

DV1205S

M/A-COM P H I INC

85 DE 5642205 0000418 6

n-channel enhancement-mode RF Power FETs designed for...

175MHz
6-24V
5W
10dB

HF/VHF Amplifiers Class A, B, or C
High Dynamic Range Amp

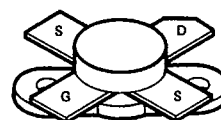
Benefits

20:1 VSWR
No Thermal Runaway
Broadband Capability
Class A, B, or C Operation
Low Noise Figure
High Dynamic Range
Simple Bias Circuitry
S-Parameter Design

Absolute Maximum Ratings (25°C)

Gate-Source Voltage.....15 V
Drain-Source Voltage.....45 V
Drain-Gate Voltage.....45 V
Drain Current (DC).....1 A
Total Device Dissipation.....20 W
@ 25° Case
 θ_{jc} 8.8°C/W
Storage Temperature . . . -65°C to 150°C
Junction Temperature.....200°C

Package Type S



**.380 SOE
FLANGE**

Electrical Characteristics (25°C)

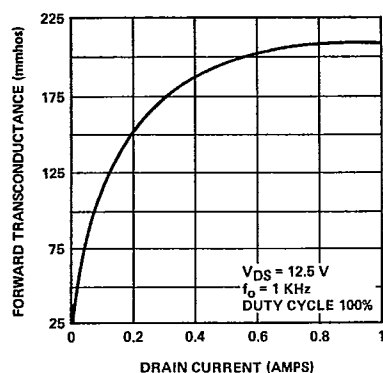
Symbol	Characteristic	Min	Typ	Max	Unit	Test Conditions
$P_{OUT(1)}$	Power Output	5			W	$V_{DS} = 12.5 \text{ V}$, $I_{DQ} = 0.5 \text{ A}$ $P_{IN} = 0.5 \text{ W}$, $f = 175 \text{ MHz}$
$\eta(1)$	Drain Efficiency	50			%	
g_m	Transconductance	150			mmho	$V_{DS} = 12.5 \text{ V}$, $I_D = 0.5 \text{ A}$
C_{oss}	Output Capacity			35		$V_{DS} = 12.5 \text{ V}$, $V_{GS} = 0 \text{ V}$
C_{rss}	Reverse Transfer Capacity			8	pF	
C_{iss}	Input Capacity			25		
$NF(2)$	Small Signal Noise Figure		7		dB	$f = 175 \text{ MHz}$, $V_{DS} = 12.5 \text{ V}$ $I_D = 0.5 \text{ A}$

Notes: (1) All devices 100% DC/RF tested.

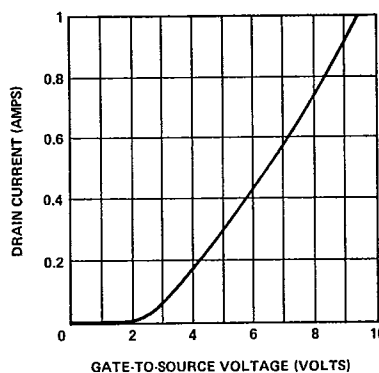
(2) Noise figure measured with 5 watt power matched source and load

Typical Performance Curves (25°C)

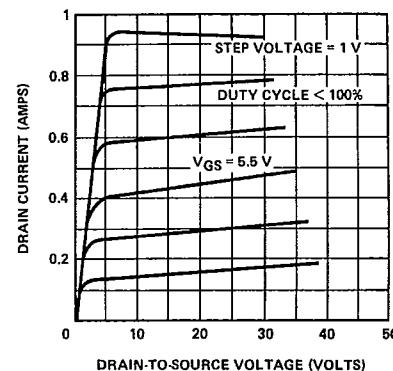
Transconductance vs Drain Current



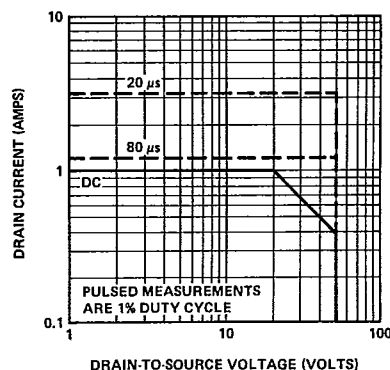
Drain Current vs Gate-to-Source Voltage



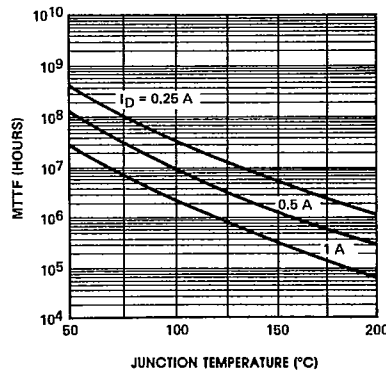
Output Characteristics vs Drain-to-Source Voltage



