Part Number: ILD0912M150HV

Integra
TECHNOLOGIES, INC.

Avionics Band RF Power LDMOS FET

The high power transistor part number ILD0912M150HV is designed for Avionics systems operating at 960-1215 MHz. Operating at 10µs, 10% pulse conditions this LDMOS FET device supplies a minimum of 150 watts of power across the instantaneous operating bandwidth of 960-1215 MHz. All devices are 100% screened for large signal RF parameters.

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

TYPICAL DATA *TYPICAL DATA* *TYPICAL DATA*

Freq (MHz)	P_I (W)	I_{dr}	I_d (A)	RL (dB)	P_O (W)	N_d (%)	N_d' (%)	G (dB)	Droop (dB)	VSWR 2:1	VSWR 20:1
960	8	0.626	6.26	11.6	184	58.8	59.7	13.62	0.02	S	P
1090	8	0.724	7.24	12.4	196	54.1	54.9	13.89	0.02	S	P
1215	8	0.629	6.29	13	170	54.1	54.9	13.27	0.00	S	P

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

N_d= Drain efficiency (including bias current)

N_d'= Drain efficiency (excluding bias current)

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MAXIMUM RATINGS

Screen	Parameter	Symbol	Min	Max	Units	Test Conditions
BD	Drain-Source Voltage	V_{DS}	--	70	V	--
BD	Gate-Source Voltage	V_{GS}	--	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	$R_{TH(JC)}$	--	0.070	°C/W	V_D=50V, I_{DQ}=10mA, T_F=25±5°C, P_{OUT}=150W
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_{DS} = 50V, V_{GS} = 0V, T_F = 25±5°C
100%	Gate Threshold Voltage	V_{GSTH2}	2	4	V	I_D = 10mA, T_F = 25±5°C, V_{DS} = 5V

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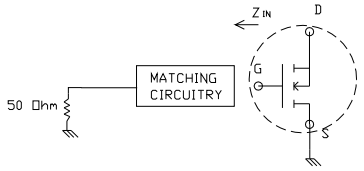
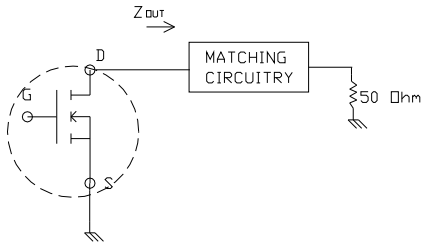
RF ELECTRICAL CHARACTERISTICS

Screen	Parameter	Symbol	Min	Max	Units	Test Conditions
100%	Input Return Loss	IRL	-18	-9	dB	V_{DD}=50V, P_{IN} =8W, Pulse=10µs, 10%, T_F=25±5°C, F=F1, F2, F3, I_{DQ}=10mA.
BD	Maximum Overdrive	$P_{IN(MAX)}$	12		W	V_{DD}=50V, Pulse=10µs, 10%, T_F=25±5°C, F=F1, F2, F3, I_{DQ}=10Ma.
100%	Power Gain	G_P	12.73	14.23	dB	V_{DD}=50V, P_{IN} =8W, Pulse=10µs, 10%, T_F=25±5ºC, F=F1, F2, F3, I_{DQ}=10mA.
100%	Output Power	P_{OUT}	150	212.4	W	V_{DD}=50V, P_{IN} =8W, Pulse=10µs, 10%, T_F=25±5ºC, F=F1, F2, F3, I_{DQ}=10mA.
100%	Drain Efficiency	Nd'	50	75	%	V_{DD}=50V, P_{IN} =8W, Pulse=10µs, 10%, T_F=25±5°C, F=F1, F2, F3, I_{DQ}=10mA.
100%	Pulse Amplitude Droop	D		-0.3	dB	V_{DD}=50V, P_{IN} =8W, Pulse=10µs, 10%, T_F=25±5°C, F=F1, F2, F3, I_{DQ}=10mA.
100%	Stability into 2:1 VSWR	VSWR-S			--	V_{DD}=50V, P_{IN} =8W, Pulse=10µs, 10%, T_F=25±5°C, F=F1, F2, F3, I_{DQ}=10mA. Rotate 2:1 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} =8W, Pulse =10µs, 10%, T_F=25±5°C, F=F1, F2, F3, I_{DQ}=10mA. Rotate 20:1 output VSWR through 360° phase. Survival.
BD	Pulse Risetime	RT		60	ns	V_{DD}=50V, P_{IN} =8W, Pulse =10µs, 10%, T_F=25±5°C, F=F1, F2, F3, I_{DQ}=10mA. Measure between 10% and 90% detected power points.

