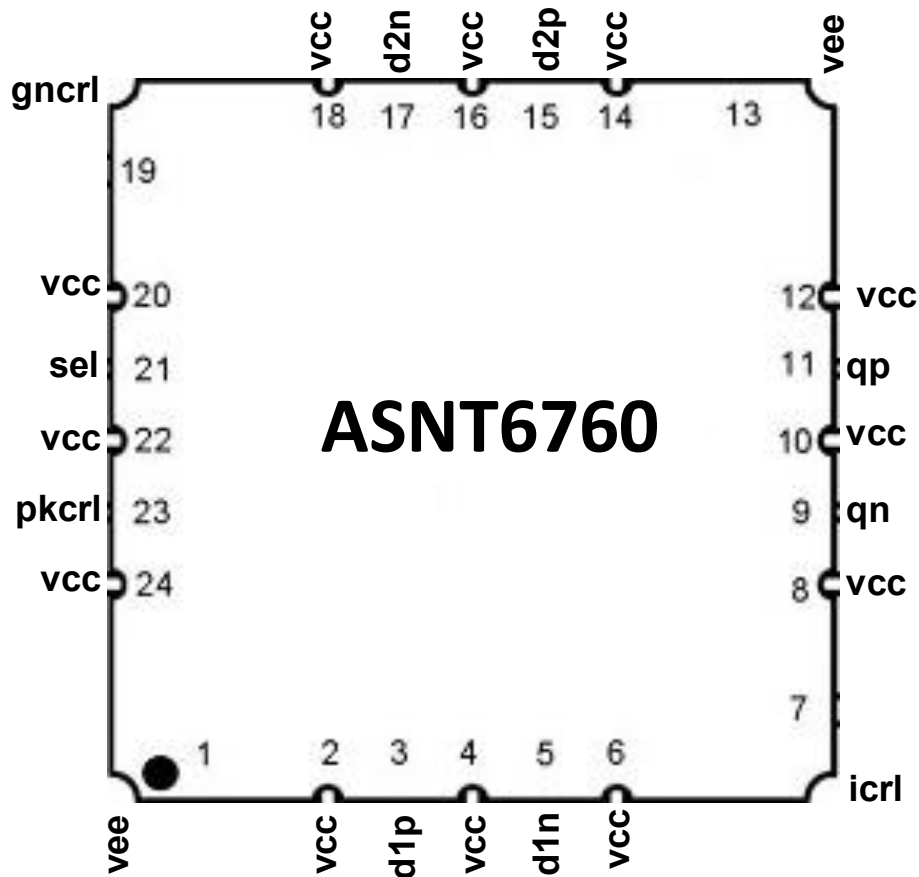




ASNT6760-KHC DC-33GHz Analog Signal Selector 1-of-2

- DC to 33GHz broadband operation
- Exhibits an extra-flat frequency response ideal for PAM3 and PAM4 applications
- Two differential CML-type input ports and one differential CML-type output port
- Single ended input linearity range up to $0.8V_{pk-pk}$ and differential input linearity up to $1.2V_{pk-pk}$
- Temperature-stabilized adjustable gain around 0dB
- Adjustable high-frequency peaking
- Adjustable internal currents for power consumption and bandwidth control
- Low jitter and limited temperature variation over industrial temperature range
- Single +3.6V or -3.6V power supply
- Power consumption: 700mW
- Fabricated in SiGe for high performance, yield, and reliability
- Custom CQFN 24-pin package





