Part Number: ILD1011M15HV

Integra
TECHNOLOGIES, INC.

Avionics Band RF Power LDMOS FET

The high power transistor part number ILD1011M15HV is designed for Avionics systems operating at 1030-1090 MHz. Operating at 50µs, 2% pulse conditions this LDMOS FET device supplies a minimum of 15 watts of power at 1030/1090 MHz. All devices are 100% screened for large signal RF parameters.

TYPICAL DATA TYPICAL DATA TYPICAL DATA TYPICAL DATA

Lot # / SN #	Freq (MHz)	Pi (W)	Id (A)	RL (dB)	P_o (W)	G (dB)	Droop (dB)	VSWR 1.5:1	VSWR 3:1
50020309-1	1030	0.5	1.625	-15	24.6	16.92	-0.11	P	S
	1090	0.5	1.6	-17	26.0	17.16	-0.03	P	S

Pulse format = 50µs, 2%, I_{DQ} = 10mA

n_d= Drain efficiency (including bias current)

n'_d= Drain efficiency (excluding bias current)

Silicon LDMOS FET
- High Power Gain
- Superior thermal stability

Class AB Operation
- Gate biased to I_{DQ} = 10 mA

Configuration
- Common Source

Gold Metal
- Maximum Reliability

Package
- Thermally enhanced
- Pb-free and RoHS-compliant

Epoxy Sealed Lid
- Gross Leak Qualified

RF Test Fixture
- Broadband
- Matched to 50 ohms
- Long-term Correlation
- 100% Device RF Screening
- No External Tuning required

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MAXIMUM RATINGS

Screen	Parameter	Symbol	Min	Max	Units	Test Conditions
BD	Drain-Source Voltage	V_{DS}	--	100	V	--
BD	Gate-Source Voltage	V_{GS}	2.75	20	V	--
BD	Storage Temperature Range	T_{STG}	-55	+200	°C	--
BD	Operating Junction Temperature Range	T_J	-55	+200	°C	--
Note	Screen 'BD' = parameter qualified By Design.					

THERMAL CHARACTERISTICS

Screen	Parameter	Symbol	Min	Max	Units	Test Conditions
BD	Thermal Resistance	$R_{TH(JC)}$	--	0.24	°C/W	V_D=50V, I_{DQ}=10mA, T_F=25±5°C, P_{OUT}=15W
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, 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}	100	--	V	I_D = 10mA, V_{GS} = 0V, T_F = 25±5°C
100%	Drain Leakage Current	I_{DSS}	--	1	µA	V_{DD} = 50V, V_{GS} = 0V, T_F = 25±5°C
100%	Gate Threshold Voltage	V_{GSTH2}	2.75	5.25	V	I_D = 100mA, V_{DS} = 5V, T_F = 25±5°C
100%	Gate Leakage Current	I_{GSS}	--	1	µA	V_{DD} = 0V, V_{GS} = 5V, T_F = 25±5°C

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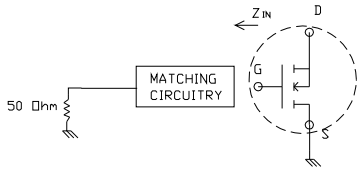
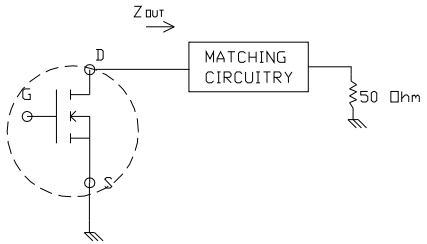
RF ELECTRICAL CHARACTERISTICS

