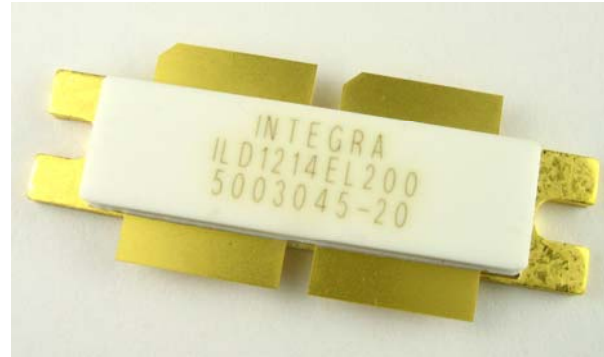


## L-Band RF Power LDMOS Transistor

The high power pulsed transistor part number ILD1214EL200 is designed for L-Band systems operating at 1.215–1.400 GHz. Operating at a pulse width of 16ms with a duty factor of 50%, this dual LDMOS device supplies a minimum of 200 watts of peak pulse power across the instantaneous operating bandwidth of 1.215–1.400 GHz. Fabricated with all gold metal contact, wire bonding and package for maximum reliability. All devices are 100% screened for large signal RF parameters in the broadband RF test fixture across the entire specified operating bandwidth with no variable or external tuning.



### Silicon LDMOS

- High Power Gain
- Superior Thermal Stability

### Class AB Operation

- Gate biased to  $I_{DQ}=2x250mA$

### Configuration

- Common Source

### Gold Metal

- Gold Chip Metal
- Gold Wire Bond
- Maximum Reliability

### Package

- Thermally Enhanced
- Gold Metal Based

### Epoxy Sealed Lid

- Gross Leak Qualified

### RF Test Fixture

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

## TYPICAL BROADBAND DATA

Device	Freq (MHz)	Pi (W)	I <sub>d</sub> (A)	RL (dB)	P <sub>o</sub> (W)	η <sub>d</sub> (%)	G (dB)	dG (dB)	Drp (dB)	VSWR 2:1
D4474-1	1215	10.9	14.76	-18	200	45.2	12.64		-0.02	S P
	1300	11	15.8	-18	200	42.2	12.60	0.56	-0.11	S P
	1400	12.4	15	-16	200	44.4	12.08		-0.13	S P

**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	$T_{STG}$	-40	+150	°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	$R_{TH(JC)}$	--	0.25	°C/W	$V_{dd}=30V, I_{DQ}=2x250mA, T_F=70\pm5^\circ C, P_{OUT}=200W$
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 (each side)	$BV_{DSS}$	65	--	V	$I_D = 10mA, V_{GS} = 0V, T_F = 25\pm5^\circ C$
BD	Drain Leakage Current (each side)	$I_{DSS}$	--	1.0	$\mu A$	$V_{DS} = 30V, V_{GS} = 0V, T_F = 25\pm5^\circ C$
100%	Gate Threshold Voltage (each side)	$V_{GSTH2}$	2.0	3.0	V	$I_D = 0.75A, V_{DS} = 5V, T_F = 25\pm5^\circ C$
BD	Gate Leakage Current (each side)	$I_{GSS}$	--	1.0	$\mu A$	$V_{GS} = 10V, V_{DS} = 0V, T_F = 25\pm5^\circ C$

