

DC-5.0 GHz 34.0 dBm Packaged HFET

Mimix
BROADBAND™

May 2010 - Rev 25-May-10

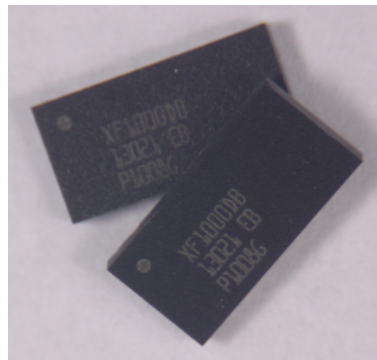
✕ F1000-DB
✕ RoHS

Features

- ✕ High Linearity, 47 dBm OIP3
- ✕ High Gain, 10 dB Gain @ 4.9 GHz
- ✕ 34 dBm P1dB
- ✕ Low Thermal Resistance
- ✕ Surface Mount 3x6mm DFN

General Description

The XF1000-BD is a high linearity Hetrojunction Field Effect Transistor (HFET) housed in a 3x6mm DFN package. Optimum performance is achieved when the device is biased at a drain voltage of 8V and drain current of 600 mA. At this bias point and at 4.9 GHz the device is capable of more than 34 dBm of P1dB and OIP3 of more than 46 dBm. The XF1000-DB is suitable for applications up to 5 GHz where it has 10 dB of gain.



Absolute Maximum Ratings

Device Voltage (Vdd)	+9.0 V
Current (Idd)	750 mA
Power Dissipation (PDC)	6.0W
RF Input Power (RFin)	+25 dBm
Junction Temperature	175 °C
Thermal Resistance	18 °C/W
Storage Temperature (Tstg)	-55 °C to +150 °C
Operating Temperature	-40 °C to +85 °C
ESD (HBM)	Class 1A
Moisture Sensitivity Level (MSL)	MSL 3

Operation of this device beyond any of these parameters may cause permanent damage.

Typical Performance: 8V, 25 °C

Parameter	Typical		Units
Frequency (F)	3600	4900	MHz
Gain (S21)	10.5	10.0	dB
Output IP3 (OIP3)	47.0	46.0	dBm
Output P1dB	34.0	33.7	dBm
Quiescent Current (Idq)	600	600	mA
Input Return Loss (S11)	-6.3	-8.0	dB
Output Return Loss (S22)	-12.6	-11.5	dB

Electrical Characteristics (T=25°C, Vdd=8V)

Unless otherwise specified, the following specifications are guaranteed at room temperature in a Mimix test fixture.

Parameter	Condition	Units	Min	Typ	Max
Frequency Range (F)		MHz	DC		5000
Test Frequency		MHz		2000	
Small Signal Gain (S21)	Externally matched	dB	12.5	14.5	
Output Intercept Point (OIP3)	Pout/Tone=22 dBm, Spacing=5 MHz	dBm	+44.0	+46.5	
Output P1dB		dBm	+33.0	+34.0	
Quiescent Current (Icq)		mA		600.0	700.0
Noise Figure (NF)		dB		5	

