

# 800-950 MHz 1W, High Linearity InGaP HBT Amplifier

August 2008 - Rev 17-Aug-08

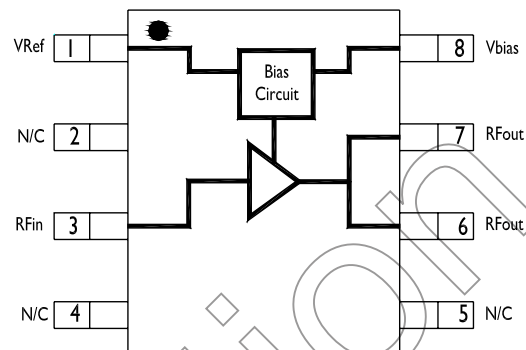
**XP1053-SD**  
RoHS

## Features

- ✕ 30.5 dBm P1dB
- ✕ Active Bias Circuit
- ✕ 16.5 dB Gain
- ✕ 5V Single Positive Supply
- ✕ RoHS Compliant SOIC-8

## General Description

The XP1053-SD is a high linearity power amplifier capable of 30.5 dBm of compressed 1-dB power and up to 46 dBm of OIP3. This device has an integrated active bias circuit and can be externally optimized to achieve 16.5 dB of gain. The XP1053-SD is housed in an RoHS compliant SOIC-8 power package and has low thermal resistance. All devices are 100% RF and DC tested. The XP1053-SD is specifically designed to be used as a driver amplifier for wireless infrastructure equipment.



## Typical Parameters

Parameter	Typ	Typ	Typ	Units
Frequency Range	800	870	940	MHz
Gain	16.7	16.7	16.2	dB
Input Return Loss	-11.6	-9.6	-13.4	dB
Output Return Loss	-7.4	-8.2	-7.3	dB
Output IP3	42.0	42.0	42.0	dBm
Output P1dB	30.6	30.6	30.2	dBm
Output Power @ ACPR -45dBc, IS-95	24.0	24.5	24.0	dBm
Output Power @ ACPR -45dBc, WCDMA	22.0	22.5	22.0	dBm

Typical performance in Mimix evaluation board

## Absolute Maximum Ratings

Supply Voltage	+6.0 V
RF Input Power	+20 dBm
Storage Temperature (Tstg)	-55 °C to +125 °C
Junction Temperature	150 °C
Operating Temperature	-40 °C to +85°C
Current	900 mA
Power Dissipation (PDC)	5W
Thermal Resistance	9 °C/W

Operation of this device above any of these parameters may cause damage.

## Electrical Characteristics (T = 25°C)

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

Parameter	Condition	Units	Min.	Typ.	Max.
Frequency Range		MHz	800		950
Gain	Externally Matched	dB	15.0	16.5	
Input Return Loss	Externally Matched	dB		-10	
Output Return Loss	Externally Matched	dB		-8	
Output IP3		dBm		+42	
Noise Figure		dB		6	
Output P1dB		dBm	29.0	30.5	
Operating Current Range		mA		420	500
Supply Voltage		V		5.0	

Notes:

1. T = 25°C, 50 Ohm system.

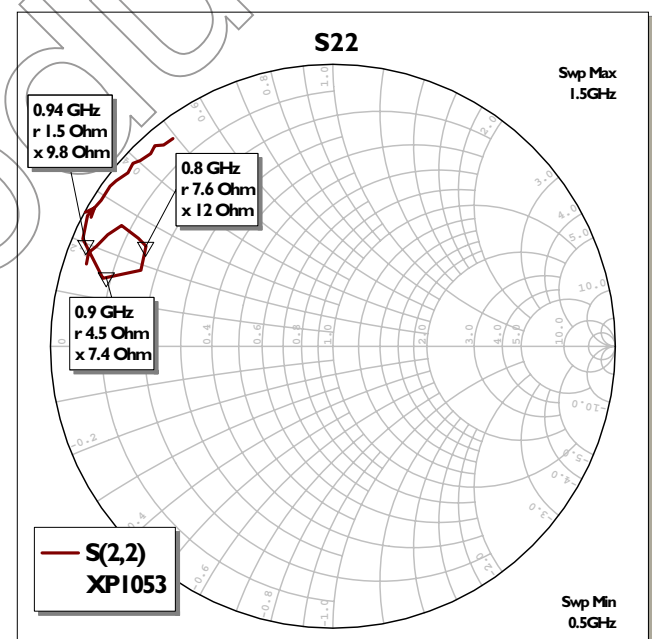
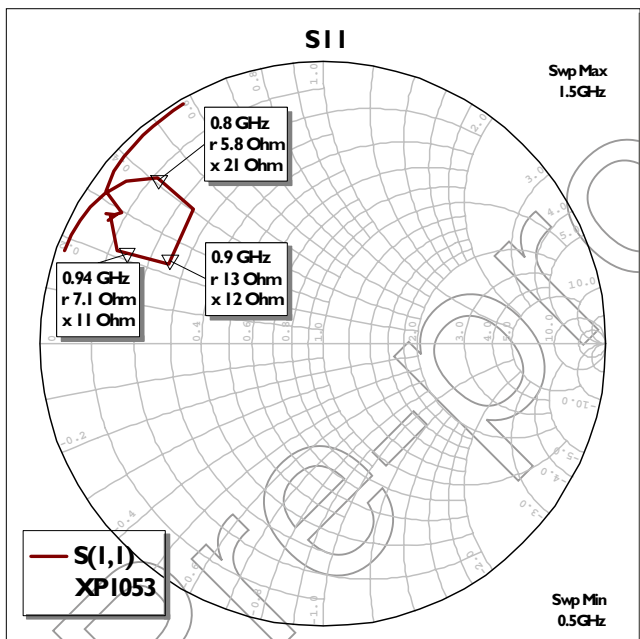
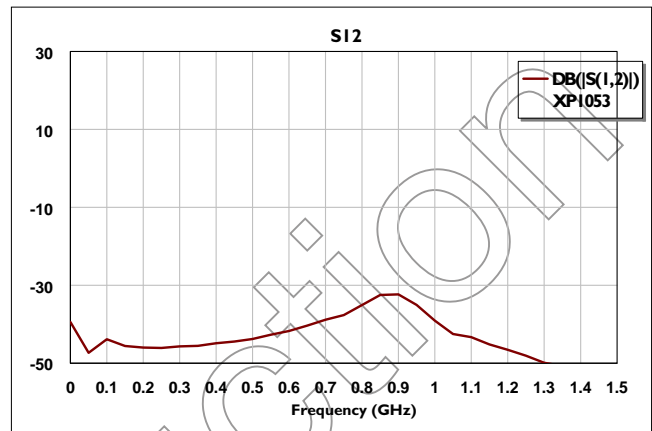
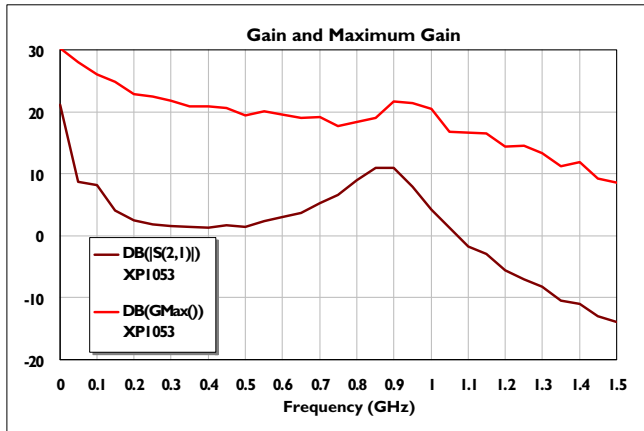
2. OIP3 is measured with two tones at output power of 15 dBm/tone separated by 1 MHz.

