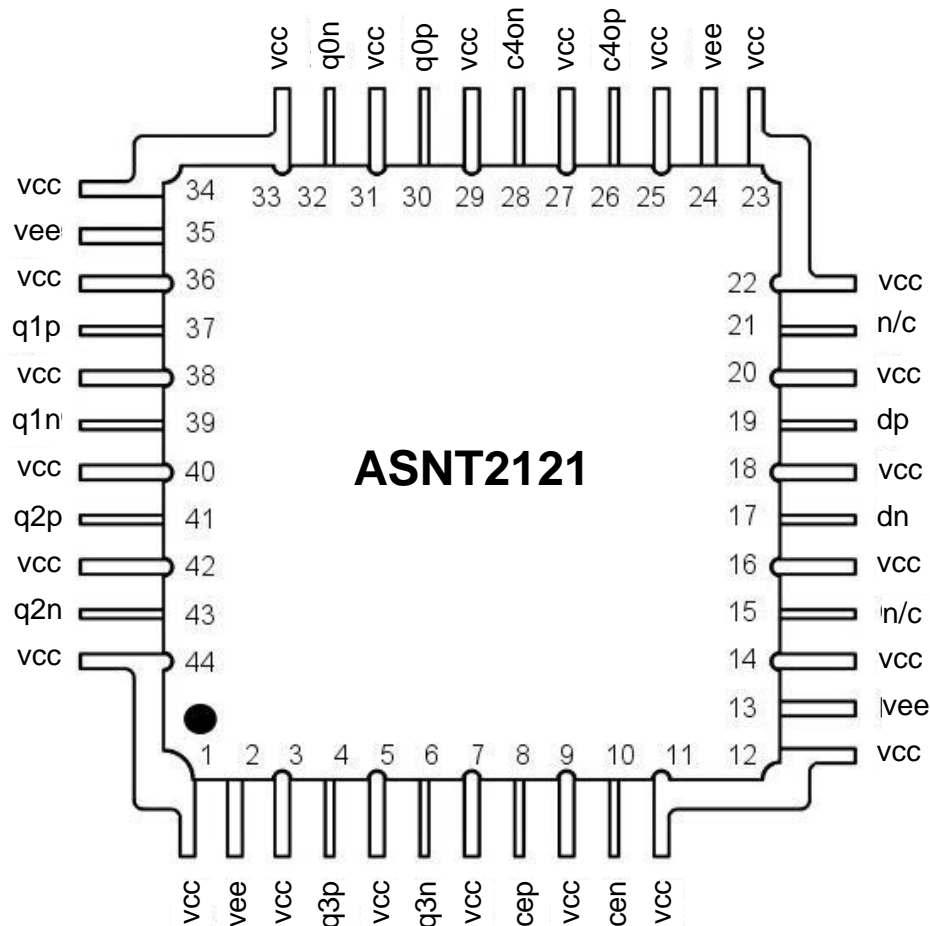




## ASNT2121-KMM DC-50Gb/s Broadband Digital 1:4 Demultiplexer

- High speed broadband 1:4 Demultiplexer (DMUX)
- Exhibits low jitter and limited temperature variation over industrial temperature range
- Differential CML I/O data and clock buffers
- Quarter-rate clock output
- Single +3.3V or -3.3V power supply
- Power consumption: 1.35W
- Fabricated in SiGe for high performance, yield, and reliability
- Custom CQFP 44-pin package





## DESCRIPTION

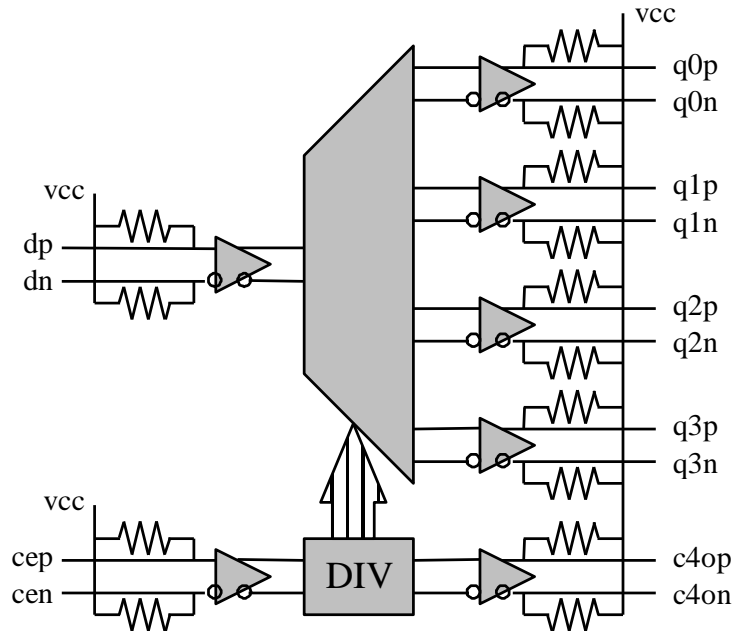


Fig. 1. Functional Block Diagram

ASNT2121-KMM is a low power and high-speed digital 1-to-4 deserializer-demultiplexer (DMUX) that functions seamlessly over data rates ( $f_{bit}$ ) ranging from DC to its maximum frequency.

