gXOB0017 A
W-band X8 MMIC multiplier
86 – 106 (81 – 110) GHz

FEATURES

- W-band, 86 – 106 GHz
- High output power, 12 dBm typ.
- Harmonic isolation, 20 dBc typ.
- High efficiency

TYPICAL APPLICATIONS

- W-band point-to-point radio
- Remote sensing
- Active imaging
- Test instrumentation

DESCRIPTION

The gXOB0017 GaAs pHEMT MMIC is a highly efficient X8 W-band multiplier ideal for point to point radio and radar applications. The integrated input and output buffers deliver high output power at a low drive level. At the recommended drive level of 0 dBm the output power is typically 12 dBm with better than 20 dBc harmonic isolation and 400 mW power dissipation.

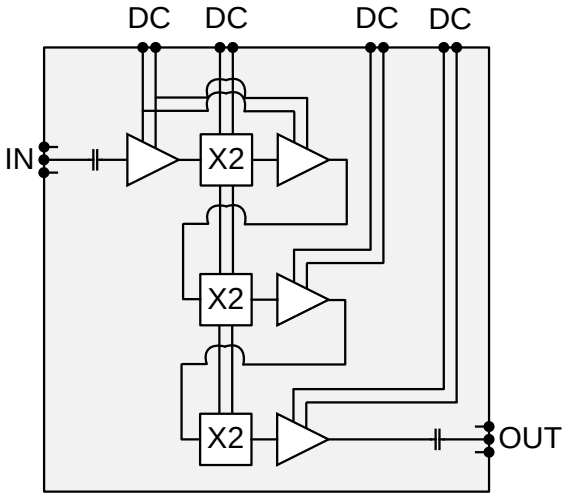

Figure 1. Circuit functional diagram.

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ELECTRICAL PERFORMANCE

Table 1. Electrical performance T_A=25C

Parameter	Min	Typ	Max	Unit
Output frequency	86		106	GHz
Input frequency	10.7		13.3	GHz
Multiplication factor		8		
Output power	10	12		dBm
Output power flatness		1		dBpp
Recommended input drive power		0		dBm
Harmonic isolation (relative to X8 output)		20		dBc
Output return loss	10			dB
Input return loss	15			dB
Power dissipation (signal off)		275		mW
Power dissipation (signal on)	350	400	450	mW

MEASURED PERFORMANCE

Measurements have been performed on-wafer at room temperature with typical bias settings and an input drive power if not specified otherwise.

Table 2. Test conditions

Parameter	Setting
Input drive power	0 dBm
Temperature	25°C

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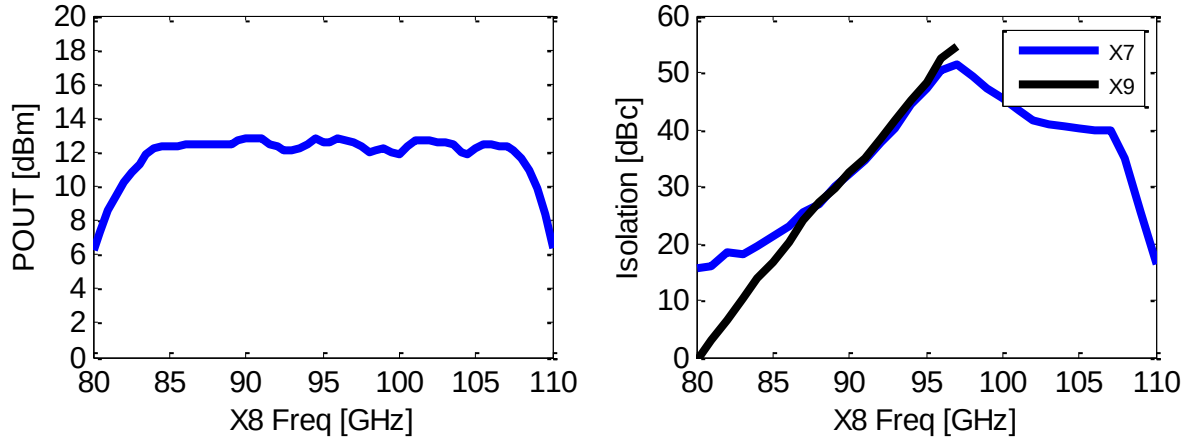

Figure 2. Output power vs X8 output frequency (left). Harmonic isolation vs X8 output frequency (right).