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## Typical Device S-parameters (measured at the input and output reference planes)

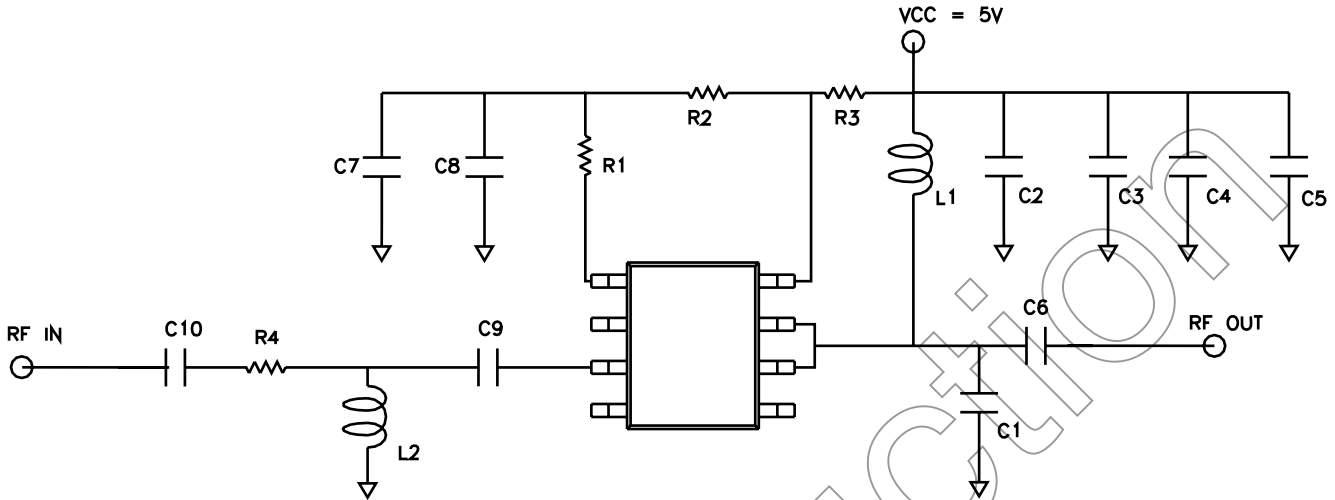


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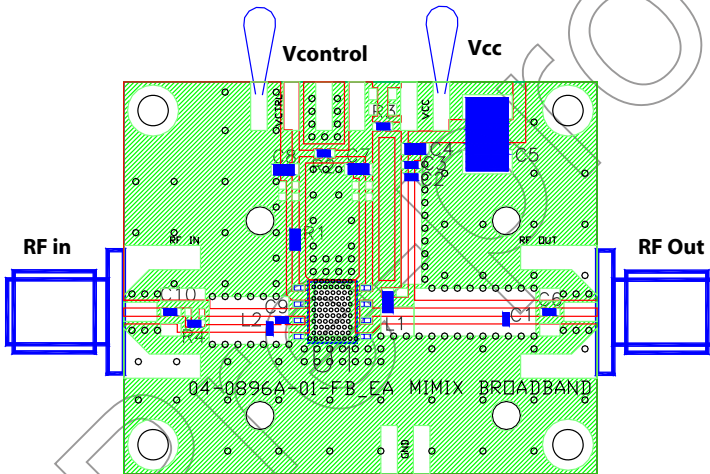
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## Evaluation Board Schematic



## Evaluation Board Component Layout



## Component Values

Ref Designator	Value	Description	Manufacturer
L1	15 nH	0603 15nH Wirewound Inductor	Coilcraft
L2	3.9 nH	3.9 nH 0402 inductor	Murata
C1	8.2 pF	0402 8.2pF COG High Q	Murata
C2	10 pF	0402 10pF COG High Q	Murata
C3	100 pF	0402 100pF COG	Murata
C4, C7, C8	10 nF	0603 10nF X7R 50V	Murata
C5	100 uF	100 uF Tantalum Capacitor	AVX
C6	82 pF	0402 82 pF COG capacitor	Murata
C9	7.5 pF	7.5 pF 0402 Hi Q capacitor	Murata
C10	82 pF	0402 82 pF COG capacitor	Murata
R1	100 Ohm	0402 100 ohm 0402 resistor	VENKEL
R2, R3, R4	0 Ohm	Zero ohm link	

