Features

- Operation Frequency：13.5～14.75GHz
- ACPR：-29dBc@P_{OUT}=36dBm
- Output P_{-1}dB：38dBm
- VD=+7V～+8V
- Small size：6mm×6 mm×1.1 mm

Applications

- SATCOM
- Telecom infrastructure
- Military
- Test instrumentation
- Microwave radio

Description

The XT3110Q6 is Ku Band GaAs MMIC power amplifier which operates from 13.5 to 14.75GHz. It provides 29 dB of small signal gain, and 38dBm of output power at 1 dB gain compression. XT3110Q6 is ideal for SATCOM and test equipment applications.

Electrical Specifications（T_A=+25℃, 50Ω）

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Output P_{-1}dB	P_{-1}dB	VD=+7V VGS=-0.8V* f=13.5GHz～14.75GHz Pin=-30dBm	36	38	-	dBm
Small Signal Gain	G_S		26	29	-	dB
SS Gain Flatness	ΔG_S		-	±1.5	-	dB
Quiescent Drain Current	IDQ		-	2.2	2.6	A
Drain Voltage	VD		7	-	8	V
Input Return Loss	RL_i		-	-12	-	dB
Power Added Efficiency	PAE	P_{OUT}= P_{-1}dB	-	30	-	%
ACPR Performance**	Ψ	P_{OUT}=36dBm	-	-29.5	-	dBc
		P_{OUT}=36.5dBm		-27	-	dBc
		P_{OUT}=37dBm		-26.5	-	dBc
ACPR Performance ***		P_{OUT}=36dBm	-	-30.5	-	dBc
		P_{OUT}=36.5dBm	-	-27.5	-	dBc
		P_{OUT}=37dBm	-	-27.2	-	dBc
EVM Performance **	Π	P_{OUT}=36dBm	-	6.2	-	%
		P_{OUT}=36.5dBm	-	6.5	-	%
		P_{OUT}=37dBm	-	6.5	-	%
EVM Performance ***		P_{OUT}=36dBm	-	5.5	-	%
		P_{OUT}=36.5dBm	-	6	-	%
		P_{OUT}=37dBm	-	6.4	-	%
Thermal Resistance	R_{th}	Tbase=70℃	-	4.1	-	℃/W

* IDQ=2.25A

** f=14.25GHz, VDS=7V,IDQ=2.25A,8PSK， σ =0.5，symbol rate=2M

*** f=14.25GHz, VDS=7V,IDQ=2.45A,8PSK， σ =0.5，symbol rate=2M

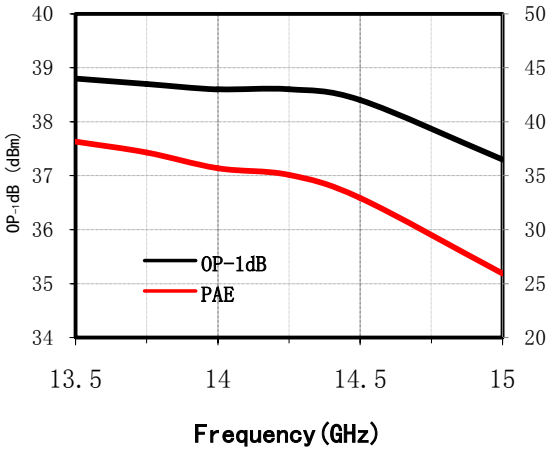
ABSOLUTE MAXIMUM RATINGS

CW Input Power	+20dBm	Operating Temperature	-55℃～+85℃
Junction Temperature	150℃	Storage Temperature	-65℃～+150℃
Drain Supply Voltage	+9V	Gate Supply Voltage	-2V
ESD (HBM)	Class 1A	Output Mismatch Stress	3:1
Soldering Temperature	260℃，20s		

