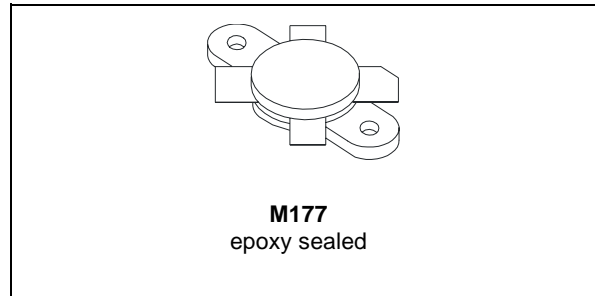




# SD2933

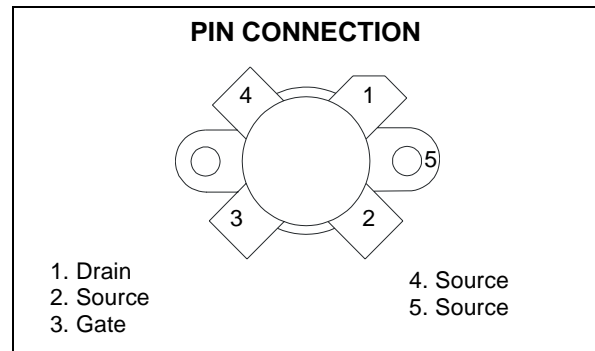
## RF POWER TRANSISTORS HF/VHF/UHF N-CHANNEL MOSFETs

- GOLD METALLIZATION
- EXCELLENT THERMAL STABILITY
- COMMON SOURCE CONFIGURATION
- $P_{OUT} = 300\text{ W MIN. WITH } 20\text{ dB GAIN @ } 30\text{ MHz}$
- THERMALLY ENHANCED PACKAGING FOR LOWER JUNCTION TEMPERATURES



### DESCRIPTION

The SD2933 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 150 MHz. Its special low thermal resistance package, makes it ideal for ISM applications where reliability and ruggedness are critical factors.



### ORDER CODES

Order Codes	Marking	Package	Packaging
SD2933	SD2933	M177	Plastic Tray

### ABSOLUTE MAXIMUM RATINGS ( $T_{CASE} = 25\text{ }^{\circ}\text{C}$ )

Symbol	Parameter	Value	Unit
$V_{(BR)DSS}$	Drain Source Voltage	125	V
$V_{DGR}$	Drain-Gate Voltage ( $R_{GS} = 1\text{ M}\Omega$ )	125	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$I_D$	Drain Current	40	A
$P_{DISS}$	Power Dissipation	648	W
$T_j$	Max. Operating Junction Temperature	200	$^{\circ}\text{C}$
$E_{AS}$	Avalanche Energy, Single Pulse ( $I_D = 60\text{ A}$ )	1500	mJ
$E_{AR}^{(1)}$	Avalanche Energy, Repetitive	50	mJ
$T_{STG}$	Storage Temperature	-65 to +150	$^{\circ}\text{C}$

(1) Repetitive rating: Pulse width limited by maximum junction temperature  
 Repetitive avalanche causes additional power losses that can be calculated as:  $P_{AV} = E_{AR} * f$

### THERMAL DATA

$R_{th(j-c)}$	Junction -Case Thermal Resistance	0.27	$^{\circ}\text{C/W}$
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**ELECTRICAL SPECIFICATION** ( $T_{CASE} = 25^{\circ}C$ )

