



# SD2933

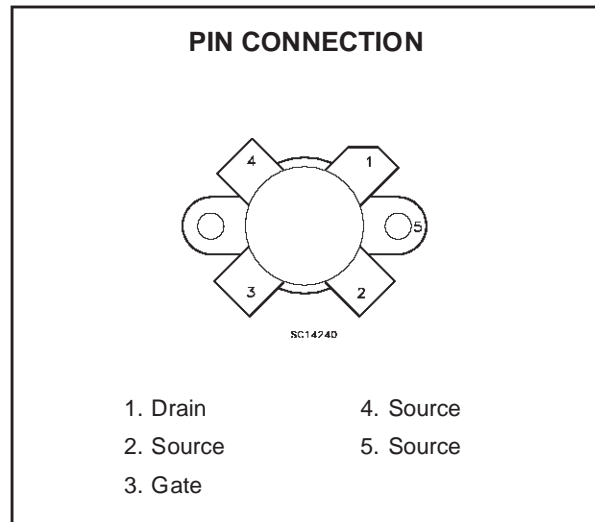
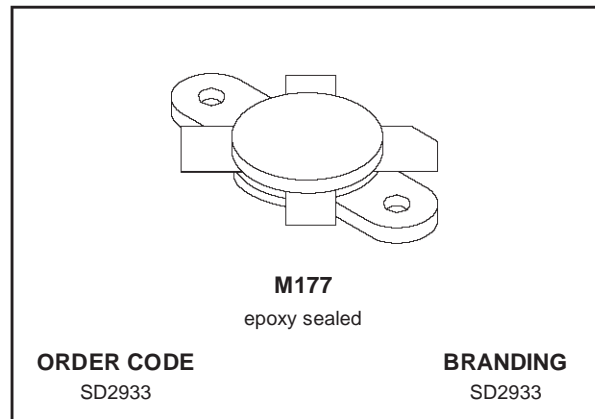
## RF POWER TRANSISTORS HF/VHF/UHF N-CHANNEL MOSFETs

ADVANCE DATA

- 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

### 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



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

Symbol	Parameter	Value	Unit
$V_{(BR)DSS}$	Drain Source Volatage	125	V
$V_{DGR}$	Drain-Gate Voltage ( $R_{GS} = 1M\Omega$ )	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	$^{\circ}\text{C}$
$T_{STG}$	Storage Temperature	-65 to 150	$^{\circ}\text{C}$

### THERMAL DATA

$R_{th(j-c)}$	Junction-Case Thermal Resistance	0.27	$^{\circ}\text{C/W}$
$R_{th(c-s)}$	Case-Heatsink Thermal Resistance*	0.15	$^{\circ}\text{C/W}$

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

**ELECTRICAL SPECIFICATION**( $T_{CASE} = 25\text{ }^{\circ}\text{C}$ )

**STATIC**

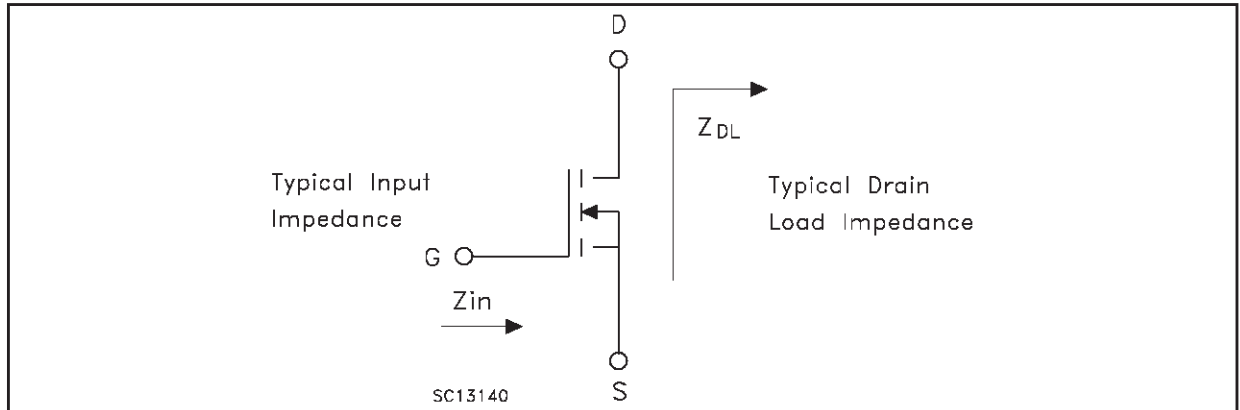
Symbol	Parameter		Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}$	$I_{DS} = 200\text{ mA}$	125			V
$I_{DSS}$	$V_{GS} = 0\text{ V}$	$V_{DS} = 50\text{ V}$			10	mA
$I_{GSS}$	$V_{GS} = 20\text{ V}$	$V_{DS} = 0\text{ V}$			10	$\mu\text{A}$
$V_{GS(Q)}$	$V_{DS} = 10\text{ V}$	$I_D = 250\text{ mA}$	2		5	V
$V_{DS(ON)}$	$V_{GS} = 10\text{ V}$	$I_D = 10\text{ A}$			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