Note 1	F1 =960 MHz, F2=1090MHz, F3=1215MHz.
Note 2	Pulse format = 10µs, 10%
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)
960	1.15 –j0.82	3.70 –j3.86
1090	1.10 -j0.52	3.50 -j2.20
1215	0.83 –j0.21	3.62 –j0.70
Impedance Definition		

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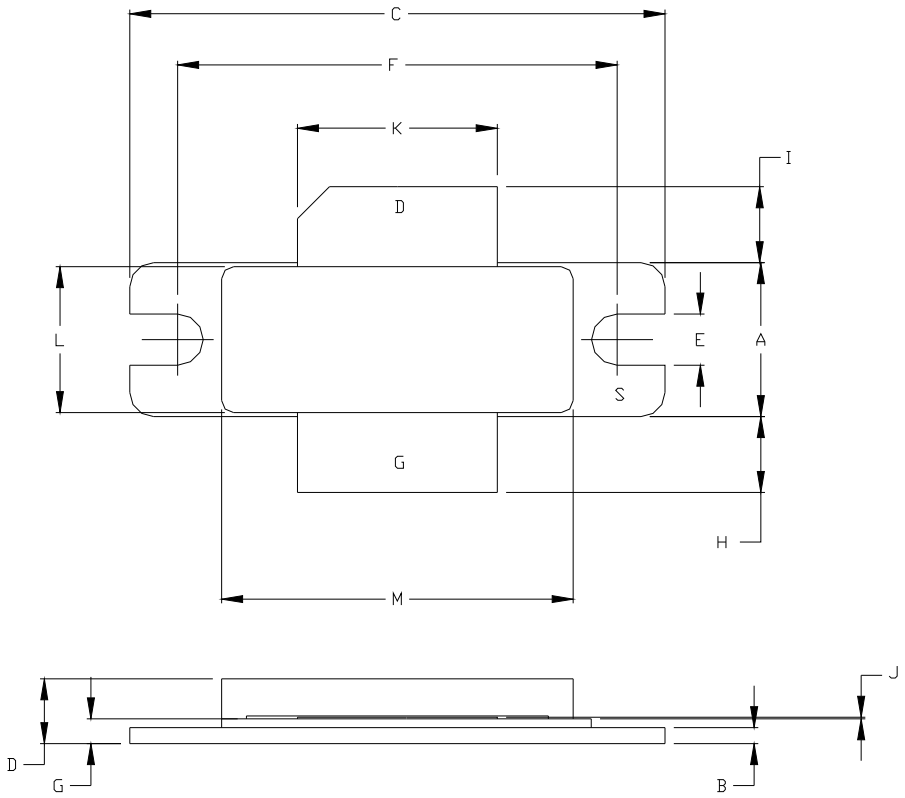
PACKAGE DIMENSIONAL OUTLINE DRAWING



DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.535	0.545	13.58	13.84
B	0.035	0.045	0.89	1.14
C	1.335	1.345	33.90	34.16
D	0.147	0.177	3.73	4.50
E	0.123	0.133	3.12	3.37
F	1.095	1.105	27.81	28.06
G	0.035	0.045	0.89	1.14
H	0.170	0.210	4.32	5.33
I	0.170	0.210	4.32	5.33
J	0.003	0.006	0.08	0.15
K	0.495	0.505	12.57	12.82
L	0.364	0.374	9.24	9.49
M	0.772	0.788	19.60	20.01

