Frequency Reference Modules

POLARIS

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Descriptions

Polaris' PFRM series is a top performance Frequency Reference Modules used in a variety of applications: Reference Frequency Generation Phase Noise Measurements, Military Electronic Systems, SATCOM, Instruments Frequency Synchronization, and Telecommunications Standards and more.

We provide two types of PFRM series: PFRM-4 series and PFRM-1 series.

The PFRM-1 series is a Single Channel OCXO Module that provides a highly stable sine wave outputs. This series is categorized into PFRM-1-10 series which output 10MHz, PFRM-1-50 series which output 50MHz and PFRM-1-100 series which output 100MHz. The OCXO housed into this series provides a very stable temperature stability over operating temperature range and excellent phase noise performance.

The PFRM-4 series is a 4-Channel Frequency Reference Module that provides a highly stable sine wave outputs. This series is categorized into PFRM-4-10 series which output 10MHz, PFRM-4-50 series which output 50MHz and PFRM-4-100 series which output 100MHz. The OCXO housed into this series provides a very stable temperature stability over operating temperature range and excellent phase noise performance.

Features

- Built in OCXO with Excellent Performance
- Sine Wave Output
- Various Options Available
- Affordable Price

Applications

- Frequency Reference Generation
- Phase Noise Measurements
- Military Electronic Systems
- SATCOM
- Instruments Frequency Synchronization
- Telecommunications Standards

Descriptions

The PFRM-1 series is a Single Channel OCXO Module that provides a highly stable sine wave outputs. This series is categorized into PFRM-1-10 series which output 10MHz, PFRM-1-50 series which output 50MHz and PFRM-4-100 series which output 100MHz.

- PFRM-1-10 series

PFRM-1-10 series is a Single Channel OCXO Module that provides a highly stable 10 MHz sine wave outputs. The OCXO with excellent performance, housed into this series provides a temperature stability from ±25 ppb to ±50 ppb over operating temperature range and aging of ± 100 ppb per year at 25°C. Also this series offers excellent phase noise performance of -165 dBc/Hz @10 KHz offset from 10 MHz Output.

- PFRM-1-50 series

PFRM-1-50 series is a Single Channel OCXO Module that provides a highly stable 50 MHz sine wave outputs. The OCXO with excellent performance, housed into this series provides a temperature stability from ±25 ppb to ±50 ppb over operating temperature range and aging of ± 100 ppb per year at 25°C. Also this series offers excellent phase noise performance of -165 dBc/Hz @10 KHz offset from 50 MHz Output.

- PFRM-1-100 series

PFRM-1-100 series is a Single Channel OCXO Module that provides a highly stable 100 MHz sine wave outputs. The OCXO with excellent performance, housed into this series provides a temperature stability from ±25 ppb to ±50 ppb over operating temperature range and aging of ± 100 ppb per year at 25°C. Also this series offers excellent phase noise performance of -165 dBc/Hz @10 KHz offset from 100 MHz Output.

Features

- 10 MHz / 50 MHz / 100 MHz Output Frequency
- Single Output Channel
- Sine Wave Output
- Built in OCXO with Excellent Performance
- Various Options Available
- Affordable Price
- Internal Voltage Regulators

Applications

- Frequency Reference Generation
- Phase Noise Measurements
- Military Electronic Systems
- SATCOM
- Instruments Frequency Synchronization
- Telecommunications Standards

10 MHz OCXO Module

Descriptions

Polaris' PFRM-1-10 series is a Single Channel OCXO Module that provides a highly stable 10 MHz sine wave outputs. The OCXO with excellent performance, housed into this series provides a temperature stability from ±25 ppb to ±50 ppb over operating temperature range and aging of ± 100 ppb per year at 25°C. Also this series offers excellent phase noise performance of -165 dBc/Hz @10 KHz offset from 10 MHz Output.

Features

- ❖ 10 MHz Output Frequency
- ❖ Sine Wave Output
- ❖ Built in OCXO with Excellent Performance
- ❖ Various Options Available
- ❖ Affordable Price
- ❖ Internal Voltage Regulators

Applications

- ❖ Military Electronic Systems
- ❖ SATCOM
- ❖ Frequency Reference Generation
- ❖ Phase Noise Measurements
- ❖ Telecommunications Standards

Ordering Information

❖ PFRM-1-10-TS-OP-PN-SV

- TS: Frequency Stability vs. Temperature (ppb)
  . TS1, TS2, or TS3: See "Note 1"
- OP: Output Power (dBm)
  . 0 to 9 in 1 steps: See "Note 2"
- PN: Phase Noise (dBc/Hz)
  . LN or ULN: See "Note 3"
- SV: Supply Voltage (Vdc)
  . 12 to 15: See "Note 4"

❖ Example

- PFRM-1-10-TS1-05-ULN-12
  . Frequency Stability vs. Temperature: ±25 ppb over -40 °C to 75 °C
  . Output Power: 5 dBm
  . Phase Noise: Ultra-Low Noise (See "Note 3")
  . Supply Voltage: 12 Vdc

Specifications for Standard Model

Parameter			Unit	Min.	Typ.	Max.	Remarks
Frequency Calibration			ppm	-0.1		+0.1	
Frequency Stability	vs. Temperature (Note 1)		ppb	TS1 (See "Note 1")			See "Ordering Information"
	Vs. Aging	Daily	ppb	-3		+3	
		1st year	ppb	-100		+100	Aging after 30 days continuous operation
Output	Frequency		MHz	10			
	Power (Note 2)		dBm	5	7		See "Ordering Information"
	Harmonics		dBc			-30	
	Spurious		dBc			-70	
	Load Impedance		Ohm	50			
Phase Noise (Note 3)			dBc/Hz	ULN (See "Note 3")			See "Ordering Information"
Supply Voltage (Note 4)			Vdc	12		15	See "Ordering Information"
Current Consumption			mA			150	Steady State
						350	Warm-up
Warm Up Time			min		3	5	
Operating Temperature				TS1 (See "Note 1")			
Storage Temperature				-40 °C to 85 °C			
Enclosure (L x W x H)			mm	65.0 x 40.0 x 23.5			

Note 1

Option	Unit	Value	Condition	Remarks
TS1	ppb	±25	-40 °C to 75 °C	
TS2	ppb	±25	-20 °C to 70 °C	
TS3	ppb	±50	-10 °C to 60 °C	

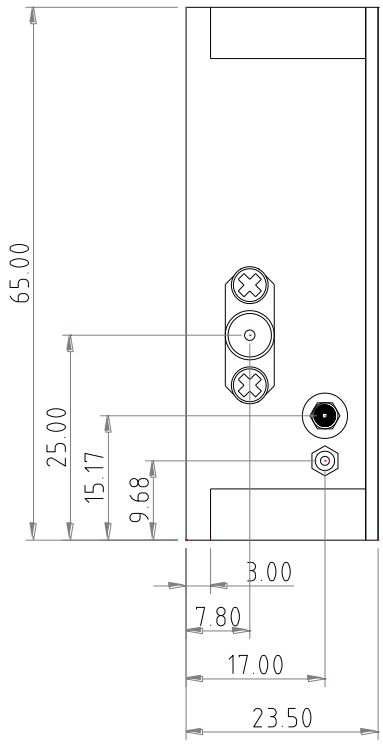
Note 2 Available order from 0 dBm (Typ.) to 9 dBm (Typ.) in 1dB steps.

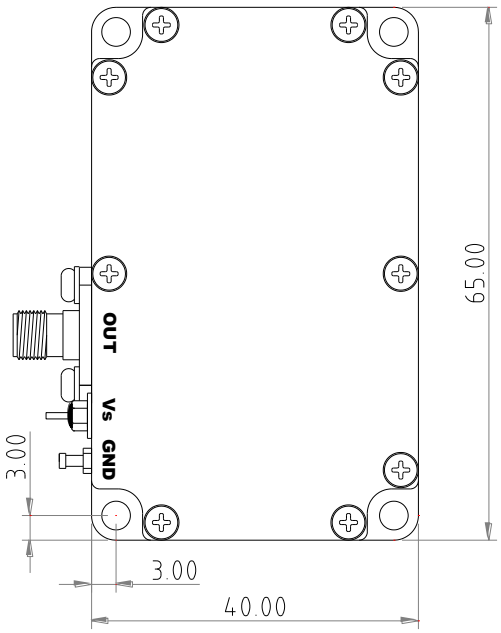
Note 3

Option	Frequency Offset	Unit	Min.	Typ.	Max.	Remarks
LN (Low Noise)	100Hz offset	dBc/Hz		-130	-125	
	1KHz offset	dBc/Hz		-140	-135	
	10KHz offset	dBc/Hz		-150	-145	
	100KHz offset	dBc/Hz		-155	-150	
	1MHz offset	dBc/Hz		-155	-150	
ULN (Ultra-Low Noise)	100Hz offset	dBc/Hz		-150	-145	
	1KHz offset	dBc/Hz		-160	-155	
	10KHz offset	dBc/Hz		-165	-160	
	100KHz offset	dBc/Hz		-170	-165	
	1MHz offset	dBc/Hz		-170	-165	

Note 4 Consult factory for ordering other Supply Voltage.