Screen	Parameter	Symbol	Min	Max	Units	Test Conditions
100%	Input Return Loss	IRL	-18	-9	dB	V_{DD}=50V, P_{IN} =0.5W, Pulse=50µs, 2%, T_F=25±5°C, F=F1, I_{DQ}=10mA.
BD	Maximum Overdrive	$P_{IN(MAX)}$		0.8	W	V_{DD}=50V, Pulse=50µs, 2%, T_F=25±5°C, F=F1, I_{DQ}=10mA.
100%	Power Gain	G_P	14.77	19.03	dB	V_{DD}=50V, P_{IN} =0.5W, Pulse=50µs, 2%, T_F=25±5ºC, F=F1, I_{DQ}=10mA.
100%	Output Power	P_{OUT}	15	40	W	V_{DD}=50V, P_{IN} =0.5W, Pulse=50µs, 2%, T_F=25±5ºC, F=F1, I_{DQ}=10mA.
100%	Drain Current	I_D	0.9	2.0	A	V_{DD}=50V, P_{IN} =0.5W, Pulse=50µs, 2%, T_F=25±5°C, F=F1, I_{DQ}=10mA.
100%	Pulse Amplitude Droop	D	-0.5	0.5	dB	V_{DD}=50V, P_{IN} =0.5W, Pulse=50µs, 2%, T_F=25±5°C, F=F1, I_{DQ}=10mA.
100%	Stability into 1.5:1 VSWR	VSWR-S		1.5:1	--	V_{DD}=50V, P_{IN} =0.5W, Pulse=50µs, 2%, T_F=25±5°C, F=F1, I_{DQ}=10mA. Rotate 1.5:1 output VSWR through 360° phase. No oscillatory or pulse break-up characteristics allowed on detected output pulse.
BD	Load Mismatch Tolerance	LMT		20:1	--	V_{DD}=50V, P_{IN} =0.5W, Pulse =50µs, 2%, T_F=25±5°C, F=F1, I_{DQ}=10mA. Rotate 20:1 output VSWR through 360° phase. Survival.
100%	Load Mismatch Tolerance	LMT		3:1	--	V_{DD}=50V, P_{IN} =0.5W, Pulse =50µs, 2%, T_F=25±5°C, F=F1, I_{DQ}=10mA. Rotate 3:1 output VSWR through 360° F=F1, phase. Survival.
BD	Pulse Risetime	RT		60	ns	V_{DD}=50V, P_{IN} =0.5W, Pulse =50µs, 2%, T_F=25±5°C, F=F1, I_{DQ}=10mA. Measure between 10% and 90% detected power points.

Note 1	F1 =-1030-1090 MHz.
Note 2	Pulse format = 50µs, 2%
Note 3	T_F = Device flange temperature.
Note 4	Screen 'BD' = parameter qualified By Design.

RF TEST FIXTURE IMPEDANCE CHARACTERISTICS

Frequency (MHz)	Z_{IF} (Ω)	Z_{OF} (Ω)
1030	0.72 - j1.35	6.10 + j9.50
1090	0.76 - j1.00	9.20 + j11.3
Impedance Definition		

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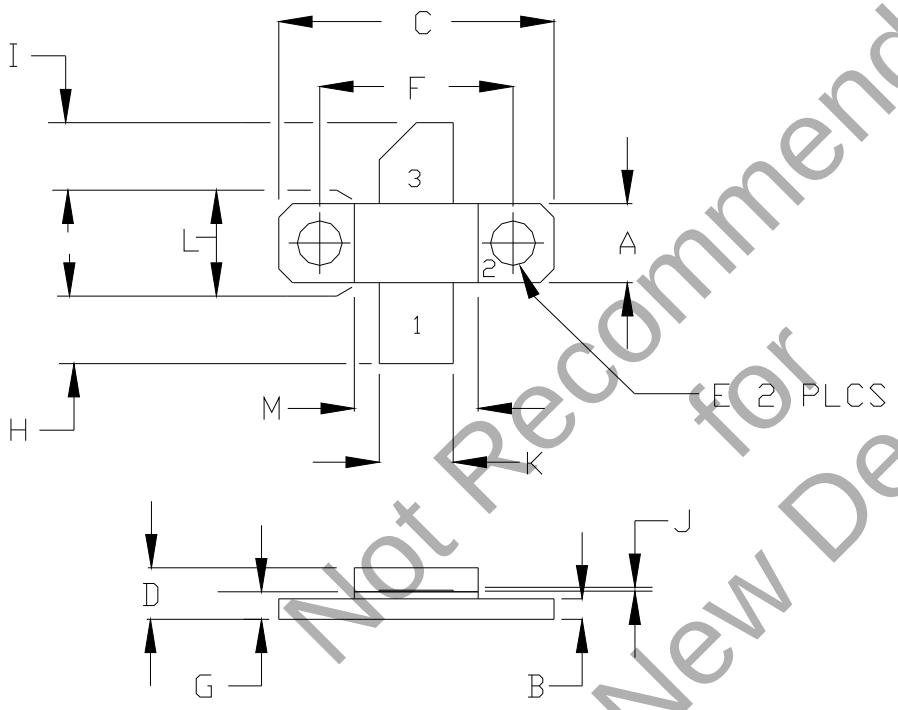
PACKAGE DIMENSIONAL OUTLINE DRAWING



