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Variable Gain Amplifier AVG1016

DESCRIPTION

Sanland's AVG1016 is a variable Gain Amplifier with Voltage Controlled Attenuator. The Amplifier has high linearity and low noise achieved by using the 0.5um GaAs E- pHEMT process. It is housed in a miniature 4.0 x 4.0 mm 24-pin Quad-Flat-Non-Lead (QFN) package. It is designed for optimum use from 45MHz up to 1000MHz. The compact footprint and low profile coupled with high gain and high linearity make the AVG1018 an ideal choice as a amplifier for CATV network and FTTH network.

KEY FEATURES

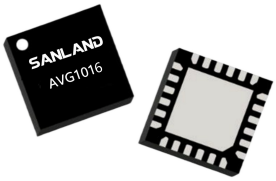
- 45-1000MHz operating frequency range
- 33 dB Gain Max
- Low Noise: 3.5 pA / √Hz Equivalent Input Noise Current (EINC)
- Linearity: -68 dBc CSO and -70 dBc CTB at +78 dBuV RF Output per Channel (60 PAL-D channels DS22)
- High dynamic gain range, 32dB Gain Control Range,
- 0-3V AGC control voltage
- Support -10dBm to +2dBm optical range single supply
- Low power consumption, 110mA for one RF output at 12V supply voltage
- Lead-free/RoHS compliant QFN4X4-24L package

Major Applications

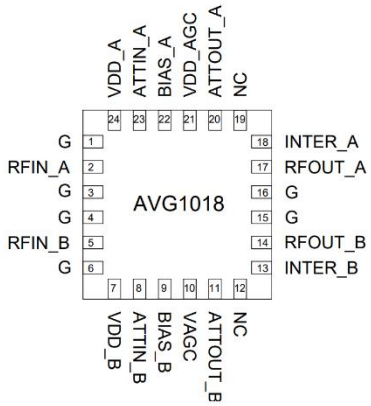
•CATV Network

•FTTH Network

•PON ONU



Pin Assignment



RoHS Compliant & Green Package

Pin Details

Pin	Name	Description	Pin	Name	Description
1	G	Ground	13	INTER_B	AMP2 RF IN
2	RFIN_A	RF IN PORT	14	RFOUT_B	RF OUT PORT
3	G	Ground	15	G	Ground
4	G	Ground	16	G	Ground
5	RFIN_B	RF IN PORT	17	RFOUT_A	RF OUT PORT
6	G	Ground	18	INTER_A	AMP2 RF IN
7	VDD_B	AMP1 Supply voltage	19	NC	Not connected
8	ATTINT_B	ATT RF IN	20	ATTOUT_A	ATT RF OUT
9	BIAS_B	Bias voltage	21	VDD_AGC	ATT Supply voltage
10	VAGC	ATT Control	22	BIAS_A	Bias voltage
11	ATTOUT_B	ATT RF OUT	23	ATTIN_A	ATT RF IN
12	NC	Not connected	24	VDD_A	AMP1 Supply voltage

Absolute Maximum Ratings

Parameter	Rating	Unit
DC Power Supply	+12	V
Max. Optical Input Power	+5	dBm
Operating Ambient Temperature	-40 to +85	℃
Storage Temperature	-65 to +150	℃
AGC Control Voltage	3	V
MSL	Level 3	-
Operation beyond any one of these limits may cause permanent damage.		

