NS 2P N220
31 Aug. 2004
Preliminary

NEL®
CI0403

30 GHz Clock Distributor

Features

- Wideband operation: 5 GHz – 30 GHz
- Single-ended clock input
- 2 differential outputs
- Output Amplitude: 0.9 Vpp (Typ.)

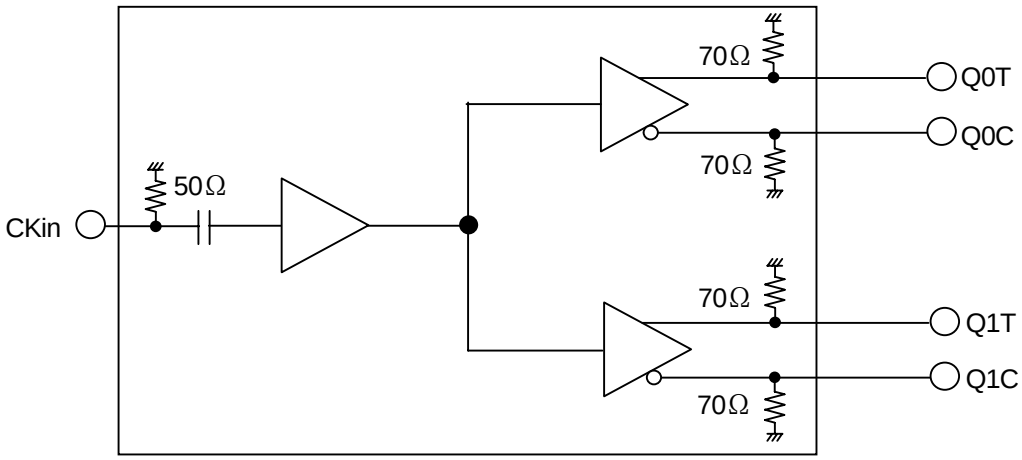
General Description

The CI0403 is an ultra-fast 1:2 Clock Distributor operating at rates up to 30 GHz. The IC is fabricated using a 0.1-µm InP HEMT process. The CI0403 is provided in a hermetically-sealed package with V-connectors.

