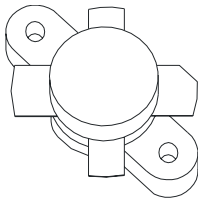
SD2931

RF POWER TRANSISTORS
HF/VHF/UHF N-CHANNEL MOSFETs

- GOLD METALLIZATION
- EXCELLENT THERMAL STABILITY
- COMMON SOURCE CONFIGURATION
- P_{OUT} = 150 W MIN. WITH 14 dB GAIN @ 175 MHz

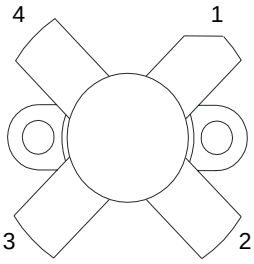


M174
epoxy sealed

DESCRIPTION

The SD2931 is a gold metallized N-Channel MOS field-effect RF power transistor. It is intended for use in 50 V dc large signal applications up to 230 MHz.

PIN CONNECTION



1. Drain
2. Source
3. Gate
4. Source

ORDER CODES

Order Codes	Marking	Package	Packaging
SD2931	SD2931	M174	Plastic Tray

ABSOLUTE MAXIMUM RATINGS (T_{CASE} = 25 °C)

Symbol	Parameter	Value	Unit
$V_{(BR)DSS}$	Drain Source Voltage	125	V
V_{DGR}	Drain-Gate Voltage (R_{GS} = 1MΩ)	125	V
V_{GS}	Gate-Source Volatge	±20	V
I_D	Drain Current	20	A
P_{DISS}	Power Dissipation	292	W
T_j	Max. Operating Junction Temperature	200	°C
T_{STG}	Storage Temperature	-65 to +150	°C

THERMAL DATA

$R_{th(j-c)}$	Junction -Case Thermal Resistance	0.6	°C/W

Obsolete Product(s) - Obsolete Product(s)

ELECTRICAL SPECIFICATION (T_{CASE} = 25°C)

STATIC

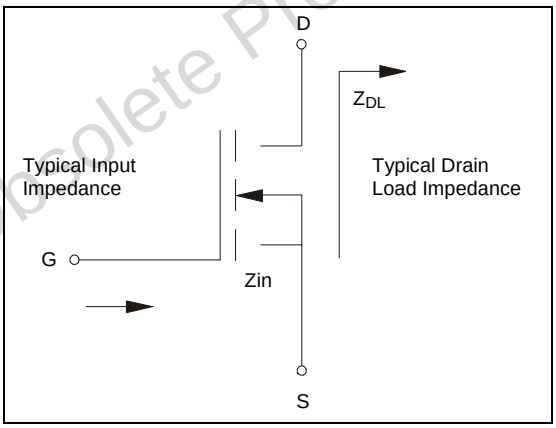
Symbol	Test Conditions			Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$	V_{GS} = 0 V	I_{DS} = 100 mA		125			V
I_{DSS}	V_{GS} = 0 V	V_{DS} = 50 V				50	µA
I_{GSS}	V_{GS} = 20 V	V_{DS} = 0 V				250	nA
$V_{GS(Q)}$*	V_{DS} = 10 V	I_D = 250 mA		1.5		4.0	V
$V_{DS(ON)}$	V_{GS} = 10 V	I_D = 10 A				3.0	V
G_{FS}	V_{DS} = 10 V	I_D = 5 A		5			mho
C_{ISS}	V_{GS} = 0 V	V_{DS} = 50 V	f = 1 MHz		480		pF
C_{OSS}	V_{GS} = 0 V	V_{DS} = 50 V	f = 1 MHz		190		pF
C_{RSS}	V_{GS} = 0 V	V_{DS} = 50 V	f = 1 MHz		18		pF

* $V_{GS(Q)}$ sorted with alpha/numeric code marked on unit.

DYNAMIC

Symbol	Test Conditions	Min.	Typ.	Max.	Unit
P_{OUT}	V_{DD} = 50 V I_{DQ} = 250 mA f = 175 MHz	150			W
G_{PS}	V_{DD} = 50 V I_{DQ} = 250 mA P_{OUT} = 150 W f = 175 MHz	14	15		dB
η_D	V_{DD} = 50 V I_{DQ} = 250 mA P_{OUT} = 150 W f = 175 MHz	55	65		%
Load Mismatch	V_{DD} = 50 V I_{DQ} = 250 mA P_{OUT} = 150 W f = 175 MHz All Phase Angles	10:1			VSWR