Enclosure Drawings





All dimensions are in millimeters.

Symbol	Connector	Description
OUT	SMA-Jack, 50 ohm	RF Output (10 MHz)
Vs	EMI Feed-thru	Supply Voltage (+12 V)
GND	Turret Thread Terminal	Ground

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50 MHz OCXO Module

Descriptions

Polaris' PFRM-1-50 series is a Single Channel OCXO Module that provides a highly stable 50 MHz sine wave outputs. The OCXO with excellent performance, housed into this series provides a temperature stability from ±25 ppb to ±50 ppb over operating temperature range and aging of ± 100 ppb per year at 25°C. Also this series offers excellent phase noise performance of -165 dBc/Hz @10 KHz offset from 50 MHz Output.

Features

- 50 MHz Output Frequency
- Sine Wave Output
- Built in OCXO with Excellent Performance
- Various Options Available
- Affordable Price
- Internal Voltage Regulators

Applications

- Military Electronic Systems
- SATCOM
- Frequency Reference Generation
- Phase Noise Measurements
- Telecommunications Standards

Ordering Information

- PFRM-1-50-TS-OP-PN-SV

  - TS: Frequency Stability vs. Temperature (ppb)
    . TS1, TS2, or TS3: See "Note 1"
  - OP: Output Power (dBm)
    . 0 to 9 in 1 steps: See "Note 2"
  - PN: Phase Noise (dBc/Hz)
    . LN or ULN: See "Note 3"
  - SV: Supply Voltage (Vdc)
    . 12 to 15: See "Note 4"

- Example

  - PFRM-1-50-TS1-05-ULN-12
    . Frequency Stability vs. Temperature: ±25 ppb over -40 °C to 75 °C
    . Output Power: 5 dBm
    . Phase Noise: Ultra-Low Noise (See "Note 3")
    . Supply Voltage: 12 Vdc

Specifications for Standard Model

Parameter			Unit	Min.	Typ.	Max.	Remarks
Frequency Calibration			ppm	-0.1		+0.1	
Frequency Stability	vs. Temperature (Note 1)		ppb	TS1 (See "Note 1")			See "Ordering Information"
	Vs. Aging	Daily	ppb	-3		+3	
		1st year	ppb	-100		+100	Aging after 30 days continuous operation
Output	Frequency		MHz	50			
	Power (Note 2)		dBm	5	7		See "Ordering Information"
	Harmonics		dBc			-30	
	Spurious		dBc			-70	
	Load Impedance		Ohm	50			
Phase Noise (Note 3)			dBc/Hz	ULN (See "Note 3")			See "Ordering Information"
Supply Voltage (Note 4)			Vdc	12		15	See "Ordering Information"
Current Consumption			mA			150	Steady State
						350	Warm-up
Warm Up Time			min		3	5	
Operating Temperature				TS1 (See "Note 1")			
Storage Temperature				-40 °C to 85 °C			
Enclosure (L x W x H)			mm	65.0 x 40.0 x 23.5			

Note 1

Option	Unit	Value	Condition	Remarks
TS1	ppb	±25	-40 °C to 75 °C	
TS2	ppb	±25	-20 °C to 70 °C	
TS3	ppb	±50	-10 °C to 60 °C	

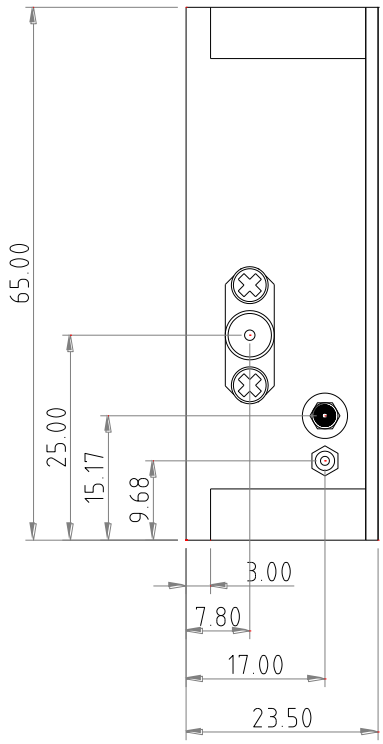
Note 2 Available order from 0 dBm (Typ.) to 9 dBm (Typ.) in 1dB steps.

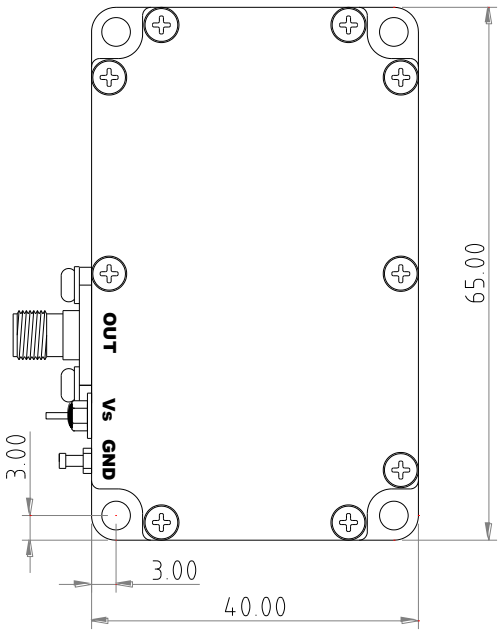
Note 3

Option	Frequency Offset	Unit	Min.	Typ.	Max.	Remarks
LN (Low Noise)	100Hz offset	dBc/Hz		-115	-110	
	1KHz offset	dBc/Hz		-135	-130	
	10KHz offset	dBc/Hz		-145	-140	
	100KHz offset	dBc/Hz		-155	-150	
	1MHz offset	dBc/Hz		-155	-150	
ULN (Ultra-Low Noise)	100Hz offset	dBc/Hz		-135	-130	
	1KHz offset	dBc/Hz		-155	-150	
	10KHz offset	dBc/Hz		-165	-160	
	100KHz offset	dBc/Hz		-170	-165	
	1MHz offset	dBc/Hz		-170	-165	

Note 4 Consult factory for ordering other Supply Voltage.

Enclosure Drawings





All dimensions are in millimeters.

Symbol	Connector	Description
OUT	SMA-Jack, 50 ohm	RF Output (50 MHz)
Vs	EMI Feed-thru	Supply Voltage (+12 V)
GND	Turret Thread Terminal	Ground

- Address: #1913, Anam tower, 311, Teheran-ro, Gangnam-gu, Seoul, Republic of Korea
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100 MHz OCXO Module

Descriptions

Polaris' PFRM-1-100 series is a Single Channel OCXO Module that provides a highly stable 100 MHz sine wave outputs. The OCXO with excellent performance, housed into this series provides a temperature stability from ±25 ppb to ±50 ppb over operating temperature range and aging of ± 100 ppb per year at 25°C. Also this series offers excellent phase noise performance of -165 dBc/Hz @10 KHz offset from 100 MHz Output.