Important Note:

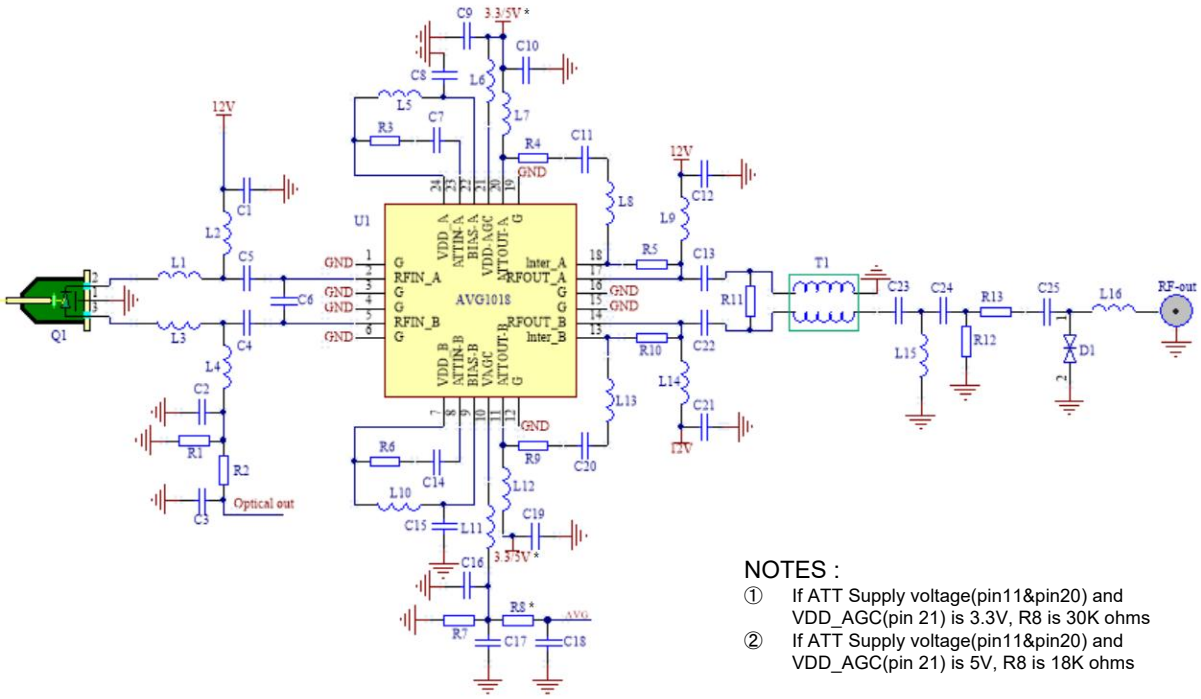
The information provided in this datasheet is deemed to be accurate and reliable only at present time. Sanland Technology Corp. reserves the right to make any changes to the specifications in this datasheet without prior notice.

Caution: ESD Sensitive
ESD Class 1A HBM
Appropriate precaution in handling, packaging And testing devices must be observed.

Electrical Characteristics for Application

Parameter	Specification			Units	Notes
	Min	Typ.	Max		
Gain	-	33	-	dB	45-1000MHz
Gain Control Range	-	32	-	dB	0-32
AGC Control Voltage	0	-	3	V	-
Output return loss	-	-15	-	dB	45-1000MHz
CTB	-	70	-	dBc	Test at Optical Input Power –5dBm. 60 PAL-D channels DS22,OMI=3.5%per channel
CSO	-	68	-	dBc	
CNR	-	48	-	dB	
MER	-	39	-	dB	Test results using 99CH digital signal.Optical Input power -5dBm ,256QAM
VDD	-	12	-	V	-
IDD	100	110	120	mA	Vdd = 12.0V
Test Conditions: VDD=12V, IDD=110mA					
TL=25℃, ZL=75 Ohms, Freq: 45— 1000MHz					

