ADSANTEC
Ultra High-Speed Mixed Signal ASICs

Advanced Science And Novel Technology Company, Inc.
27 Via Porto Grande, Rancho Palos Verdes, CA 90275

Offices: 310-377-6029 / 310-803-9284 Fax: 310-377-9940
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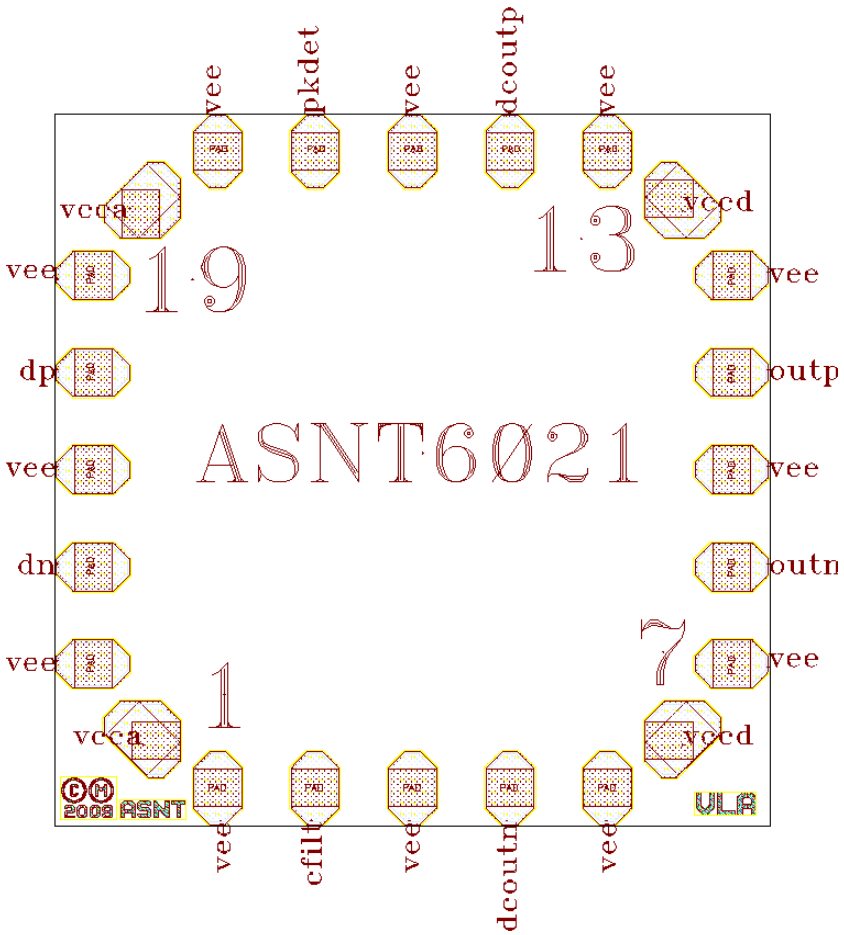
ASNT6021-BD
17.6*Gbps* Transimpedance Amplifier

- Broadband transimpedance amplifier for low noise receiver side applications
- Features automatic input offset control and a peak detector
- 8*GHz* of analog bandwidth for limiting of input data
- 60*dBΩ* of transimpedance differential gain
- 15*pA/sqrtHz* of input referred noise density (0.1 to 10*GHz*)
- CML output interface with 50Ω termination and 225*mV*p-p single-ended swing
- Single +3.3*V* power supply
- Power consumption: 250*mW*
- Exhibits low jitter and limited temperature variation over industrial temperature range