Applications

- Clock Distributor
- Clock Amplifier

Functional Diagram



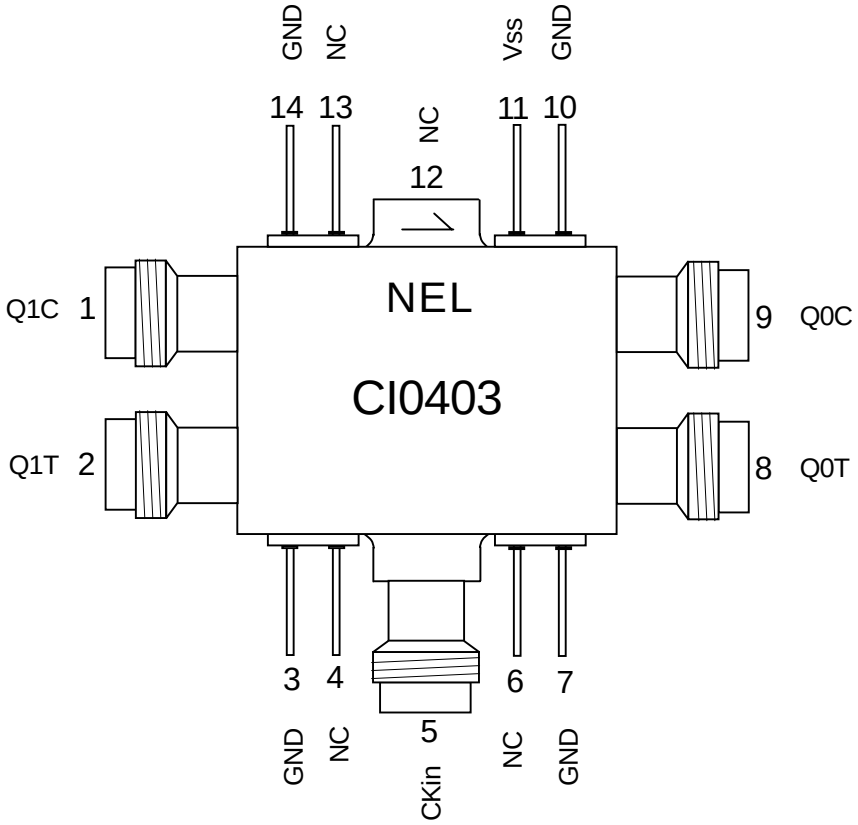
Connection Table

No.	NAME	FUNCTION	No.	NAME	FUNCTION
1	Q1C(1)	Clock Output 1 (Complementary)	8	Q0T(1)	Clock Output 0 (True)
2	Q1T(1)	Clock Output 1 (True)	9	Q0C(1)	Clock Output 0 (Complementary)
3	GND	Ground (0.0 V)	10	GND	Ground (0.0 V)
4	NC	No Internal Connection	11	Vss	Power Supply (-4.5 V)
5	CKin	Clock Input	12	NC	No Internal Connection
6	NC	No Internal Connection	13	NC	No Internal Connection
7	GND	Ground (0.0 V)	14	GND	Ground (0.0 V)

Notes

(1) Terminate unused output connectors to GND through 50-ohm resistors.

Connection Diagram (Top View)



Absolute Maximum Ratings

SYMBOL	PARAMETER	RATING	UNIT
VSS	Power Supply Voltage	-5.0 to +0.1	V
Vin	Applied Voltage Amplitude at Clock Input (CKin)	1.2	Vpp
Vinck	Applied Voltage at Clock Input (CKin)	-1.2 to +1.2	V
Vout	Applied Voltage at Clock Outputs (Q0T, Q0C, Q1T, Q1C)	TBD	V
Tstor	Storage Temperature	TBD	°C
Tc(1)	Case Temperature under Bias	TBD	°C

TBD: To Be Determined

Recommended Operating Conditions

SYMBOL	PARAMETER	MIN.	TYP.	MAX.	UNIT
VSS	Power Supply	-4.7	-4.5	-4.3	V
CKin	Clock Input Interface	DC coupling or AC coupling (see AC Characteristics)			
Q0T, Q0C Q1T, Q1C	Data Output Interface	DC coupling (see AC Characteristics), Terminate to GND through 50 ohm.			

DC Characteristics

(Vss = -4.5. V, GND = 0.0 V, Tc(1) = 30 °C)

SYMBOL	PARAMETER	MIN.	TYP.	MAX.	UNIT
ISS	Power Supply Current		260	TBD	mA

TBD: To Be Determined

Note

(1) Tc: Temperature at package base.

AC Characteristics

(Vss = -4.5 V, GND = 0.0 V)

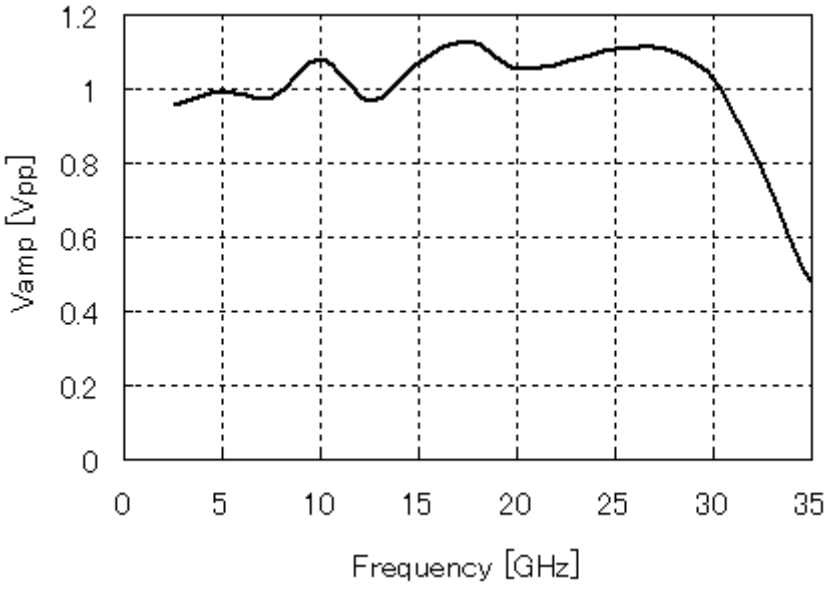
SYMBOL	PARAMETER	Tc=30 °C			UNIT	
		MIN	TYP	MAX		
Vin	Clock Input Voltage Amplitude	TBD	0.6		Vpp	
Vcenter	Clock Input Center Voltage	-0.6		0.6	V	
f_{MAX}	Maximum Input frequency	30			GHz	
f_{MIN}	Minimum Input frequency			5	GHz	
Vamp	Output Voltage Amplitude (Q0T, Q0C, Q1T, Q1C)	TBD	0.9		Vpp	(1)
tr	Output Rise Time (Q0T, Q0C, Q1T, Q1C) 20 - 80%		9	TBD	ps	(2)
tf	Output Fall Time (Q0T, Q0C, Q1T, Q1C) 20 - 80%		9	TBD	ps	(2)
Jitter	Output jitter (Q0T, Q0C, Q1T, Q1C)			0.03	UIrms	(3)