**STATIC**

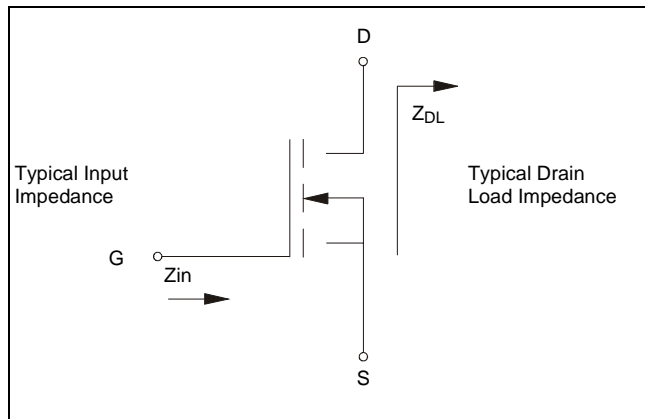
Symbol	Test Conditions		Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}$	$I_{DS} = 200\text{ mA}$	125			V
$I_{DSS}$	$V_{GS} = 0\text{ V}$	$V_{DS} = 50\text{ V}$			100	$\mu\text{A}$
$I_{GSS}$	$V_{GS} = 20\text{ V}$	$V_{DS} = 0\text{ V}$			500	nA
$V_{GS(Q)}$	$V_{DS} = 10\text{ V}$	$I_D = 250\text{ mA}$	1.5		4	V
$V_{DS(ON)}$	$V_{GS} = 10\text{ V}$	$I_D = 20\text{ A}$			3	V
$G_{FS}$	$V_{DS} = 10\text{ V}$	$I_D = 10\text{ A}$	10			mho
$C_{ISS}$	$V_{GS} = 0\text{ V}$	$V_{DS} = 50\text{ V}$		1000		pF
$C_{OSS}$	$V_{GS} = 0\text{ V}$	$V_{DS} = 50\text{ V}$		372		pF
$C_{RSS}$	$V_{GS} = 0\text{ V}$	$V_{DS} = 50\text{ V}$		29		pF

GFS sorts for each unit

**DYNAMIC**

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
$P_{OUT}$	$V_{DD} = 50\text{ V}$	$I_{DQ} = 250\text{ mA}$ $f = 30\text{ MHz}$	300	400		W
$G_{PS}$	$V_{DD} = 50\text{ V}$	$I_{DQ} = 250\text{ mA}$ $P_{OUT} = 300\text{ W}$ $f = 30\text{ MHz}$	20	23.5		dB
$\eta_D$	$V_{DD} = 50\text{ V}$	$I_{DQ} = 250\text{ mA}$ $P_{OUT} = 300\text{ W}$ $f = 30\text{ MHz}$	50	65		%
Load Mismatch	$V_{DD} = 50\text{ V}$	$I_{DQ} = 250\text{ mA}$ $P_{OUT} = 300\text{ W}$ $f = 30\text{ MHz}$ All Phase Angles	3:1			VSWR

**IMPEDANCE DATA**



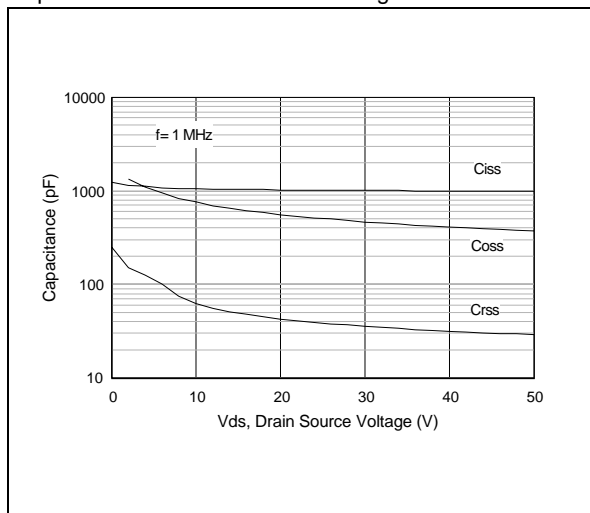
FREQ	$Z_{IN} (\Omega)$	$Z_{DL} (\Omega)$
30 MHz	$1.8 - j 0.2$	$2.8 + j 2.3$
108 MHz	$1.9 + j 0.2$	$1.6 + j 1.4$
175 MHz	$1.9 + j 0.3$	$1.5 + j 1.6$

