



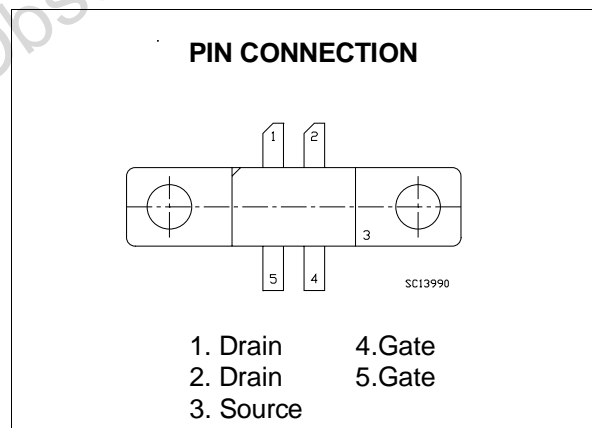
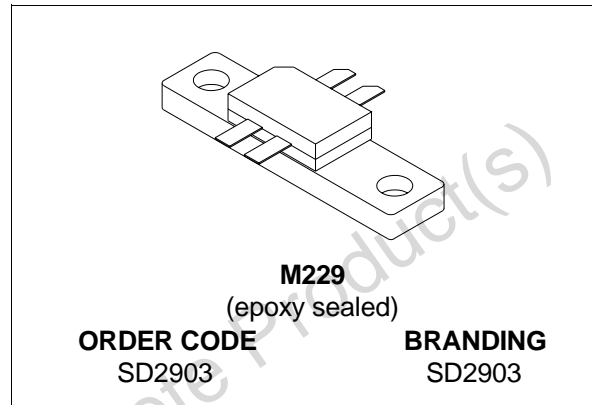
# SD2903

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

- GOLD METALLIZATION
- 2 - 500 MHz
- 30 WATTS
- 28 VOLTS
- 13 dB MIN. AT 400 MHz
- CLASS A OR AB OPERATION
- EXCELLENT THERMAL STABILITY
- COMMON SOURCE CONFIGURATION, PUSH-PULL

### DESCRIPTION

The SD2903 is a gold metallized N-Channel MOS field-effect RF power transistor. It is intended for use in 28 V DC large signal applications up to 500 MHz



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

Symbol	Parameter	Value	Unit
$V_{(BR)DSS}$	Drain Source Voltage	65	V
$V_{DGR}$	Drain-Gate Voltage (RGS = 1 M $\Omega$ )	65	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$I_D$	Drain Current	5	A
$P_{DISS}$	Power Dissipation	100	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	1.75	$^{\circ}\text{C}/\text{W}$
$R_{th(c-s)}$	Case-Heatsink Thermal Resistance *	0.40	$^{\circ}\text{C}/\text{W}$