REF. 7170198B

**DYNAMIC**

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

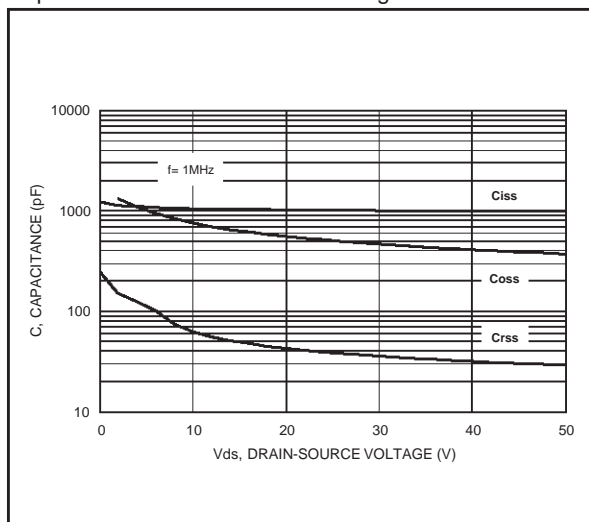
**IMPEDANCE DATA**



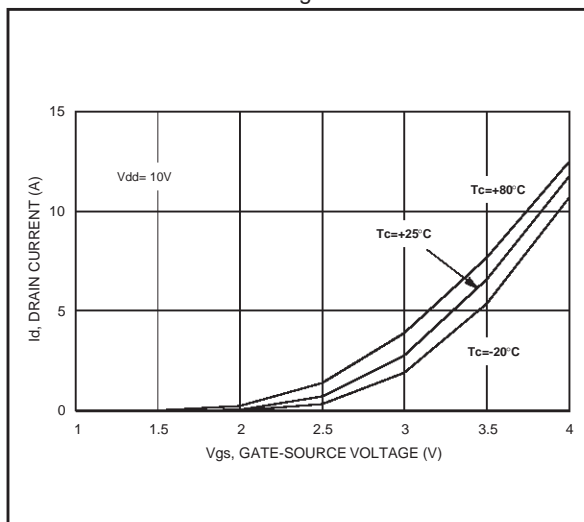
Frequency	$Z_{IN} (\Omega)$	$Z_{DL} (\Omega)$
30 MHz	$1.8 - j 0.2$	$2.8 + j 2.3$
108 MHz	$1.9 + j 0.2$	$1.6 + j 1.4$
150 MHz	$1.9 + j 0.3$	$1.5 + j 1.6$