**GFS SORTS**

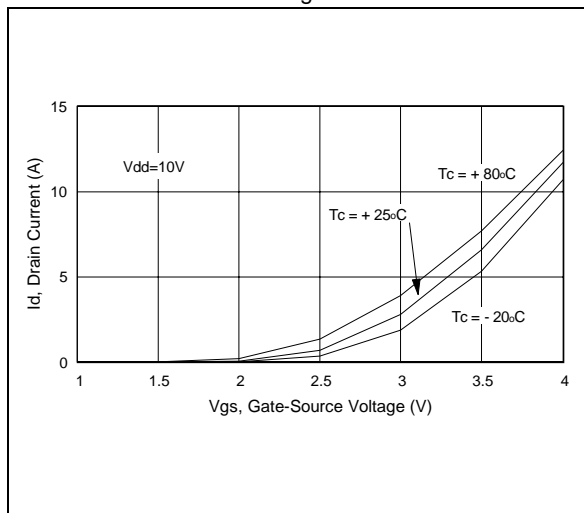
A	10 ÷ 10.99	E	14 ÷ 14.99
B	11 ÷ 11.99	F	15 ÷ 15.99
C	12 ÷ 12.99	G	16 ÷ 16.99
D	13 ÷ 13.99	H	17 ÷ 18

TYPICAL PERFORMANCE

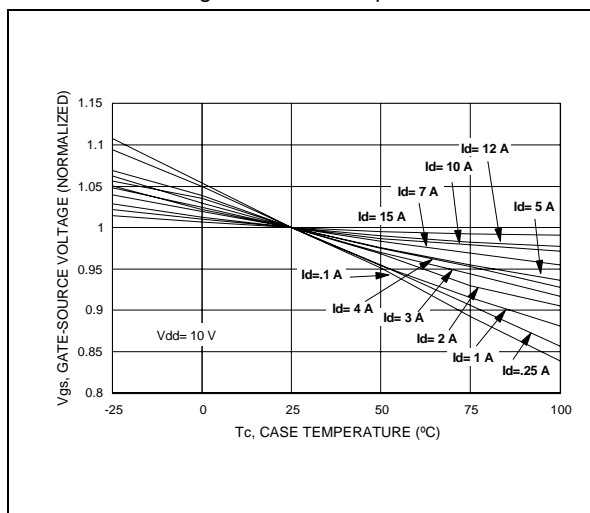
Capacitance vs. Drain-Source Voltage



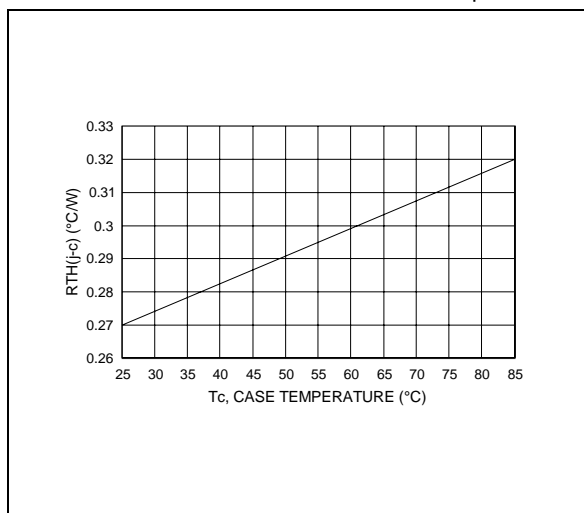
Drain Current vs. Gate Voltage



Gate-Source Voltage vs. Case Temperature



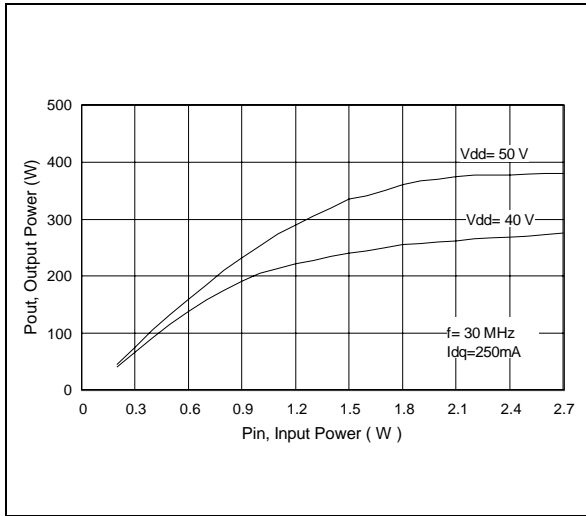
Maximum Thermal Resistance vs. Case Temperature



