Part Number: ILD3135EL20

Integra
TECHNOLOGIES, INC.

S-Band Radar Transistor

Part number ILD3135EL20 is designed for S-Band radar applications operating over the 3.1 – 3.5 GHz instantaneous frequency band. Under 16ms / 50% pulsing conditions it supplies a minimum of 20 watts (typically 25-30W) of peak output power with 10dB gain typically. Specified operation is with Class AB bias. The device also may be operated with Class A or B bias. When appropriately rated, it is operable under a wide range of pulse widths and duty factors. It operates with spectral purity into all phases of 3:1 output load VSWR. All devices are 100% screened for large signal RF parameters in a fixed tuned broadband matching circuit / test fixture. The use of external tuners is not allowed during screening. This device is rated for a peak output power level of P_{PEAK} = 20W @ 50% duty factor. This corresponds to an average power P_{AVG} = 10W.

Silicon LDMOS FET
- High Power Gain
- Excellent thermal stability
- Gold Metal

Gold Metal System
- Complete Gold System
- LDMOS with Gold Metal
- Gold Bond Wires
- Gold Package Metal
- Maximum Reliability

Class A, AB, B Operation
- Specified with AB bias
- Operable with A bias
- Operable with B bias

Internal Impedance Matching
- Erase of Use
- Ultra Low Loss Design

BeO Free Package
- Metal Based
- Epoxy Seal

High Power RF Test / Fixture
- Broadband
- Matched to 50 Ω (ohms)
- Long-term Correlation
- 100% Device RF Screening
- No External Tuning required

TYPICAL DATA *TYPICAL DATA* *TYPICAL DATA* *TYPICAL DATA*

FREQ (GHz)	PW (ms)	Duty (%)	V_{DD} (V)	I_{DQ} (mA)	P_{IN} (W)	IRL (dB)	P_{OUT} (W)	G_P (dB)	I_D (A)	Droop (dB)	VSWR-S 3:1
3.100	16	50	28.0	10	2.75	-18	26.9	9.9	3.30	-0.06	P
3.300	16	50	28.0	10	2.75	-14	27.2	9.9	3.30	-0.10	P
3.500	16	50	28.0	10	2.75	-12	28.9	10.2	3.30	-0.14	P

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MAXIMUM RATINGS

Screen	Parameter	Symbol	Min	Max	Units	Test Conditions
BD	Drain-Source Voltage	V_{DS}	--	65	V	--
BD	Gate-Source Voltage	V_{GS}	-0.5	12	V	--
BD	Storage Temperature Range	T_{STG}	-55	+150	°C	--
BD	Operating Junction Temperature Range	T_J	-55	+200	°C	--
BD	CW Operation	--	--	--	--	Not rated for CW operation.
Note	Screen 'BD' = parameter qualified By Design.					

THERMAL CHARACTERISTICS

Screen	Parameter	Symbol	Min	Max	Units	Test Conditions
BD	Thermal Resistance	$R_{TH(JC)}$	--	1.2	°C/W	V_{DD}=V1, I_{DQ}=I_{DQ1}, PW=PW1, DF=DF1, T_F=25±5°C, P_{OUT}=25W
Note	Screen 'BD' = parameter qualified By Design.					

PROCESSING SPECIFICATIONS

Screen	Parameter	Symbol	Min	Max	Units	Test Conditions
100%	DC Wafer Probe	--	--	--	--	Per Integra specification.
Q1	Wafer DC and RF Qualification	--	--	--	--	Per Integra specification.
LM	Wire Bond Strength	--	--	--	--	Line monitor per Integra specification.
100%	Pre-cap visual inspection	--	--	--	--	Per Integra specification
100%	Gross leak test	--	--	--	--	MIL-STD-750D, Method 1071.6, Test Condition C
Note	Screen 'Q1' = parameter is qualified by assembly and test of 3 pieces minimum per wafer.					
Note	Screen 'LM' = parameter is qualified by assembly line monitor.					