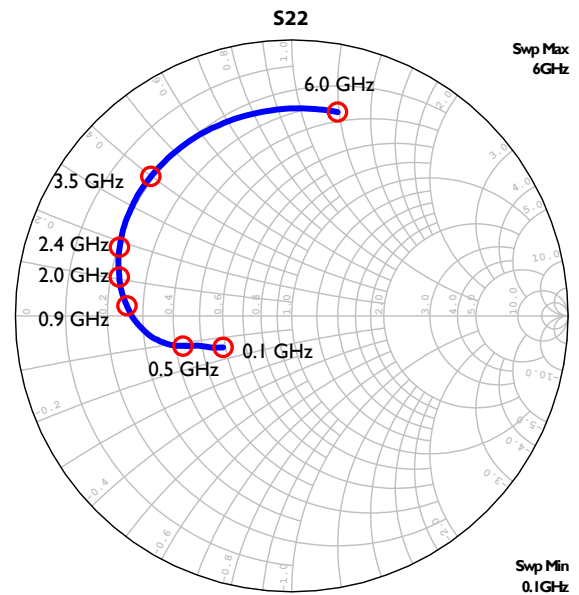
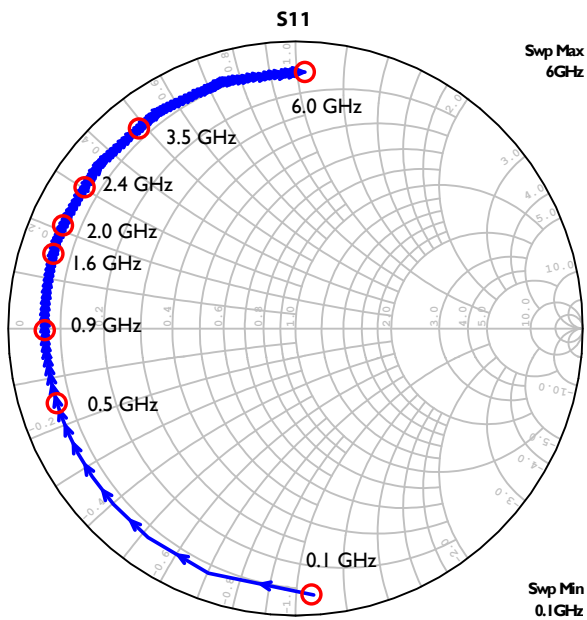
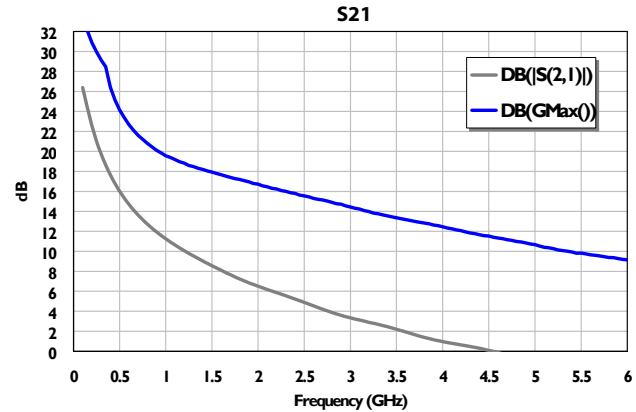
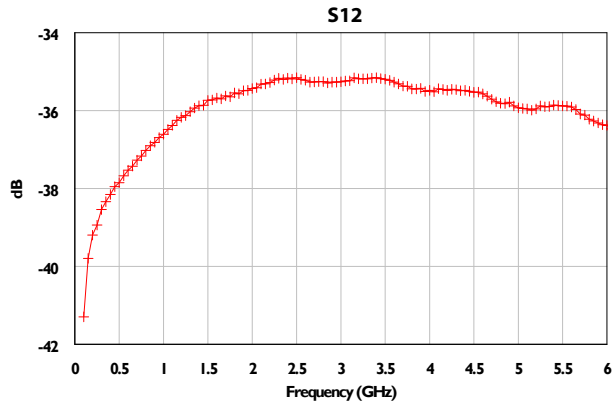
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S-parameters: (Vdd=8V, Idd=600 mA)