**RF ELECTRICAL CHARACTERISTICS**

Screen	Parameter	Symbol	Min	Max	Units	Test Conditions
100%	Input Return Loss	RL	-18	-7	dB	$V_{DD}=V1$ ; $I_{DQ}=I_{DQ1}$ ; $T_F=T_{F1}$ ; $P_O=P_{OUT1}$ ; $F=F1, F2, F3$ ; PW1,DF1
100%	Power Gain	$G_P$	10	16.5	dB	$V_{DD}=V1$ ; $I_{DQ}=I_{DQ1}$ ; $T_F=T_{F1}$ ; $P_O=P_{OUT1}$ ; $F=F1, F2, F3$ ; PW1,DF1
100%	Input Power	$P_i$	4.48	20.0	W	$V_{DD}=V1$ ; $I_{DQ}=I_{DQ1}$ ; $T_F=T_{F1}$ ; $P_O=P_{OUT1}$ ; $F=F1, F2, F3$ ; PW1,DF1
100%	Drain Current Efficiency	$\eta_D$	38	75	%	$V_{DD}=V1$ ; $I_{DQ}=I_{DQ1}$ ; $T_F=T_{F1}$ ; $P_O=P_{OUT1}$ ; $F=F1, F2, F3$ ; PW1,DF1
100%	Pulse Amplitude Droop	Droop	-0.5	0.5	dB	$V_{DD}=V1$ ; $I_{DQ}=I_{DQ1}$ ; $T_F=T_{F1}$ ; $P_O=P_{OUT1}$ ; $F=F1, F2, F3$ ; PW1,DF1
100%	Gain Flatness versus Frequency	GF	0	3	dB	$V_{DD}=V1$ ; $I_{DQ}=I_{DQ1}$ ; $T_F=T_{F1}$ ; $P_O=P_{OUT1}$ ; $F=F1, F2, F3$ ; PW1,DF1
100%	Stability into 2:1 VSWR	VSWR-S	2:1	--	--	$V_{DD}=V1$ ; $I_{DQ}=I_{DQ1}$ ; $T_F=T_{F1}$ ; $P_O=P_{OUT1}$ ; $F=F1, F2, F3$ ; PW1,DF1 Rotate 2:1 output VSWR through 360° phase. No oscillatory or pulse break-up characteristics allowed on detected output pulse.
100%	Load Mismatch Tolerance	LMT	2:1	--	--	$V_{DD}=V1$ ; $I_{DQ}=I_{DQ1}$ ; $T_F=T_{F1}$ ; $P_O=P_{OUT1}$ ; $F=F1, F2, F3$ ; PW1,DF1 Rotate output VSWR through 360° phase. Post test $P_O = \text{Pre test } P_O \pm 10W$ .
Notes	$V1=30V$ ; $I_{DQ1}$ (Drain Quiescent Current)=250mA/side PW1(Pulse Width 1) =16ms; DF1(Duty Factor 1)=50%; $P_{OUT1}=200W$ ; $F1=1.215GHz$ , $F2=1.300GHz$ , $F3=1.400GHz$ $T_{F1}$ (Flange Temp)= $40 \pm 5^\circ C$ ; RF Electrical characteristics are tested in broadband RF test fixture. Thermal grease is applied to the flange for RF testing.					

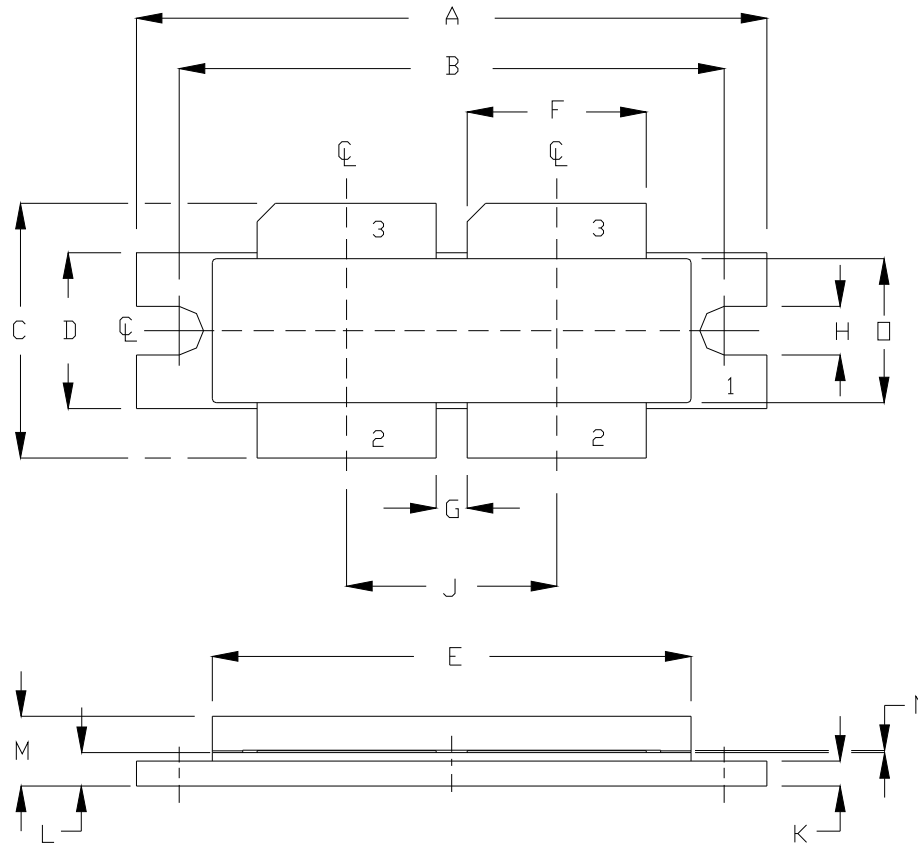
**BROADBAND RF TEST FIXTURE IMPEDANCE CHARACTERISTICS**

