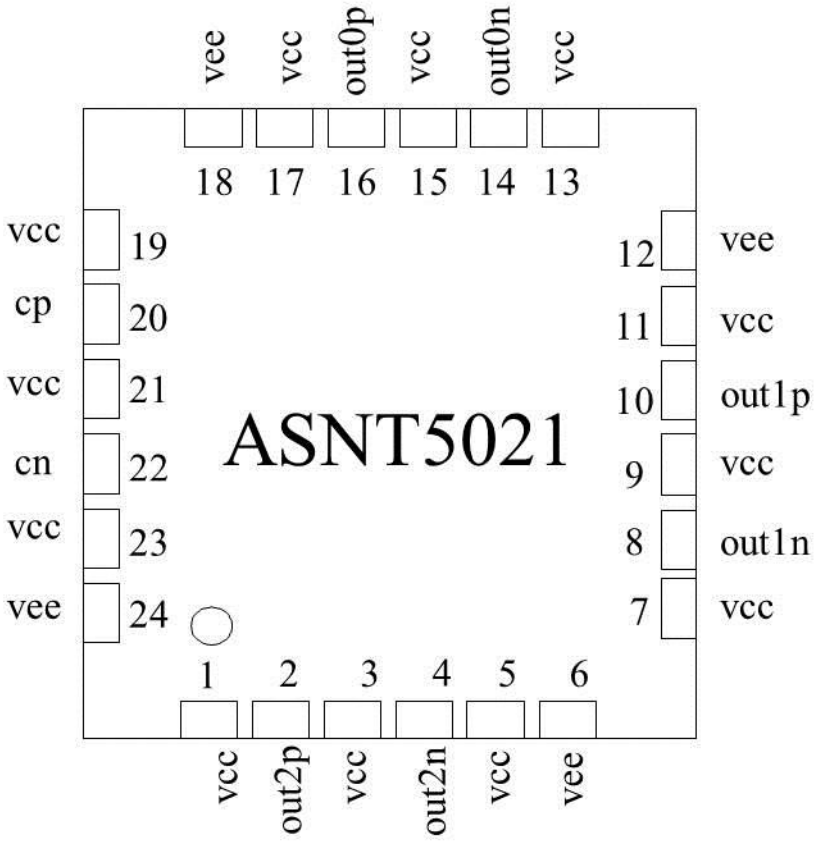
ADSANTEC
Ultra High-Speed Mixed Signal ASICs

Advanced Science And Novel Technology Company, Inc.
2790 Skypark Drive Suite 112, Torrance, CA 90505

Offices: 310-530-9400 / Fax: 310-530-9402
www.adsantec.com

ASNT5021-PQC
DC-28*Gbps*/17*GHz* Signal Distributor 1-to-3

- High-speed broadband Data/Clock Amplifier and Distributor
- Exhibits low jitter and limited temperature variation over industrial temperature range
- One input differential signal port and three differential amplified output signal ports
- Matched phase delays for all outputs
- Fully differential CML input interface
- Fully differential CML output interfaces with 600*mV* single-ended swing
- Single +3.3*V* or -3.3*V* power supply
- Power consumption: 780*mW*
- Fabricated in SiGe for high performance, yield, and reliability
- Standard MLF/QFN 24-pin package