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DESCRIPTION

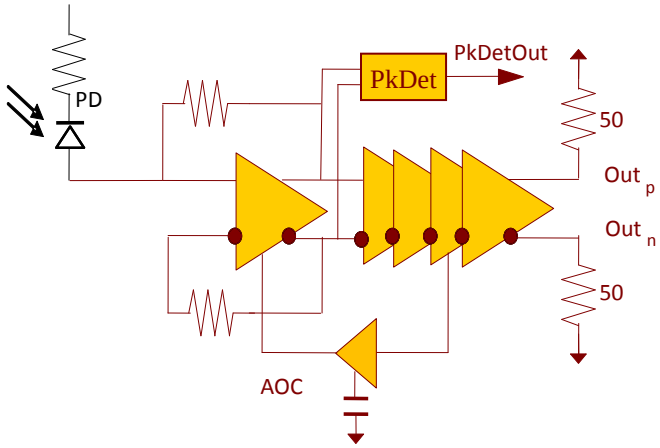

Fig. 1. Functional Block Diagram

The ASNT6021-BD SiGe IC combines the functions of a transimpedance and limiting amplifiers to convert a small current from a photodiode into a standard digital signal. The device can process an input current signal within the frequency band from DC to 8*GHz* and deliver an output CML signal with a data rate up to 17.6*Gbps* and differential amplitude of 450*mV*. The output CML logic interface has on chip 50Ω termination and may be used differentially, AC/DC coupled, single-ended, or in any combination. The part operates from a positive power supply VCC=3.3*V*. The on-chip peak detector with a sensitivity of 3*V/mA* generates a single-ended output voltage in the range from VCC to VCC-1*V*.

POWER SUPPLY CONFIGURATION

The part can operate with a positive supply (vcca=vccd=+3.3*V* and vee=0.0*V*=ground). All outputs need AC termination when connected to any devices with 50*Ohm* termination to ground.

All the characteristics detailed below assume vcca=vccd= 3.3*V* and vee = 0.0*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		0.27	*W*
Junction Temperature		+125	*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			
dp	21	Input	High-speed positive data current input
dn	23		High-speed negative data current input
outp	11	Output	Differential CML high-speed data signal outputs
outn	9		
Controls			
dcoutp	15	Control	Differential output duty cycle control inputs
dcoutn	5		
pkdet	17	Output	Single-ended peak detector output
cfilt	3		External capacitor connection

Supply and Termination Voltages		
Name	**Description**	**Pin Number**
vcca	Analog power supply (+3.3*V*)	1, 19
vccd	Digital power supply (+3.3*V*)	7, 13
vee	Negative power supply (0*V*)	2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24

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ELECTRICAL CHARACTERISTICS

PARAMETER	MIN	TYP	MAX	UNIT	COMMENTS
General Parameters					
vcca	3.1	3.3	3.5	*V*	±6%
vccd	3.1	3.3	3.5	*V*	±6%
vee		0.0		*V*	
Icc		75		*mA*	
Power consumption		250		*mW*	
Junction temperature	-25	50	125	*°C*	
HS Input Data (dp/dn)					
Frequency	0		8	*GHz*	
Optical sensitivity	-19	-18	-16	*dBm*	0.85*A/W* responsivity
Overload current		1		*mA*	
HS Output Data (outp/outn)					
Data rate	0		17.6	*Gbps*	
CM Level	vcc-(Swing)/2			*V*	With external 50*Ohm* DC termination
Differential swing	380	450	520	*mV*	Peak-to-peak
Peak detector (pkdet)					
Sensitivity		3		*V/mA*	
Output range	Vcc-1		Vcc	*V*	

DIE INFORMATION

The main dimensions of the die are given in Table 2.

Table 2. Important Die Dimensions

Pad metal dimensions	113*µm* x 74*µm*
Pad opening dimensions	105*µm* x66*µm*
Die dimensions	1100*µm* x 1100*µm*

The part's identification label is ASNT6021-BD. 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 2 characters after the dash indicate that the die is not packaged.

The IC complies with the Restriction of Hazardous Substances (RoHS) per EU 2002/95/EC for all 6 substances.

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REVISION HISTORY

Revision	Date	Changes
2.0.1	01-2014	Corrected format Added power supply configuration section Added absolute maximum ratings section Corrected electrical characteristics Added die information Added revision history table
1	10-2008	First release