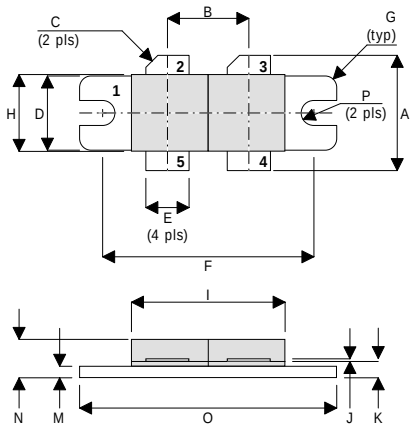
TetraFET

D1020UK

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 150W – 28V – 400MHz PUSH–PULL

FEATURES

- **EXTRA LOW C_{rss}**
- **SIMPLIFIED AMPLIFIER DESIGN**
- **SUITABLE FOR BROAD BAND APPLICATIONS**
- **SIMPLE BIAS CIRCUITS**
- **LOW NOISE**
- **HIGH GAIN – 10 dB MINIMUM**

APPLICATIONS

- HF/VHF/UHF COMMUNICATIONS from 1 MHz to 500 MHz

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

P_D	Power Dissipation	389W
BV_{DSS}	Drain – Source Breakdown Voltage *	70V
BV_{GSS}	Gate – Source Breakdown Voltage *	±20V
$I_{D(sat)}$	Drain Current *	25A
T_{stg}	Storage Temperature	–65 to 150℃
T_j	Maximum Operating Junction Temperature	200℃

* Per Side

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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	70			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 28V	V_{GS} = 0			5	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 = 5A	4			S
TOTAL DEVICE							
G_{PS}	Common Source Power Gain	P_O = 150W		10			dB
η	Drain Efficiency	V_{DS} = 28V	I_{DQ} = 2A	50			%
VSWR	Load Mismatch Tolerance	f = 400MHz		20:1			—
PER SIDE							
C_{iss}	Input Capacitance	V_{DS} = 28V	V_{GS} = –5V f = 1MHz			300	pF
C_{oss}	Output Capacitance	V_{DS} = 28V	V_{GS} = 0 f = 1MHz			150	pF
C_{rss}	Reverse Transfer Capacitance	V_{DS} = 28V	V_{GS} = 0 f = 1MHz			10	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. 0.45°C / W

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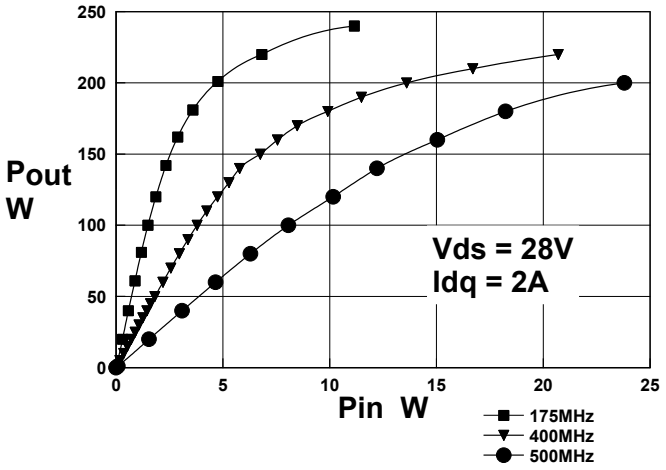

