Advanced Science And Novel Technology Company, Inc.
2790 Skypark Dr., Ste #112, Torrance, CA 90505
Office: (310) 530-9400 Fax: (310) 530-9402
www.adsantec.com

ASNT5073A-PQC is available on two evaluation boards: one with negative supply and one with positive supply. Application notes for these two evaluation boards are presented in order of:

- Negative supply on ASNT05_12
- Positive supply on ASNT05_11

By default, ADSANTEC will ship the positive supply evaluation board. Please send us a message through the DigiKey marketplace website if you would like to receive the negative supply version.

The datasheet for ASNT5073A-PQC can be accessed through the following **LINK**.

ADSANTEC
Ultra High-Speed Mixed Signal ASICs
Advanced Science And Novel Technology Company, Inc.
2790 Skypark Dr., Ste #112, Torrance, CA 90505
Office: (310) 530-9400 Fax: (310) 530-9402
www.adsantec.com

ASNT5073A-PQC on ASNT05_12 Evaluation Board 0.5*MHz*-17*GHz* Signal Phase Shifter with Amplitude Control Application Note

Part Description

The ASNT5073A-PQC phase shifter accepts a broadband clock signal at its differential input port ip/in and delivers the signal's copy with a controlled phase delay to its differential output port outp/outn. The delay can be adjusted by DC or AC signals applied to the differential tuning port icntp/icntn. The output amplitude can be adjusted by DC signals applied to the differential tuning port tnp/tnn.

The part is mounted on an ASNT05_12 evaluation board with 50*Ohm* transmission lines to transfer signals from the chip to 4 high-speed edge-mount female connectors (Southwest or similar) as shown in Fig. 1. The board has four low-speed edge-mount SMA connectors for control signals, a MOLEX connector for the power supply, as well as signal filters, supply filters, and decoupling networks. The board measures approximately 2.0x2.0 inches, without connectors.

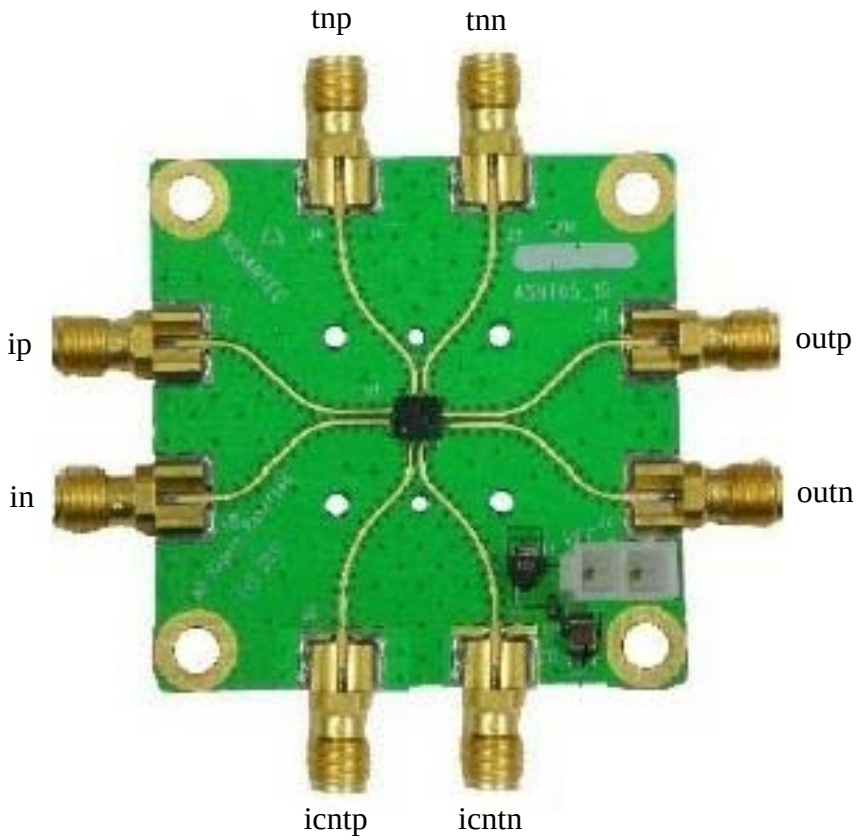

Fig. 1. Layout of ASNT05_12 PCB

The signal and power connectors are described in Table 1 and Table 2 below.

