



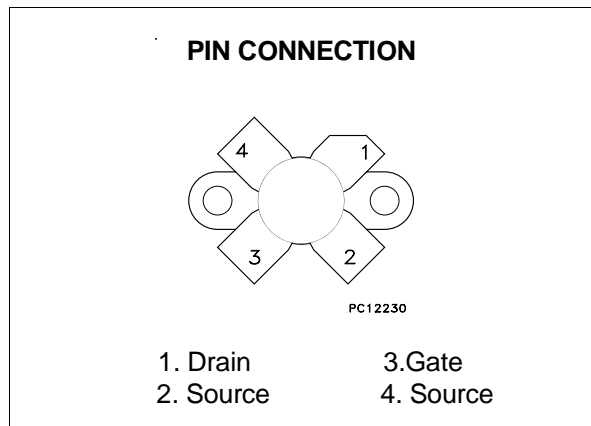
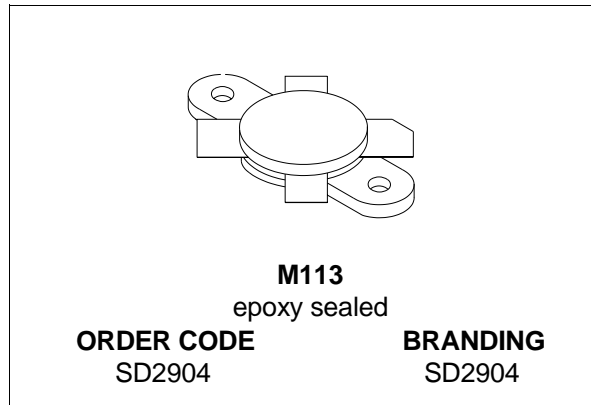
# SD2904

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

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

### DESCRIPTION

The SD2904 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 ( $R_{GS}=1M\Omega$ )	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 *	0.30	$^{\circ}\text{C}/\text{W}$

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

# SD2904

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

### STATIC

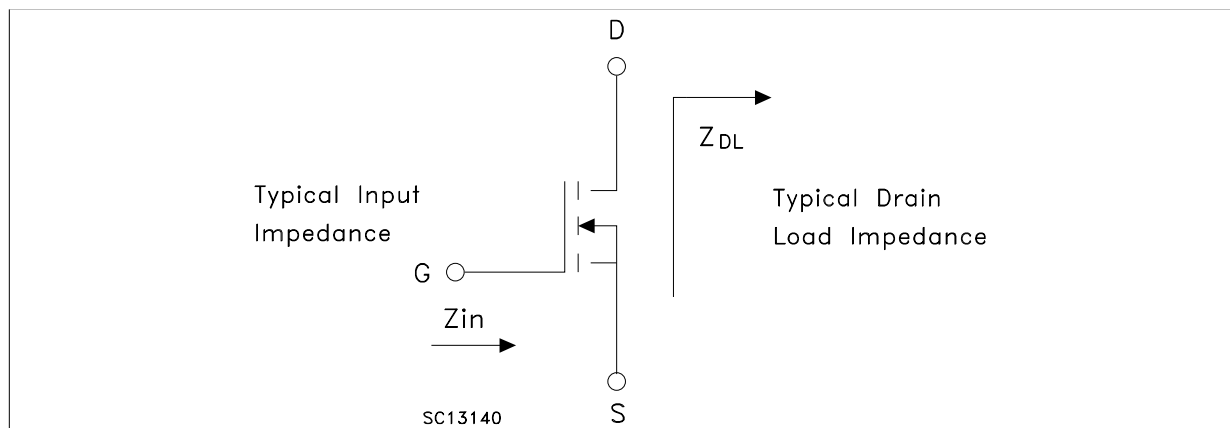
Symbol	Parameter		Min.	Typ.	Max.	Unit
V <sub>(BR)DSS</sub>	V <sub>GS</sub> = 0V	I <sub>DS</sub> = 30 mA	65			V
I <sub>DSS</sub>	V <sub>GS</sub> = 0V	V <sub>DS</sub> = 28 V			3	mA
I <sub>GSS</sub>	V <sub>GS</sub> = 20V	V <sub>DS</sub> = 0 V			2	μA
V <sub>GS(Q)</sub>	V <sub>DS</sub> = 10V	I <sub>D</sub> = 60 mA	1.0		6.0	V
V <sub>DS(ON)</sub>	V <sub>GS</sub> = 10V	I <sub>D</sub> = 3 A			1.6	V
g <sub>FS</sub>	V <sub>DS</sub> = 10V	I <sub>D</sub> = 3 A	1.2			mho
C <sub>ISS</sub>	V <sub>GS</sub> = 0V	V <sub>DS</sub> = 28 V		47		pF
C <sub>OSS</sub>	V <sub>GS</sub> = 0V	V <sub>DS</sub> = 28 V		35		pF
C <sub>RSS</sub>	V <sub>GS</sub> = 0V	V <sub>DS</sub> = 28 V		7		pF