TYPICAL PERFORMANCE

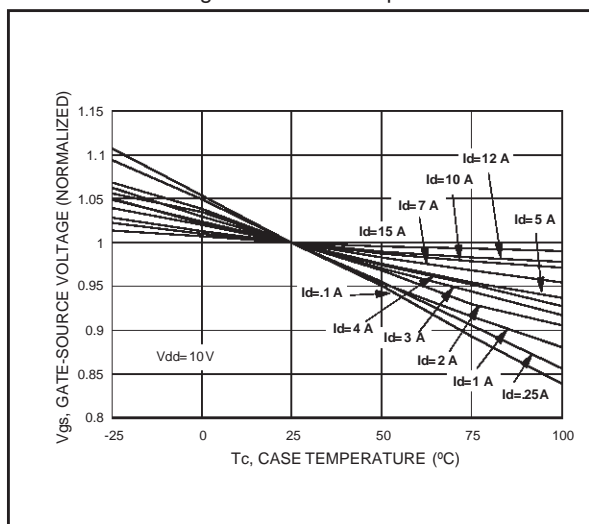
Capacitance vs. Drain-Source Voltage



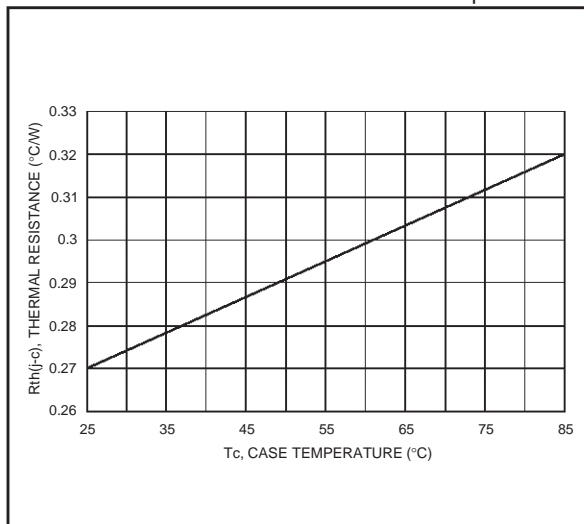
Drain Current vs. Gate Voltage



Gate-Source Voltages vs. Case Temperature