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

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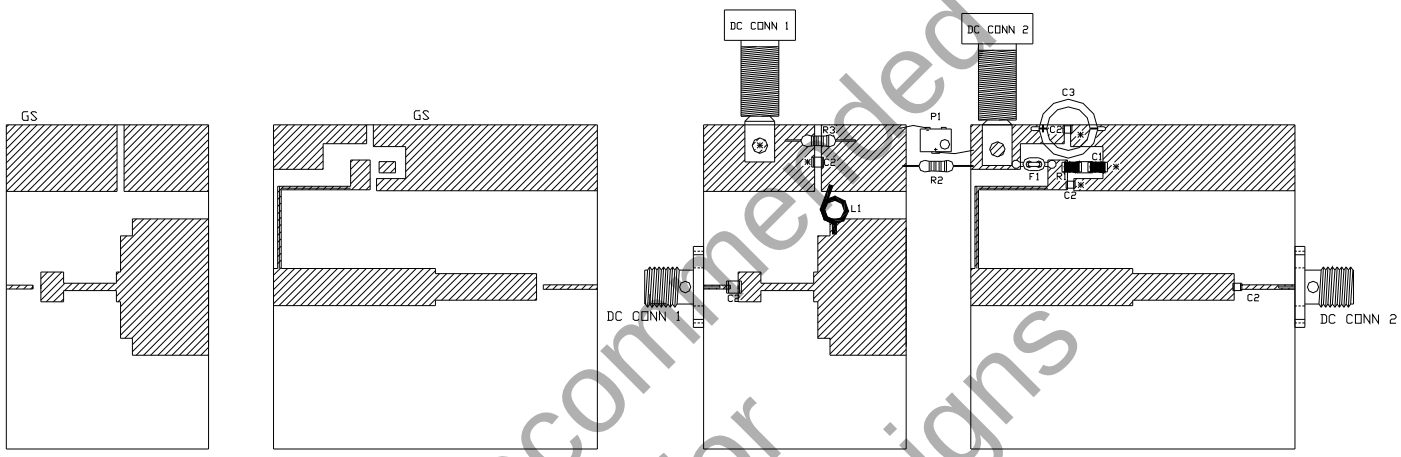
RF TEST FIXTURE – ASSEMBLY AND PARTS LIST



COMPONENT	DESCRIPTION
DUT	TRANSISTOR #ILD1011M15HV MOUNT HARD TO THE RIGHT
PC BOARD	ROGERS #RT6010.2LM 2E/2E .025"
C1	CHIP CAPACITOR ATC100A 0.1uF
C2	CHIP CAPACITOR ATC100A 100pF
C3	ELECTROLYTIC CAPACITOR 68uF
C4 (NOT SHOWN)	ELECTROLYTIC CAPACITOR, 4700uF / 50V
R1	SNUB RESISTOR 6.8Ω OHMS
R2	RESISTOR 10K OHMS
R3	RESISTOR 560 OHMS
L1	3 TURNS #18 AWG, 0.125" DIA, 0.18" LONG PULL TIGHT AND FULLY CLOSED, LEFT HAND.
P1	POTENTIOMETER
F1	FERRITE BEAD WITH BIAS WIRE
BIAS WIRE	BIASLINE WIRE-1
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-04 (1.25")
OUTPUT PC BOARD CARRIER	2 INCH BRASS-07 (2")
TRANSISTOR CARRIER	2 INCH COPPER-05 (PL32)
TRANSISTOR CLAMP	NORYL CLAMP-07
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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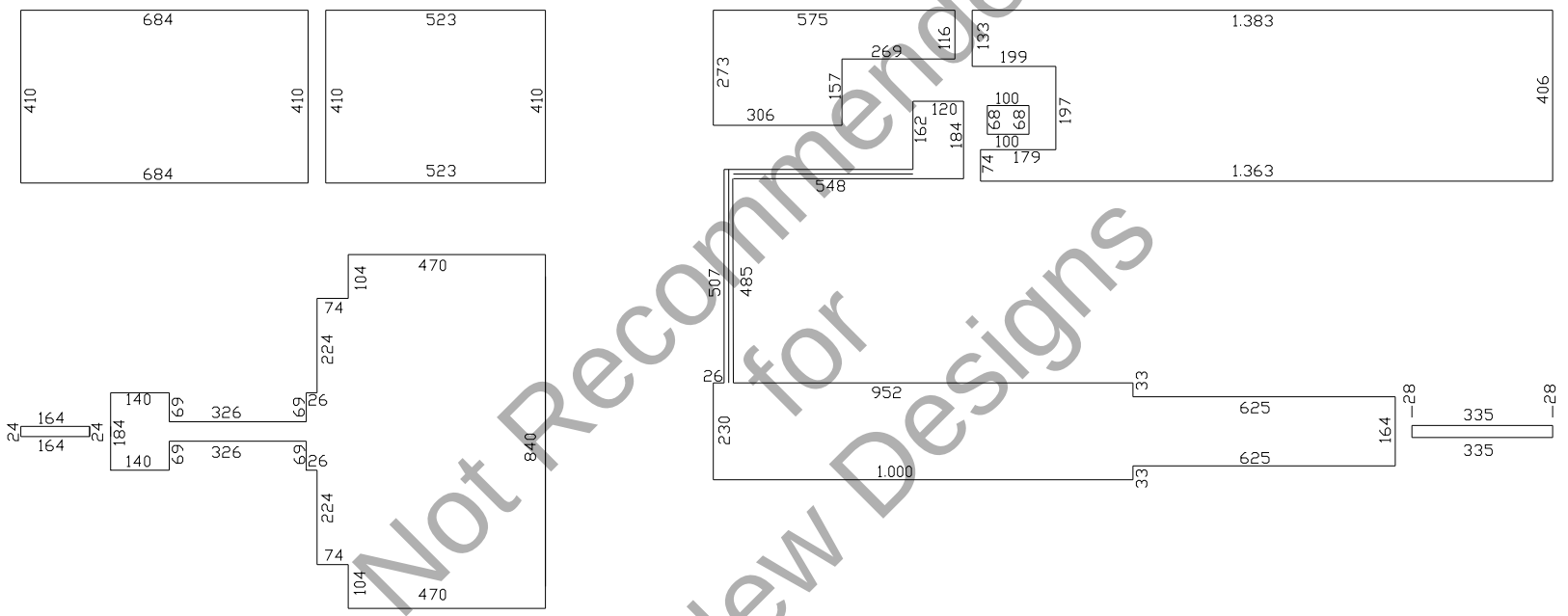
RF TEST FIXTURE – CIRCUIT DIMENSIONS IN MILS