PIN SCHEDULE	
D	DRAIN
S	SOURCE
G	GATE

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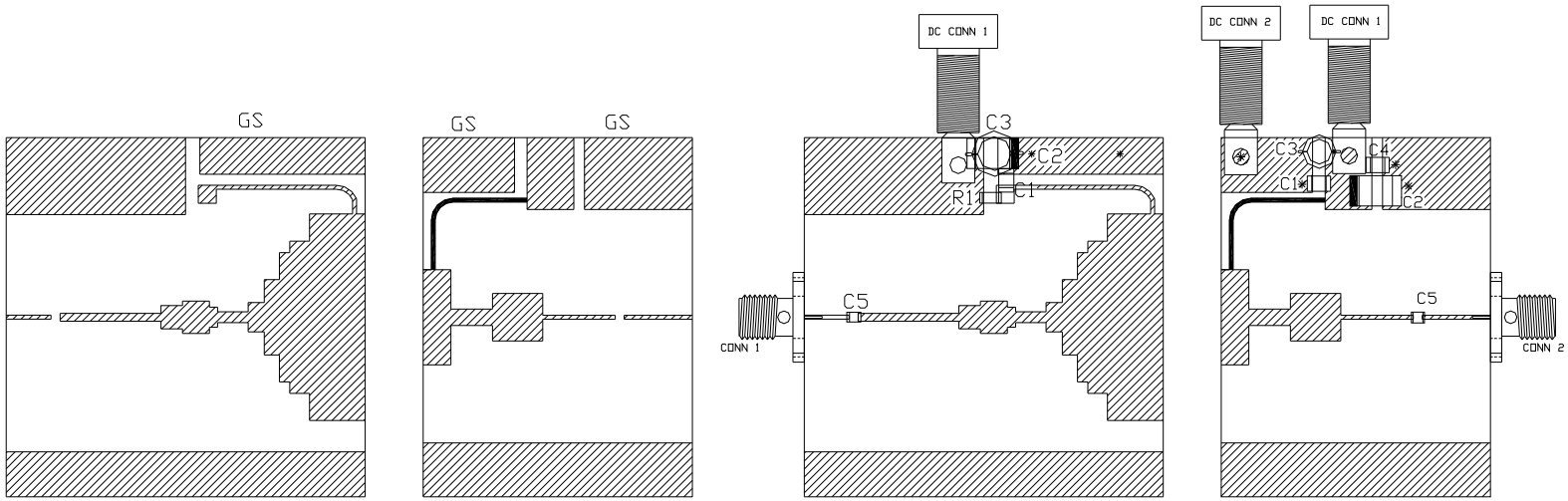
RF TEST FIXTURE – ASSEMBLY AND PARTS LIST



COMPONENT	DESCRIPTION
DUT	TRANSISTOR ILD0912M150HVX MOUNT HARD TO THE RIGHT
PC BOARD	ROGERS #RO 3010 10.2, .025" 1oz Cu
C1	CHIP CAPACITOR ATC100B-47pF (2PLCS)
C2	TANTALUM - AVX 4.7 uF, 50V ESR = 0.3OHMS (2PLCS)
C3	ELECTROLYTIC CAPACITOR 68uF/63V
C4	CHIP CAPACITOR CERAMIC ATC100B - 1000pF 250V
C5	CHIP CAPACITOR ATC100A - 39 pF (2PLCS)
C6 (NOT SHOWN)	ELECTROLYTIC CAPACITOR, 4700uF / 50V
R1	RESISTOR 1206 - 300 OHMS
GS (6 PLACES)	GROUND SHIM, COPPER, TH=0.001"
CONN 1, CONN 2	SMA CONNECTOR, OS #2052-5636-02
INPUT PC BOARD CARRIER	2 INCH BRASS-07 (2.0")
OUTPUT PC BOARD CARRIER	2 INCH BRASS-05 (1.5")
TRANSISTOR CARRIER	2 INCH COPPER-22
TRANSISTOR CLAMP	NORYL CLAMP-08
ALUMINUM HEAT SINK	2 INCH HEATSINK-11
DC CONN 1	BANANA JACK, BLACK
DC CONN 2	BANANA JACK, RED
NOTE	USE CORNELL DUBILIER ALUMINUM FLAT PACK "MLP" SERIES OR SIMILAR FOR STORAGE CAPACITOR FIXTURE HARDWARE DRAWINGS AVAILABLE ON REQUEST