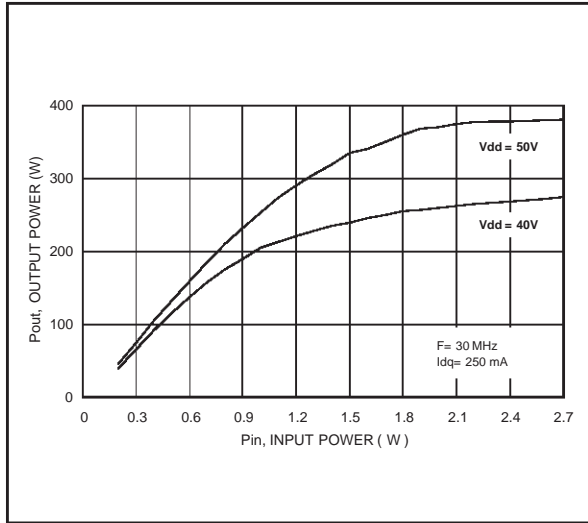


Maximum Thermal Resistance vs. Case Temperature

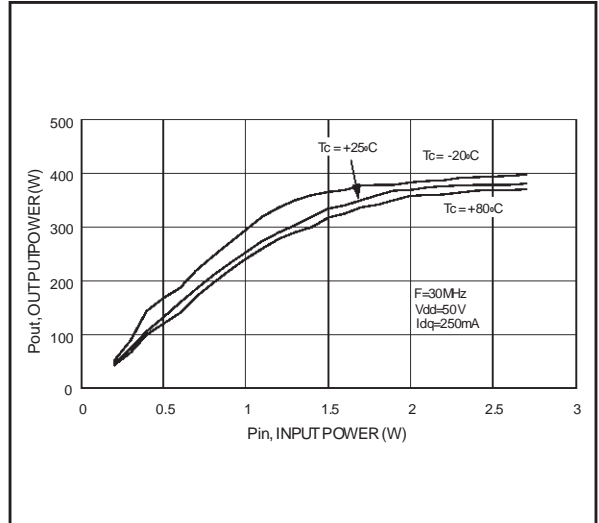


TYPICAL PERFORMANCE

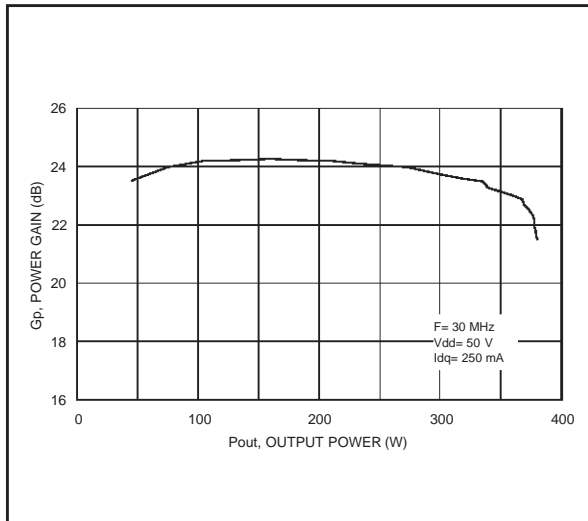
Output Power vs. Input Power



