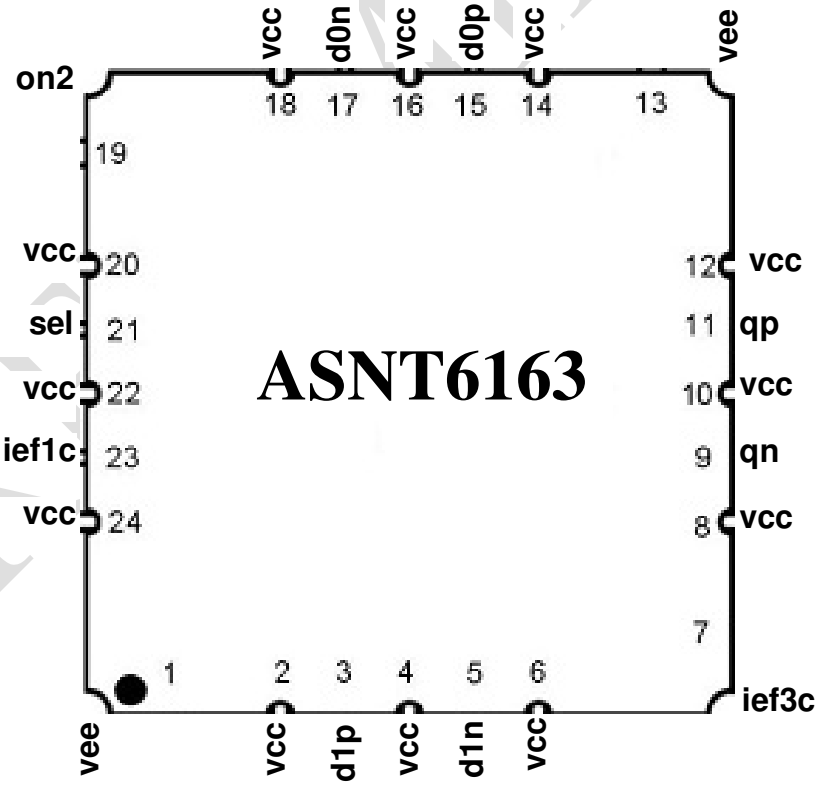
ADSANTEC
Ultra High-Speed Mixed Signal ASICs

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

ASNT6163-KHC
DC-32*GHz* Analog Signal Selector 1-of-2

- DC to 32*GHz* broadband operation
- Two differential CML-type input ports and one differential CML-type output port
- Temperature-stabilized differential gain of approximately 0*dB*
- 1*dB* compression point of 0*dBm*
- DC-to-1G*Hz* broadband channel selector port
- Optional two-channel mixer/adder setting available
- Low jitter and limited temperature variation over industrial temperature range
- Single +3.6*V* or -3.6*V* power supply
- Power consumption: 700*mW*
- Fabricated in SiGe for high performance, yield, and reliability
- Custom CQFN 24-pin package



