



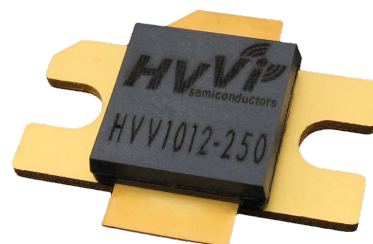
The innovative Semiconductor Company!

HVV1012-250 HIGH VOLTAGE, HIGH RUGGEDNESS

*L-Band Avionics Pulsed Power Transistor
1025-1150 MHz, 10 μ s Pulse, 1% Duty Cycle
For Airborne DME, TCAS and IFF Applications*

FEATURES

- Silicon MOSFET Technology
- Operation from 24V to 50V
- High Power Gain
- Extreme Ruggedness
- Internal Input and Output Matching
- Excellent Thermal Stability
- All Gold Bonding Scheme



TYPICAL PERFORMANCE

High voltage vertical technology is well suited for high power pulsed applications in the L-Band including Airborne DME, IFF, TCAS and Mode-S applications.

MODE	FREQUENCY (MHz)	VDD (V)	IDQ (mA)	Power (W)	GAIN (dB)	EFFICIENCY (%)	IRL (dB)
Class AB	1150	50	100	250	19.5	48	20:1

Table 1: Typical RF Performance in broadband test fixture at 25°C temperature with RF pulse conditions of pulse width = 10 μ s and pulse period = 1ms.

DESCRIPTION

The high power HVV1012-250 device is an enhancement mode RF MOSFET power transistor designed for pulsed applications in the L-Band from 1025MHz to 1150MHz. The high voltage HVVFET™ technology produces over 250W of pulsed output power while offering high gain, high efficiency, and ease of matching with a 50 V supply. The vertical device structure assures high reliability and ruggedness as the device is specified to withstand a 20:1 VSWR at all phase angles under full rated output power.

ORDERING INFORMATION

Device Part Number: HVV1012-250

Demo Kit Part Number: HVV1012-250-EK

Available through Richardson Electronics (<http://rfwireless.rell.com/>)

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ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Conditions	Min	Typical	Max	Unit
$V_{BR(DSS)}$	Drain-Source Breakdown	VGS=0V, ID=5mA	95	102	-	V
I_{DSS}	Drain Leakage Current	VGS=0V, VDS=48V	-	50	200	μ A
I_{GSS}	Gate Leakage Current	VGS=5V, VDS=0V	-	1	5	μ A
G_P^1	Power Gain	F=1150MHz	17.5	19.5	-	dB
IRL^1	Input Return Loss	F=1150MHz	-	-7	-4	dB
η_D^1	Drain Efficiency	F=1150MHz	46	48	-	%
$V_{GS(Q)}^2$	Gate Quiescent Voltage	VDD=50V, IDQ=100mA	1.1	1.45	1.8	V
V_{TH}	Threshold Voltage	VDD=5V, ID=300 μ A	0.7	1.2	1.7	V

PULSE CHARACTERISTICS

Symbol	Parameter	Conditions	Min	Typical	Max	Unit
T_r^1	Rise Time	F=1150MHz	-	<40	50	nS
T_f^1	Fall Time	F=1150MHz	-	<15	50	nS
PD^1	Pulse Droop	F=1150MHz	-	0.25	0.5	dB

THERMAL CHARACTERISTICS

Symbol	Parameter	Max	Unit
θ_{JC}^1	Thermal Resistance	0.10	$^{\circ}$ C/W

RUGGEDNESS PERFORMANCE

Symbol	Parameter	Test Condition	Max	Units
LMT^1	Load Mismatch Tolerance	F = 1150 MHz	20:1	VSWR

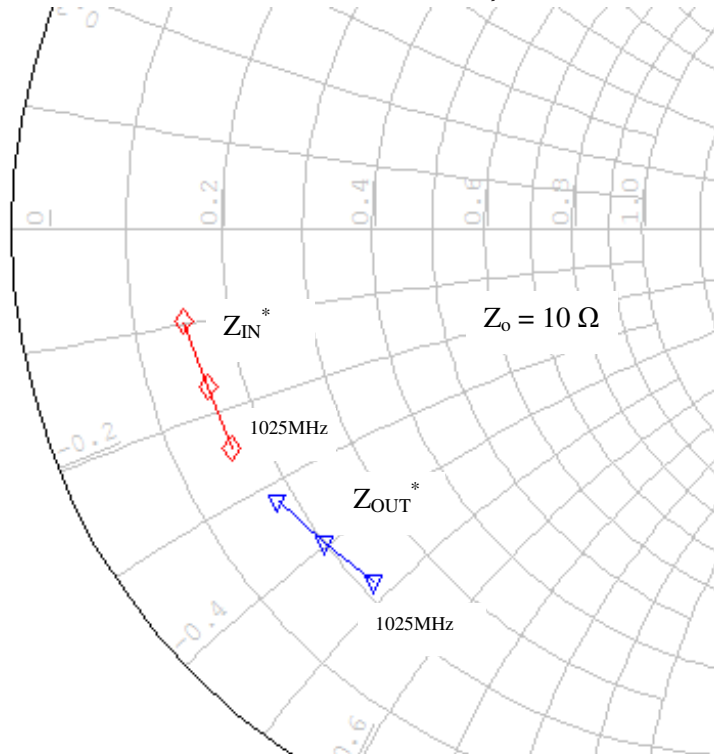
The HVV1012-250 device is capable of withstanding an output load mismatch corresponding to a 20:1 VSWR at rated output power and nominal operating voltage across the frequency band of operation.