IMPEDANCE DATA



FREQ	Z_{IN} (Ω)	Z_{DL} (Ω)
30 MHz	1.7 - j 5.7	6.8 + j 0.9
175 MHz	1.2 - j 2.0	2.0 + j 2.4

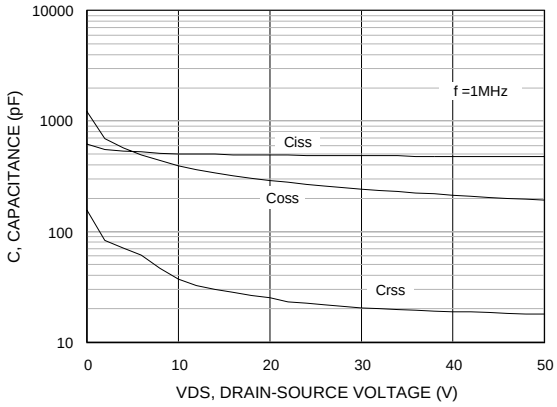
V_{GS} SORTS

AA	1.5 - 1.6	J	2.8 - 2.9
BB	1.6 - 1.7	K	2.9 - 3.0
CC	1.7 - 1.8	L	3.0 - 3.1
DD	1.8 - 1.9	M	3.1 - 3.2
EE	1.9 - 2.0	N	3.2 - 3.3
A	2.0 - 2.1	P	3.3 - 3.4
B	2.1 - 2.2	Q	3.4 - 3.5
C	2.2 - 2.3	R	3.5 - 3.6
D	2.3 - 2.4	S	3.6 - 3.7
E	2.4 - 2.5	T	3.7 - 3.8
F	2.5 - 2.6	U	3.8 - 3.9
G	2.6 - 2.7	V	3.9 - 4.0
H	2.7 - 2.8		

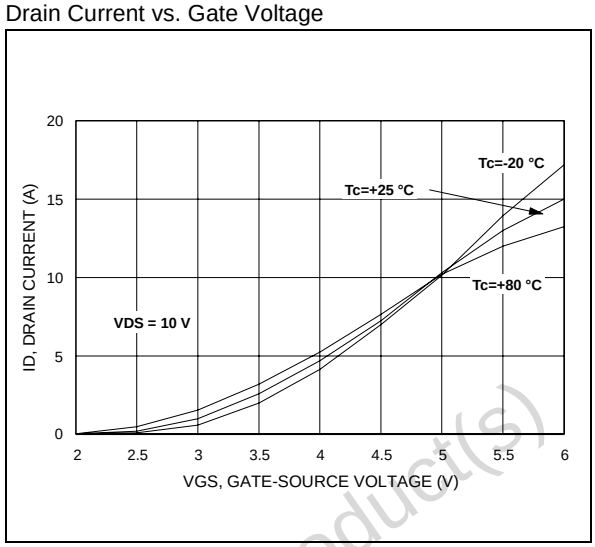
Obsolete Product(s) - Obsolete Product(s)

TYPICAL PERFORMANCE

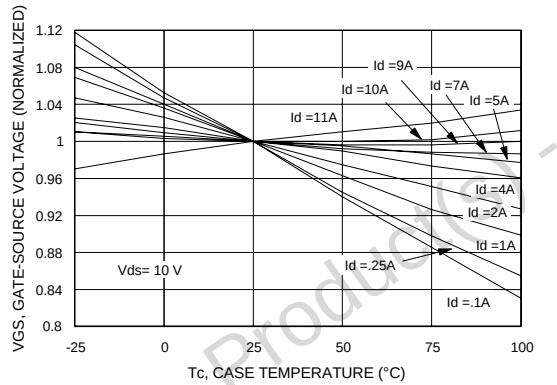
Capacitance vs. Drain-Source Voltage



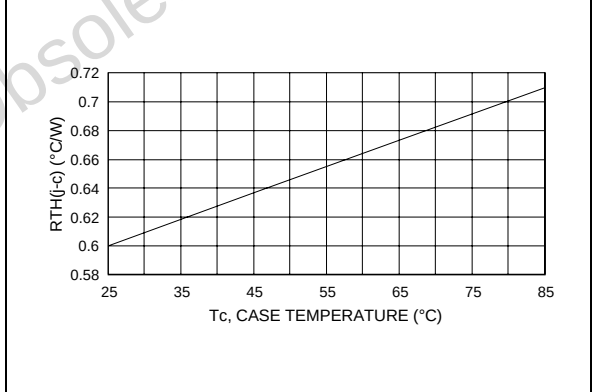
Drain Current vs. Gate Voltage



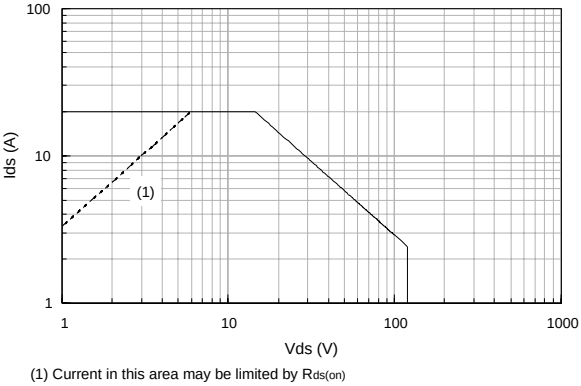
Gate-Source Voltage vs. Case Temperature