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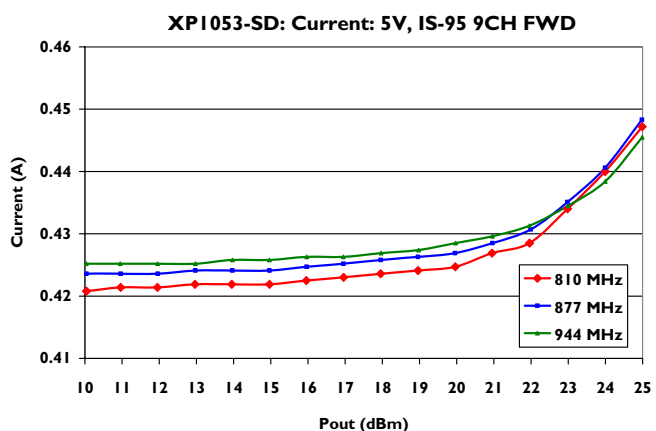
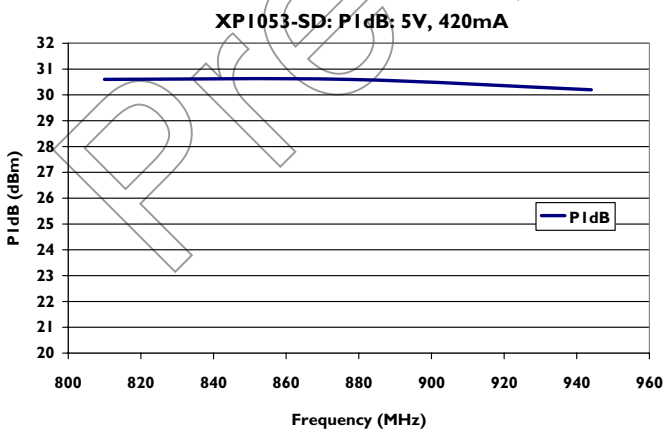
