



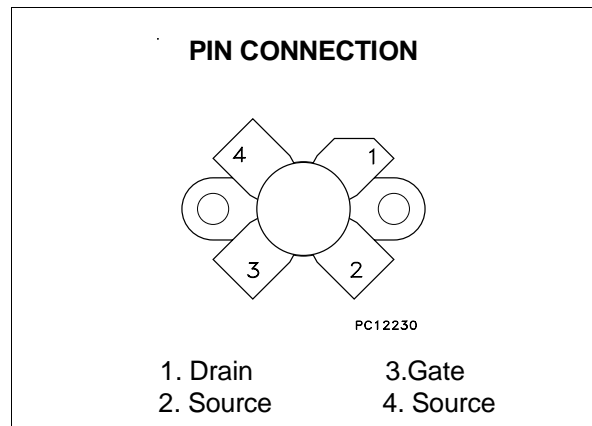
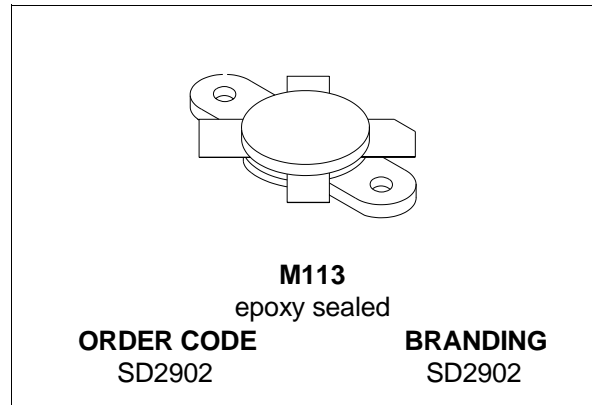
# SD2902

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

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

### DESCRIPTION

The SD2902 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	2.5	A
$P_{DISS}$	Power Dissipation	58.3	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	3.0	$^{\circ}\text{C}/\text{W}$
$R_{th(c-s)}$	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).

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

**STATIC**

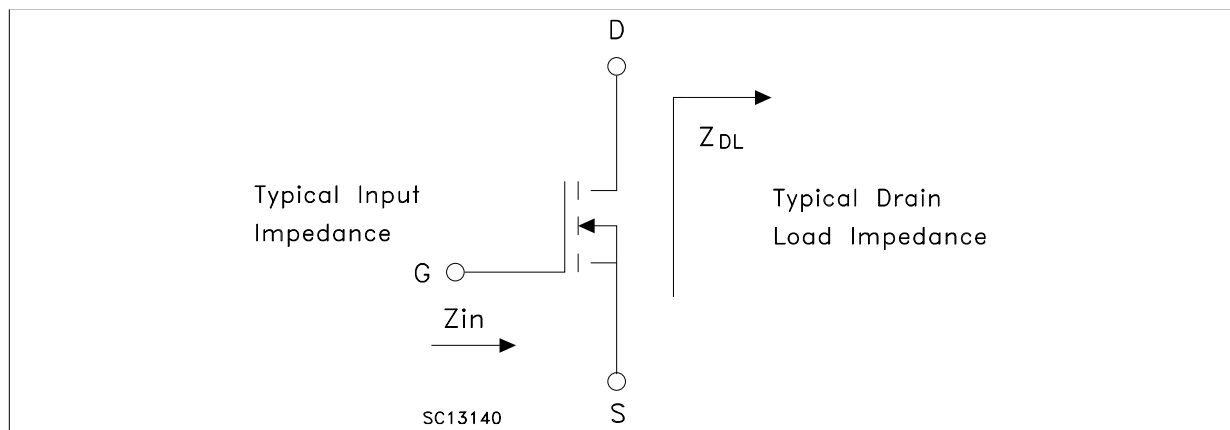
Symbol	Parameter		Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$	$V_{GS} = 0V$	$I_{DS} = 15\text{ mA}$	65			V
$I_{DSS}$	$V_{GS} = 0V$	$V_{DS} = 28\text{ V}$			1.5	mA
$I_{GSS}$	$V_{GS} = 20V$	$V_{DS} = 0\text{ V}$			1.0	$\mu\text{A}$
$V_{GS(Q)}$	$V_{DS} = 10V$	$I_D = 30\text{ mA}$	1.0		6.0	V
$V_{DS(ON)}$	$V_{GS} = 10V$	$I_D = 1.5\text{ A}$			1.6	V
$g_{FS}$	$V_{DS} = 10V$	$I_D = 1.5\text{ A}$	0.6			mho
$C_{ISS}$	$V_{GS} = 0V$	$V_{DS} = 28\text{ V}$		23		pF
$C_{OSS}$	$V_{GS} = 0V$	$V_{DS} = 28\text{ V}$		18		pF
$C_{RSS}$	$V_{GS} = 0V$	$V_{DS} = 28\text{ V}$		3.5		pF