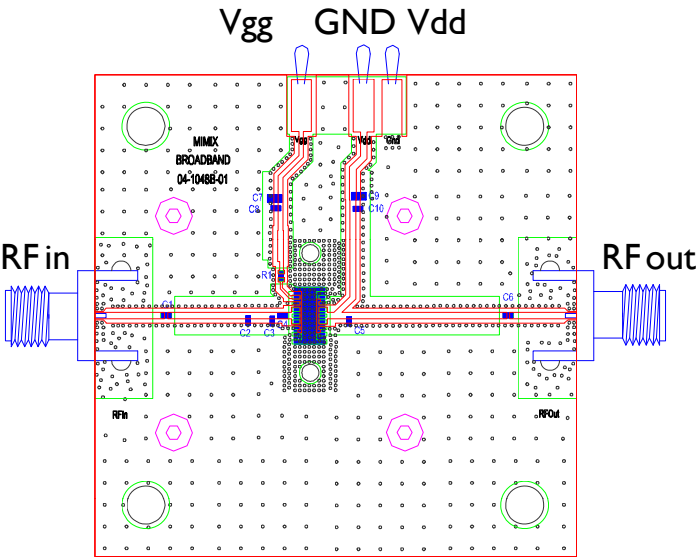


S-Parameters files are available for download at www.mimixbroadband.com.

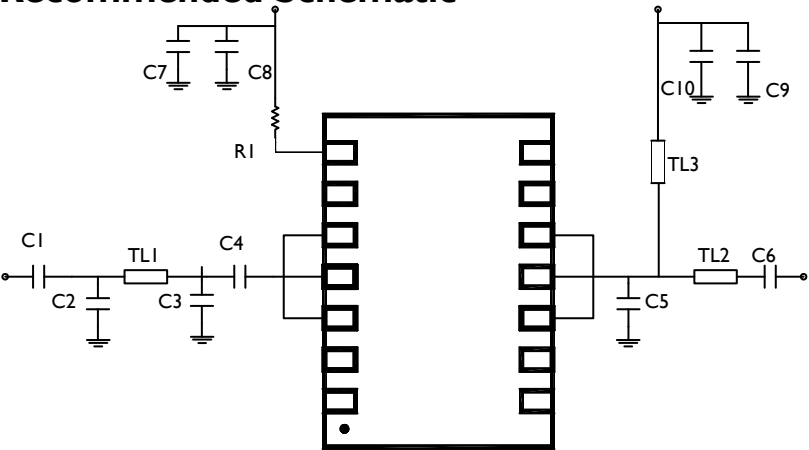
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Evaluation Board: (3.6 GHz)



Recommended Schematic



Component Values

REF. Designator	DESCRIPTION	QTY	TYP	TOLERANCE
R1	RESISTOR, 100Ohm 0402	1	100 Ω	
C1	0 ohm link	1	0Ω	
C2	CAPACITOR, 2.2pF 0402	1	2.2pF	0.05pF
C3	CAPACITOR, 4.0pF 0402	1	4.0pF	0.05pF
C4	CAPACITOR, 2.2pF 0402	1	2.2pF	0.05pF
C5	CAPACITOR, 1.6pF 0402	1	1.6pF	0.05pF
C6	CAPACITOR, 20pF 0402	1	20pF	
C7, 9	CAPCITOR, 1uF 0603	1	1uF	
C8, C10	CAPACITOR, 10nF 0402	1	10nF	