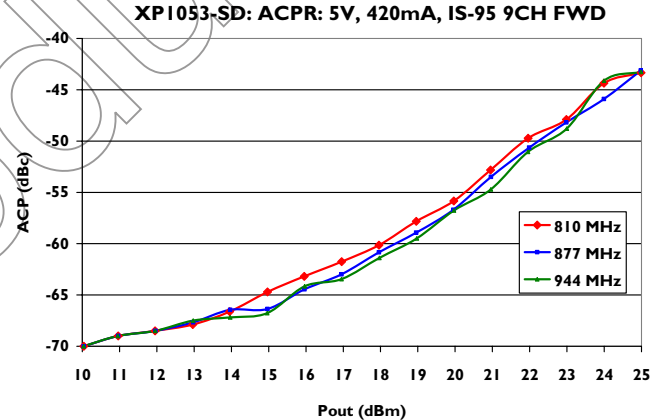
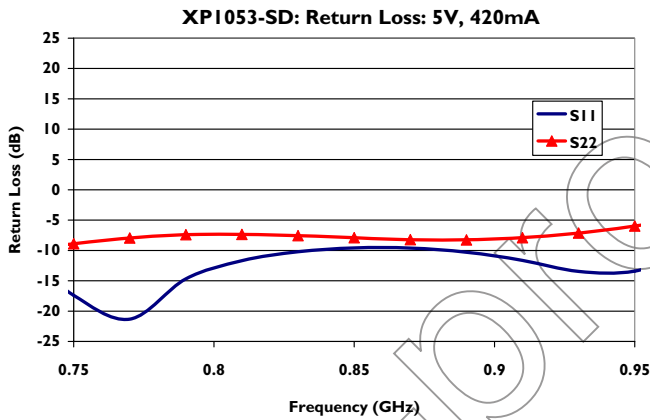
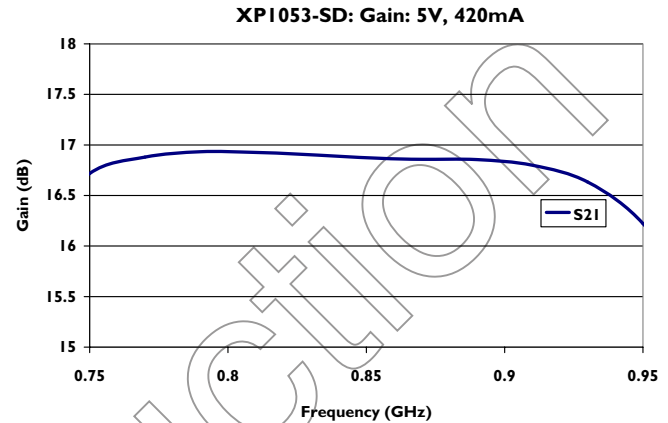
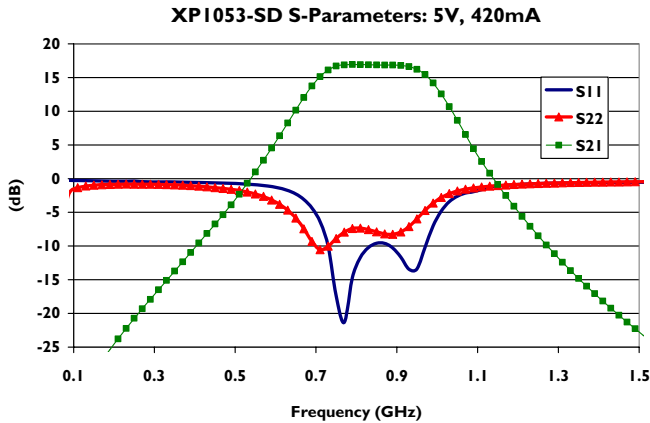


