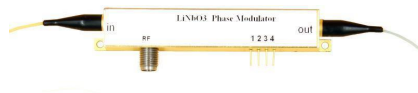




R-PM Series Phase Modulator



Description

The LiNbO₃ phase modulator is widely used in high-speed optical communication system, laser sensing and ROF systems because of well electro-optic effect. The R-PM series based on Ti-diffused and APE technology, has stable physical and chemical characteristics, which can meet requirement of the most applications in laboratory experiments and industrial systems.

Features

- Low insertion loss
- Polarization-maintaining
- Low half-wave voltage
- Dual-polarization option

Applications

- Optical communication
- Quantum key distribution
- Laser sensing systems
- Frequency shifting

Wavelength

- 850nm
- 1064nm
- 1310nm
- 1550nm

Bandwidth

- 300MHz
- 2.5GHz
- 10GHz

Operating wavelength	780nm	850nm	1064nm	1310nm	1550nm		
3dB Bandwidth	~10GHz	~10GHz	~10GHz	~10GHz	~300MHz	~10GHz	~18GHz
Insertion Loss	<3dB	<3.5dB	<3.5dB	<3.5dB	<3.5dB	<3.5dB	<3.5dB
Polarization extinction ratio	>20dB	>20dB	>20dB	>20dB	>20dB		
V _π @RF (50KHz)	<3V	<3V	<4.0V	<3V	<4V	<3.5V	<4.5V

Ordering Information

R	AM	15	10G	XX	XX
	Type: PM---Phase Modulator	Wavelength: 07---780nm 08---850nm 10---1060nm 13---1310nm 15---1550nm	工作带宽: 300M---300MHz 10G---10GHz 20G---10GHz	In-Out Fiber type: PP---PM/PM PS---PM/SMF	Optical connector: FA---FC/APC FP---FC/PC SP---Customization

**R-PM-10-10G****Wavelength 1064nm 10GHz Phase modulator**

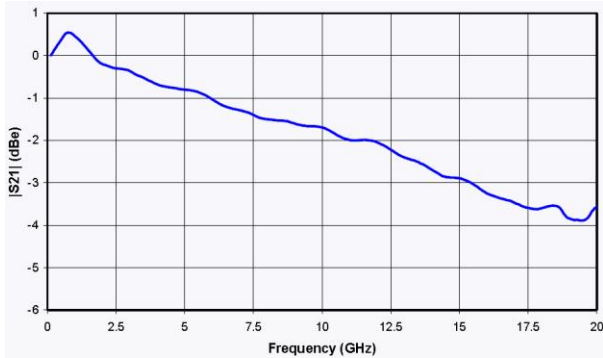
Parameter		Symbol	Min	Typ	Max	Unit
Optical parameters						
Operating wavelength		λ	980	1060	1150	nm
Insertion loss		IL		3	3.5	dB
Optical return loss		ORL			-45	dB
Polarization extinction ratio		PER	20			dB
Optical fiber	Input port		980nm PM fiber(125/250 μ m)			
	output port		980nm PM fiber(125/250 μ m)			
Optical fiber interface			FC/PC、FC/APC Or Customization			
Electrical parameters						
Operating bandwidth (-3dB)		S_{21}	10	12		GHz
Half-wave voltage @50KHz		V_{Π}		3.5	4.0	V
Electrical return loss		S_{11}		-12	-10	dB
Input impedance		Z_{RF}	50			Ω
Electrical interface			SMA(f)			

Limit Conditions

Parameter	Symbol	Unit	Min	Typ	Max
Input optical power	$P_{in,Max}$	dBm			20
Input RF power		dBm			28
Operating temperature	T_{op}	$^{\circ}$ C	-10		60
Storage temperature	T_{st}	$^{\circ}$ C	-40		85
Humidity	RH	%	5		90

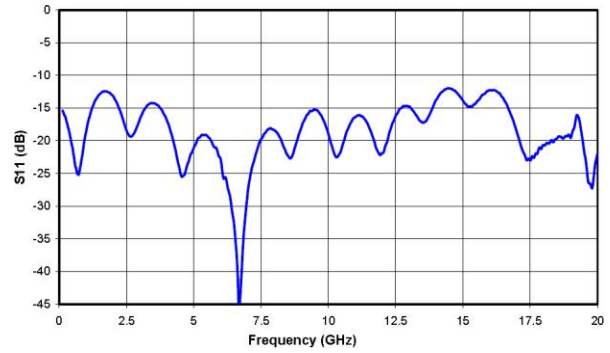


S21 Curve



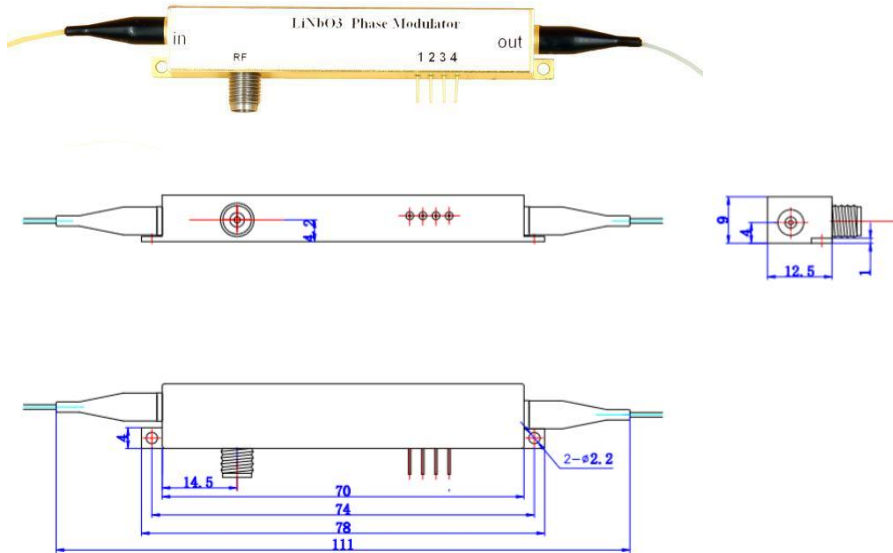
S21 Curve

&S11 Curve



S11 Curve

Mechanical Diagram



PORT	Symbol	Note
In	Optical input port	PM Fiber (125μm/250μm)
Out	Optical output port	PM and SMF option
RF	RF input port	SMA(f)
Bias	Bias control port	1,2,3,4-N/C

