

## GaAs MMIC 5-bit CNC Attenuator Chip, 0.1-8GHz

### Performance characteristics

Principle block diagram frequency range: 0.1-8GHz

Insertion loss: 1.0dB typ

Attenuation range: 0.25~7.75dB

Bit count: 5

Attenuation step: 0.25dB

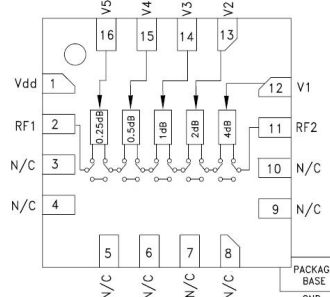
Full positive: +5V power supply, 0/+5V control

(compatible with +3.3V)

50Ohm input/output

Chip size: QFN 3X3

### Principle Block Diagram



### Product Introduction:

GDA-0008-5B-PD-CQ5 is a GaAs MMIC 5-bit CNC attenuator chip, with a frequency range of 0.1-8GHz, insertion loss of 1.0dB, switching speed of 50ns, integrated driver inside the chip, using 0/+5V control (compatible with +3.3V). The amplifier adopts a 3X3mm 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

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

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

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

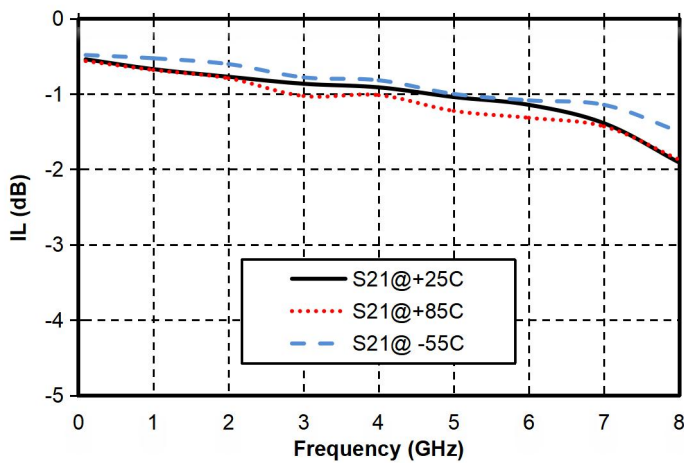
Index	minimum value	Typical value	Maximum value	Unit
Frequency range		0.1-8		GHz
Insertion loss	-	1.0	-	dB
Attenuation range		0.25~7.75		dB
Attenuation step		0.25		dB
Attenuation number		5		bite
Attenuation accuracy (fundamental state)	-	-	±0.4	dB
Additional phase shift (fundamental state)	-	-	±8.0	degree
Input return loss	-	19	-	dB

Output Return Loss	-	19	-	dB
Switching speed	-	50	-	ns
P-1dB	-	23	-	dBm
Supply voltage	3	5	-	V
Power supply current		7	-	mA
Control high voltage	2.5	3.3	5	V
Control low voltage	0		0.8	V
Control current	-	-	1	mA

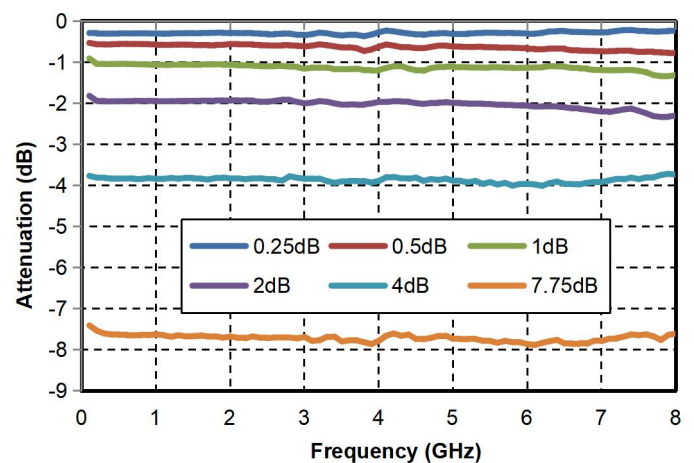
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### Main indicator testing curve