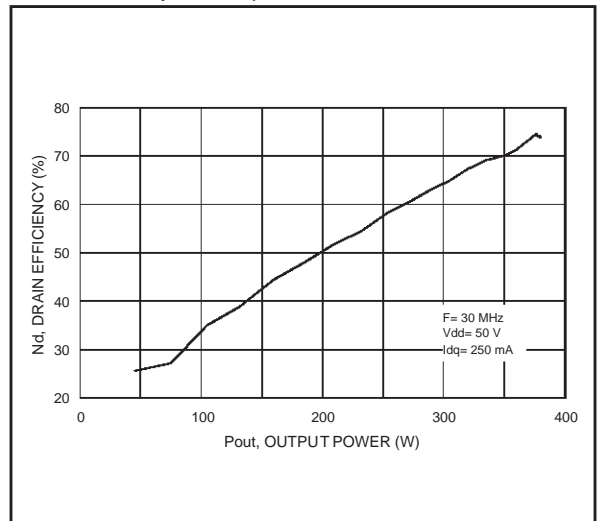
Output Power vs. Input Power



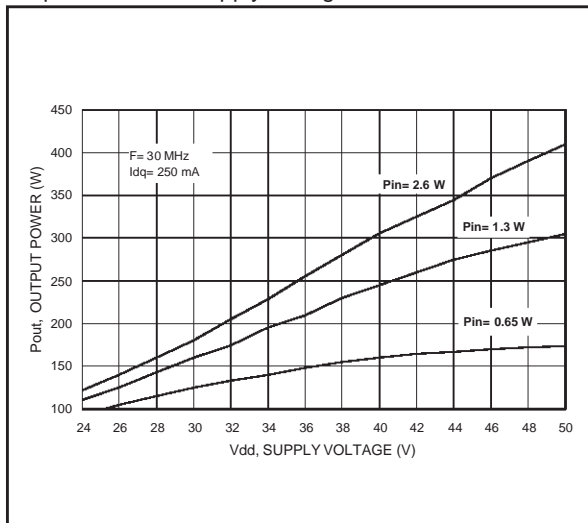
Power Gain vs. Output Power



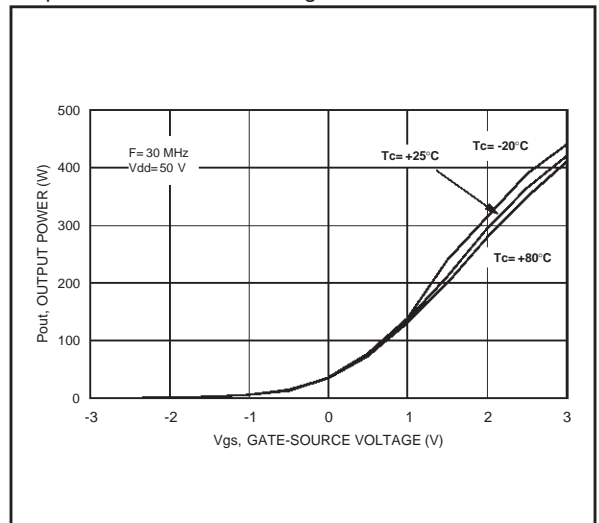
Drain Efficiency vs. Output Power