DESCRIPTION

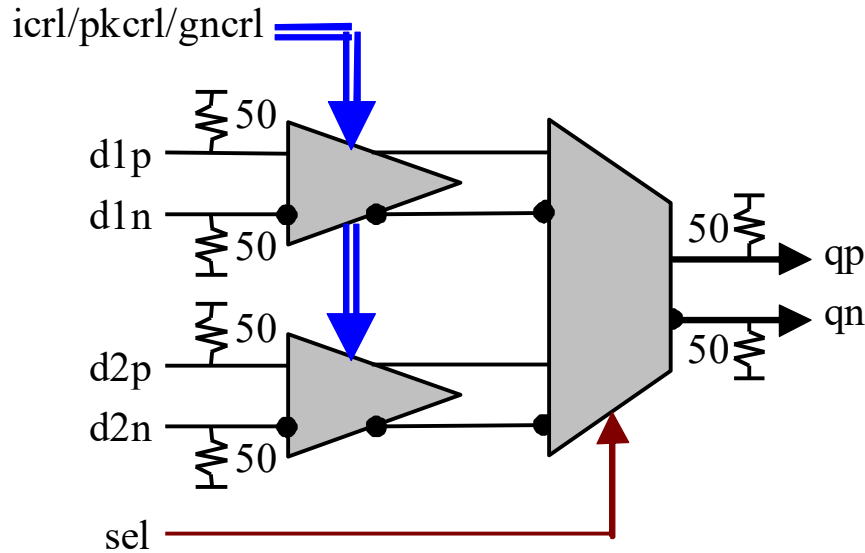


Fig. 1. Functional Block Diagram

The temperature stable ASNT6760-KHC analog signal selector 1-of-2 is intended for use in high-speed systems. Its extra-flat frequency response is ideal for PAM3 and PAM4 signals. The IC shown in Fig. 1 can deliver one of two different broad-band analog differential signals $d1p/d1n$ and $d2p/d2n$ to its differential output qp/qn with a nominal gain of $0dB$. A low-speed analog current control $icrl$ is available for power consumption and bandwidth adjustments. A low-speed analog control $pkcr1$ is available for peaking adjustments at higher frequencies (above $25GHz$). A relatively flat frequency response with variation of no more than $\pm 0.5dB$ within DC-to- $40GHz$ can be achieved with these two control voltages. Another low-speed analog control $gncr1$ is available for gain adjustment. A nominal gain of $0dB$ can be achieved for all corner, voltage, and temperature variations. The active input selection is performed through the external high-speed single-ended port sel that can be referenced to either vcc or vee . **The default state of this pin cannot be used for operation and correct external voltages are required!**

The part's I/O's support the CML logic interface with an on-chip 50Ω termination to vcc and may be used differentially, AC/DC coupled, single-ended, or in any combination (also see 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.

POWER SUPPLY CONFIGURATION

The part can operate with either negative supply ($vcc = 0.0V = \text{ground}$ and $vee = -3.6V$), or positive supply ($vcc = +3.6V$ and $vee = 0.0V = \text{ground}$). In case of the positive supply, all I/Os need AC termination when connected to any devices with a 50Ω termination to ground. Different PCB layouts will be needed for each different power supply combination.

All the characteristics detailed below assume $vcc = 0.0V = \text{ground}$.



TYPICAL PERFORMANCE CHARACTERISTICS

At default values for minimum and maximum current/power consumption, the frequency responses of ASNT6760-KHC are shown in Fig. 2.