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

# SD2903

## ELECTRICAL SPECIFICATION (T<sub>case</sub> = 25 °C)

### STATIC (Per Section)

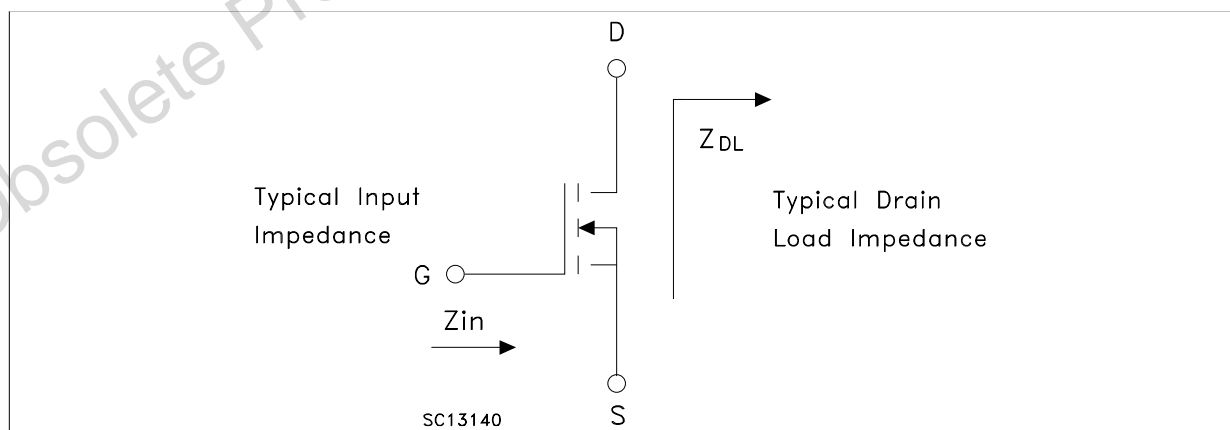
Symbol	Parameter		Min.	Typ.	Max.	Unit
V <sub>(BR)DSS</sub>	V <sub>GS</sub> = 0V	I <sub>DS</sub> = 15 mA	65			V
I <sub>DSS</sub>	V <sub>GS</sub> = 0V	V <sub>DS</sub> = 28 V			1.5	mA
I <sub>GSS</sub>	V <sub>GS</sub> = 20V	V <sub>DS</sub> = 0 V			1.0	μA
V <sub>GS(Q)</sub>	V <sub>DS</sub> = 10V	I <sub>D</sub> = 30 mA	1.0		6.0	V
V <sub>DS(ON)</sub>	V <sub>GS</sub> = 10V	I <sub>D</sub> = 1.5 A			1.6	V
g <sub>FS</sub>	V <sub>DS</sub> = 10V	I <sub>D</sub> = 1.5 A	0.6			mho
C <sub>ISS</sub>	V <sub>GS</sub> = 0V	V <sub>DS</sub> = 28 V		23		pF
C <sub>OSS</sub>	V <sub>GS</sub> = 0V	V <sub>DS</sub> = 28 V		18		pF
C <sub>RSS</sub>	V <sub>GS</sub> = 0V	V <sub>DS</sub> = 28 V		3.5		pF

REF. 1021309H

### DYNAMIC (Total Device)

Symbol	Parameter		Min.	Typ.	Max.	Unit
P <sub>OUT</sub>	f = 400 MHz	V <sub>DD</sub> = 28 V	I <sub>DQ</sub> = 100 mA	30		W
G <sub>PS</sub>	f = 400 MHz	V <sub>DD</sub> = 28 V	P <sub>out</sub> = 30 W	13	15	dB
η <sub>D</sub>	f = 400 MHz	V <sub>DD</sub> = 28 V	P <sub>out</sub> = 30 W	45	50	%
Load Mismatch	f = 400 MHz	V <sub>DD</sub> = 28 V	P <sub>out</sub> = 30 W	5:1		VSWR
	All Angles					

### IMPEDANCE DATA

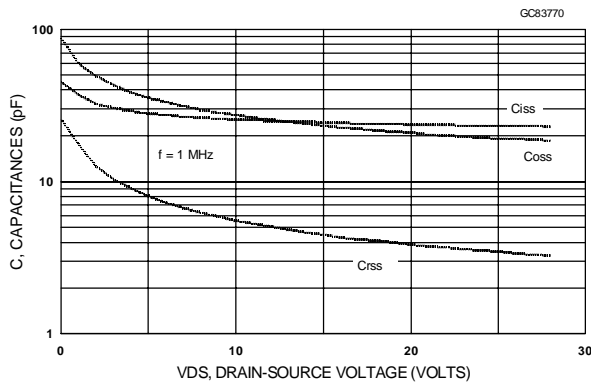


FREQ.	Z <sub>IN</sub> (Ω)	Z <sub>DL</sub> (Ω)
400 MHz	4.6 - j 12	13.6 + j 10

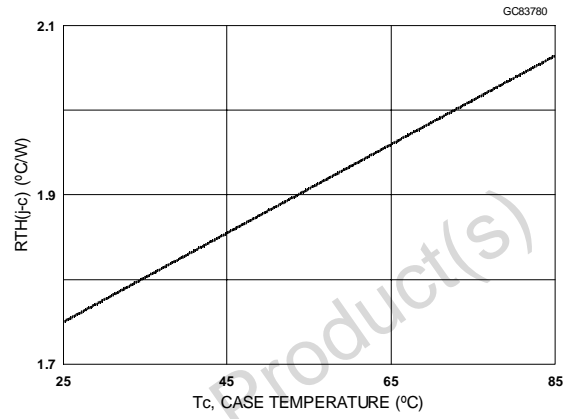
Measured Gate to Gate and Drain to Drain, Respectively.