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DESCRIPTION

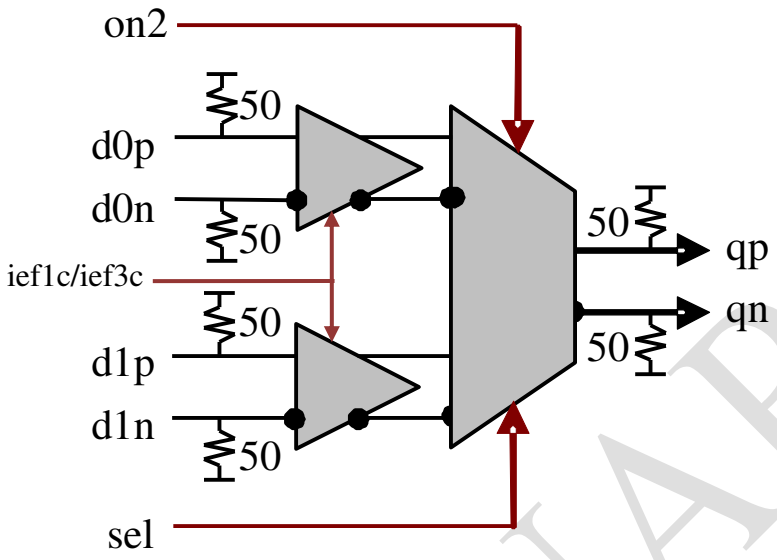


Fig. 1. Functional Block Diagram

The temperature stable ASNT6163-KHC analog signal selector 1-of-2 is intended for use in high-speed systems. The IC shown in Fig. 1 can deliver one of two different broad-band analog differential signals d0p/d0n and d1p/d1n to its differential output qp/qn with a nominal gain of 0*dB*. It can also be used as a two-channel analog mixer/adder of signals d0p/d0n and d1p/d1n. Two low-speed analog current controls Ief1c and Ief3c are available for bandwidth and peaking adjustments.

The active input selection is performed through the external high-speed single-ended port sel that can be referenced to either vcc or vee. When the low-speed single-ended control port on2 is set to vcc, it switches the circuit into mixer/adder mode with both inputs active at the same time.

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 (also see **Error! Not a valid bookmark self-reference.**). 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.

POWER SUPPLY CONFIGURATION

The part can operate with either negative supply (vcc = 0.0*V* = ground and vee = −3.6*V*), or positive supply (vcc = +3.6*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* = ground.

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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 (assumed vcc).

Table 1. Absolute Maximum Ratings

Parameter	Min	Max	Units
Supply Voltage (vee)		-4.0	*V*
Power supply current		320	*mA*
Input Voltage	vcc-1.2	vcc-0.6	*V*
RF Input Voltage Swing (SE)		0.6	*V*
Case Temperature		+90	*ºC*
Storage Temperature	-40	+100	*ºC*
Operational Humidity	10	98	*%*
Storage Humidity	10	98	*%*

TERMINAL FUNCTION

TERMINAL			DESCRIPTION
Name	**No.**	**Type**	
High-speed Signals			
d0p	15	CML - type	Differential high speed data inputs with internal SE 50*Ohm* termination to vcc
d0n	17		
d1p	3	CML - type	
d1n	5		
qp	11	CML - type	Differential high speed data outputs with internal SE 50*Ohm* termination to vcc. Require external SE 50*Ohm* termination to vcc
qn	9		
Control Signals			
sel	21	SE	High-speed high-impedance input (active: high, d1 is connected to q default: low, d0 is connected to q;)
ief1c	23	Analog Control	Analog current control with internal 64*KOhm* termination to vcc and 72*KOhm* termination to vee.
ief3c	7		
on2	19	CMOS	Low-speed high-impedance input (active: high, mixer/adder mode; default: low, 1-of-2 selector mode;)
Supply and Termination Voltages			
Name	**Description**		**Pin Number**
vcc	Positive power supply rail		2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24
vee	Negative power supply rail		1, 13

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ELECTRICAL CHARACTERISTICS

PARAMETER	MIN	TYP	MAX	UNIT	COMMENTS
General Parameters					
vee	-3.4	-3.6	-3.8	*V*	±5.5%
vcc		0.0		*V*	External ground
*I*vee		200		*mA*	In Selector Mode
		280		*mA*	In Mixer/Adder Mode
Power consumption		700		*mW*	In Selector Mode
		1000		*mW*	In Mixer/Adder Mode
Junction temperature	-25	50	125	*°C*	
Input Analog (d0p/d0n, d1p/d1n)					
Bandwidth	DC		32	*GHz*	-3*dB*
Common mode level		vcc		*mV*	AC-coupled
Voltage swing, pk-pk	0		400	*mV*	Single-ended, with unused input not connected or AC terminated
	0		800	*mV*	Differential
S11		-35		*dB*	at 3*GHz*
		-16		*dB*	at 10*GHz*
		-11		*dB*	at 20*GHz*
		-9		*dB*	at 25*GHz*
Current Control Signals (ief1c/ief3c)					
Control range	vee		vcc	*V*	
Default voltage level		vee+1.9		*V*	at ±3.6*V* supply
Output Analog (qp/qn)					
Bandwidth	DC		32	*GHz*	-3*dB*
Common mode level		vcc-0.55		*V*	With external 50*Ohm* DC termination
Small Signal Differential Gain	-1.5	0.0	+1.5	*dB*	up to 25*GHz*
Output referred 1*dB* Compression Point		1		*dBm*	Single-Ended, 20*GHz*
THD		0.5		%	at 1*GHz*
		0.6		%	at 10*GHz*
		1.9		%	at 25*GHz*
		2.5		%	at 35*GHz*
Low-Speed Control (on2)					
High logic level		vcc		*V*	Mixer/Adder Mode
Low logic level		vee		*V*	1-of-2 Selector Mode
High-Speed Control (sel)					
Bandwidth		1		*GHz*	
High logic level		vcc		*V*	Input d1p/d1n is active
Low logic level		vee		*V*	Input d0p/d0n is active
Input current			20	*uA*	sink or source