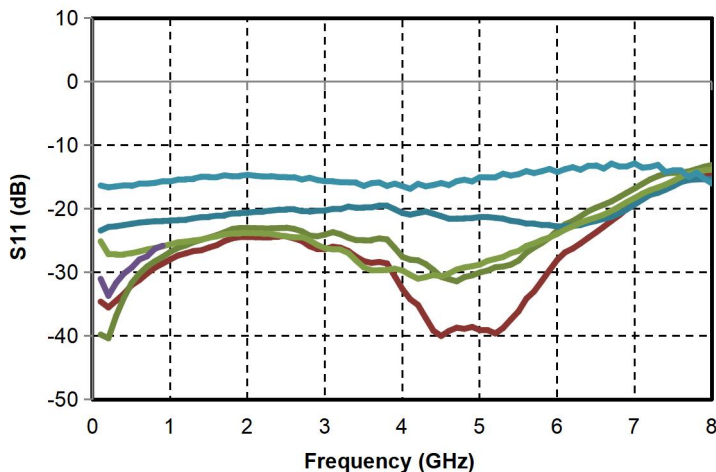
Insertion loss vs. frequency



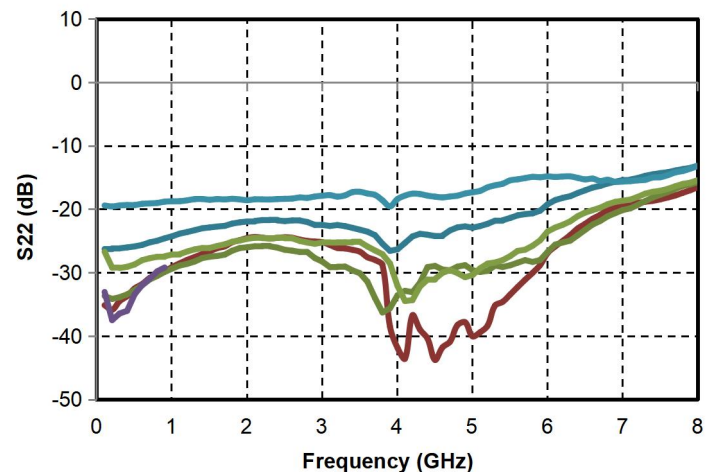
Reference attenuation state vs. frequency



Input Echo vs. Frequency

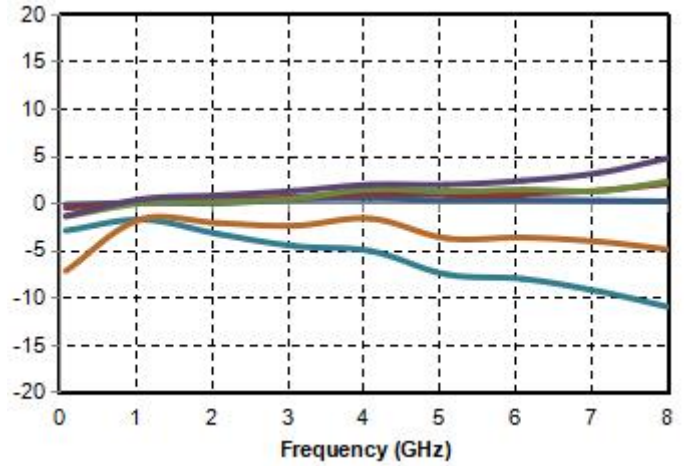
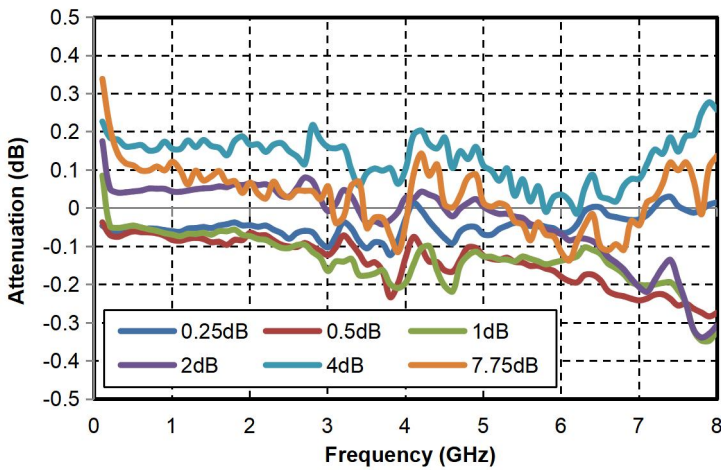


Output Echo vs. Frequency



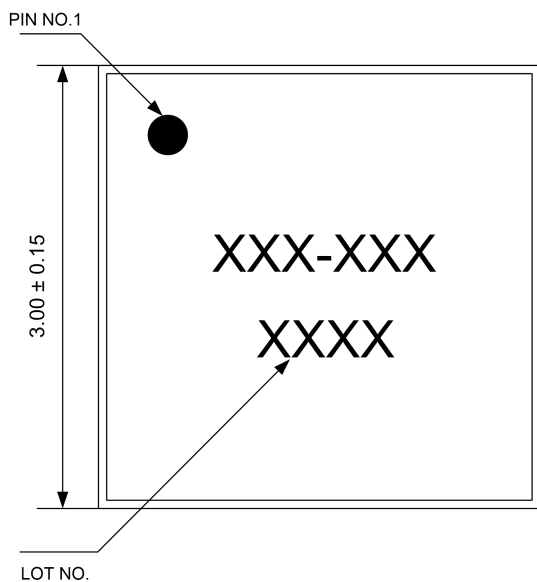
Attenuation accuracy (fundamental state) vs. frequency