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R-PM Series Phase Modulator



Description

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Features

- Low insertion loss
- Polarization-maintaining
- Low half-wave voltage
- Dual-polarization option

Applications

- Optical communication
- Quantum key distribution
- Laser sensing systems
- Frequency shifting

Wavelength

- 850nm
- 1064nm
- 1310nm
- 1550nm

Bandwidth

- 300MHz
- 2.5GHz
- 10GHz

Operating wavelength	780nm	850nm	1064nm	1310nm	1550nm		
3dB Bandwidth	~10GHz	~10GHz	~10GHz	~10GHz	~300MHz	~10GHz	~18GHz
Insertion Loss	<3dB	<3.5dB	< 3.5dB	< 3.5dB	< 3.5dB	< 3.5dB	< 3.5dB
Polarization extinction ratio	> 20dB	> 20dB	> 20dB	> 20dB	> 20dB		
V _π @RF (50KHz)	< 3V	< 3V	<4.0V	< 3V	< 4V	<3.5V	< 4.5V

Ordering Information

R	AM	15	10G	XX	XX
	Type: PM---Phase Modulator	Wavelength: 07---780nm 08---850nm 10---1060nm 13---1310nm 15---1550nm	工作带宽: 300M---300MHz 10G---10GHz 20G---10GHz	In-Out Fiber type: PP---PM/PM PS---PM/SMF	Optical connector: FA---FC/APC FP---FC/PC SP---Customization

**R-PM-13-10G****Wavelength 1310nm 10GHz Phase modulator**

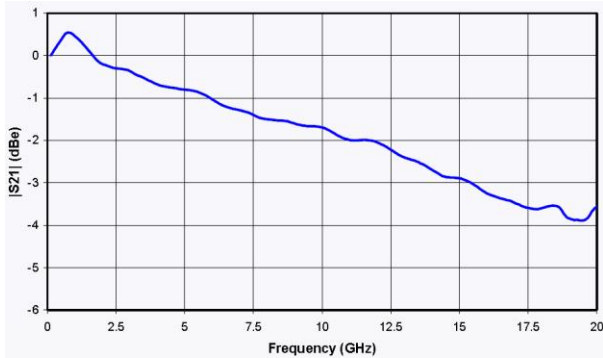
Parameter		Symbol	Min	Typ	Max	Unit
Optical parameters						
Operating wavelength		λ	1290	1310	1310	nm
Insertion loss		IL		3.5	4	dB
Optical return loss		ORL			-45	dB
Polarization extinction ratio		PER	20			dB
Optical fiber	Input port		PM fiber(125/250 μ m)			
	output port		PM fiber(125/250 μ m)			
Optical fiber interface			FC/PC、FC/APC Or Customization			
Electrical parameters						
Operating bandwidth (-3dB)		S_{21}	10	12		GHz
Half-wave voltage @50KHz		V_{Π}		2.7	3	V
Electrical return loss		S_{11}		-12	-10	dB
Input impedance		Z_{RF}	50			Ω
Electrical interface			SMA(f)			

Limit Conditions

Parameter	Symbol	Unit	Min	Typ	Max
Input optical power	$P_{in,Max}$	dBm			20
Input RF power		dBm			28
Operating temperature	T_{op}	$^{\circ}$ C	-10		60
Storage temperature	T_{st}	$^{\circ}$ C	-40		85
Humidity	RH	%	5		90

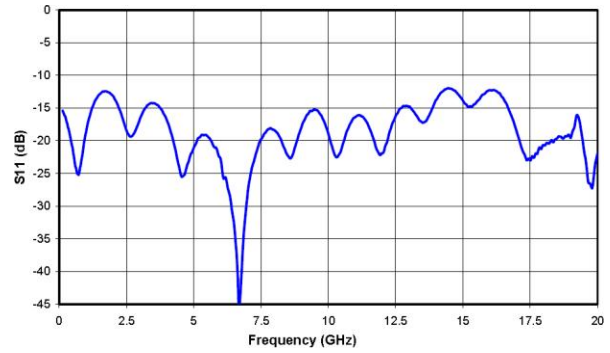


S21 Curve



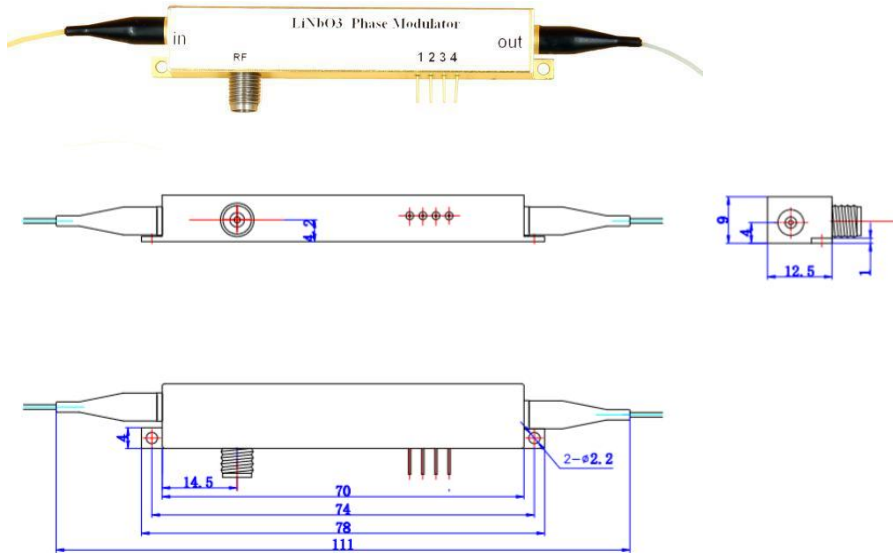
S21 Curve

&S11 Curve



S11 Curve

Mechanical Diagram



PORT	Symbol	Note
In	Optical input port	PM Fiber (125μm/250μm)
Out	Optical output port	PM and SMF option
RF	RF input port	SMA(f)
Bias	Bias control port	1,2,3,4-N/C

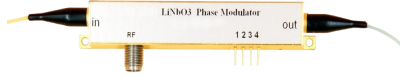
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R-PM Series Phase Modulator

Description

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Features

- Low insertion loss
- Polarization-maintaining
- Low half-wave voltage
- Dual-polarization option

