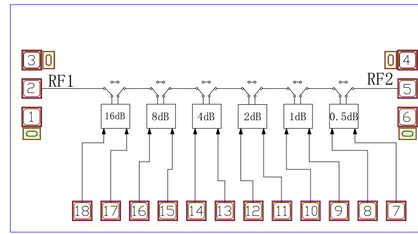
Features

·Freq: DC-18.0GHz
·Insertion Loss: 3.0dB
·Attenuation Range:0.5~31.5dB
·RMS: 0.1dB
·RF1/RF2 Stationary Wave: 1.3/1.3
·50Ω Input/Output
·Die Size: 2.2×1.2×0.1mm^3

Functional Diagram



Generation Description

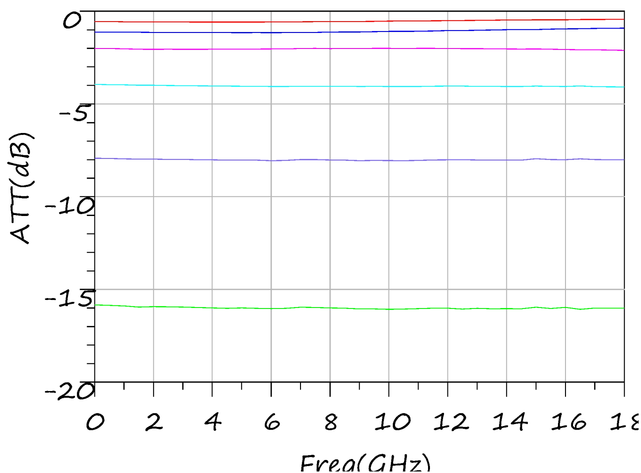
The MC1415 is a 6-bit, digital step attenuator working at DC-18.0 GHz with a typical insertion loss of 3.0dB. The logic control is 0V/-5V. No need for external power bias. No power consumption and the switch speed is less than 20ns.
The chip applies the on-chip metallization through-hole technology thus no need for additional grounding measures which makes it very easy and convenient to use; the backside of the chip is metallized, suitable for conductive adhesive bonding or eutectic mounting process..

Electrical Specification (T_A=+25℃, 50Ω system,0V/-5V Control)

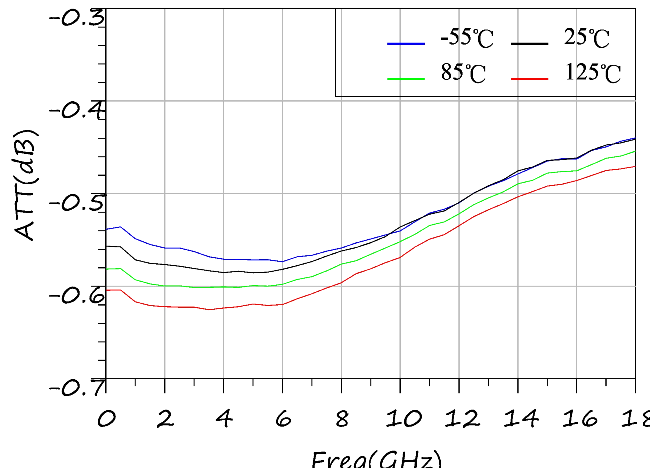
Parameter		Function	Min.	Typ.	Max.	Units
Frequency Range		Freq	DC	-	18.0	GHz
Insertion Loss		IL	-	3.0	-	dB
Attenuation Range		△IL	0.5~31.5			dB
Attenuation Accuracy	0.5	-	-	0.5	-	dB
	1.0	-	-	1.0	-	dB
	2.0	-	-	2.0	-	dB
	4.0	-	-	4.0	-	dB
	8.0	-	-	8.0	-	dB
	16.0	-	-	16.0	-	dB
RMS		-	-	0.1	-	dB
RF1 Stationary Wave		VSWR	-	1.3	-	-
RF2 Stationary Wave		VSWR	-	1.3	-	-

[1] The chips are 100% DC and RF tested.