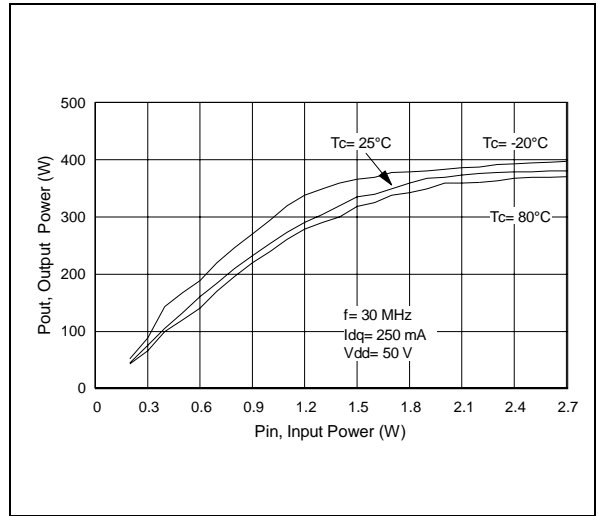
# SD2933

## TYPICAL PERFORMANCE

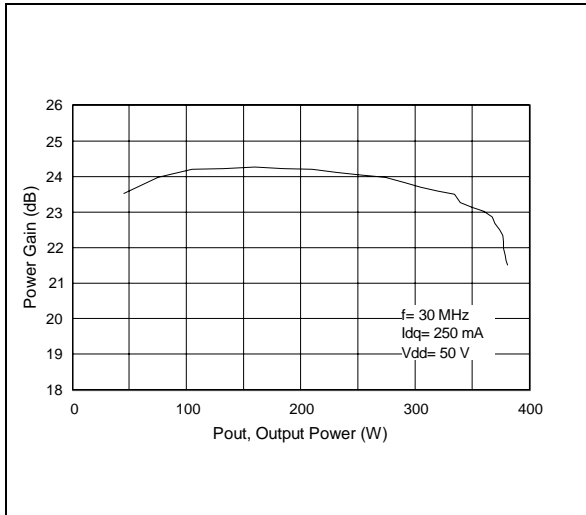
Output Power vs. Input Power



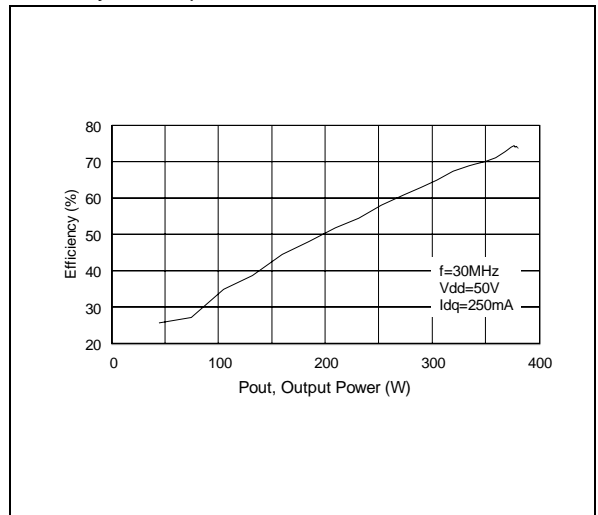
Output Power vs. Input Power



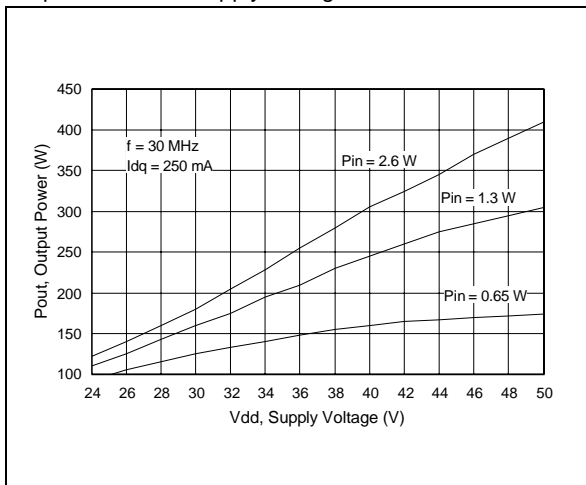
Power Gain vs. Output Power



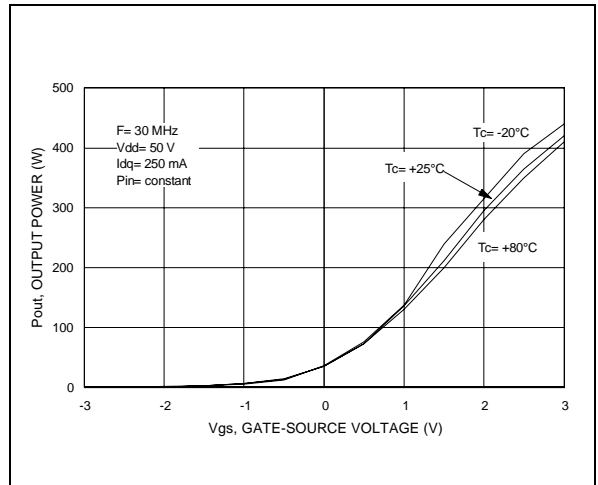
Efficiency vs. Output Power



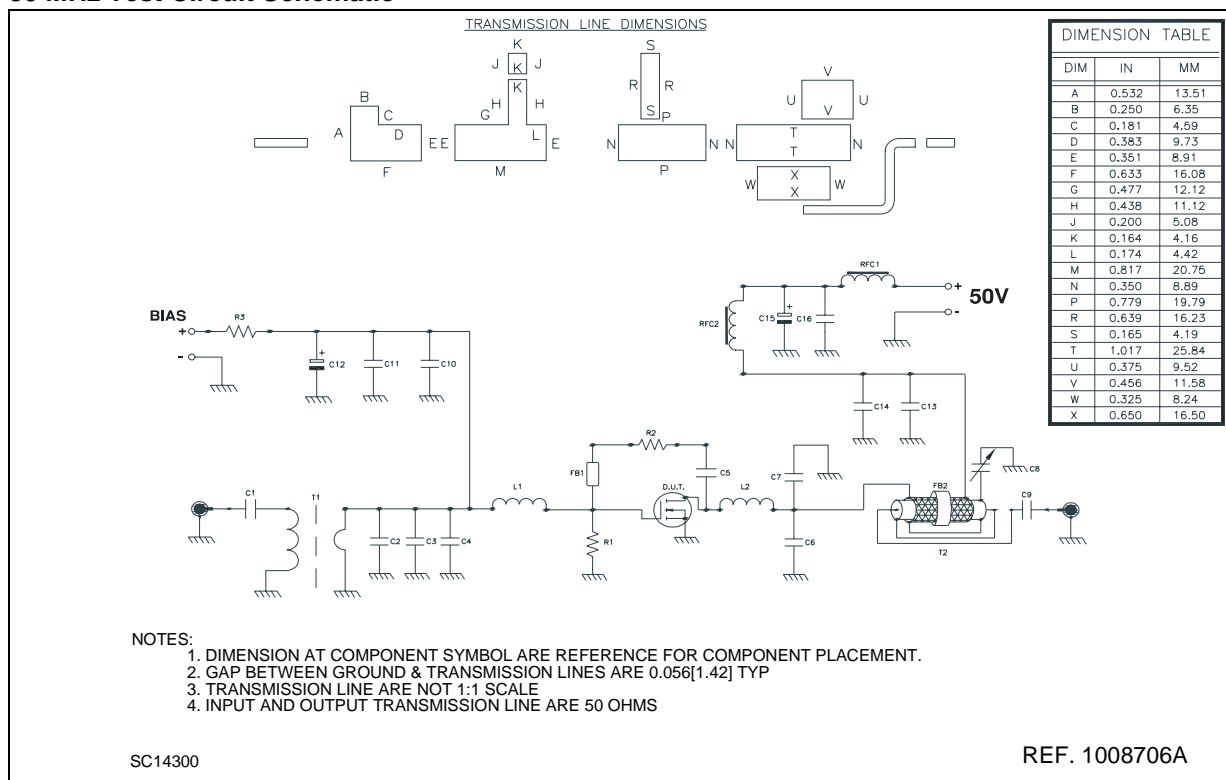
Output Power vs. Supply Voltage



