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
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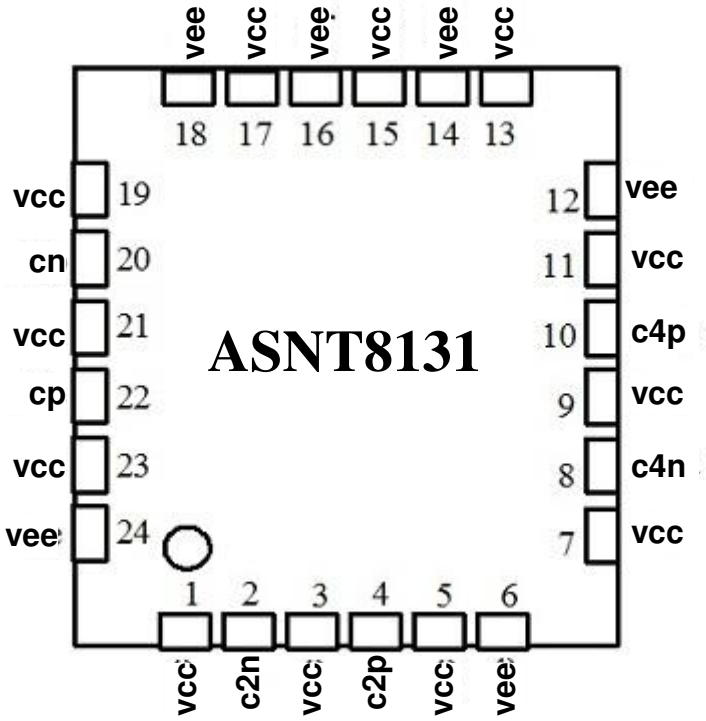
ASNT8131-PQC

32*GHz* High-Sensitivity Divider by 2 and by 4

- Wide frequency range from DC to 32*GHz*
- Divided-by-2 and divided-by-4 outputs
- 50% duty cycle of the divided clock signals
- Fully differential CML input interface
- Fully differential CML output interfaces
- Single +3.3*V* or -3.3*V* power supply
- Industrial temperature range
- Power consumption of 317*mW* at full operational speed
- Standard MLF/QFN 24-pin package



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DESCRIPTION

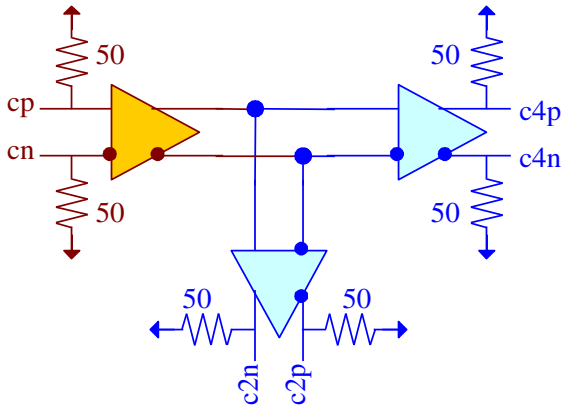

Fig. 1. Functional Block Diagram

ASNT8131-PQC is a high-speed, low-power divider by-2 and by-4 with increased sensitivity. The part shown in *Fig. 1* accepts a CML input clock signal (cp/cn) with the speed from DC to maximum operational frequency and provides clean 50% duty cycle output signals with divided-by-2 (c2p/c2n) and divided-by-4 (c4p/c4n) frequency. The part's I/Os 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**).

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 50Ohm 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*.

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 (assumed vcc).

Table 1. Absolute Maximum Ratings

Parameter	Min	Max	Units
Supply Voltage (vee)		-3.6	*V*
Power Consumption		0.35	*W*
RF Input Voltage Swing (SE)		1.0	*V*
Case Temperature		+90	°*C*
Storage Temperature	-40	+100	°*C*
Operational Humidity	10	98	%
Storage Humidity	10	98	%

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TERMINAL FUNCTIONS

TERMINAL			DESCRIPTION
Name	No.	Type	
High-Speed I/Os			
cp	22	CML input	Differential clock input with internal SE 50*Ohm* termination to vcc.
cn	20		
c2p	4	CML output	Differential divided clock outputs. Require external SE 50*Ohm* termination to vcc.
c2n	2		
c4p	10		
c4n	8		

Supply and Termination Voltages		
Name	Description	Pin Number
vcc	Positive power supply. (+3.3*V* or 0*V*)	1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23
vee	Negative power supply. (0*V* or -3.3*V*)	6, 12, 14, 16, 18, 24