Application Circuit



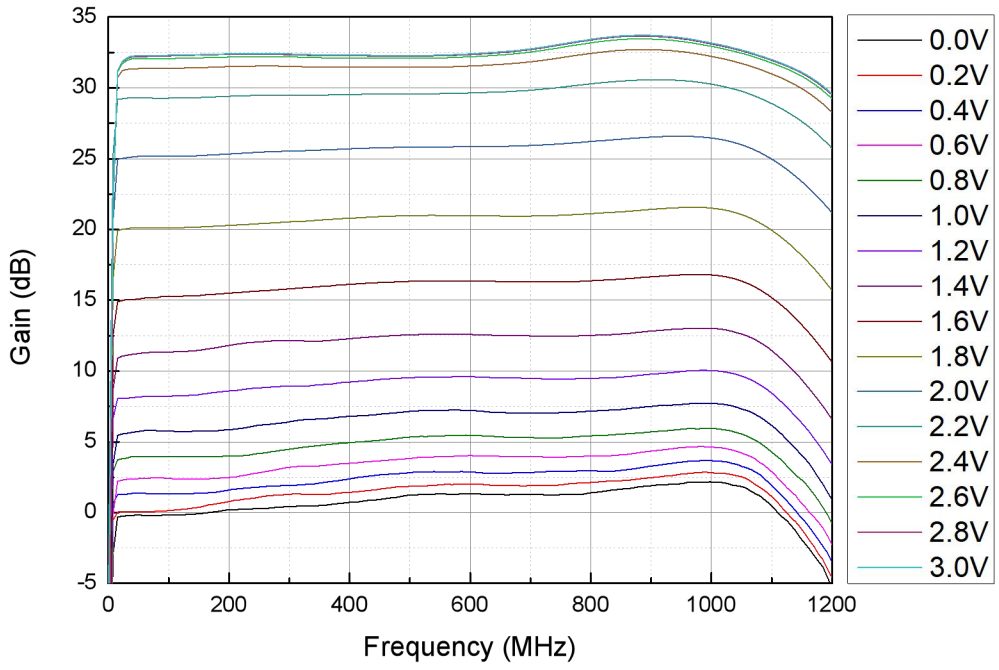
Component	Value	Component	Value
L16	5.6nH(0402)	R1,R5,R10	1K(0402)
L8,L13	8.2nH(0402)	R7	7.5K(0402)
L1,L3	10nH(0402)	R8	18K/5V&30K/3.3V(0402)
L15	270nH(0402)	R2	10K(0402)
L2,L4,L9,L14	1008CS-471XGLC(0402)	C6	1.2P(0402)
L5,L6,L7,L10,L11,12	BLM15HD182SN1(0402)	C23	36P(0402)
R13	10R(0402)	C24	100P(0402)
R4,R9	20R(0402)	C4,C5,C7,C11,C13,C14,C20, C22,C25	10nF(0402)
R3,R6	75R(0402)	C1,C2,C3,C8,C9,C10,C12, C15,C16,C17,C18,C19,C21	0.1uF(0402)
R11	180R(0402)	T1	BW21S7511A01TF
R12	390R(0402)	U1	AVG1018

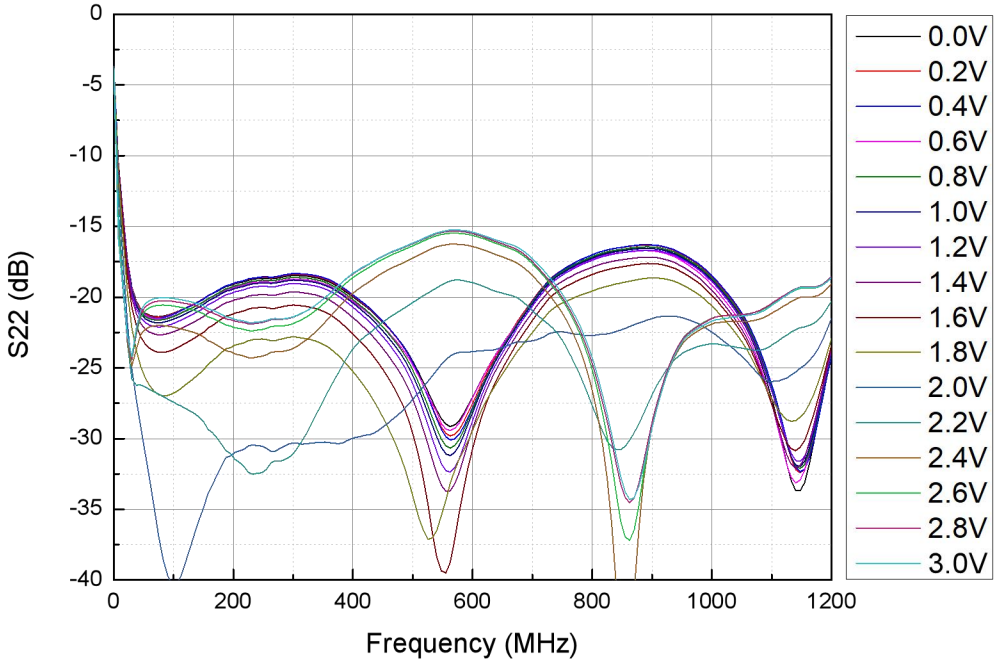
Typical Peformance (+25℃)

