



# TLCA03981

## Ka-Band MMIC Amplifier/Multiplier

### Description

The TLCA03981 is a broadband, two-stage general purpose MMIC amplifier and 2x to 4x multiplier. A 0.15MM HEMT was chosen to provide up to 20dB gain. All of the functions of the TLCA03981 are On-Chip tunable to customer specifications at customer desired frequency from 20 to 45 GHz. The flexible options of simple On-Chip tuning for flat gain, peak gain, conversion gain, and associated S-parameters are as the customer desire with low power consumption. These options are provided by the TLCA03981 which makes it an excellent candidate for use in radar or communication systems. The TLCA03981 is also available in Die or SMT Packaging.

### Features

- ❑ 0.15 MM MMHEMT
- ❑ 20 to 45 GHz
- ❑ Small-signal gain 10 to 20 dB
- ❑ Small-signal gain 10 dB to 20 dB
- ❑ PSAT ≥ 22 dBm
- ❑ Chip Dimensions 2.17 x 1.3 x 0.1 mm

### Maximum Ratings

Symbol	Parameter	Rating	Units
VD	Positive Supply Voltages	6	V
VG	Negative Supply Voltage	- 2	V
ID	Positive Supply Current	200	mA
TC	Operating Temperature	- 50 to 130	° C
TSTG	Storage Temperature	- 65 to -150	° C

### Performance Summary

(At 25 C, 50 ohm system)	Min	Typ	Max	Units
<b>Amplifier</b>				
Frequency	20		45	GHz
PSAT		22		dBm
PAE		24	26	%
Gain Small Signal	10	15	20	dB
Isolation	30	40	50	dB
<b>Multiplier</b>				
Input Frequency	13.5		22	GHz
Output Frequency	27		45	GHz
PIN	-5	0	10	dBm
Conversion Loss/Gain	5	8.5	+3	dB
Spurious	30	35	50	dB
Drain Supply Voltage	1	2.5	5	V
Gate Supply Voltage	-1.5	-0.75	-0.2	V
Drain Supply Current	75	100	150	mA

TLC can auto tune chip to maximize performance at customer target frequency and bias.

TLC reserves the right to change performance data and specifications without notice



# TLCA03981

## Ka-Band MMIC Amplifier/Multiplier

### Performance Data

### Adjustable S-parameter to Desired Performance

Figure A: Flat Gain 10 – 15dB from 12 to 40 GHz

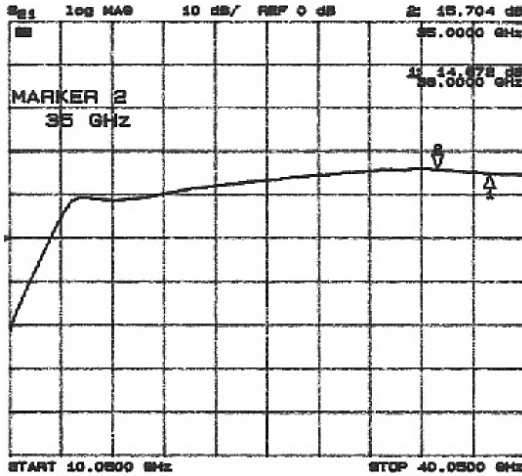


Figure B: Tune for peak gain of 20 dB at customer target frequency (i.e. 35 GHz)