(1) Measurement Condition: f =30 GHz

(2) Measurement Condition: f =10 GHz

(3) $Jitter[UIrms] = \dfrac{\sqrt{(OutputRMSJitter)^2 - (InputRMSJitter)^2}}{1/f}$

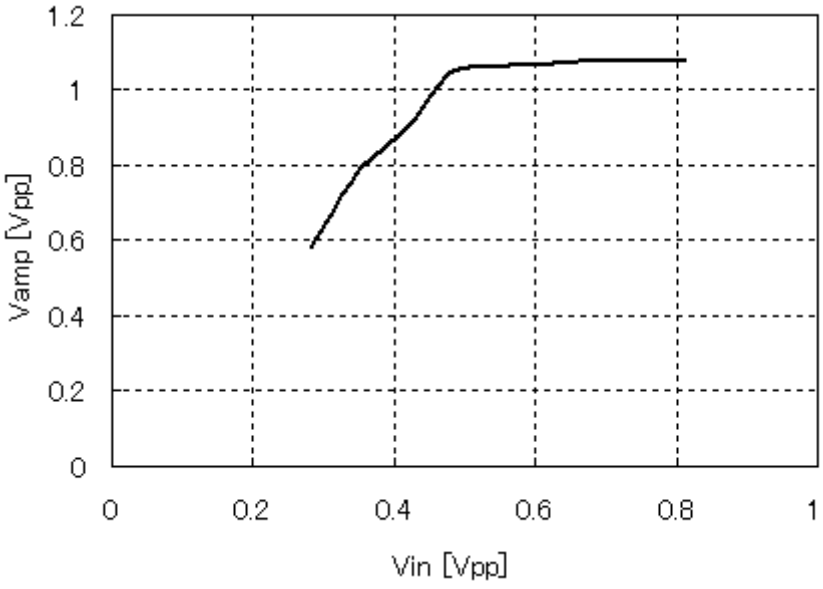
Sample Output Voltage Amplitude vs. Frequency (2.5GHz – 35GHz)