Frequency (GHz)	$Z_{IF}$ ( $\Omega$ )	$Z_{OF}$ ( $\Omega$ )
1.215	1.8 -j1.2	1.2 -j2.9
1.300	1.7 -j0.4	1.2 -j2.1
1.400	1.6 +j0.6	1.2 -j1.4

$Z_{IF}$  = The test fixture input impedance for each side.

$Z_{OF}$  = The test fixture output impedance for each side.

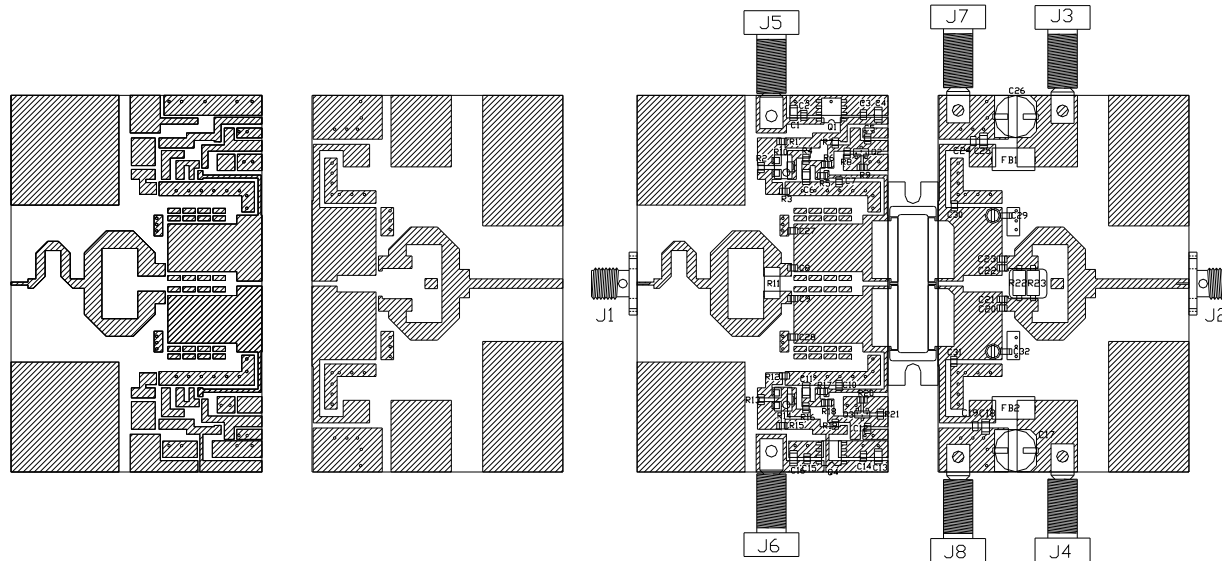
**PACKAGE DIMENSIONAL OUTLINE DRAWING**



DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	1.615	1.625	41.02	41.27
B	1.395	1.405	35.43	35.69
