	0.300	MAX
G	21.59	0.38	0.850	0.015
H	3.94	0.13	0.155	0.005
I	12.70	0.13	0.500	0.005
J	0.13	0.03	0.005	0.001
K	24.76	0.13	0.975	0.005
M	2.59	0.13	0.102	0.005
N	4.06	0.25	0.160	0.010

GOLD METALLISED MULTI-PURPOSE SILICON DMOS RF FET 60W – 28V – 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	117W
BV_{DSS}	Drain – Source Breakdown Voltage	70V
BV_{GSS}	Gate – Source Breakdown Voltage	±20V
$I_{D(sat)}$	Drain Current	15A
T_{stg}	Storage Temperature	–65 to 150°C
T_j	Maximum Operating Junction Temperature	200°C

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

Parameter		Test Conditions		Min.	Typ.	Max.	Unit
BV_{DSS}	Drain–Source Breakdown Voltage	$V_{GS} = 0$	$I_D = 100mA$	70			V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 28V$	$V_{GS} = 0$			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 *	$V_{DS} = 10V$	$I_D = 3A$	2.4			S
G_{PS}	Common Source Power Gain	$P_O = 60W$		16			dB
η	Drain Efficiency	$V_{DS} = 28V$	$I_{DQ} = 0.3A$	50			%
VSWR	Load Mismatch Tolerance	f = 175MHz		20:1			—
C_{iss}	Input Capacitance	$V_{DS} = 0$ $V_{GS} = -5V$	f = 1MHz			180	pF
C_{oss}	Output Capacitance	$V_{DS} = 28V$ $V_{GS} = 0$	f = 1MHz			90	pF
C_{rss}	Reverse Transfer Capacitance	$V_{DS} = 28V$ $V_{GS} = 0$	f = 1MHz			7.5	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. 1.5°C / W

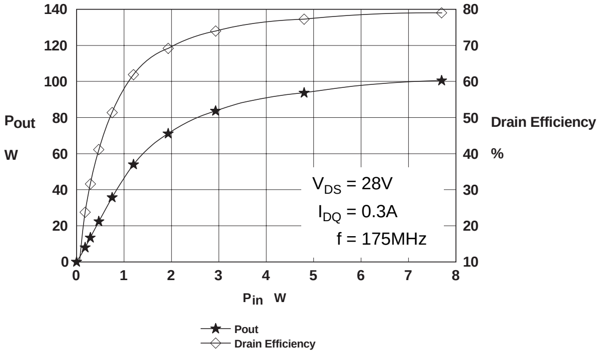


Figure 1 – Power Output and Efficiency vs. Power Input.

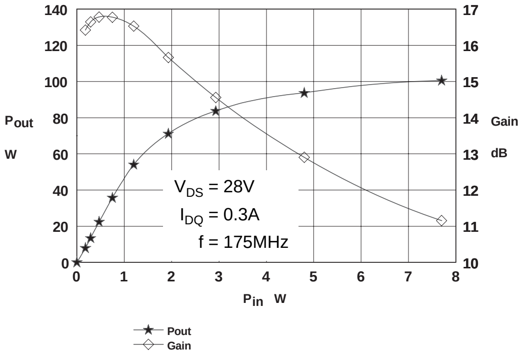


Figure 2 – Power Output & Gain vs. Power Input.

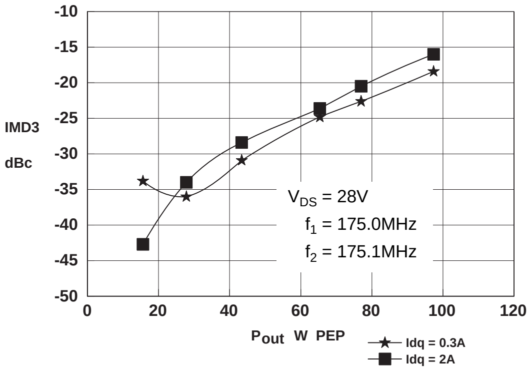


Figure 3 – IMD vs. Output Power.