Maximum Thermal Resistance vs. Case Temperature



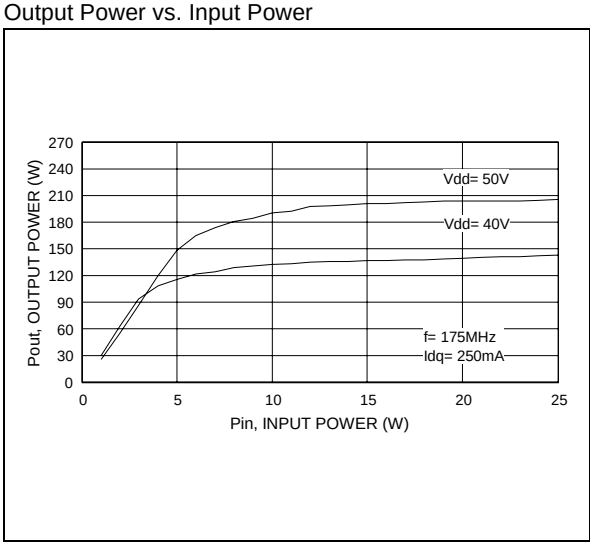
Safe Operating Area



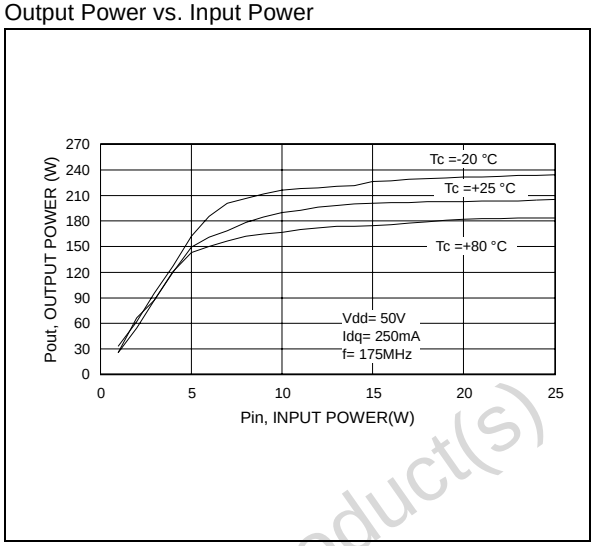
Obsolete Product(s) - Obsolete Product(s)

TYPICAL PERFORMANCE (175 MHz)