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DESCRIPTION

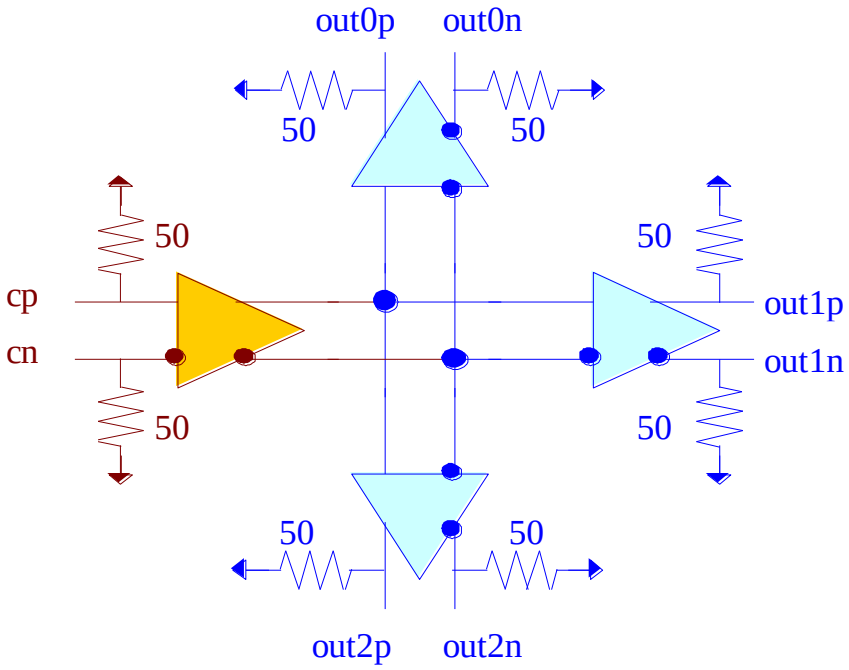

Fig. 1. Functional Block Diagram

The temperature stable ASNT5021-PQC SiGe IC provides active broadband data/clock signal splitting, and is intended for use in high-speed measurement / test equipment. The IC shown in Fig. 1 can deliver three phase-matched copies of the broadband data/clock input signal cp/cn to three high-speed differential outputs out0p/out0n, out1p/out1n, out2p/out2n.

The part's I/O's support the CML logic interface with on chip 50*Ohm* termination to vcc and may be used differentially, AC/DC coupled, single-ended, or in any combination (see also POWER SUPPLY CONFIGURATION). In the DC-coupling mode, the input signal's common mode voltage should comply with the specifications shown in ELECTRICAL CHARACTERISTICS. In the AC-coupling mode, the input termination provides the required common mode voltage automatically. The differential DC signaling mode is recommended for optimal performance.

POWER SUPPLY CONFIGURATION

The part can operate with either negative supply (vcc = 0.0*V* = ground and vee = −3.3*V*), or positive supply (vcc = +3.3*V* and vee = 0.0*V* = ground). In case of the positive supply, all I/Os need AC termination when connected to any devices with 50*Ohm* termination to ground. Different PCB layouts will be needed for each different power supply combination.

All the characteristics detailed below assume vcc = 0.0*V* and vee = -3.3*V*.

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ABSOLUTE MAXIMUM RATINGS

Caution: Exceeding the absolute maximum ratings shown in Table 1 may cause damage to this product and/or lead to reduced reliability. Functional performance is specified over the recommended operating conditions for power supply and temperature only. AC and DC device characteristics at or beyond the absolute maximum ratings are not assumed or implied. All min and max voltage limits are referenced to ground.

Table 1. Absolute Maximum Ratings

Parameter	Min	Max	Units
Supply Voltage (vee)		-3.6	*V*
Power Consumption		0.86	*W*
RF Input Voltage Swing (SE)		1.0	*V*
Case Temperature		+90	*ºC*
Storage Temperature	-40	+100	*ºC*
Operational Humidity	10	98	*%*
Storage Humidity	10	98	*%*

TERMINAL FUNCTIONS

TERMINAL			DESCRIPTION
Name	**No.**	**Type**	
High-Speed I/Os			
cp	20	CML input	Differential high speed data/clock inputs with internal SE 50*Ohm* termination to vcc
cn	22		
out0p	16	CML output	Differential high speed data/clock outputs with internal SE 50*Ohm* termination to vcc. Require external SE 50*Ohm* termination to vcc
out0n	14		
out1p	10	CML output	Differential high speed data/clock outputs with internal SE 50*Ohm* termination to vcc. Require external SE 50*Ohm* termination to vcc
out1n	8		
out2p	2	CML output	Differential high speed data/clock outputs with internal SE 50*Ohm* termination to vcc. Require external SE 50*Ohm* termination to vcc
out2n	4		
Supply and Termination Voltages			
Name	**Description**		**Pin Number**
vcc	Positive power supply (+3.3*V* or 0)		1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23
vee	Negative power supply (0*V* or -3.3*V*)		6, 12, 18, 24