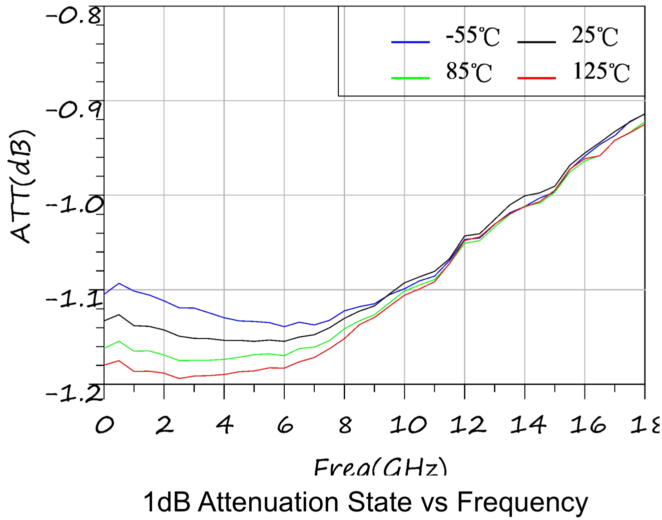
Typical Testing Characteristics



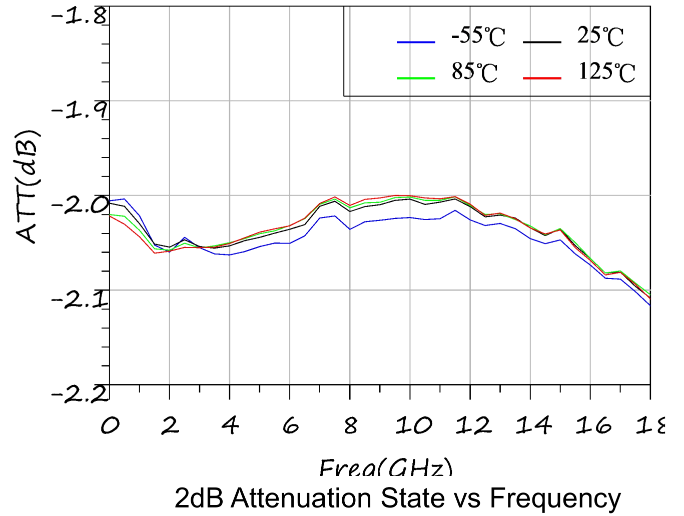
Normalized Attenuation & Frequency over Major Attenuation