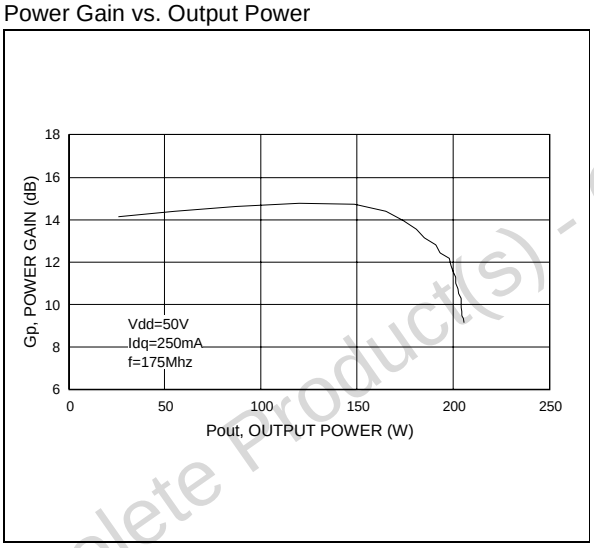
Output Power vs. Input Power



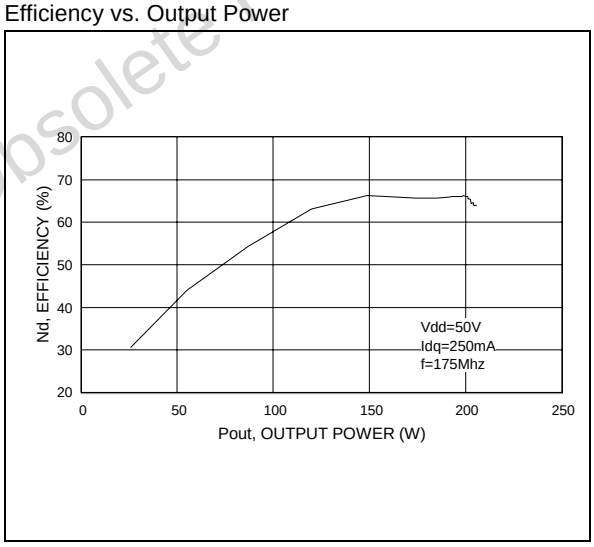
Output Power vs. Input Power



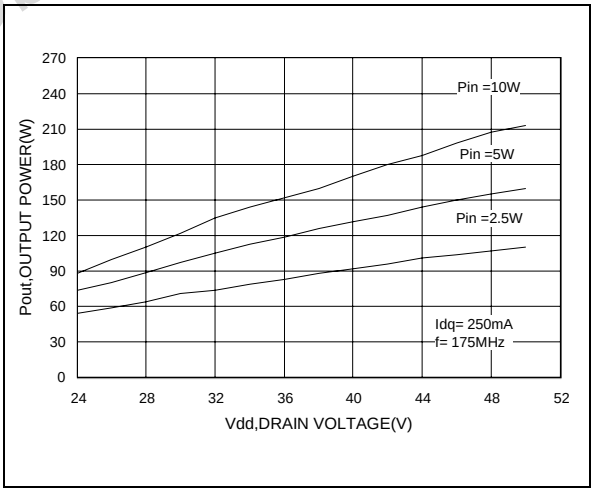
Power Gain vs. Output Power



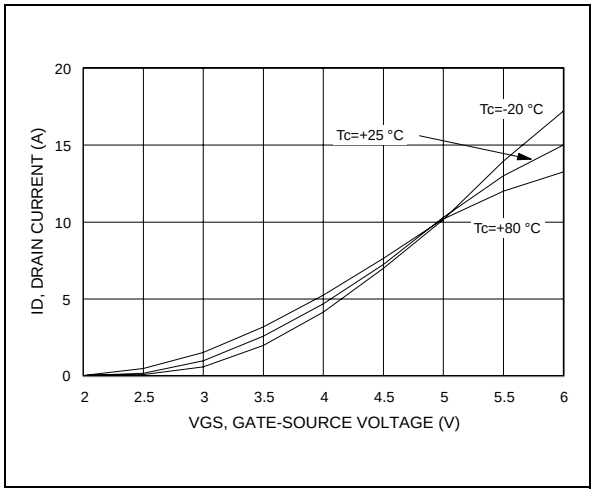
Efficiency vs. Output Power



Output Power vs. Supply Voltage

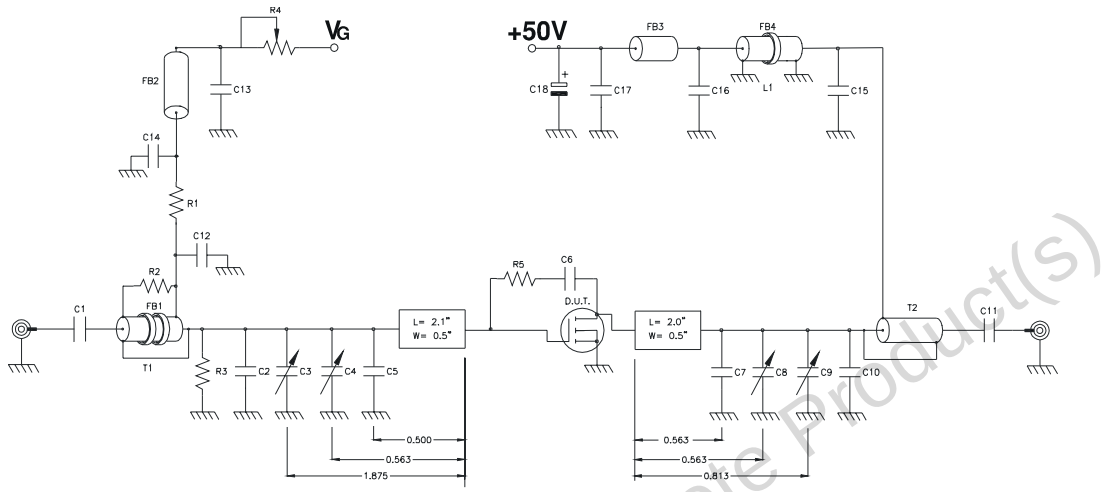


Drain Current vs. Gate-Source Voltage



Obsolete Product(s) - Obsolete Product(s)

