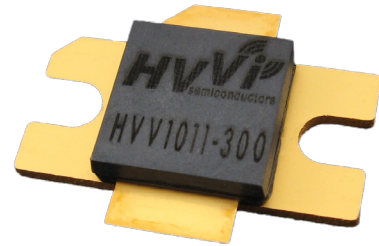


## HVV1011-300 HIGH VOLTAGE, HIGH RUGGEDNESS

*L-Band Avionics Pulsed Power Transistor  
1030/1090 MHz, 50µs Pulse, 5% Duty  
For TCAS, IFF and Mode-S 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 IFF, TCAS and Mode-S applications.

MODE	FREQUENCY (MHz)	VDD (V)	IDQ (mA)	Power (W)	GAIN (dB)	$\eta$ (%)	IRL (dB)	VSWR
Class AB	1400	50	100	120	20	45	-8	20:1

Table 1: Typical RF Performance in broadband test fixture at 25°C temperature with RF pulse conditions of pulse width = 50µs and pulse period = 1ms.

### DESCRIPTION

The high power HVV1011-300 device is an enhancement mode RF MOSFET power transistor designed for pulsed applications in the L-Band from 1030MHz to 1090MHz. The high voltage HVVFET™ technology produces over 300W 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: HVV1011-300

Demo Kit Part Number: HVV1011-300-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=50V	-	50	200	µA
$I_{GSS}$	Gate Leakage Current	VGS=5V, VDS=0V	-	1	5	µA
$G_P^1$	Power Gain	F=1090MHz	16	18	-	dB
$IRL^1$	Input Return Loss	F=1090MHz	-	-12	-8	dB
$\eta_D^1$	Drain Efficiency	F=1090MHz	43	45	-	%
$VGS(Q)^2$	Gate Quiescent Voltage	VDD=50V, IDQ=100mA	1.1	1.45	1.8	V
VTH	Threshold Voltage	VDD=5V, ID=300µA	0.7	1.2	1.7	V

### PULSE CHARACTERISTICS

Symbol	Parameter	Conditions	Min	Typical	Max	Unit
$T_r^1$	Rise Time	F=1090MHz	-	<35	50	nS
$T_f^1$	Fall Time	F=1090MHz	-	<15	50	nS
$PD^1$	Pulse Droop	F=1090MHz	-	0.3	0.5	dB

### THERMAL PERFORMANCE

Symbol	Parameter	Max	Unit
$\theta_{JC}^1$	Thermal Resistance	0.20	°C/W

### RUGGEDNESS PERFORMANCE

Symbol	Parameter	Test Condition	Max	Units
LMT <sup>1</sup>	Load Mismatch Tolerance	F = 1090 MHz	20:1	VSWR

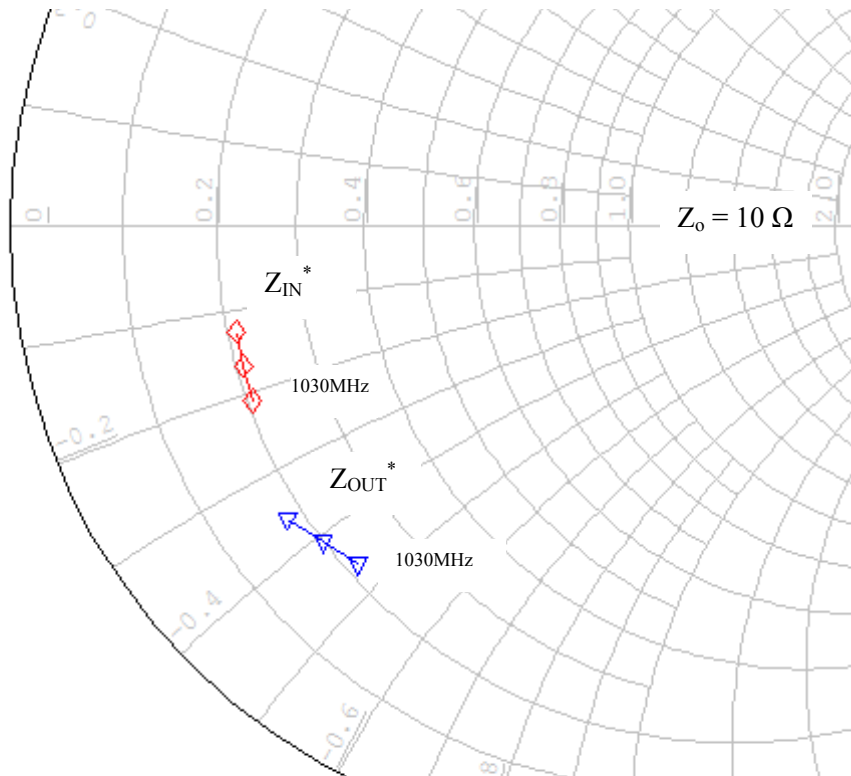
The HVV1011-300 device is capable of withstanding an output load mismatch corresponding to a 20:1 VSWR at rated output power and nominal operating voltage across the frequency band of operation.