REF. 1021308K

**DYNAMIC**

Symbol	Parameter				Min.	Typ.	Max.	Unit
$P_{OUT}$	$f = 400\text{ MHz}$	$V_{DD} = 28\text{ V}$		$I_{DQ} = 25\text{ mA}$	15			W
$G_{PS}$	$f = 400\text{ MHz}$	$V_{DD} = 28\text{ V}$	$P_{out} = 15\text{ W}$	$I_{DQ} = 25\text{ mA}$	12.5	13.5		dB
$\eta_D$	$f = 400\text{ MHz}$	$V_{DD} = 28\text{ V}$	$P_{out} = 15\text{ W}$	$I_{DQ} = 25\text{ mA}$	45	55		%
Load Mismatch	$f = 400\text{ MHz}$ All Angles	$V_{DD} = 28\text{ V}$	$P_{out} = 15\text{ W}$	$I_{DQ} = 25\text{ mA}$	10:1			VSWR

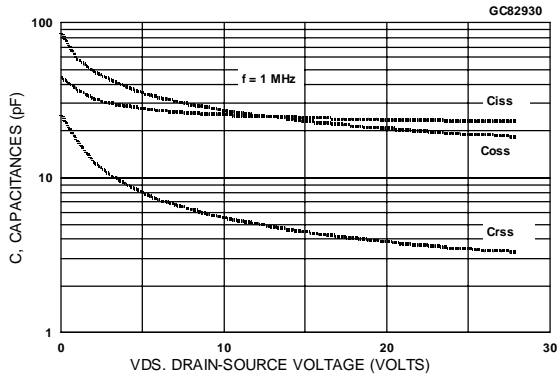
**IMPEDANCE DATA**



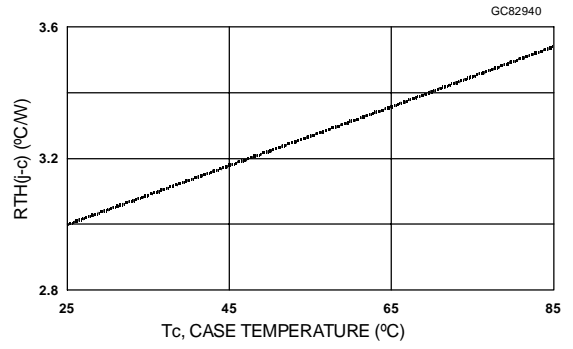
FREQ.	$Z_{IN} (\Omega)$	$Z_{DL} (\Omega)$
400 MHz	$2.6 - j 6.5$	$7.8 + j 10$

TYPICAL PERFORMANCE

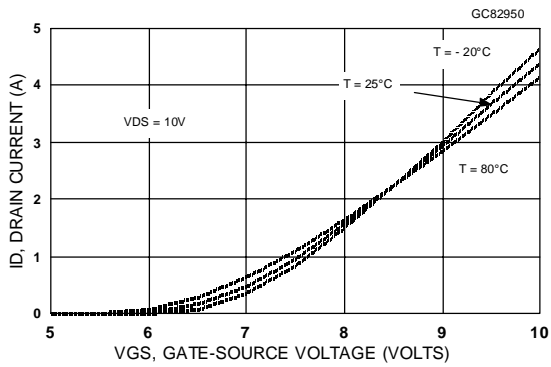
Capacitance vs Drain-Source Voltage



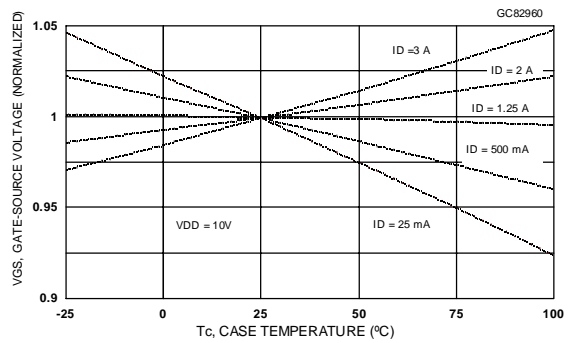
Maximum Thermal Resistance vs Case Temperature