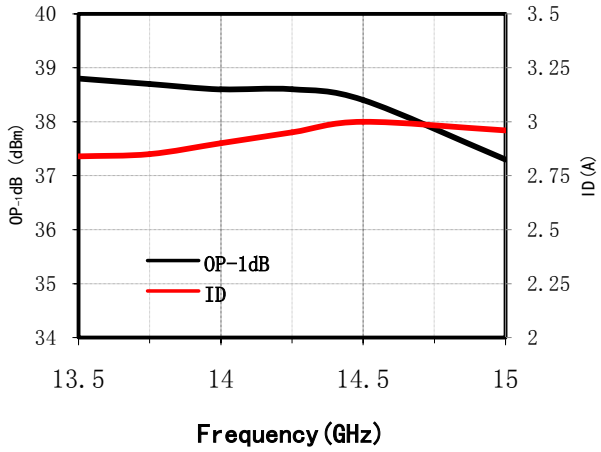
Typical Performance

VD=+7V IDQ=2.25A T_A=25℃ CW Operation

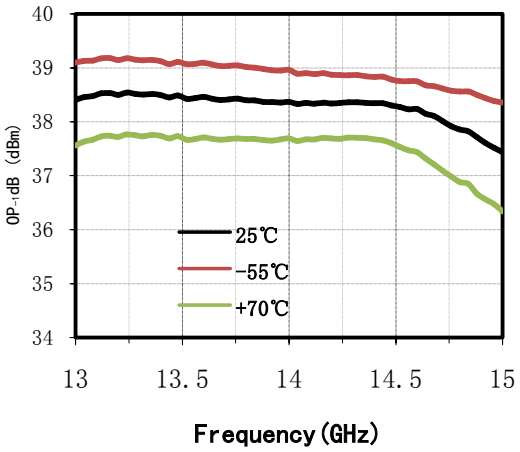
OP-1dB、PAE vs. Freq



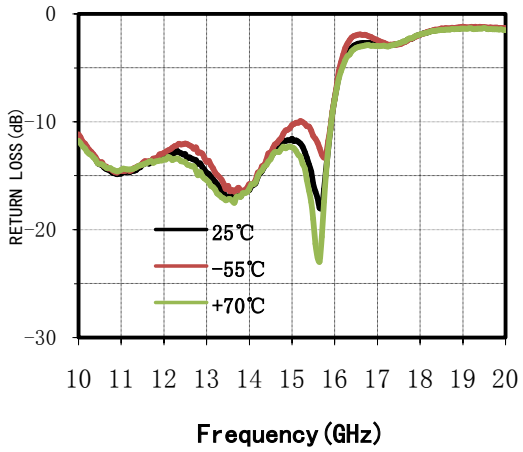
OP-1dB vs. ID



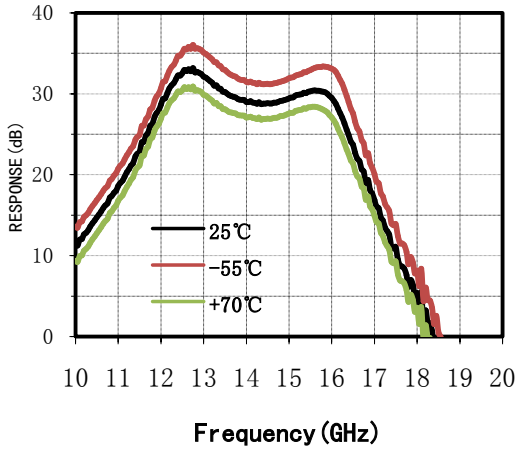
OP-1dB vs. Temperature



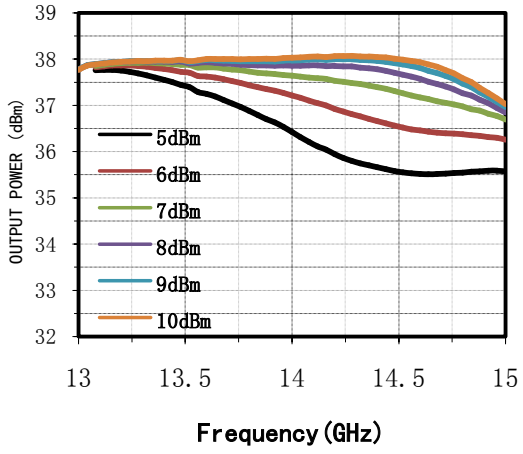
Input Return Loss vs. Temperature



Small Signal Gain vs. Temperature

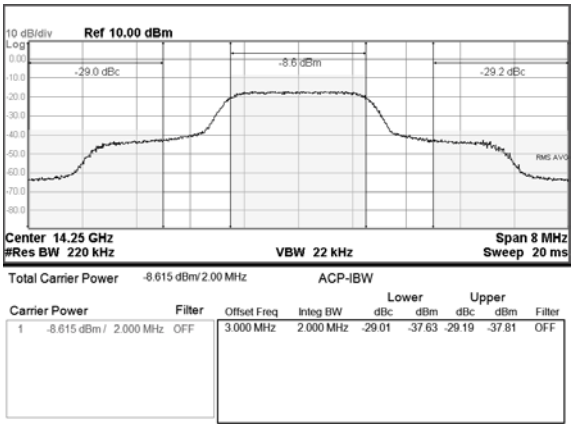


Input Power vs. Output Power

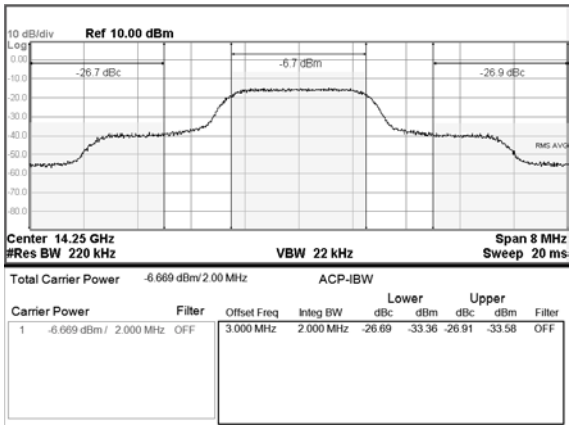


ACPR Performance

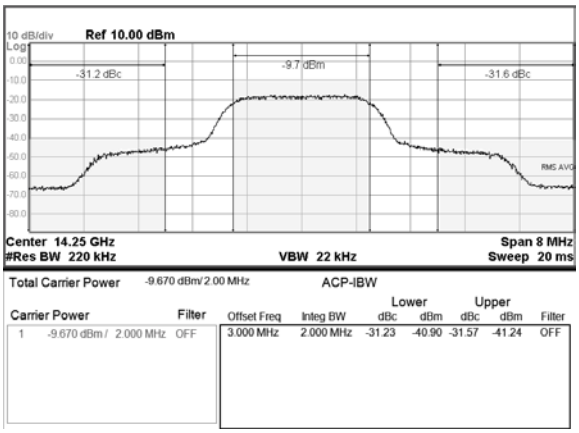
P_{OUT}=36dBm IDQ=2.25A



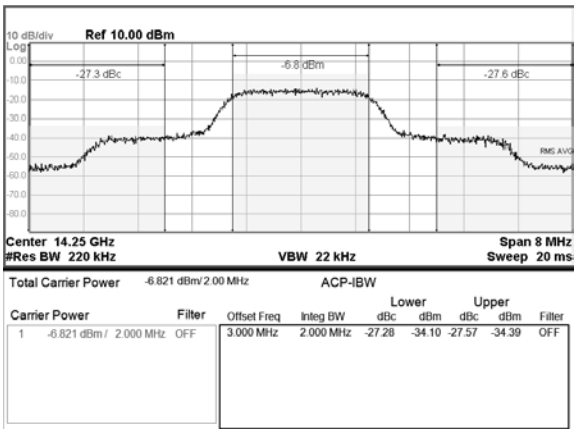
P_{OUT}=37dBm IDQ=2.25A



P_{OUT}=36dBm IDQ=2.45A



P_{OUT}=37dBm IDQ=2.45A



EVM Performance

P_{OUT}=36.5dBm IDQ=2.25A

EVM	= 6.6896	%rms	17.756	% pk	at sym	849	
Mag Err	= 4.4720	%rms	-14.371	% pk	at sym	576	
Phase Err	= 2.8820	deg	9.2286	deg pk	at sym	849	