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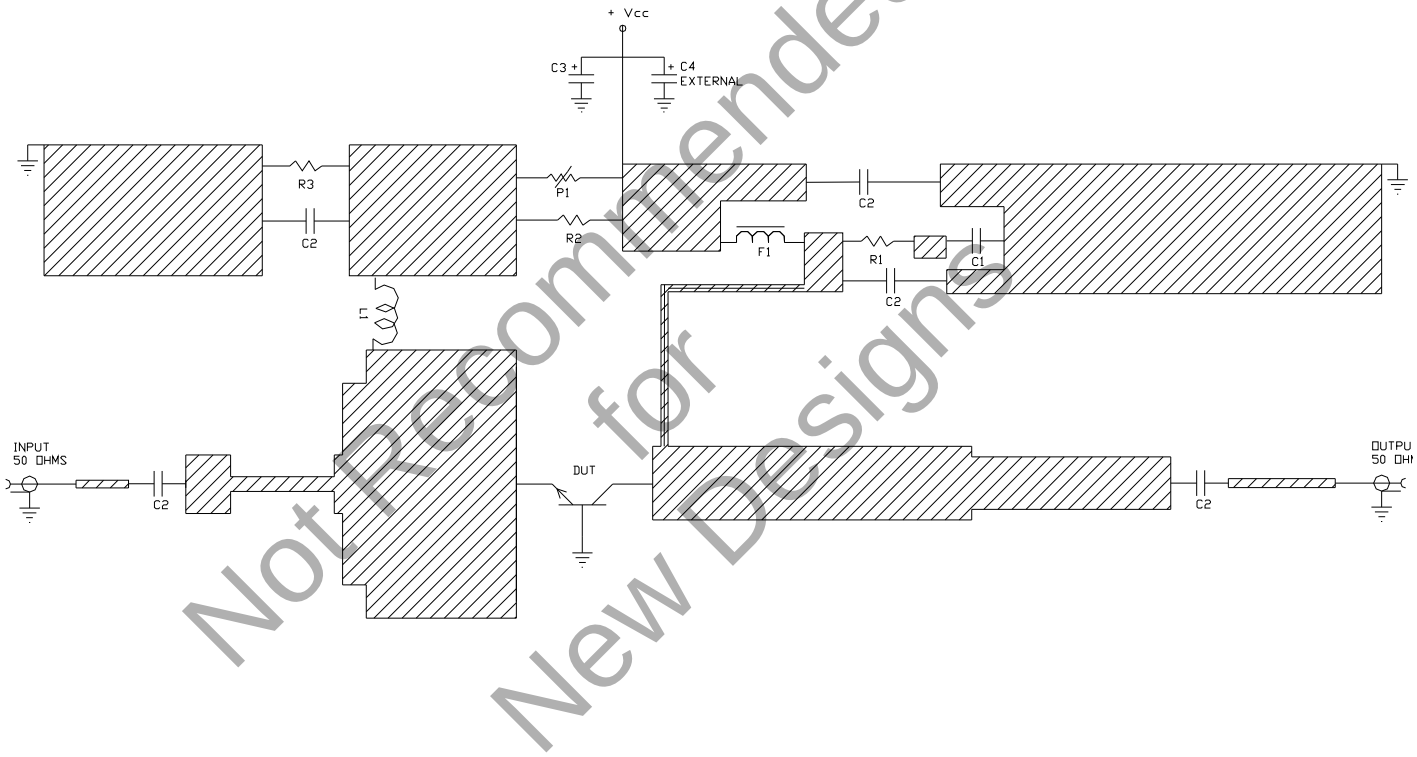
RF TEST FIXTURE – ELECTRICAL SCHEMATIC



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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.	

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