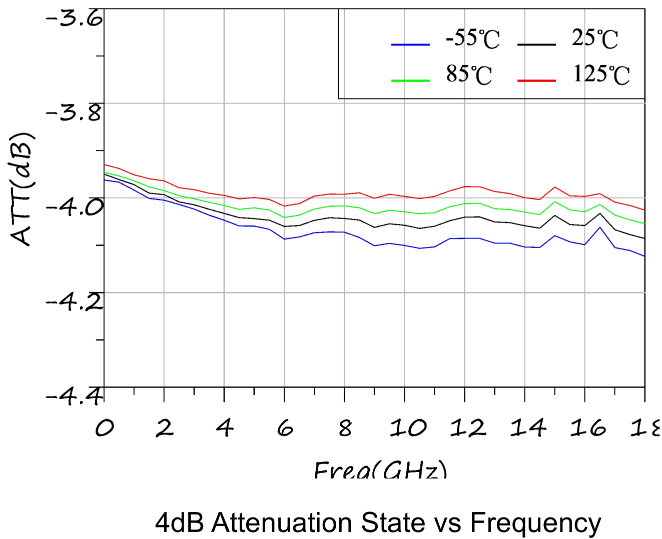
0.5dB Attenuation State vs Frequency



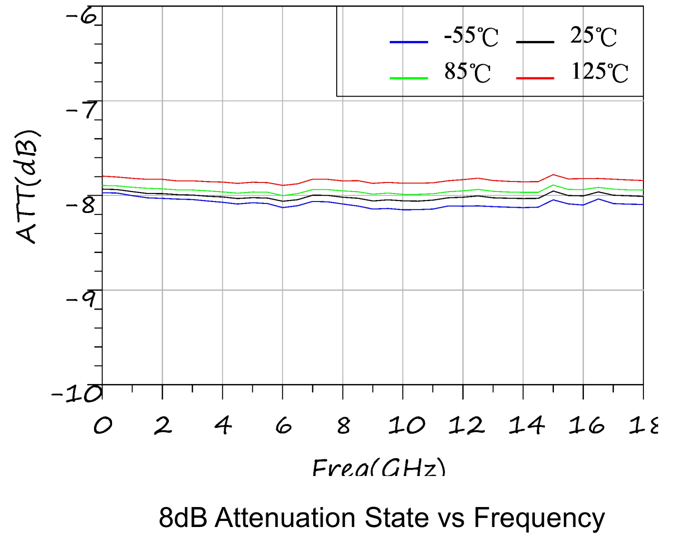
1dB Attenuation State vs Frequency



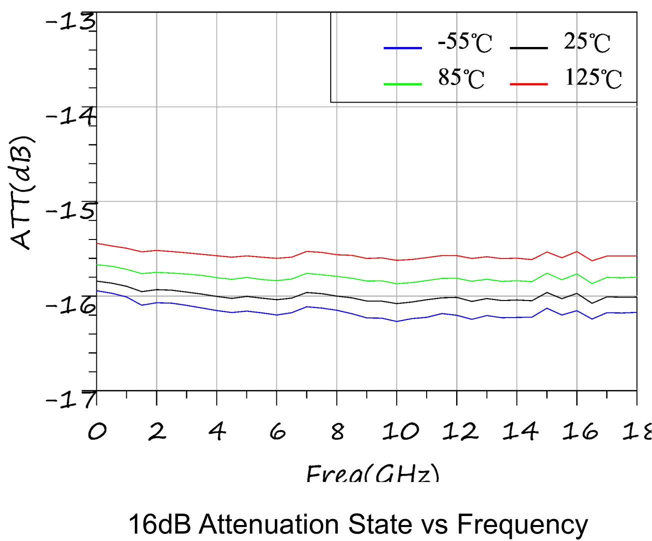
2dB Attenuation State vs Frequency



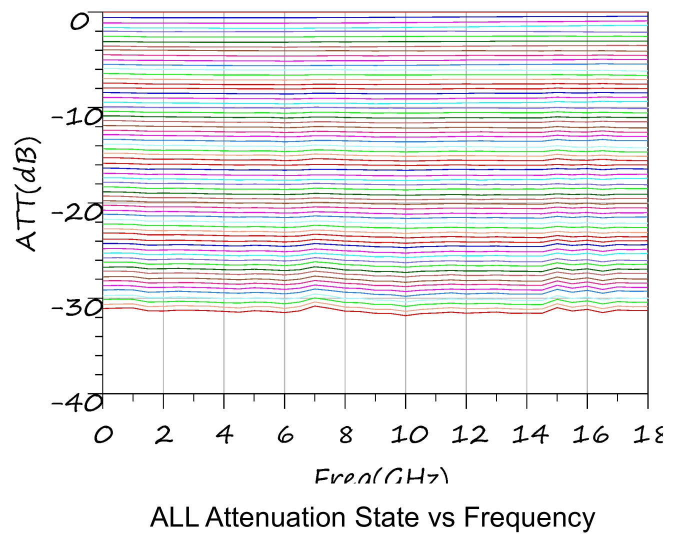
4dB Attenuation State vs Frequency



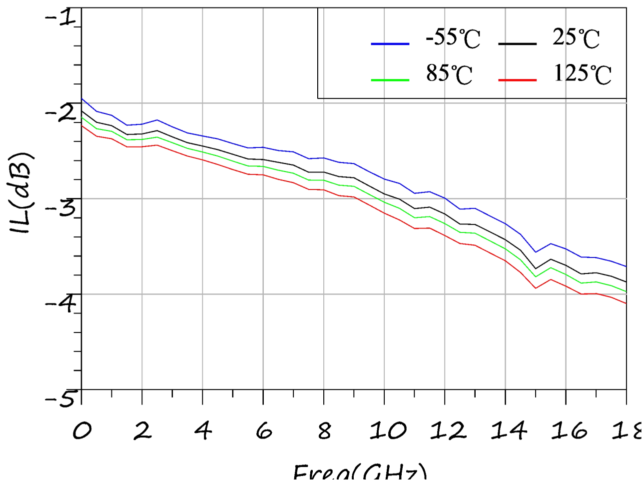
8dB Attenuation State vs Frequency



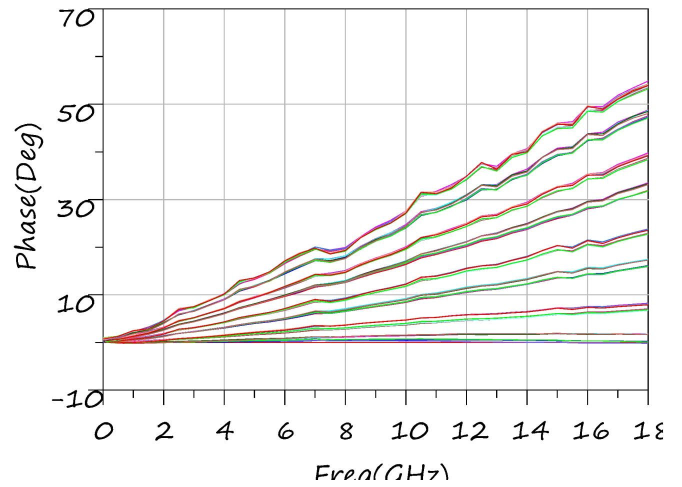
16dB Attenuation State vs Frequency



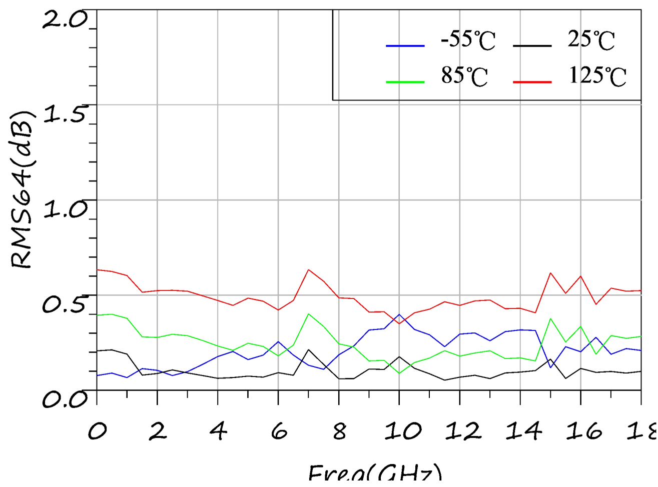
ALL Attenuation State vs Frequency



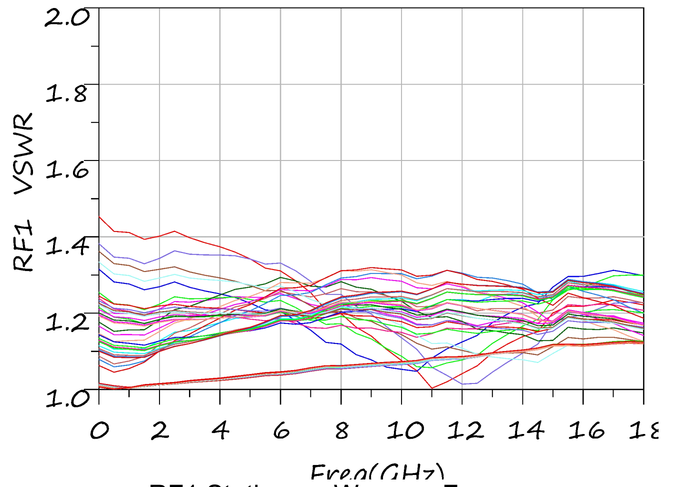
Insertion Loss vs Frequency



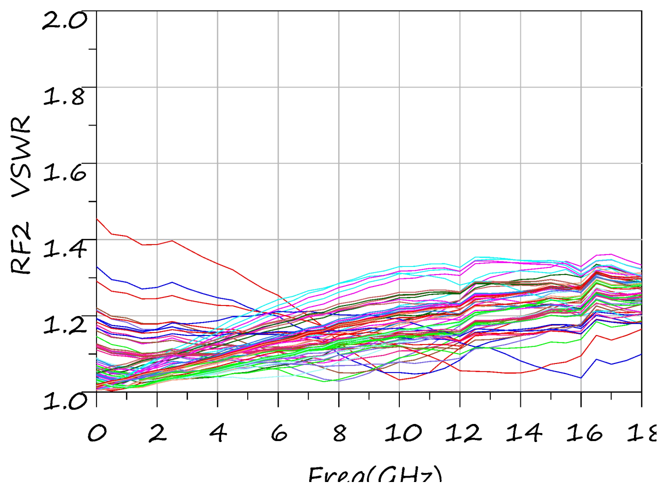
Relative Phase Shift vs Frequency



RMS 64 (dB) vs Frequency



RF1 Stationary Wave vs Frequency

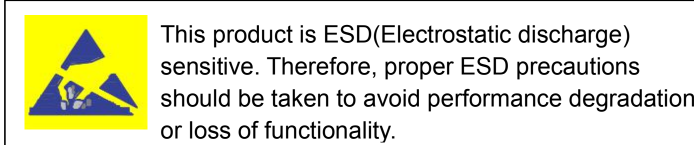


RF2 Stationary Wave vs Frequency

·Storing in a dry, nitrogen environment

Absolute Maximum Ratings