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## Typical Performance

Measured in Mimix evaluation board

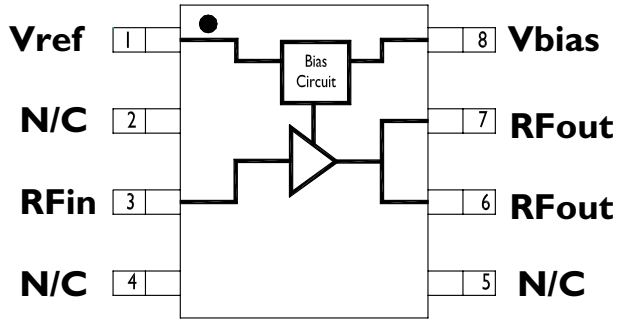


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## Functional Block Diagram

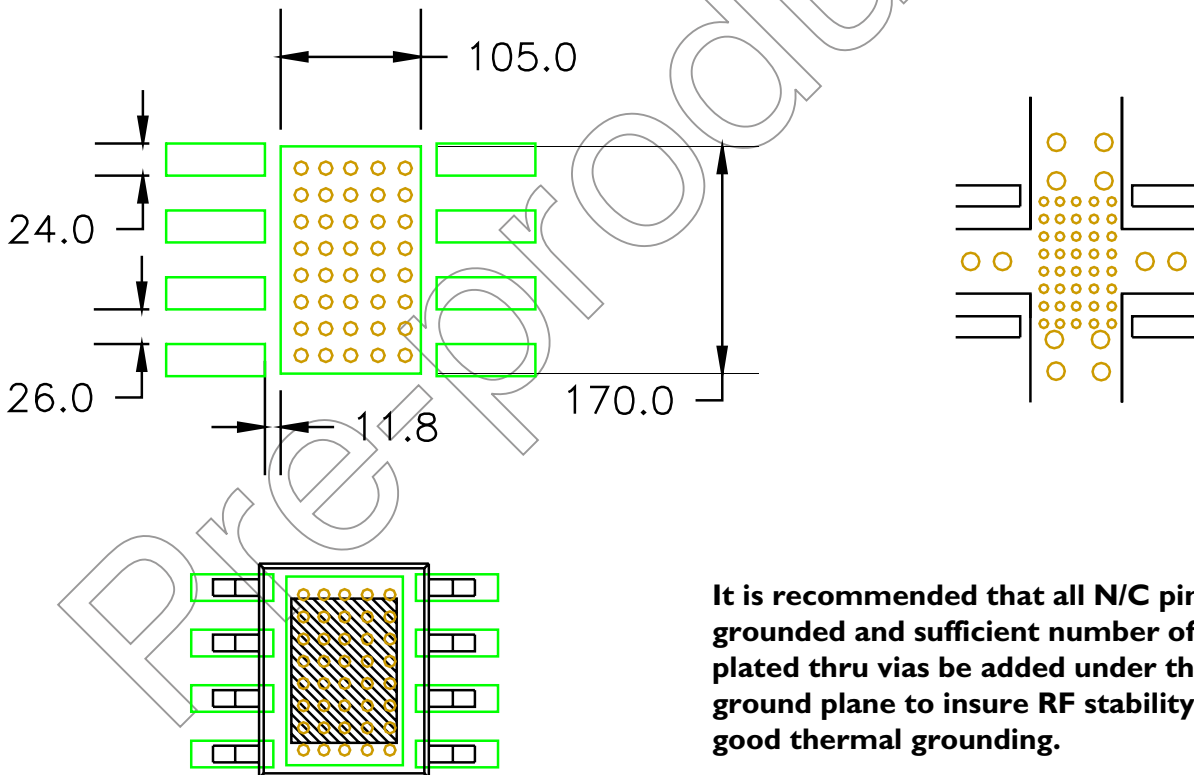


Backside slug is collector GND

## Pin Out Detail

Pin	Function	Description
1	Vref	Reference voltage
3	RFin	RF Input
6, 7	RFout	RF output
8	Vbias	Bias circuit voltage
2,4,5	N/C	Not connected