Figure 1. Output Power Vs Input Power

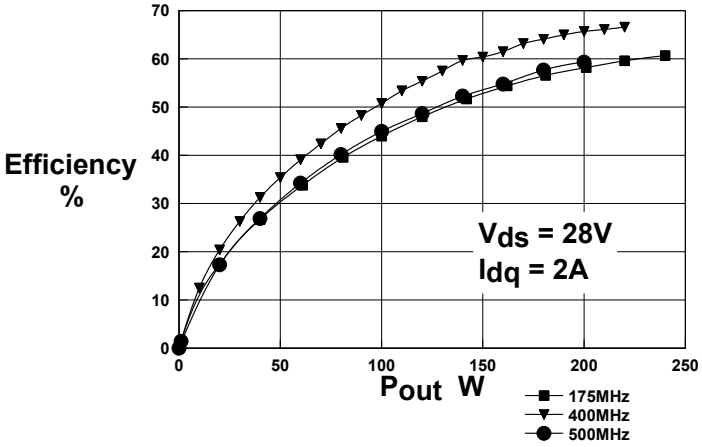

Figure 2. Efficiency Vs. Output Power

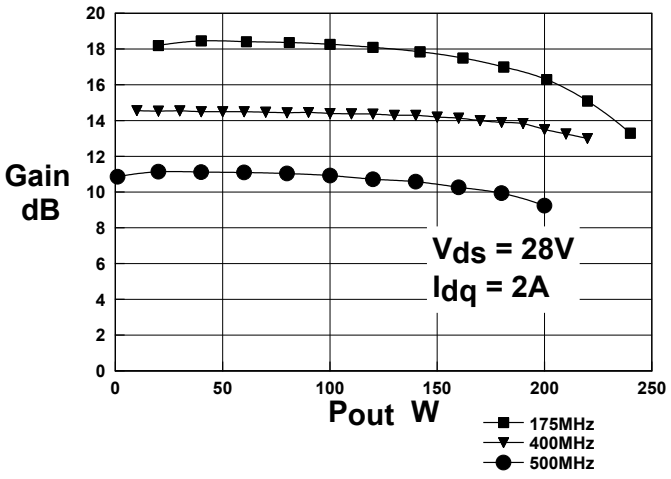

Figure 3. Gain Vs Output Power

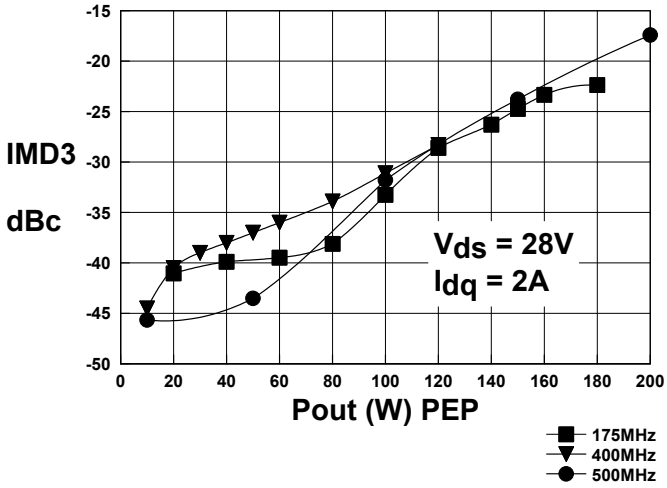

Figure 3. PEP vs. IMD 3

Typical S Parameters

!D1020UK.s2p
!Vds=28V,Idq=2A
 # MHZ S MA R 50

Freq	S11		S21		S12		S22	
MHz	Mag	Ang	Mag	Ang	Mag	Ang	Mag	Ang
100	0.91	-176.9	5.45	62.1	0.006	8.3	0.80	-171.5
200	0.95	-179.2	1.99	40.1	0.006	59.9	0.89	-173.2
300	0.97	178.6	1.11	28.9	0.011	79.2	0.93	-175.9
400	0.98	176.0	0.65	20.6	0.017	83.6	0.96	-178.8
500	0.98	174.0	0.46	16.2	0.022	83.6	0.97	179.0
600	0.99	171.7	0.32	13.2	0.028	82.4	0.98	176.6
700	0.99	169.8	0.25	12.2	0.034	81.0	0.98	174.8
800	0.99	167.9	0.21	12.3	0.039	79.5	0.98	173.1
900	0.99	165.6	0.17	13.7	0.046	77.6	0.99	171.1
1000	0.99	163.7	0.15	15.9	0.052	76.0	0.99	169.4