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ELECTRICAL CHARACTERISTICS

PARAMETER	MIN	TYP	MAX	UNIT	COMMENTS
General Parameters					
vee	-3.1	-3.3	-3.5	*V*	±6%
vcc		0.0		*V*	External ground
*I*vee		235		*mA*	
Power consumption		780		*mW*	
Junction temperature	-40	25	125	*°C*	
HS Input Data/Clock (cp/cn)					
Data Rate	DC		28	*Gbps*	
Frequency	DC		17	*GHz*	
Swing	0.05		1.0	*V*	Differential or SE, p-p
CM Voltage Level	vcc-0.8		vcc	*V*	Must match for both inputs
HS Output Data/Clock (out0p/ out0n, out1p/ out1n, out2p/ out2n)					
Data Rate	DC		28	*Gbps*	
Frequency	DC		17	*GHz*	
Phase mismatch			2	*ps*	Between any two SE outputs
Logic "1" level		vcc		*V*	
Logic "0" level		vcc-0.6		*V*	With external 50*Ohm* DC termination
Rise/Fall times	15		19	*ps*	20%-80%
Additive Jitter			5	*ps*	Peak-to-peak
Duty cycle	45	50	55	*%*	For clock signal

PACKAGE INFORMATION

The chip die is housed in a standard 24-pin QFN package shown in Fig. 2. It is recommended that the center heat slug located on the back side of the package is soldered to the vee plain that is ground for the positive supply or power for the negative supply.

The part's identification label is ASNT5021-PQC. The first 8 characters of the name before the dash identify the bare die including general circuit family, fabrication technology, specific circuit type, and part version while the 3 characters after the dash represent the package's manufacturer, type, and pin out count.

This device complies with the Restriction of Hazardous Substances (RoHS) per EU 2002/95/EC for all six substances.

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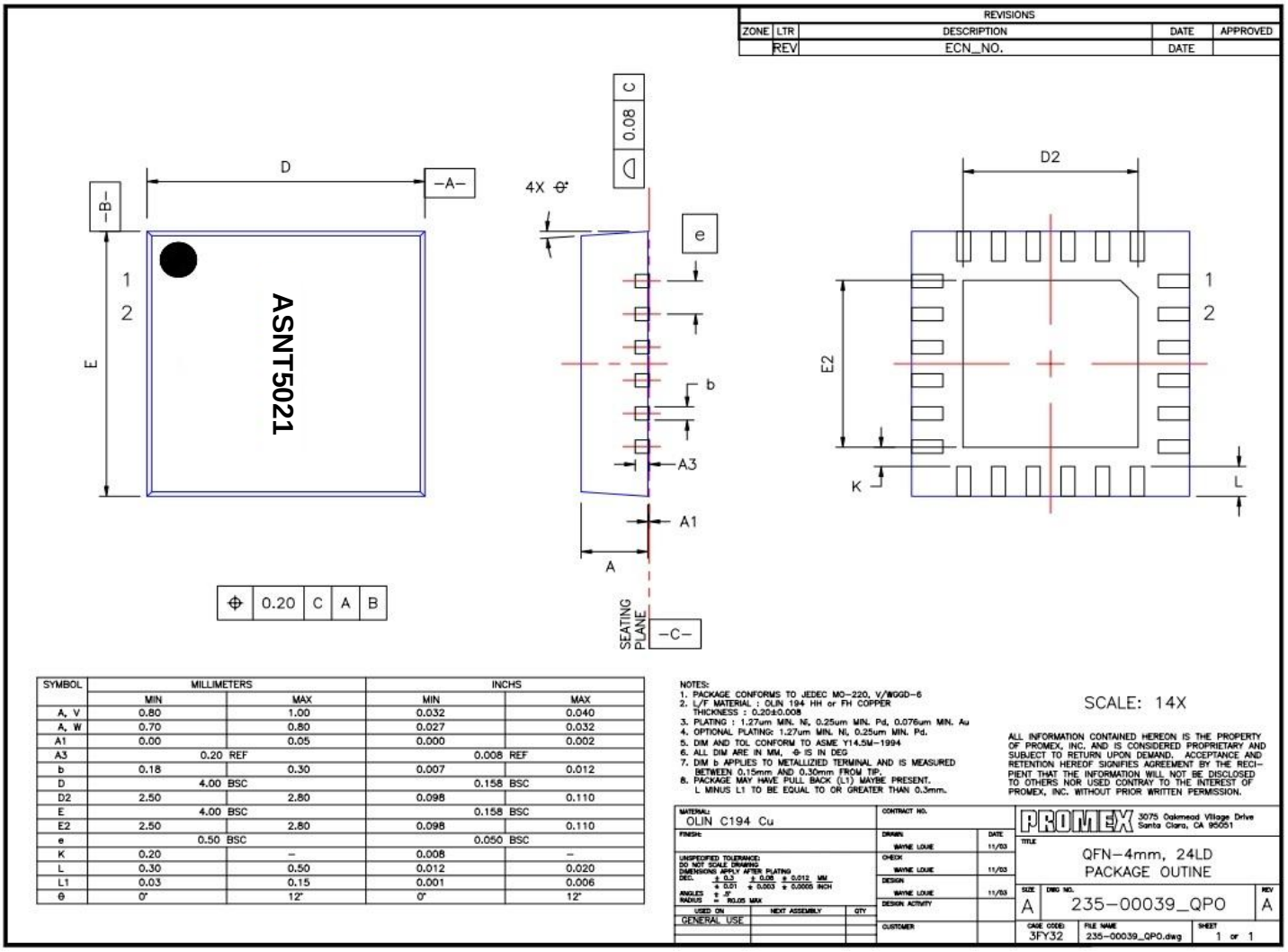

