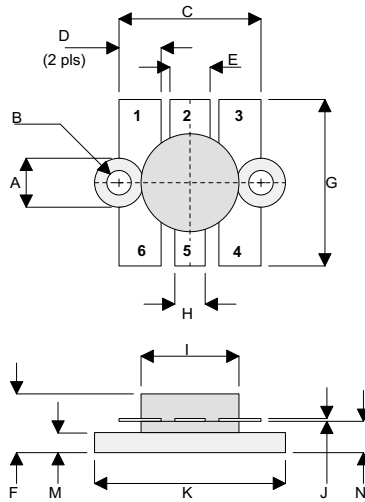


MECHANICAL DATA



DT

PIN 1	SOURCE (COMMON)	PIN 2	GATE
PIN 3	SOURCE (COMMON)	PIN 4	SOURCE (COMMON)
PIN 5	DRAIN	PIN 6	SOURCE (COMMON)

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  
80W – 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 ( $T_{case} = 25^{\circ}C$  unless otherwise stated)

$P_D$	Power Dissipation	175W
$BV_{DSS}$	Drain – Source Breakdown Voltage	70V
$BV_{GSS}$	Gate – Source Breakdown Voltage	$\pm 20V$
$I_{D(sat)}$	Drain Current	20A
$T_{stg}$	Storage Temperature	-65 to 150°C
$T_j$	Maximum Operating Junction Temperature	200°C

Semelab Ltd reserves the right to change test conditions, parameter limits and package dimensions without notice. Information furnished by Semelab is believed to be both accurate and reliable at the time of going to press. However Semelab assumes no responsibility for any errors or omissions discovered in its use. Semelab encourages customers to verify that datasheets are current before placing orders.

**ELECTRICAL CHARACTERISTICS** ( $T_{case} = 25^{\circ}\text{C}$  unless otherwise stated)

Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$BV_{DSS}$ Drain-Source Breakdown Voltage	$V_{GS} = 0$ $I_D = 100\text{mA}$	70			V
$I_{DSS}$ Zero Gate Voltage Drain Current	$V_{DS} = 28\text{V}$ $V_{GS} = 0$			4	mA
$I_{GSS}$ Gate Leakage Current	$V_{GS} = 20\text{V}$ $V_{DS} = 0$			1	$\mu\text{A}$
$V_{GS(th)}$ Gate Threshold Voltage *	$I_D = 10\text{mA}$ $V_{DS} = V_{GS}$	1		7	V
$g_{fs}$ Forward Transconductance *	$V_{DS} = 10\text{V}$ $I_D = 4\text{A}$	3.2			S
$G_{PS}$ Common Source Power Gain	$P_O = 80\text{W}$	16			dB
$\eta$ Drain Efficiency	$V_{DS} = 28\text{V}$ $I_{DQ} = 0.4\text{A}$	50			%
VSWR Load Mismatch Tolerance	$f = 175\text{MHz}$	20:1			—
$C_{iss}$ Input Capacitance	$V_{DS} = 28\text{V}$ $V_{GS} = -5\text{V}$ $f = 1\text{MHz}$			240	pF
$C_{oss}$ Output Capacitance	$V_{DS} = 28\text{V}$ $V_{GS} = 0$ $f = 1\text{MHz}$			120	pF
$C_{rss}$ Reverse Transfer Capacitance	$V_{DS} = 28\text{V}$ $V_{GS} = 0$ $f = 1\text{MHz}$			10	pF

\* Pulse Test: Pulse Duration = 300  $\mu\text{s}$ , Duty Cycle  $\leq 2\%$

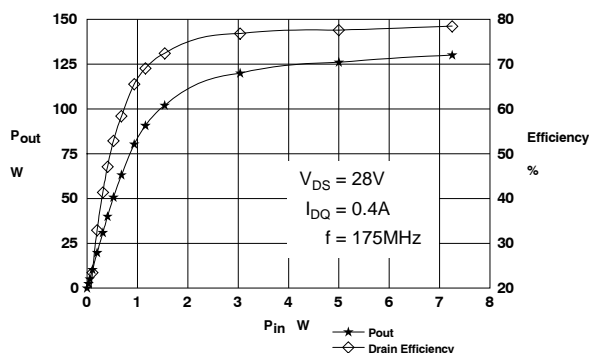
**HAZARDOUS MATERIAL WARNING**

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.