Drain Current vs Gate Voltage

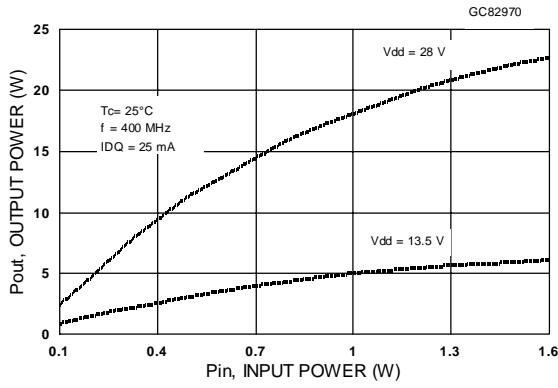


Gate-Source Voltages vs Case Temperature

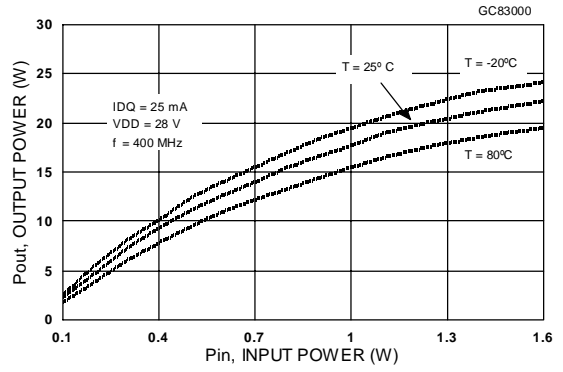


TYPICAL PERFORMANCE

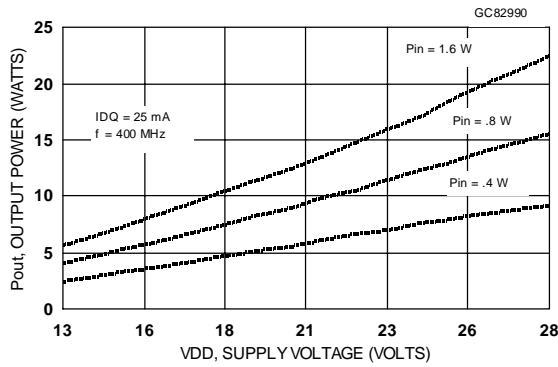
Output Power vs Input Power



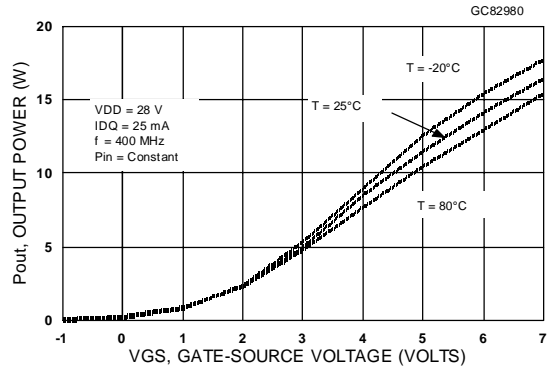
Output Power vs Input Power



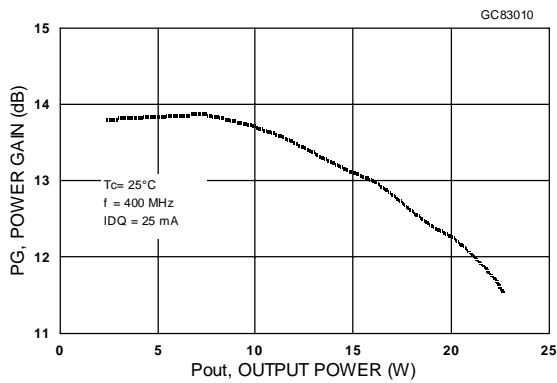
Output Power vs Voltage Supply



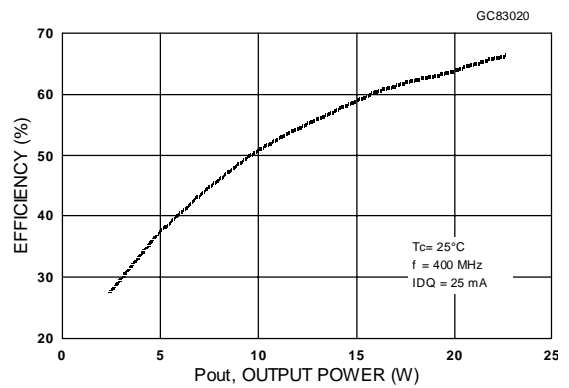
Output Power vs Gate Voltage



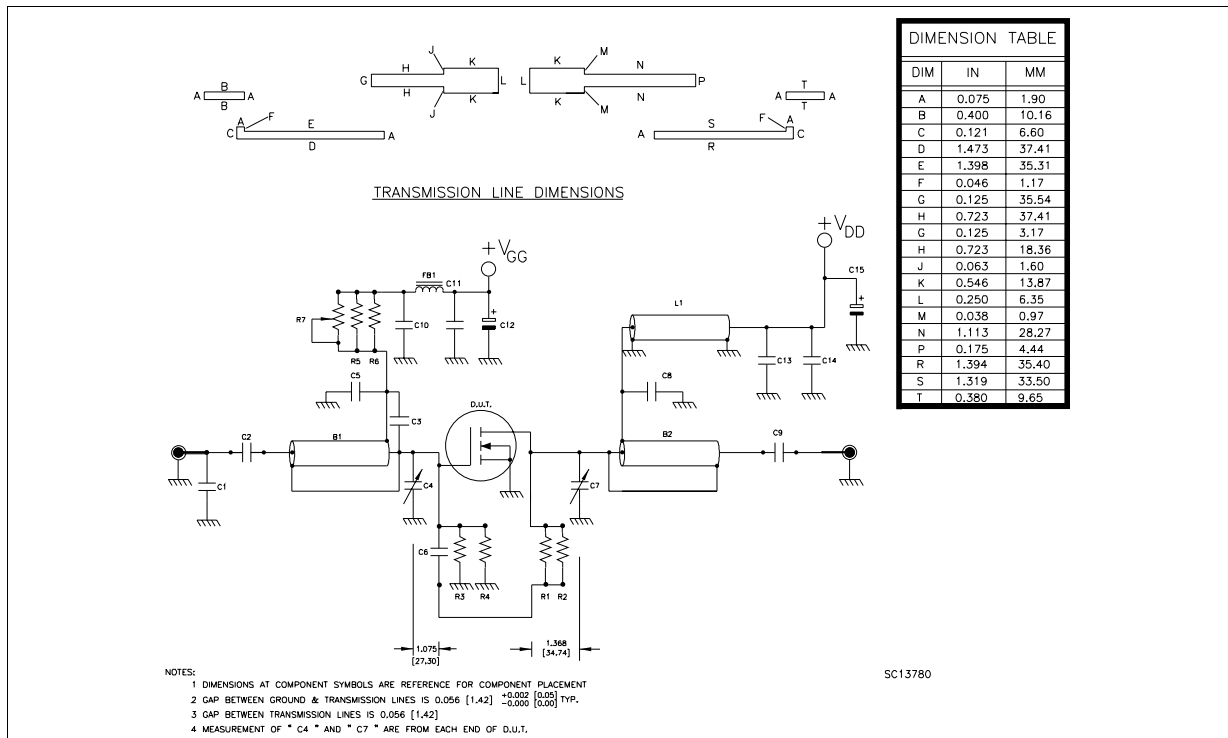
Power Gain vs Output Power



Efficiency vs Output Power



400 MHz Test Circuit Schematic

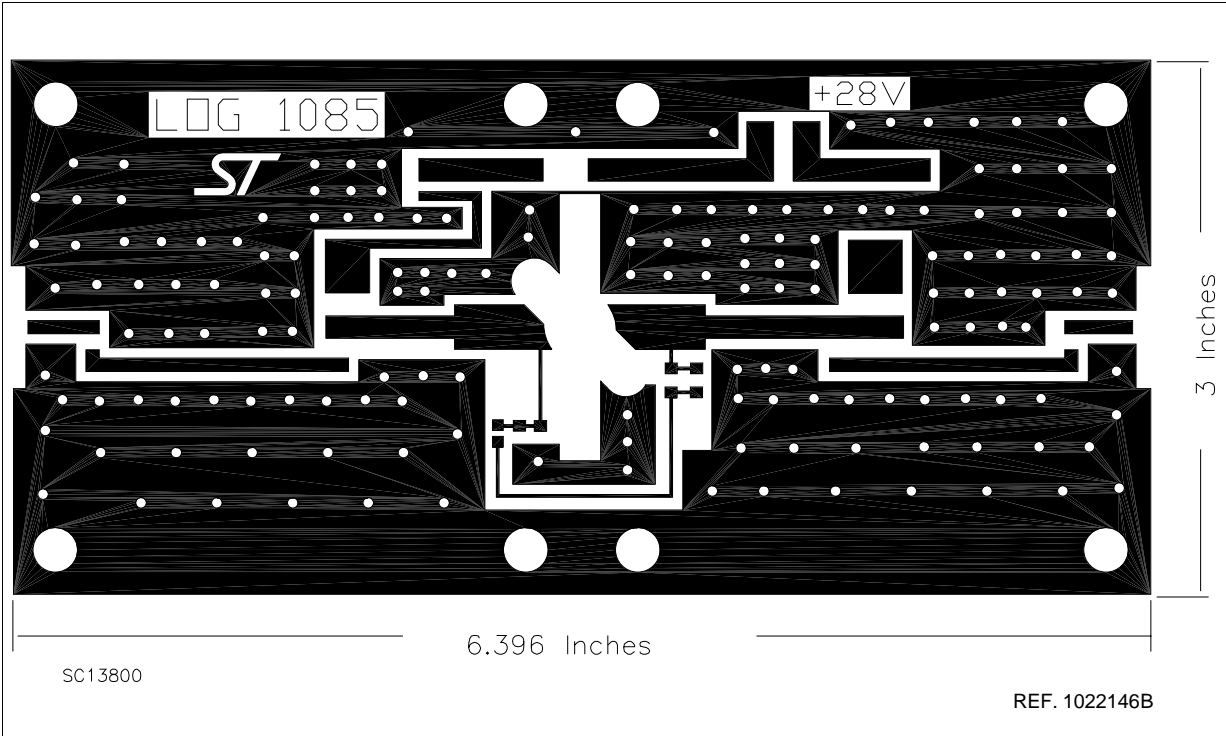


400 MHz Test Circuit Component Part List

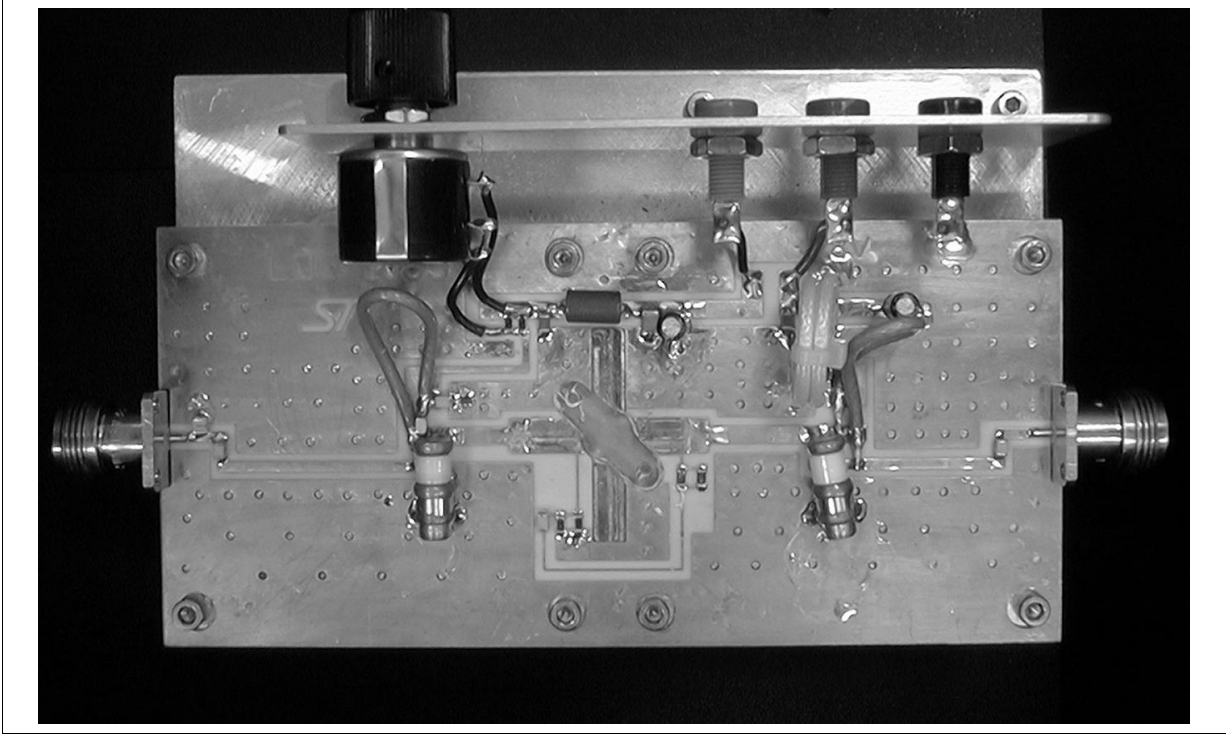