SYMBOL	MILLIMETERS		INCHS	
	MIN	MAX	MIN	MAX
A, V	0.80	1.00	0.032	0.040
A, W	0.70	0.80	0.027	0.032
A1	0.00	0.05	0.000	0.002
A3	0.20 REF		0.008 REF	
b	0.18	0.30	0.007	0.012
D	4.00 BSC		0.158 BSC	
D2	2.50	2.80	0.098	0.110
E	4.00 BSC		0.158 BSC	
E2	2.50	2.80	0.098	0.110
e	0.50 BSC		0.050 BSC	
K	0.20	–	0.008	–
L	0.30	0.50	0.012	0.020
L1	0.03	0.15	0.001	0.006
θ	0°	12°	0°	12°

NOTES:
1. PACKAGE CONFORMS TO JEDEC MO-220, V/WGGD-6
2. L/F MATERIAL : OLIN 194 HH or FH COPPER THICKNESS : 0.20±0.008
3. PLATING : 1.27um MIN. NI, 0.25um MIN. Pd, 0.076um MIN. Au
4. OPTIONAL PLATING: 1.27um MIN. NI, 0.25um MIN. Pd.
5. DIM AND TOL CONFORM TO ASME Y14.5M-1994
6. ALL DIM ARE IN MM, θ IS IN DEG
7. DIM b APPLIES TO METALLIZIED TERMINAL AND IS MEASURED BETWEEN 0.15mm AND 0.30mm FROM TIP.
8. PACKAGE MAY HAVE PULL BACK (L1) MAYBE PRESENT. L MINUS L1 TO BE EQUAL TO OR GREATER THAN 0.3mm.

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MATERIAL: OLIN C194 Cu
FINISH:
CONTRACT NO.
PROMEX 3075 Oakmead Village Drive Santa Clara, CA 95051
TITLE: QFN-4mm, 24LD PACKAGE OUTINE
SIZE A | DWG NO. 235-00039_QPO | REV A
CAGE CODE 3FY32 | FILE NAME 235-00039_QPO.dwg | SHEET 1 OF 1

Fig. 2. QFN 24-Pin Package Drawing (All Dimensions in mm)

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REVISION HISTORY

Revision	Date	Changes
2.2.2	07-2019	Updated Letterhead
2.2.1	03-2013	Added phase mismatch specifications Revised electrical characteristics table Updated description
2.1.1	02-2013	Revised title Revised package pin out drawing Revised description Revised power supply configuration Revised absolute maximum ratings Revised terminal functions Revised electrical characteristics Revised package information Format correction
2.0	01-2012	Added power supply configuration Added absolute maximums rating table Revised electrical characteristics section Revised package information section Added mechanical drawing
1.0	10-2008	Initial release