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PACKAGE INFORMATION

The chip die is housed in a custom 24-pin CQFN 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.

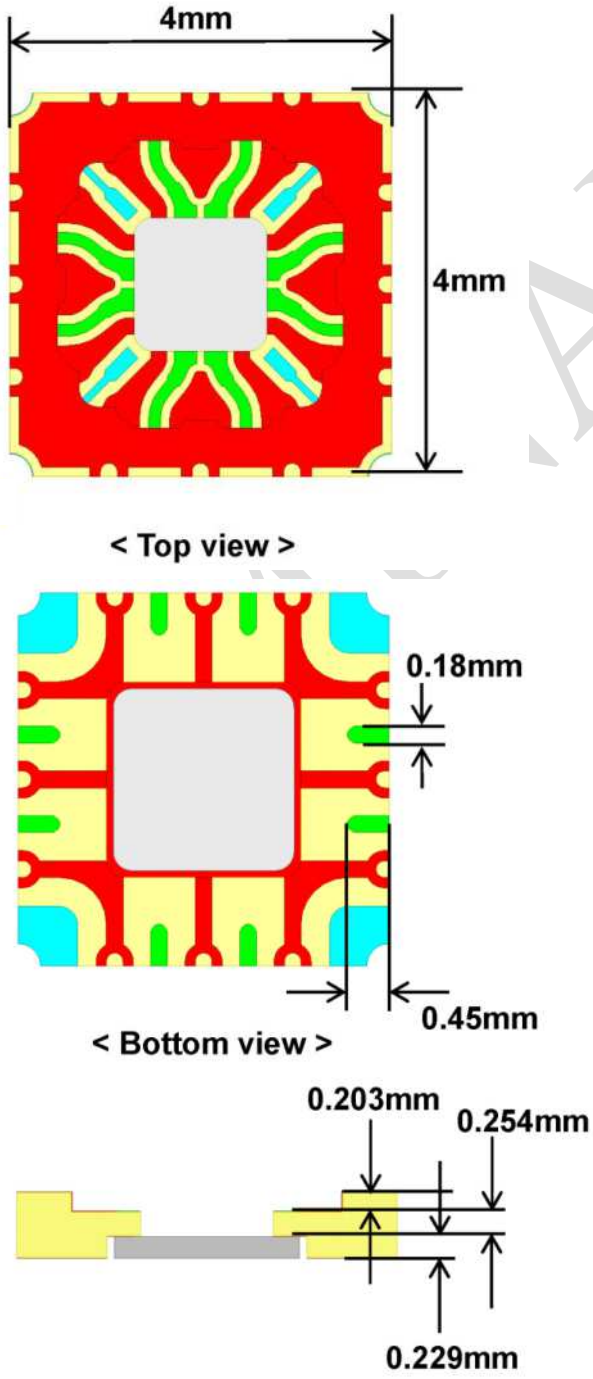


Fig. 2. CQFN 24-Pin Package Drawing (All Dimensions in mm)

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The part's identification label is ASNT6163-KHC. 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 2011/65/EU for all ten substances.

REVISION HISTORY

Revision	Date	Changes
0.0.2	12-2019	Preliminary release

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