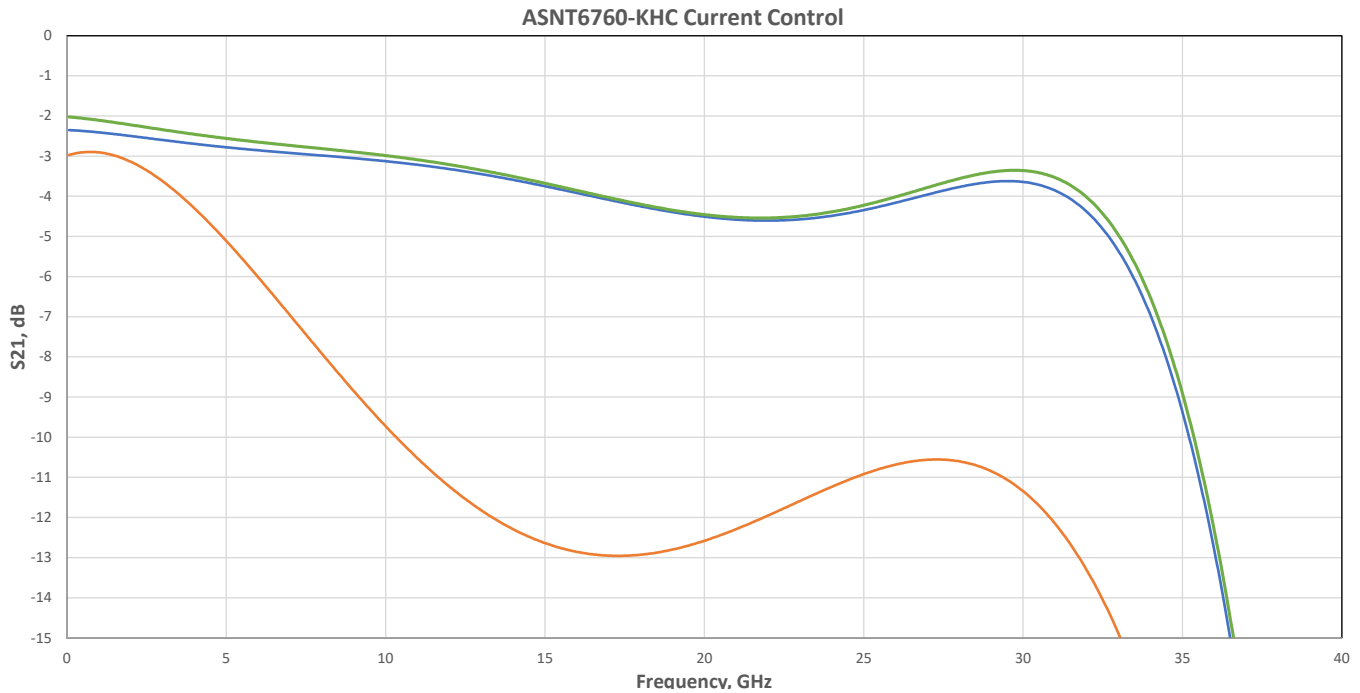


Fig. 2. Frequency Response at *Minimum Current*, *Default*, and *Maximum Current*

The frequency responses at different gain controls are shown in Fig. 3.

