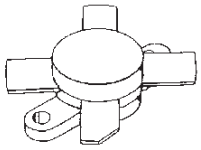
SD2931-10

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

ADVANCE DATA

- GOLD METALLIZATION
- EXCELLENT THERMAL STABILITY
- COMMON SOURCE CONFIGURATION
- POUT = 150W MIN. WITH 14 dB gain @175 MHz
- THERMALLY ENHANCED PACKAGING FOR LOWER JUNCTION TEMPERATURES



M174
epoxy sealed

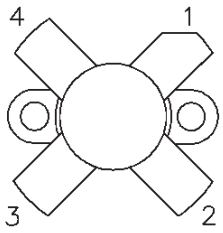
ORDER CODE	BRANDING
SD2931-10	TSD2931-10

DESCRIPTION

The SD2931-10 is a gold metallized N-Channel MOS field-effect RF power transistor. Being electrically identical to the standard SD2931 MOSFET, it is intended for use in 50V dc large signal applications up to 230 MHz.

The SD2931-10 is mechanical compatible to the SD2931 but offers in addition a better thermal capability (25 % lower thermal resistance), representing the best-in-class transistors for ISM applications.

PIN CONNECTION



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

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 Voltage	±20	V
I_D	Drain Current	20	A
P_{DISS}	Power Dissipation	389	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	0.45	°C/W
$R_{th(c-s)}$	Case-Heatsink Thermal Resistance *	0.2	°C/W

* Determined using a flat aluminum or copper heatsink with thermal compound applied (Dow Corning 340 or equivalent).

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

STATIC

Symbol	Parameter			Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$	V_{GS} = 0V	I_{DS} = 100 mA		125			V
I_{DSS}	V_{GS} = 0V	V_{DS} = 50 V				5	mA
I_{GSS}	V_{GS} = 20V	V_{DS} = 0 V				5	µA
$V_{GS(Q)}$ *	VDS = 10V	I_D = 250 mA		2.0		5.0	V
$V_{DS(ON)}$	V_{GS} = 10V	I_D = 10 A				3.0	V
G_{FS}	V_{DS} = 10V	I_D = 5 A		5			mho
C_{ISS}	V_{GS} = 0V	V_{DS} = 50 V	f = 1 MHz		480		pF
C_{OSS}	V_{GS} = 0V	V_{DS} = 50 V	f = 1 MHz		190		pF
C_{RSS}	V_{GS} = 0V	V_{DS} = 50 V	f = 1 MHz		18		pF

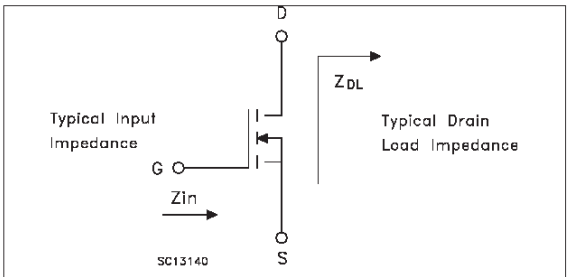
* $V_{GS(Q)}$ sorted with alpha/numeric code marked on unit.

REF. 7165489C

DYNAMIC

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

IMPEDANCE DATA



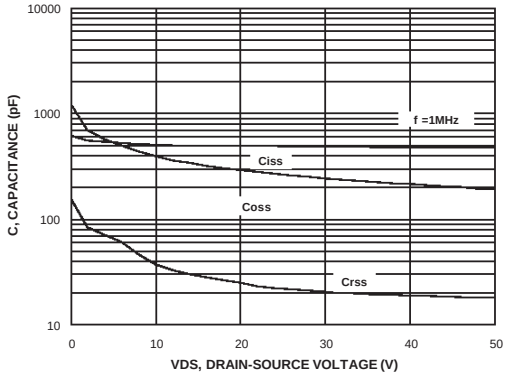
FREQ.	Z_{IN} (Ω)	Z_{DL} (Ω)
30 MHz	1.7 - j 5.7	6.8 + j 0.9
175 MHz	1.2 - j 2.0	2.0 + j 2.4