DC ELECTRICAL CHARACTERISTICS

Screen	Parameter	Symbol	Min	Max	Units	Test Conditions
100%	Drain-Source Breakdown Voltage	BV_{DSS}	65	--	V	I_{DS}=10uA, V_{GS}=0V, T_F=25±5°C
100%	Drain Leakage Current	I_{DSS}	--	1.0	uA	V_{DS}=28V, V_{GS}=0V, T_F=25±5°C
100%	Operating Gate Voltage	V_{GS}	2.5	4.0	V	V_{DS}=5V, I_D=0.1A, T_F=25±5°C
100%	Gate Leakage Current	I_{GSS}	--	1.0	uA	V_{GS}=10V, V_{DS}=0V, T_F=25±5°C

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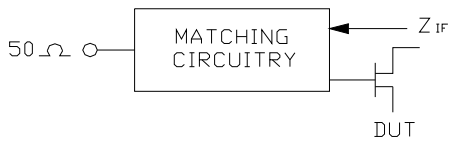
RF ELECTRICAL CHARACTERISTICS

Screen	Parameter	Symbol	Min	Max	Units	Test Conditions
100%	Input Return Loss	IRL	-18	-7	dB	V_{DD}=V1, I_{DQ}=I_{DQ1}, PW=PW1, DF=DF1, T_F=T_{F1}, P_{IN}=P_{IN1}, F=F1, F2, F3.
100%	Output Power	P_O	20	50	W	V_{DD}=V1, I_{DQ}=I_{DQ1}, PW=PW1, DF=DF1, T_F=T_{F1}, P_{IN}=P_{IN1}, F=F1, F2, F3.
100%	Drain Current - Peak	I_D	--	3.5	A	V_{DD}=V1, I_{DQ}=I_{DQ1}, PW=PW1, DF=DF1, T_F=T_{F1}, P_{IN}=P_{IN1}, F=F1, F2, F3.
100%	Pulse Amplitude Droop	D	-0.3	0.3	dB	V_{DD}=V1, I_{DQ}=I_{DQ1}, PW=PW1, DF=DF1, T_F=T_{F1}, P_{IN}=P_{IN1}, F=F1, F2, F3.
100%	3:1 Load Mismatch Stability	VSWR-S	--	--	--	V_{DD}=V1, I_{DQ}=I_{DQ1}, PW=PW1, DF=DF1, T_F=T_{F1}, P_{IN}=P_{IN1}, F=F1, F2, F3. Rotate 3:1 output VSWR through 360° phase. No oscillatory or pulse break-up characteristics allowed on detected output pulse. All non-harmonically related signals must be at least –65 dBc.
100%	Output Power Flatness	OPF	--	1	dB	V_{DD}=V1, I_{DQ}=I_{DQ1}, PW=PW1, DF=DF1, T_F=T_{F1}, P_{IN}=P_{IN1}, F=F1, F2, F3.
Note 1	V1 = 28V; I_{DQ1} = 10mA; PW1 = 16ms; DF1 = 50%, P_{IN1} = 2.75W.					
Note 2	Test Frequencies: F1 = 3.1 GHz, F2 = 3.3 GHz, F3 = 3.5 GHz.					
Note 3	T_{F1} = 25±5°C = Device flange temperature.					
Note 4	Screen 'BD' = parameter qualified By Design.					

RF TEST FIXTURE IMPEDANCE CHARACTERISTICS

Frequency (GHz)	Z_{IF} (Ω)	Z_{OF} (Ω)
3.10	2.7 - j4.3	3.6 - j7.2
3.30	2.4 - j3.9	3.2 - j7.0
3.50	2.1 - j3.3	2.8 - j6.3
Impedance Definition		

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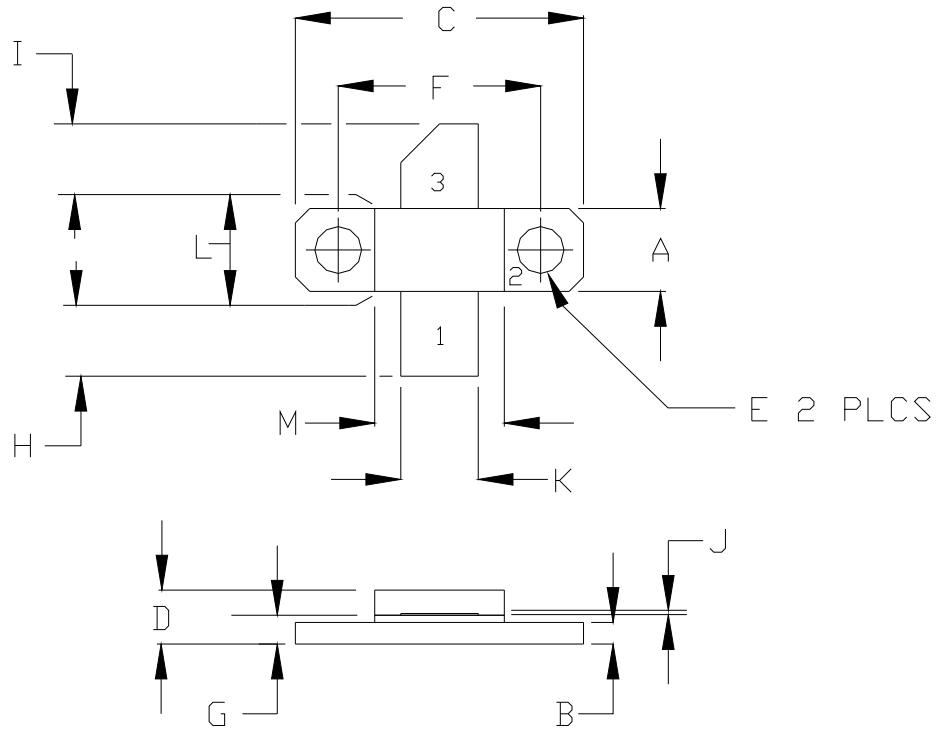
PACKAGE DIMENSIONAL OUTLINE DRAWING



DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.225	0.235	5.71	5.96
B	0.055	0.065	1.40	1.65
C	0.795	0.805	20.19	20.44
D	0.140	0.160	3.55	4.06
E	0.125	0.135	3.18	3.43
F	0.557	0.567	14.14	14.40
G	0.077	0.087	1.95	2.20
H	0.215	0.245	5.46	6.22
I	0.215	0.245	5.46	6.22
J	0.004	0.006	0.10	0.15
K	0.210	0.220	5.33	5.58
L	0.225	0.235	5.71	5.96
M	0.355	0.365	9.01	9.27

PIN	SCHEDULE
1	GATE
2	SOURCE
3	DRAIN

NOTES:

LID: LID-PL32-1

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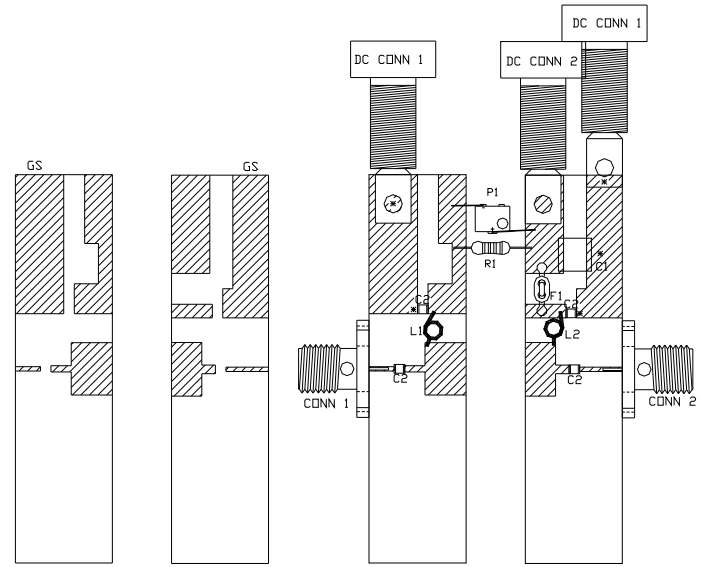
RF TEST FIXTURE – ASSEMBLY AND PARTS LIST



COMPONENT	DESCRIPTION
DUT	TRANSISTOR #ILD3135EL20 MOUNT HARD TO THE RIGHT
PC BOARD	ROGERS #RO6010.2 1oz Cu, 25 MILS THICK
C1	ELECCTROLYTIC CAPACITOR, 4.7uF/50V
C2	CHIP CAPACITOR ARC100A 39pF
C3 (NOT SHOWN)	ELECTROLYTIC CAPACITOR, 4700uF / 50V
L1	INDUCTOR WIRE COIL:3 TURN AWG#22 INSULATED, .076" DIA, PULL TIGHT AND FULLY CLOSED, LEFT HAND
L2	INDUCTOR WIRE CIOL:3 TURN AWG#22 INSULATED, .076" DIA, PULL TIGHT AND FULLY CLOSED, RIGHT HAND
F1	FERRITE TWIN HOLE CORE, 1 TURN AWG#22 INSULATED
R1	RESISTOR 12K OHMS
P1	POTENTIOMETER
GS (5 PLACES)	GROUND SHIM, COPPER, TH=0.001"
CONN 1, CONN 2	SMA CONNECTOR, DS #2052-5636-02
INPUT PC BOARD CARRIER	2 INCH BRASS-01 (0.50")
OUTPUT PC BOARD CARRIER	2 INCH BRASS-01 (0.50")
TRANSISTOR CARRIER	2 INCH COPPER-01 (P32)
TRANSISTOR CLAMP	NORYL CLAMP-01 (P32)
ALUMINUM HEAT SINK	2 INCH HEATSINK-09
DC CONN 1	BANANA JACK, BLACK
DC CONN 2	BANANA JACK, RED
NOTE	FIXTURE HARDWARE DRAWINGS AVAILABLE ON REQUEST