TYPICAL PERFORMANCE

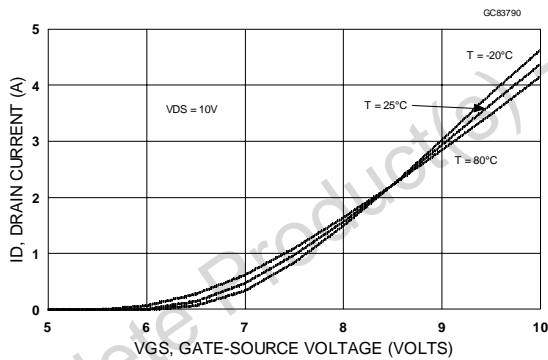
Capacitance vs Drain-Source Voltage



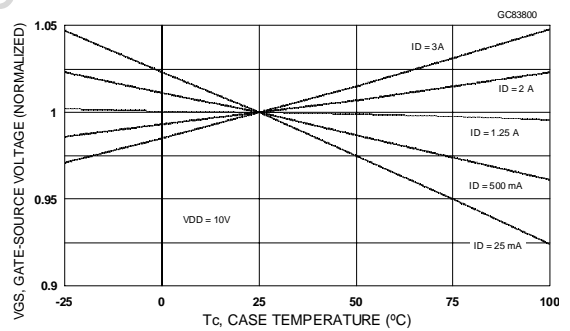
Maximum Thermal Resistance vs Case Temperature