C	0.634	0.674	16.10	17.12
D	0.395	0.405	10.03	10.29
E	1.219	1.241	30.96	31.52
F	0.455	0.465	11.56	11.81
G	0.075	0.085	1.90	2.16
H	0.120	0.130	3.05	3.30
J	0.535	0.545	13.59	13.84
K	0.059	0.069	1.499	1.753
L	0.081	0.091	2.06	2.31
M	0.164	0.194	4.16	4.93
N	0.004	0.007	0.10	0.18
Ø	0.354	0.364	8.99	9.24

PIN SCHEDULE	
1	SOURCE
2	GATE
3	DRAIN

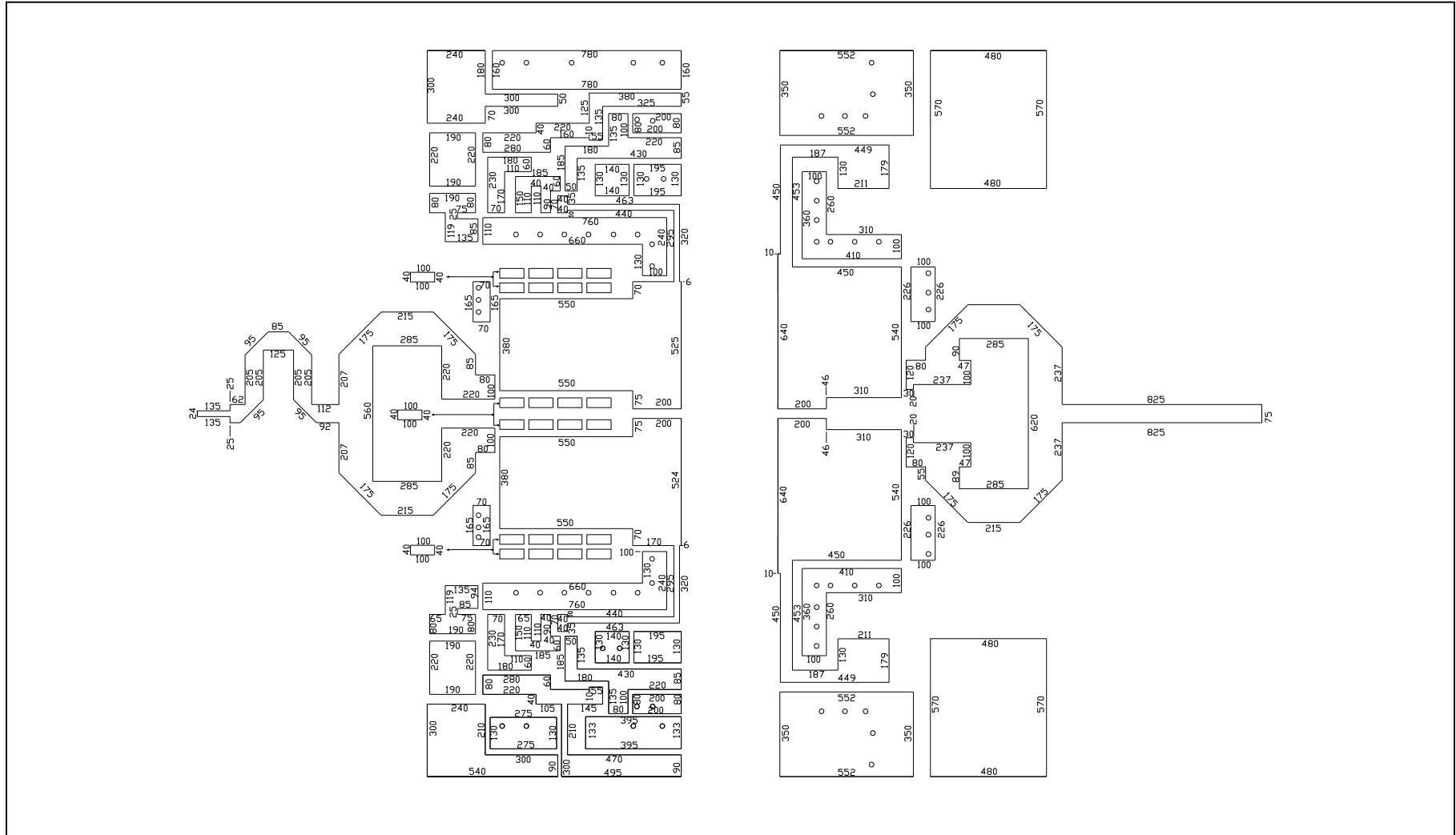
**RF-TEST-FIXTURE ASSEMBLY AND PART LIST**