Applications

- Optical communication
- Quantum key distribution
- Laser sensing systems
- Frequency shifting

Wavelength

- 850nm
- 1064nm
- 1310nm
- 1550nm

Bandwidth

- 300MHz
- 2.5GHz
- 10GHz

Operating wavelength	780nm	850nm	1064nm	1310nm	1550nm		
3dB Bandwidth	~10GHz	~10GHz	~10GHz	~10GHz	~300MHz	~10GHz	~18GHz
Insertion Loss	<3dB	<3.5dB	<3.5dB	<3.5dB	<3.5dB	<3.5dB	<3.5dB
Polarization extinction ratio	>20dB	>20dB	>20dB	>20dB	>20dB		
V _π @RF (50KHz)	<3V	<3V	<4.0V	<3V	<4V	<3.5V	<4.5V

Ordering Information

R	AM	15	10G	XX	XX
	Type: PM---Phase Modulator	Wavelength: 07---780nm 08---850nm 10---1060nm 13---1310nm 15---1550nm	工作带宽: 300M---300MHz 10G---10GHz 20G---10GHz	In-Out Fiber type: PP---PM/PM PS---PM/SMF	Optical connector: FA---FC/APC FP---FC/PC SP---Customization

**R-PM-15-10G****Wavelength 1550nm 10GHz Phase modulator**

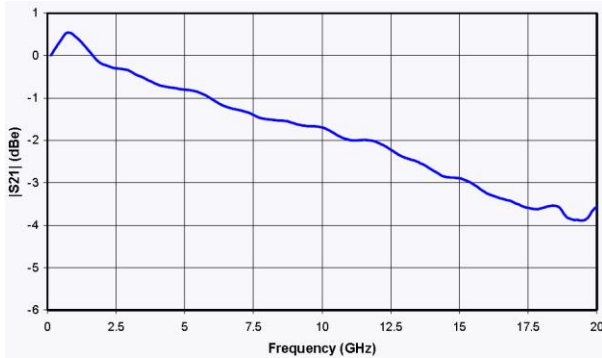
Parameter		Symbol	Min	Typ	Max	Unit
Optical parameters						
Operating wavelength		λ	1530	1550	1565	nm
Insertion loss		IL		3	3.5	dB
Optical return loss		ORL			-45	dB
Polarization extinction ratio		PER	20			dB
Optical fiber	Input port		850nm PM fiber(125/250 μ m)			
	output port		850nm PM fiber(125/250 μ m)			
Optical fiber interface			FC/PC、FC/APC Or Customization			
Electrical parameters						
Operating bandwidth (-3dB)		S_{21}	10	12		GHz
Half-wave voltage @50KHz		V_{Π}		3	3.5	V
Electrical return loss		S_{11}		-12	-10	dB
Input impedance		Z_{RF}	50			Ω
Electrical interface			SMA(f)			

Limit Conditions

Parameter	Symbol	Unit	Min	Typ	Max
Input optical power	$P_{in,Max}$	dBm			20
Input RF power		dBm			28
Operating temperature	T_{op}	$^{\circ}$ C	-10		60
Storage temperature	T_{st}	$^{\circ}$ C	-40		85
Humidity	RH	%	5		90

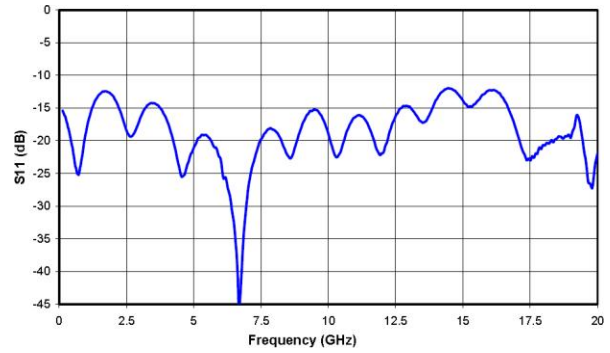


S21 Curve



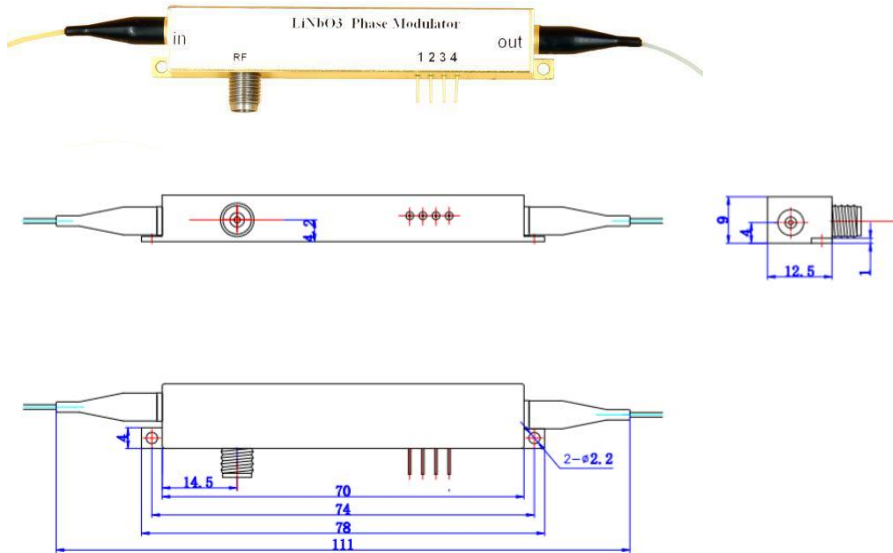
S21 Curve

&S11 Curve



S11 Curve

Mechanical Diagram



PORT	Symbol	Note
In	Optical input port	PM Fiber (125μm/250μm)
Out	Optical output port	PM and SMF option
RF	RF input port	SMA(f)
Bias	Bias control port	1,2,3,4-N/C

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R-PM Series Phase Modulator



Description

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Features

- Low insertion loss
- Polarization-maintaining
- Low half-wave voltage
- Dual-polarization option

Applications

- Optical communication
- Quantum key distribution
- Laser sensing systems
- Frequency shifting