Table 1. Signal Connectors

Name on PCB	Name on Chip	Signal description	Signal polarity	I/O type
J7	ip	Differential inputs with internal SE 50*Ohm* termination to VCC	Direct	CML input
J8	in		Inverted	
J1	outp	Differential outputs with internal SE 50*Ohm* termination to VCC; require external SE 50*Ohm* termination to VCC	Direct	CML output
J2	outn		Inverted	
J6	icntp	Differential control input with internal SE 100*Ohm* terminations to VCC	Direct	DC voltage
J5	icntn		Inverted	
J4	tnp	Differential control input with internal SE 50*Ohm* terminations to VCC	Direct	DC voltage
J3	tnn		Inverted	

Table 2. Power Supply Connectors

Name on PCB	Name on Chip	Supply type	Supply voltage, *V*
GND	vcc	External ground	0
VEE	vee	Main negative power supply	-3.3

Initial Setup and Basic Functionality

1. The part is static sensitive. Please observe anti-static protection procedures!
2. Measure the resistance of all connector pins to VCC, including the power supply, while making sure the board is grounded. All high speed I/O ports should measure 50*Ohms* while on the power supply connector, VEE should be high impedance and GND should be a short. icntp/icntn should measure 100*Ohms* and tnp/tnn should measure 50*Ohms*. Fig. 2 shows the resistance values of the described I/O connectors.

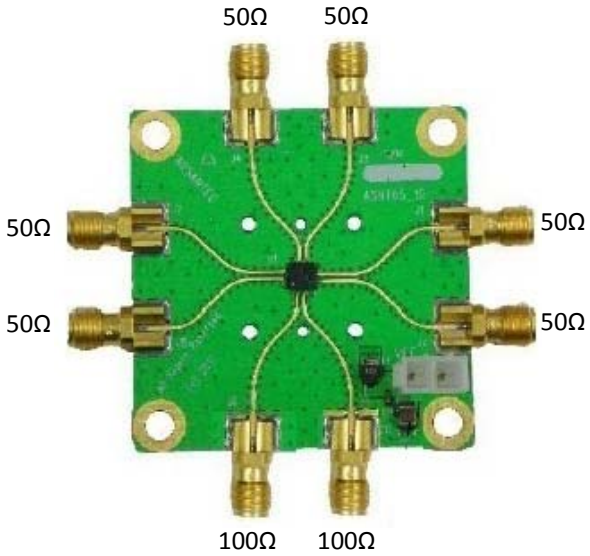

Fig. 2. Impedance of I/O Connectors

Advanced Science And Novel Technology Company, Inc.
2790 Skypark Dr., Ste #112, Torrance, CA 90505
Office: (310) 530-9400 Fax: (310) 530-9402
www.adsantec.com

3. Switch on the first external power supply unit and set it to a negative supply voltage with a value of -0.0*V* (positive output pin of the unit must be shorted to ground).
4. Connect the supply unit's output pins to the PCB's Molex connector marked VEE GND so that the negative output pin is connected to VEE connector pin.
5. Gradually increase the negative supply voltage to -3.3*V*.
6. Monitor the supply current in accordance with the part's specifications. Current should be approximately 395*mA*.
7. Apply differential or SE high-speed clock signal to connectors J7/J8. DC blocks or the appropriate shift of voltage levels are required!
8. Observe a high-speed delayed clock signal at connectors J1/J2. Connect them to a sampling oscilloscope (or similar devices with a 50*Ohm* termination to ground) either directly or through DC blocks.
9. Apply DC voltages within the range from vcc to vcc-0.5*V* to connectors J6/J5 to modify the delay value. Observe the corresponding signal shifts on the oscilloscope.
10. Apply DC voltages within the range from vcc to vcc-0.5*V* to connectors J4/J3 to modify the output amplitude. Observe the corresponding output amplitude changes on the oscilloscope.