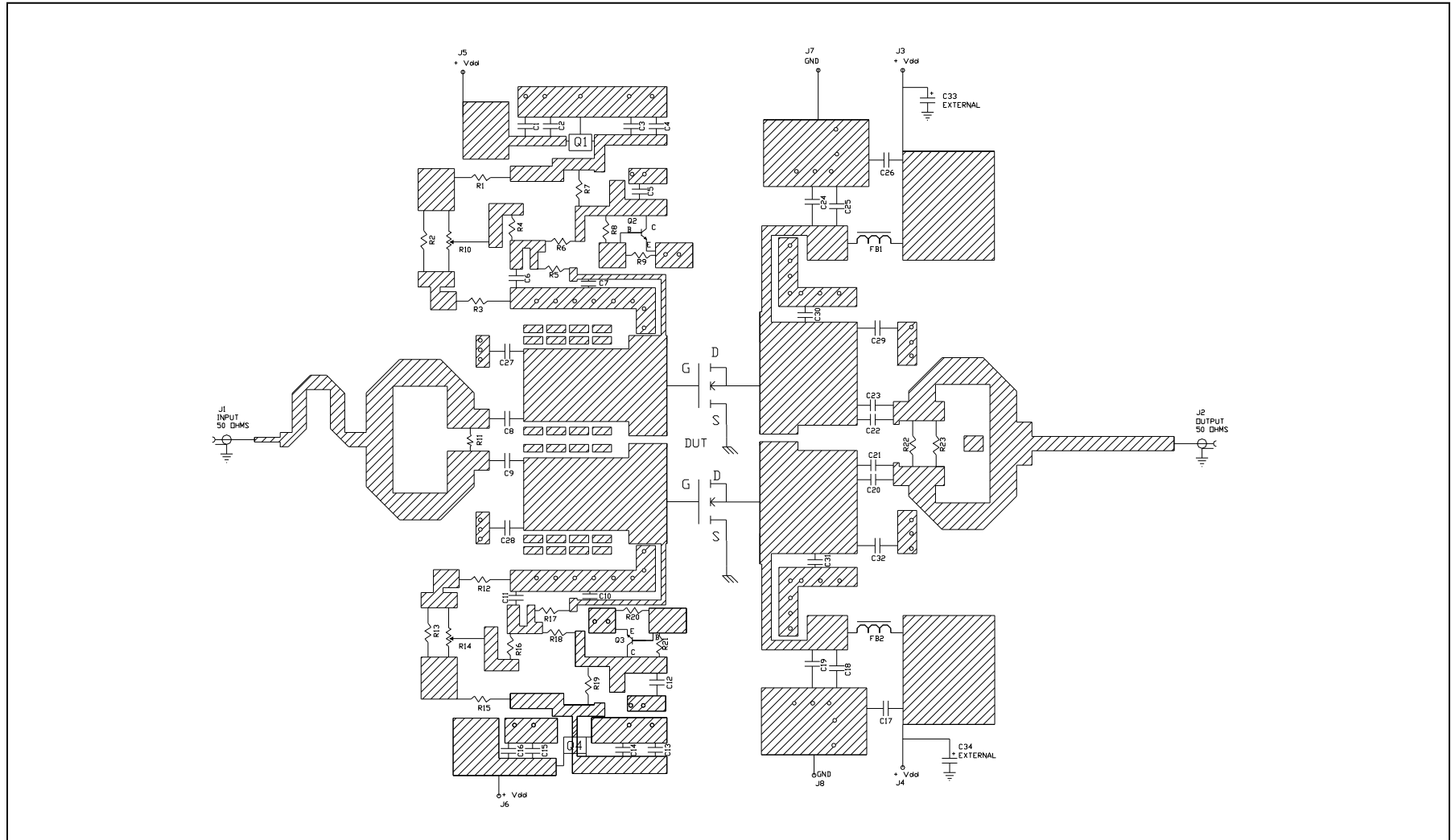
COMPONENT	DESCRIPTION
BUY	TRANSISTOR ILD1214EL200 MOUNT HARD TO THE RIGHT
PC BOARD	RIGID, #01 500, 23mil, 1oz, COPPER
C1, C4, C6, C11, C13, C16, C18, C25	CHIP CAPACITOR 1206, 1uF, MURATA GRM31CR72A105KA01L
C2, C3, C5, C7, C8, C9, C10, C12, C14, C15, C19, C24	CHIP CAPACITOR 100pF, ATC 600F101JW250X1
C17, C26	ELECTROLYTIC CAPACITOR 68uF / 50V, 8x10mm NICHIDN 14016639MML165
C20, C21, C22, C23	CHIP CAPACITOR 0505, 47pF, ATC 100A
C27, C28	CHIP CAPACITOR 0805, 33pF, ATC 600F33BWP250
C29, C32	CHIP CAPACITOR 04-23pF, TRIMERS (DHANSON #27283
C30	CHIP CAPACITOR 0805, 3pF, ATC 600F3RDCW250
C31	CHIP CAPACITOR 0805, 3pF, ATC 600F3RDCW250
C33, C34 (External)	ELECTROLYTIC CAPACITOR 4700uF / 50V
FBI, FB2	BEAD, 10A STEWARD #28F0181-1SR-10
R1, R15	RESISTOR 0805, 820ohm
R2, R13	RESISTOR 0805, 390ohm
R3, R12	RESISTOR 0805, 150ohm
R4, R16	RESISTOR 0805, 18kohm
R5, R17	RESISTOR 0805, 31ohm
R6, R18	RESISTOR 0805, 10kohm
R7, R19	RESISTOR 0805, 1kohm
R8, R21	RESISTOR 0805, 5kohm