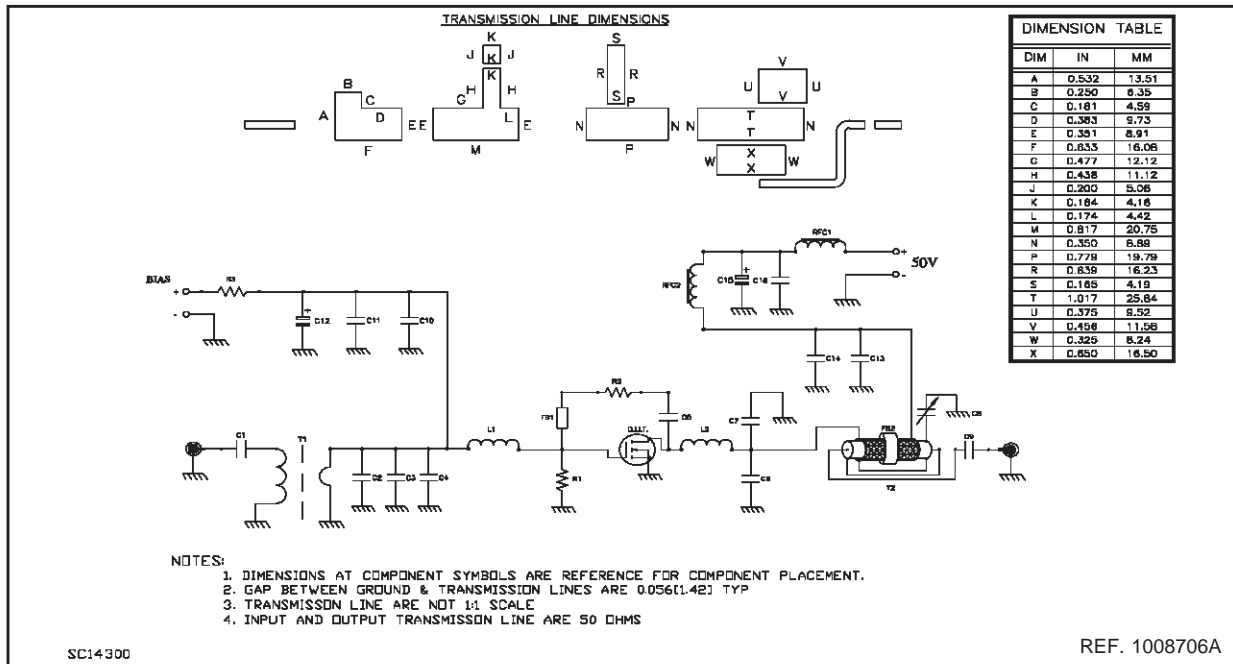
Output Power vs. Supply Voltage



Output Power vs. Gate Voltage



## 30 MHZ TEST CIRCUIT SCHEMATIC



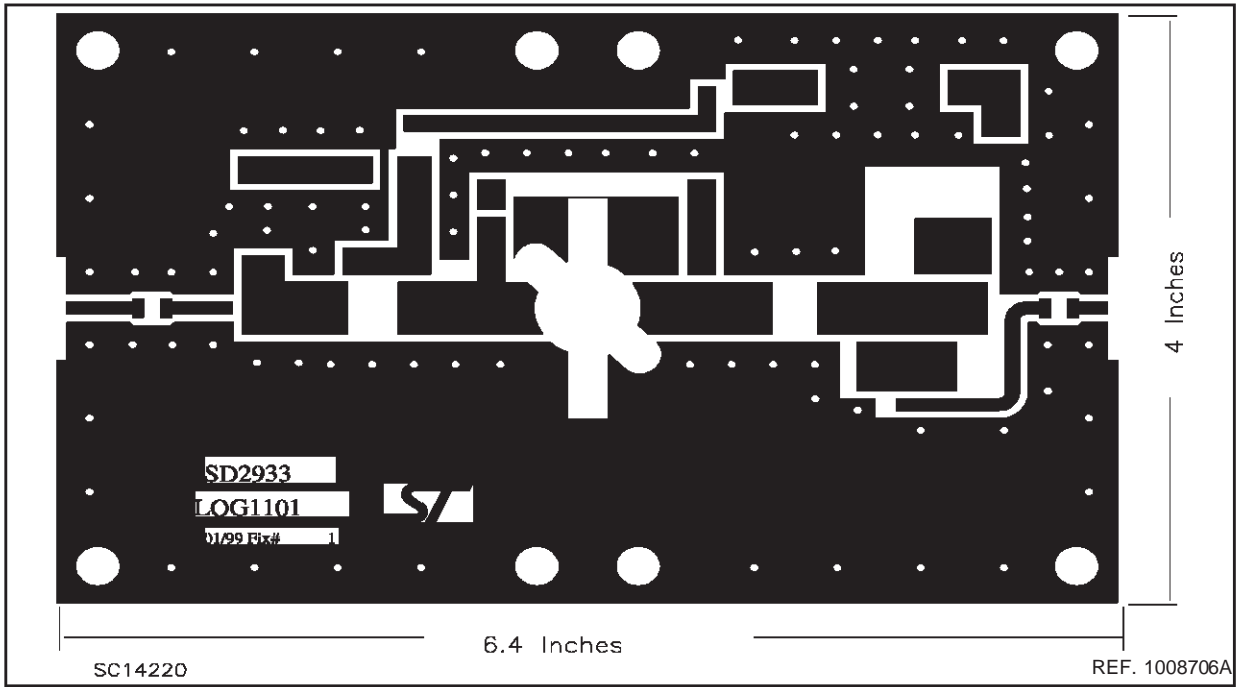
## 30 MHz TEST CIRCUIT COMPONENT PART LIST