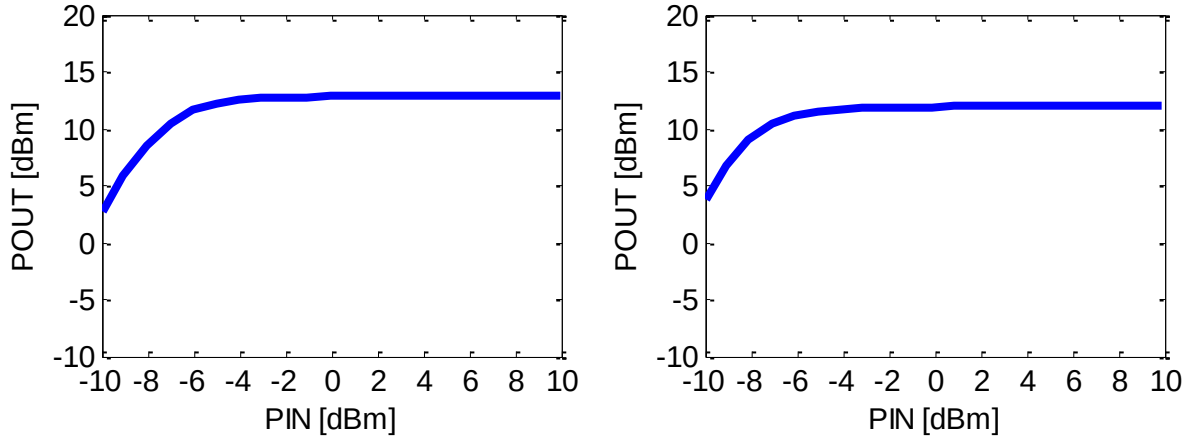

Figure 3. Output power vs input power at 90 GHz (left). Output power vs input power at 100 GHz (right).

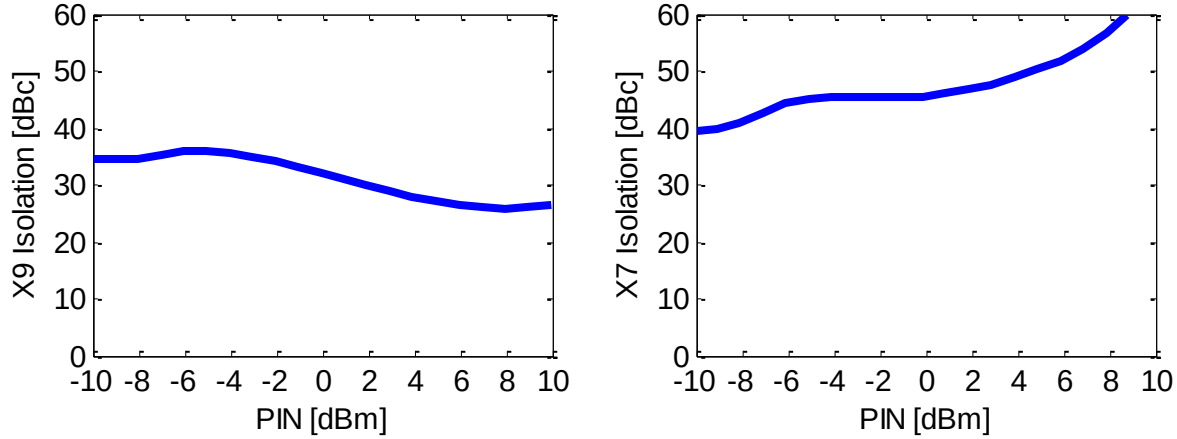

Figure 4. X9 isolation vs input power at 90 GHz (left). X7 isolation vs input power at 100 GHz (right).

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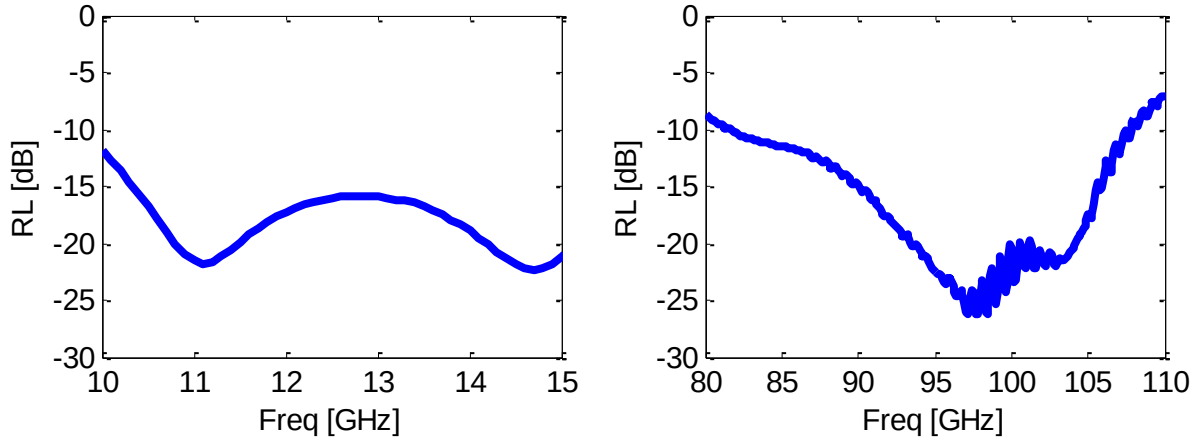

Figure 5. Input return loss (left). Output return loss (right).