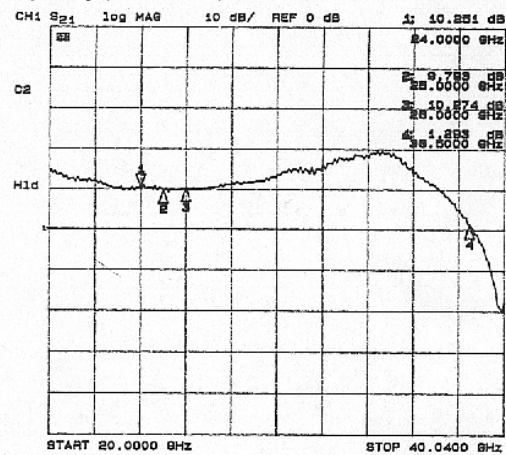


Figure C: Tune for low loss at lower frequency GHz

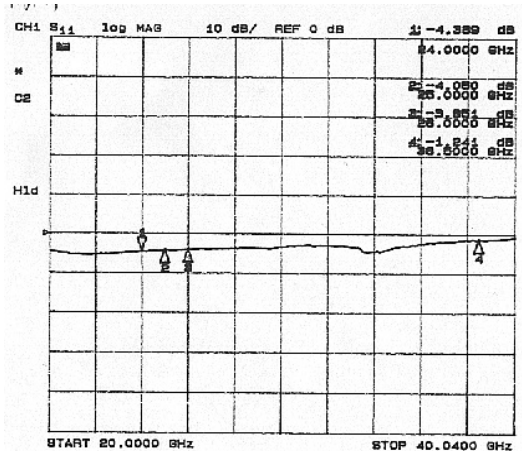
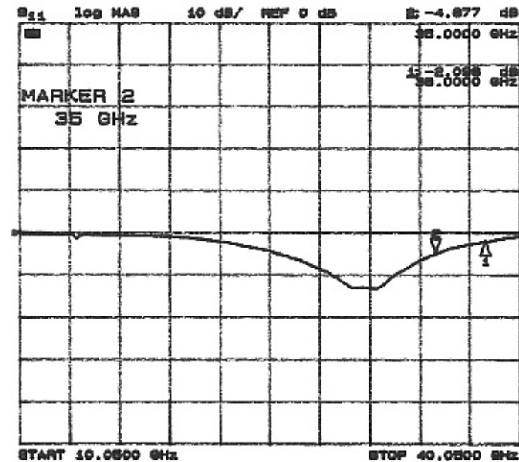


Figure D: Tune for low insertion loss at desired frequency (i.e. 32 GHz)



TLC reserves the right to change performance data and specifications without notice



# TLCA03981

## Ka-Band MMIC Amplifier/Multiplier

### Performance Data

Figure E: Isolation > 30 or 40 dB

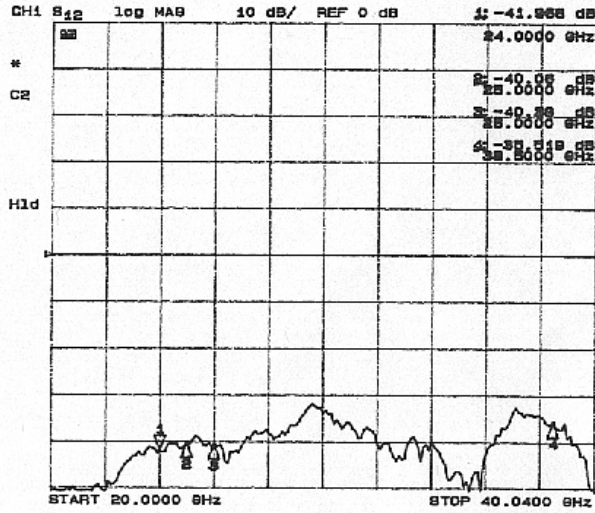
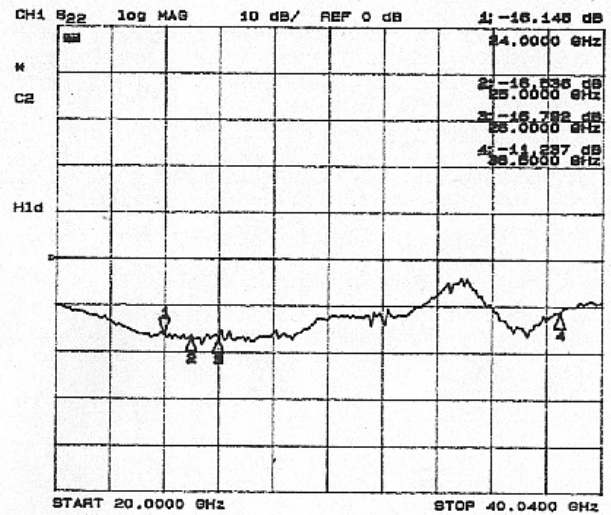