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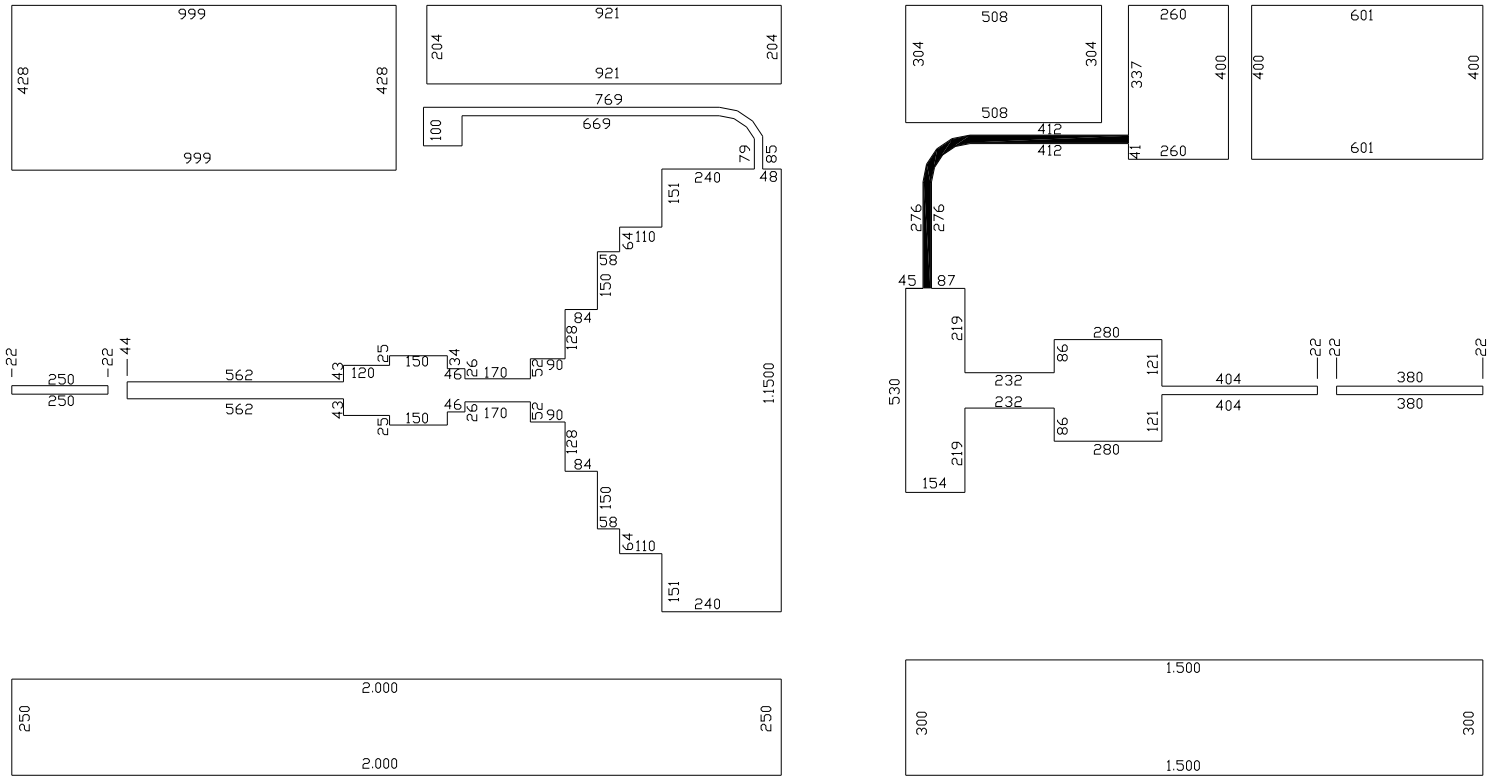
RF TEST FIXTURE – CIRCUIT DIMENSIONS IN MILS