REF. 1021310H

### DYNAMIC

Symbol	Parameter				Min.	Typ.	Max.	Unit
P <sub>OUT</sub>	f = 400 MHz	V <sub>DD</sub> = 28 V		I <sub>DQ</sub> = 50 mA	30			W
G <sub>PS</sub>	f = 400 MHz	V <sub>DD</sub> = 28 V	P <sub>out</sub> = 30 W	I <sub>DQ</sub> = 50 mA	9.5	11.5		dB
η <sub>D</sub>	f = 400 MHz	V <sub>DD</sub> = 28 V	P <sub>out</sub> = 30 W	I <sub>DQ</sub> = 50 mA	45	55		%
Load Mismatch	f = 400 MHz	V <sub>DD</sub> = 28 V	P <sub>out</sub> = 30 W	I <sub>DQ</sub> = 50 mA	10:1			VSWR
	All Angles							

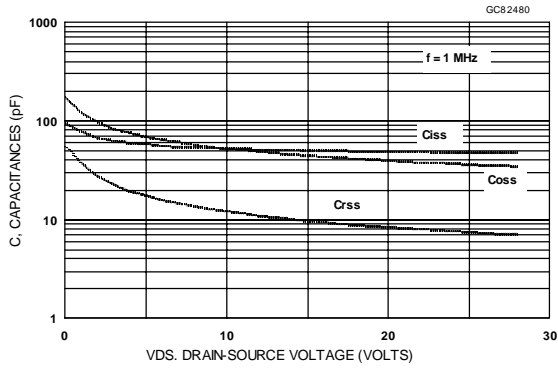
### IMPEDANCE DATA



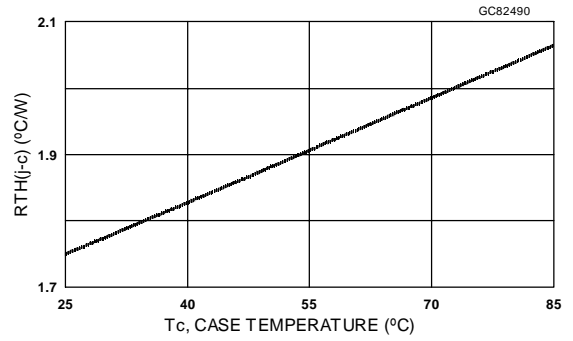
FREQ.	Z <sub>IN</sub> (Ω)	Z <sub>DL</sub> (Ω)
400 MHz	2.0 - j 2.4	5.6 + j 0.4

TYPICAL PERFORMANCE

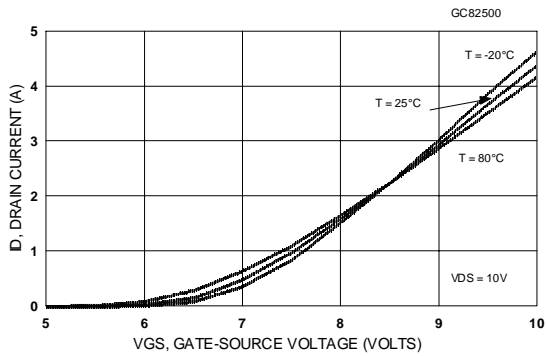
Capacitance vs Drain-Source Voltage



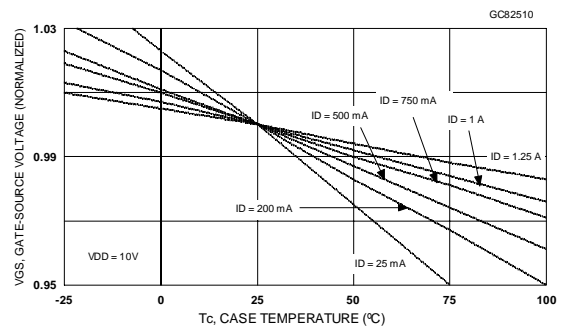
Maximum Thermal Resistance vs Case Temperature