Figure F: Tuned for distributed Return loss

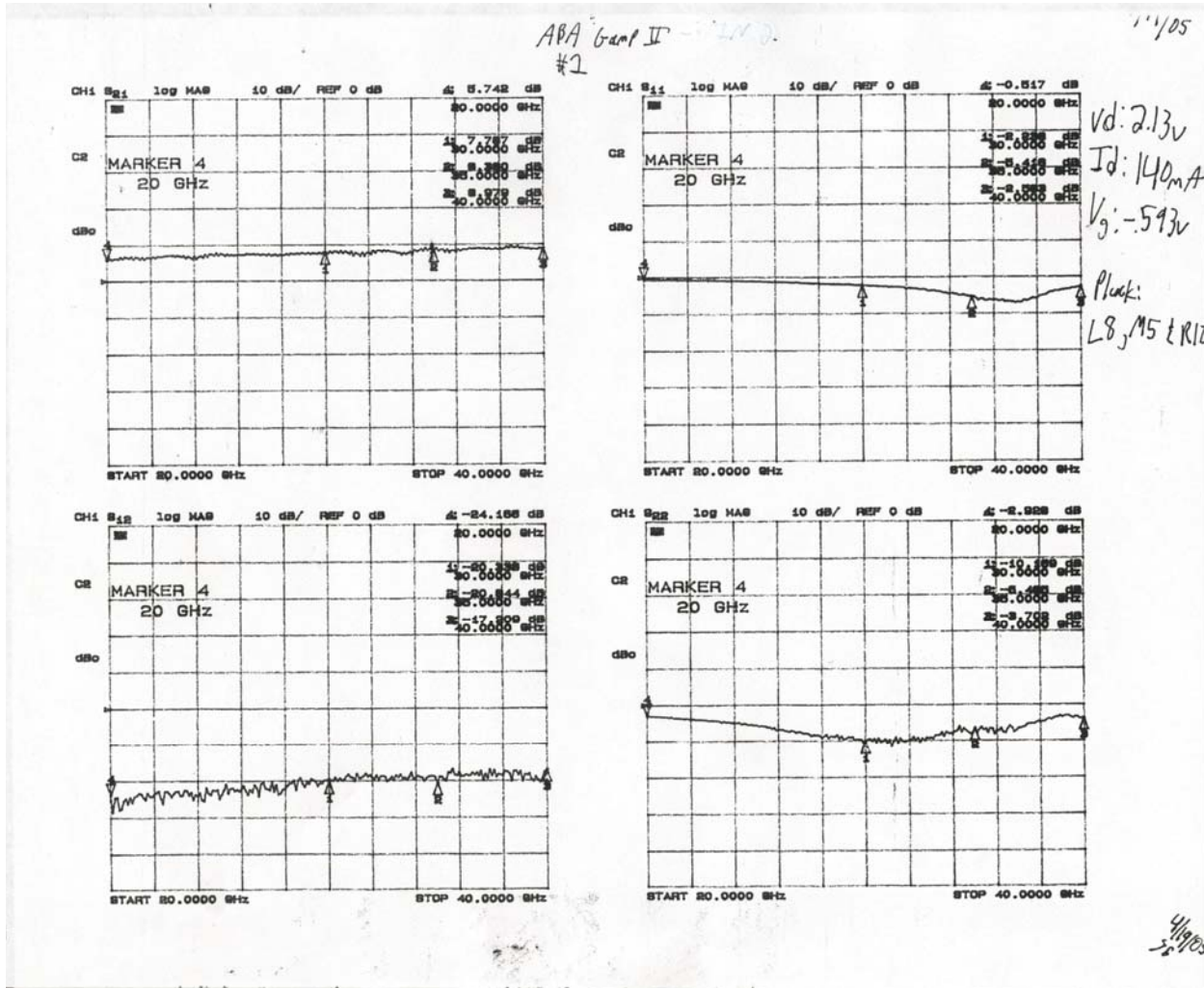


TLC reserves the right to change performance data and specifications without notice