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		95		*mA*	
Power consumption		317		*mW*	
Junction temperature	-25	50	125	*°C*	
HS Input Clock (cp/cn)					
Frequency	0		32	*GHz*	
Swing	40		800	*mV*	Differential or SE, p-p
CM Voltage Level	vcc-0.8	vcc-0.2	vcc	*mV*	Must match for both inputs
Output Divided Clock (c2p/c2n, c4p/c4n)					
Frequency *f*/2	0		16	*GHz*	For c2 out signal
Frequency *f*/4	0		8	*GHz*	For c4 out signal
Diff. Swing	570	600	630	*mV*	Peak-to-peak
CM Level	vcc-(Diff. swing)/4			*V*	
Duty cycle	45	50	55	%	
Additive Jitter		TBD		*ps*	Peak-to-peak

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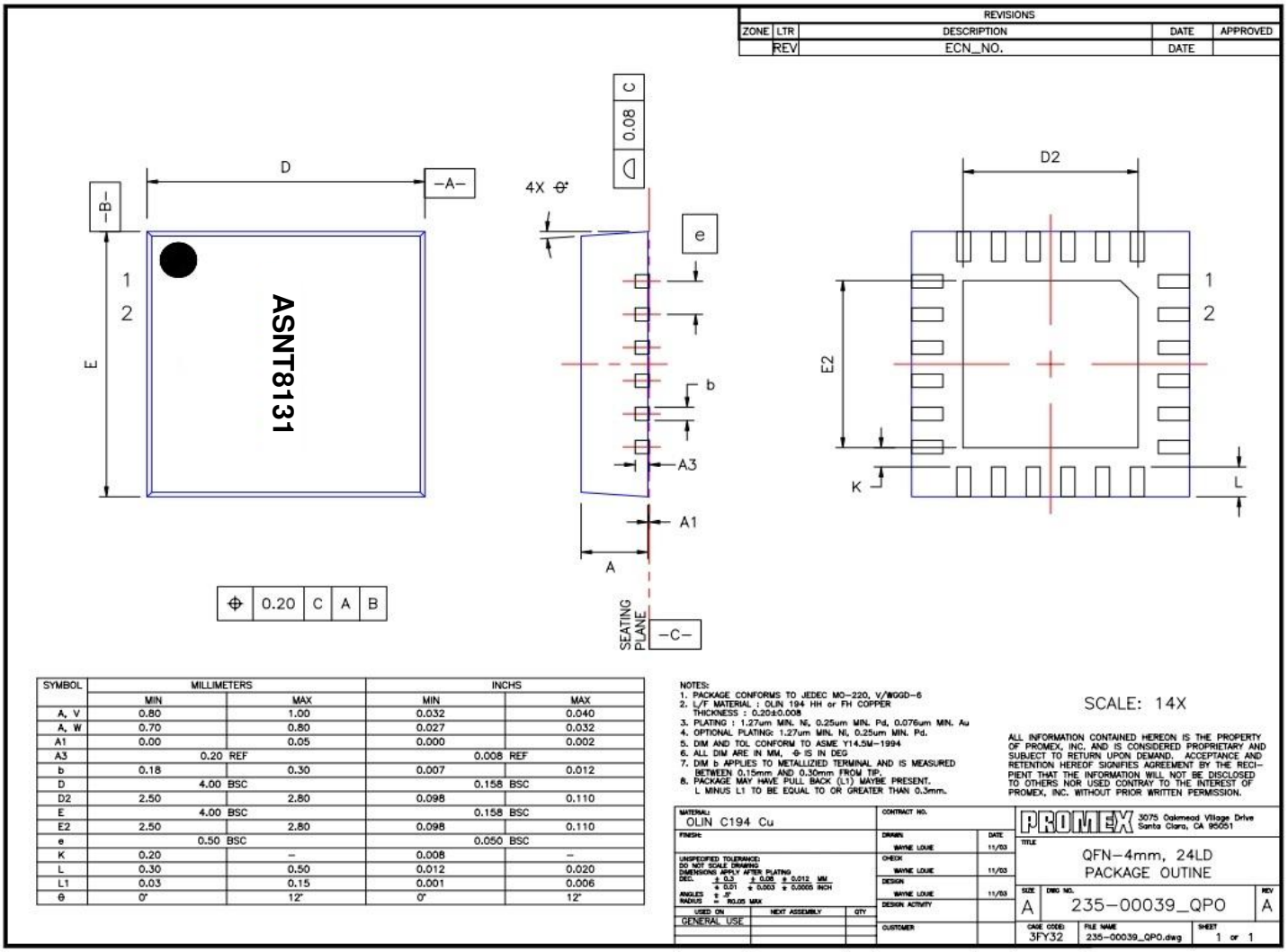
PACKAGE INFORMATION

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 ground to help dissipate heat generated by the chip during operation.

The part's identification label is ASNT8131-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 2011/65/EU for all ten substances.



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°

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

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REVISION HISTORY

Revision	Date	Changes
1.2.2	02-2020	Updated Package Information
1.1.2	07-2019	Updated Letterhead
1.1.1	01-2013	Correction: output Diff Swing instead of SE Format correction
1.0.1	01-2013	First release