Drain Current vs Gate Voltage

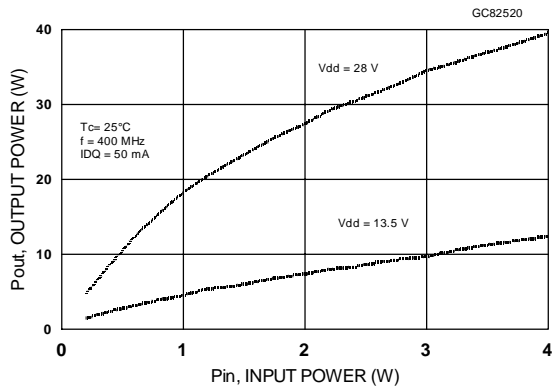


Gate-Source Voltages vs Case Temperature

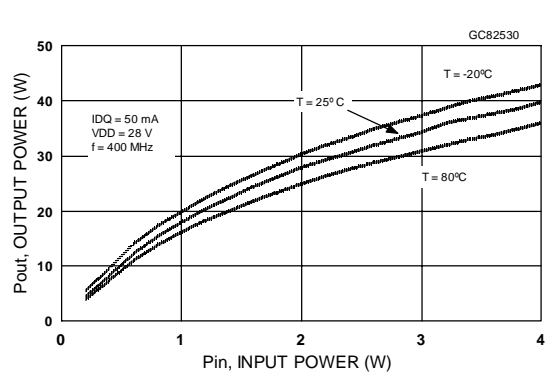


TYPICAL PERFORMANCE

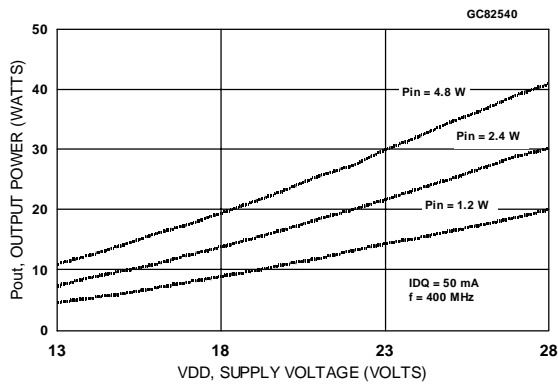
Output Power vs Input Power



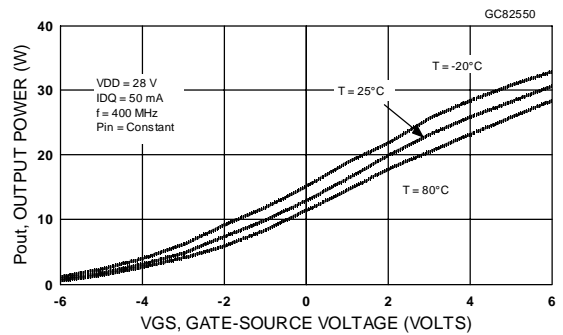
Output Power vs Input Power



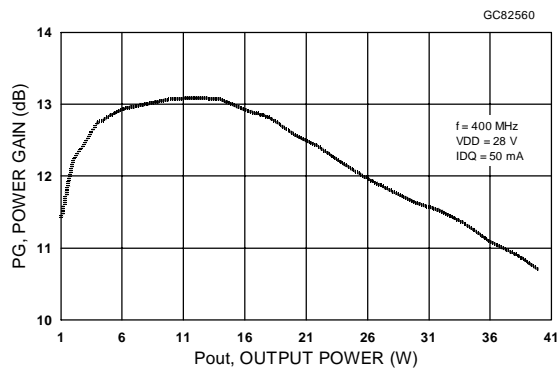
Output Power vs Voltage Supply



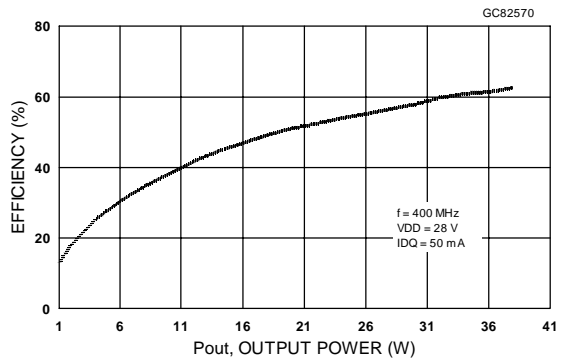
Output Power vs Gate Voltage



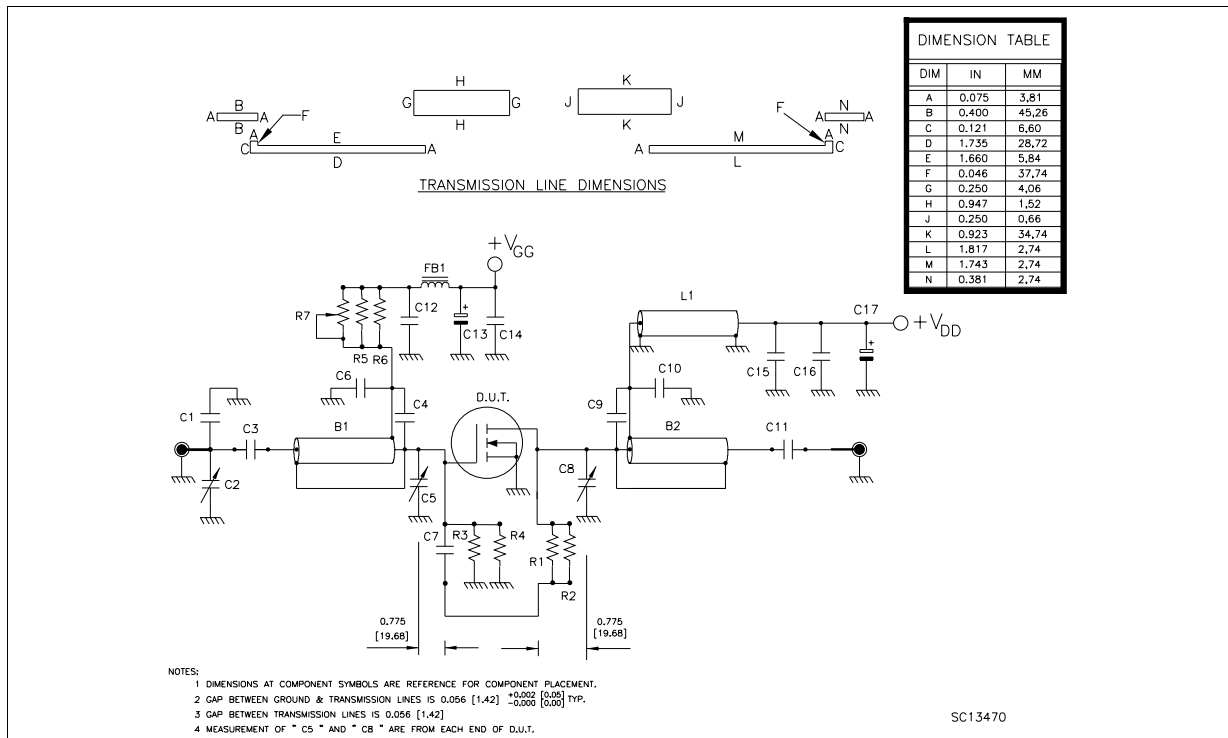
Power Gain vs Output Power



Efficiency vs Output Power



400 MHz Test Circuit Schematic

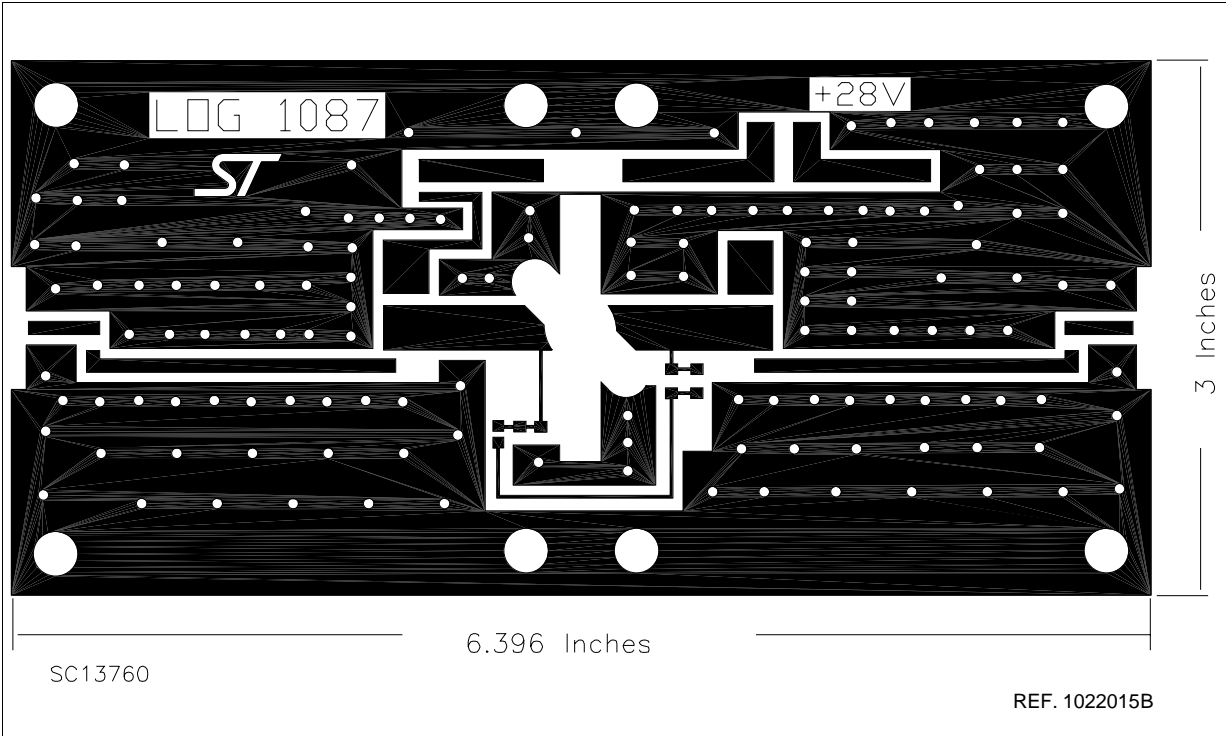


400 MHz Test Circuit Component Part List

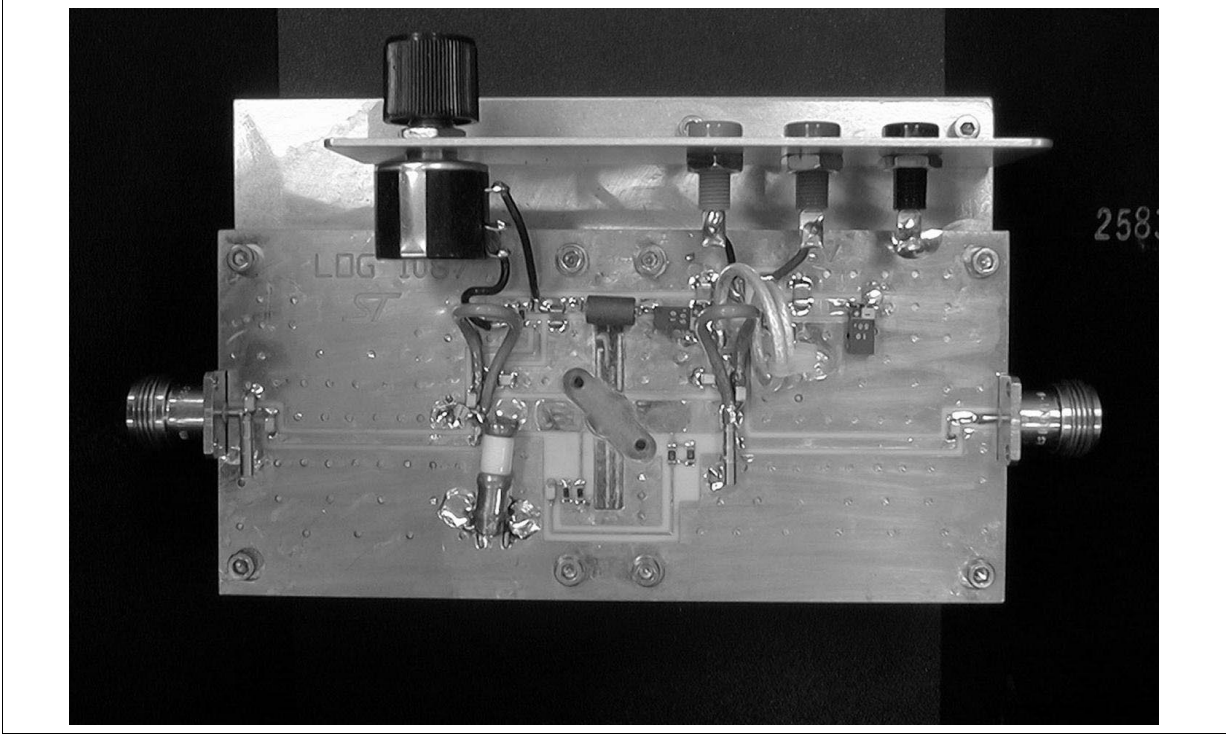