R7	536-1-1-503	SPECTROL	534 SERIES 10 TURN / 3.09W WIRE WOUND PRECISION POTENTIOMETER
R6	CR1206-4W-471JT	VENKEL	470 OHM 1/4 W SURFACE MOUNT CHIP RESISTOR
R5	CR1206-4W-471JT	VENKEL	470 OHM 1/4 W SURFACE MOUNT CHIP RESISTOR
R4	CR1206-4W-471JT	VENKEL	470 OHM 1/4 W SURFACE MOUNT CHIP RESISTOR
R3	CR1206-4W-471JT	VENKEL	470 OHM 1/4 W SURFACE MOUNT CHIP RESISTOR
R2	CR1206-4W-821JT	VENKEL	820 OHM 1/4 W SURFACE MOUNT CHIP RESISTOR
R1	CR1206-4W-821JT	VENKEL	820 OHM 1/4 W SURFACE MOUNT CHIP RESISTOR
FB1	2943666671	FAIR-RITE CORP	EMI SHIELD BEAD, 2 1/2 TURN WOUND WITH TINNED Cu WIRE #24 AWG
L1	RG316		INDUCTOR, RG316, 50 OHMS, NOM O.D. 0.090[2.29], L=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[76.19] FLEXIBLE COAXIAL CABLE OR EQUIVALENT