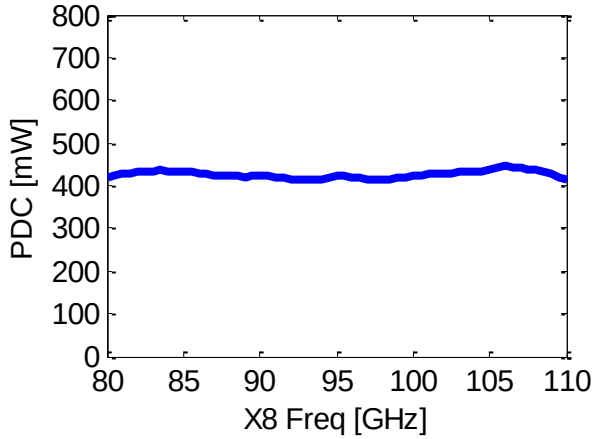

Figure 6. Power dissipation vs X8 output frequency.

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RECOMMENDED OPERATING CONDITIONS

Apply the gate (VG_...) supplies first followed by the drain (VD_...) supplies. Gate voltages are adjusted within the typical min/max range to obtain the specified drain currents. The drain currents are stated with all input signals off.

Table 3. Electrical settings, P1 pads

Connector P1	Pad No.	Bias settings (V / mA)			Function
		Min	Typ	Max	
NC	1				NC
NC	2				NC
VG_AMP_1	3	-0.8	-0.6	-0.4	Input
VD_AMP_1	4	3.2	3.3 / 32	3.4	Input
VG_X	5	-1.1	-0.9	-0.7	Input
VD_X	6	3.2	3.3 / 2	3.4	Input
GND	7				Ground
VG_AMP_2	8	-0.7	-0.5	-0.3	Input
VD_AMP_2	9	3.2	3.3 / 12	3.4	Input
VG_AMP_3	10	-0.7	-0.5	-0.3	Input
VD_AMP_3	11	3.2	3.3 / 34	3.4	Input
NC	12				NC
NC	13				NC

Table 4. Electrical settings, P2 pads

Connector P2	Pad No.	Settings	Function
GND	14		Ground
RF_OUT	15	50 Ohm, open-circuit at DC	Output
GND	16		Ground

Table 5. Electrical settings, P3 pads

Connector P3	Pad No.	Settings	Function
GND	17		Ground
RF_IN	18	50 Ohm, open-circuit at DC	Input
GND	19		Ground

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ABSOLUTE MAXIMUM RATINGS

Table 6. Absolute Maximum Ratings

Gate supply voltage	-2 to + 0.7 V
Drain supply voltage	4.5 V
Gate-drain breakdown	8 V
ID_AMP_1	55 mA
ID_X	85 mA
ID_AMP_2	30 mA
ID_AMP_3	90 mA
Input level	+ 15 dBm
Operating temperature	-40 to + 85 C
Storage temperature	-65 to +150 C

OUTLINE DRAWING

Dimensions are in µm. Substrate thickness is 50 µm (GaAs). Drawing is also available in dxf-file format on the web.

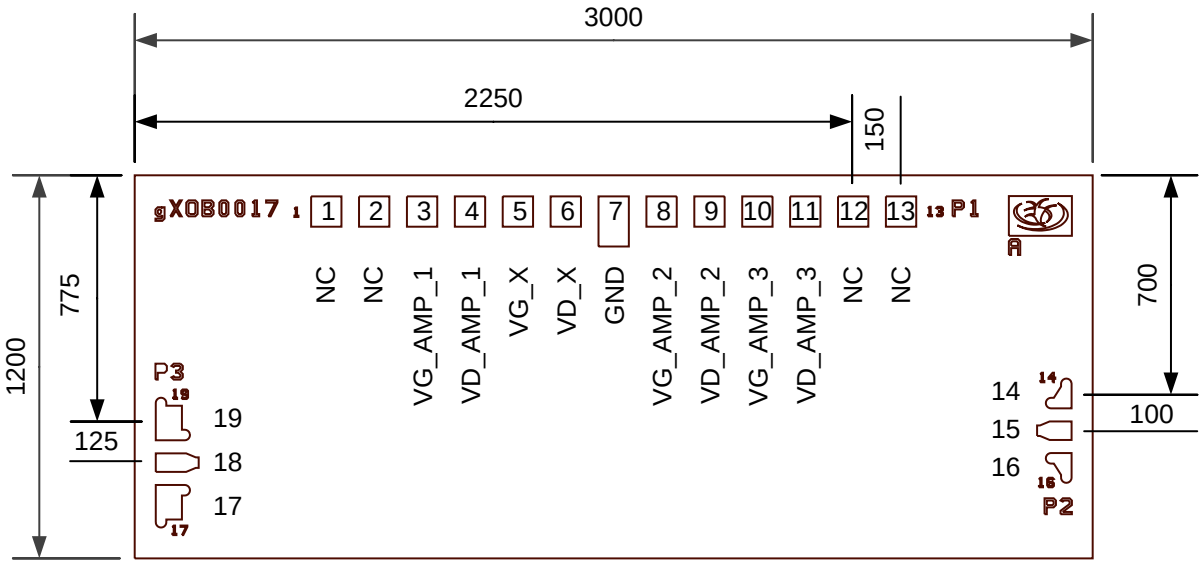

Figure 7. Outline drawing, dimensions are in um.

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