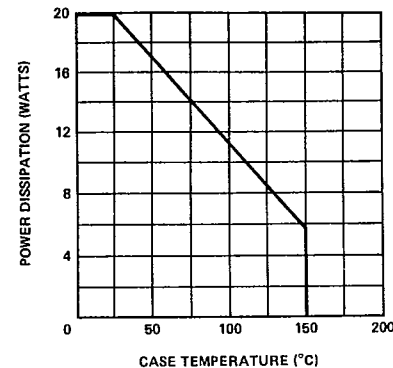
DC and Inductive Safe Operating Region TC = 25°C



MTTF vs Junction Temperature

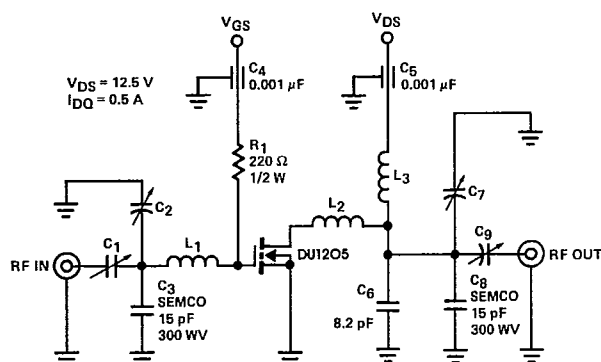


Power Dissipation vs Case Temperature



Test Fixture

DV1205 175 MHz



Parts List

C₁, C₇, 2.7 to 30 pF, ARCO #461 trimmer capacitors
 C₂, C₉, 5 to 80 pF, ARCO #462 trimmer capacitors
 L₁, 3 turns #18 AWG on 1/8" diameter, close wound
 L₂, 2 turns #16 AWG on 1/8" diameter, close wound
 L₃, 10 turns #22 AWG on 1/4" diameter, close wound

Small Signal 2-Port Parameters DV1205S

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2-Port Y-Parameter Matrix in Millimhos

Polar S-Parameters in 50.0 Ohm System

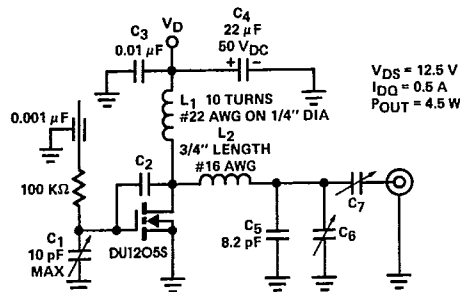
Freq (MHz)	Y ₁₁ (Real Imag)	Y ₂₁ (Real Imag)	Y ₁₂ (Real Imag)	Y ₂₂ (Real Imag)	Freq (MHz)	S ₁₁ (Magn Angl)	S ₂₁ (Magn Angl)	S ₁₂ (Magn Angl)	S ₂₂ (Magn Angl)
40	-.116 1.92	.182 -7.52	-.004 -2.16	3.18 3.08	10	.98 -20	.152 160	.02 71	.72 -29
20	.042 2.96	.180 -8.62	.014 -6.70	3.56 4.76	20	.90 -43	.133 145	.05 59	.70 -58
30	-.436 4.54	.182 -13.7	.054 -1.13	3.32 6.76	30	.86 -65	.118 130	.07 47	.71 -83
40	-.738 6.14	.184 -16.6	.096 -1.64	2.94 9.02	40	.79 -84	.101 117	.09 36	.72 -102
50	-.518 8.48	.187 -21.4	.178 -2.02	3.48 12.0	50	.74 -96	.844 108	.09 29	.71 -115
60	-.400 10.6	.186 -25.4	.238 -2.46	3.66 14.8	60	.71 -106	7.11 100	.09 23	.70 -124
70	-.464 12.8	.184 -34.0	.338 -2.94	3.64 17.6	70	.68 -113	6.09 92	.10 20	.69 -131
80	.280 15.5	.192 -35.6	.434 -3.28	4.58 21.2	80	.67 -120	5.32 87	.09 16	.70 -136
90	.892 17.0	.193 -38.2	.612 -3.94	4.68 23.6	90	.66 -127	4.63 84	.09 14	.72 -141
100	1.04 19.7	.196 -47.4	.726 -4.38	6.18 26.2	100	.67 -131	4.11 79	.09 12	.71 -145
120	2.68 24.2	.210 -54.0	.920 -5.40	8.46 32.2	120	.68 -139	3.33 75	.08 9	.72 -151
140	3.22 28.0	.212 -67.8	1.39 -6.98	9.60 37.0	140	.69 -146	2.73 69	.09 8	.74 -156
160	4.74 32.2	.222 -77.6	1.90 -8.34	12.3 42.0	160	.71 -151	2.30 66	.08 8	.75 -159
180	5.70 37.4	.228 -95.8	2.50 -9.86	13.8 48.2	180	.72 -154	1.97 61	.08 8	.76 -162
200	9.44 42.6	.240 -117	2.94 -10.9	18.4 54.4	200	.73 -158	1.71 58	.07 9	.78 -164
225	10.2 48.4	.252 -140	3.66 -12.9	18.9 61.4	225	.74 -161	1.53 54	.07 9	.79 -166
250	12.6 54.4	.260 -169	4.72 -15.5	20.6 68.8	250	.75 -164	1.33 51	.07 11	.80 -168
275	16.1 60.8	.260 -202	6.06 -18.5	22.0 77.0	275	.76 -167	1.15 47	.07 13	.81 -170
300	21.0 67.2	.250 -236	7.28 -21.6	23.8 83.6	300	.77 -170	1.02 44	.07 16	.82 -171
325	27.4 72.8	.238 -256	8.92 -24.4	24.4 89.2	325	.78 -171	.90 42	.07 19	.82 -171
350	38.4 79.0	.230 -296	9.96 -26.0	29.0 97.0	350	.79 -173	.81 40	.06 23	.83 -172
375	41.0 82.6	.206 -304	12.9 -30.2	26.0 98.6	375	.80 -174	.74 38	.07 26	.84 -172
400	48.2 83.8	.188 -318	15.4 -32.2	26.8 102	400	.81 -175	.68 36	.07 31	.84 -173
425	55.8 86.2	.168 -324	17.0 -34.2	29.8 103	425	.82 -176	.62 36	.06 34	.84 -173
450	61.2 87.0	.143 -334	18.4 -36.0	33.0 106	450	.82 -176	.58 33	.06 37	.85 -173
475	61.4 87.0	.127 -324	22.0 -39.0	31.2 104	475	.83 -177	.55 33	.07 41	.85 -173
500	60.6 82.8	.102 -312	24.2 -41.8	32.2 105	500	.82 -177	.52 32	.08 44	.85 -174