Drain Current vs Gate Voltage

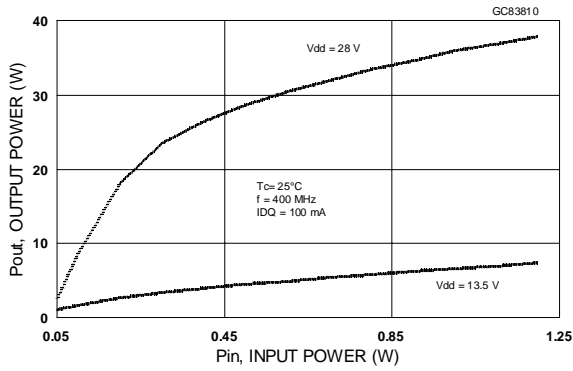


Gate-Source Voltages vs Case Temperature

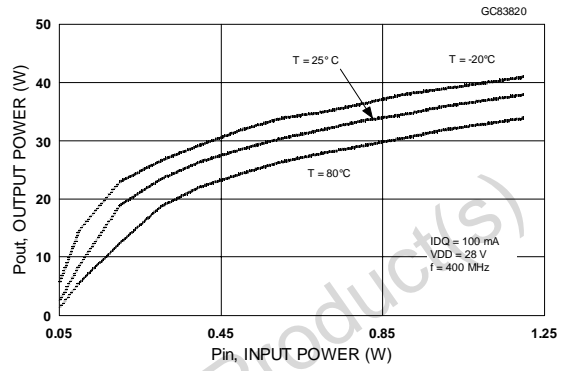


TYPICAL PERFORMANCE

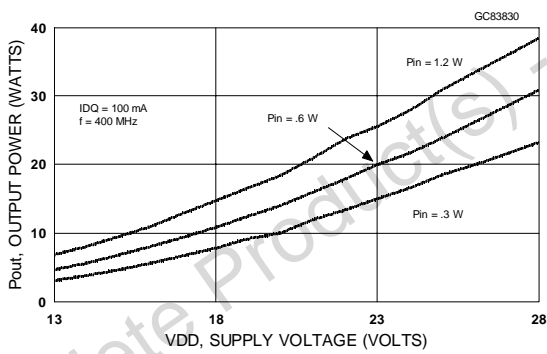
Output Power vs Input Power



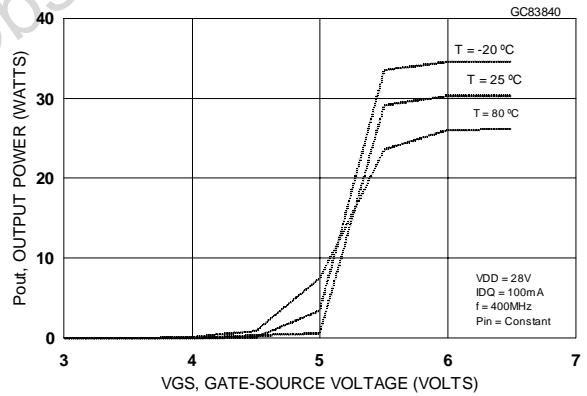
Output Power vs Input Power



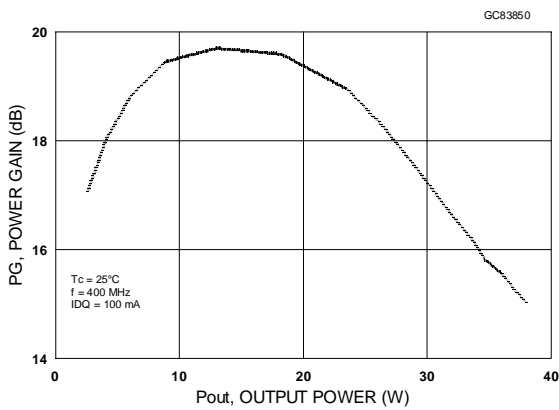
Output Power vs Voltage Supply



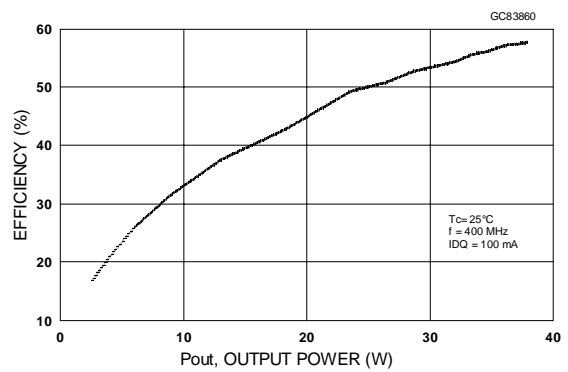
Output Power vs Gate Voltage



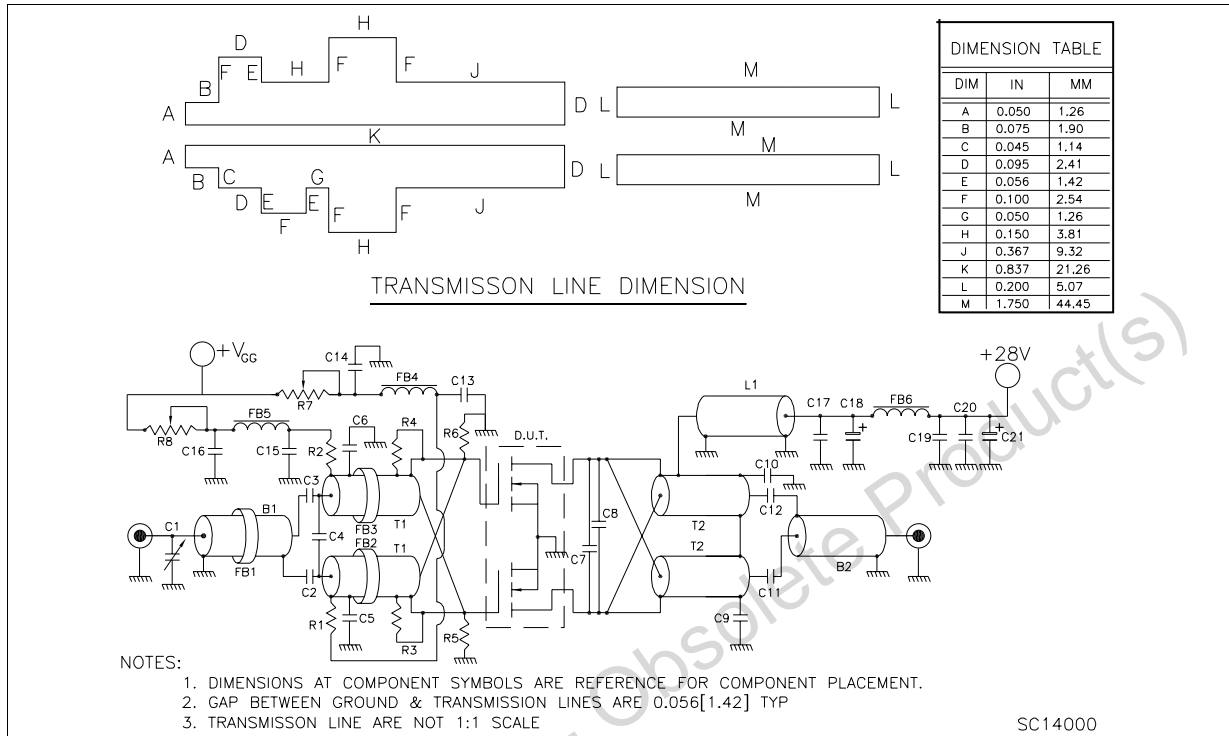
Power Gain vs Output Power



Efficiency vs Output Power



400 MHz Test Circuit Schematic

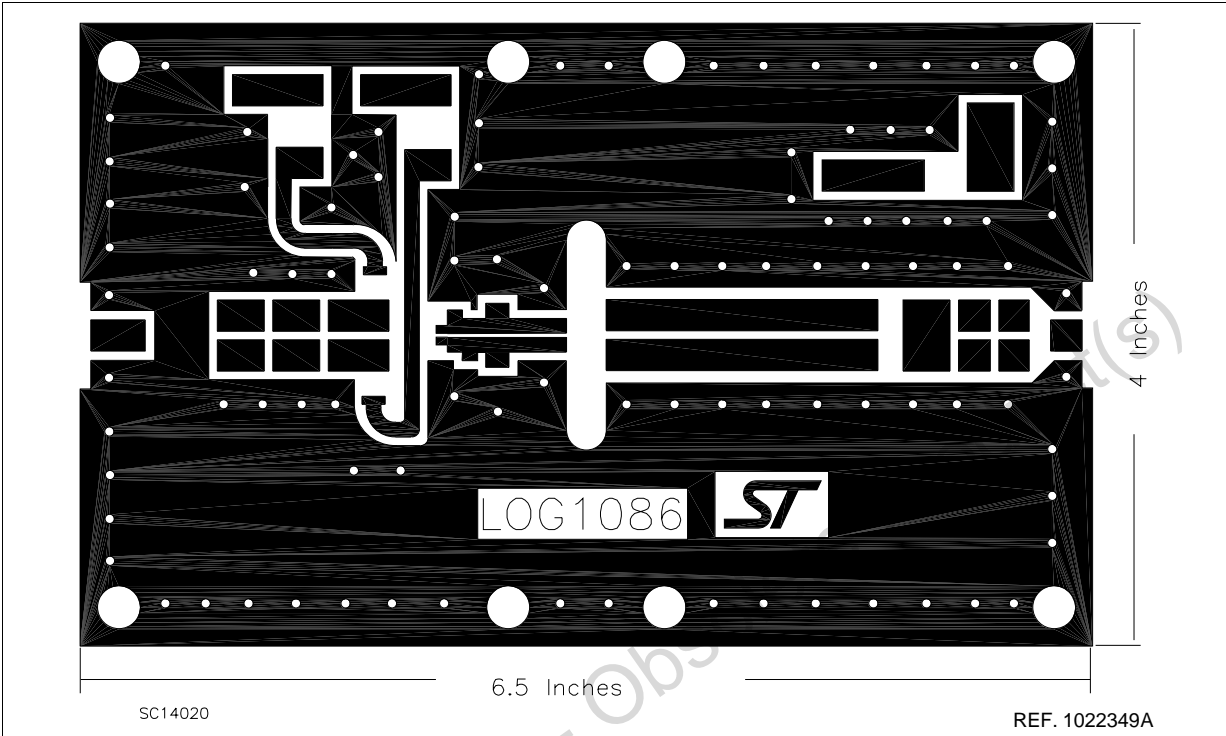


400 MHz Test Circuit Component Part List

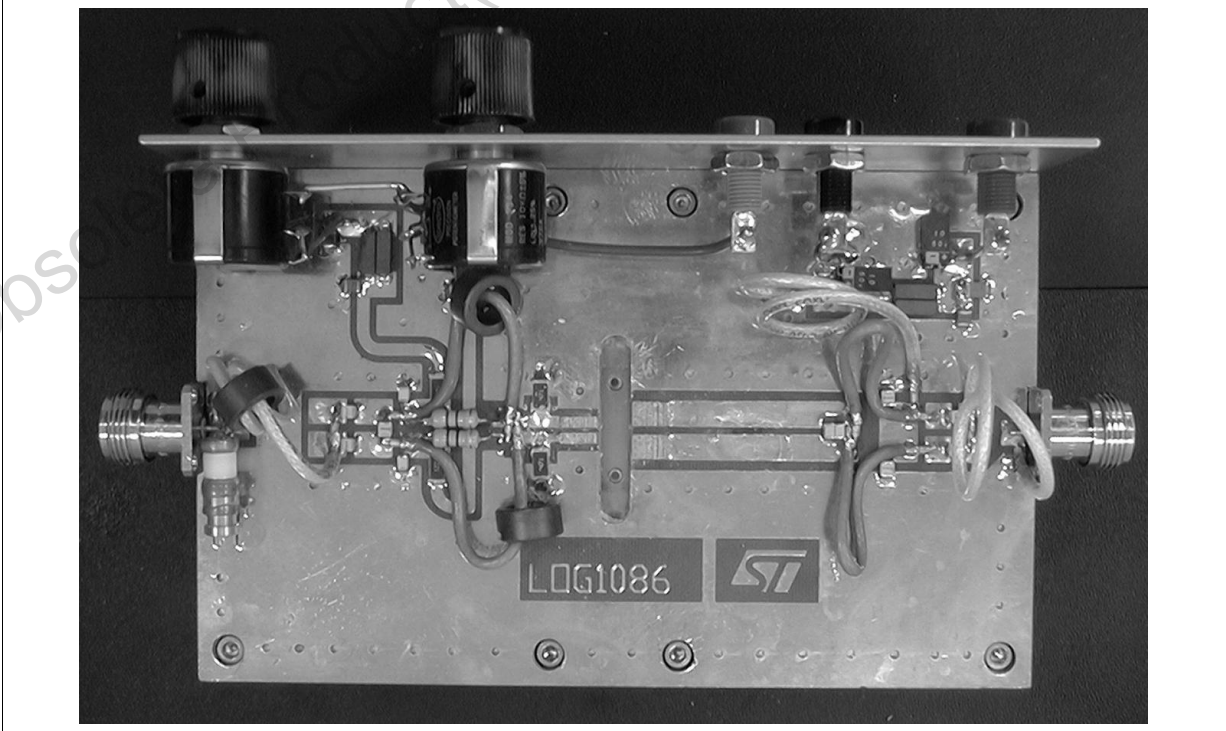
COMPONENT	PART N.	VENDOR	DESCRIPTION
R8	534-1-1-103	SPECTROL	10K OHM 3.09W 10 TURN WIREWOUND PRECISION POTENTIOMETER
R7	534-1-1-103	SPECTROL	10K OHM 3.09W 10 TURN WIREWOUND PRECISION POTENTIOMETER
R6	CR2512-1W-471JB	VENKEL	470 OHM 1W SURFACE MOUNT CHIP RESISTOR