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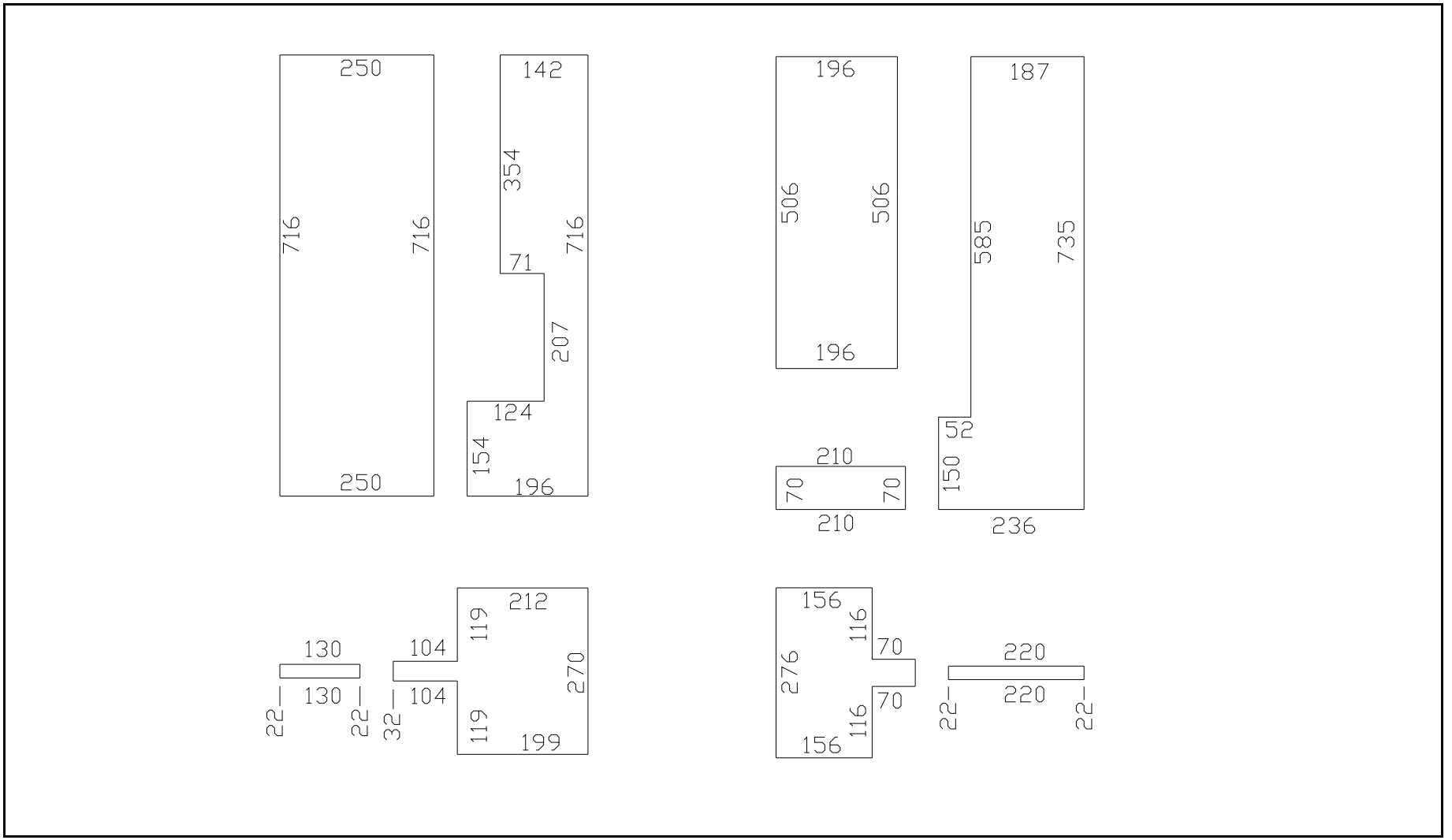
RF TEST FIXTURE – CIRCUIT DIMENSIONS IN MILS