V_{GS} SORTS

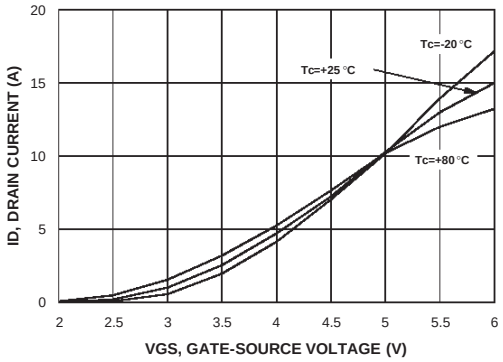
A	2.0 - 2.1	R	3.5 - 3.6
B	2.1 - 2.2	S	3.6 - 3.7
C	2.2 - 2.3	T	3.7 - 3.8
D	2.3 - 2.4	U	3.8 - 3.9
E	2.4 - 2.5	V	3.9 - 4.0
F	2.5 - 2.6	W	4.0 - 4.1
G	2.6 - 2.7	X	4.1 - 4.2
H	2.7 - 2.8	Y	4.2 - 4.3
J	2.8 - 2.9	Z	4.3 - 4.4
K	2.9 - 3.0	2	4.4 - 4.5
L	3.0 - 3.1	3	4.5 - 4.6
M	3.1 - 3.2	4	4.6 - 4.7
N	3.2 - 3.3	5	4.7 - 4.8
P	3.3 - 3.4	6	4.8 - 4.9
Q	3.4 - 3.5	7	4.9 - 5.0

TYPICAL PERFORMANCE

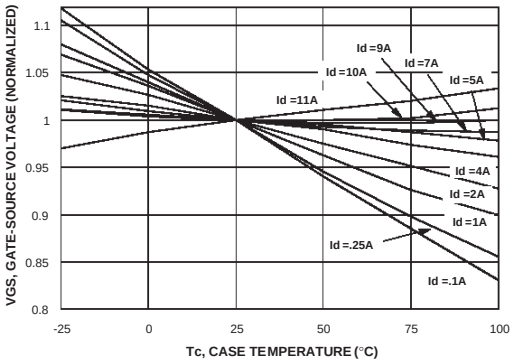
Capacitance vs Drain-Source Voltage



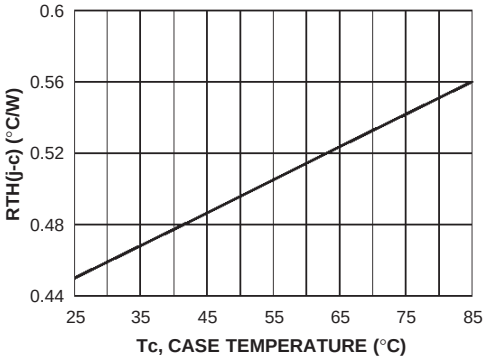
Drain Current vs Gate Voltage



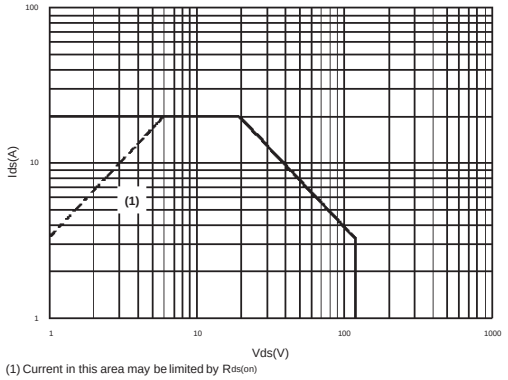
Gate-Source Voltages vs Case Temperature



