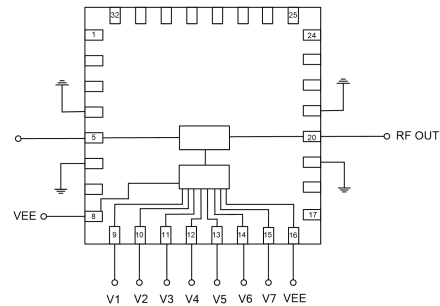


## GaAs MMIC CNC Attenuator Chip, DC-12GHz

### Performance Characteristics

Frequency range: DC-12GHz  
 Insertion loss: 3.5dB typ  
 Attenuation range: 0.25~31.75dB  
 Bit count: 7  
 Attenuation accuracy (RMS): 0.4dB  
 Additional phase shift (RMS): 0.7°  
 Standing wave: 1.3:1  
 50Ohm input/output  
 Chip size: QFN 5X5

### Principle Block Diagram



### Product Introduction

GDA-0012-7C-PD-CQ5 is a GaAs MMIC 7-digit controlled attenuator chip, with a frequency range of DC~12GHz, insertion loss of 3.5dB, switching speed of 50ns, integrated driver inside the chip, powered by -5V and controlled by 0/+5V. The CNC attenuator adopts a 5X5mm surface mount lead-free ceramic tube shell, which can achieve airtight packaging. The surface of the pin pads is treated with gold plating technology, suitable for reflow soldering installation process.

#### Use restriction parameters<sup>1</sup>

Power supply voltage range	-6V
Control voltage range	-0.5V~+5.5V
Maximum input power	+27dBm
Working temperature	-55 ~ +85°C
Storage temperature	-65 ~ +150°C

【1】 Exceeding any of the above maximum limits may result in permanent damage.

#### Electrical parameters (Ta=+25 ° C, VEE=-5V, 0/+5V control)

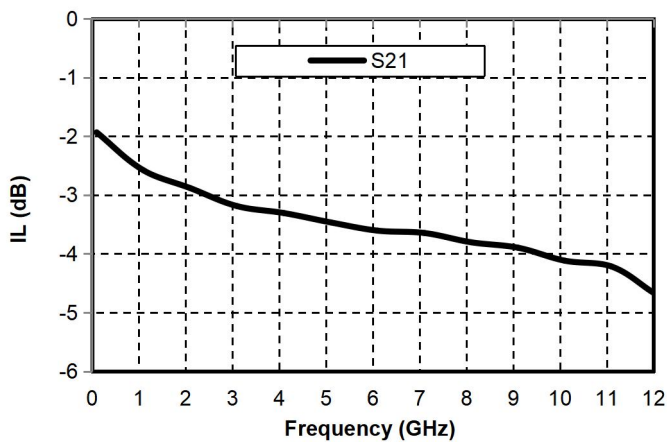
Index	minimum value	Typical value	Maximum value	Unit
Frequency range	DC~12			GHz
Insertion loss	-	3.5	-	dB
Attenuation range	0.5~31.75			dB
Attenuation step	0.25			dB
Attenuation number	7			bite
Attenuation accuracy (all frequency bands)	-	-1.1 ~ +0.3	-	dB
Attenuation accuracy RMS	-	0.4	-	dB
Additional phase shift RMS	-	0.7	-	degree
Input return loss	-	19	-	dB

Output Return Loss	-	18	-	dB
Switching speed	-	50	-	ns
P-1dB	-	22	-	dBm
Current	-	10	-	mA

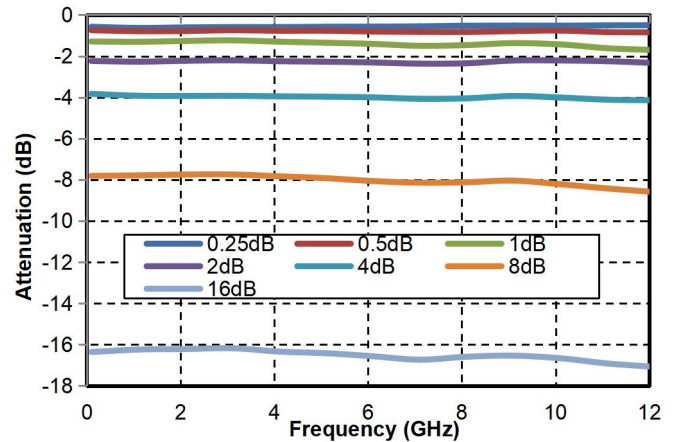
## GaAs MMIC CNC Attenuator Chip, DC-12GHz