R5	CR2512-1W-471JB	VENKEL	470 OHM 1W SURFACE MOUNT CHIP RESISTOR
R4			470 OHM 1/2W WIREWOUND AXIAL LEAD RESISTOR OR EQUIVALENT
R3			470 OHM 1/2W WIREWOUND AXIAL LEAD RESISTOR OR EQUIVALENT
R2	CR2512-1W-221JB	VENKEL	220 OHM 1W SURFACE MOUNT CHIP RESISTOR
R1	CR2512-1W-221JB	VENKEL	220 OHM 1W SURFACE MOUNT CHIP RESISTOR
L1			INDUCTOR, 1/4 WAVE CHOKE RG-316 50 OHM NOM O.D. 0.090[2.29] L = 5.30[134.61] FLEXIBLE COAXIAL CABLE OR EQUIVALENT
FB6	2743021447	FAIR-RITE CORP	SURFACE MOUNT EMI SHIELD BEAD
FB5	2743021447	FAIR-RITE CORP	SURFACE MOUNT EMI SHIELD BEAD
FB4	2743021447	FAIR-RITE CORP	SURFACE MOUNT EMI SHIELD BEAD
FB3	2643801102	FAIR-RITE CORP	SHIELD BEAD
FB2	2643801102	FAIR-RITE CORP	SHIELD BEAD
FB1	2643801102	FAIR-RITE CORP	SHIELD BEAD
T2			R.F. TRANSFORMER, 1/8 WAVE RG-316-25 OHM NOM O.D. 0.090[2.29] L = 2.75[69.85] FLEXIBLE COAXIAL CABLE OR EQUIVALENT
T1			R.F. TRANSFORMER, 1/8 WAVE RG-316-25 OHM NOM O.D. 0.090[2.29] L = 2.75[69.85] FLEXIBLE COAXIAL CABLE OR EQUIVALENT THRU SHIELD BEAD