Board Dimension

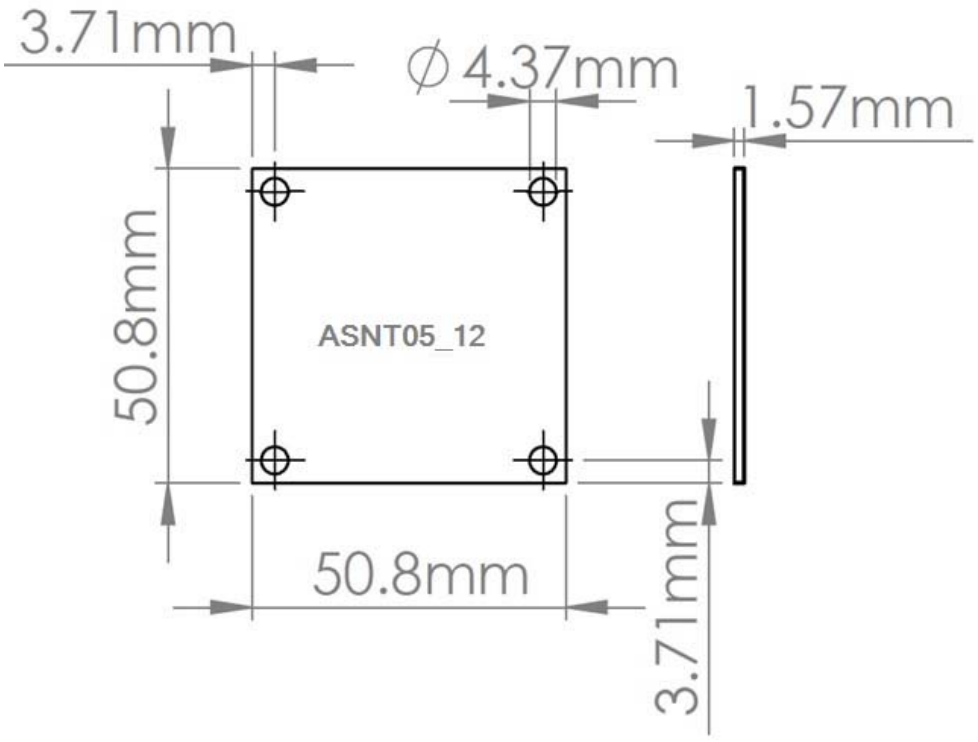

Fig. 3. ASNT05_12 Board Dimensions

Advanced Science And Novel Technology Company, Inc.
2790 Skypark Dr., Ste #112, Torrance, CA 90505

Office: (310) 530-9400 Fax: (310) 530-9402
www.adsantec.com

ASNT5073A-PQC on ASNT05_11 Evaluation Board 0.5*MHz*-17*GHz* Signal Phase Shifter with Amplitude Control Application Note

Part Description

The ASNT5073A-PQC phase shifter accepts a broadband clock signal at its differential input port ip/in and delivers the signal's copy with a controlled phase delay to its differential output port outp/outn. The delay can be adjusted by DC or AC signals applied to the differential tuning port icntp/icntn. The output amplitude can be adjusted by DC signals applied to the differential tuning port tnp/tnn.

The part is mounted on an ASNT05_11 evaluation board with 50*Ohm* transmission lines to transfer signals from the chip to 4 high-speed edge-mount female connectors (Southwest or similar) as shown in Fig. 4. The board has four low-speed edge-mount SMA connectors for control signals, a MOLEX connector for the power supply, as well as signal filters, supply filters, and decoupling networks. The board measures approximately 2.0x2.0 inches, without connectors.