Features

- ❖ 100 MHz Output Frequency
- ❖ Sine Wave Output
- ❖ Built in OCXO with Excellent Performance
- ❖ Various Options Available
- ❖ Affordable Price
- ❖ Internal Voltage Regulators

Applications

- ❖ Military Electronic Systems
- ❖ SATCOM
- ❖ Frequency Reference Generation
- ❖ Phase Noise Measurements
- ❖ Telecommunications Standards

Ordering Information

❖ PFRM-1-100-TS-OP-PN-SV

- TS: Frequency Stability vs. Temperature (ppb)
  . TS1, TS2, or TS3: See "Note 1"
- OP: Output Power (dBm)
  . 0 to 9 in 1 steps: See "Note 2"
- PN: Phase Noise (dBc/Hz)
  . LN or ULN: See "Note 3"
- SV: Supply Voltage (Vdc)
  . 12 to 15: See "Note 4"

❖ Example

- PFRM-1-100-TS1-05-ULN-12
  . Frequency Stability vs. Temperature: ±25 ppb over -40 °C to 75 °C
  . Output Power: 5 dBm
  . Phase Noise: Ultra-Low Noise (See "Note 3")
  . Supply Voltage: 12 Vdc

Specifications for Standard Model

Parameter			Unit	Min.	Typ.	Max.	Remarks
Frequency Calibration			ppm	-0.1		+0.1	
Frequency Stability	vs. Temperature (Note 1)		ppb	TS1 (See "Note 1")			See "Ordering Information"
	Vs. Aging	Daily	ppb	-3		+3	
		1st year	ppb	-100		+100	Aging after 30 days continuous operation
Output	Frequency		MHz	100			
	Power (Note 2)		dBm	5	7		See "Ordering Information"
	Harmonics		dBc			-30	
	Spurious		dBc			-70	
	Load Impedance		Ohm	50			
Phase Noise (Note 3)			dBc/Hz	ULN (See "Note 3")			See "Ordering Information"
Supply Voltage (Note 4)			Vdc	12		15	See "Ordering Information"
Current Consumption			mA			150	Steady State
						350	Warm-up
Warm Up Time			min		3	5	
Operating Temperature				TS1 (See "Note 1")			
Storage Temperature				-40 °C to 85 °C			
Enclosure (L x W x H)			mm	65.0 x 40.0 x 23.5			

Note 1

Option	Unit	Value	Condition	Remarks
TS1	ppb	±25	-40 °C to 75 °C	
TS2	ppb	±25	-20 °C to 70 °C	
TS3	ppb	±50	-10 °C to 60 °C	

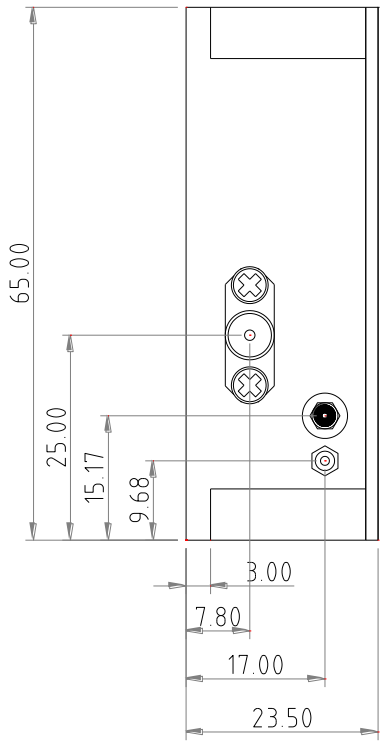
Note 2 Available order from 0 dBm (Typ.) to 9 dBm (Typ.) in 1dB steps.

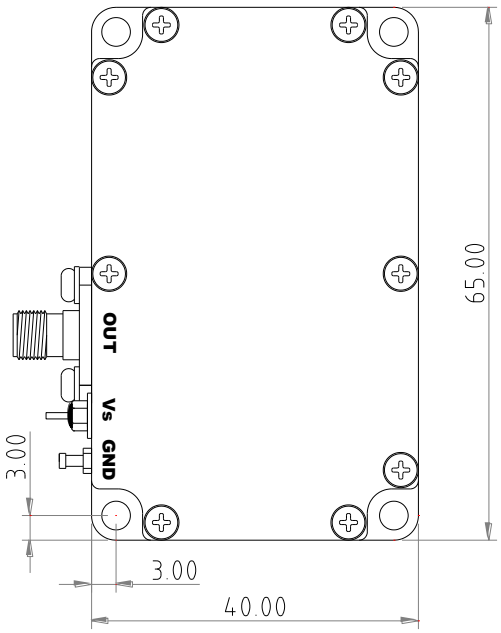
Note 3

Option	Frequency Offset	Unit	Min.	Typ.	Max.	Remarks
LN (Low Noise)	100Hz offset	dBc/Hz		-110	-105	
	1KHz offset	dBc/Hz		-130	-125	
	10KHz offset	dBc/Hz		-140	-135	
	100KHz offset	dBc/Hz		-155	-150	
	1MHz offset	dBc/Hz		-155	-150	
ULN (Ultra-Low Noise)	100Hz offset	dBc/Hz		-130	-125	
	1KHz offset	dBc/Hz		-150	-145	
	10KHz offset	dBc/Hz		-165	-160	
	100KHz offset	dBc/Hz		-170	-165	
	1MHz offset	dBc/Hz		-170	-165	

Note 4 Consult factory for ordering other Supply Voltage.

Enclosure Drawings





All dimensions are in millimeters.

Symbol	Connector	Description
OUT	SMA-Jack, 50 ohm	RF Output (100 MHz)
Vs	EMI Feed-thru	Supply Voltage (+12 V)
GND	Turret Thread Terminal	Ground

- Address: #1913, Anam tower, 311, Teheran-ro, Gangnam-gu, Seoul, Republic of Korea
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Descriptions

The PFRM-4 series is a 4-Channel Frequency Reference Module that provides a highly stable sine wave outputs. This series is categorized into PFRM-4-10 series which output 10MHz, PFRM-4-50 series which output 50MHz and PFRM-4-100 series which output 100MHz.

- PFRM-4-10 series

PFRM-4-10 series is a 4-Channel Frequency Reference Module that provides a highly stable 10 MHz sine wave outputs. This series offers two enclosure options depending on the type of connectors for the external interface. The OCXO with excellent performance, housed into this series provides a temperature stability from ±25 ppb to ±50 ppb over operating temperature range and aging of ± 100 ppb per year at 25°C. Also this series offers excellent phase noise performance of -160 dBc/Hz @10 KHz offset from 10 MHz Output.

- PFRM-4-50 series

PFRM-4-50 series is a 4-Channel Frequency Reference Module that provides a highly stable 50 MHz sine wave outputs. This series offers two enclosure options depending on the type of connectors for the external interface. The OCXO with excellent performance, housed into this series provides a temperature stability from ±25 ppb to ±50 ppb over operating temperature range and aging of ± 100 ppb per year at 25°C. Also this series offers excellent phase noise performance of -160 dBc/Hz @10 KHz offset from 50 MHz Output.

- PFRM-4-100 series

PFRM-4-100 series is a 4-Channel Frequency Reference Module that provides a highly stable 100 MHz sine wave outputs. This series offers two enclosure options depending on the type of connectors for the external interface. The OCXO with excellent performance, housed into this series provides a temperature stability from ±25 ppb to ±50 ppb over operating temperature range and aging of ± 100 ppb per year at 25°C. Also this series offers excellent phase noise performance of -160 dBc/Hz @10 KHz offset from 100 MHz Output.

Four Channels Frequency Reference Modules

Features

- 10 MHz / 50 MHz / 100 MHz Output Frequency
- Four Output Channels
- Sine Wave Output
- External Reference Automatic Switching
- Built in OCXO with Excellent Performance
- Various Options Available
- Affordable Price

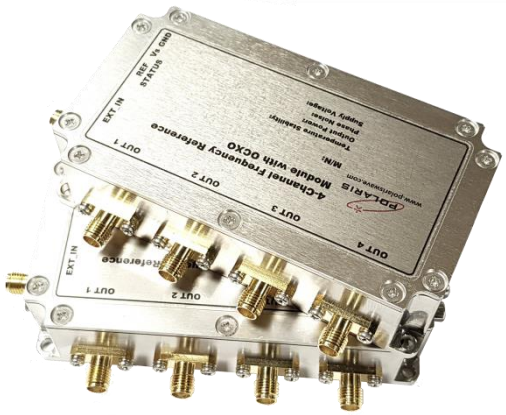
Applications

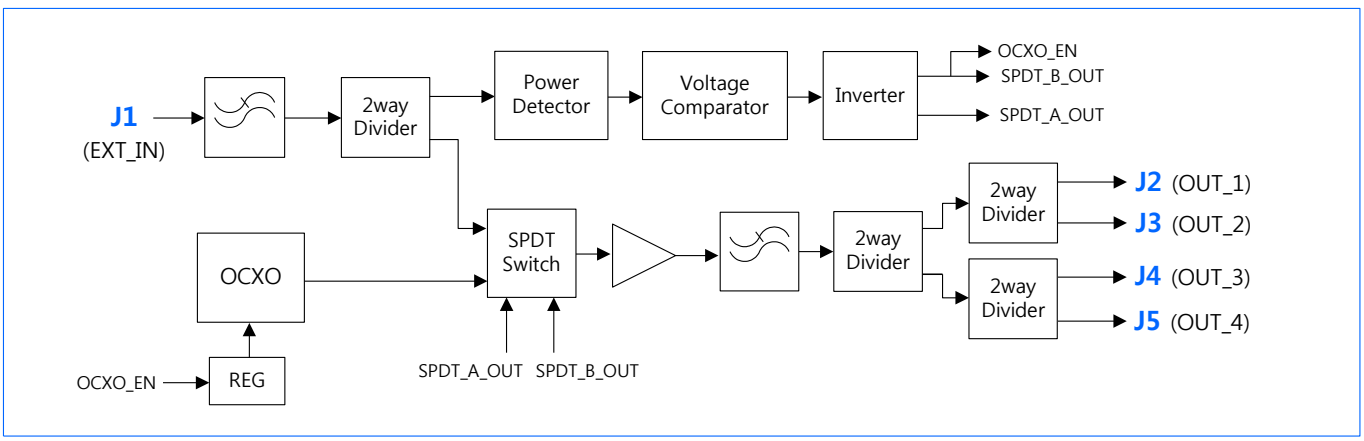
- Frequency Reference Generation
- Phase Noise Measurements
- Military Electronic Systems
- SATCOM
- Instruments Frequency Synchronization
- Telecommunications Standards