175 MHz Test Circuit Schematic (Production Test Circuit)



Note: All dimensions in inches

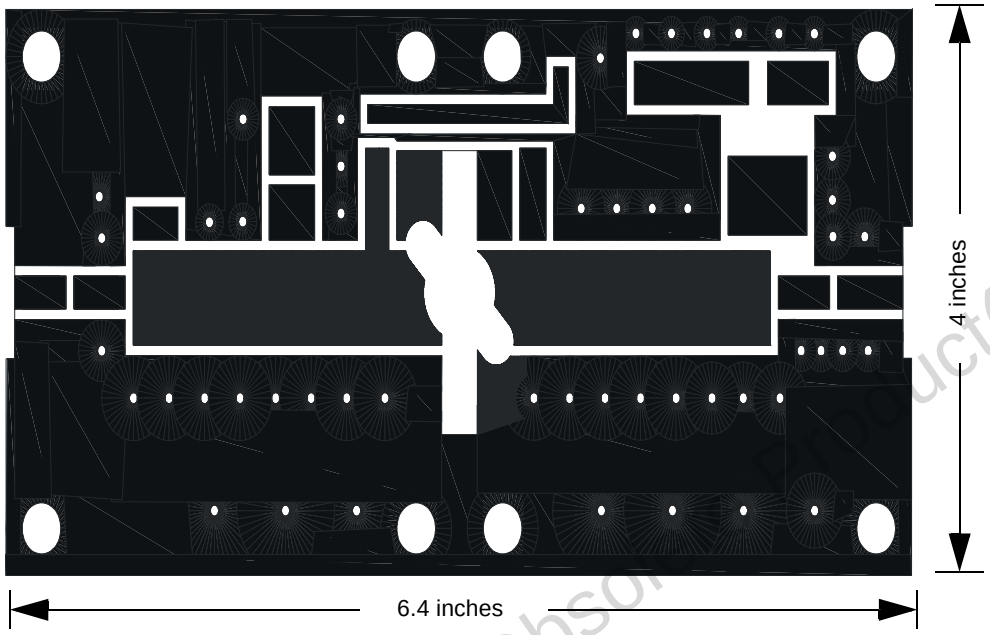
REF. 1021579C

175 MHz Test Circuit Component Part List

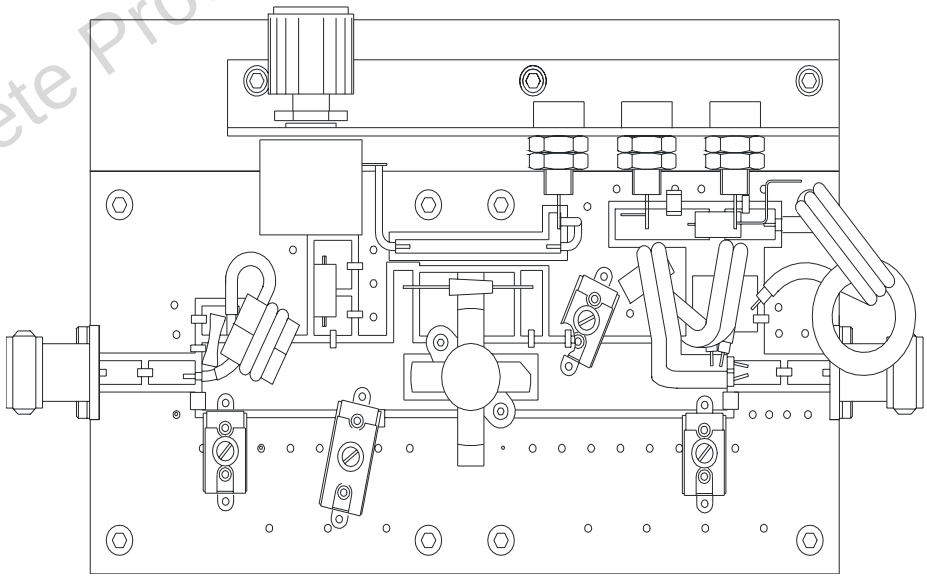
T1	4:1 Transformer, 25 ohm Flexible Coax .090 OD 6” Long
T2	1:4 Transformer, 25 ohm Semi-Rigid Coax .141 OD 6” Long
FB1	Toroid X 2, 0.5” OD .312” ID 850µ 2 Turns
FB2, FB3	VK200
FB4	Shield Bead, 1” OD 0.5” ID 850µ 3 Turns
L1	1/4 Wave Choke, 50 ohm Semi-Rigid Coax .141 OD 12” Long
PCB	0.62” Woven Fiberglass, 1 oz. Copper, 2 Sides, εr = 2.55
R1, R3	470 ohm 1 W Chip Resistor
R2	360 ohm 1/2 W Resistor
R4	20 Kohm 10 Turn Potentiometer
R5	560 ohm 1 W Resistor
C1, C11	470 pF ATC Chip Cap
C2	43 pF ATC Chip Cap
C3, C8, C9	Arco 404, 12-65 pF
C4	Arco 423, 16-100 pF
C5	120 pF ATC Chip Cap
C6	0.01 µF ATC Chip Cap
C7	30 pF ATC Chip Cap
C10	91 pF ATC Chip Cap
C12, C15	1200 pF ATC Chip Cap
C13, C14,C16, C17	0.01 µF / 500 V Chip Cap
C18	10 µF 63 V Electrolytic Capacitor