B1	RG316-25		BALUN, RG316-25, 25 OHM, NOM O.D. 0.090[2.29], L=3.00[76.19] FLEXIBLE COAXIAL CABLE OR EQUIVALENT
C15	SKR100M1JD11	MALLORY	10 $\mu$ F / 63V ALUMINUM ELECTROLYTICS RADIAL LEAD CAPACITOR
C14	C1812X7R501-104KNE	VENKEL	0.1 $\mu$ F / 500V SURFACE MOUNT CERAMIC CHIP CAPACITOR
C13	ATC200B103KW50X	ATC	10000pF ATC 200B SURFACE MOUNT CERAMIC CHIP CAPACITOR
C12	SKR100M1JD11	MALLORY	10 $\mu$ F / 63V ALUMINUM ELECTROLYTICS RADIAL LEAD CAPACITOR
C11	C1812X7R501-104KNE	VENKEL	0.1 $\mu$ F / 500V SURFACE MOUNT CERAMIC CHIP CAPACITOR
C10	ATC200B103KW50X	ATC	10000pF ATC 200B SURFACE MOUNT CERAMIC CHIP CAPACITOR
C9	ATC100B271KW200X	ATC	270pF ATC 100B SURFACE MOUNT CERAMIC CHIP CAPACITOR
C8	ATC100B121KW300X	ATC	120pF ATC 100B SURFACE MOUNT CERAMIC CHIP CAPACITOR
C7	5601PC	JOHANSON	1-30pF STANDARD AIR DIELECTRIC VARIABLE CAPACITOR
C6	ATC100B121KW300X	ATC	120pF ATC 100B SURFACE MOUNT CERAMIC CHIP CAPACITOR
C5	ATC100B121KW300X	ATC	120pF ATC 100B SURFACE MOUNT CERAMIC CHIP CAPACITOR
C4	5601PC	JOHANSON	1-30pF STANDARD AIR DIELECTRIC VARIABLE CAPACITOR
C3	ATC100B510KW500X	ATC	51pF ATC 100B SURFACE MOUNT CERAMIC CHIP CAPACITOR
C2	ATC100B271KW200X	ATC	270pF ATC 100B SURFACE MOUNT CERAMIC CHIP CAPACITOR
C1	ATC100B130JW500X	ATC	13pF ATC 100B SURFACE MOUNT CERAMIC CHIP CAPACITOR
PCB	NO320X1011HE	ROGERS CORP.	WOVEN GLASS REINFORCED CERAMIC HYDROCARBON 0.032" THK, $\epsilon_r=3.38$ , 10z ED Cu BOTH SIDES
COMPONENT	PART NO.	VENDOR	DESCRIPTION