1.V_{DD}=+12V , V_{AGC}=0~3V , V_{DD_AGC}=+3.3V , Temperature = +25℃.

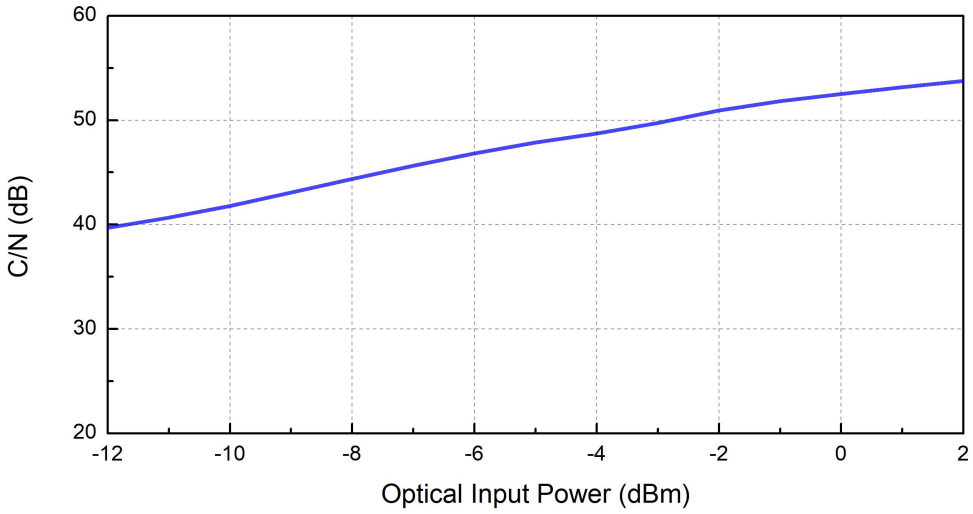
2.C/N, CTB, CSO : Test at Optical Input Power –5dBm. 60 PAL-D channels DS22,OMI=3.5%per channel

3.MER : Test results using 99CH digital signal. Optical Input power -5dBm ,256QAM

