

43 GHz T-FF

Features

- Maximum operating frequency: 43 GHz
- Output amplitude: 0.9 V_{pp}
- Single-ended clock input

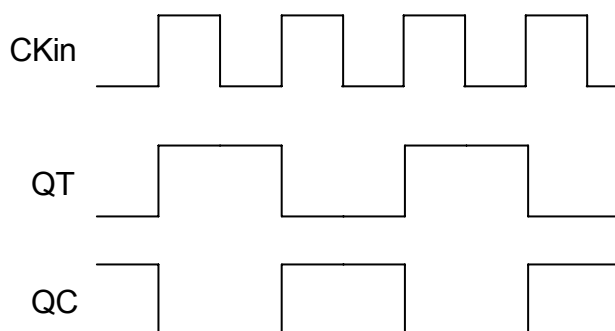
General Description

The CI0084 is a dynamic T-type Flip Flop (T-FF) operating at rates from 20 GHz to 43 GHz. The I/O levels are SCFL (V_H: 0.0 V, V_L: -0.9 V). The IC is fabricated using a 0.1-μm InP HEMT process. The CI0084 is provided in a hermetically-sealed package with V-connectors.

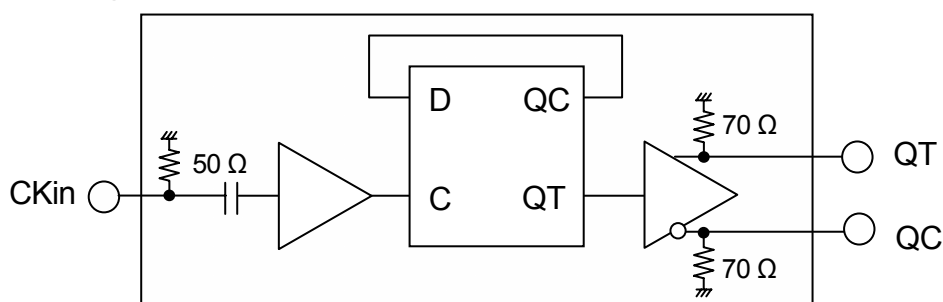
Applications

- Frequency Divider

Timing Chart



Functional Diagram



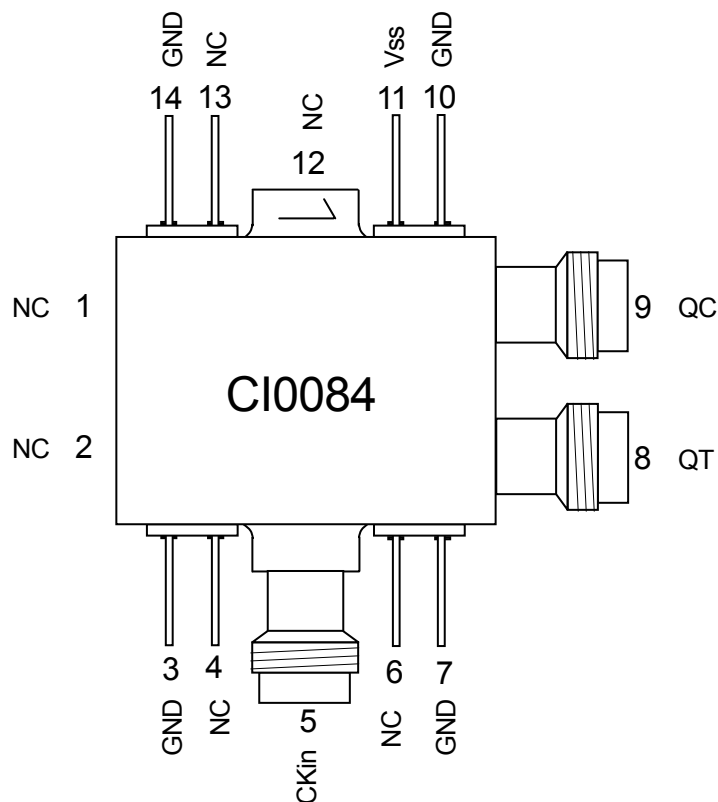
Connection Table

No.	NAME	FUNCTION	No.	NAME	FUNCTION
1	NC	No Internal Connection	8	QT ⁽¹⁾	Signal Output (True)
2	NC	No Internal Connection	9	QC ⁽¹⁾	Signal Output (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)

Note

(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 Signal Outputs (QT, QC)	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 (see DC Characteristics) or AC coupling (see AC Characteristics)			
QT, QC	Signal Output Interface	DC coupling (see DC Characteristics) , Terminate to GND through 50 Ω			

DC Characteristics

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

SYMBOL	PARAMETER	MIN.	TYP.	MAX.	UNIT
ISS	Power Supply Current		240	TBD	mA
VOH	Output Voltage, High (QT, QC)	TBD	0.0		V
VOL	Output Voltage, Low (QT, QC)		-0.9	TBD	V
VIH	Input Voltage, High (CKin)	TBD	0.0		V
VIL	Input Voltage, Low (CKin)		-0.9	TBD	V

TBD: To Be Determined

Note

(1) Tc: Temperature at package base.