Obsolete Product(s) - Obsolete Product(s)

175 MHz Test Circuit Photomaster



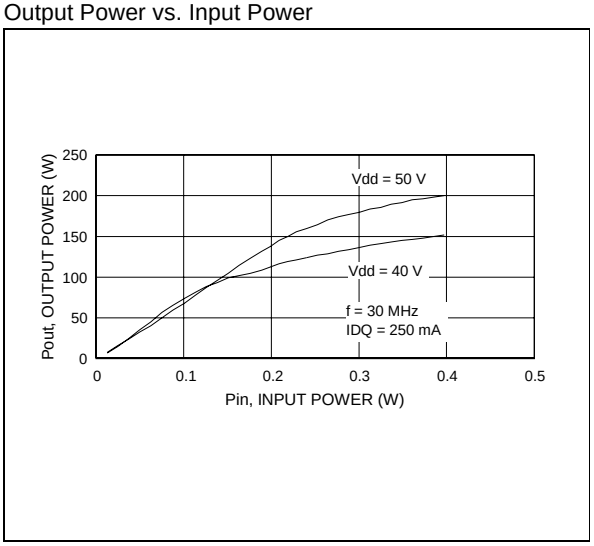
175 MHz Test Circuit



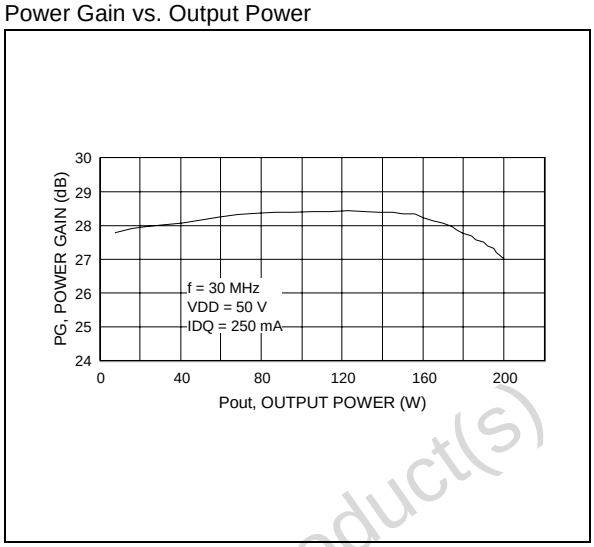
Obsolete Product(s) - Obsolete Product(s)

TYPICAL PERFORMANCE (30 MHz)