10 MHz 4-Channel Frequency Reference Module with OCXO

Descriptions

Polaris' PFRM-4-10 series is a 4-Channel Frequency Reference Module that provides a highly stable 10 MHz sine wave outputs. This series offers two enclosure options depending on the type of connectors for the external interface. The OCXO with excellent performance, housed into this series provides a temperature stability from ±25 ppb to ±50 ppb over operating temperature range and aging of ± 100 ppb per year at 25°C. Also this series offers excellent phase noise performance of -160 dBc/Hz @10 KHz offset from 10 MHz Output.





Features

- ❖ 10 MHz Output Frequency
- ❖ Four Output Channels
- ❖ Sine Wave Output
- ❖ External Reference Automatic Switching
- ❖ Built in OCXO with Excellent Performance
- ❖ Various Options Available
- ❖ Affordable Price

Applications

- ❖ Frequency Reference Generation
- ❖ Phase Noise Measurements
- ❖ Military Electronic Systems
- ❖ SATCOM
- ❖ Instruments Frequency Synchronization
- ❖ Telecommunications Standards

Specifications for Standard Model

Parameter			Unit	Min.	Typ.	Max.	Remarks
External Reference Input	Frequency		MHz		10		
	Power into 50 ohm		dBm	-2	0	+2	
Frequency Calibration			ppm	-0.1		+0.1	
Frequency Stability	vs. Temperature (Note 1)		ppb		TS1 (See "Note 1")		See "Ordering Information"
	Vs. Aging	Daily	ppb	-3		+3	
		1st year	ppb	-100		+100	Aging after 30 days continuous operation
Output	Frequency		MHz		10		
	Power (Note 2)		dBm	8	10		See "Ordering Information"
	No. of Output Channels		-		4		
	Harmonics		dBc			-50	
	Spurious		dBc			-70	
	Load Impedance		Ohm		50		
Phase Noise (Note 3)			dBc/Hz		ULN (See "Note 3")		See "Ordering Information"
Supply Voltage (Note 4)			Vdc	12		15	See "Ordering Information"
Current Consumption			mA			400	Steady State
						600	Warm-up
Warm Up Time			min		3	5	
Reference Switching Mode			-		Automatic		When an ext. reference is input.
Operating Temperature					TS1 (See "Note 1")		
Storage Temperature					-40 °C to 85 °C		
Enclosure (L x W x H)			mm		100.0 x 55.0 x 23.5		

Note 1

Option	Unit	Value	Operating Temperature	Remarks
TS1	ppb	±25	-20 °C to 70 °C	
TS2	ppb	±25	-40 °C to 75 °C	
TS3	ppb	±50	-10 °C to 60 °C	

Note 2 Available order from 0 dBm (Typ.) to 13 dBm (Typ.) in 1dB steps.

Note 3

Option	Frequency Offset	Unit	Min.	Typ.	Max.	Remarks
LN (Low Noise)	100Hz offset	dBc/Hz		-130	-125	
	1KHz offset	dBc/Hz		-140	-135	
	10KHz offset	dBc/Hz		-150	-145	
	100KHz offset	dBc/Hz		-155	-150	
	1MHz offset	dBc/Hz		-155	-150	
ULN (Ultra-Low Noise)	100Hz offset	dBc/Hz		-145	-140	
	1KHz offset	dBc/Hz		-155	-150	
	10KHz offset	dBc/Hz		-160	-155	
	100KHz offset	dBc/Hz		-165	-160	
	1MHz offset	dBc/Hz		-165	-160	

Note 4 Consult factory for ordering other Supply Voltages.

Ordering Information

❖ PFRM-4-10-TS-OP-PN-SV-EC

- TS: Frequency Stability vs. Temperature (ppb)
  . TS1, TS2, or TS3: See "Note 1"
- OP: Output Power (dBm)
  . 0 to 13 in 1 steps: See "Note 2"
- PN: Phase Noise (dBc/Hz)
  . LN or ULN: See "Note 3"
- SV: Supply Voltage (Vdc)
  . 12 to 15: See "Note 4"
- EC: Enclosure Type
  . DS: Enclosure with 9 way D_Sub_Plug Connector
  . FT: Enclosure with EMI Feed-thru Connectors

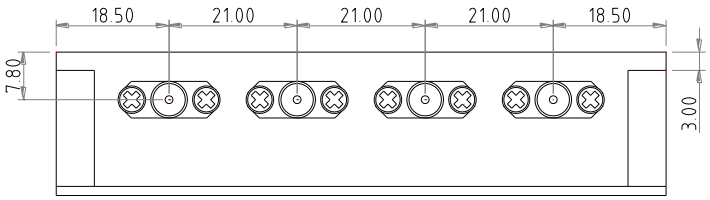
❖ Examples

- PFRM-4-10-TS1-05-ULN-12-FT
  . Frequency Stability vs. Temperature: ±25 ppb over -20 °C to 70 °C
  . Output Power: 5 dBm
  . Phase Noise: Ultra-Low Noise (See "Note 3")
  . Supply Voltage: 12 Vdc
  . Enclosure Type: Enclosure with EMI Feed-thru Connectors

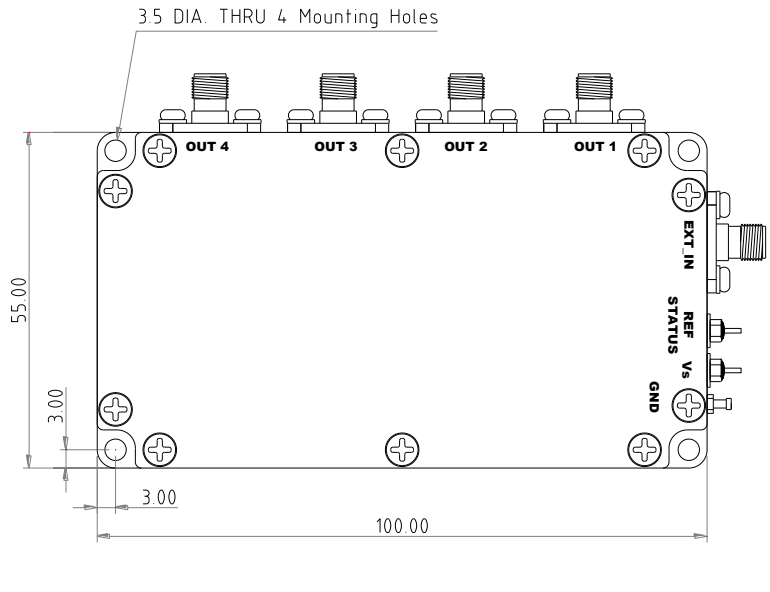
- PFRM-4-10-TS2-10-LN-13-DS
  . Frequency Stability vs. Temperature: ±25 ppb over -40 °C to 75 °C
  . Output Power: 10 dBm
  . Phase Noise: Low Noise (See "Note 3")
  . Supply Voltage: 13 Vdc
  . Enclosure Type: Enclosure with 9 way D_Sub_Plug Connector

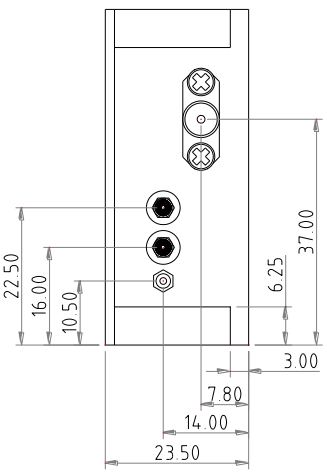
Enclosure Drawings

Enclosure with EMI Feed-thru connectors



All dimensions are in millimeters.