C15	ATC200B103MW50X	ATC	10000 pF ATC 200B SURFACE MOUNT CERAMIC CHIP CAPACITOR
C14	SKR101M1JG13V7	MALLORY	100 $\mu$ F / 63V ALUMINUM ELECTROLYTICS RADIAL LEAD CAPACITOR
C13	ATC200B103MW50X	ATC	10000 pF ATC 200B SURFACE MOUNT CERAMIC CHIP CAPACITOR
C12	ATC700B122MW50X	ATC	1200 pF ATC 700B SURFACE MOUNT CERAMIC CHIP CAPACITOR
C11	SKR470M1JF11V	MALLORY	47 $\mu$ F / 63V ALUMINUM ELECTROLYTICS RADIAL LEAD CAPACITOR
C10	ATC200B103MW50X	ATC	10000 pF ATC 200B SURFACE MOUNT CERAMIC CHIP CAPACITOR
C9	ATC200B103MW50X	ATC	10000 pF ATC 200B SURFACE MOUNT CERAMIC CHIP CAPACITOR
C8	C1812X7R501-103KNE	VENKEL	0.01 $\mu$ F / 500V SURFACE MOUNT CERAMIC CHIP CAPACITOR
C7	TYPE 468	ARCO	175-680 pF TYPE 46 STANDARD TRIMMER CAPACITOR
C6	ATC700B301JP200X	ATC	300 pF ATC 700B SURFACE MOUNT CERAMIC CHIP CAPACITOR
C5	ATC700B511MW100X	ATC	510 pF ATC 700B SURFACE MOUNT CERAMIC CHIP CAPACITOR
C4	ATC200B103MW50X	ATC	10000 pF ATC 200B SURFACE MOUNT CERAMIC CHIP CAPACITOR
C3	ATC700B301JP200X	ATC	300 pF ATC 700B SURFACE MOUNT CERAMIC CHIP CAPACITOR
C2	ATC700B751MW50X	ATC	750 pF ATC 700B SURFACE MOUNT CERAMIC CHIP CAPACITOR
C1	ATC700B751MW50X	ATC	750 pF ATC 700B SURFACE MOUNT CERAMIC CHIP CAPACITOR
R3	C1812X7R501-103KNE	VENKEL	0.01 $\mu$ F / 500V SURFACE MOUNT CERAMIC CHIP CAPACITOR
R2	CR2512-1W-102JB	VENKEL	1 K OHM 1 W SURFACE MOUNT CHIP RESISTOR
R1	RS-2B	DALE	560 OHM 2 W WIRE-WOUND AXIAL LEAD RESISTOR
T2	CR2512-1W-102JB	VENKEL	1 K OHM 1 W SURFACE MOUNT CHIP RESISTOR
T1	83242	BELDEN	RG-142B/U 50 OHM COAXIAL CABLE OD = 0.165[4.18] L=15"[381.00] COVERED - WITH 15"[381.00] TINNED COPPER TUBULAR BRAID 13/65"[5.1] WIDTH
L2	TYPE 2170	ALPHA	HF 2-30 MHZ SURFACE MOUNT 9:1 (Impedance Ratio) TRANSFORMER (43 Material)
L1	RT-600-9	COMM CONCEPTS, Inc	1 3/4 TURN AIR-WOUND 12AWG ID=0.250[6.34] BUS BAR WIRE
RFC1	TYPE 8011	BELDEN	1 3/4 TURN AIR-WOUND 16AWG ID=0.219[5.56] POLY-COATED MAGNET WIRE
FB2	2643801102	FAIR-RITE CORP	3 TURNS 14AWG WIRE THROUGH FAIR RITE TOROID
FB1	2643801102	FAIR-RITE CORP	3 TURNS 14AWG WIRE THROUGH FAIR RITE TOROID
PCB	5967002701	FAIR-RITE CORP	TOROID
COMPONENT	2743019447	FAIR-RITE CORP	SURFACE MOUNT EMI SHIELD BEAD
	GO300M10260B	ROGERS CORP.	ULTRALAM 2000. 0.030 THK, Er = 2.55, 2 Oz ED CU BOTH SIDES
	PART N.	VENDOR	DESCRIPTION