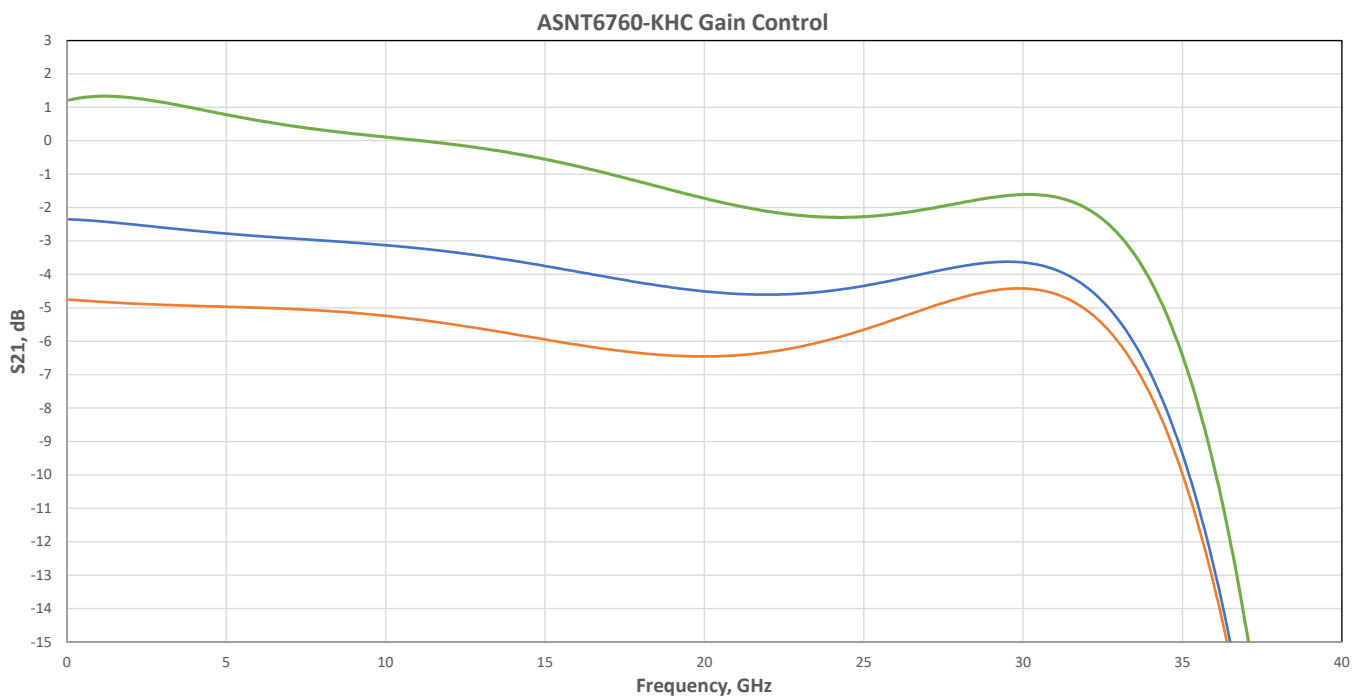


Fig. 3. Frequency Response at *Minimum Gain*, *Default*, and *Maximum Gain*



The frequency responses at different peaking controls are shown in Fig. 4.