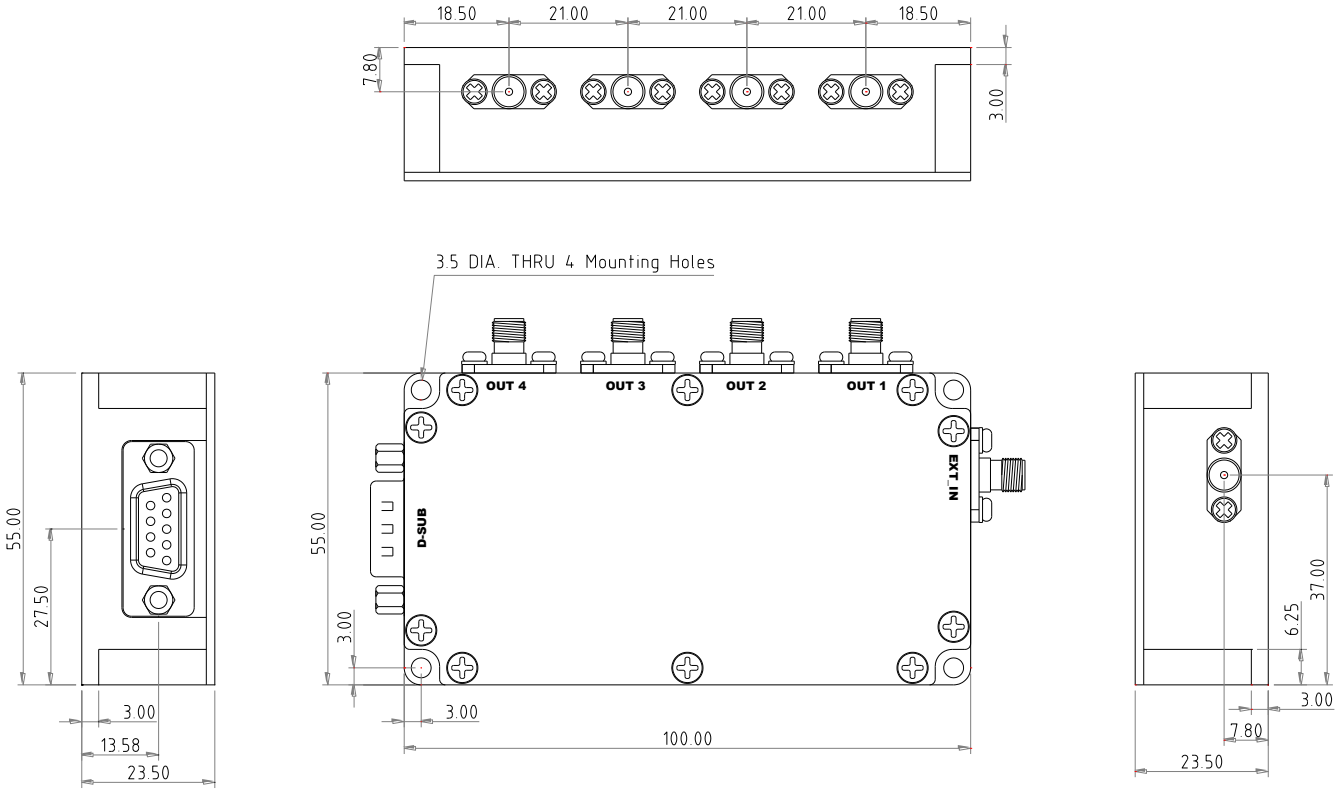




Symbol	Connector	Description
EXT_IN	SMA-Jack, 50 ohm	External Reference Frequency Input (10 MHz)
OUT 1 to OUT 4	SMA-Jack, 50 ohm	RF Output (10 MHz)
Vs	EMI Feed-thru	Supply Voltage (+12 V)
REF STATUS	EMI Feed-thru	TTL "High" when operating with internal OCXO and TTL "Low" when operating with external reference
GND	Turret Thread Terminal	Ground

Enclosure Drawings

Enclosure with D_Sub Connector



All dimensions are in millimeters.

Symbol	Connector	Description
EXT_IN	SMA-Jack, 50 ohm	External Reference Frequency Input (10 MHz)
OUT 1 to OUT 4	SMA-Jack, 50 ohm	RF Output (10 MHz)
D_SUB	9 way D_Sub Plug	GND (Ground): P1 Vs (Supply Voltage, +12 V): P5, P9 INT_OCXO_ACTIVE (Note 3): P6 EXT_REF_ACTIVE (Note 4): P2 Not Used: P3, P4, P7, P8

(Note 3) INT_OCXO_ACTIVE: TTL "High" when operating with internal OCXO and TTL "Low" when operating with external reference.

(Note 4) EXT_REF_ACTIVE: TTL "High" when operating with external reference and TTL "Low" when operating with internal OCXO.

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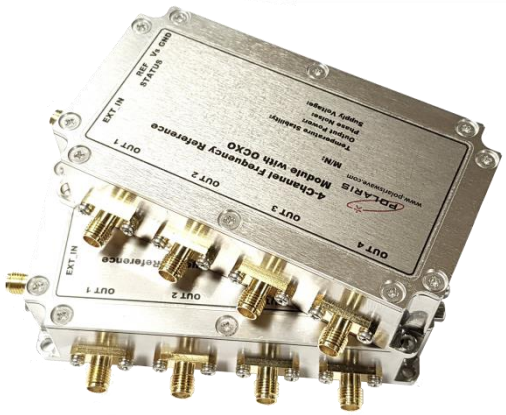
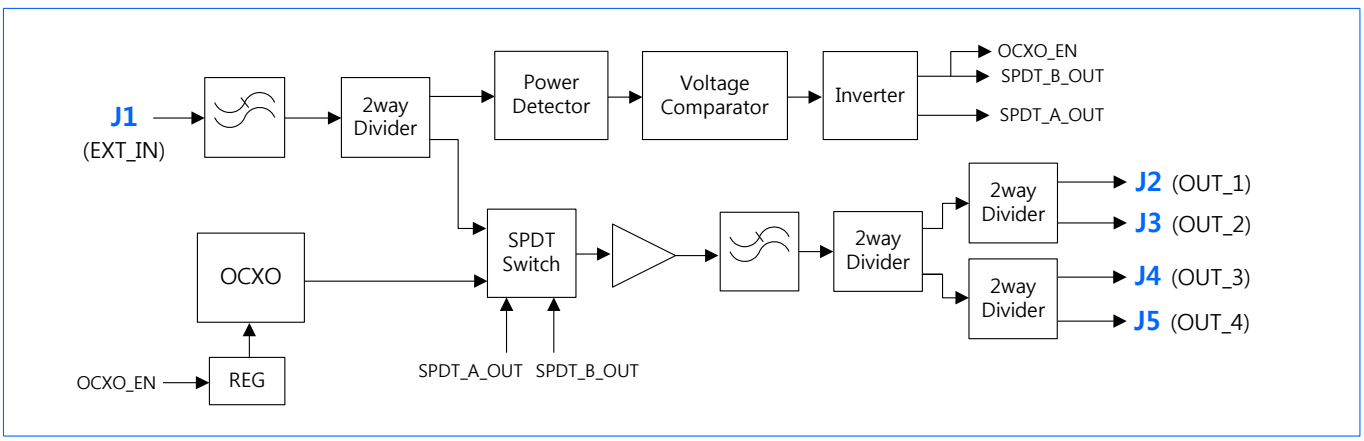
50 MHz 4-Channel Frequency Reference Module with OCXO

Descriptions

Polaris' PFRM-4-50 series is a 4-Channel Frequency Reference Module that provides a highly stable 50 MHz sine wave outputs. This series offers two enclosure options depending on the type of connectors for the external interface. The OCXO with excellent performance, housed into this series provides a temperature stability from ±25 ppb to ±50 ppb over operating temperature range and aging of ± 100 ppb per year at 25°C. Also this series offers excellent phase noise performance of -160 dBc/Hz @10 KHz offset from 50 MHz Output.