R7	534-1-1-203	SPECTROL	534 SERIES 3.09W, 10 TURN WIREWOUND PRECISION POTENTIOMETER
R6	CR1206-4W-471JT	VENKEL	470K OHM 1/4 W SURFACE MOUNT CHIP RESISTOR
R5	CR1206-4W-471JT	VENKEL	470K OHM 1/4 W SURFACE MOUNT CHIP RESISTOR
R4	CR1206-4W-471JT	VENKEL	470K OHM 1/4 W SURFACE MOUNT CHIP RESISTOR
R3	CR1206-4W-471JT	VENKEL	470K OHM 1/4 W SURFACE MOUNT CHIP RESISTOR
R2	CR1206-4W-821JT	VENKEL	820K OHM 1/4 W SURFACE MOUNT CHIP RESISTOR
R1	CR1206-4W-821JT	VENKEL	820K OHM 1/4 W SURFACE MOUNT CHIP RESISTOR
FB1	2943666671	FAIR-RITE CORP.	EMI SHIELD BEAD, 2 1/2 WOUND WITH TINNED COPPER WIRE #24 AWG
L1	RG316		INDUCTOR, RG316, 50 OHMS, NOM. O.D. 0.090[2.29] 5.5[139.70] LG. FLEXIBLE COAXIAL CABLE OR EQUIVALENT
B2	RG316-25		BALUN, RG316-25, 25 OHM, NOM. O.D. 0.090[2.29], L=3.00[76.20] FLEXIBLE COAXIAL CABLE OR EQUIVALENT