Main indicator testing curve

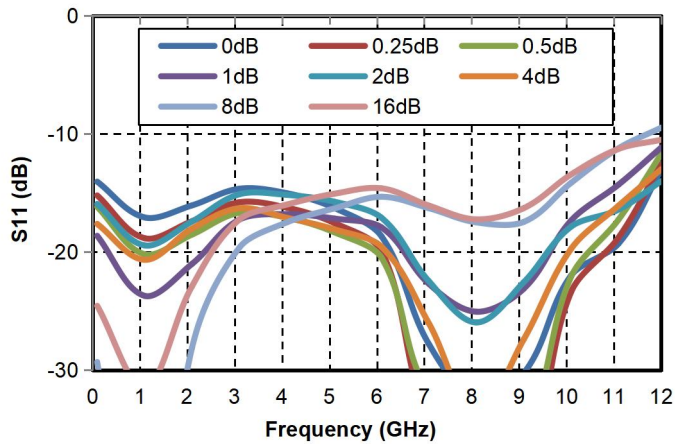
Insertion loss vs. frequency



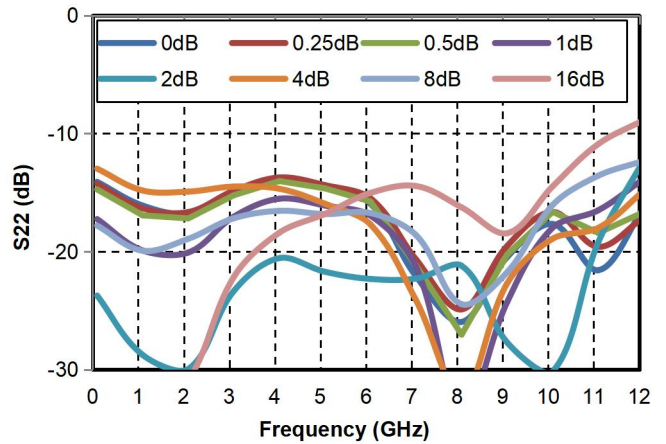
Reference attenuation state vs. frequency



Input Echo vs. Frequency

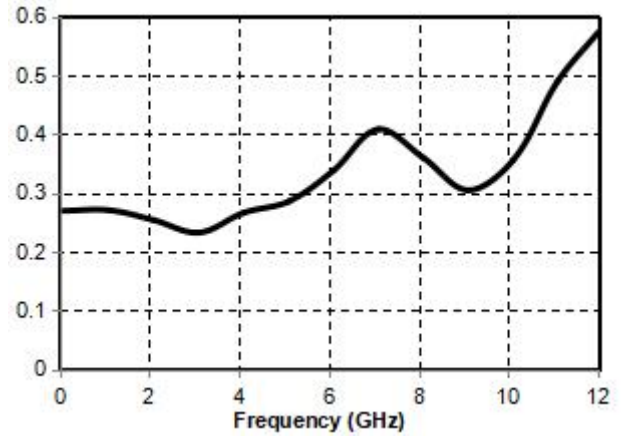
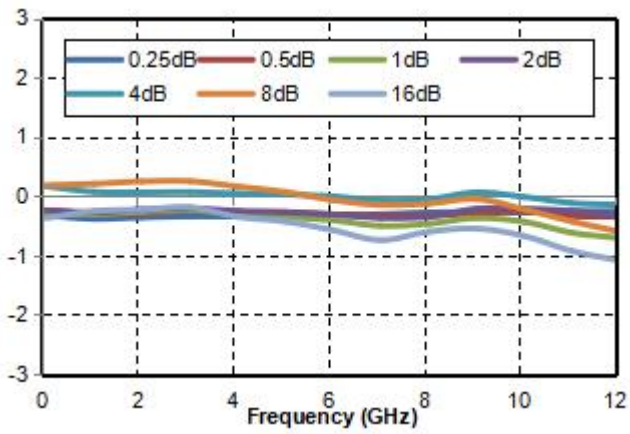