Wavelength

- 850nm
- 1064nm
- 1310nm
- 1550nm

Bandwidth

- 300MHz
- 2.5GHz
- 10GHz

Operating wavelength	780nm	850nm	1064nm	1310nm	1550nm		
3dB Bandwidth	~10GHz	~10GHz	~10GHz	~10GHz	~300MHz	~10GHz	~18GHz
Insertion Loss	<3dB	<3.5dB	<3.5dB	<3.5dB	<3.5dB	<3.5dB	<3.5dB
Polarization extinction ratio	>20dB	>20dB	>20dB	>20dB	>20dB		
V _π @RF (50KHz)	<3V	<3V	<4.0V	<3V	<4V	<3.5V	<4.5V

Ordering Information

R	AM	15	10G	XX	XX
	Type: PM---Phase Modulator	Wavelength: 07---780nm 08---850nm 10---1060nm 13---1310nm 15---1550nm	工作带宽: 300M---300MHz 10G---10GHz 20G---10GHz	In-Out Fiber type: PP---PM/PM PS---PM/SMF	Optical connector: FA---FC/APC FP---FC/PC SP---Customization

**R-PM-15-300M****Wavelength 1550nm 300MHz Phase modulator**

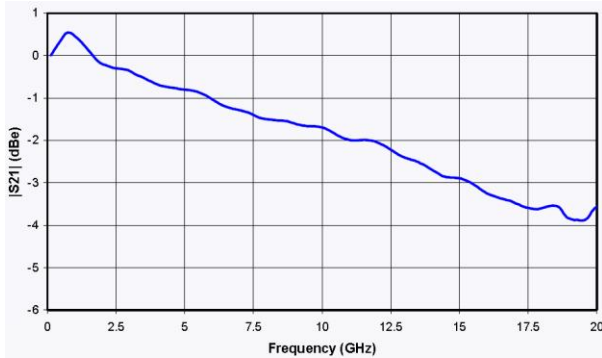
Parameter		Symbol	Min	Typ	Max	Unit
Optical parameters						
Operating wavelength		λ	1530	1550	1565	nm
Insertion loss		IL		3	3.5	dB
Optical return loss		ORL			-45	dB
Polarization extinction ratio		PER	20			dB
Optical fiber	Input port		PM fiber(125/250 μ m)			
	output port		PM fiber(125/250 μ m)			
Optical fiber interface			FC/PC、FC/APC Or Customization			
Electrical parameters						
Operating bandwidth (-3dB)		S_{21}		300		MHz
Half-wave voltage @50KHz		V_{Π}		3.5	4	V
Electrical return loss		S_{11}		-12	-10	dB
Input impedance		Z_{RF}	50			Ω
Electrical interface			SMA(f)			

Limit Conditions

Parameter	Symbol	Unit	Min	Typ	Max
Input optical power	$P_{in,Max}$	dBm			20
Input RF power		dBm			28
Operating temperature	T_{op}	$^{\circ}$ C	-10		60
Storage temperature	T_{st}	$^{\circ}$ C	-40		85
Humidity	RH	%	5		90

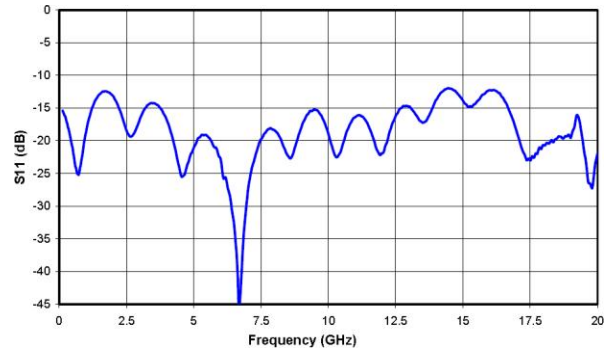


S21 Curve



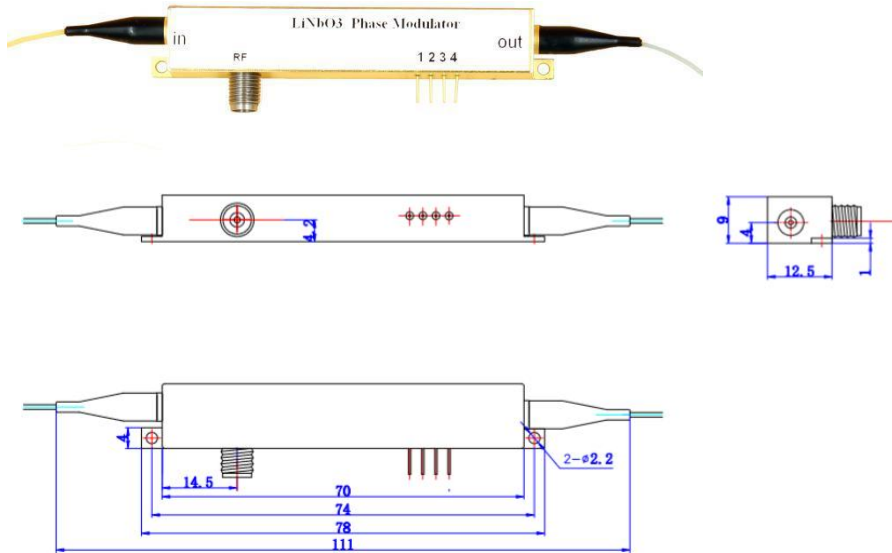
S21 Curve

&S11 Curve



S11 Curve

Mechanical Diagram



PORT	Symbol	Note
In	Optical input port	PM Fiber (125μm/250μm)
Out	Optical output port	PM and SMF option
RF	RF input port	SMA(f)
Bias	Bias control port	1,2,3,4-N/C

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R-PM Series Phase Modulator



Description

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Features

- Low insertion loss
- Polarization-maintaining
- Low half-wave voltage
- Dual-polarization option

Applications

- Optical communication
- Quantum key distribution
- Laser sensing systems
- Frequency shifting

Wavelength

- 850nm
- 1064nm
- 1310nm
- 1550nm

Bandwidth

- 300MHz
- 2.5GHz
- 10GHz

Operating wavelength	780nm	850nm	1064nm	1310nm	1550nm		
3dB Bandwidth	~10GHz	~10GHz	~10GHz	~10GHz	~300MHz	~10GHz	~18GHz
Insertion Loss	<3dB	<3.5dB	<3.5dB	<3.5dB	<3.5dB	<3.5dB	<3.5dB
Polarization extinction ratio	>20dB	>20dB	>20dB	>20dB	>20dB		
V _π @RF (50KHz)	<3V	<3V	<4.0V	<3V	<4V	<3.5V	<4.5V