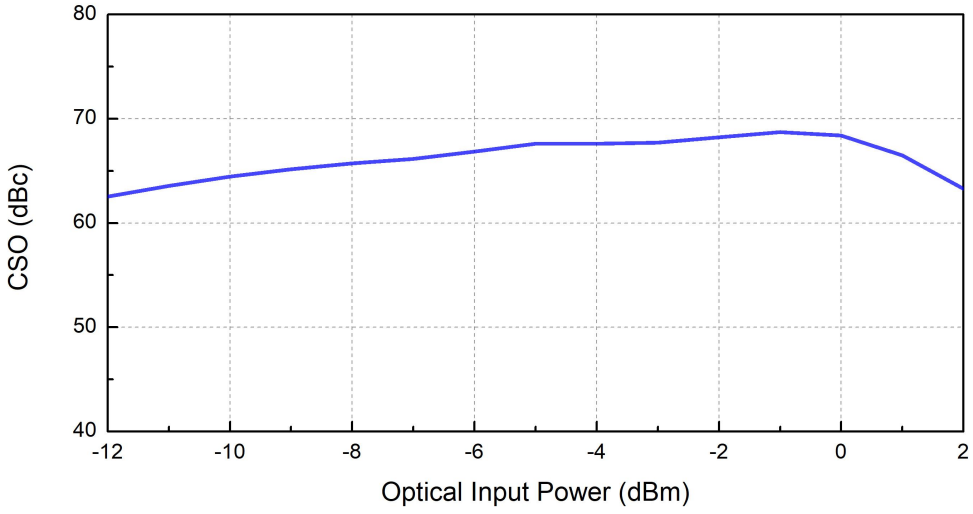




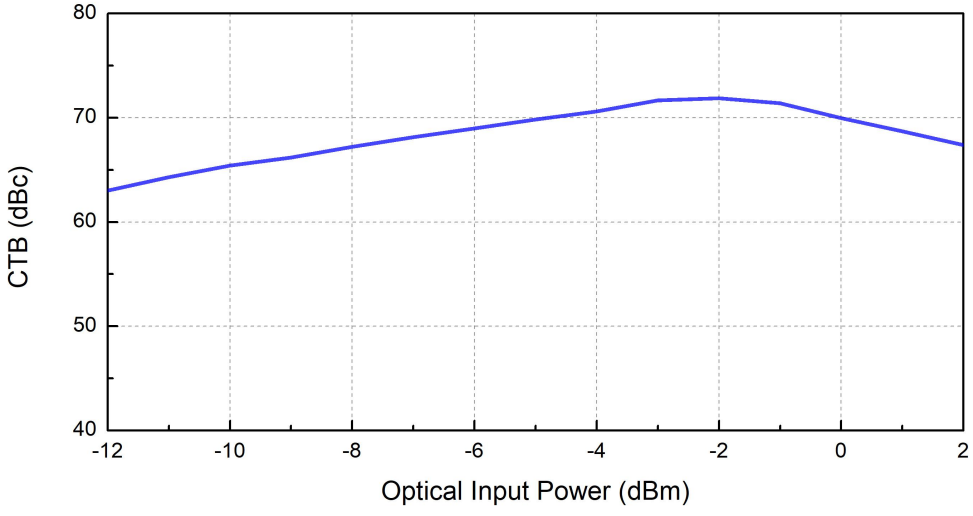
C/N


C/N (dB)
60
50
40
30
20
-12
-10
-8
-6
-4
-2
0
2
Optical Input Power (dBm)