B1	RG316-25		BALUN, RG316-25, 25 OHM, NOM. O.D. 0.090[2.29], L=3.00[76.20] FLEXIBLE COAXIAL CABLE OR EQUIVALENT
C17	SKR100M1HD11	MALLORY	10μF/50V ALUMINUM ELECTROLYTIC RADIAL LEAD CAPACITOR
C16	C1812X7R501-104KNE	VENKEL	0.1μ/500V SURFACE MOUNT CERAMIC CHIP CAPACITOR
C15	ATC200B103MW50X	ATC	10000pF ATC 200B SURFACE MOUNT CERAMIC CHIP CAPACITOR
C14	C1812X7R501-104KNE	VENKEL	0.1μ/500V SURFACE MOUNT CERAMIC CHIP CAPACITOR
C13	SKR100M1HD11	MALLORY	10μF/50V ALUMINUM ELECTROLYTIC RADIAL LEAD CAPACITOR
C12	ATC200B103MW50X	ATC	10000pF ATC 200B SURFACE MOUNT CERAMIC CHIP CAPACITOR
C11	ATC100B121KP300X	ATC	120pF ATC 100B SURFACE MOUNT CERAMIC CHIP CAPACITOR
C10	ATC100B121KP300X	ATC	120pF ATC 100B SURFACE MOUNT CERAMIC CHIP CAPACITOR