Ref Designator	Electrical Length
TL1	50Ω, 20.8°
TL2	50Ω, 9.3°
TL3	50Ω, 77°

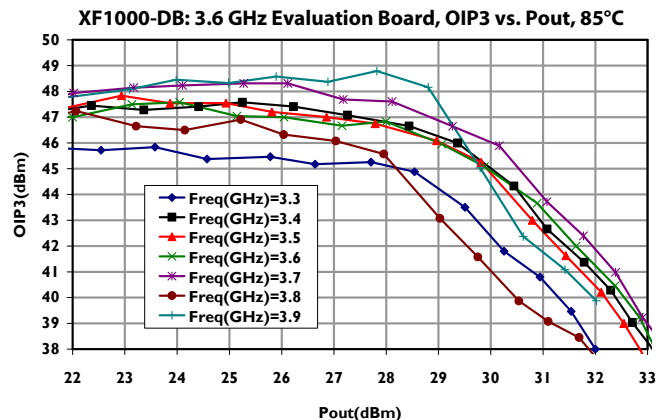
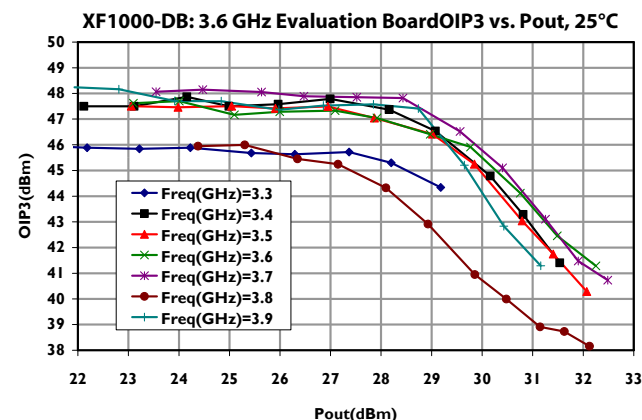
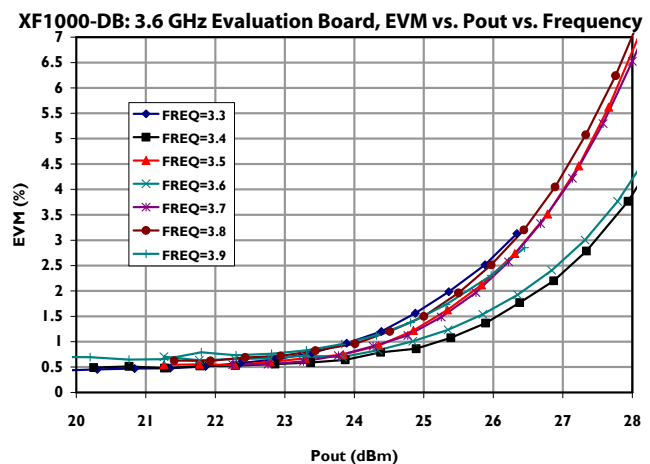
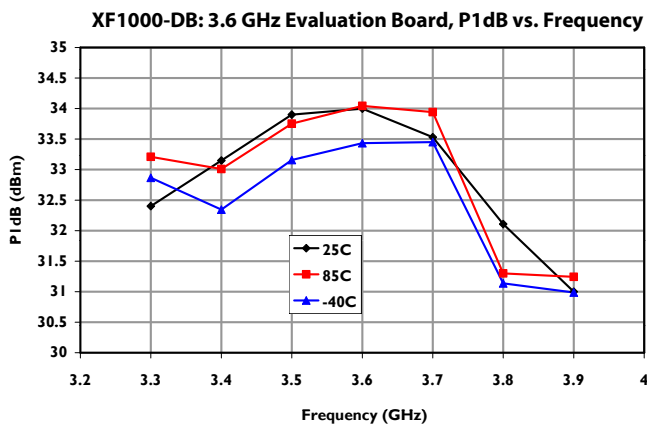
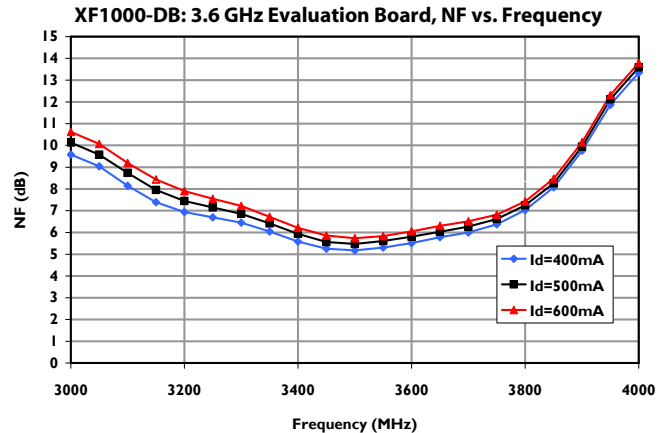
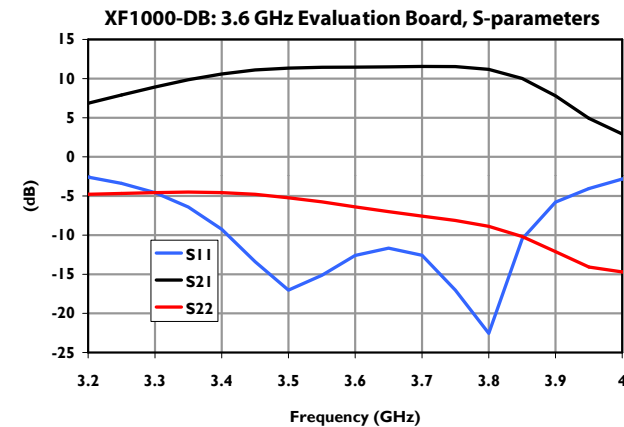
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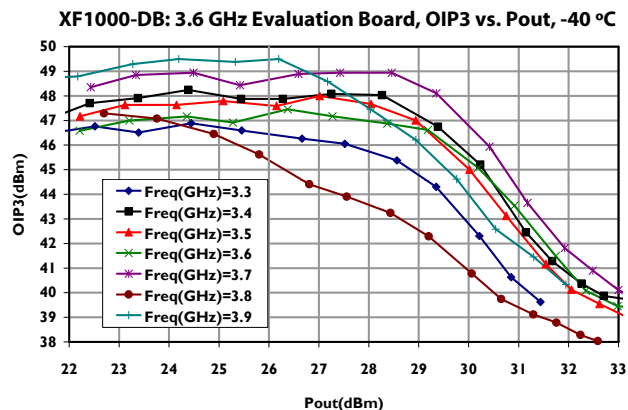
Typical Performance: 3.6 GHz (Evaluation Board)