## Land Pattern

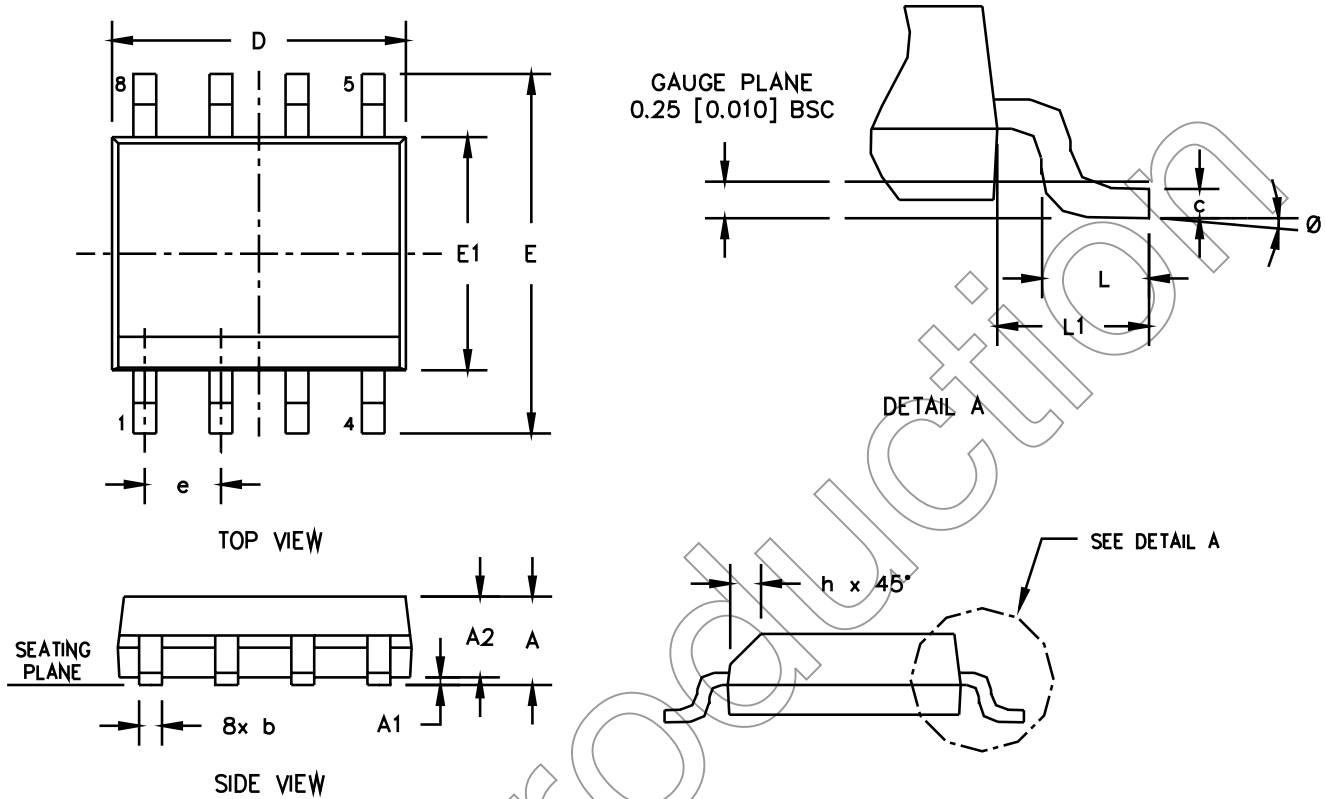


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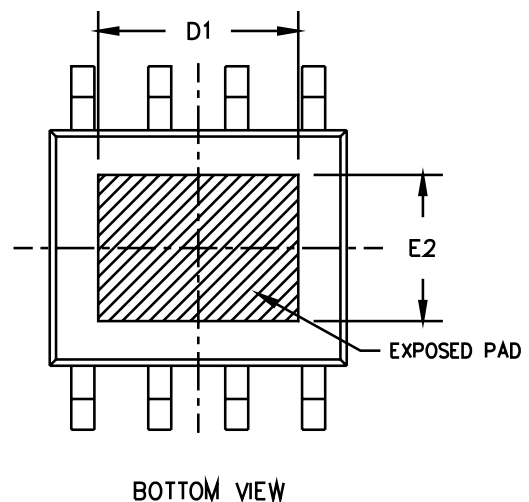
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## Physical Dimensions



SYM	DIMENSION IN INCHES			DIMENSION IN MM		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.056	0.058	0.061	1.42	1.47	1.55
A1	0.001	0.004	0.005	0.025	0.102	0.127
A2	0.051	0.054	0.057	1.30	1.37	1.45
b	0.014	0.016	0.020	0.36	0.41	0.51
c	0.007	0.008	0.010	0.18	0.20	0.25
D	0.191	0.193	0.195	4.85	4.90	4.95
E1	0.151	0.153	0.155	3.84	3.89	3.94
E	0.234	0.240	0.244	5.94	6.10	6.20
e	0.050			1.27		
L	0.020	0.027	0.032	0.51	0.69	0.81
L1	0.042	0.044	0.046	1.07	1.12	1.17
∅	0°	-	8°	0°	-	8°
h	0.011	0.015	0.019	0.28	0.38	0.48
D1	0.120	-	0.130	3.05	-	3.30
E2	0.085	-	0.095	2.16	-	2.41