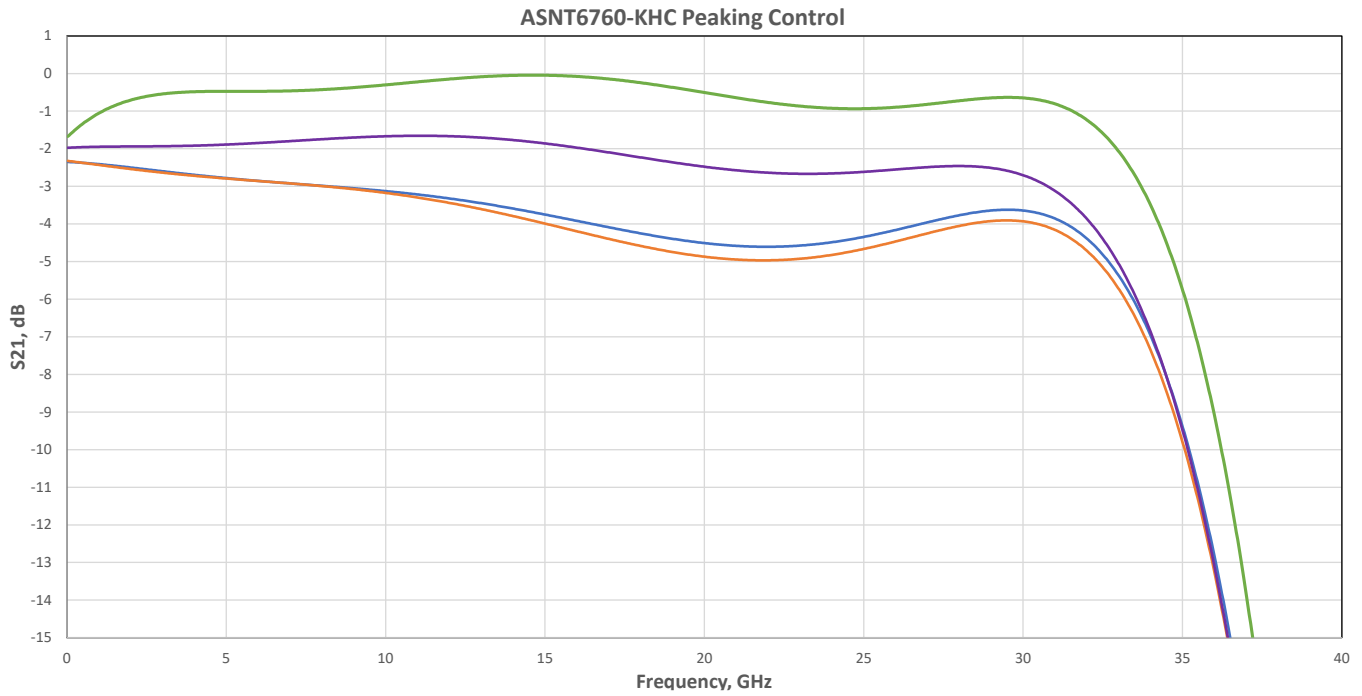


Fig. 4. Frequency Response at *Minimum Peaking*, *Default*, *Maximum Peaking*, and *Maximum Peaking with Lower Current*



PAM4 SIGNAL EYE PROPAGATION

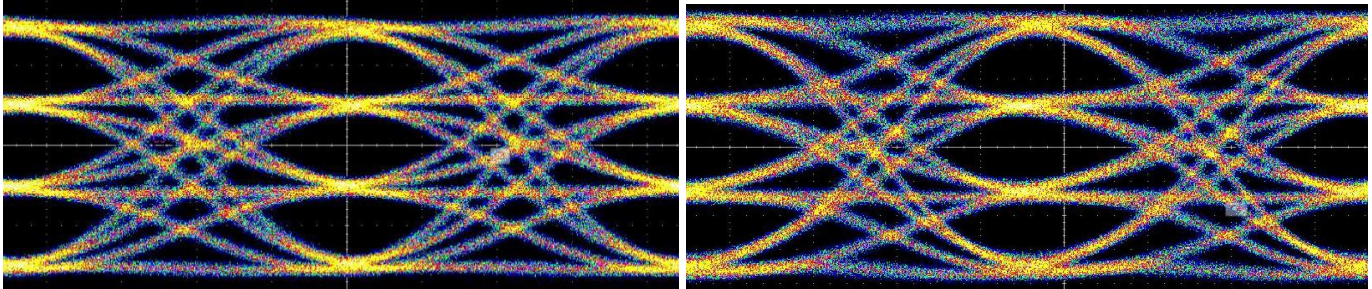


Fig. 5. PAM4 at 25Gbaud, 800mV Differential Peak-Peak, Left: Input, Right: Output

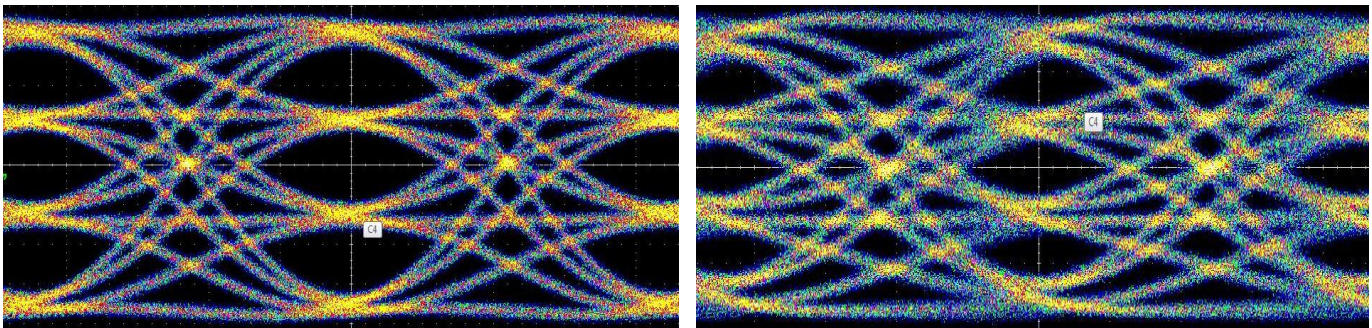


Fig. 6. PAM4 at 32Gbaud, 800mV Differential Peak-Peak, Left: Input, Right: Output