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Typical Performance: 3.6 GHz (Evaluation Board) (cont.)



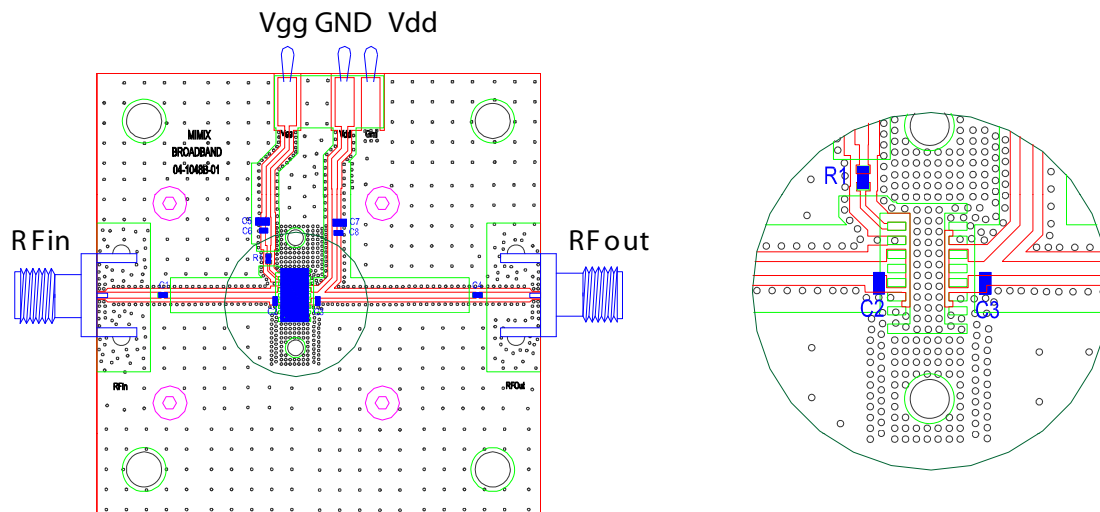
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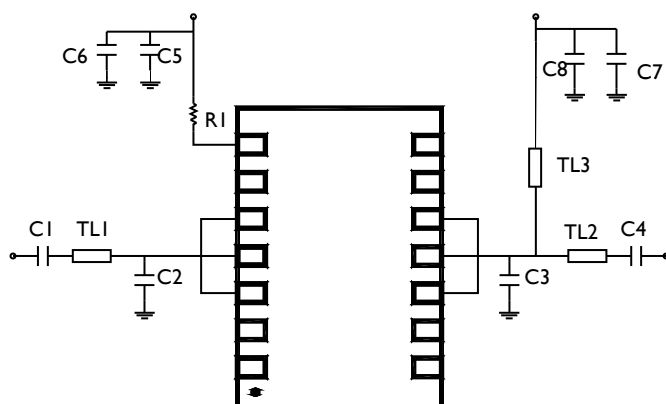
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Evaluation Board: (4.9 GHz)