Maximum Thermal Resistance vs Case Temperature



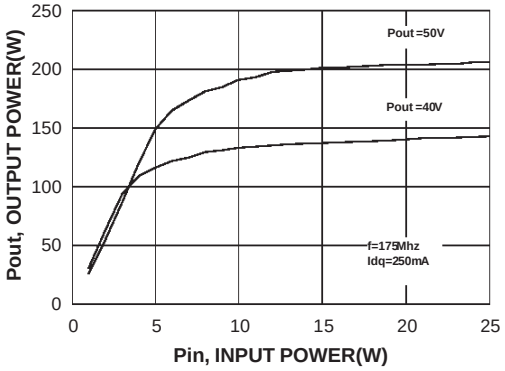
DC Safe Operating Area



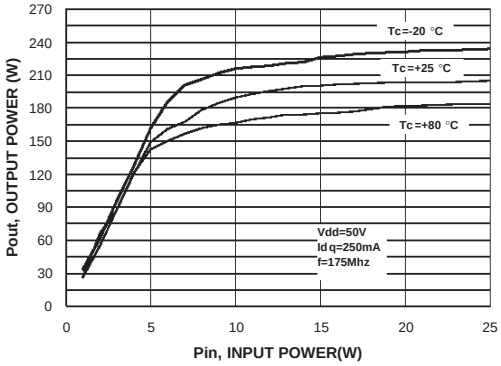
(1) Current in this area may be limited by $R_{ds(on)}$

TYPICAL PERFORMANCE (175 MHz)