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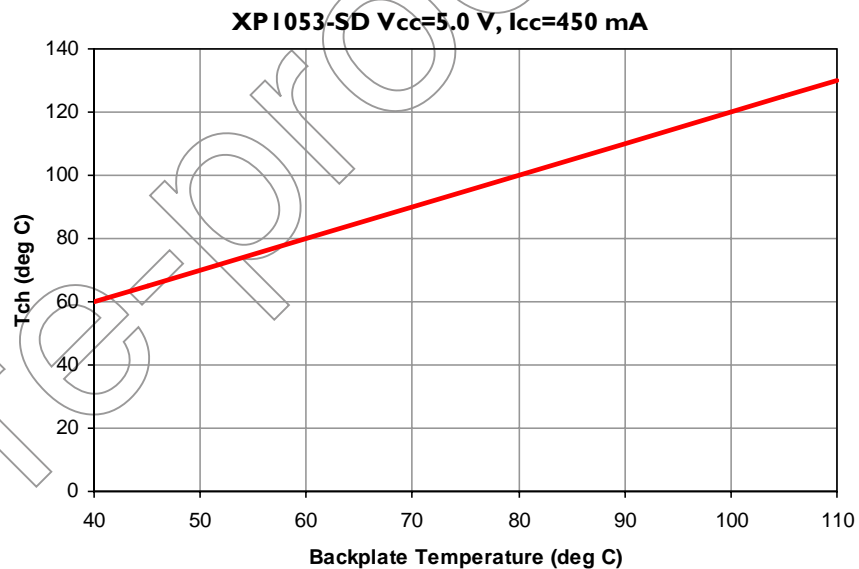
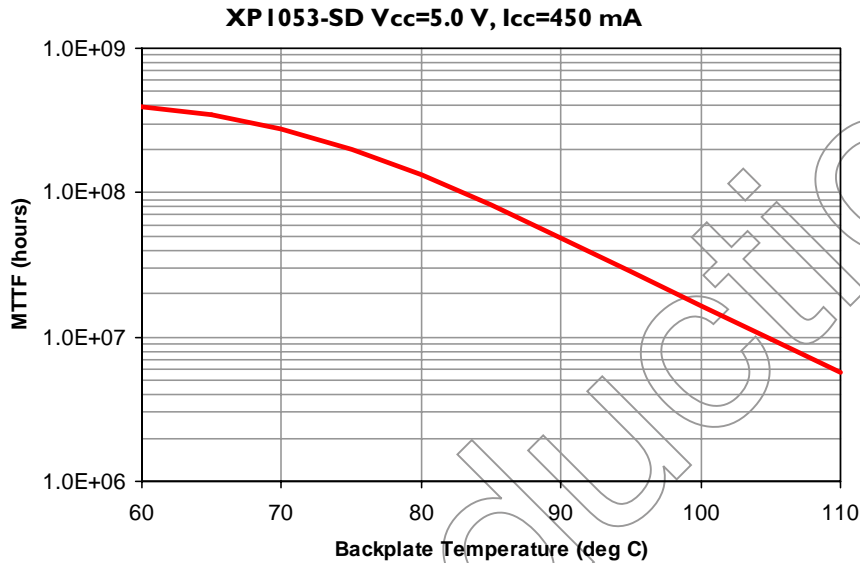


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## MTTF

These numbers were calculated based on accelerated life test information received from the fabrication foundry and measured thermal resistance.



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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

XP1053-SD-0G00  
XP1053-SD-0G0T

XP1053-SD-EV1

### Description

Matte Tin plated RoHS compliant SOIC-8 surface mount package in bulk quantity  
Matte Tin plated RoHS compliant SOIC-8 surface mount package in tape and reel

XP1053-SD Evaluation Board



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

Proper ESD procedures should be followed when handling this device.

Mimix Broadband, Inc., 10795 Rockley Rd., Houston, Texas 77099  
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