Recommended Schematic



Component Values

REF. Designator	DESCRIPTION	QTY	TYP	Tolerance
R1	Resistor, 100Ohm 0402	1	100 Ω	
C1	CAPACITOR, 0402, 50V	1	20pF	5%
C2	CAPACITOR, 0402, 50V	1	1.3pF	0.05pF
C3	CAPACITOR, 0402, 50V	1	1.4pF	0.05pF
C4	CAPACITOR, 0402, 50V	1	20pF	5%
C5, C7	CAPACITOR, 0603, 16V	1	1uF	10%
C6, C8	CAPACITOR, 0402, 25V	1	10nF	10%

Ref Designator	Electrical Length
TL1	50Ω, (not critical)
TL2	50Ω, (not critical)
TL3	50Ω, 66°

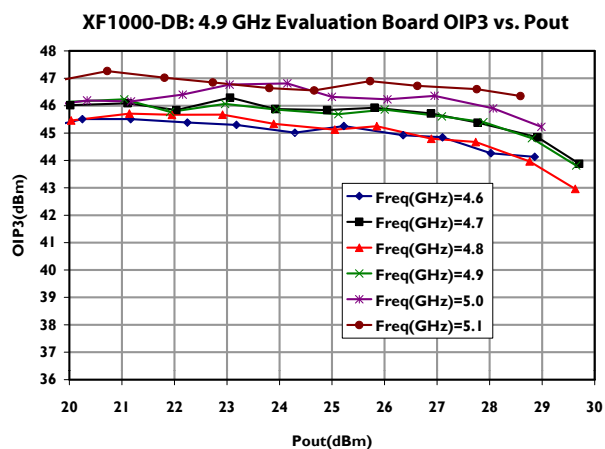
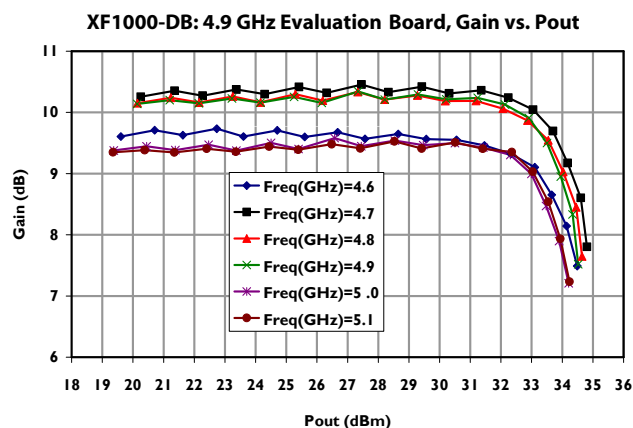
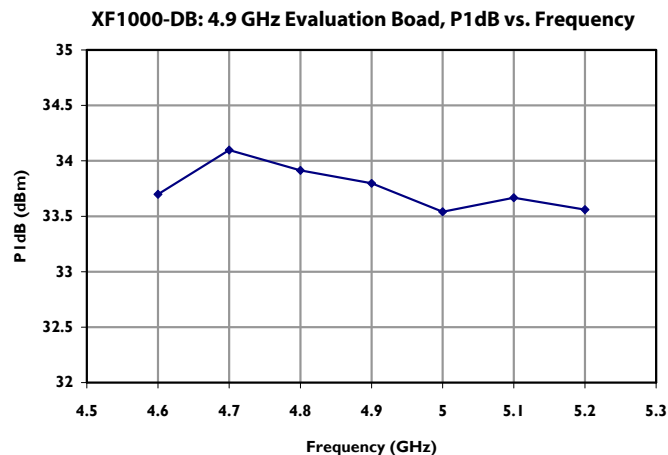
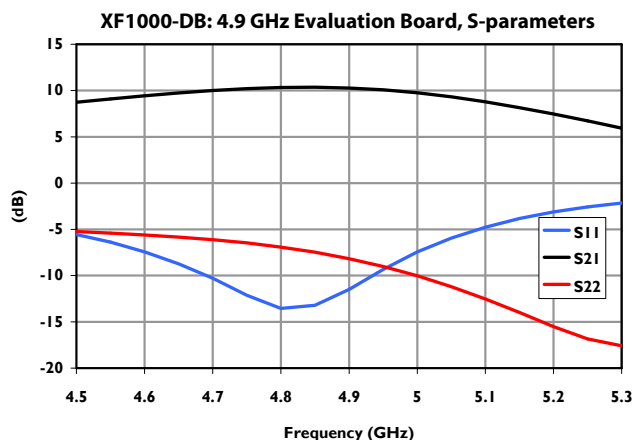
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Typical Performance: 4.9 GHz (Evaluation Board)