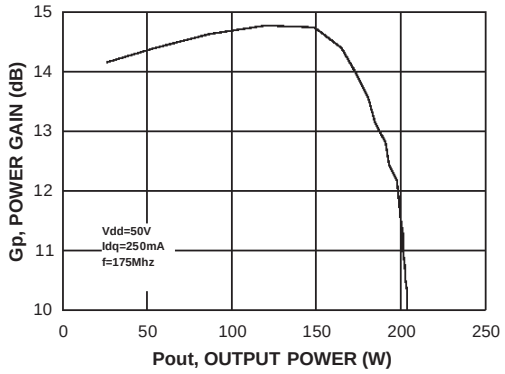
Output Power vs Input Power



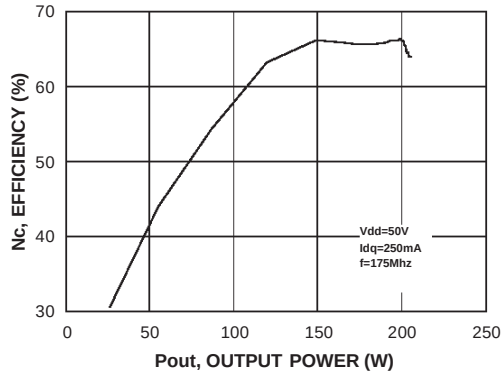
Output Power vs Input Power



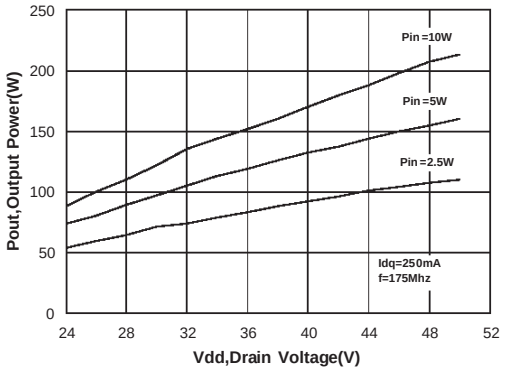
Power Gain vs Output Power



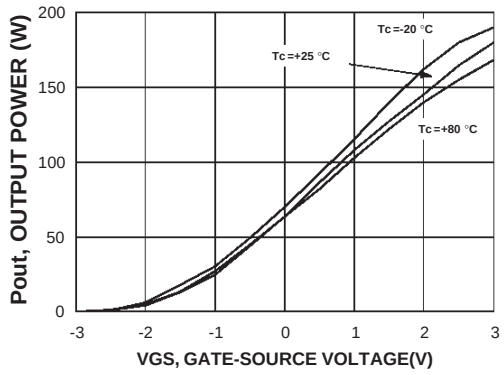
Efficency vs Output Power



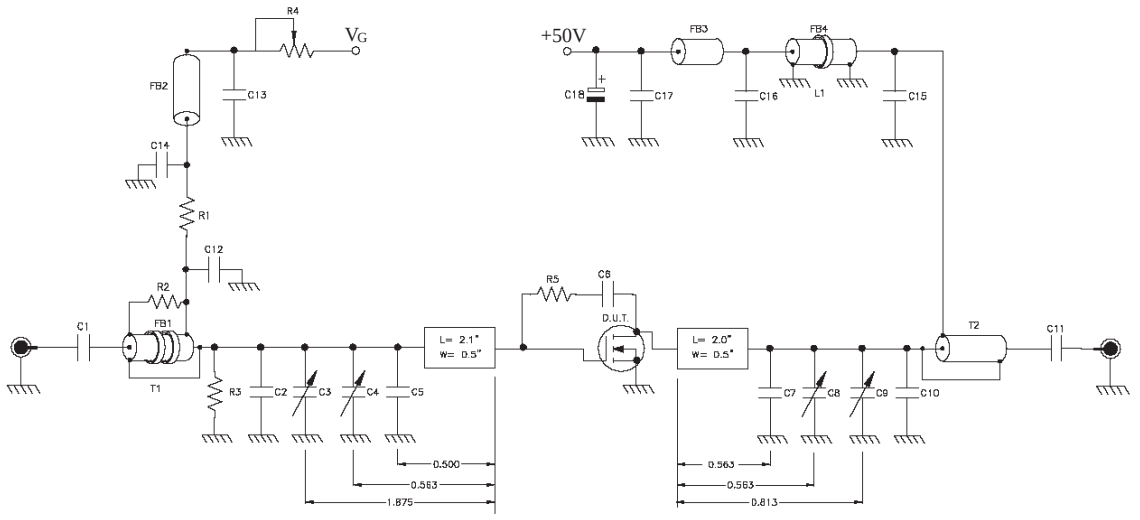
Output Power vs Supply Voltage



Output Power vs Gate Voltage



175 MHz Test Circuit Schematic (Production Test Circuit)



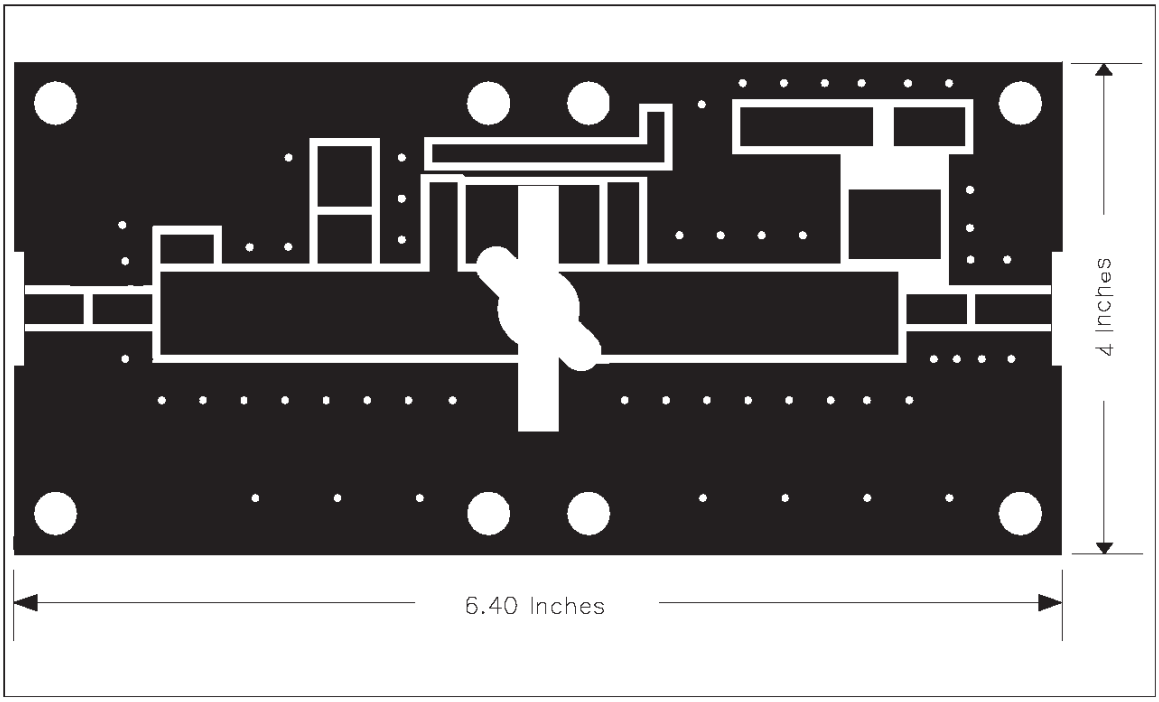
Note : All dimensions in inches

REF. 1021579C

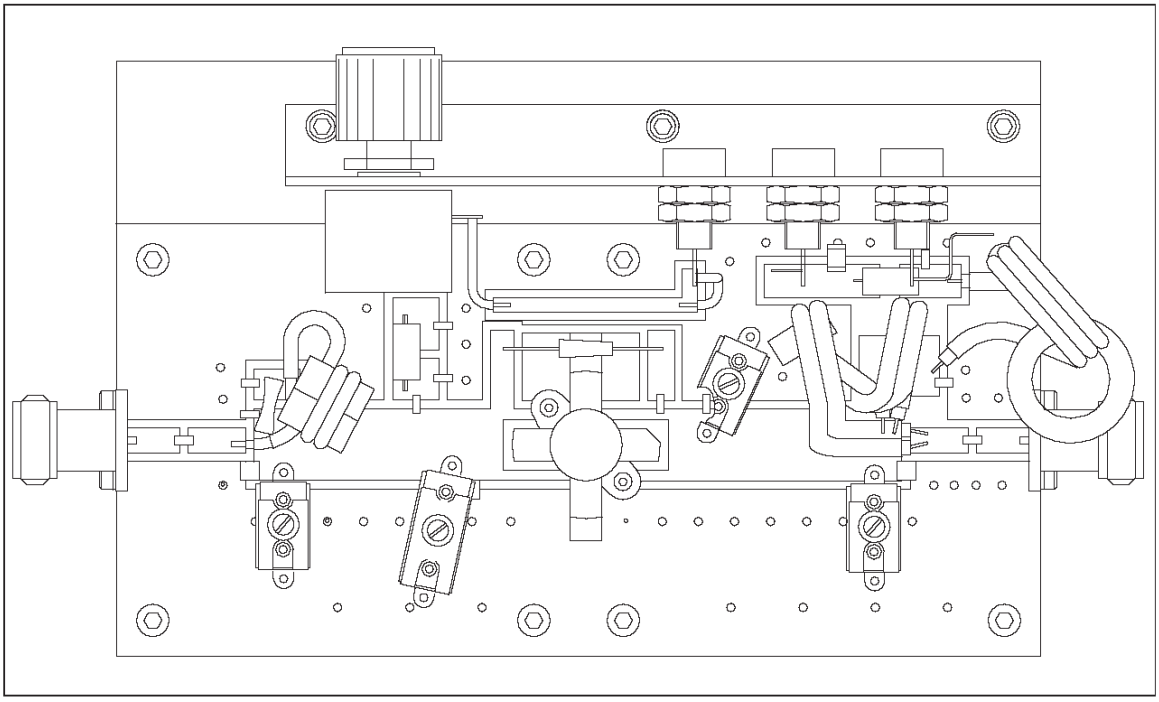
175 MHz Test Circuit Component Part List

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 850u 2 Turns		
FB2, FB3	VK200		
FB4	Shield Bead, 1” OD 0.5” ID 850u 3 Turns		
L1	1/4Wave Choke, 50 ohm Semi-Rigid Coax .141 OD 12 ” Long		
PCB	0.062” Woven Fiberglass, 1 oz. Copper, 2 Sides, er = 2.55		
R1, R3	470 ohm 1W Chip Resistor	R4	20K ohm 10 Turn Potentiometer
R2	360 ohm 1/2W Resistor	R5	560 ohm 1W Resistor
C1, C11	470 pF ATC Chip Cap	C7	30 pF ATC Chip Cap
C2	43 pF ATC Chip Cap	C10	91 pF ATC Chip Cap
C3, C8, C9	Arco 404, 12-65 pF	C12, C15	1200 pF ATC Chip Cap
C4	Arco 423, 16-100 pF	C13, C14	0.01 uF / 500V Chip Cap
C5	120 pF ATC Chip Cap	C16, C17	0.01 uF / 500V Chip Cap
C6	0.01 uF ATC Chip Cap	C18	10 uF 63V Electrolytic Capacitor