Measurement Conditions

Vss=-4.5 V, Vin=0.6 Vpp

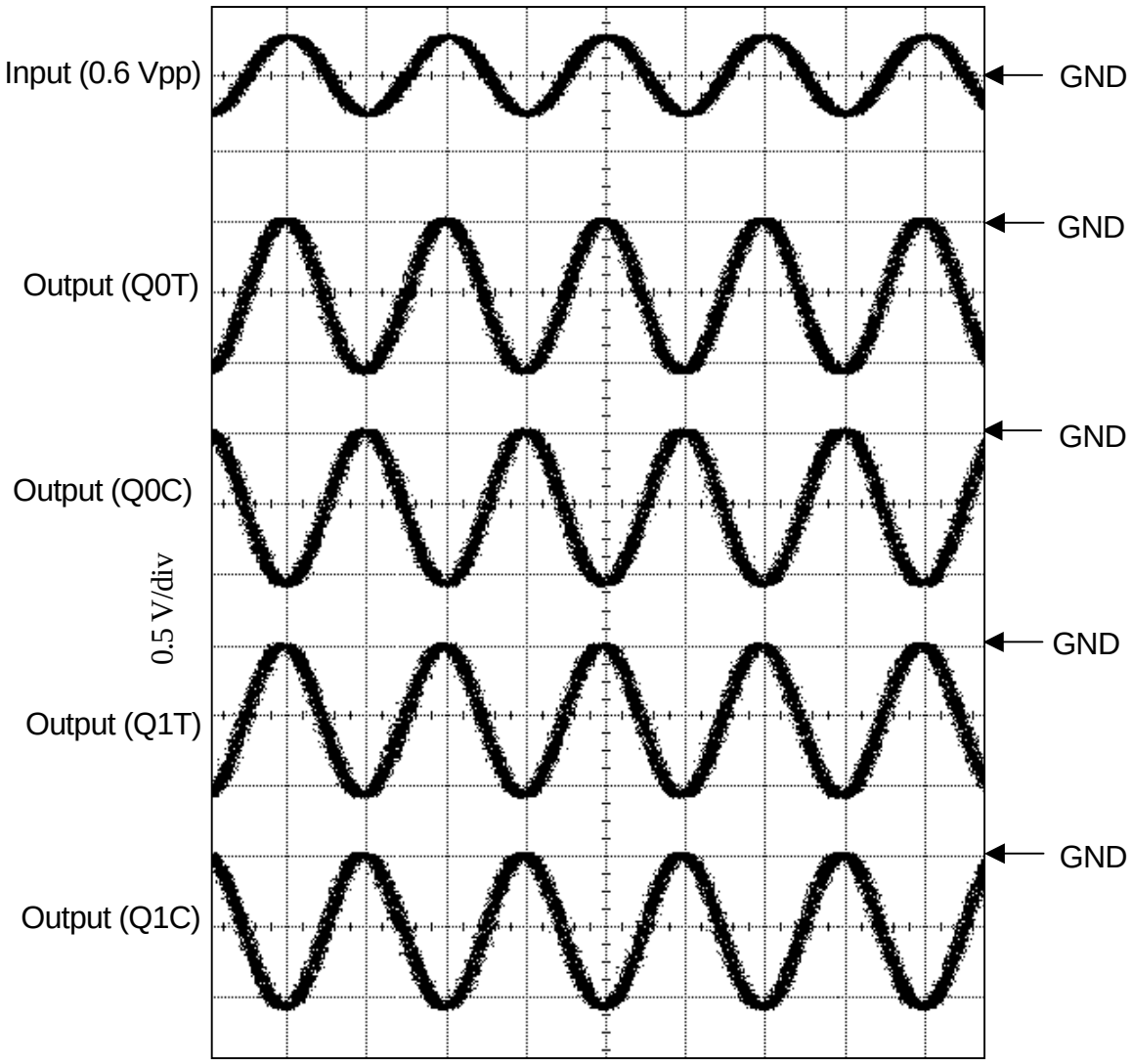
Sample Output Voltage Amplitude vs. Input Voltage Amplitude at 25 GHz