Ordering Information

R	AM	15	10G	XX	XX
	Type: PM---Phase Modulator	Wavelength: 07---780nm 08---850nm 10---1060nm 13---1310nm 15---1550nm	工作带宽: 300M---300MHz 10G---10GHz 20G---10GHz	In-Out Fiber type: PP---PM/PM PS---PM/SMF	Optical connector: FA---FC/APC FP---FC/PC SP---Customization

**R-PM-07-10G****Wavelength 780nm 10GHz Phase modulator**

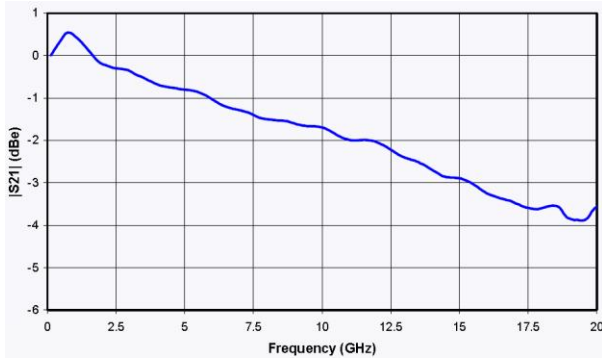
Parameter		Symbol	Min	Typ	Max	Unit
Optical parameters						
Operating wavelength		λ	760	780	800	nm
Insertion loss		IL		2.5	3	dB
Optical return loss		ORL			-45	dB
Polarization extinction ratio		PER	20			dB
Optical fiber	Input port		780nm PM fiber(125/250 μ m)			
	output port		780nm PM fiber(125/250 μ m)			
Optical fiber interface			FC/PC、FC/APC Or Customization			
Electrical parameters						
Operating bandwidth (-3dB)		S ₂₁	10	12		GHz
Half-wave voltage @50KHz		V _{II}		2.5	3	V
Electrical return loss		S ₁₁		-12	-10	dB
Input impedance		Z _{RF}	50			Ω
Electrical interface			SMA(f)			

Limit Conditions

Parameter	Symbol	Unit	Min	Typ	Max
Input optical power@850nm	P _{in,Max}	dBm			13
Input RF power		dBm			28
Operating temperature	T _{op}	°C	-10		60
Storage temperature	T _{st}	°C	-40		85
Humidity	RH	%	5		90

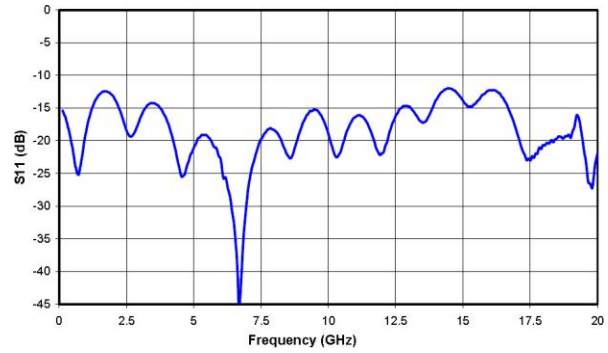


S21 Curve



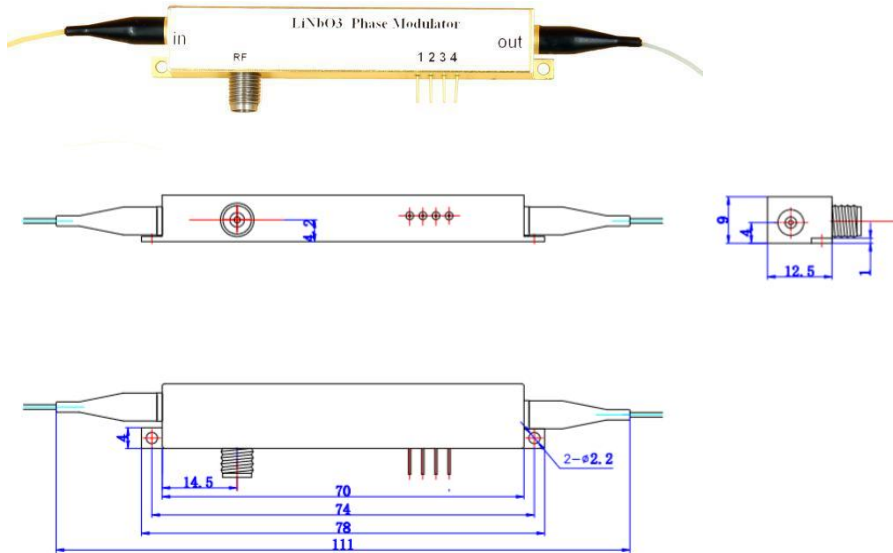
S21 Curve

&S11 Curve



S11 Curve

Mechanical Diagram



PORT	Symbol	Note
In	Optical input port	PM Fiber (125μm/250μm)
Out	Optical output port	PM and SMF option
RF	RF input port	SMA(f)
Bias	Bias control port	1,2,3,4-N/C

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R-PM Series Phase Modulator



Description

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Features

- Low insertion loss
- Polarization-maintaining
- Low half-wave voltage
- Dual-polarization option

Applications

- Optical communication
- Quantum key distribution
- Laser sensing systems
- Frequency shifting

Wavelength

- 850nm
- 1064nm
- 1310nm
- 1550nm

Bandwidth

- 300MHz
- 2.5GHz
- 10GHz

Operating wavelength	780nm	850nm	1064nm	1310nm	1550nm		
3dB Bandwidth	~10GHz	~10GHz	~10GHz	~10GHz	~300MHz	~10GHz	~18GHz
Insertion Loss	<3dB	<3.5dB	<3.5dB	<3.5dB	<3.5dB	<3.5dB	<3.5dB
Polarization extinction ratio	>20dB	>20dB	>20dB	>20dB	>20dB		
V _π @RF (50KHz)	<3V	<3V	<4.0V	<3V	<4V	<3.5V	<4.5V

Ordering Information

R	AM	15	10G	XX	XX
	Type: PM---Phase Modulator	Wavelength: 07---780nm 08---850nm 10---1060nm 13---1310nm 15---1550nm	工作带宽: 300M---300MHz 10G---10GHz 20G---10GHz	In-Out Fiber type: PP---PM/PM PS---PM/SMF	Optical connector: FA---FC/APC FP---FC/PC SP---Customization