D1023UK

OPTIMUM SOURCE AND LOAD IMPEDANCE

Frequency MHz	Z_S Ω	Z_L Ω
175MHz	2.0 – j4.3	3.7 – j4.5

Typical S Parameters

! V_{DS} = 28V, I_{DQ} = 0.3A
MHZ S MA R 50

!Freq MHz	S11 mag	S11 ang	S21 mag	S21 ang	S12 mag	S12 ang	S22 mag	S22 ang
70	0.83	-156.8	6.9	59.9	0.018	-16.7	0.65	-137.0
100	0.87	-163.3	4.3	46.9	0.012	-15.5	0.75	-147.2
150	0.91	-171.0	2.3	31.5	0.007	37.1	0.84	-159.7
200	0.93	-177.6	1.4	22.6	0.013	81.0	0.90	-168.8
250	0.95	177.6	0.9	14.3	0.022	86.6	0.93	-175.0
300	0.97	173.6	0.7	10.5	0.032	86.9	0.95	179.5
350	0.96	168.6	0.5	4.0	0.039	80.0	0.96	175.3
400	0.98	165.0	0.4	3.9	0.048	80.0	0.98	172.0
450	0.98	161.9	0.3	2.9	0.053	77.5	0.98	169.8
500	0.97	159.3	0.3	2.1	0.064	74.8	0.97	166.5

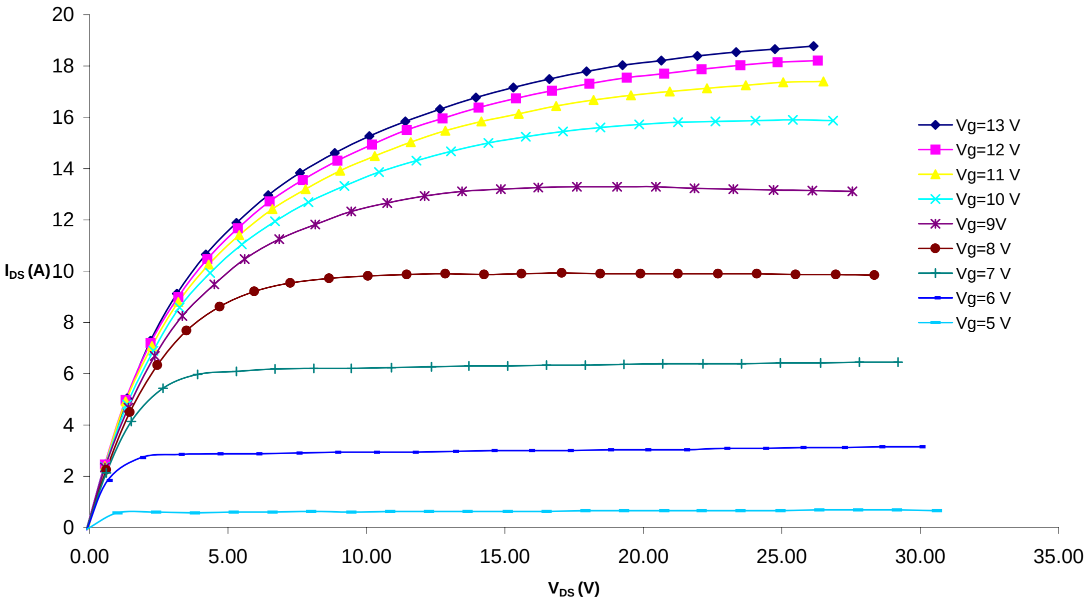


Figure 4 – Typical IV Characteristics.