**<sup>1</sup>NOTE: : All parameters measured under pulsed conditions at 275W output power measured at the 10% point of the pulse with pulse width = 50µsec, duty cycle = 5% and VDD = 50V, IDQ = 100mA in a broad-band matched test fixture.**

**<sup>2</sup>NOTE: Amount of gate voltage required to attain nominal quiescent current.**

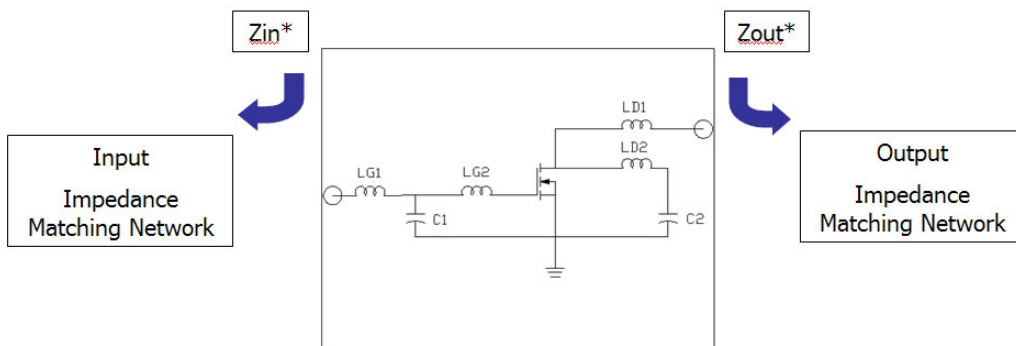
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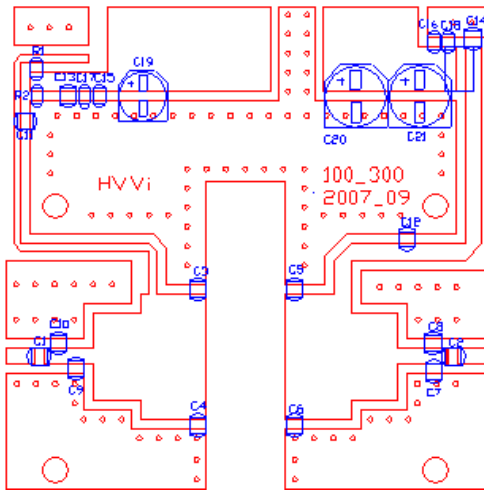
**Test Circuit Impedance**

Frequency	Z <sub>in</sub> '(ohms)	Z <sub>out</sub> '(ohms)
1030MHz	2.06-j2.10	2.17-j4.60
1060MHz	2.09-j1.67	2.00-j4.07
1090MHz	2.10-j1.25	1.80-j3.58