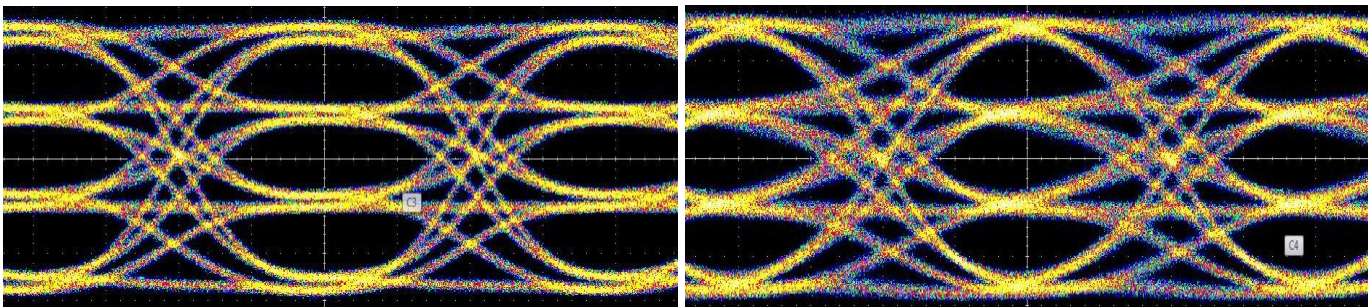


Fig. 7. PAM4 at 25Gbaud, 1200mV Differential Peak-Peak, Left: Input, Right: Output

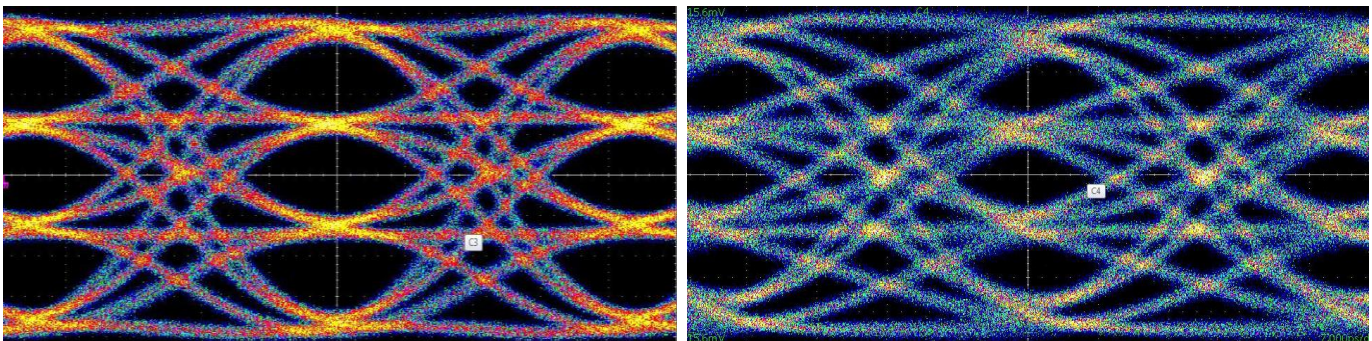


Fig. 8. PAM4 at 32Gbaud, 1200mV Differential Peak-Peak, Left: Input, Right: Output



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 nor implied. All min and max voltage limits are referenced to ground (assumed to be VCC).