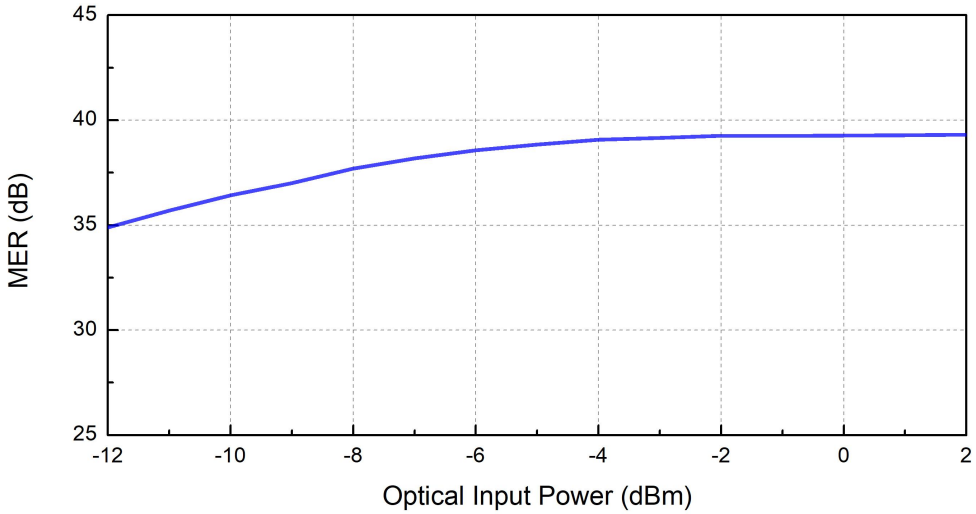
CSO


CSO (dBc)
80
70
60
50
40
-12
-10
-8
-6
-4
-2
0
2
Optical Input Power (dBm)

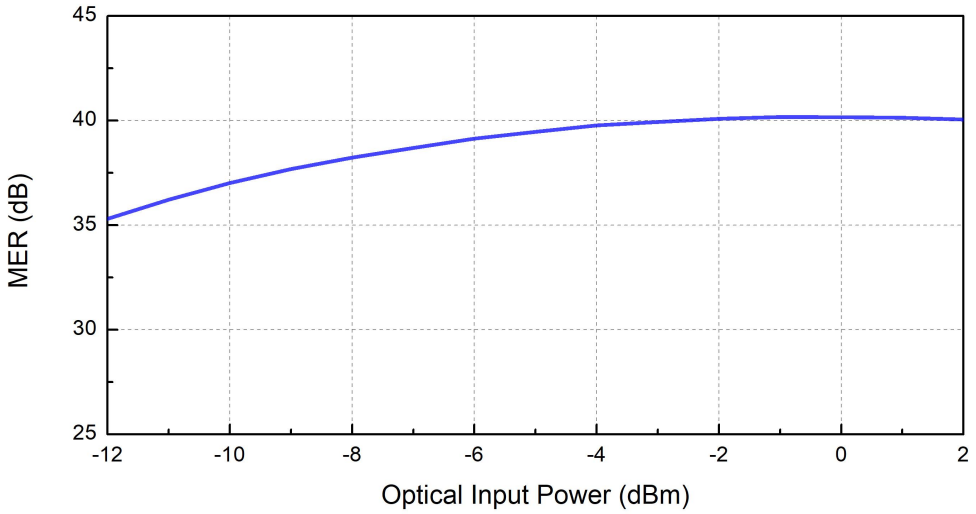
CTB


CTB (dBc)
80
70
60
50
40
-12
-10
-8
-6
-4
-2
0
2
Optical Input Power (dBm)

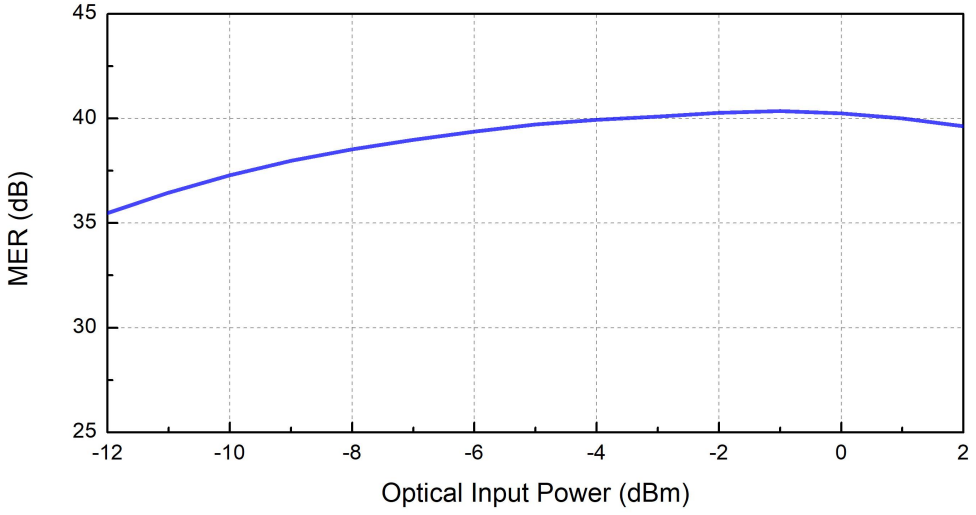
MER(115MHz)