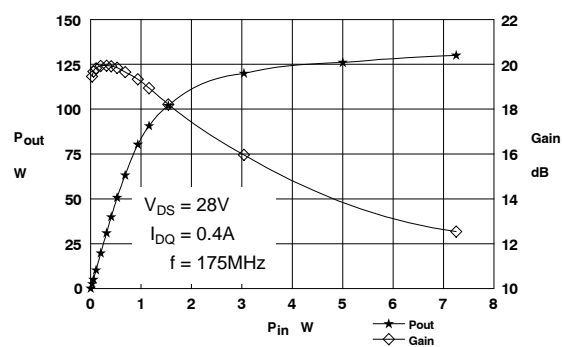
**THESE DEVICES MUST NEVER BE THROWN AWAY WITH GENERAL INDUSTRIAL OR DOMESTIC WASTE.**

**THERMAL DATA**

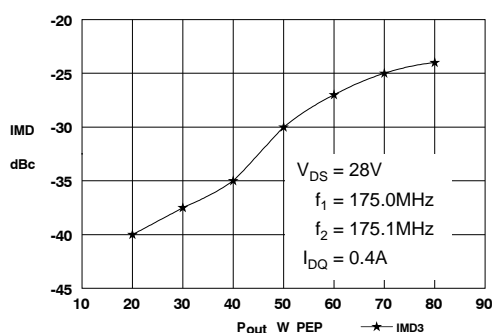
$R_{THj-case}$	Thermal Resistance Junction – Case	Max. 1.0 $^{\circ}\text{C} / \text{W}$
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**Figure 1 – Power Output and Efficiency vs. Power Input.**



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



**Figure 3 – IMD vs. Output Power.**

## D1004UK OPTIMUM SOURCE AND LOAD IMPEDANCE

Frequency MHz	$Z_S$ $\Omega$	$Z_L$ $\Omega$
175MHz	$2.2 + j1.9$	$3.2 - j0.5$

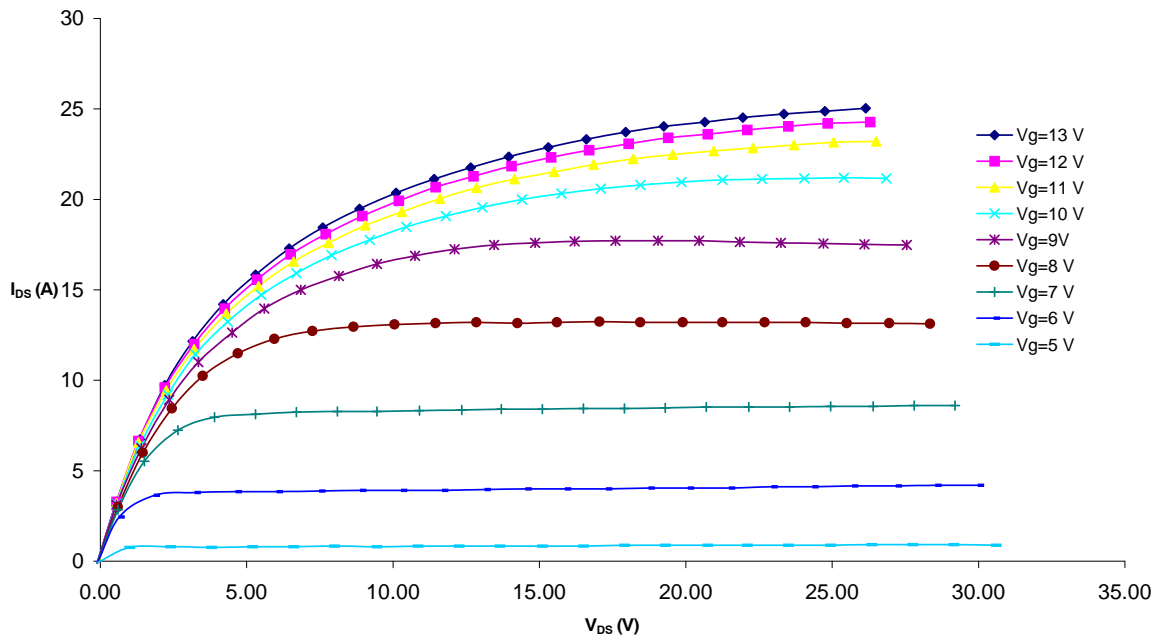


Figure 4 – Typical IV Characteristics.