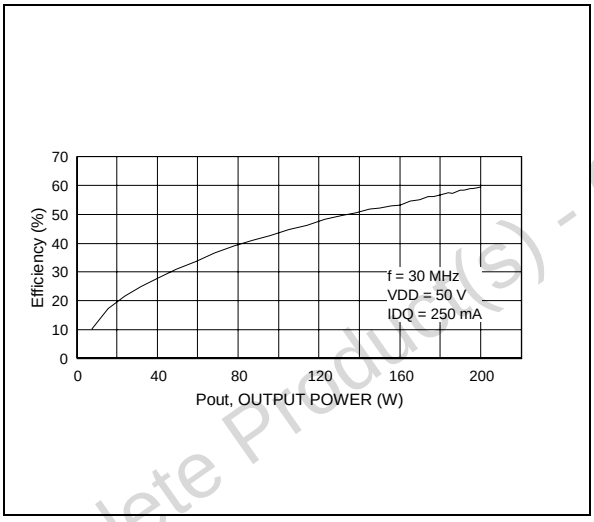
Output Power vs. Input Power



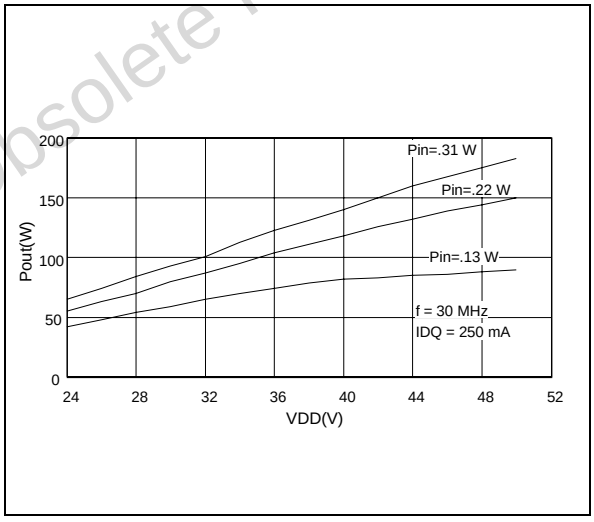
Power Gain vs. Output Power



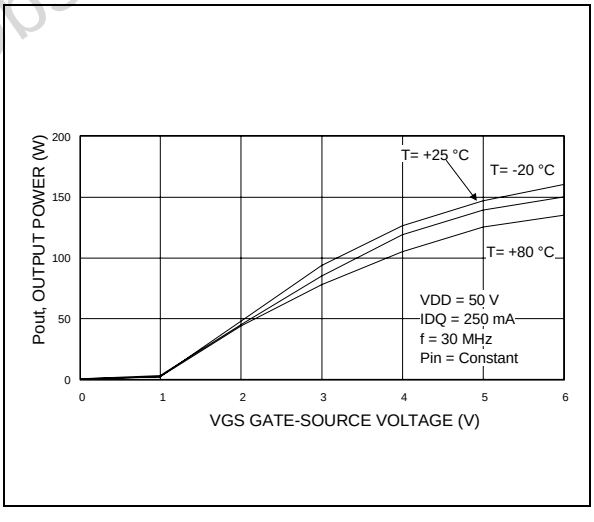
Efficiency vs. Output Power



Output Power vs. Supply Voltage

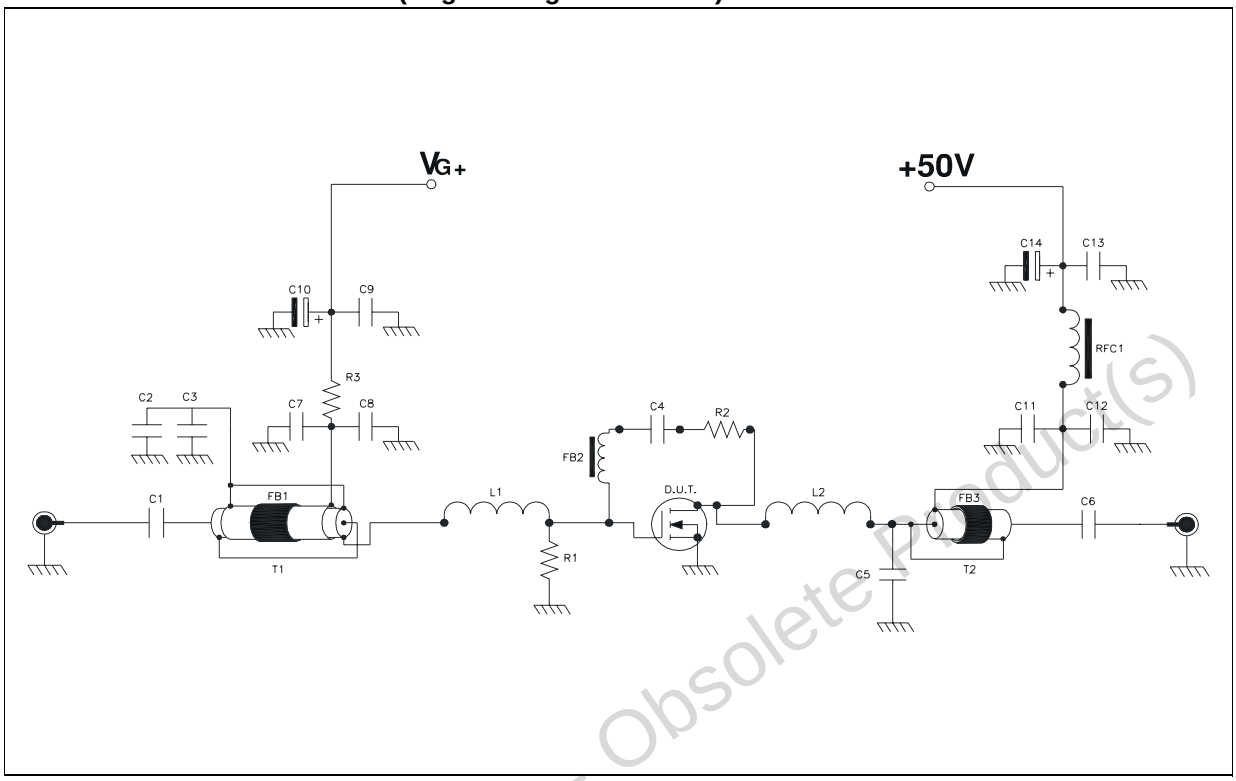


Output Power vs. Gate Voltage



Obsolete Product(s) - Obsolete Product(s)

30 MHz Test Circuit Schematic (Engineering Test Circuit)



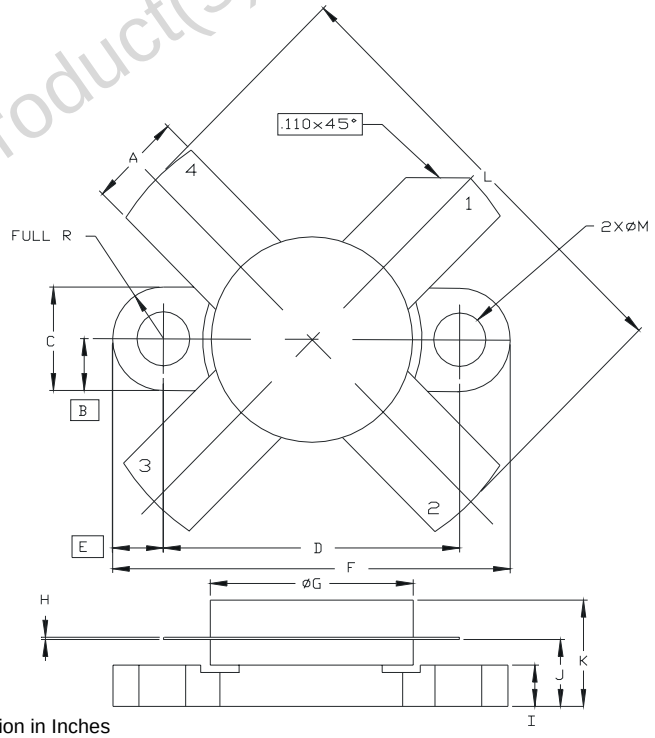
30 MHz Test Circuit Component Part List

T1	9:1 Transformer, 25 ohm Flexible Coax with extra shield .090 OD 15” Long
T2	1:4 Transformer, 50 ohm Flexible Coax .225 OD 15” Long
FB1	Toroid 1.7” OD .30” ID 220µ 4Turns
FB2	Surface Mount EMI Shield Bead
FB3	Toroid 1.7” OD .300” ID 220µ 3Turns
RFC1	Toroid 0.5” OD 0.30” ID 125µ 4Turns 12 awg wire
PCB	0.62” Woven Fiberglass, 1 oz. Copper, 2 Sides, εr = 2.55