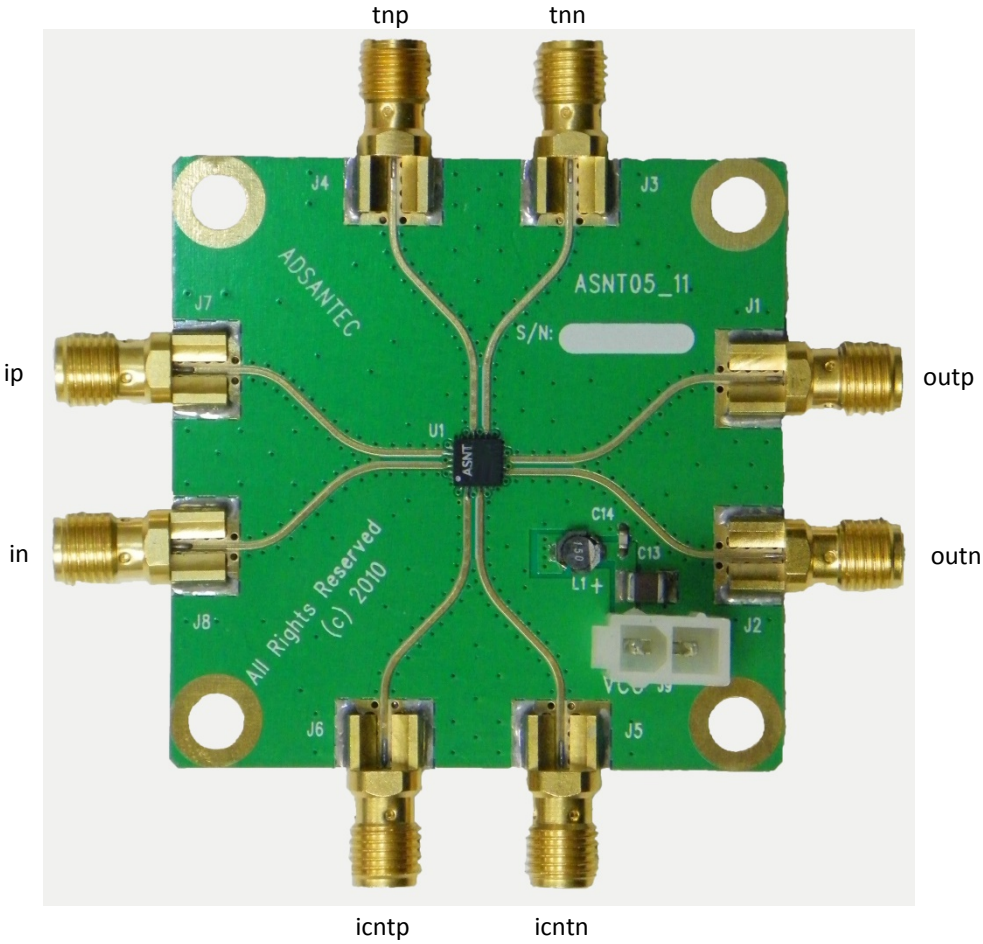

Fig. 4. Layout of ASNT05_11 PCB

The signal and power connectors are described in Table 1 and Table 2 below.

Table 3. Signal Connectors

Name on PCB	Name on Chip	Signal description	Signal polarity	I/O type
J7	ip	Differential inputs with internal SE 50*Ohm* termination to VCC	Direct	CML input
J8	in		Inverted	
J1	outp	Differential outputs with internal SE 50*Ohm* termination to VCC; require external SE 50*Ohm* termination to VCC	Direct	CML output
J2	outn		Inverted	
J6	icntp	Differential control input with internal SE 100*Ohm* terminations to VCC	Direct	DC voltage
J5	icntn		Inverted	
J4	tnp	Differential control input with internal SE 50*Ohm* terminations to VCC	Direct	DC voltage
J3	tnn		Inverted	

Table 4. Power Supply Connectors

Name on PCB	Name on Chip	Supply type	Supply voltage, *V*
VCC	vcc	Main positive power supply	+3.3
GND	vee	External ground	0

Initial Setup and Basic Functionality

11. The part is static sensitive. Please observe anti-static protection procedures!
12. Measure the resistance of all connector pins to VCC, including the power supply, while making sure the board is grounded. All high speed I/O ports should measure 50*Ohms* while on the power supply connector, VCC should be a short, and GND should be high impedance. icntp/icntn should measure 100*Ohms* and tnp/tnn should measure 50*Ohms*. Fig. 5 shows the resistance values of the described I/O connectors.

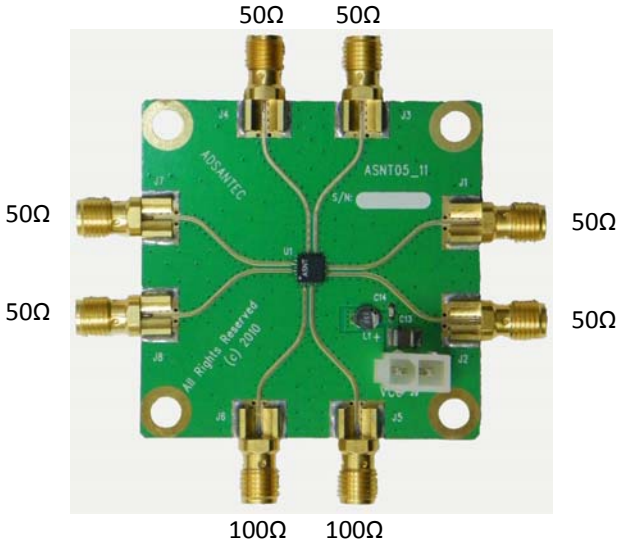

Fig. 5. Impedance of I/O Connectors

Advanced Science And Novel Technology Company, Inc.
2790 Skypark Dr., Ste #112, Torrance, CA 90505
Office: (310) 530-9400 Fax: (310) 530-9402
www.adsantec.com