Measurement Conditions

Vss=-4.5 V, Input Clock : 25GHz

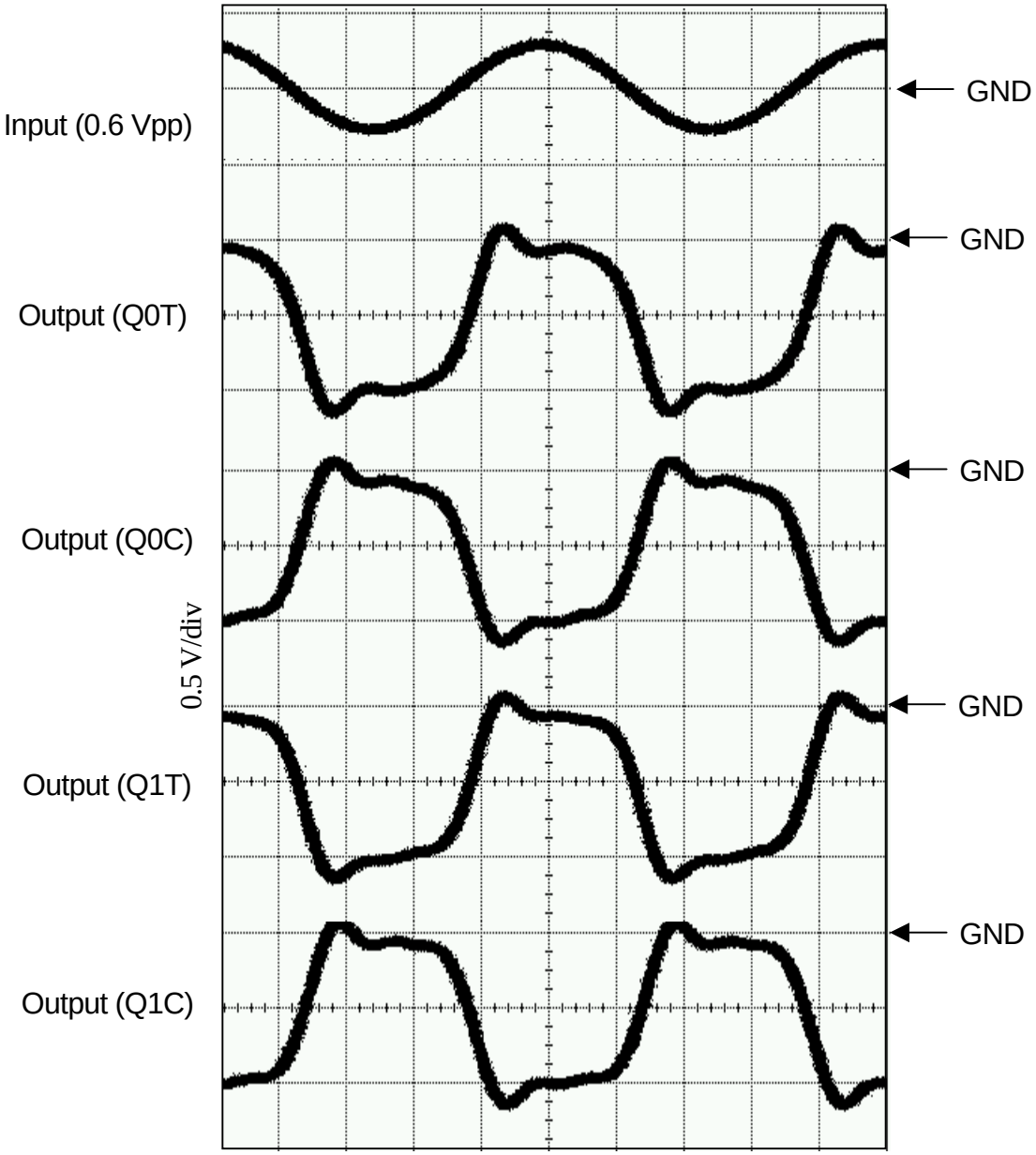
Sample Waveforms (25 GHz)



Measurement Conditions

Vss = -4.5 V, Input Clock: 25 GHz , 0.6Vpp

Sample Waveforms (10 GHz)