B2			BALUN, 1/4 WAVE RG-316 50 OHM NOM O.D. 0.090[2.29] L=5.30[134.61] FLEXIBLE COAXIAL CABLE OR EQUIVALENT
B1			BALUN, 1/4 WAVE RG-316 50 OHM NOM O.D. 0.090[2.29] L=5.30[134.61] FLEXIBLE COAXIAL CABLE OR EQUIVALENT, 3 TURN THRU SHIELD BEAD
C21	SKR100M1J011	MALLORY	10µF / 63V ALUMINUM ELECTROLYTICS RADIAL LEAD CAPACITOR
C20	C1812X7R501-103KNE	VENKEL	0.01µF / 500V SURFACE MOUNT CERAMIC CHIP CAPACITOR
C19	ATC700B122MW50X	ATC	1200pF ATC 700B SURFACE MOUNT CERAMIC CHIP CAPACITOR
C18	SKR100M1J011	MALLORY	10µF / 63V ALUMINUM ELECTROLYTICS RADIAL LEAD CAPACITOR
C17	ATC700B122MW50X	ATC	1200pF ATC 700B SURFACE MOUNT CERAMIC CHIP CAPACITOR
C16	ATC200B103MW50X	ATC	10000pF ATC 200B SURFACE MOUNT CERAMIC CHIP CAPACITOR
C15	ATC700B122MW50X	ATC	1200pF ATC 700B SURFACE MOUNT CERAMIC CHIP CAPACITOR
C14	ATC200B103MW50X	ATC	10000pF ATC 200B SURFACE MOUNT CERAMIC CHIP CAPACITOR
C13	ATC700B122MW50X	ATC	1200pF ATC 700B SURFACE MOUNT CERAMIC CHIP CAPACITOR
C12	ATC100B181KW300X	ATC	180pF ATC 100B SURFACE MOUNT CERAMIC CHIP CAPACITOR