Freq Err	= -36.173	Hz	SNR (MER)	= 23.492	dB		
IQ Offset	= -34.873	dB	Amp Droop	= -76.42	udB/sym		
Quad Err	= 27.712	mdeg	Gain Imb	= -0.007	dB		

0	01010111	00110101	11011110	11010101	01101000	00000101
48	01001110	00000110	10110110	10011000	01101111	10100110
96	10010101	11010101	10000101	11101110	00110001	10011110
144	01000110	01111111	10100010	01100110	01110100	10000001
192	00100110	10111110	10110000	10010100	10111110	00011001
240	10111000	11010101	01000100	11111000	01000001	01011001
288	11001110	00101111	11111101	10010010	00001100	00010110

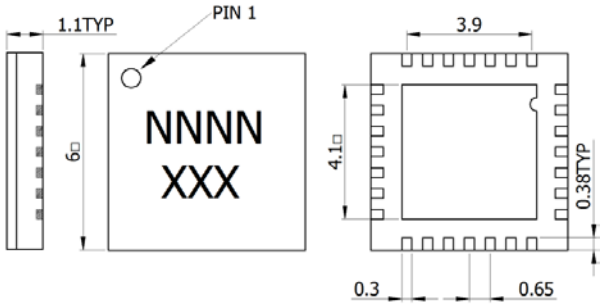
P_{OUT}=36.5dBm IDQ=2.45A

EVM	= 5.9975	%rms	16.463	% pk	at sym	994	
Mag Err	= 4.2154	%rms	-14.947	% pk	at sym	234	
Phase Err	= 2.4684	deg	8.6854	deg pk	at sym	530	
Freq Err	= -34.182	Hz	SNR (MER)	= 24.441	dB		
IQ Offset	= -36.336	dB	Amp Droop	= -29.45	udB/sym		
Quad Err	= -27.011	mdeg	Gain Imb	= 0.056	dB		