Additional phase shift (fundamental state) vs. frequency

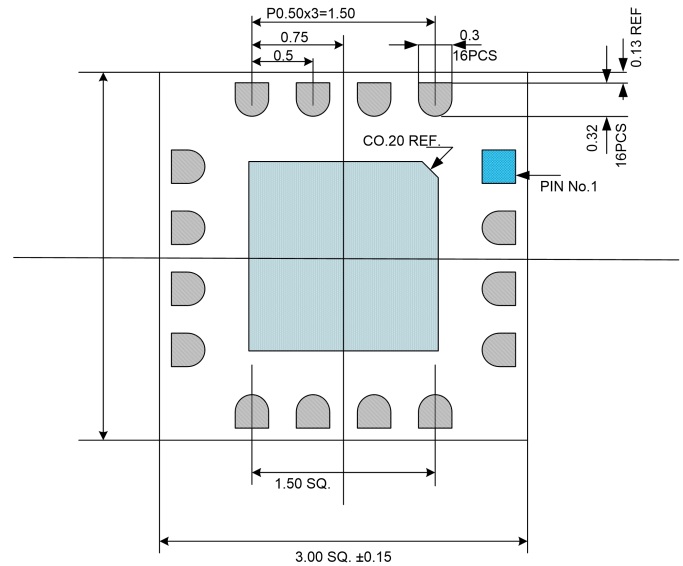


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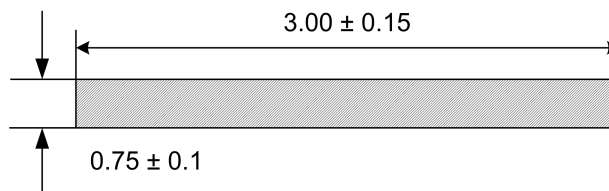
### External structure



vertical view



Top view



Side view

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

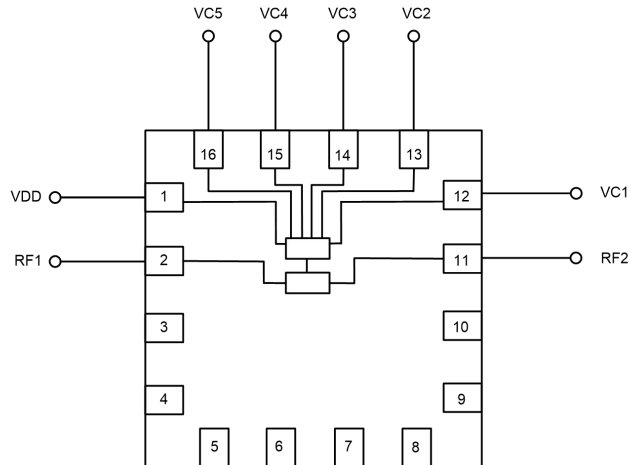
## Truth table

VC1	VC2	VC3	VC4	VC5	VDD	Conduction path RF1-RF2
+5V	+5V	+5V	+5V	+5V	+5V	Initial state N=0: attenuation of 0dB
+5V	+5V	+5V	+5V	0V		Attenuation state N=1: Attenuation amount is 0.25dB
+5V	+5V	+5V	0V	+5V		Attenuation state N=2: attenuation amount is 0.5dB
+5V	+5V	0V	+5V	+5V		Attenuation state N=4: Attenuation amount is 1dB
+5V	0V	+5V	+5V	+5V		Attenuation state N=8: Attenuation amount is 2dB
0V	+5V	+5V	+5V	+5V		Attenuation state N=16: Attenuation amount is 4dB
0V	0	0V	0V	0V		Attenuation state N=31: Attenuation amount is 7.75dB

## GaAs MMIC 5-bit CNC Attenuator Chip, 0.1-8GHz

Pin Definition		
Pin number	Functional symbols	Function Description
2	RF1	The signal input terminal is externally connected to a 50 ohm circuit, and there is no integrated DC isolation capacitor inside the chip
11	RF2	The signal output terminal is externally connected to a 50 ohm circuit, and there is no integrated DC isolation capacitor inside the chip
1	VDD	Chip power port
12~16	VC	Attenuation control pads, refer to the truth table for attenuation control
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



## Precautions for use

- Sealing material: Ceramic material that meets ROHS specifications
- Lead frame material: copper alloy
- Lead surface coating: gold, with a gold layer thickness greater than 0.3um MIN
- Maximum reflow soldering peak temperature: 260 °C