Table 1. Absolute Maximum Ratings

Parameter	Min	Max	Units
Supply Voltage (vee)		-3.9	V
Power supply current		300	mA
Input Voltage	VCC-1.0	VCC+0.4	V
RF Input Voltage Swing (SE)		0.8	V
Case Temperature		+90	°C
Storage Temperature	-40	+100	°C
Operational Humidity	10	98	%
Storage Humidity	10	98	%

TERMINAL FUNCTION

TERMINAL			DESCRIPTION
Name	No.	Type	
High-speed Signals			
d1p	3	CML - type	Differential high speed data inputs with an internal SE 50Ohm termination to VCC
d1n	5		
d2p	15	CML - type	
d2n	17		
qp	11	CML - type	Differential high speed data outputs with an internal SE 50Ohm termination to VCC. Require an external SE 50Ohm termination to VCC
qn	9		
Control Signals			
sel	21	CMOS	High-speed high-impedance input with a 2.3KOhm termination to both vee and vcc (active: low, d2 is connected to q; active: high, d1 is connected to q;)
gnctrl	19	Analog Control	Analog gain control with an internal 15KOhm termination to VCC and 35KOhm termination to vee.
pkctrl	23		Analog peaking control with an internal 48KOhm termination to VCC and 55KOhm termination to vee.
icrl	7		Analog current control with an internal 24KOhm termination to VCC and 84.5KOhm termination to vee.
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



ELECTRICAL CHARACTERISTICS

PARAMETER	MIN	TYP	MAX	UNIT	COMMENTS
General Parameters					
vee	-3.2	-3.6	-3.8	V	-12%, +6%
vcc		0.0		V	External ground
I _{vee}	90	200	230	mA	At max. control range
Power consumption	290	720	880	mW	At max. control range
Junction temperature	-25	50	125	°C	
Input Analog (d1p/d1n, d2p/d2n)					
Bandwidth	DC		33	GHz	-3dB
Common mode level		vcc		mV	AC-coupled
Single-ended voltage swing, pk-pk; unused input not connected or AC terminated			600	mV	THD < 0.8% at 2GHz
			600	mV	THD < 0.7% at 5GHz
			600	mV	THD < 1.1% at 10GHz
Single-ended voltage swing, pk-pk; unused input not connected or AC terminated			1.2	V	THD < 1.7% at 2GHz
			1.2	V	THD < 1.8% at 5GHz
			1.2	V	THD < 6% at 10GHz
S11		TBD		dB	at 3GHz
		TBD		dB	at 10GHz
		TBD		dB	at 20GHz
		TBD		dB	at 25GHz
Gain Control Signal (gnctrl)					
Control range	vee+1.6		vee+3.2	V	
Default voltage level		vee+2.5		V	at ±3.6V supply
Gain adjustment	-5	0	1	dB	
Peak Control Signal (pkctrl)					
Control range	vee+1.4		vee+2.6	V	
Default voltage level		vee+1.9		V	at ±3.6V supply
Peaking adjustment	0		2	dB	at 30GHz
Current Control Signal (ictrl)					
Control range	vee+2.4		vee+3.6	V	
Default voltage level		vee+2.8		V	at ±3.6V supply
Current adjustment	90	200	230	mA	
Output Analog (qp/qn)					
Bandwidth	DC		33	GHz	-3dB
Common mode level		vcc-0.55		V	With an external 50Ohm DC termination
Output referred 1dB Compression Point		>6		dBm	Single-Ended, 20Gbps
Selector Control (sel)					
High logic level		vcc		V	Input d1p/d1n is active
Low logic level		vee		V	Input d2p/d2n is active

PACKAGE INFORMATION

The chip die is housed in a custom 24-pin CQFN package shown in Fig. 9. 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.