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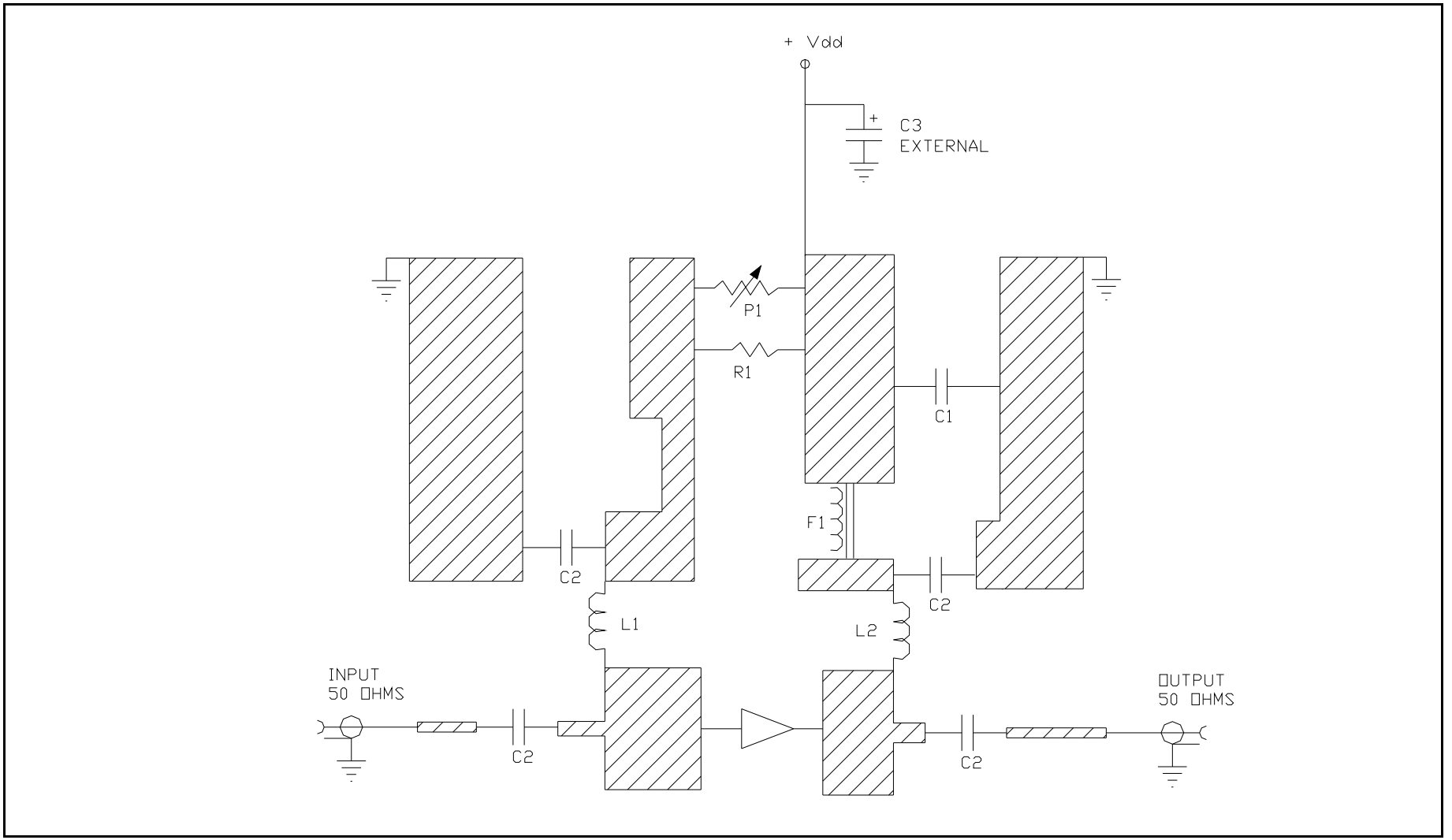
RF TEST FIXTURE – ELECTRICAL SCHEMATIC



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DEFINITIONS

Data Sheet Status	
Proposed Specification	This data sheet contains proposed specifications.
Preliminary Specification	This data sheet contains specifications based on preliminary measurements and data.
Product Specification	This data sheet contains final product specifications.

Maximum Ratings
Stress above one or more of the maximum ratings may cause permanent damage to the device. These are maximum ratings only operation of the device at these or at any other conditions above those given in the characteristics sections of the specification is not implied. Exposure to maximum values for extended periods of time may affect device reliability.

WARNING

Product and environmental safety - toxic materials
This product contains beryllium oxide. The product is entirely safe provided that the BeO base is not damaged. All persons who handle, use or dispose of this product should be aware of its nature and of the necessary safety precautions. After use, dispose of as chemical or special waste according to the regulations applying at the location of the user. It must never be thrown out with general or domestic waste.

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