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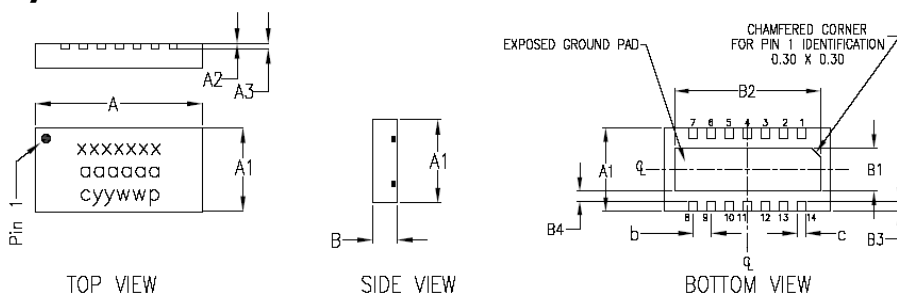
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✕ RoHS

App Note [1] Biasing - The XF1000-DB requires power supply sequencing. Negative voltage supply (V_{gg}) needs to be turned on first and then positive voltage can be applied to the drain (V_{dd}). When turning off the device, the positive supply (V_{dd}) should be turned off first and then negative voltage (V_{gg}) can be removed.

The gate voltage is adjusted in order to set the drain current to the desired level. The gate voltage required to achieve a certain current can vary over temperature and from one device to another due to pinch-off voltage variation. Constant drain current can be achieved by implementing an active bias circuit which allows for temperature compensation and eliminates the effect of pinch off voltage variation.

Physical Dimensions



MARKINGS:

MIMIX PART/MODEL NO.

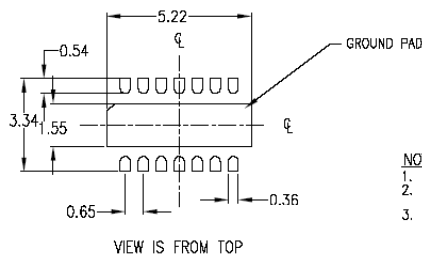
WAFER LOT NUMBER

DATE CODE = YYWW

C = COUNTRY OF ORIGIN

P = PLATING OPTION

GENERIC RECOMMENDED SOLDER PAD PITCH AND DIMENSIONS
DIMENSIONS ARE IN MM



DIMENSIONS ARE IN MM			
SYM	MIN	NOM	MAX
A	—	6.00	—
A1	—	3.00	—
A2	0.00	0.02	0.05
B	0.80	0.90	1.00
B1	1.45	1.55	1.65
B2	5.15	5.25	5.35
B3	5.15	5.25	5.35
B4	0.27 MIN		
b	0.27	0.37	0.47
c	0.25	0.30	0.35