175 MHz Test Circuit Photomaster

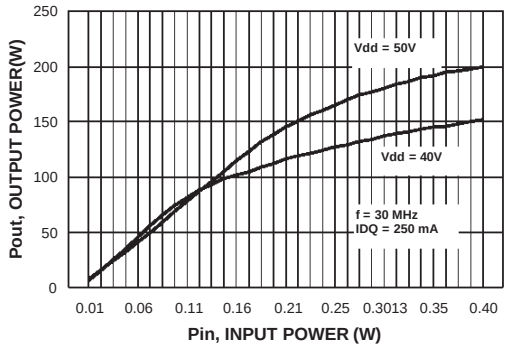


175 MHz Test Circuit

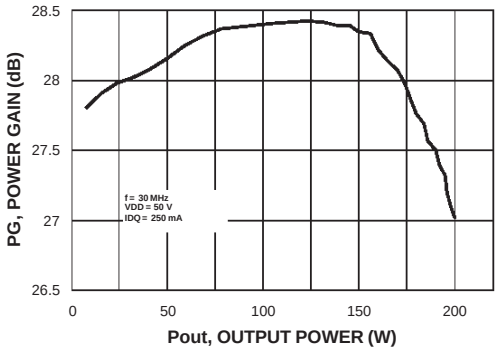


TYPICAL PERFORMANCE (30 MHz)