Output Power vs. Gate Voltage



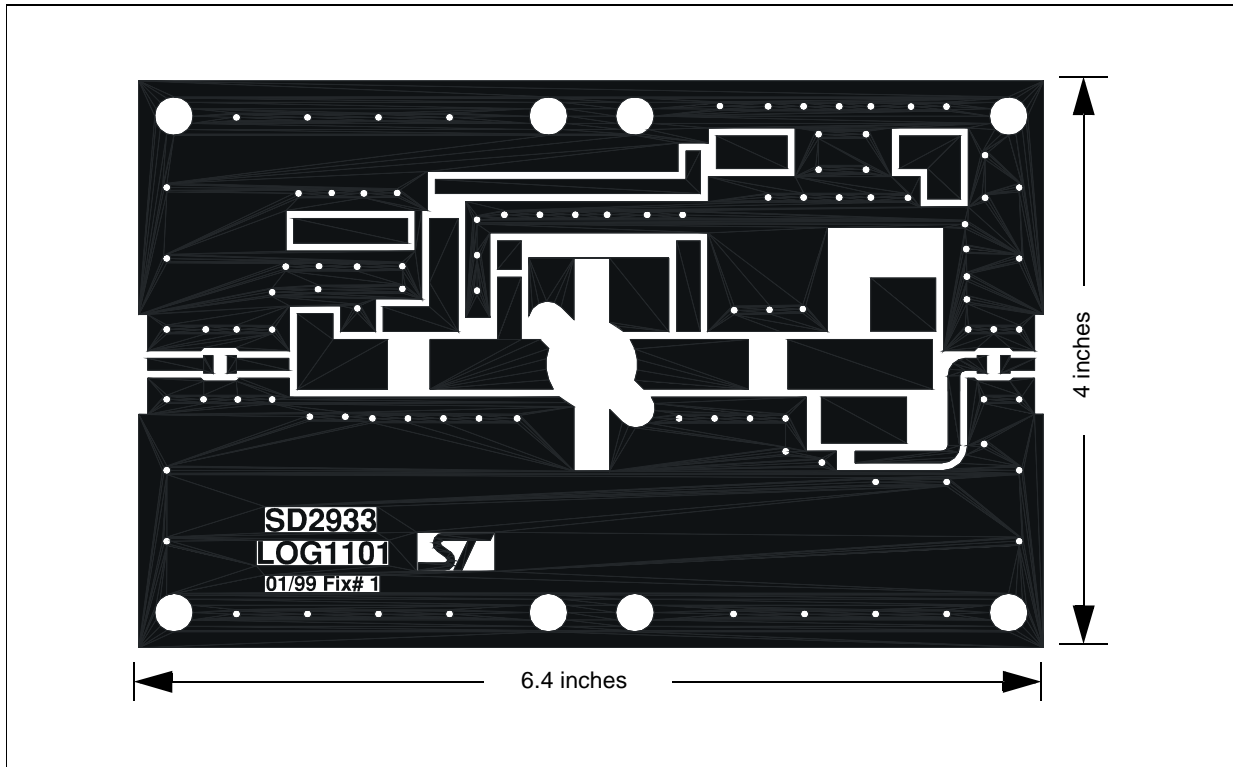
## 30 MHz Test Circuit Schematic



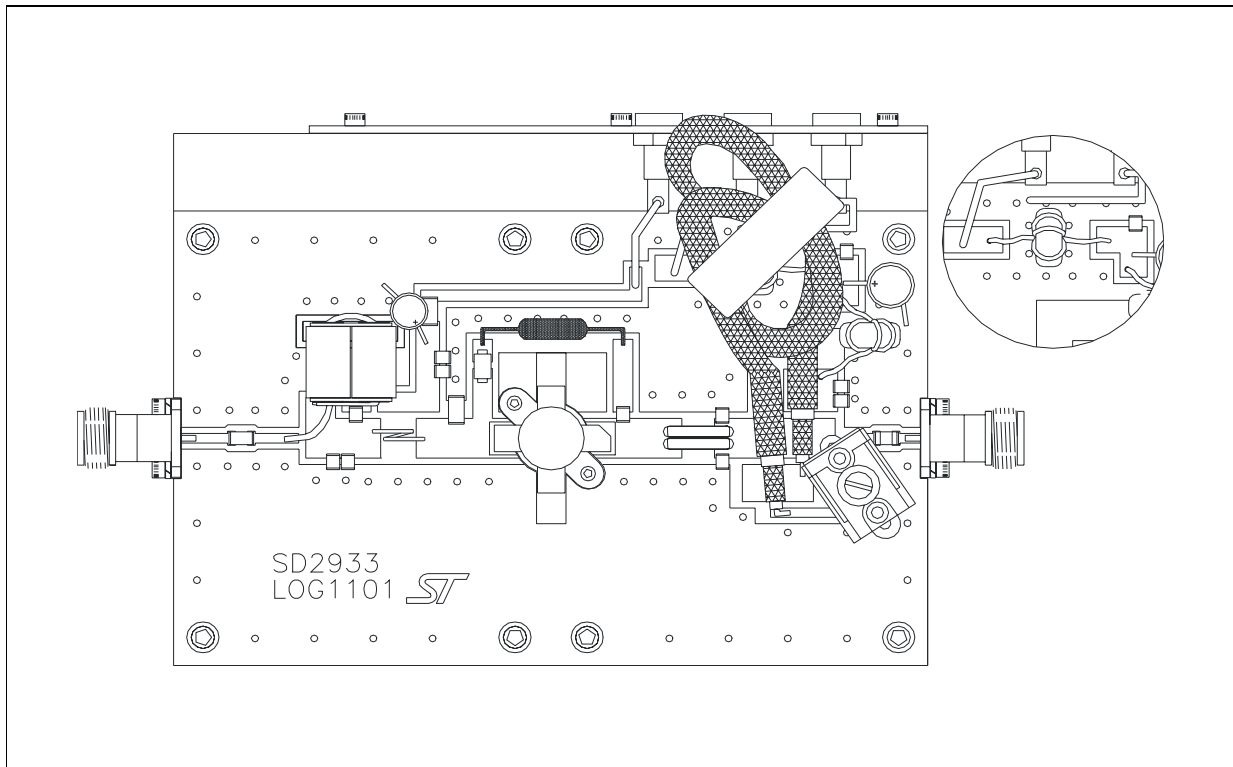
## 30 MHz Test Circuit Component Part List

C1,C9	0.01 $\mu$ F / 500 V SURFACE MOUNT CERAMIC CHIP CAPACITOR
C2, C3	750 pF ATC 700B SURFACE MOUNT CERAMIC CHIP CAPACITOR
C4	300 pF ATC 700B SURFACE MOUNT CERAMIC CHIP CAPACITOR
C5,C10,C11,C14,C16	10000 pF ATC 200B SURFACE MOUNT CERAMIC CHIP CAPACITOR