Features

- ❖ 50 MHz Output Frequency
- ❖ Four Output Channels
- ❖ Sine Wave Output
- ❖ External Reference Automatic Switching
- ❖ Built in OCXO with Excellent Performance
- ❖ Various Options Available
- ❖ Affordable Price

Applications

- ❖ Frequency Reference Generation
- ❖ Phase Noise Measurements
- ❖ Military Electronic Systems
- ❖ SATCOM
- ❖ Instruments Frequency Synchronization
- ❖ Telecommunications Standards

Specifications for Standard Model

Parameter			Unit	Min.	Typ.	Max.	Remarks
External Reference Input	Frequency		MHz		50		
	Power into 50 ohm		dBm	-2	0	+2	
Frequency Calibration			ppm	-0.1		+0.1	
Frequency Stability	vs. Temperature (Note 1)		ppb		TS1 (See "Note 1")		See "Ordering Information"
	Vs. Aging	Daily	ppb	-3		+3	
		1st year	ppb	-100		+100	Aging after 30 days continuous operation
Output	Frequency		MHz		50		
	Power (Note 2)		dBm	8	10		See "Ordering Information"
	No. of Output Channels		-		4		
	Harmonics		dBc			-50	
	Spurious		dBc			-70	
	Load Impedance		Ohm		50		
Phase Noise (Note 3)			dBc/Hz		ULN (See "Note 3")		See "Ordering Information"
Supply Voltage (Note 4)			Vdc	12		15	See "Ordering Information"
Current Consumption			mA			400	Steady State
						600	Warm-up
Warm Up Time			min		3	5	
Reference Switching Mode			-		Automatic		When an ext. reference is input.
Operating Temperature					TS1 (See "Note 1")		
Storage Temperature					-40 °C to 85 °C		
Enclosure (L x W x H)			mm		100.0 x 55.0 x 23.5		

Note 1

Option	Unit	Value	Condition	Remarks
TS1	ppb	±25	-20 °C to 70 °C	
TS2	ppb	±25	-40 °C to 75 °C	
TS3	ppb	±50	-10 °C to 60 °C	

Note 2 Available order from 0 dBm (Typ.) to 13 dBm (Typ.) in 1dB steps.

Note 3

Option	Frequency Offset	Unit	Min.	Typ.	Max.	Remarks
LN (Low Noise)	100Hz offset	dBc/Hz		-115	-110	
	1KHz offset	dBc/Hz		-135	-130	
	10KHz offset	dBc/Hz		-145	-140	
	100KHz offset	dBc/Hz		-155	-150	
	1MHz offset	dBc/Hz		-155	-150	
ULN (Ultra-Low Noise)	100Hz offset	dBc/Hz		-125	-120	
	1KHz offset	dBc/Hz		-150	-145	
	10KHz offset	dBc/Hz		-160	-155	
	100KHz offset	dBc/Hz		-165	-160	
	1MHz offset	dBc/Hz		-165	-160	

Note 4 Consult factory for ordering other Supply Voltage.

Ordering Information

❖ PFRM-4-50-TS-OP-PN-SV-EC

- TS: Frequency Stability vs. Temperature (ppb)
  . TS1, TS2, or TS3: See "Note 1"
- OP: Output Power (dBm)
  . 0 to 13 in 1 steps: See "Note 2"
- PN: Phase Noise (dBc/Hz)
  . LN or ULN: See "Note 3"
- SV: Supply Voltage (Vdc)
  . 12 to 15: See "Note 4"
- EC: Enclosure Type
  . DS: Enclosure with 9 way D_Sub_Plug Connector
  . FT: Enclosure with EMI Feed-thru Connectors

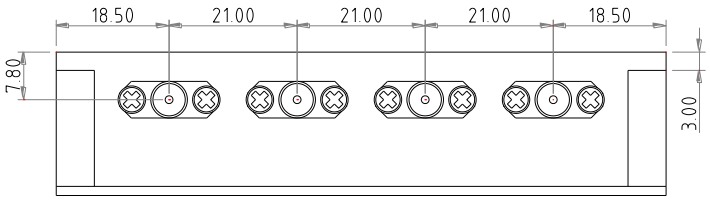
❖ Examples

- PFRM-4-50-TS1-05-ULN-12-FT
  . Frequency Stability vs. Temperature: ±25 ppb over -20 °C to 70 °C
  . Output Power: 5 dBm
  . Phase Noise: Ultra-Low Noise (See "Note 3")
  . Supply Voltage: 12 Vdc
  . Enclosure Type: Enclosure with EMI Feed-thru Connectors

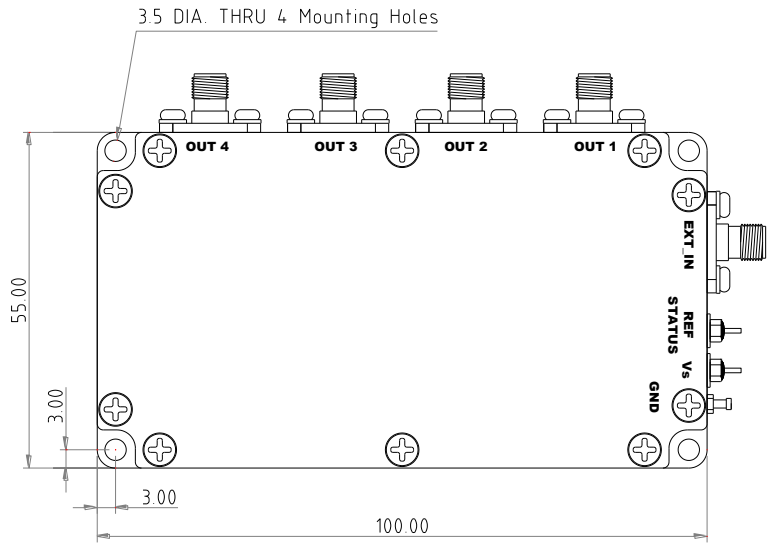
- PFRM-4-50-TS2-10-LN-13-DS
  . Frequency Stability vs. Temperature: ±25 ppb over -40 °C to 75 °C
  . Output Power: 10 dBm
  . Phase Noise: Low Noise (See "Note 3")
  . Supply Voltage: 13 Vdc
  . Enclosure Type: Enclosure with 9 way D_Sub_Plug Connector

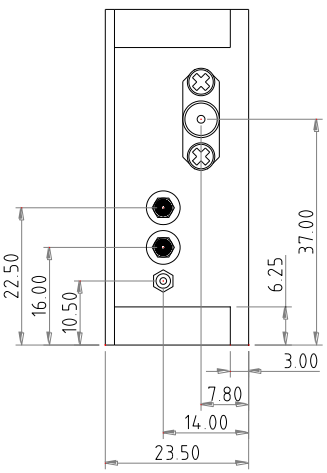
Enclosure Drawings

Enclosure with EMI Feed-thru connectors



All dimensions are in millimeters.