0	10101110	11111010	10100111	10101110	01101001	01010111
48	10001001	11111001	11111110	10110100	10110000	11000111
96	00101000	01101100	10110111	00010100	10011001	00011000
144	11100010	11001011	10010111	00001010	10000111	01011111
192	01101001	00111111	11110110	11000110	10100110	11101010
240	11001001	10010011	10110001	00101110	01111110	10010010
288	10001100	01111100	00110001	11001000	11011011	10101011

Outline Drawing

Lead-Free 6mm 28-Lead PQFN



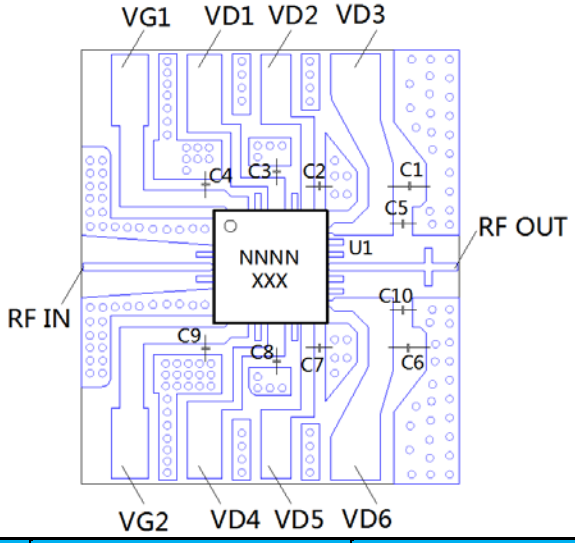
1.Unit：millimeters

2.Finish: Electroless Nickel per MIL-C-26074,Class1 2—5um thick.Gold plate per MIL-G-45204.3.A.1 3.Package Conforms to JEDEC MO-220

Pin Configuration and Description

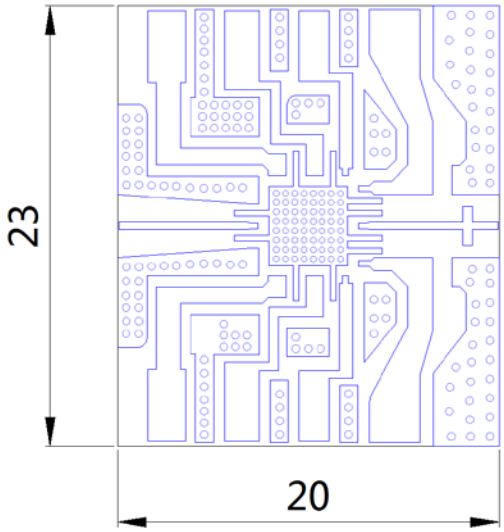
NO.	Description	NO.	Description	NO.	Description	NO.	Description
1	GND	8	VG	15	VD	22	VD
2	GND	9	VG	16	GND	23	GND
3	GND	10	GND	17	GND	24	VD
4	RF Input	11	VD	18	RF Output	25	VD
5	GND	12	VD	19	GND	26	GND
6	GND	13	GND	20	GND	27	VG
7	GND	14	VD	21	VD	28	VG

Assembly Drawing



Part No.	Manufacturer	Part Number	Package
C2～C5、C6～C9	AVX	0603YD225KAT2A	0603
C1、C10	TAIYO YUDEN	UMK325BJ106MM	1210
PCB	Rogers.	RO4003c t=0.203	
U1	-	XT3110Q6	QFN6

Recommended PCB Layout



1.Unit：millimeters

2.PCB : Rogers. RO 4003c t=0.203

Operating the XT3110Q6

1.The XT3110Q6 is biased with a positive drain power supply and negative gate power supply. Performance is optimized at the drain voltage setting to +7.0V,The recommended quiescent drain current is 2.25Amps.

2.Turn ON procedure:

a.Apply gate voltage VG and set to -0.8 V

b.Apply drain voltage VD and set to +7 V

3.Turn OFF procedure:

a.Turn off drain voltage VD

b.Turn off gate voltage VG

RF power can be applied at any time.

4.To improve the thermal and RF performance, we recommend attach a heat sink to the bottom of the board and apply 0.1mm indium shim between the heat sink and the board.