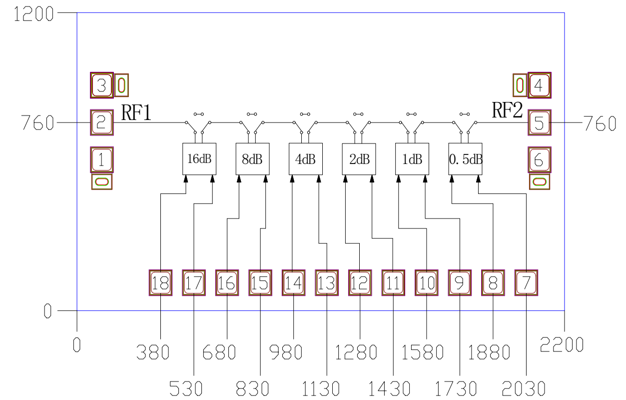
Parameter Limits	Value
Input Power, 50Ω	23dBm
Digital Control Input Voltage	-7V~0V
Storage Temperature Range	-65~+150℃
Operating Temperature Range	-55~+125℃
Mounting Temperature (30s, N_2 protection)	300℃
Exceeding the above conditions may cause permanent damage to the chip.	



This product is ESD(Electrostatic discharge) sensitive. Therefore, proper ESD precautions should be taken to avoid performance degradation or loss of functionality.

·Assembling in a clean environment
·Avoiding rapid temperature changes during the mounting process
·Do not touch the surface or use dry and wet chemical methods to clean the surface
·Using 2 bonding wires (shaped as figure 八) for input and output, the bonding wires should be as short as possible

Outline Drawing



Notes:

1. Units:μm
2. Back side metallization: Gold
3. Back side metal is ground
4. Bonding Pad size:100μm
5. Outline Dimensional Tolerance: ±50μm