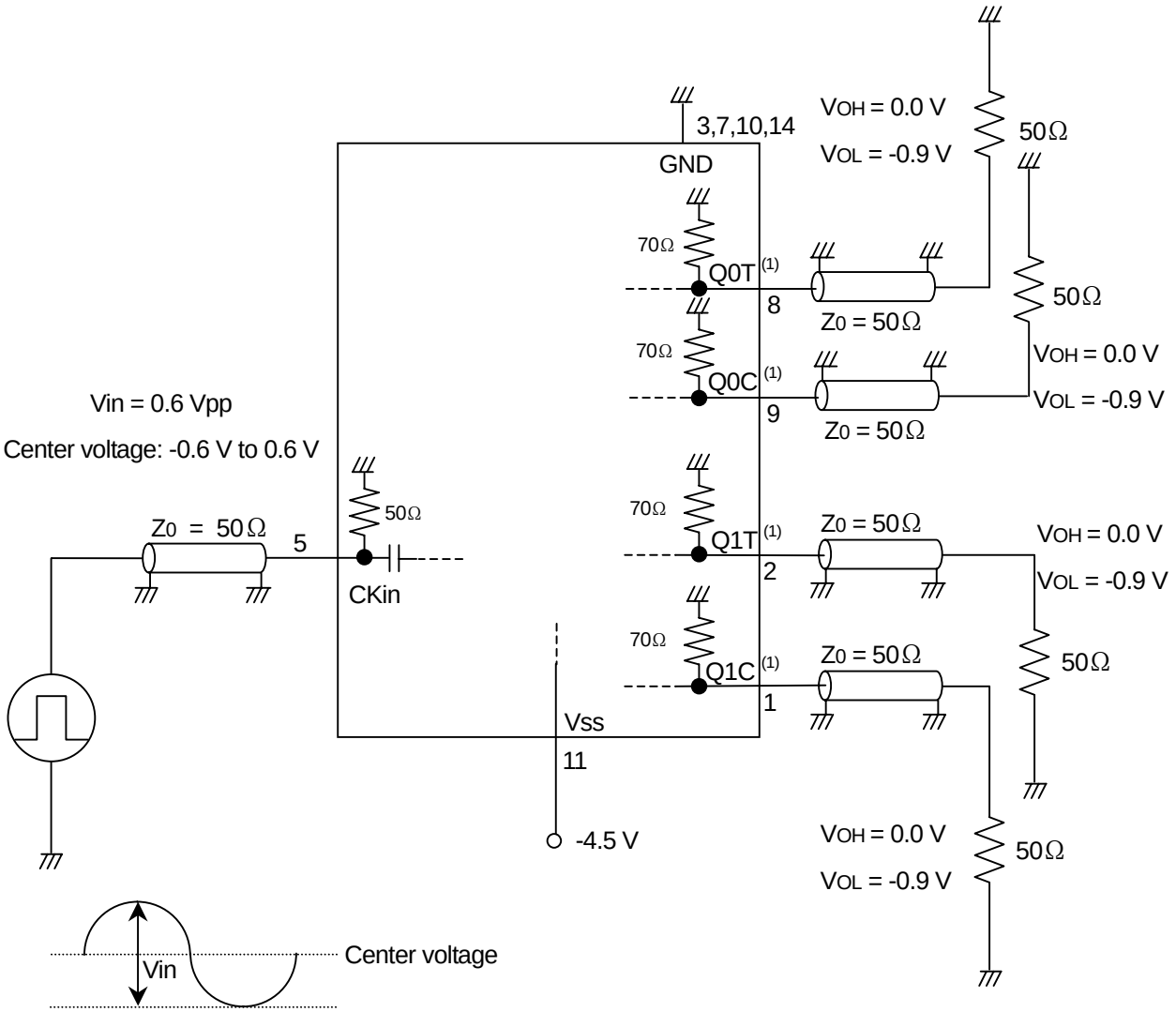


Measurement Conditions

Vss = -4.5 V, Input Clock: 10 GHz , 0.6Vpp

Sample Implementation

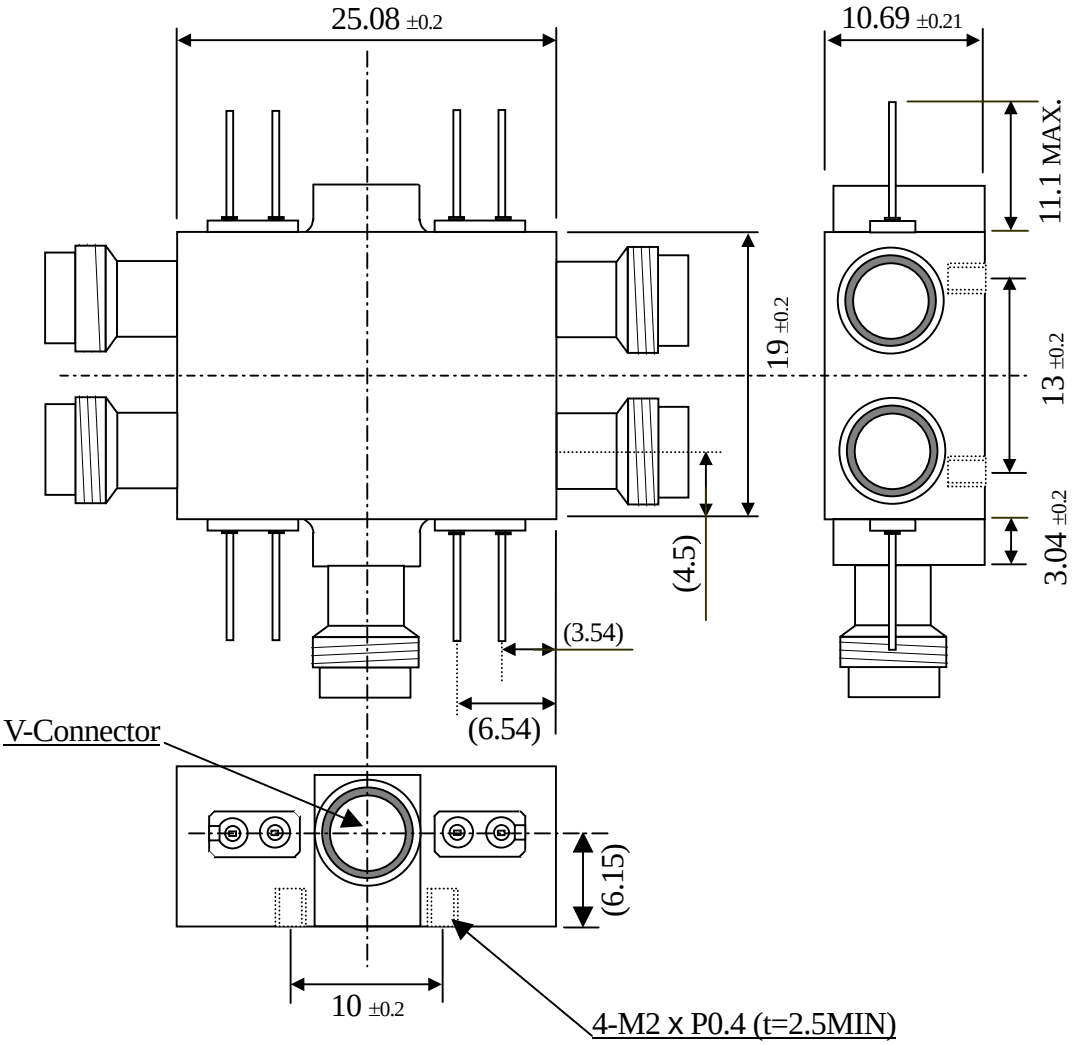
Note: Each number corresponds to a pin or a connector as shown in Connection Diagram



Note

(1) DC coupling only.

SCMD Package Dimension (mm)



Handling Instructions

Since the IC is fabricated using InP HEMT process, users are recommended to follow the instructions below to prevent damage to the chip from electro-static discharge.

(1) Power Supply Sequence

The following power sequence is recommended

1) Set power supply voltages Vss, and GND to 0 V.
2) Apply Vss.

RF signal is recommended to be applied, while power supplying and biasing.

(2) Handling Precautions

1) Use a conductive working desk connected to the ground (or, a conductive table top connected to the ground).
2) Require all handling personnel to wear a conductive bracelet or wrist-strap connected to the ground through a 1 M-ohm resistor.
3) Ground all test equipment.
4) Ground all soldering iron tops.
5) Store IC's and other devices such as chip capacitors in their conductive carriers until they are soldered.
6) Use power supplies that do not generate over-voltages such as spikes. Many power supplies generate over-voltages when their outputs are turned on or turned off. To avoid these over-voltages, connect power supplies to Vss after the power supply outputs are turned on and set to 0 V. Disconnect power supplies from Vss after the power supply outputs are set to 0 V but before the outputs are turned off.

Caution

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