C9	ATC100B300KW500K	ATC	30pF ATC 100B SURFACE MOUNT CERAMIC CHIP CAPACITOR
C8	27291PC	JOHANSON	0.8-8.0pF GIGA-TRIM VARIABLE CAPACITOR
C7	ATC100B121KP300X	ATC	120pF ATC 100B SURFACE MOUNT CERAMIC CHIP CAPACITOR
C6	ATC100B121KP300X	ATC	120pF ATC 100B SURFACE MOUNT CERAMIC CHIP CAPACITOR
C5	5601PC	JOHANSON	1-30pF STANDARD AIR DIELECT. VARIABLE CAPACITOR
C4	ATC100B470KW500X	ATC	47pF ATC 100B SURFACE MOUNT CERAMIC CHIP CAPACITOR
C3	ATC100B121KP300X	ATC	120pF ATC 100B SURFACE MOUNT CERAMIC CHIP CAPACITOR
C2	27291PC	JOHANSON	0.8-8.0pF GIGA-TRIM VARIABLE CAPACITOR
C1	ATC100B43CP500X	ATC	4.3pF ATC 100B SURFACE MOUNT CERAMIC CHIP CAPACITOR
PCB	NO320X1011HE	ROGERS CORP.	WOVEN GLASS REINFORCED HYDROCARBON CERAMIC 0.032" THK, ε <sub>r</sub> = 3.38, 1 Oz ED Cu BOTH SIDES
COMPONENT	PART NO	VENDOR	DESCRIPTION