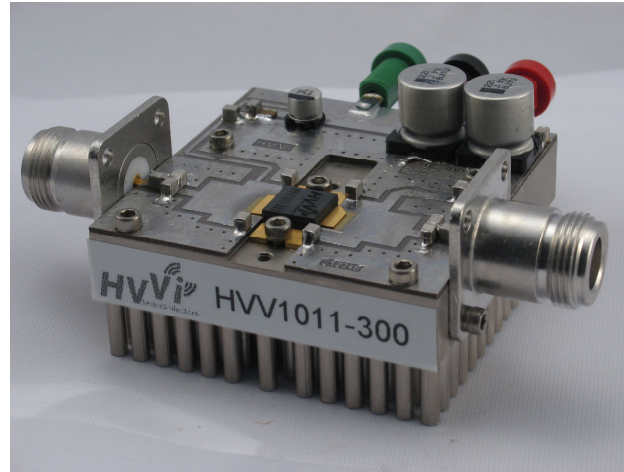


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Demonstration Board Outline



Demonstration Circuit Board Picture

(AutoCAD Files for Demonstration Board available online at [www.hvvi.com/products](http://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

HVV1011-300 Demonstration Circuit Board Bill of Materials

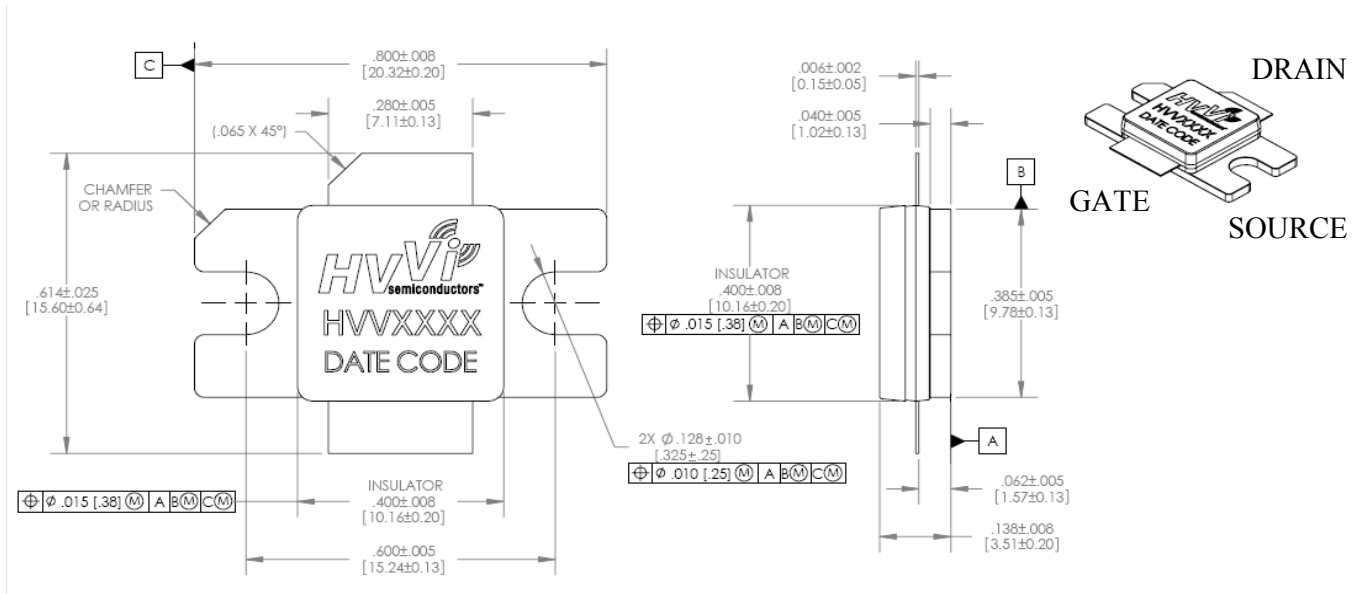


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**PACKAGE DIMENSIONS**



**Note: Drawing is not actual size.**

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