C11	ATC100B181KW300X	ATC	180pF ATC 100B SURFACE MOUNT CERAMIC CHIP CAPACITOR
C10	ATC100B121KW300X	ATC	120pF ATC 100B SURFACE MOUNT CERAMIC CHIP CAPACITOR
C9	ATC100B121KW300X	ATC	120pF ATC 100B SURFACE MOUNT CERAMIC CHIP CAPACITOR
C8	ATC100B9R1KP500X	ATC	9.1pF ATC 100B SURFACE MOUNT CERAMIC CHIP CAPACITOR
C7	ATC100B5R6CP500X	ATC	5.6pF ATC 100B SURFACE MOUNT CERAMIC CHIP CAPACITOR
C6	ATC100B121KW300X	ATC	120pF ATC 100B SURFACE MOUNT CERAMIC CHIP CAPACITOR
C5	ATC100B121KW300X	ATC	120pF ATC 100B SURFACE MOUNT CERAMIC CHIP CAPACITOR
C4	ATC100B5R6CP500X	ATC	5.6pF ATC 100B SURFACE MOUNT CERAMIC CHIP CAPACITOR
C3	ATC100B181KW300X	ATC	180pF ATC 100B SURFACE MOUNT CERAMIC CHIP CAPACITOR
C2	ATC100B181KW300X	ATC	180pF ATC 100B SURFACE MOUNT CERAMIC CHIP CAPACITOR
C1	PC26T200	JOHANSON	1-20pF STANDARD AIR VARIABLE CAPACITOR
PCB	PO310M104BQB	ROGERS CORP	GLASS MICROFIBER REINFORCED PTFE 0.031 THK, εr=2.20, 1 Oz ED Cu BOTH SIDES
COMPONENT	PART N.	VENDOR	DESCRIPTION