SC13750

400MHz Test Circuit Photomaster

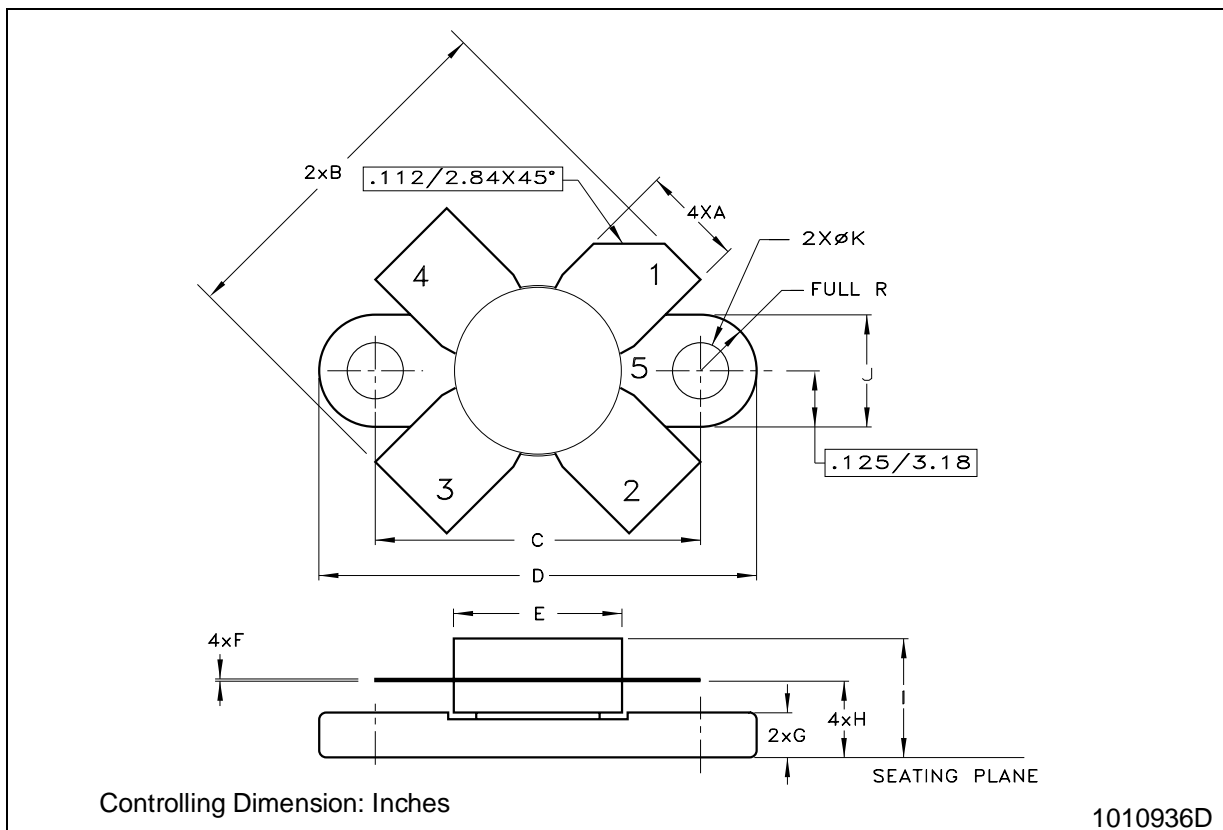


Production Test Fixture



**M113 (.380 DIA 4/L N/HERM W/FLG) MECHANICAL DATA**

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	5.59		5.84	0.220		0.230
B	19.81		20.83	0.780		0.820
C	18.29		18.54	0.720		0.730
D	24.64		24.89	0.970		0.980
E	9.40		9.78	0.370		0.385
F	0.10		0.15	0.004		0.006
G	2.16		2.67	0.085		0.105
H	4.06		4.57	0.160		0.180
I			7.14			0.281
J	6.22		6.48	0.245		0.255
K	3.05		3.30	0.120		0.130



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