R1, R3	1 K ohm 1 W Chip Resistor
R2	680 ohm 3W Wirewound Resistor
C1,C4,C6,C7,C8,C9, C11,C12,C13	0.1 µF ATC Chip Cap
C2,C3	750 pF ATC Chip Cap
C5	470 pF ATC Chip Cap
C10	10 µF 63 V Electrolytic Capacitor
C14	100 µF 63 V Electrolytic Capacitor

Obsolete Product(s) - Obsolete Product(s)

M174 (.500 DIA 4/L N/HERM W/FLG) MECHANICAL DATA

DIM.	mm			Inch		
	MIN.	TYP.	MAX	MIN.	TYP.	MAX
A	5.56		5.584	0.219		0.230
B		3.18			0.125	
C	6.22		6.48	0.245		0.255
D	18.28		18.54	0.720		0.730
E		3.18			0.125	
F	24.64		24.89	0.970		0.980
G	12.57		12.83	0.495		0.505
H	0.08		0.18	0.003		0.007
I	2.11		3.00	0.083		0.118
J	3.81		4.45	0.150		0.175
K			7.11			0.280
L	25.53		26.67	1.005		1.050
M	3.05		3.30	0.120		0.130



Controlling Dimension in Inches

1011000D

Obsolete Product(s) - Obsolete Product(s)

Obsolete Product(s) - Obsolete Product(s)

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