**R-PM-08-10G****Wavelength 850nm 10GHz Phase modulator**

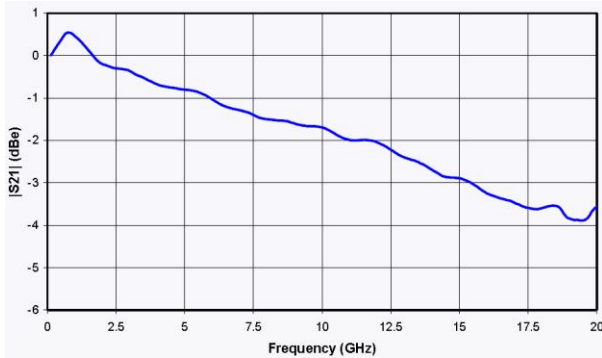
Parameter		Symbol	Min	Typ	Max	Unit
Optical parameters						
Operating wavelength		λ	800	850	905	nm
Insertion loss		IL		3	3.5	dB
Optical return loss		ORL			-45	dB
Polarization extinction ratio		PER	20			dB
Optical fiber	Input port		850nm PM fiber(125/250 μ m)			
	output port		850nm PM fiber(125/250 μ m)			
Optical fiber interface			FC/PC、FC/APC Or Customization			
Electrical parameters						
Operating bandwidth (-3dB)		S ₂₁	10	12		GHz
Half-wave voltage @50KHz		V _{II}		2.5	3	V
Electrical return loss		S ₁₁		-12	-10	dB
Input impedance		Z _{RF}	50			Ω
Electrical interface			SMA(f)			

Limit Conditions

Parameter	Symbol	Unit	Min	Typ	Max
Input optical power@850nm	P _{in,Max}	dBm			13
Input RF power		dBm			28
Operating temperature	T _{op}	°C	-10		60
Storage temperature	T _{st}	°C	-40		85
Humidity	RH	%	5		90

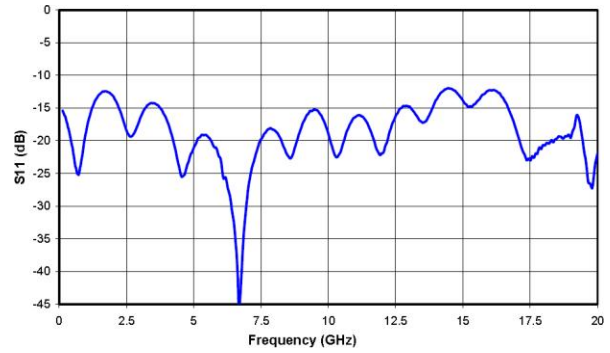


S21 Curve



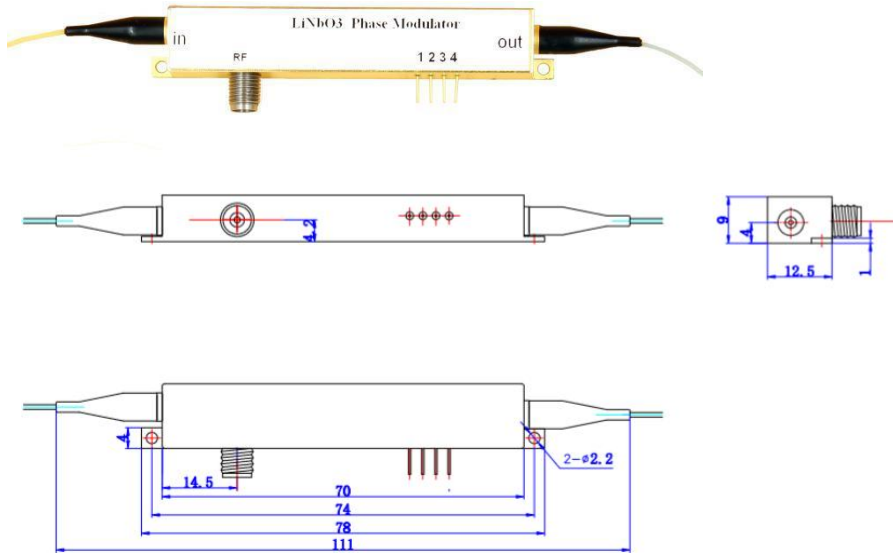
S21 Curve

&S11 Curve



S11 Curve

Mechanical Diagram



PORT	Symbol	Note
In	Optical input port	PM Fiber (125μm/250μm)
Out	Optical output port	PM and SMF option
RF	RF input port	SMA(f)
Bias	Bias control port	1,2,3,4-N/C

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R-PM-15 Series

1550nm Phase Modulator

Lithium niobate electro-optical phase modulator based on titanium diffusion process has the characteristics of low insertion loss, high modulation bandwidth, low half wave voltage, high damage optical power, etc. It is mainly used in the fields of optical chirp control in high-speed optical communication systems, phase shift in coherent communication systems, generation of sidebands in ROF systems, and reduction of stimulated Brillouin scattering (SBS) in analog optical fiber communication systems.

Features

- Bandwidth ~2.5GHz
- Low half-wave voltage
- High damage optical power
- Low insertion loss

Application

- Optical fiber sensing
- Optical fiber communication
- Laser coherent synthesis
- Phase delay (direction shifter)
- Quantum communication
- ROF system



Performance

Parameter		Symbol	Min	Typ	Max	Unit
Optical parameters						
Optical parameters		λ	1530	1550	1565	nm
Optical parameters		IL		4	5	dB
Optical return loss		ORL			-45	dB
Switch extinction ratio		ER@D C	20	23	45	dB
Dynamic extinction ratio		DER		13		dB
Optical fiber	Input port		Panda PM			
	output port		Panda PM or SMF-28			
Optical fiber interface			FC/PC、FC/APC Or user to specify			
Electrical parameters						
Operating bandwidth (-3dB)	R-PM-15-2.5G	2.5	3		GHz	2.5