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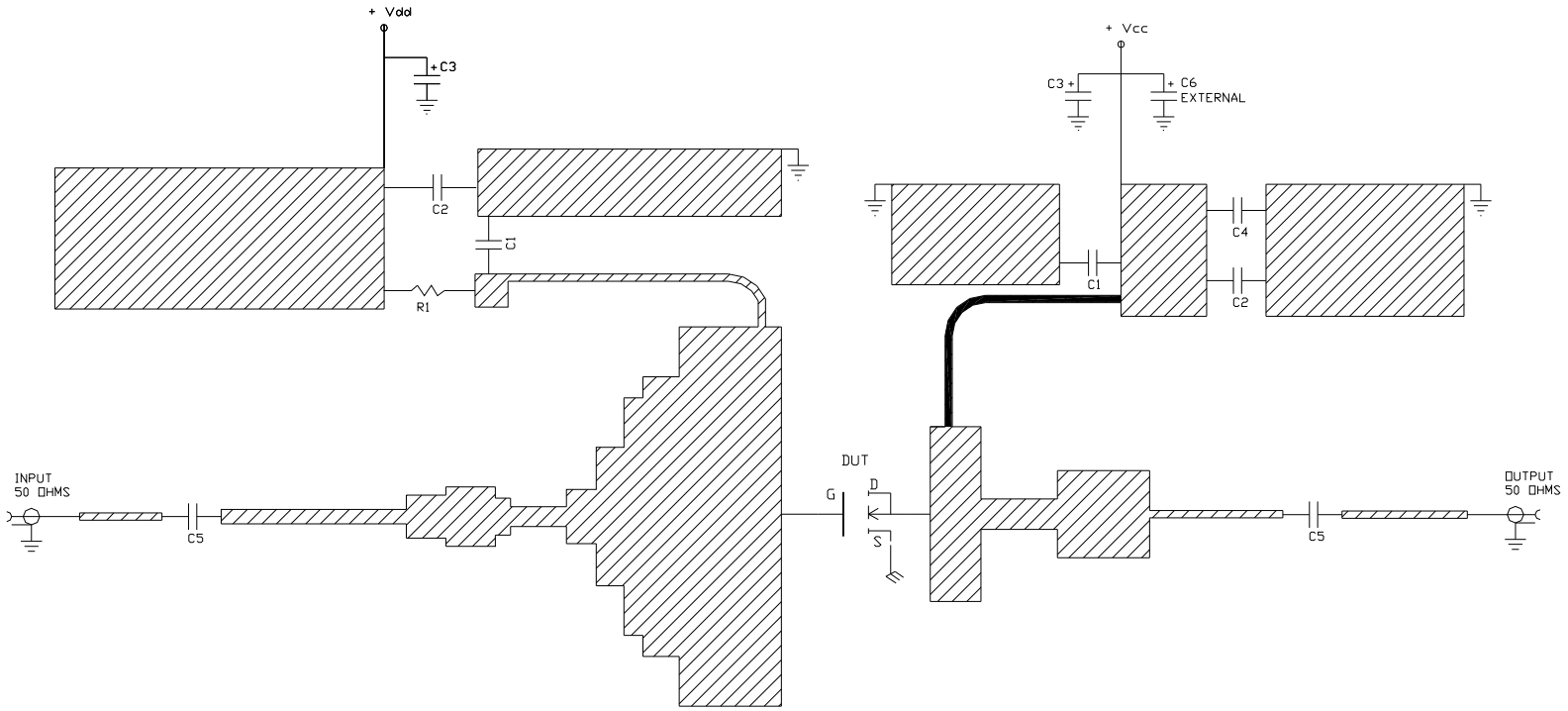
RF TEST FIXTURE – ELECTRICAL SCHEMATIC



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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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