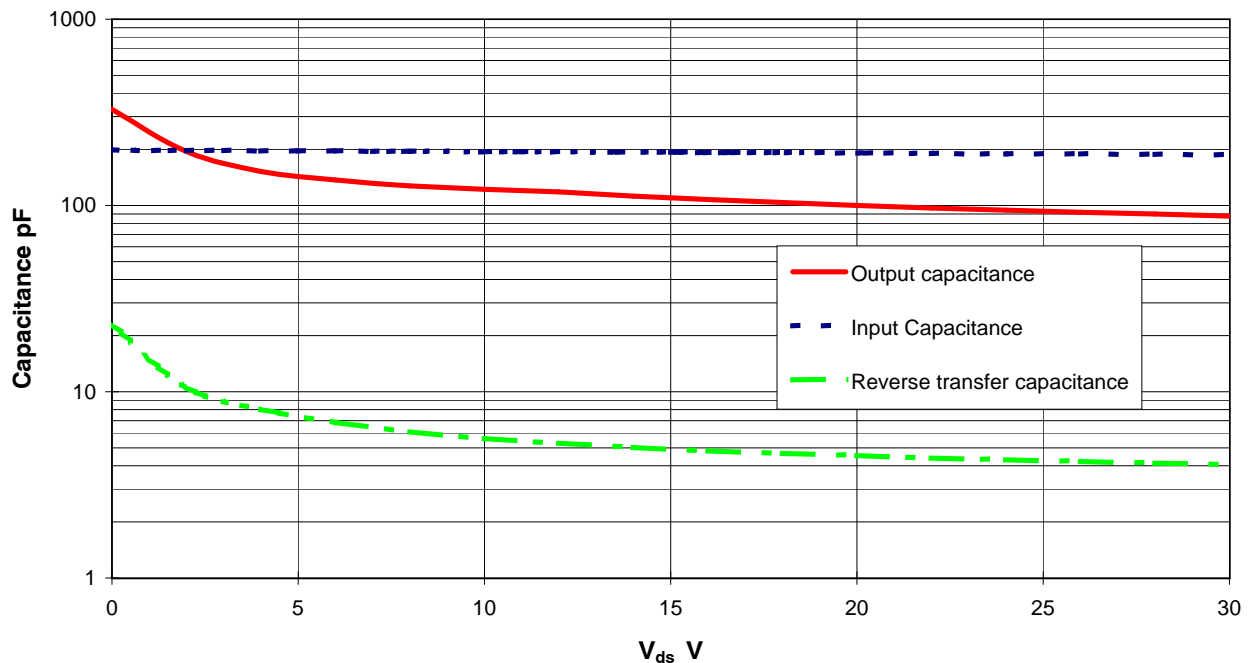
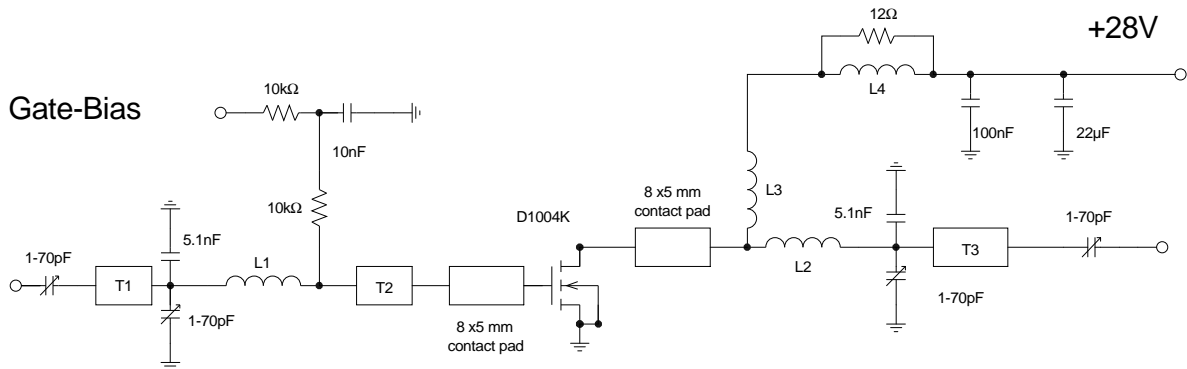


Figure 5 – Typical CV Characteristics.

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## D1004UK 175MHz TEST FIXTURE

Substrate 1.6mm PTFE/ glass,  $\epsilon_r = 2.5$   
 All microstrip lines  $W = 4.4\text{mm}$

T1 7.5mm  
 T2 6mm  
 T3 8mm

L1 Hairpin loop 16swg 13mm dia  
 L2 Hairpin loop 16swg 11mm dia  
 L3 10 turns 18swg enameled copper wire, 4mm i.d.  
 L4 12 turns 18swg enameled copper wire on 22.7mm o.d. ferrite core