C6	510 pF ATC 700B SURFACE MOUNT CERAMIC CHIP CAPACITOR
C7	300 pF ATC 700B SURFACE MOUNT CERAMIC CHIP CAPACITOR
C8	175-680 pF TYPE 46 STANDARD TRIMMER CAPACITOR
C12	47 $\mu$ F / 63 V ALUMINUM ELECTROLYTIC RADIAL LEAD CAPACITOR
C13	1200 pF ATC 700B SURFACE MOUNT CERAMIC CHIP CAPACITOR
C15	100 $\mu$ F / 63 V ALUMINUM ELECTROLYTIC RADIAL LEAD CAPACITOR
R1,R3	1 K OHM 1 W SURFACE MOUNT CHIP RESISTOR
R2	560 OHM 2 W WIRE-WOUND AXIAL LEAD RESISTOR
T1	HF 2-30 MHz SURFACE MOUNT 9:1 TRANSFORMER
T2	RG - 142B/U 50 OHM COAXIAL CABLE OD = 0.165[4.18] L 15"[381.00] COVERED WITH 15"[381.00] TINNED COPPER TUBULAR BRAND 13/65" [5.1] WIDTH
L1	1 3/4 TURN AIR-WOUND 16 AWG ID = 0.219 [5.56] POLY-COATED MAGNET WIRE
L2	1 3/4 TURN AIR-WOUND 12 AWG ID = 0.250 [6.34] BUS BAR WIRE
RFC1,RFC2	3 TURNS 14 AWG WIRE THROUGH FAIR RITE TOROID
FB1	SURFACE MOUNT EMI SHIELD BEAD
FB2	TOROID
PCB	ULTRALAM 2000. 0.030" THK, $\epsilon_r = 2.55$ , 2 Oz ED CU BOTH SIDES