Output Echo vs. Frequency



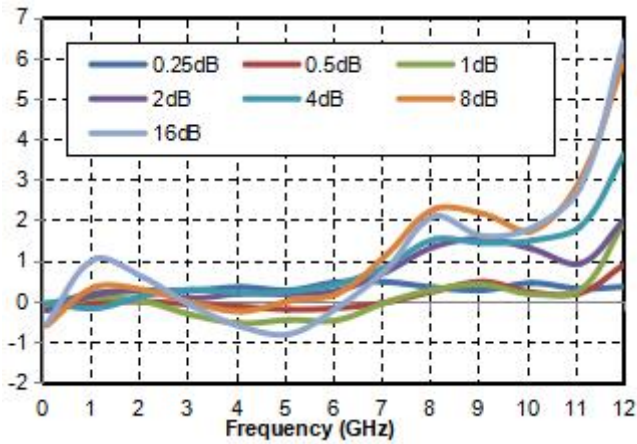
Attenuation accuracy vs. frequency

Attenuation accuracy RMS vs. frequency

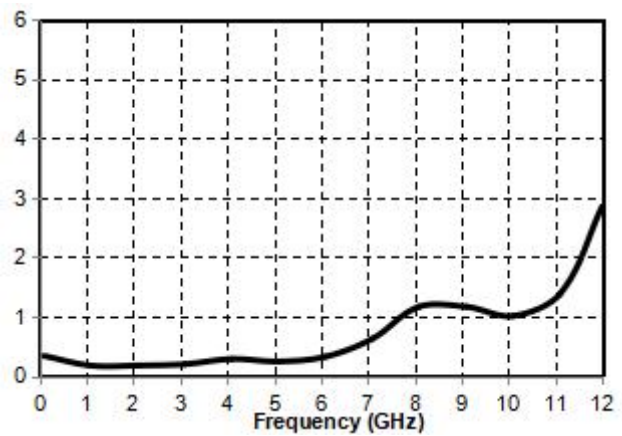


## GaAs MMIC CNC Attenuator Chip, DC-12GHz

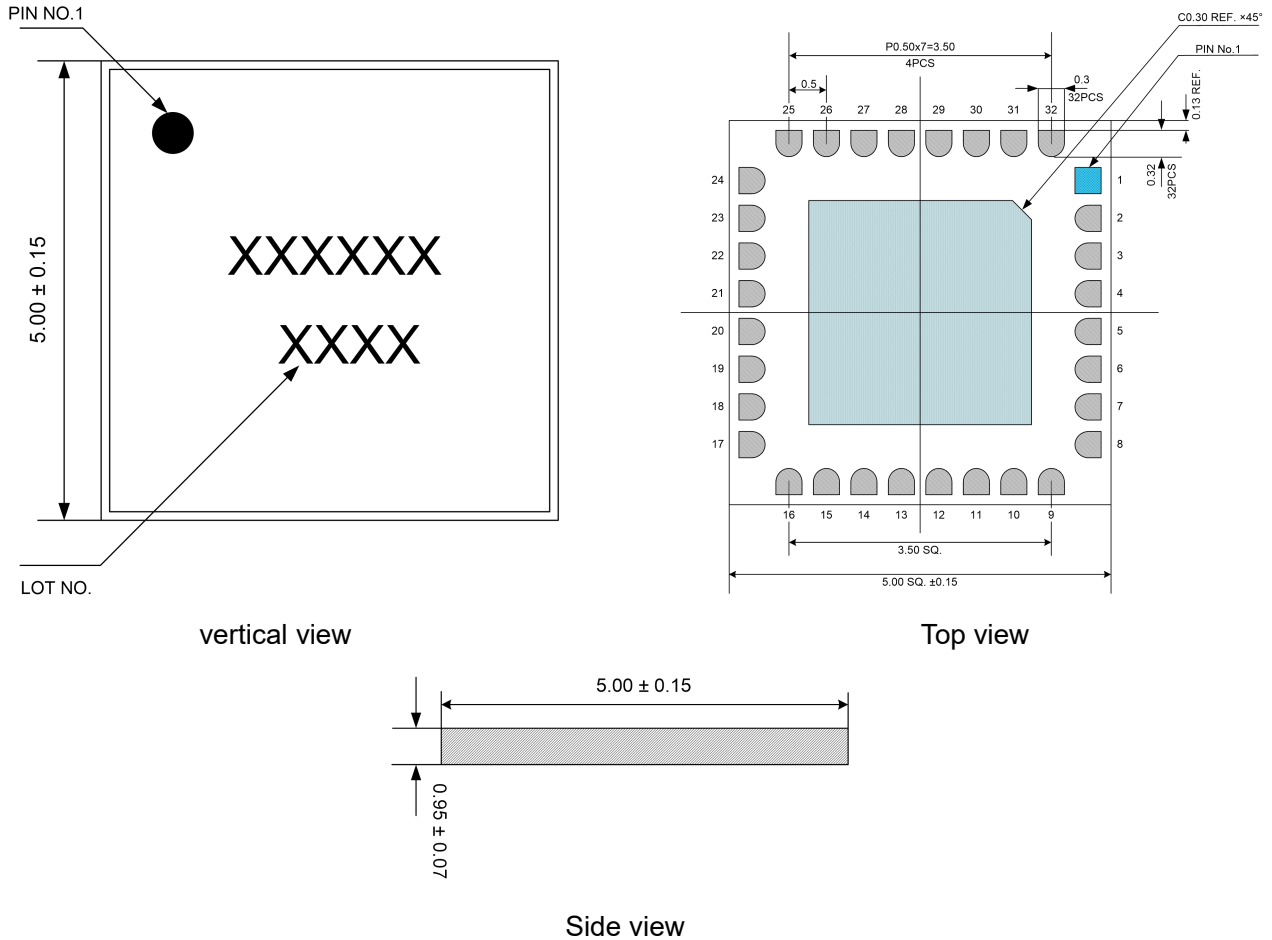
Additional phase shift vs. frequency



Additional phase shift RMS vs. frequency



## External structure



The units in the figure are all millimeters, with an unspecified tolerance of  $\pm 0.15\text{mm}$

## GaAs MMIC CNC Attenuator Chip, DC-12GHz

### Truth table

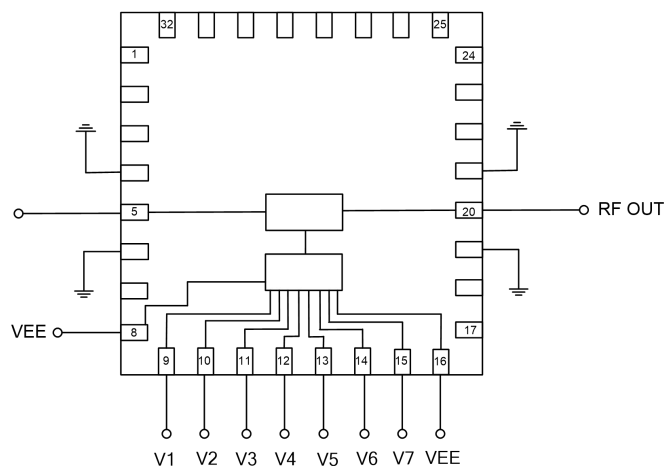
Truth table								
V1	V2	V3	V4	V5	V6	V7	VEE	Conduction pathway
0	0	0	0	0	0	0	-5V	Initial state N=0: attenuation amount is 0
+5V	0	0	0	0	0	0	-5V	Attenuation state N=1: Attenuation amount is 0.25
0	+5V	0	0	0	0	0	-5V	Attenuation state N=2: attenuation amount is 0.5
0	0	+5V	0	0	0	0	-5V	Attenuation state N=4: Attenuation amount is 1

0	0	0	+5V	0	0	0	-5V	Attenuation state N=8: Attenuation amount is 2
0	0	0	0	+5V	0	0	-5V	Attenuation state N=16: Attenuation amount is 4
0	0	0	0	0	+5V	0	-5V	Attenuation state N=32: Attenuation amount is 8
0	0	0	0	0	0	+5V	-5V	Attenuation state N=64: Attenuation amount is 16

## Pin Definition

Pin number	Functional symbols	Function Description
5	RF IN	The signal input terminal is externally connected to a 50 ohm circuit, and there is no integrated DC isolation capacitor inside the chip
20	RF OUT	The signal output terminal is externally connected to a 50 ohm circuit, and there is no integrated DC isolation capacitor inside the chip
8、16	VEE	Power on port
9-15	VC	Attenuation control pads, refer to the truth table for attenuation control
4、6、19、21	GND	The pins should have sufficient and good contact with the RF and DC ground
Chip bottom	GND	The bottom of the chip needs to have sufficient and good contact with RF and DC ground
other	NC	Hanging pins can be grounded

## Recommended circuit



Connect the VEE on either side.