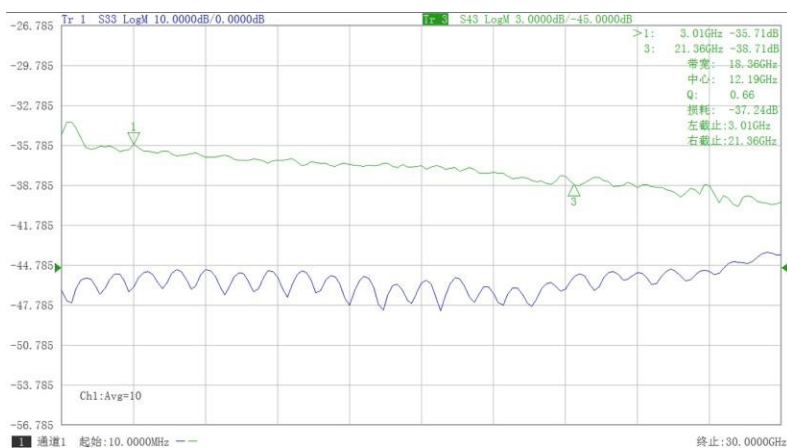


Half-wave voltage	RF	@50KHz		3	3.5	V
	Bias	@Bias		4.5	5	V
Electrical return loss		S_{11}		-12	-10	dB
Input impedance	RF	Z_{RF}	50			Ω
	Bias	Z_{BIAS}	1M			Ω
Electrical interface			SMA(f)			

Limit Conditions

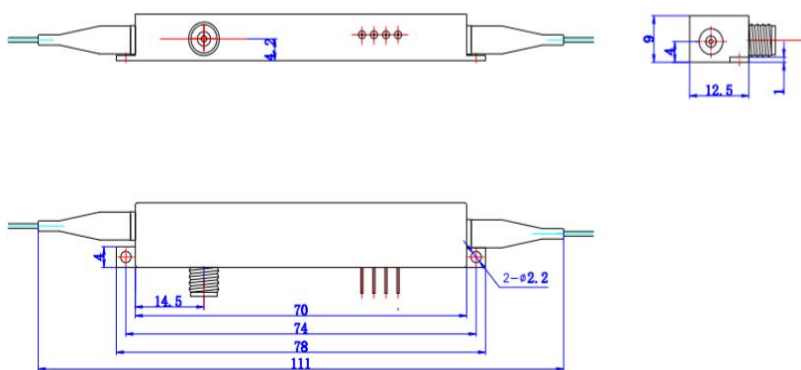
Parameter	Symbol	Min	Typ	Max	Unit
Input optical power @1550nm	$P_{in,Max}$	dBm			20
Input RF power		dBm			28
Operating temperature	Top	°C	-10		60
Storage temperature	Tst	°C	-40		85
Humidity	RH	%	5		90
Bias voltage	Vbias	V	-20		20

Curves



S₁₁&S₂₁ curves

Package (mm)



R-PM-15-2.5G



Ordering

R	PM	W	B	F	C
	Modulator Type: PM---Phase modulator	Wavelength: 15---1550nm	Bandwidth: 2.5G---2.5GHz	Fiber: PP---PM/PMF	Connector: FA---FC/APC FP---FC/PC SP--- User specified

* If you have special requirements, please contact our sales staff

R-PM-15 Series

1550nm Phase Modulator

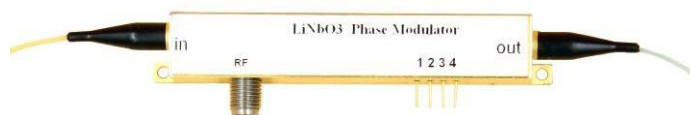
Lithium niobate electro-optical phase modulator based on titanium diffusion process has the characteristics of low insertion loss, high modulation bandwidth, low half wave voltage, high damage optical power, etc. It is mainly used in the fields of optical chirp control in high-speed optical communication systems, phase shift in coherent communication systems, generation of sidebands in ROF systems, and reduction of stimulated Brillouin scattering (SBS) in analog optical fiber communication systems.

Features

- Bandwidth ~20GHz
- Low half-wave voltage
- High damage optical power
- Low insertion loss

Application

- Optical fiber sensing
- Optical fiber communication
- Laser coherent synthesis
- Phase delay (direction shifter)
- Quantum communication
- ROF system



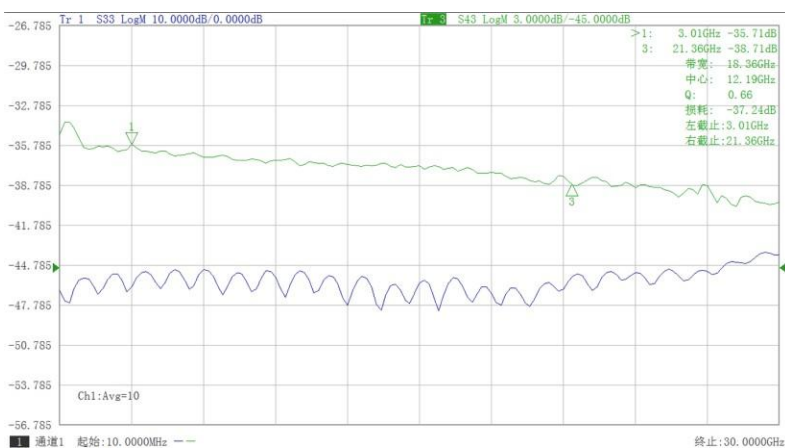
Performance

Parameter	Symbol	Min	Typ	Max	Unit
Optical parameters					
Optical parameters	λ	1520		1570	nm
Optical parameters	IL	3	3.5	4	dB
Optical return loss	ORL			-45	dB
Optical fiber	Input port		Panda PM		
	output port		Panda PM		
Optical fiber interface		FC/PC、FC/APC or Customization			
Electrical parameters					
Operating bandwidth (-3dB)	R-PM-15-20G	S_{21}	18	20	GHz
V_{π} @ 50KHz	R-PM-15-20G	V_{π}	3	4	V
Electrical return loss		S_{11}	-12	-10	dB
Input impedance	R-PM-15-20G	Z_{RF}	50		Ω
Electrical interface	R-PM-15-20G		K(f)		

