Power and Hybrid

28V RF SILICON FET

40W 500MHz Single-Ended

D1014UK

- Simplified Amplifier Design
- Suitable for HF & VHF Broad Band Applications
- Low C_{rss}
- Useful P_O at 1GHz
- Low Noise
- High Gain – 12 dB Minimum
- ROHS Compliant

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C unless otherwise stated)

P_D	Power Dissipation	87.5W
BV_{DSS}	Drain – Source Breakdown Voltage	70V
BV_{GSS}	Gate – Source Breakdown Voltage	±20V
$I_{D\ (sat)}$	Drain Current	10A
T_{stg}	Storage Temperature	-65 to 150°C
T_j	Maximum Operating Junction Temperature	200°C

THERMAL PROPERTIES

Symbols	Parameters	Max	Units
$R_{THj\text{-}case}$	Thermal Resistance Junction - Case	2.0	°C / W

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ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise stated)

Symbols	Parameters	Test Conditions	Min.	Typ	Max.	Units
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			2	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 = 2A	1.6			S
G_{PS}	Common Source Power Gain	P_O = 40W	12			dB
η	Drain Efficiency	V_{DS} = 28V I_{DQ} = 0.2A	50			%
VSWR	Load Mismatch Tolerance	f = 500MHz	20:1			-
C_{iss}	Input Capacitance	V_{DS} = 0 V_{GS} = -5V f = 1MHz			120	pF
C_{oss}	Output Capacitance	V_{DS} = 28V V_{GS} = 0 f = 1MHz			60	pF
C_{rss}	Reverse Transfer Capacitance	V_{DS} = 28V V_{GS} = 0 f = 1MHz			5	pF

*Pulse Test: Pulse Duration = 300µs , Duty Cycle ≤2%

HAZARDOUS MATERIAL WARNING

The ceramic portion of the device between leads and metal flange is beryllium oxide. Beryllium oxide dust us 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.