30 MHz Test Circuit Photomaster

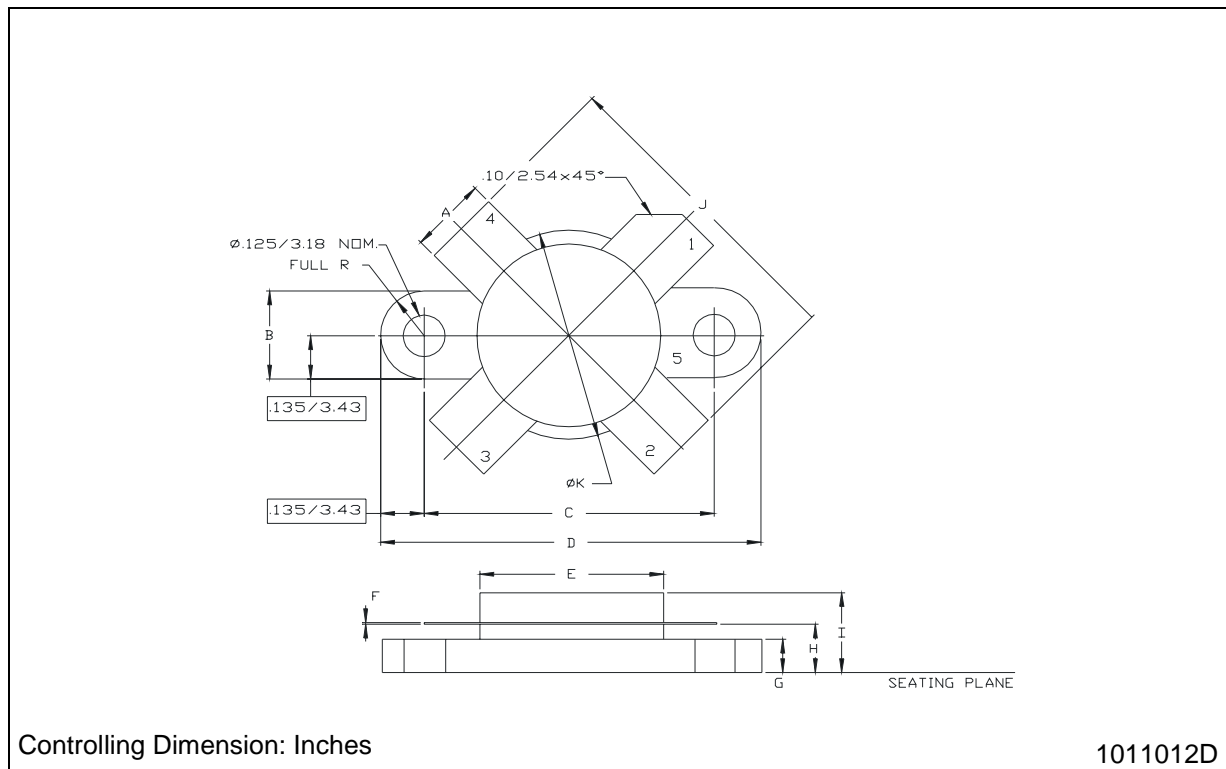


30 MHz Test Circuit



## M177 (.550 DIA 4/L N/HERM W/FLG) MECHANICAL DATA

DIM.	mm			Inch		
	MIN.	TYP.	MAX	MIN.	TYP.	MAX
A	5.72		5.97	0.225		0.235
B	6.73		6.96	0.265		0.275
C	21.84		22.10	0.860		0.870
D	28.70		28.96	1.130		1.140
E	13.84		14.10	0.545		0.555
F	0.08		0.18	0.003		0.007
G	2.49		2.74	0.098		0.108
H	3.81		4.32	0.150		0.170
I			7.11			0.280
J	27.43		28.45	1.080		1.120
K	15.88		16.13	0.625		0.635



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