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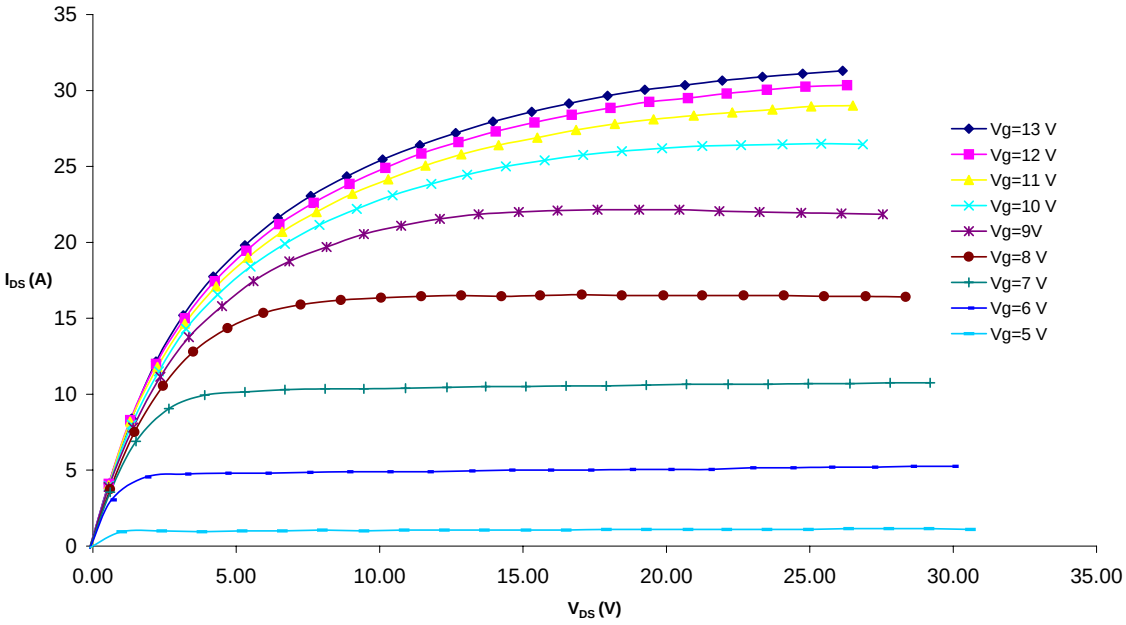

Figure 4 – Typical IV Characteristics.