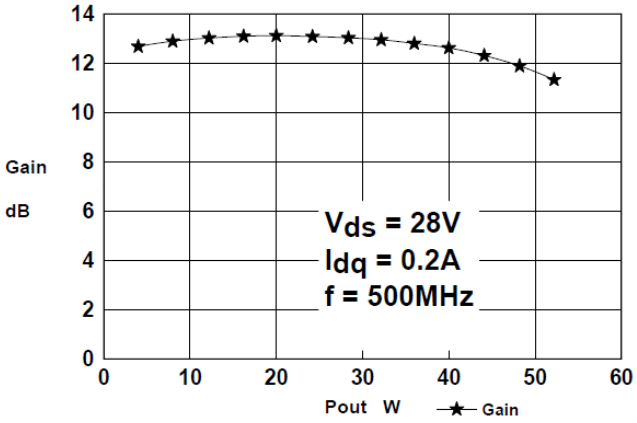


Figure 1- Gain vs. Power Output

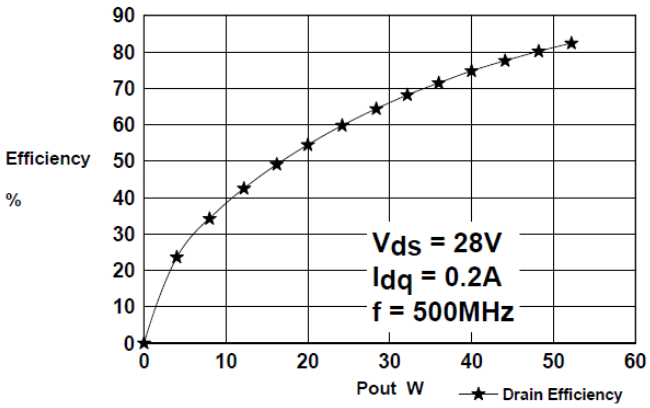


Figure 2 - Efficiency vs Power Output

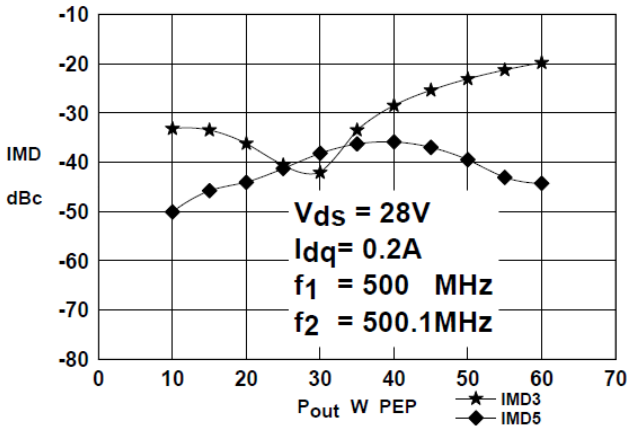


Figure 3 - IMD vs Power Output

OPTIMUM SOURCE AND LOAD IMPEDANCE

Frequency MHz	Z_S Ω	Z_L Ω
500MHz	2.3 + j1.0	3.7 + j0.8

Typical S Parameters

! V_{DS} = 28V, I_{DQ} = 0.2A
MHZ S MA R 50

Freq	S11		S21		S12		S22	
MHz	mag	ang	mag	ang	mag	ang	mag	ang
100	0.79	-158	14.62	69	0.012	-7	0.61	-145
200	0.88	-167	5.82	42	0.006	3	0.79	-156
300	0.92	-171	3.02	28	0.007	60	0.87	-162
400	0.92	-176	1.82	18	0.117	77	0.90	-167
500	0.94	-179	1.44	15	0.017	76	0.92	-169
600	0.95	177	1.06	13	0.023	75	0.95	-171
700	0.97	174	0.68	10	0.029	74	0.97	-174
800	0.97	171	0.54	5	0.034	69	0.96	-177
900	0.98	167	0.45	1	0.039	64	0.97	178
1000	0.97	165	0.36	1	0.043	64	0.96	178

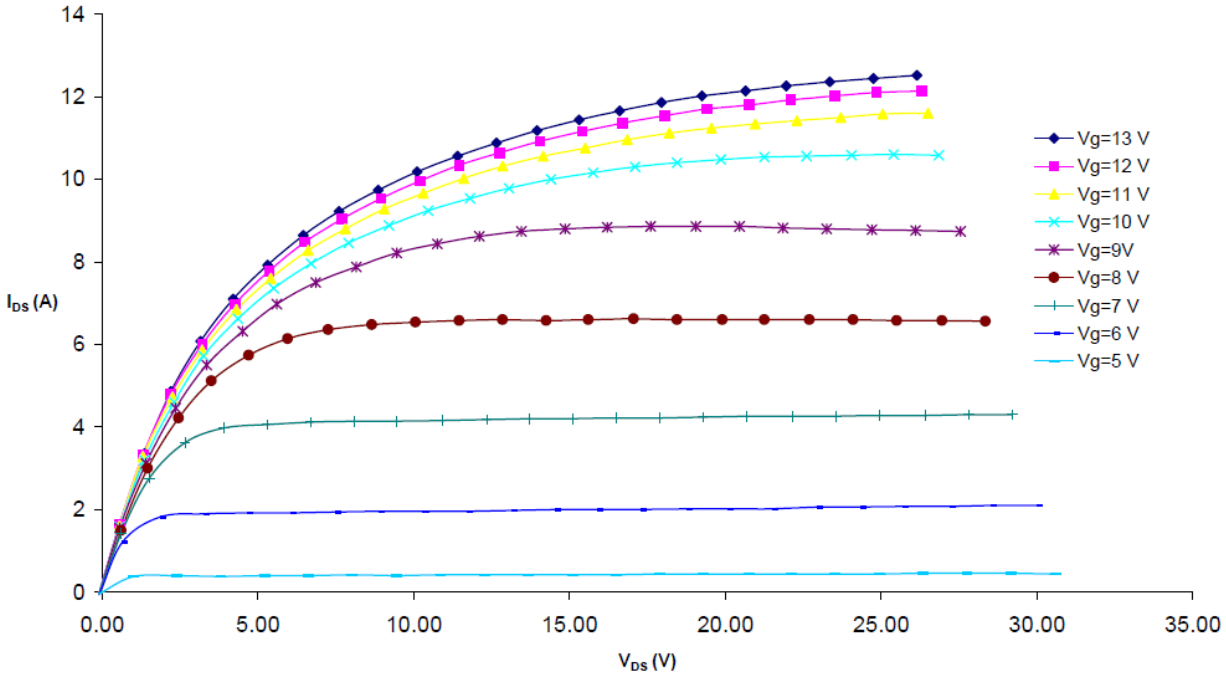


Figure 4 – Typical IV Characteristics.