13. Switch on the first external power supply unit and set it to a positive supply voltage with a value of +0.0*V* (negative output pin of the unit must be shorted to ground).
14. Connect the supply unit's output pins to the PCB's Molex connector marked VCC GND so that the positive output pin is connected to the VCC connector pin.
15. Gradually increase the positive supply voltage to +3.3*V*.
16. Monitor the supply current in accordance with the part's specifications. Current should be approximately 395*mA*.
17. Apply differential or SE high-speed clock signal to connectors J7/J8 through DC blocks.
18. Observe a high-speed delayed clock signal at connectors J1/J2. Connect them to a sampling oscilloscope (or similar devices with a 50*Ohm* termination to ground) through DC blocks.
19. Apply DC voltages within the range from vcc to vcc-0.5*V* to connectors J6/J5 to modify the delay value. Observe the corresponding signal shifts on the oscilloscope.
20. Apply DC voltages within the range from vcc to vcc-0.5*V* to connectors J4/J3 to modify the output amplitude. Observe the corresponding output amplitude changes on the oscilloscope.

Board Dimensions

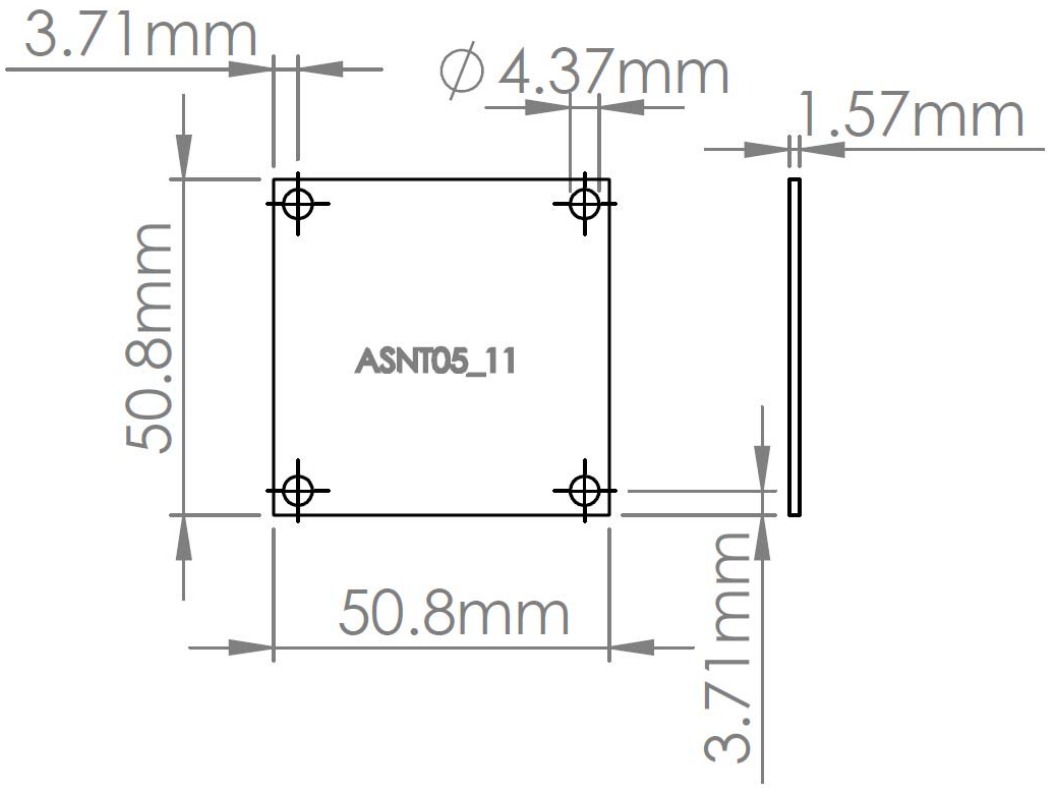

Fig. 6. ASNT05_11 Board Dimensions

Advanced Science And Novel Technology Company, Inc.
2790 Skypark Dr., Ste #112, Torrance, CA 90505

Office: (310) 530-9400 Fax: (310) 530-9402
www.adsantec.com

Revision History

Revision	Date	Changes
1.0.1	09-2020	Initial Release

Advanced Science And Novel Technology Company, Inc.
2790 Skypark Dr., Ste #112, Torrance, CA 90505

Office: (310) 530-9400 Fax: (310) 530-9402
www.adsantec.com