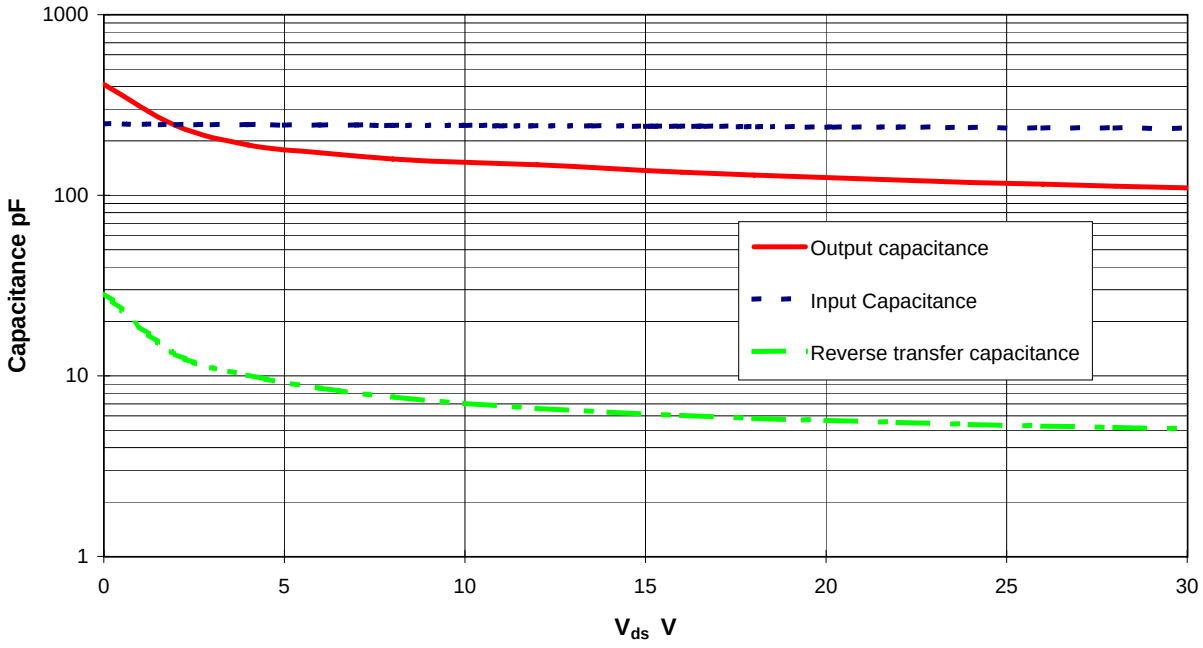

Figure 5 – Typical CV Characteristics.

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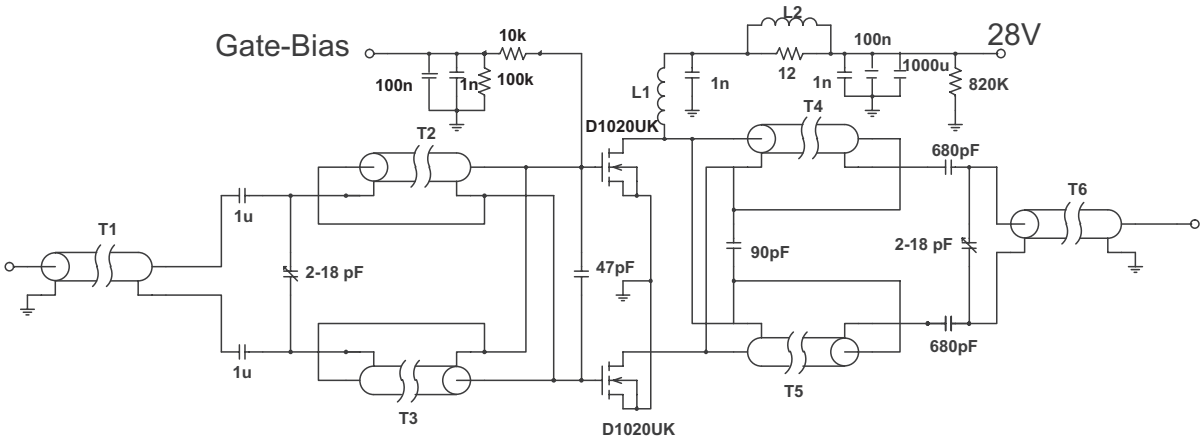

175 MHz Test Fixture

T1,2,3	7cm Storm Products EXE 18 19/30 S1TW coaxial cable on Siemens A1 x 1 2 hole core
T4,5	14cm Storm products EXE18 19/30 S1TW coaxial cable
T6	11cm Storm products EXE 18 19/30 S1TW coaxial cable
L1	6 turns 1.2mm dia wire, 5mm internal diameter
L2	1.5 turns 0.9mm dia wire on Siemens A1 x 1 2 hole core

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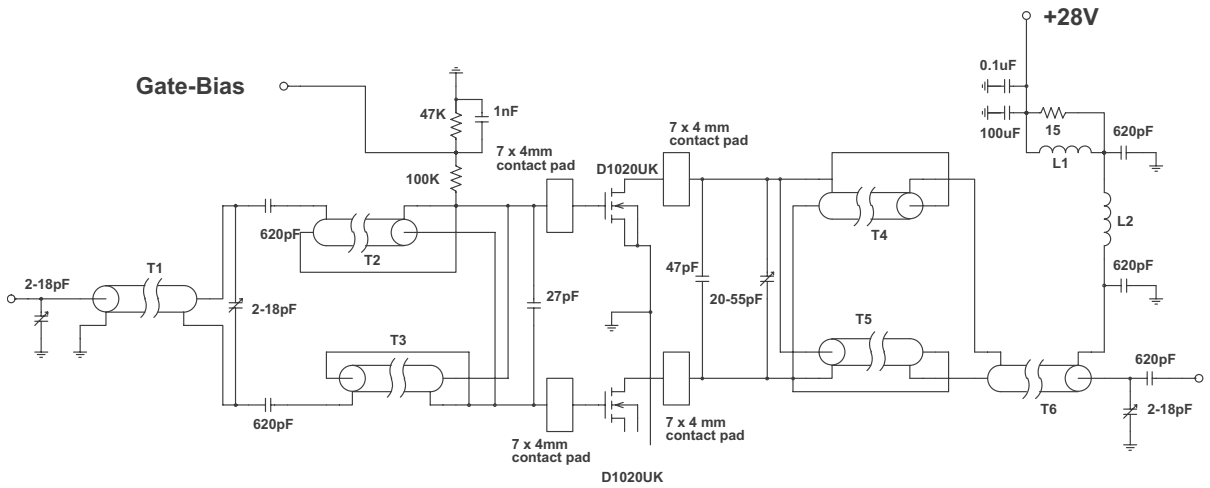