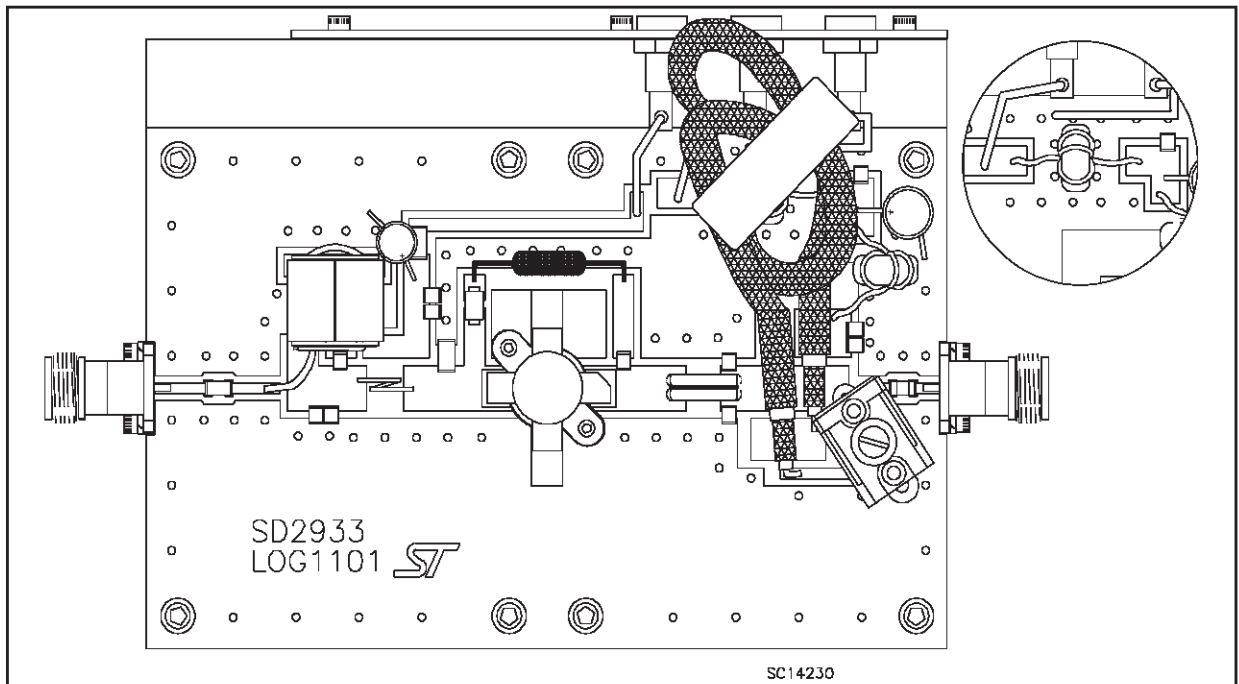
SC14210

**SD2933**

**30 MHZ TEST CIRCUIT PHOTOMASTER**

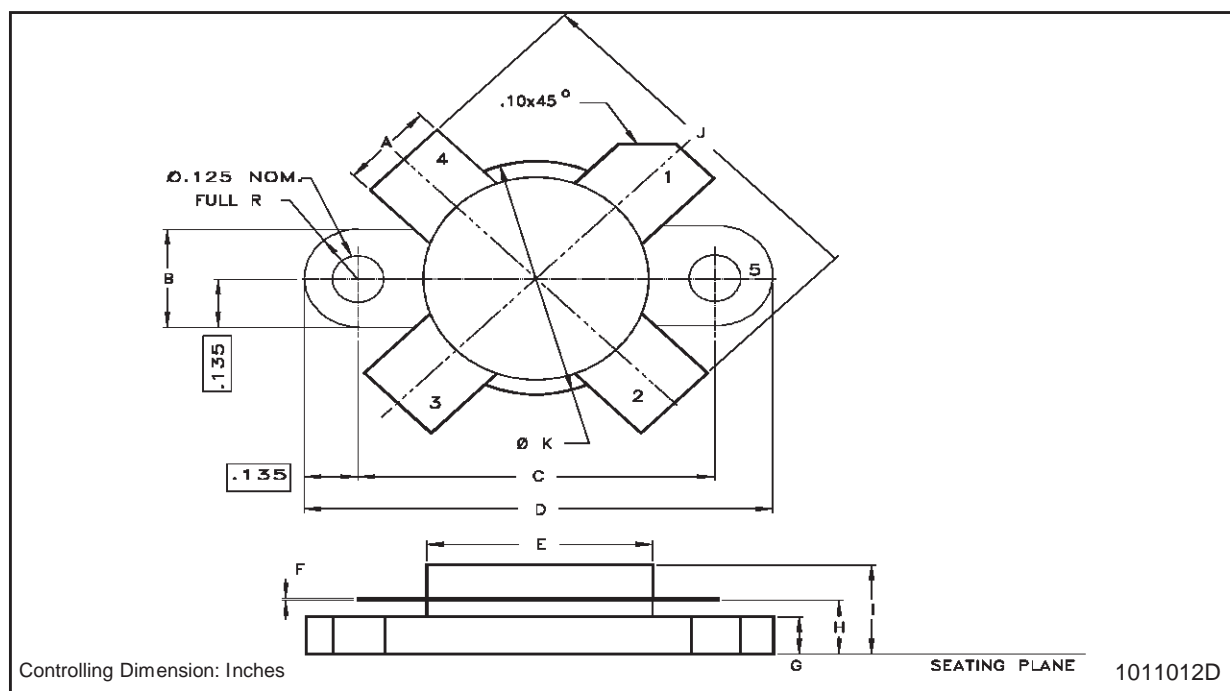


**30 MHZ PRODUCTION TEST FIXTURE**



## 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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