Pad Number	Function	Description	Interface Schematic
2	RF1	RF signal input/Output, 50Ω matched, Without blocking capacitor inside	RF1
5	RF2	RF signal input/Output, 50Ω matched, Without blocking capacitor inside	
7~18	A1~B6	DC control signal, external 0V/-5V voltage	
1, 3, 4, 6	GND	Grounding Pad for probe test	GND
Die Bottom	GND	Die bottom must be connected to RF/DC ground	

Pad Descriptions

Truth Table

Control Voltage Range

Typ.	Control Voltage Range
0V	-0.2V~0V
-5V	-7V~-3V

Bias Voltage	Control Input						Status
A1/B1	A2/B	A3/	A4/B	A5/B	A6/	A1/B	
0/-5V	0/-5	0/-5	0/-5V	0/-5	0/-5	0/-5	Reference
-5V/0V	0/-5	0/-5	0/-5V	0/-5	0/-5	**-5V/**	0.5dB
0/-5V	**-5V/**	0/-5	0/-5V	0/-5	0/-5	0/-5	1dB
0/-5V	0/-5	**-5V/**	0/-5V	0/-5	0/-5	0/-5	2dB
0/-5V	0/-5	0/-5	**-5V/0**	0/-5	0/-5	0/-5	4dB
0/-5V	0/-5	0/-5	0/-5V	**-5V/**	0/-5	0/-5	8dB
0/-5V	0/-5	0/-5	0/-5V	0/-5	**-5V/**	0/-5	16dB

Assembly Drawing

RF2

A1