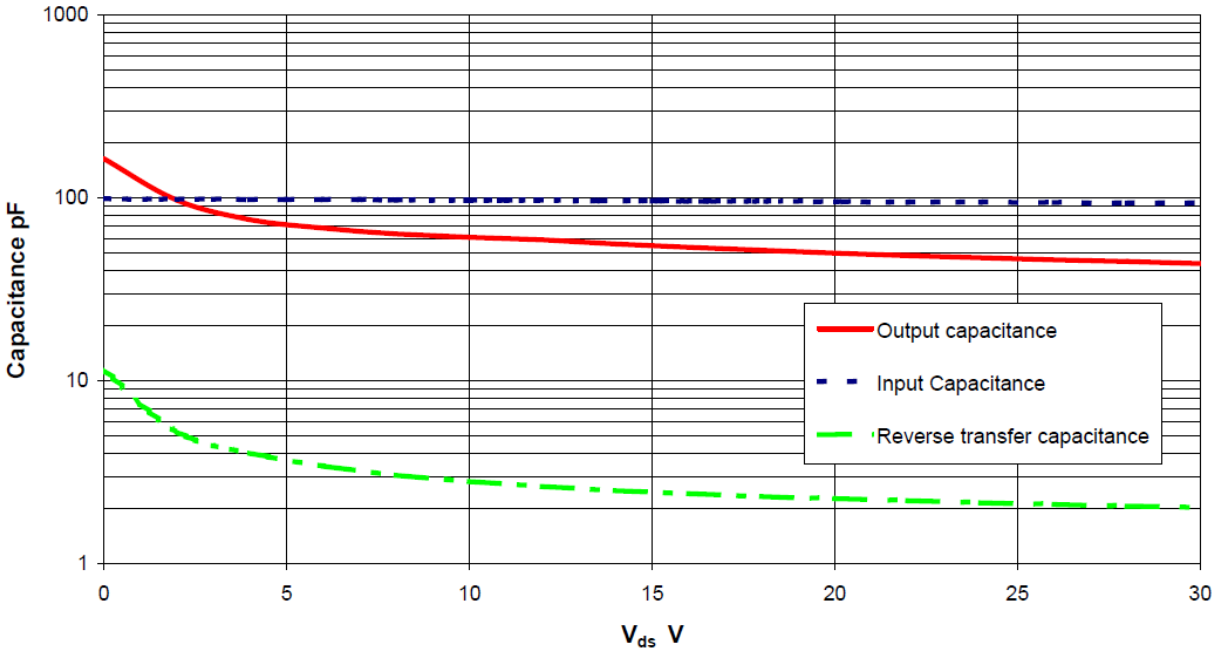
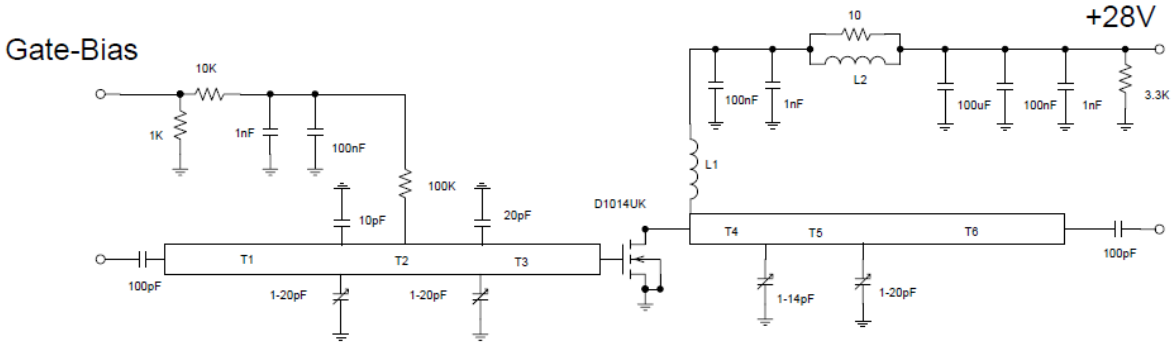


Figure 5 – Typical CV Characteristics.



Substrate 0.8mm G200, Er=4.0

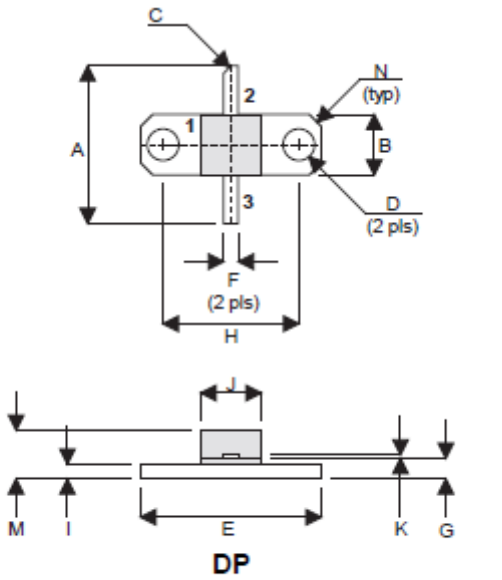
All microstrip lines W=1.68mm

T1 36mm
T2 16mm
T3 10mm
T4 6.5mm
T5 12mm
T6 39mm

L1 5.5 turns 20swg enamelled copper wire, 7mm i.d.
L2 1.5 turns 24swg enamelled copper wire on Siemens B62152A7X 2 hole core

D1014UK 500MHz Test Fixture

MECHANICAL DATA



DP

PIN 1 SOURCE PIN 2 DRAIN

PIN 3 GATE

DIM	mm	Tol.	Inches	Tol.
A	16.51	0.25	0.650	0.010
B	6.35	0.13	0.250	0.005
C	45°	5°	45°	5°
D	3.30	0.13	0.130	0.005
E	18.92	0.08	0.745	0.003
F	1.52	0.13	0.060	0.005
G	2.16	0.13	0.085	0.005
H	14.22	0.08	0.560	0.003
I	1.52	1.13	0.060	0.005
J	6.35	0.13	0.250	0.005
K	0.13	0.03	0.005	0.001
M	4.19	1.27	0.165	0.050
N	1.27 x 45°	0.13	0.050 x 45°	0.005