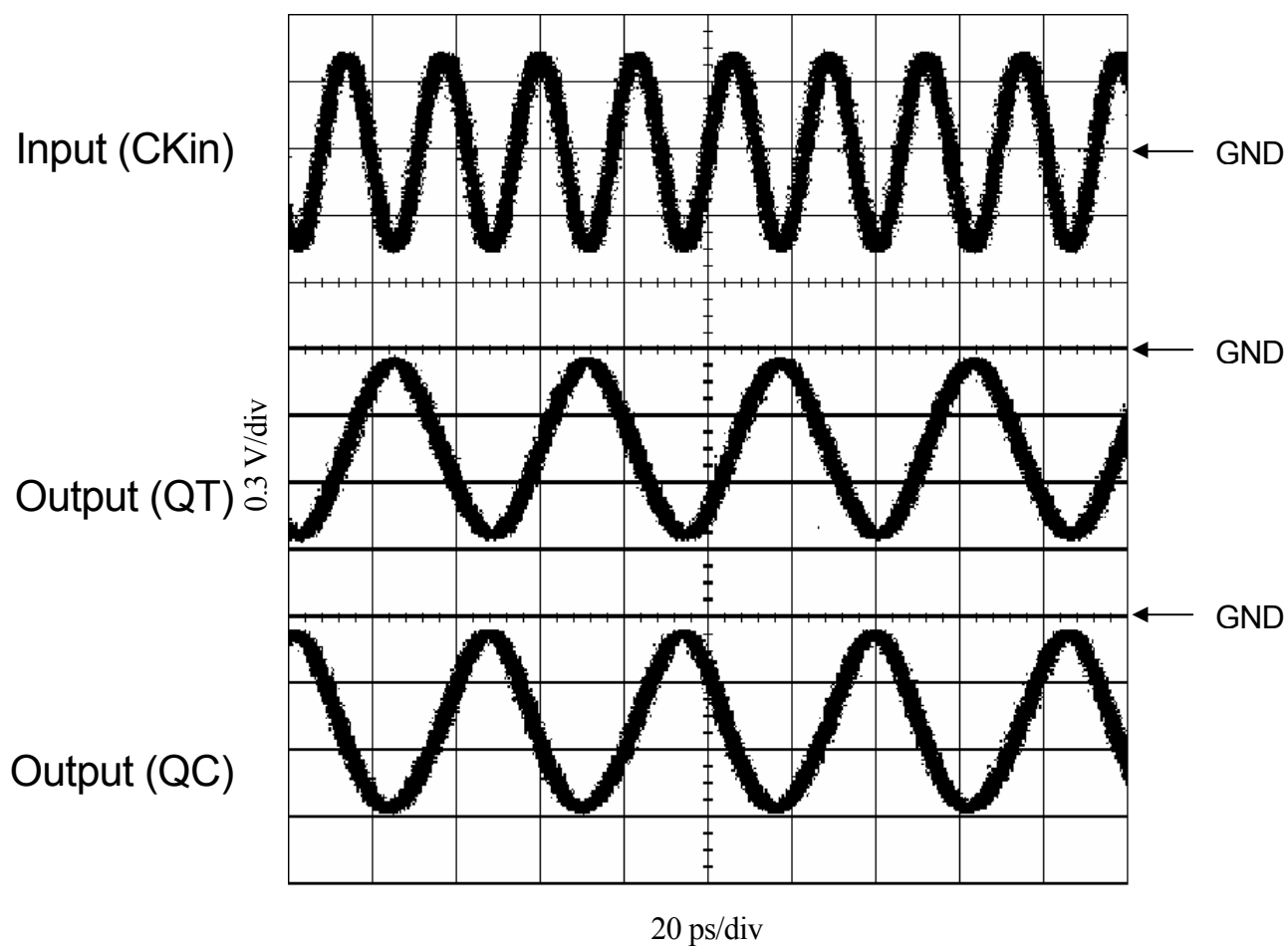
AC Characteristics (43 GHz)