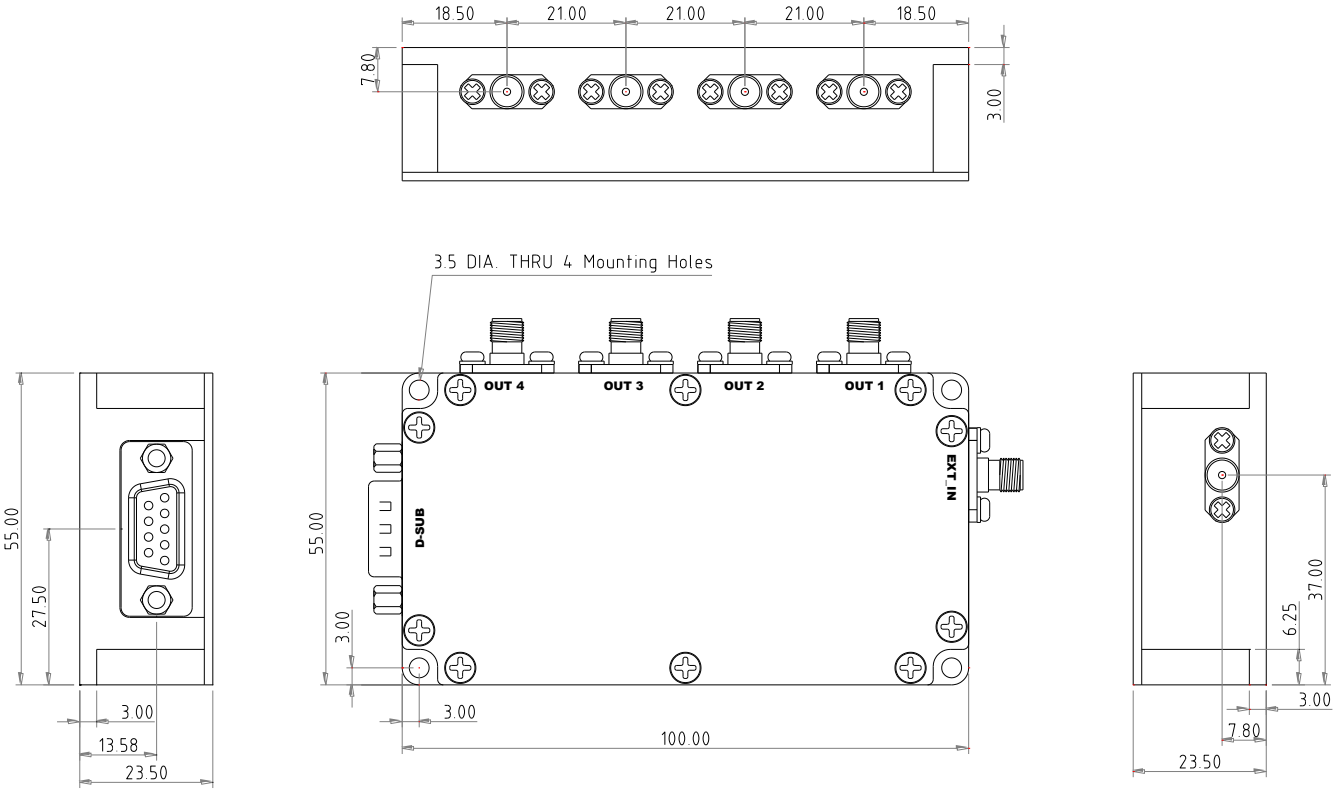




Symbol	Connector	Description
EXT_IN	SMA-Jack, 50 ohm	External Reference Frequency Input (50 MHz)
OUT 1 to OUT 4	SMA-Jack, 50 ohm	RF Output (50 MHz)
Vs	EMI Feed-thru	Supply Voltage (+12 V)
REF STATUS	EMI Feed-thru	TTL "High" when operating with internal OCXO and TTL "Low" when operating with external reference
GND	Turret Thread Terminal	Ground

Enclosure Drawings

Enclosure with D_Sub Connector



All dimensions are in millimeters.

Symbol	Connector	Description
EXT_IN	SMA-Jack, 50 ohm	External Reference Frequency Input (50 MHz)
OUT 1 to OUT 4	SMA-Jack, 50 ohm	RF Output (50 MHz)
D_SUB	9 way D_Sub Plug	GND (Ground): P1 Vs (Supply Voltage, +12 V): P5, P9 INT_OCXO_ACTIVE (Note 3): P6 EXT_REF_ACTIVE (Note 4): P2 Not Used: P3, P4, P7, P8

(Note 3) INT_OCXO_ACTIVE: TTL "High" when operating with internal OCXO and TTL "Low" when operating with external reference.

(Note 4) EXT_REF_ACTIVE: TTL "High" when operating with external reference and TTL "Low" when operating with internal OCXO.

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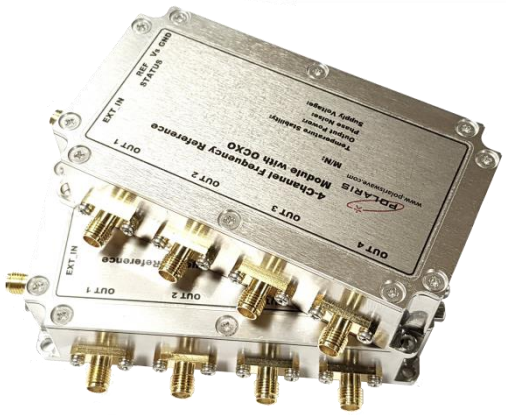
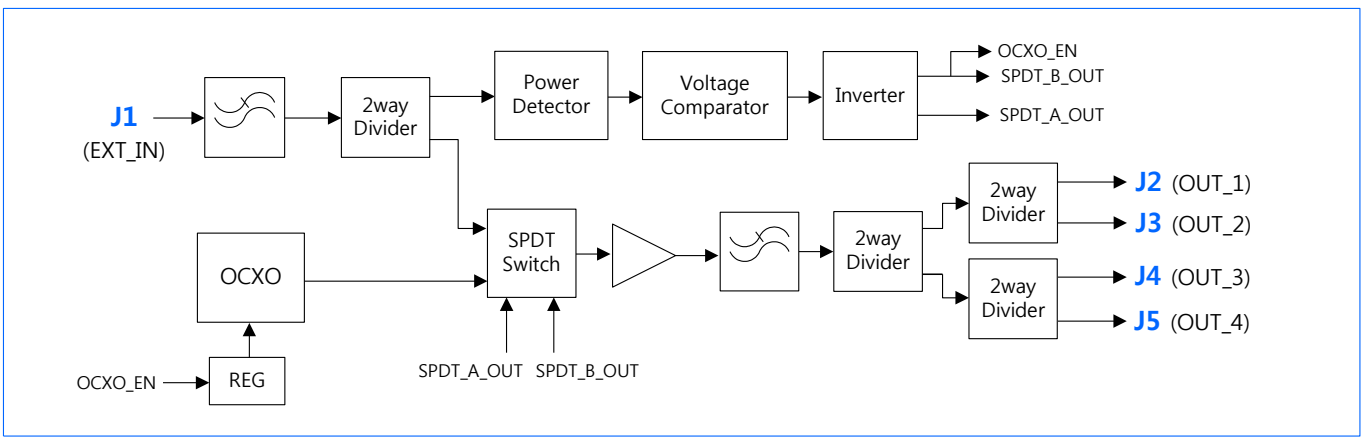
100 MHz 4-Channel Frequency Reference Module with OCXO

Descriptions

Polaris' PFRM-4-100 series is a 4-Channel Frequency Reference Module that provides a highly stable 100 MHz sine wave outputs. This series offers two enclosure options depending on the type of connectors for the external interface. The OCXO with excellent performance, housed into this series provides a temperature stability from ±25 ppb to ±50 ppb over operating temperature range and aging of ± 100 ppb per year at 25°C. Also this series offers excellent phase noise performance of -160 dBc/Hz @10 KHz offset from 100 MHz Output.





Features

- ❖ 100 MHz Output Frequency
- ❖ Four Output Channels
- ❖ Sine Wave Output
- ❖ External Reference Automatic Switching
- ❖ Built in OCXO with Excellent Performance
- ❖ Various Options Available
- ❖ Affordable Price

Applications

- ❖ Frequency Reference Generation
- ❖ Phase Noise Measurements
- ❖ Military Electronic Systems
- ❖ SATCOM
- ❖ Instruments Frequency Synchronization
- ❖ Telecommunications Standards

Specifications for Standard Model

Parameter			Unit	Min.	Typ.	Max.	Remarks
External Reference Input	Frequency		MHz		100		
	Power into 50 ohm		dBm	-2	0	+2	
Frequency Calibration			ppm	-0.1		+0.1	
Frequency Stability	vs. Temperature (Note 1)		ppb		TS1 (See "Note 1")		See "Ordering Information"
	Vs. Aging	Daily	ppb	-3		+3	
		1st year	ppb	-100		+100	Aging after 30 days continuous operation
Output	Frequency		MHz		100		
	Power (Note 2)		dBm	8	10		See "Ordering Information"
	No. of Output Channels		-		4		
	Harmonics		dBc			-50	
	Spurious		dBc			-70	
	Load Impedance		Ohm		50		
Phase Noise (Note 3)			dBc/Hz		ULN (See "Note 3")		See "Ordering Information"
Supply Voltage (Note 4)			Vdc	12		15	See "Ordering Information"
Current Consumption			mA			400	Steady State
						600	Warm-up
Warm Up Time			min		3	5	
Reference Switching Mode			-		Automatic		When an ext. reference is input.
Operating Temperature					TS1 (See "Note 1")		
Storage Temperature					-40 °C to 85 °C		
Enclosure (L x W x H)			mm		100.0 x 55.0 x 23.5		

Note 1

Option	Unit	Value	Condition	Remarks
TS1	ppb	±25	-20 °C to 70 °C	
TS2	ppb	±25	-40 °C to 75 °C	
TS3	ppb	±50	-10 °C to 60 °C	

Note 2 Available order from 0 dBm (Typ.) to 13 dBm (Typ.) in 1dB steps.

Note 3

Option	Frequency Offset	Unit	Min.	Typ.	Max.	Remarks
LN (Low Noise)	100Hz offset	dBc/Hz		-110	-105	
	1KHz offset	dBc/Hz		-130	-125	
	10KHz offset	dBc/Hz		-140	-135	
	100KHz offset	dBc/Hz		-155	-150	
	1MHz offset	dBc/Hz		-155	-150	
ULN (Ultra-Low Noise)	100Hz offset	dBc/Hz		-120	-115	
	1KHz offset	dBc/Hz		-145	-140	
	10KHz offset	dBc/Hz		-155	-150	
	100KHz offset	dBc/Hz		-165	-160	
	1MHz offset	dBc/Hz		-165	-160	

Note 4 Consult factory for ordering other Supply Voltage.