¹**NOTE: All parameters measured under pulsed conditions at 250W output power measured at the 10% point of the pulse with pulse width = 10 μ sec, duty cycle = 1% and VDD = 50V, IDQ = 100mA in a broad-band matched test fixture.**

²**NOTE: Amount of gate voltage required to attain nominal quiescent current.**

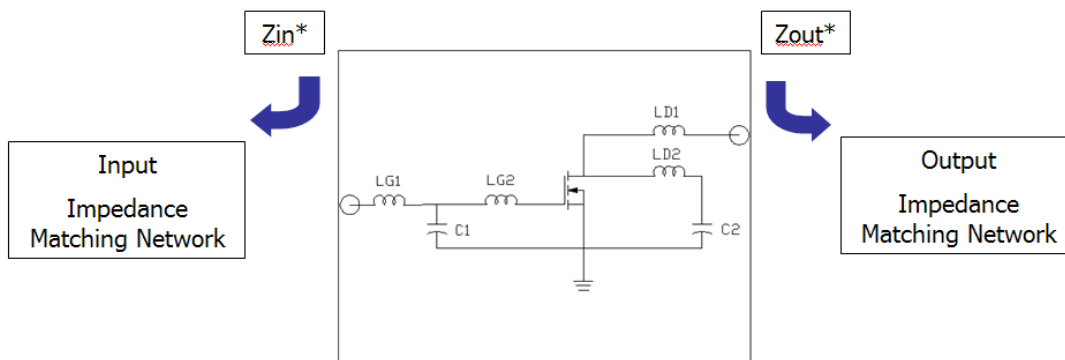
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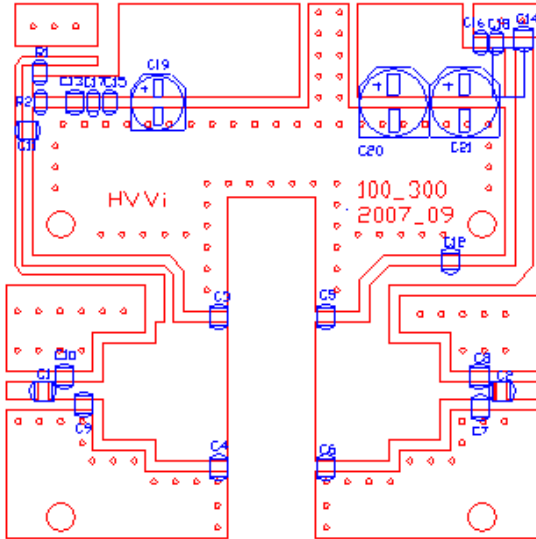
Test Circuit Impedance

Frequency	Z_{in}^* (ohms)	Z_{out}^* (ohms)
1025MHz	1.64-j2.43	2.17-j4.75
1087MHz	1.60-j1.71	2.00-j3.94
1150MHz	1.51-j0.97	1.80-j3.20



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Demonstration Board Outline



Demonstration Circuit Board Picture

(AutoCAD Files for Demonstration Board available online at www.hvvi.com/products)