(V_{SS} = -4.5 V, GND = 0.0 V)

SYMBOL	PARAMETER	Tc=30 °C			UNIT
		MIN.	TYP.	MAX.	
V _{in}	Clock Input Voltage Amplitude	TBD	0.9		V _{pp}
V _{center}	Clock Input Center Voltage	-0.5		0.5	V
f _{MAX}	Maximum Clock Frequency	43			GHz
f _{MIN}	Minimum Clock Frequency		20		GHz
V _{amp}	Output Voltage Amplitude (QT, QC)	TBD	0.9		V _{pp}
t _r	Output Rise Time (QT, QC) 20 - 80%		10	TBD	ps
t _f	Output Fall Time (QT, QC) 20 - 80%		10	TBD	ps

TBD: To Be Determined

Sample Waveforms (43 GHz)

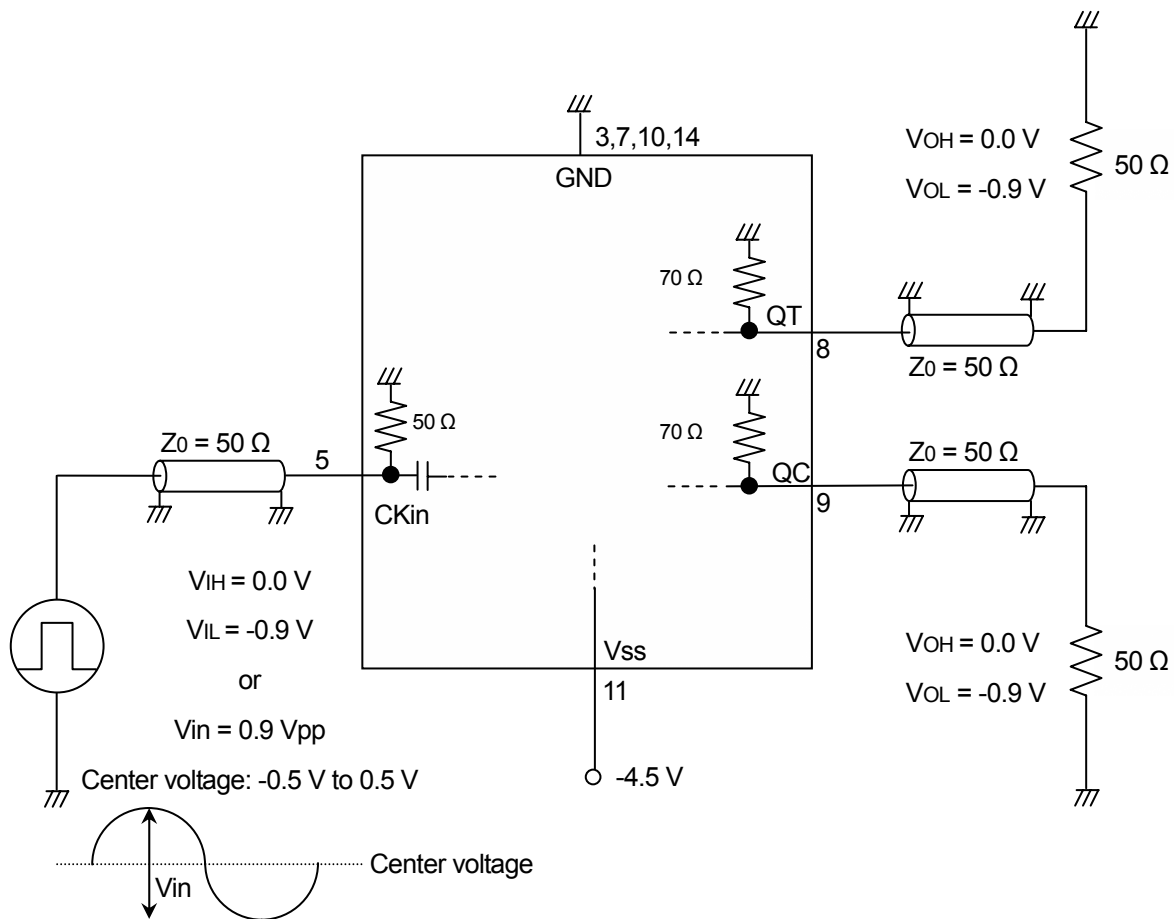


Measurement Conditions

$V_{ss} = -4.5$ V, Input Clock: 43 GHz

Sample Implementation

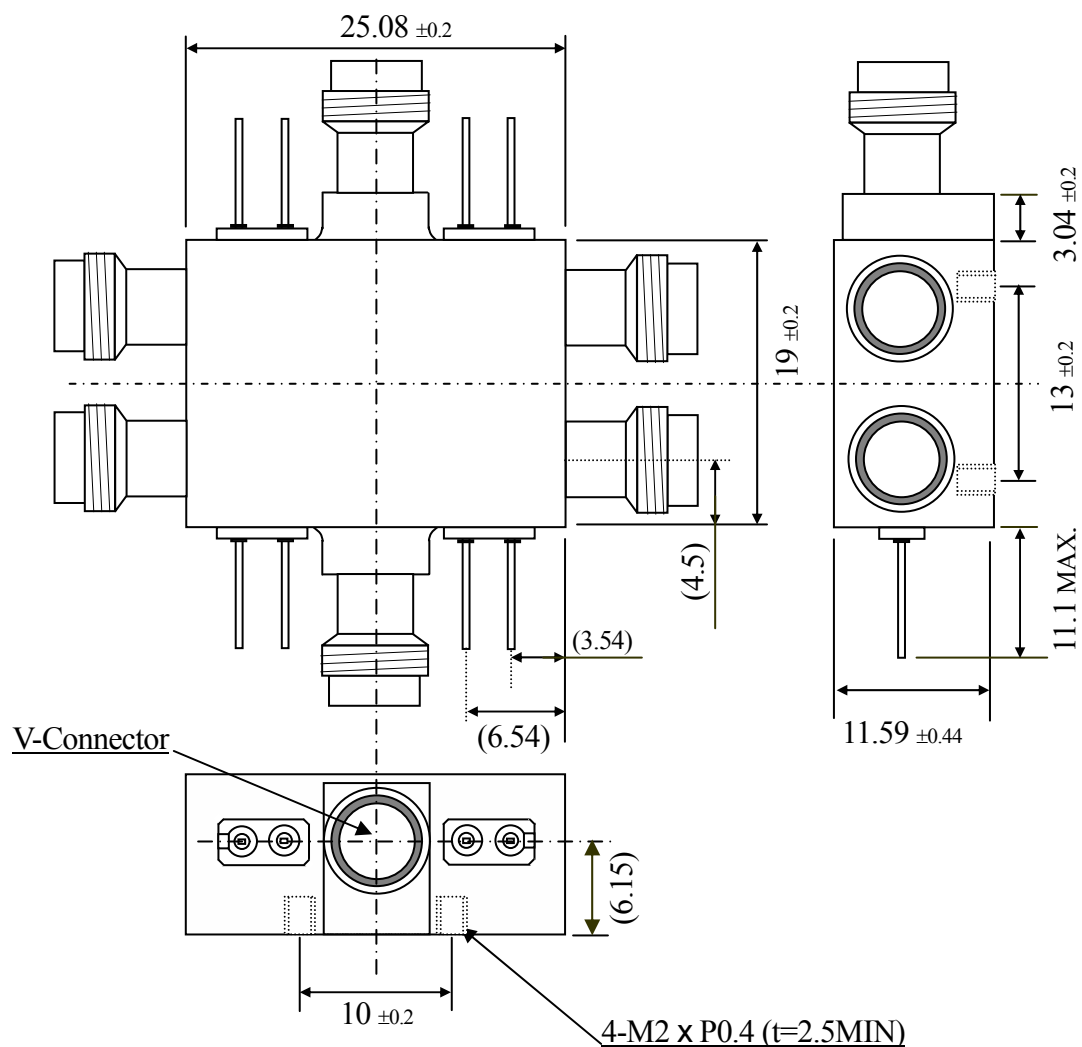
Note: Each number corresponds to a pin or a connector as shown in Connection Diagram



Power Supply Sequence

- (1) Set power supply voltages V_{ss} , and GND to 0 V .
- (2) Apply -4.5 V to V_{ss} .
- (3) Input clock signal.

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) 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 MΩ resistor.
- 3) Ground all test equipment.
- 4) Ground all soldering iron tips.
- 5) Store IC's and other devices such as chip capacitors in their conductive carriers until they are soldered.

Ordering Information

Part #:	Description:
CI0084 - 43	$f_{\text{MAX}} = 43 \text{ GHz}$
CI0084 - 47	$f_{\text{MAX}} = 47 \text{ GHz}$
CI0084 - 50	$f_{\text{MAX}} = 50 \text{ GHz}$

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