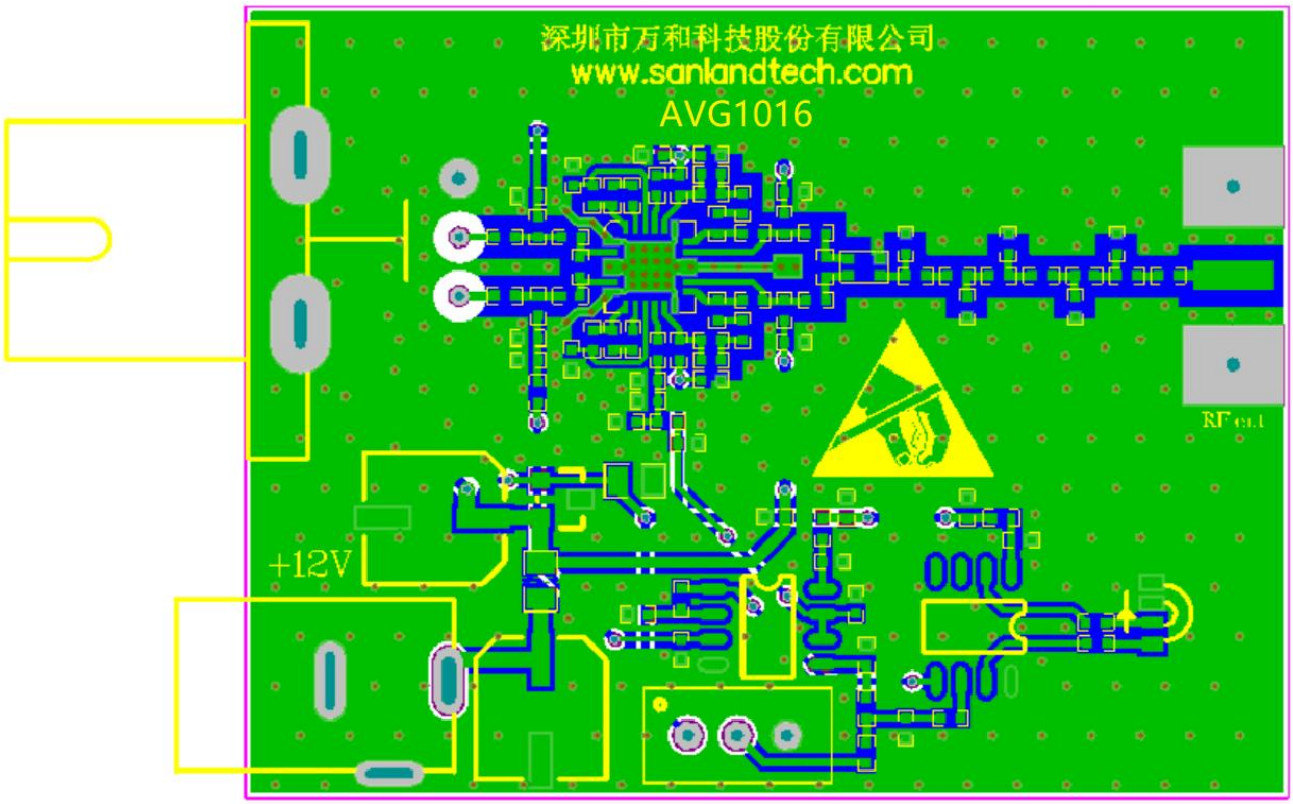
MER(451MHz)



MER(859MHz)



Recommended PCB



QFN4X4-24L Package Outline Dimension