Conditions: 12.5 V @ 500 mA

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Applications

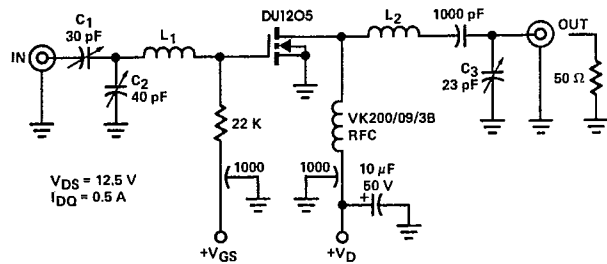
DV1205S 400 MHz Oscillator



Parts List

- L1, 10 turns #22 AWG on 1/4" diameter, close wound
- L2, 3/4" length of #16 AWG
- C6, 1.5 to 20 pF, ARCO #402 trimmer capacitor
- C7, 0.9 to 7 pF, ARCO #400 trimmer capacitor
- C2, Uniceram 47 pF capacitor with ribbon leads. Lead length ≈ 0.25 " long and .05" wide.

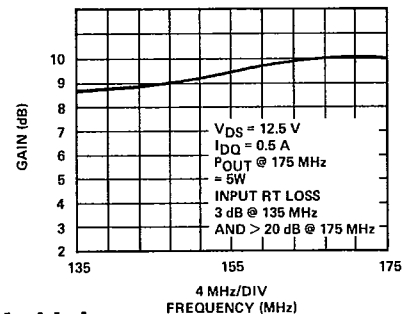
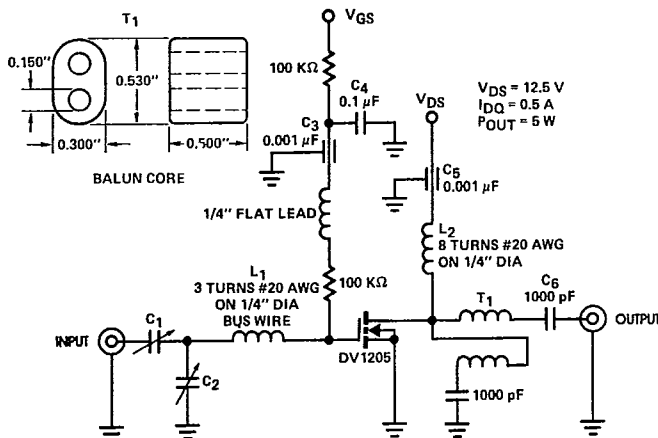
2 Meter Amplifier 5 W Output



Parts List

- L1, 60 nHy 4T #22 AWG close wound 0.125" I.D.
- L2, 54 nHy 3 1/2T #22 AWG close wound 0.125" I.D.
- C1, C2, C3, ARCO #462 5-80 pF

DV1205S 135-175 MHz Amplifier



Parts List

- C1, C2 ARCO #462, 2 to 80 pF, trimmer capacitors
- L1, 3 turns buss wire #20 AWG on 1/4" diameter
- L2, 8 turns #20 AWG on 1/4" diameter
- T1, 1 turn of 25 ohm coax on 2 balun cores. Stackpole #57-0973 $\mu_o = 35$.

CAUTION: Beryllium Oxide — The top cap of this device is alumina which is harmless. However the ceramic portion between the leads and the metal flange is Beryllium Oxide, the dust of which is toxic. Care must therefore be taken during handling and mounting the device to prevent any damage to this area.

Steps must be taken to ensure that all those who may handle, use, or dispose of this device are aware of its nature and of these necessary safety precautions. In particular the transistor should never be thrown out with general industrial or domestic waste.