NOTES:

1. VIEWS ARE NOT TO SCALE. USE DIMENSIONS AND TABLE.
2. MARKINGS ARE FOR ILLUSTRATION PURPOSES ONLY. ACTUAL MARKINGS MAY VARY FOR EACH DEVICE TYPE MODULE.
3. ALL INFORMATION CONTAINED HEREIN IS FOR USE WITH MIMIX BROADBAND APPLICATION NOTES AND SPECIFICATION DOCUMENTS FOR GENERIC MIMIX BROADBAND DEVICES. INFORMATION MAY NOT REFLECT SPECIFIC REQUIREMENTS FOR EACH UNIQUE CIRCUIT DESIGN USING THIS PACKAGE TYPE.

Pin-out Details

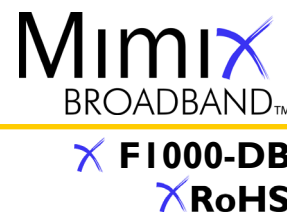
Description	Pin #
V _{gg}	7
RF Input	3,4,5
RF Output /V _{dd}	10,11,12
NC	1,2,6,8,9,13,14

Mimix Broadband, Inc., 10795 Rockley Rd., Houston, Texas 77099
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Handling and Assembly Information

CAUTION! - Mimix Broadband MMIC Products contain gallium arsenide (GaAs) which can be hazardous to the human body and the environment. For safety, observe the following procedures:

- Do not ingest.
- Do not alter the form of this product into a gas, powder, or liquid through burning, crushing, or chemical processing as these by-products are dangerous to the human body if inhaled, ingested, or swallowed.
- Observe government laws and company regulations when discarding this product. This product must be discarded in accordance with methods specified by applicable hazardous waste procedures.

Life Support Policy - Mimix Broadband's products are not authorized for use as critical components in life support devices or systems without the express written approval of the President and General Counsel of Mimix Broadband. As used herein: (1) Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, and whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury to the user. (2) A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

Package Attachment - This packaged product from Mimix Broadband is provided as a rugged surface mount package compatible with high volume solder installation. Care should be taken not to apply heavy pressure to the top or base material to avoid package damage. Vacuum tools or other suitable pick and place equipment may be used to pick and place this part. Care should be taken to ensure that there are no voids or gaps in the solder connection so that good RF, DC and ground connections are maintained. Voids or gaps can eventually lead not only to RF performance degradation, but reduced reliability and life of the product due to thermal stress.

Mimix Lead-Free RoHS Compliant Program - Mimix has an active program in place to meet customer and governmental requirements for eliminating lead (Pb) and other environmentally hazardous materials from our products. All Mimix RoHS compliant components are form, fit and functional replacements for their non-RoHS equivalents. Lead plating of our RoHS compliant parts is 100% matte tin (Sn) over copper alloy and is backwards compatible with current standard SnPb low-temperature reflow processes as well as higher temperature (260°C reflow) "Pb Free" processes.

Ordering Information

Part Number for Ordering

XF1000-DB-0G00
XF1000-DB-0G0T
XF1000-DB-EV1
XF1000-DB-EV2

Description

Matte Tin plated RoHS compliant 3x6mm surface mount package in bulk quantity
Matte Tin plated RoHS compliant 3x6mm surface mount package in tape and reel
Evaluation Board @ 3600 MHz
Evaluation Board @ 4900 MHz



Caution: ESD Sensitive
Appropriate precautions in handling, packaging
and testing devices must be observed.

Proper ESD procedures should be followed when handling this device.

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