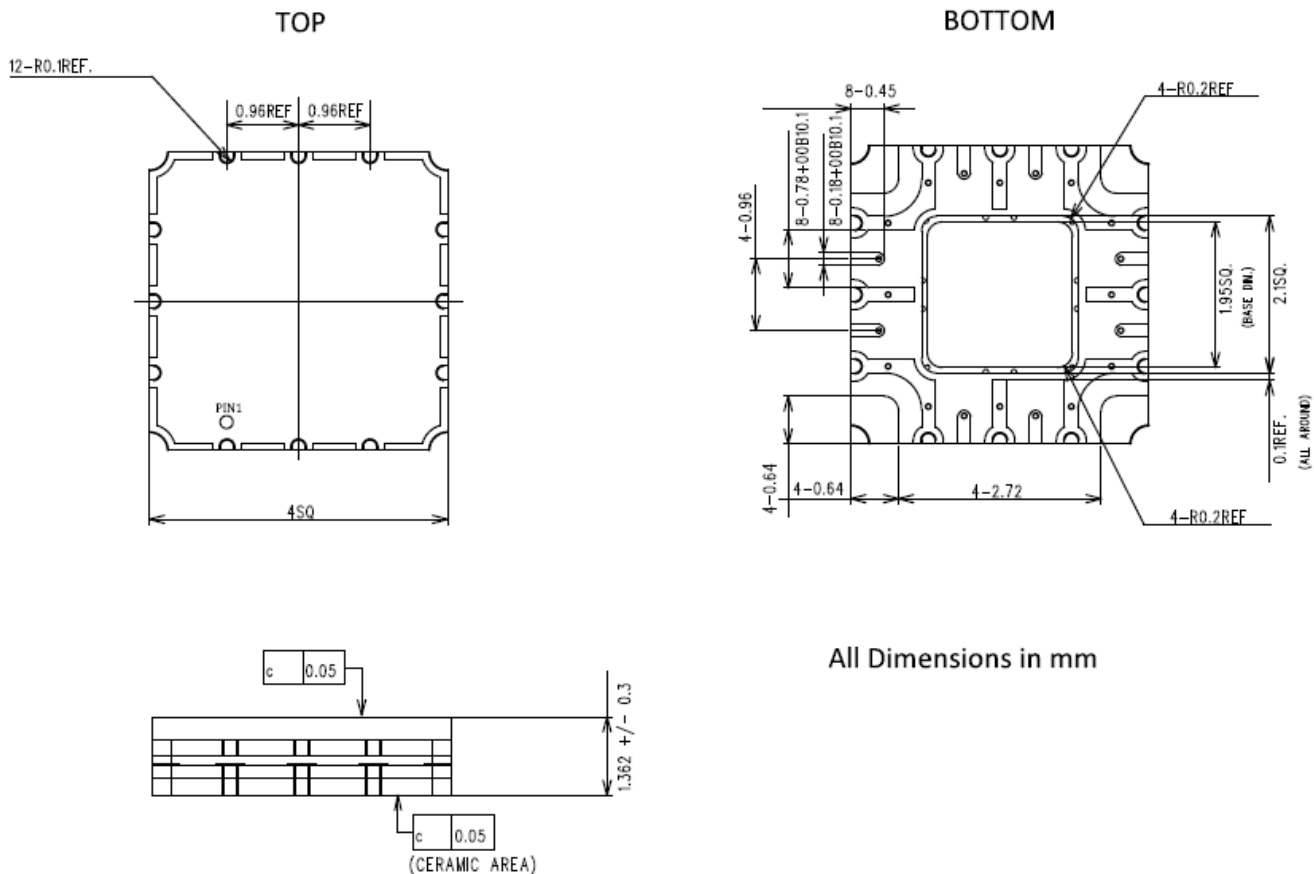


Fig. 9. CQFN 24-Pin Package Drawing (All Dimensions in mm)

The part's identification label is ASNT6760-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 digits after the underscore represent the package's manufacturer, type, and pin out count.

This device complies with Commission Delegated Directive (EU) 2015/863 of 4 June 2015 amending Annex II to Directive 2011/65/EU of the European Parliament and of the Council as regards the list of restricted substances (Text with EEA relevance) on the restriction of the use of certain hazardous substances in electrical and electronics equipment (RoHS Directive) in accordance with the definitions set forth in the directives for all ten substances.



REVISION HISTORY

Revision	Date	Changes
1.2.2	05-2026	Minor wording changes and pin name edits
1.1.2	10-2025	Corrected sel port description
1.0.2	09-2023	First release
0.0.1	04-2023	Preliminary release