# TLCA03981

## Ka-Band MMIC Amplifier/Multiplier

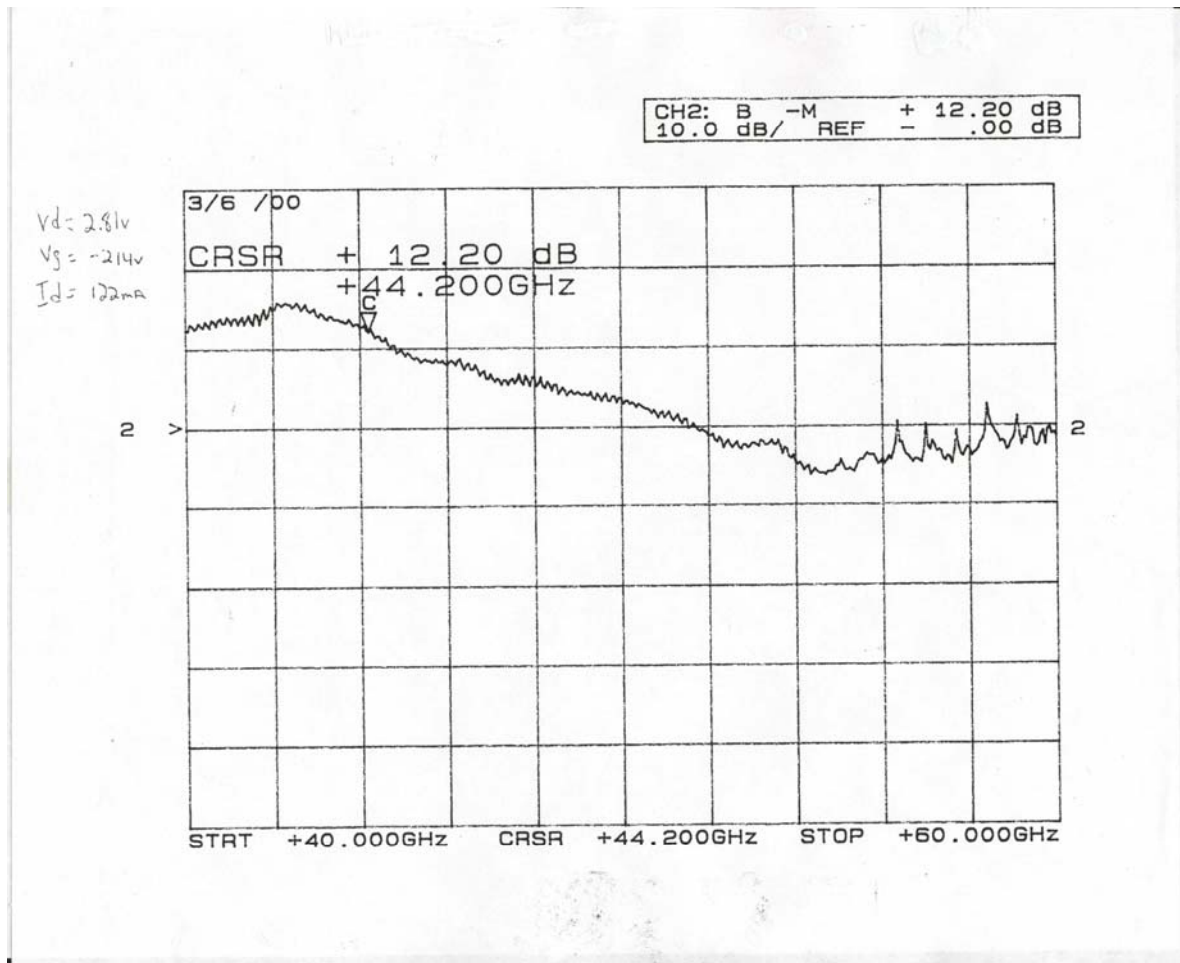


TLC reserves the right to change performance data and specifications without notice



# TLCA03981

## Ka-Band MMIC Amplifier/Multiplier



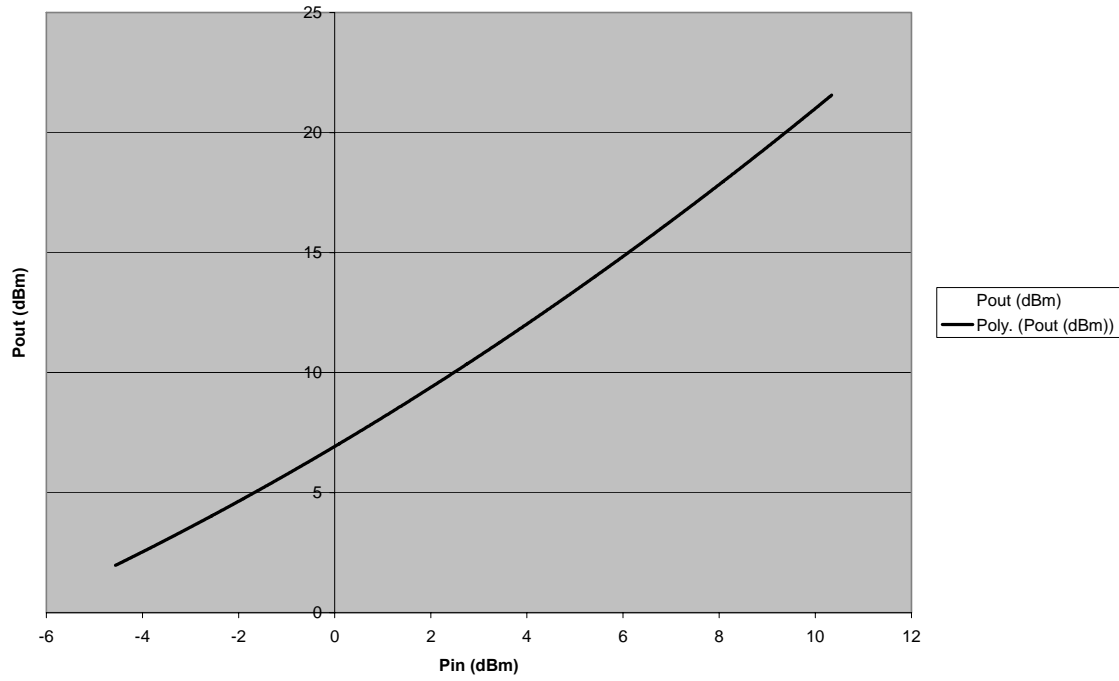
TLC reserves the right to change performance data and specifications without notice