Limit Conditions

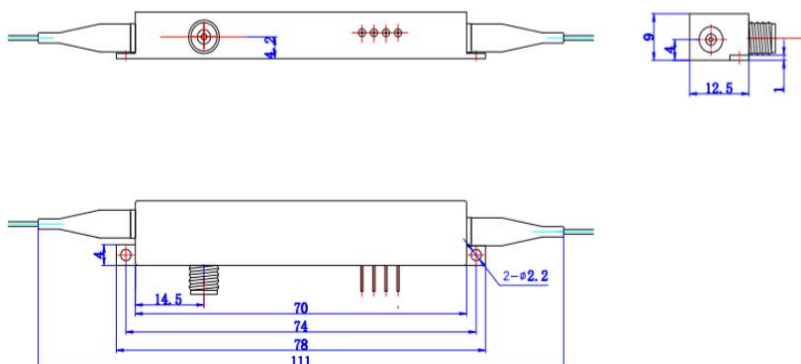
Parameter	Symbol	Min	Typ	Max	Unit
Input optical power @1550nm	$P_{in,Max}$	dBm			17
Input RF power		dBm			27
Operating temperature	T_{op}	°C	-10		60
Storage temperature	T_{st}	°C	-40		85
Humidity	RH	%	5		90

Curves



S_{11} & S_{21} curves

Package (mm)



R-PM-15-20G



Ordering

R	PM	W	B	F	C
	Modulator Type: PM---Phase modulator	Wavelength: 15---1550nm	Bandwidth: 20G---20GHz	Fiber: PP---PM/PMF	Connector: FA---FC/APC FP---FC/PC SP--- User specified

* If you have special requirements, please contact our sales staff



ROF-PM-UV

Low-V_{pi} phase modulator

ROF-PM-UV series Low-V_{pi} phase modulator has low half-wave voltage (2.5 V) , low insertion loss, high bandwidth, high damage characteristics of optical power, chirp in high-speed optical communication system is mainly used for light control, phase shift of coherent communication system, sideband ROF system and reduce the simulation of optical fiber communication system in Brisbane deep stimulated scattering (SBS), etc.

Features

- High endurance light power
- Low half-wave voltage~2.5V
- Low insertion loss
- High modulating bandwidth



Applications

- Optical fiber sensing
- Optical fiber communication, laser coherent synthesis
- Phase delay (shifter)
- Quantum communication
- ROF system

Performance parameter

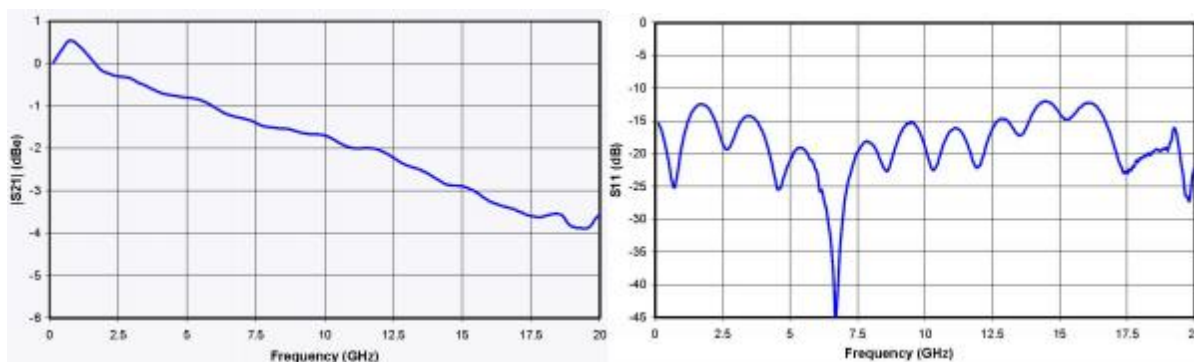
Parameter	Symbol	Min	Typ	Max	Unit	
Optical parameters						
Operating wavelength	λ	1525		1565	nm	
Insertion loss	IL		3	3.5	dB	
Optical return loss	ORL			-45	dB	
Optical fiber	Input port		Panda PM			
	output port		Panda PM			
Optical fiber interface		FC/PC 、 FC/APC Or user to specify				
Electrical parameters						
Operating bandwidth (-3dB)	S ₂₁	10	12		GHz	
RF Half-wave voltage (Each electrode)	@50KHz	V _π	2.4	2.5	2.6	V
	@ 10GHz	V _π	3.4V		3.7	V
Electrical return loss	S ₁₁		-12	-10	dB	
RF Input impedance	Z _{RF}	50			Ω	
Electrical interface		SMA(f)				



Limit Conditions

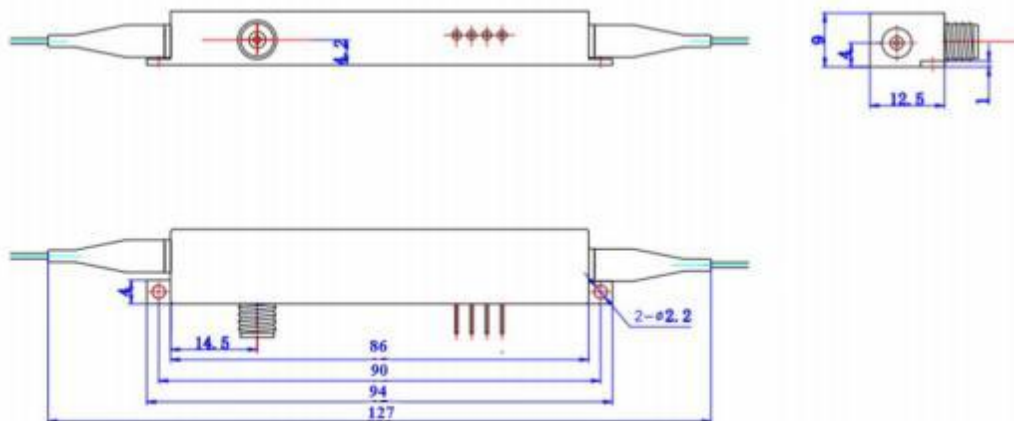
Parameter	Symbol	Min	Typ	Max	Unit
Input optical power	$P_{in,Max}$	dBm			20
Input RF power		dBm			28
Operating temperature	T_{op}	°C	-10		60
Storage temperature	T_{st}	°C	-40		85
Humidity	RH	%	5		90

Characteristic curve



S11&S21 Curve

Mechanical Diagram(mm)



Order information

ROF	PM-UV	15	10G	XX	XX
	Modulator type: PM---Phase modulator UV---Low-Vpi	Working wavelength: 15--- 1550nm	Operating bandwidth: 10G--- 10GHz	Optical fiber: PS---PM/SMF PP---PM/PMF	Facet: FA---FC/APC FP---FC/PC SP---用户指定

* please contact our sales if you have special requirements.