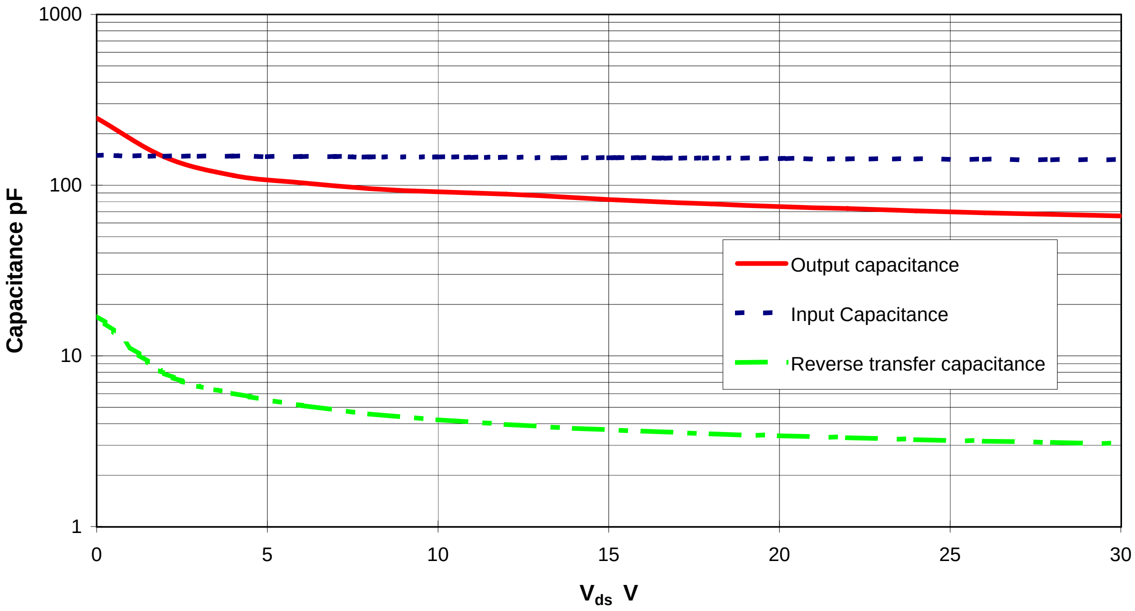
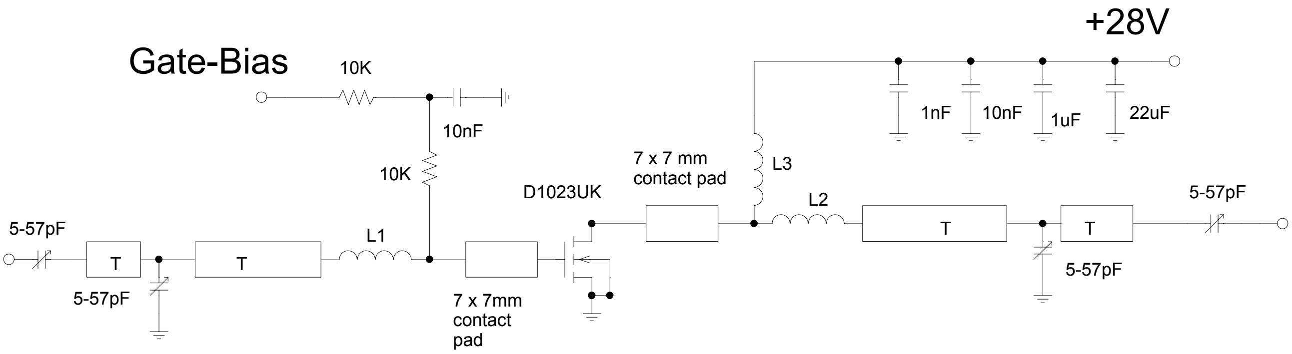


Figure 5 – Typical CV Characteristics.



D1023UK 175MHz TEST FIXTURE

Substrate 1.6mm PTFE/ glass, Er= 2.5
All microstrip lines W= 4.4mm

T1	8mm
T2	22mm
T3	18mm
T4	4.5mm

L1	Hairpin loop 16swg 15.5mm dia.
L2	Hairpin loop 16swg 10mm dia.
L3	11 turns 18swg enamelled copper wire, 10mm i. d.