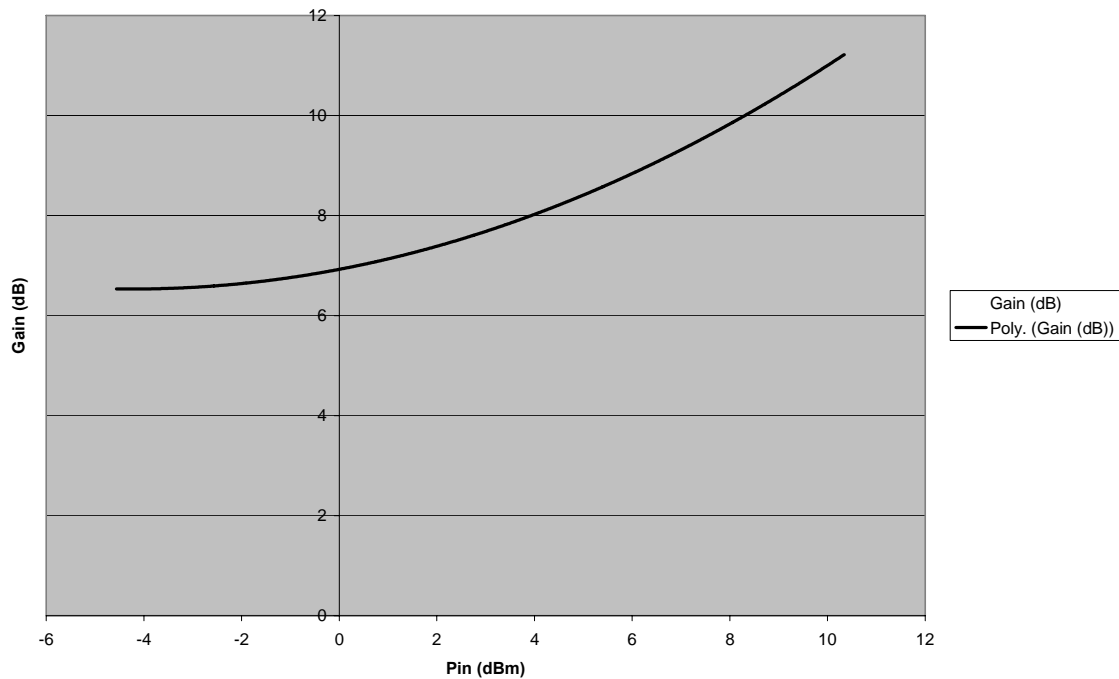
# TLCA03981

## Ka-Band MMIC Amplifier/Multiplier

Pin vs. Pout @ 35GHz



Gain @ 35 GHz



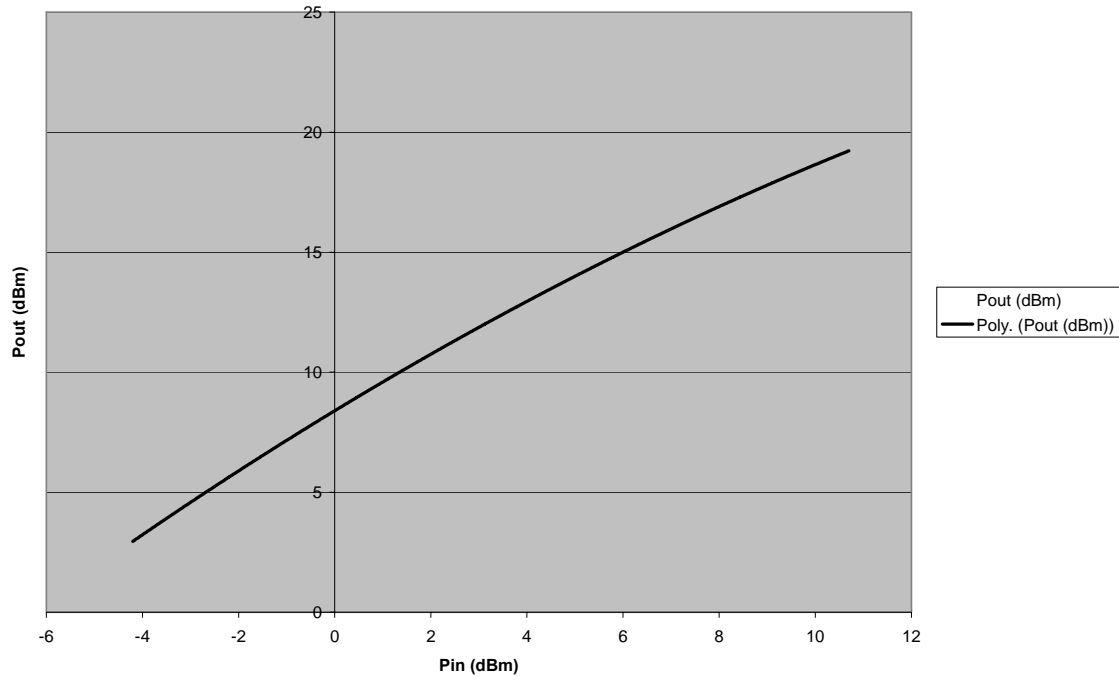
TLC reserves the right to change performance data and specifications without notice