SC14010

400 MHz Test Circuit Photomaster

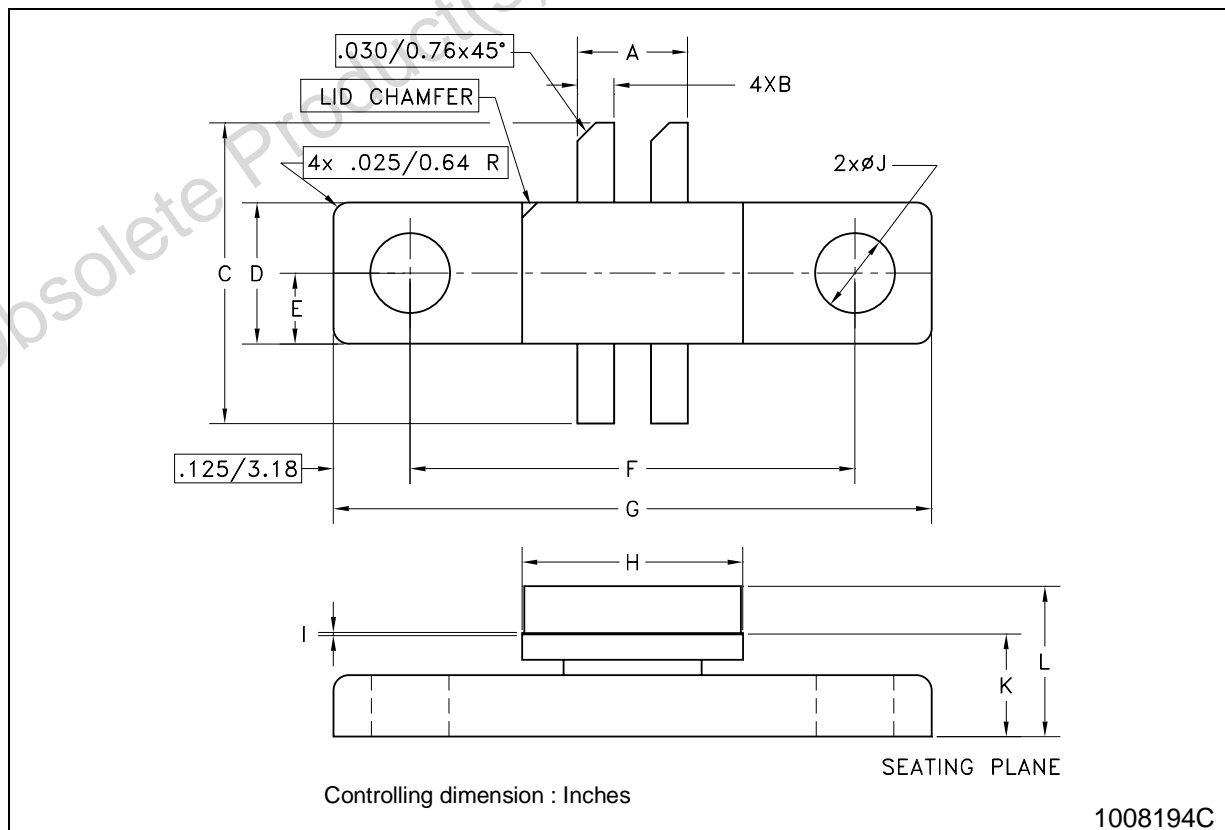


Production Test Fixture



**M229 (.230 x .360 WIDE 4L BAL N/HERM W/FLG) MECHANICAL DATA**

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	4.45		4.70	0.175		0.185
B	1.40		1.65	0.055		0.065
C	11.94		12.95	0.470		0.510
D	5.72		6.10	0.225		0.240
E		2.92			0.115	
F	18.29		18.54	0.720		0.730
G	24.64		24.89	0.970		0.980
H	9.02		9.27	0.355		0.365
I	0.10		0.15	0.004		0.006
J	3.18		3.43	0.125		0.135
K	4.06		4.32	0.160		0.170
L	5.84		6.60	0.230		0.260



1008194C

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