Part	Description	Part Number	Manufacturer
C1, C2:	100 pF ATC 100B Chip Capacitor	100B101JP500X	ATC
C3,C4:	3.9 pF ATC 100B Chip Capacitor	100B3R9JP500X	ATC
C5:	5.6 pF ATC 100B Chip Capacitor	100B5R6JP500X	ATC
C6,C9:	4.7 pF ATC 100B Chip Capacitor	100B4R7JP500X	ATC
C7,C8:	2.0 pF ATC 100B Chip Capacitor	100B2R0JP500X	ATC
C10:	2.4 pF ATC 100B Chip Capacitor	100B2R4JP500X	ATC
C11:	15 pF ATC 100B Chip Capacitor	100B150JP500X	ATC
C12:	27 pF ATC 100B Chip Capacitor	100B270JP500X	ATC
C13, C14:	47 pF ATC 100B Chip Capacitor	100B470JP500X	ATC
C15, C16:	10K pF 100V Chip Capacitor (X7R 1206)	C1206C103K1RACTU	Kemet
C17, C18:	1K pF 100V Chip Capacitor (X7R 1206)	C1206C102K1RACTU	Kemet
C19:	10 uF 63V Elect FK SMD	PCE3479CT-ND	Digi Key
C20, C21:	100 uF 63V Elect FK SMD	PCE3483CT-ND	Digi Key
R1:	10 Ohms Chip Resistor (1206)	ERJ8GEYJ100V	Panasonic
R2:	1.0 K Ohms Chip Resistor (1206)	ERJ8GEYJ102V	Panasonic
RF Connectors	Type "N" RF connectors	5919CC-TB-7	Coaxicom
DC Drain Conn	Connector Jack Banana Nylon Red	J151-ND	DIGI-KEY
DC Ground Conn	Connector Jack Banana Nylon Black	J152-ND	DIGI-KEY
DC Gate Conn.	Connector Jack Banana Nylon Green	J153-ND	DIGI-KEY
PCB Board	PCB: Arlon, 30 mils thick, 2.55 Dielectric, 2 oz Copper # (DS2346)		DS Electronics
Device Clamp	Cool Innovation Nylon Clamp Foot	FXT000158 Rev. B	Cool Innovation
Heat Sink	Cool Innovations Aluminum Heat Sink	3-252510RS3411	Cool Innovation
S.S. Screws (4)	4-40 X 1/4 Stainless Steel Socket Hex Head	P242393	Copper State Bolt
Alloy Screws (4)	4-40 X 1/2 Alloy Socket Cap screw Hex	SCAS-0440-08C	Small Parts Inc
Metal Washer (6)	#4 Washer Zinc PLTD Steel Lock	ZSLW-004-M	Small Parts Inc
Alloy Screws (2)	4-40 X 3/4 Alloy Socket Cap Screw Head	SCAS-0440-12M	Small Parts Inc

HVV1012-250 Demonstration Circuit Board Bill of Materials

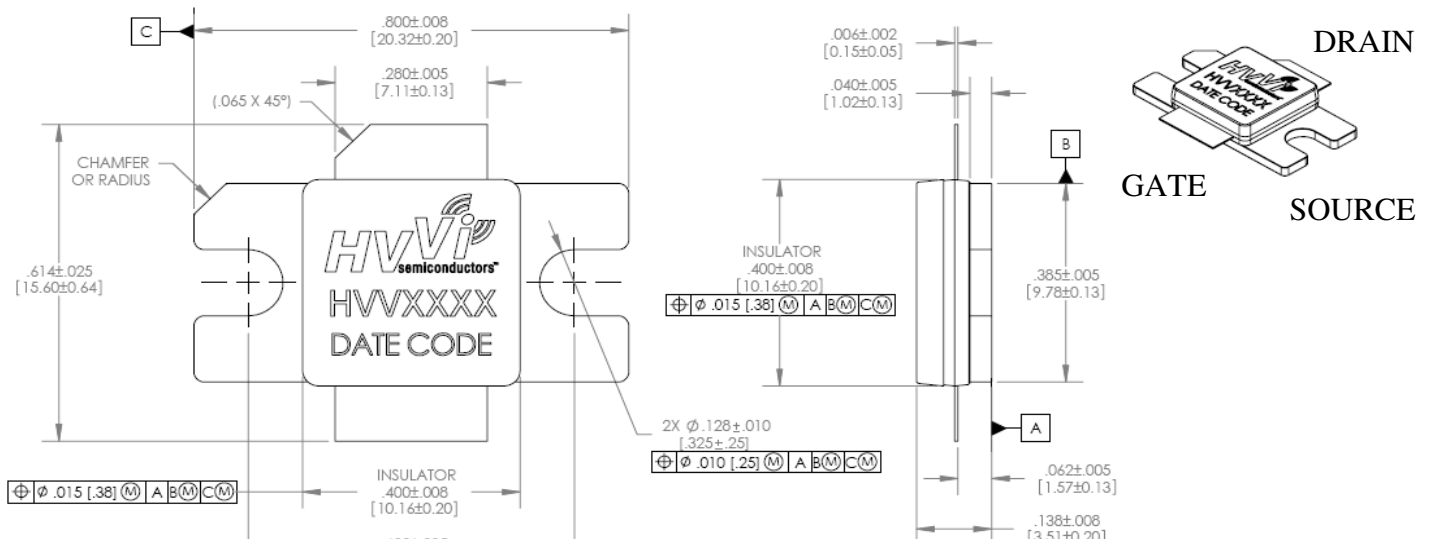


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PACKAGE DIMENSIONS



Note: Drawing is not actual size.

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