400 MHz Test Fixture

T1	11cm 50 Ohm UT47 semi-rigid coax
T2,3,4,5	8.9cm 18 Ohm UT62-18 semi-rigid coax
T6	9.4cm 50 Ohm UT85 semi-rigid coax
L1	5.5 turns 18swg enamelled copper wire on Fair-Rite FT50B-43 ferrite core
L2	6 turns 18swg enamelled copper wire, 3.5mm internal diameter

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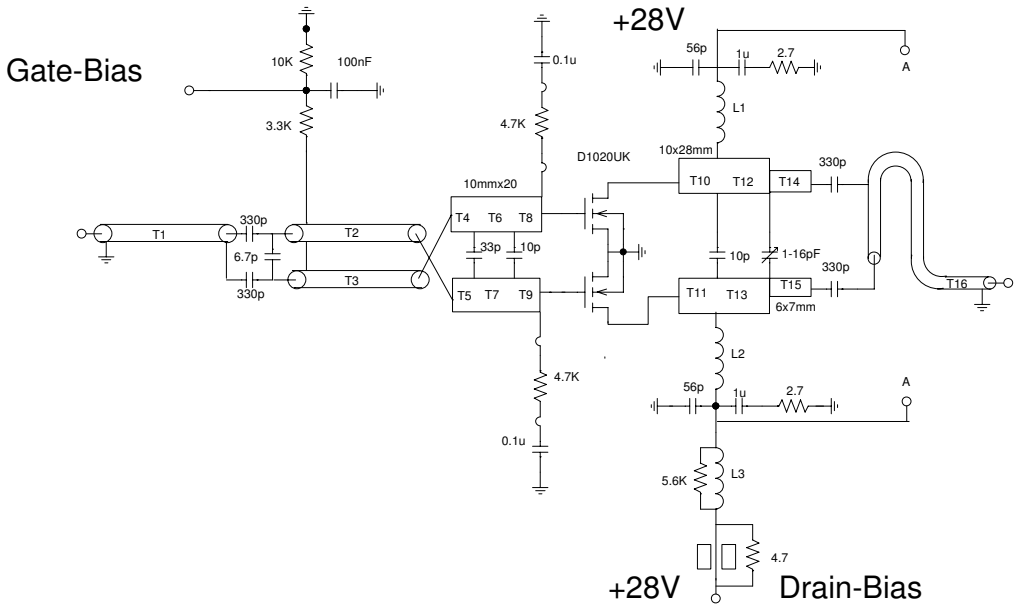

D1020UK 500MHz TEST FIXTURE

Substrate 0.78mm, Er=3.3

All microstrip lines W=10mm unless otherwise stated

T1 70mm 50 Ohm Coaxial cable
T2 50mm 25 Ohm Coaxial cable
T3 50mm 25 Ohm Coaxial cable
T4 3.8mm
T5 3.8mm
T6 10.6mm
T7 10.6mm
T8 5.6mm
T9 5.6mm
T10 14mm
T11 14mm
T12 14mm
T13 14mm
T14 7mm width 6mm height
T15 7mm width 6mm height
T16 80mm 50 Ohm Coaxial Cable

L1 = L2 3 turns 1mm diameter enamelled copper wire, 5mm i.d.

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