COMPONENT	DESCRIPTION
R9, R20	RESISTOR 0805, 15kohm
R10, R14	RESISTOR P10T, 200ohm, BURNS #3224W-1-201E
R11	RESISTOR 200ohm, 1w, 5%, 2512
R22, R23	RESISTOR 50ohm, 30w, 2010, ATC LR1201010050 J8K
Q1, Q4	IC, V-REG, S01CB #UA78L08ACD
Q2, Q3	TRANSISTOR NPN, SOT-23, MMBT2222AFSCT-ND
J1, J2	SMA CONNECTOR DS #8092-5636-02
INPUT PC BOARD CARRIER	3 INCH BRASS-07 RPK
OUTPUT PC BOARD CARRIER	3 INCH BRASS-07 RPK
TRANSISTOR CARRIER	4 INCH COPPER-24 RPK
TRANSISTOR CLAMP	NDURL CLAMP-T80
ALUMINUM HEATSINK	4 INCH HEATSINK-03
J7, J8	BANANA JACK, BLACK
J3, J4	BANANA JACK, RED
J5, J6	BANANA JACK, BLUE
NOTE	FIXTURE HARDWARE DRAWINGS AVAILABLE ON REQUEST

**RF-TEST-FIXTURE CIRCUIT DIMENSIONS**



**RF-TEST-FIXTURE ELECTRICAL SCHEMATIC**



**DEFINITIONS**

<b>Data Sheet Status</b>	
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.
<b>Maximum Ratings</b>	
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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