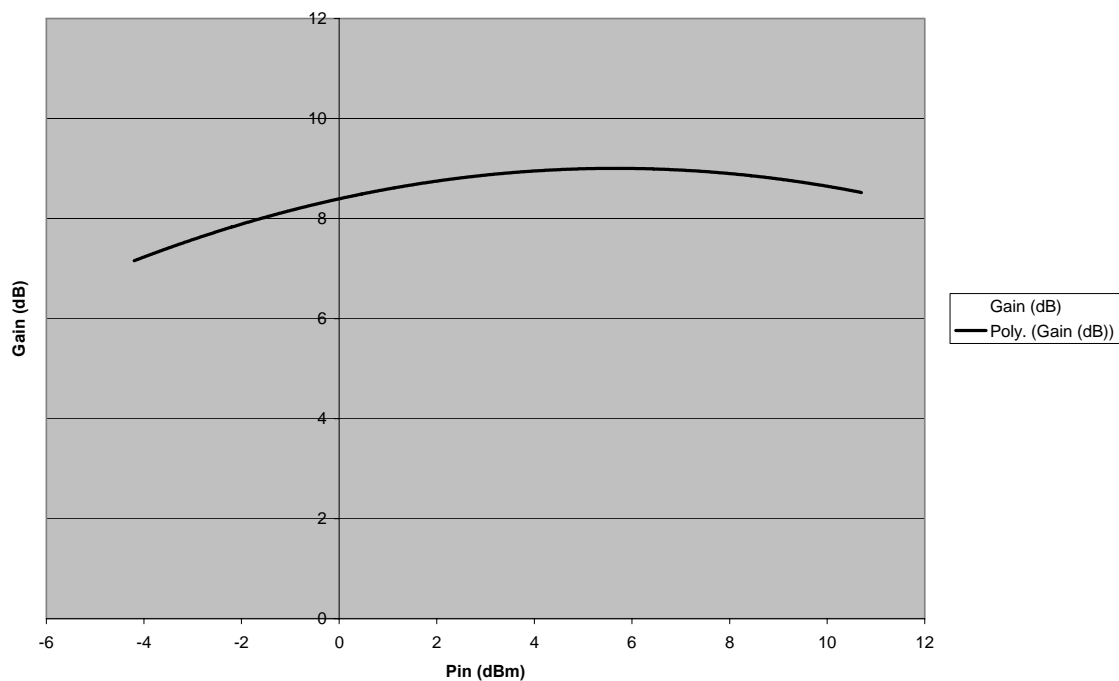
# TLCA03981

## Ka-Band MMIC Amplifier/Multiplier

Pin vs. Pout @ 40GHz



Gain @ 40GHz



TLC reserves the right to change performance data and specifications without notice