The main function of the part shown in Fig. 1 is to demultiplex an incoming high speed serial differential CML data bit stream  $dp/dn$  running at a bit rate of  $f_{bit}$  into 4 parallel data channels  $q0p/q0n$ ,  $q1p/q1n$ ,  $q2p/q2n$ ,  $q3p/q3n$  running at a bit rate of  $f_{bit}/4$ . Differential or single-ended full-rate clock  $cep/cen$  must be provided by an external source for the part to function properly.

The parallel words and clock divided-by-4  $c4op/c4on$  are transmitted through CML output interfaces. The clock and data outputs are phase-matched to each other resulting in a very little relative skew over the operating temperature range of the device.

The part's I/O's support the CML logic interface with on chip  $50\Omega$  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 ( $vcc = 0.0V = \text{ground}$  and  $vee = -3.3V$ ), or positive supply ( $vcc = +3.3V$  and  $vee = 0.0V = \text{ground}$ ). In case of the positive supply, all I/Os need AC termination when connected to any devices with  $50\Omega$  termination to ground. Different PCB layouts will be needed for each different power supply combination.



All the characteristics detailed below assume  $V_{CC} = 0.0V$  and  $V_{EE} = -3.3V$ .

## 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 ( $V_{EE}$ )		-3.6	V
Power Consumption		1.5	W
RF Input Voltage Swing (SE)		1.0	V
Case Temperature		+100	$^{\circ}C$
Storage Temperature	-40	+100	$^{\circ}C$
Operational Humidity	10	98	%
Storage Humidity	10	98	%



## TERMINAL FUNCTIONS

TERMINAL			DESCRIPTION
Name	No.	Type	
<b>Low-Speed I/Os</b>			
q0p	30	CML output	Differential quarter-rate data outputs. Require external SE 50Ohm termination to VCC
q0n	32		
q1p	37	CML output	
q1n	39		
q2p	41	CML output	
q2n	43		
q3p	4	CML output	
q3n	6		
c4op	26	CML output	Differential quarter-rate clock outputs. Require external SE 50Ohm termination to VCC
c4on	28		
<b>High-Speed I/Os</b>			
cep	8	CML input	Differential full-rate clock inputs with internal 50Ohm termination to VCC
cen	10		
dp	19	CML input	Differential full-rate data inputs with internal 50Ohm termination to VCC
dn	17		
<b>Supply and Termination Voltages</b>			
Name	Description	Pin Number	
vcc	Positive power supply (+3.3V or 0)	1, 3, 5, 7, 9, 11, 12, 14, 16, 18, 20, 22, 23, 25, 27, 29, 31, 33, 34, 36, 38, 40, 42, 44	
vee	Negative power supply (0V or -3.3V)	2, 13, 24, 35	
n/c	Not connected pins	15, 21	



## ELECTRICAL CHARACTERISTICS

PARAMETER	MIN	TYP	MAX	UNIT	COMMENTS
<b>General Parameters</b>					
vee	-3.1	-3.3	-3.5	V	±6%
vcc		0.0		V	External ground
I <sub>vee</sub>		410		mA	
Power consumption		1350		mW	
Junction temperature	-40	25	125	°C	
<b>HS Input Data (dp/dn)</b>					
Data Rate	DC	40	50	Gb/s	
Swing	0.2		0.8	V	Differential or SE, p-p
CM Voltage Level	vcc-0.8		vcc	V	Must match for both inputs
<b>HS Input Clock (cep/cen)</b>					
Frequency	DC	40	50	GHz	
Swing	0.2		0.8	V	Differential or SE, p-p
CM Voltage Level	vcc-0.8		vcc	V	Must match for both inputs
Duty Cycle	40	50	60	%	
<b>LS Output Data (q0p/q0n, q1p/q1n, q2p/q2n, q3p/q3n)</b>					
Data Rate	DC	10	12.5	Gb/s	
Logic "1" level		vcc		V	
Logic "0" level		vcc-0.45		V	With external 50Ω DC termination
Output Jitter		3		ps	Peak-to-peak at 10Gb/s
<b>LS Output Clock (c4op/c4on)</b>					
Frequency	DC	10	12.5	GHz	
Logic "1" level		vcc		V	
Logic "0" level		vcc-0.45		V	With external 50Ω DC termination
Duty Cycle		50		%	
Output Jitter		2		ps	Peak-to-peak at 10GHz

## PACKAGE INFORMATION

The chip die is housed in a custom, 44-pin CQFP package shown in Fig. 2. The package provides a center heat slug located on its back side to be used for heat dissipation. ADSANTEC recommends for this section to be soldered to the vcc plain, which is ground for a negative supply, or power for a positive supply.