SC13790

400 MHz Test Circuit Photomaster

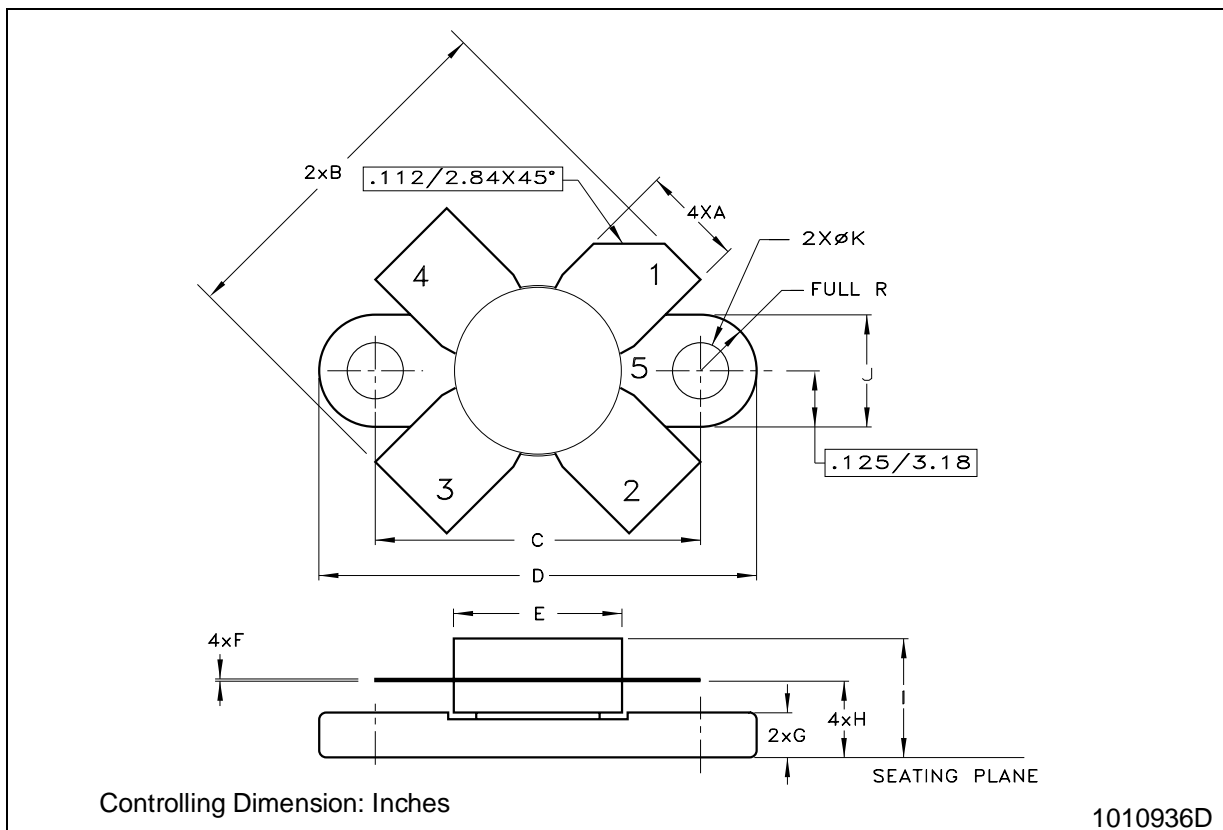


Production Test Fixture



### 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



Information furnished is believed to be accurate and reliable. However, STMicroelectronics assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of STMicroelectronics. Specification mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied. STMicroelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of STMicroelectronics.

The ST logo is a trademark of STMicroelectronics

© 1999 STMicroelectronics – Printed in Italy – All Rights Reserved

STMicroelectronics GROUP OF COMPANIES

Australia - Brazil - China - Finland - France - Germany - Hong Kong - India - Italy - Japan - Malaysia - Malta - Morocco - Singapore - Spain - Sweden - Switzerland - United Kingdom - U.S.A.

<http://www.st.com>