Ordering Information

❖ PFRM-4-100-TS-OP-PN-SV-EC

- TS: Frequency Stability vs. Temperature (ppb)
  . TS1, TS2, or TS3: See "Note 1"
- OP: Output Power (dBm)
  . 0 to 13 in 1 steps: See "Note 2"
- PN: Phase Noise (dBc/Hz)
  . LN or ULN: See "Note 3"
- SV: Supply Voltage (Vdc)
  . 12 to 15: See "Note 4"
- EC: Enclosure Type
  . DS: Enclosure with 9 way D_Sub_Plug Connector
  . FT: Enclosure with EMI Feed-thru Connectors

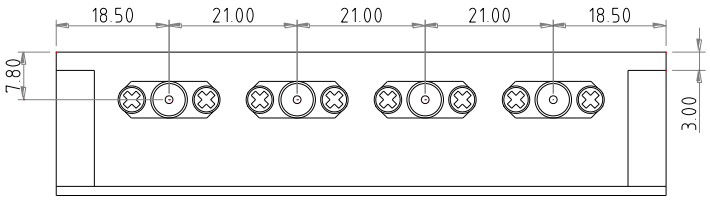
❖ Examples

- PFRM-4-100-TS1-05-ULN-12-FT
  . Frequency Stability vs. Temperature: ±25 ppb over -20 °C to 70 °C
  . Output Power: 5 dBm
  . Phase Noise: Ultra-Low Noise (See "Note 3")
  . Supply Voltage: 12 Vdc
  . Enclosure Type: Enclosure with EMI Feed-thru Connectors5

- PFRM-4-100-TS2-10-LN-13-DS
  . Frequency Stability vs. Temperature: ±25 ppb over -40 °C to 75 °C
  . Output Power: 10 dBm
  . Phase Noise: Low Noise (See "Note 3")
  . Supply Voltage: 13 Vdc
  . Enclosure Type: Enclosure with 9 way D_Sub_Plug Connector

Enclosure Drawings

Enclosure with EMI Feed-thru connectors



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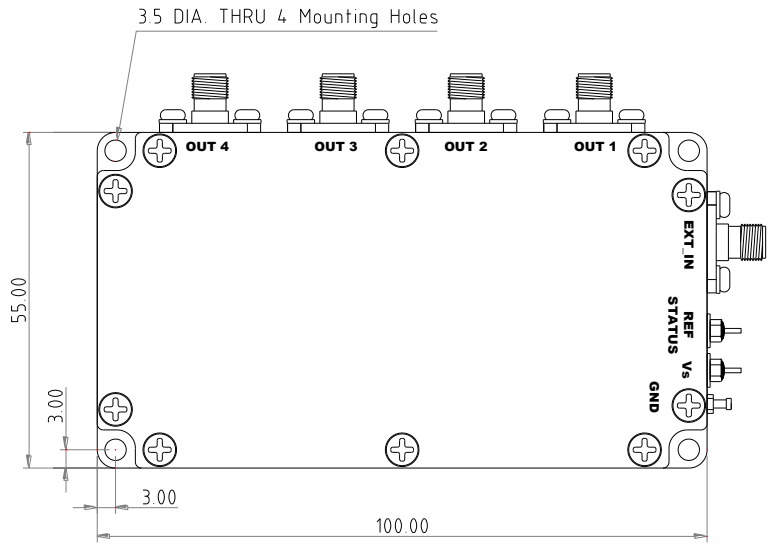

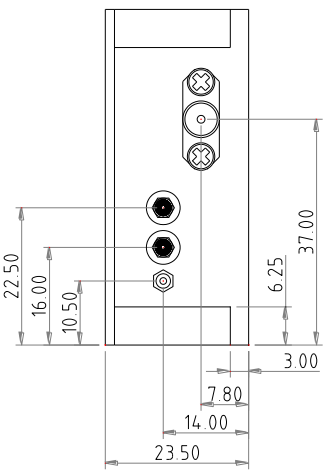

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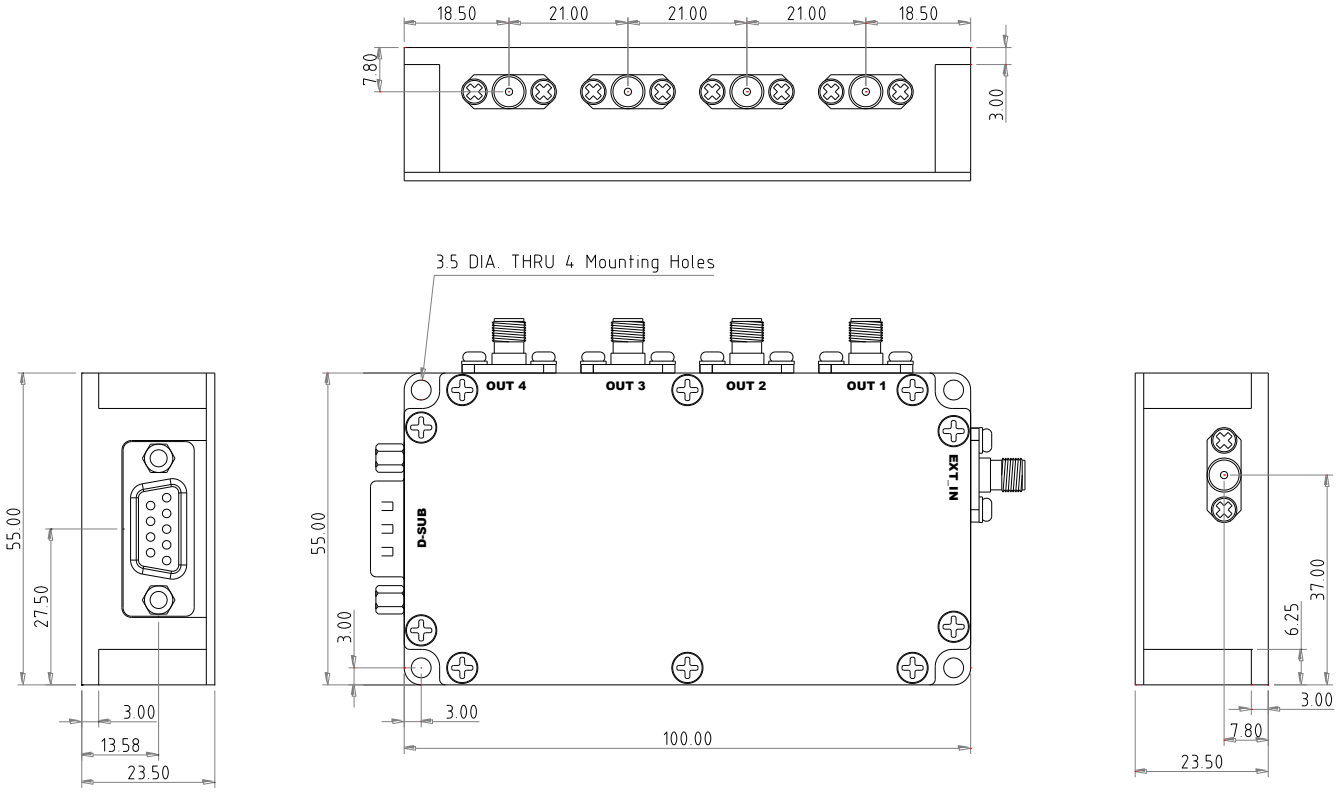
EXT_IN	SMA-Jack, 50 ohm	External Reference Frequency Input (100 MHz)
OUT 1 to OUT 4	SMA-Jack, 50 ohm	RF Output (100 MHz)
Vs	EMI Feed-thru	Supply Voltage (+12 V)
REF STATUS	EMI Feed-thru	TTL "High" when operating with internal OCXO and TTL "Low" when operating with external reference
GND	Turret Thread Terminal	Ground

Enclosure Drawings

Enclosure with D_Sub Connector



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Symbol	Connector	Description
EXT_IN	SMA-Jack, 50 ohm	External Reference Frequency Input (100 MHz)
OUT 1 to OUT 4	SMA-Jack, 50 ohm	RF Output (100 MHz)
D_SUB	9 way D_Sub Plug	GND (Ground): P1 Vs (Supply Voltage, +12 V): P5, P9 INT_OCXO_ACTIVE (Note 3): P6 EXT_REF_ACTIVE (Note 4): P2 Not Used: P3, P4, P7, P8

(Note 3) INT_OCXO_ACTIVE: TTL "High" when operating with internal OCXO and TTL "Low" when operating with external reference.

(Note 4) EXT_REF_ACTIVE: TTL "High" when operating with external reference and TTL "Low" when operating with internal OCXO.

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