The part's identification label is ASNT2121-KMM. 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.

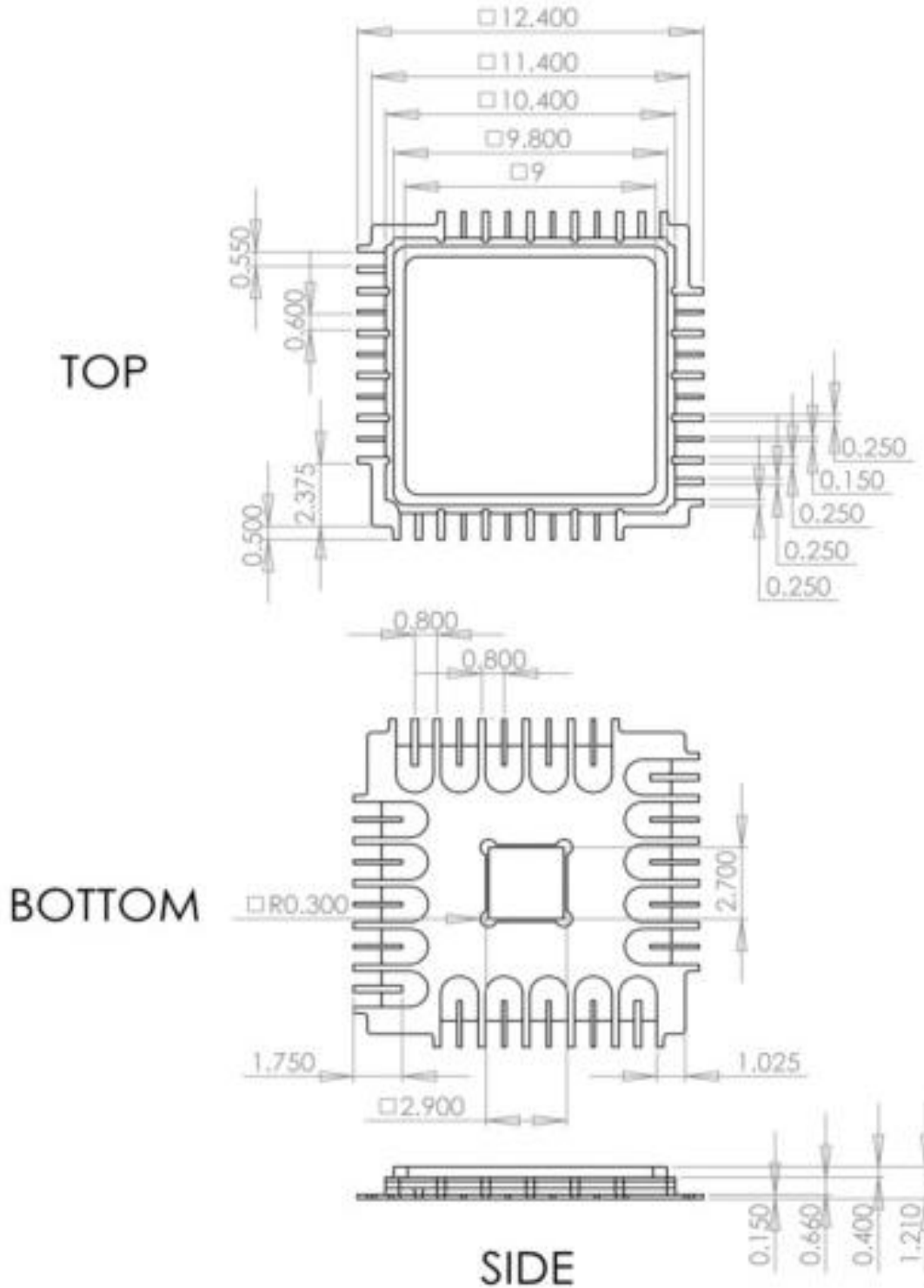


Fig. 2. CQFP 44-Pin Package Drawing (All Dimensions in mm)



## REVISION HISTORY

Revision	Date	Changes
1.8.2	05-2020	Updated package information
1.7.2	07-2019	Updated Letterhead
1.7.1	05-2015	Updated package information
1.6.1	02-2013	Title correction Corrected description Corrected electrical characteristics Updated package information
1.5.1	01-2013	Corrected block diagram Package information correction Absolute maximum ratings correction Description correction Format correction
1.4.1	01-2013	Format correction Power and current consumption correction Absolute maximum ratings correction
1.3.1	12-2011	Format correction Electrical specifications correction Package pin out drawing update
1.2	11-2011	Terminal functions table has been corrected Added absolute maximums ratings table Added packaging information
1.1	07-2011	First release