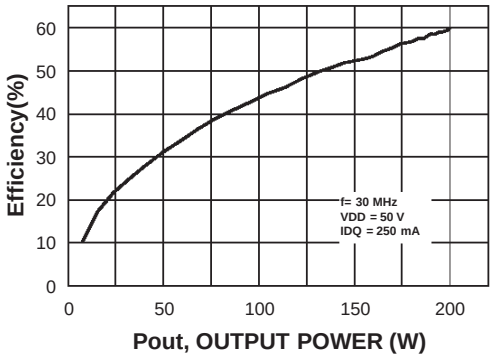
Output Power vs Input Power



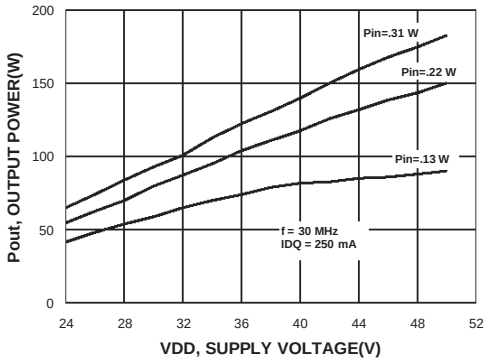
Power Gain vs Output Power



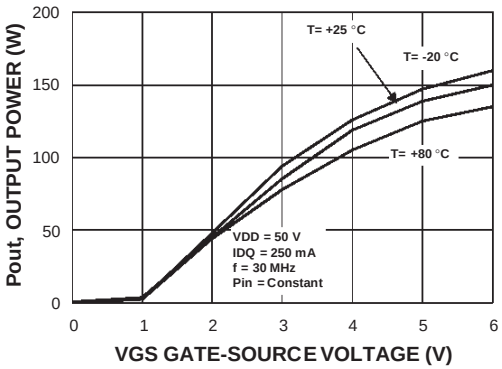
Efficency vs Output Power



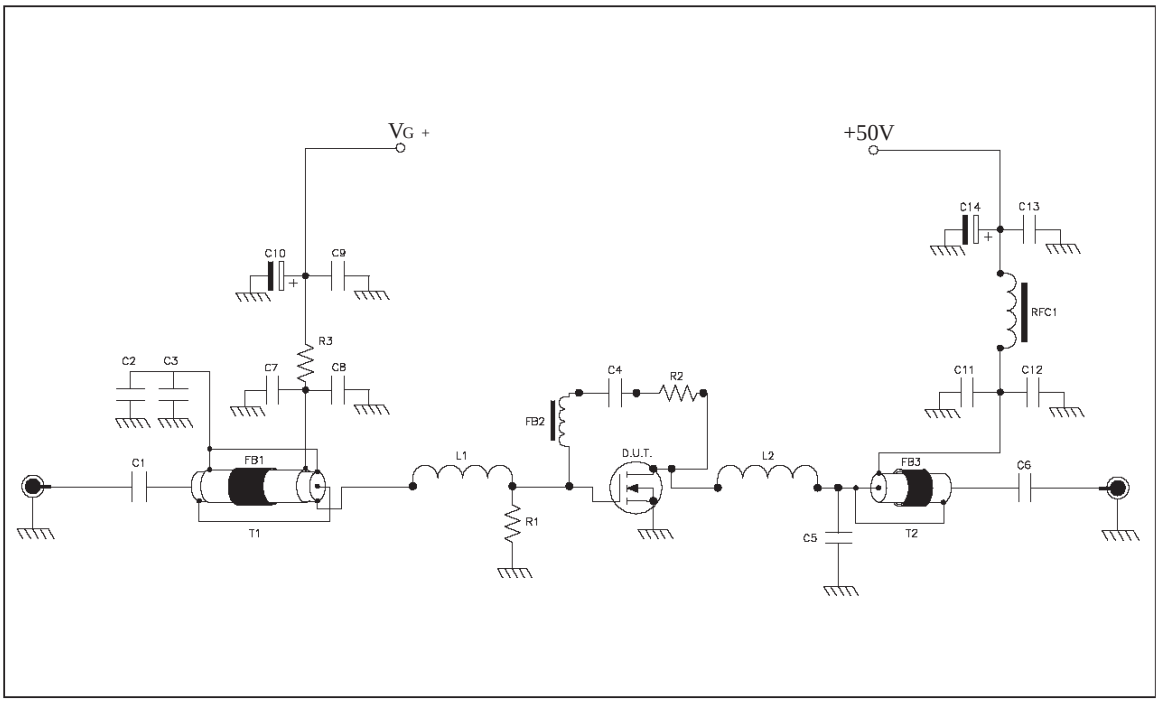
Output Power vs Supply Voltage



Output Power vs Gate Voltage



30 MHz Test Circuit Schematic (Engineering Test Circuit)

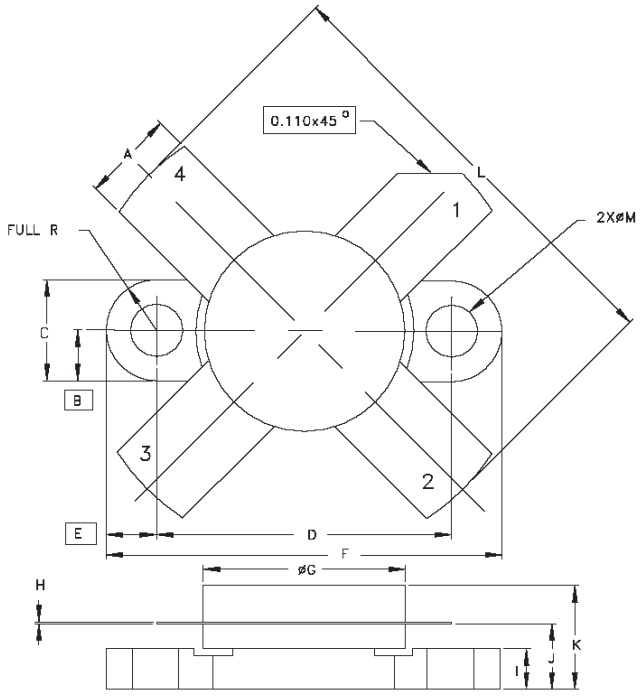


30 MHz Test Circuit Component Part List

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 220u 4 Turns		
FB2	Surface Mount EMI Shield Bead		
FB3	Toroid, 1.7" OD .300" ID 220u 3 Turns		
RFC1	Toroid, 0.5" OD 0.30" ID, 125u 4 turns 12 awg wire		
PCB	0.062" Woven Fiberglass, 1 oz. Copper, 2 Sides, er = 2.55		
C1, C4, C6, C7, C8,	0.01 uF ATC Chip Cap	C5	470 pF ATC Chip Cap
C9, C11, C12, C13	0.01 uF ATC Chip Cap	C10	10 uF 63V Electrolytic Capacitor
C2, C3	750 pF ATC Chip Cap	C14	100 uF 63V Electrolytic Capacitor
R1, R3	1K ohm 1W Chip Resistor	R2	680 ohm 3W Wirewound Resistor

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

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	5.56		5.84	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