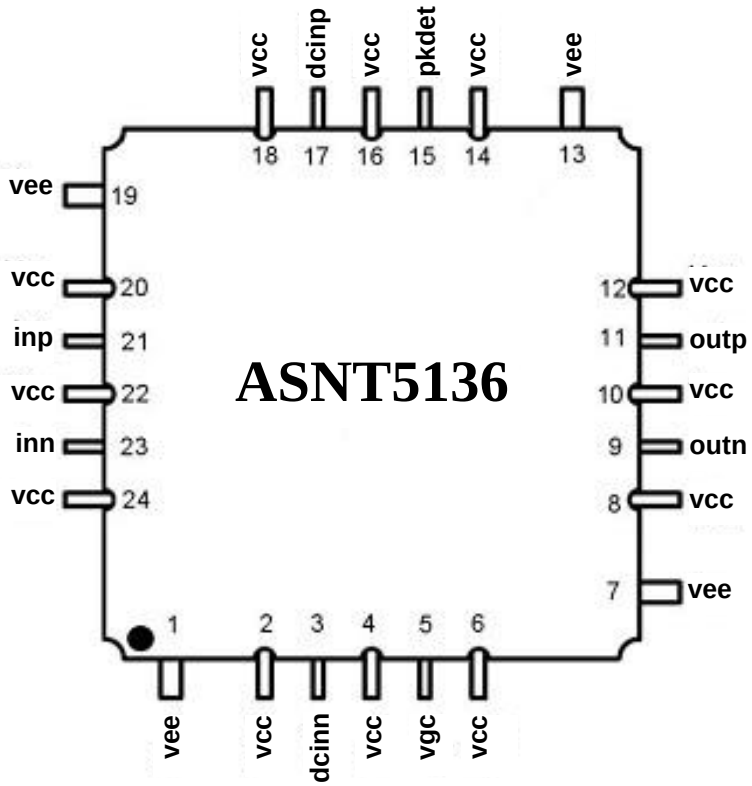
ADSANTEC
Ultra High-Speed Mixed Signal ASICs

Advanced Science And Novel Technology Company, Inc.
2790 Skypark Drive Suite 112, Torrance, CA 90505

Offices: 310-530-9400 / Fax: 310-530-9402
www.adsantec.com

ASNT5136-KMC
DC-45*Gbps* Limiting Amplifier

- Broadband limiting amplifier with adjustable gain, output peaking, and offset controls
- Low jitter and limited temperature variation over industrial temperature range
- 30*GHz* of analog bandwidth in limiting mode
- On-chip input peak detector
- Fully differential CML-type input interface
- Fully differential CML output interface with 300*mV* single-ended swing
- Single +3.3*V* or -3.3*V* power supply
- Power consumption: 365*mW*
- Fabricated in SiGe for high performance, yield, and reliability
- Custom CQFP 24-pin package



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DESCRIPTION

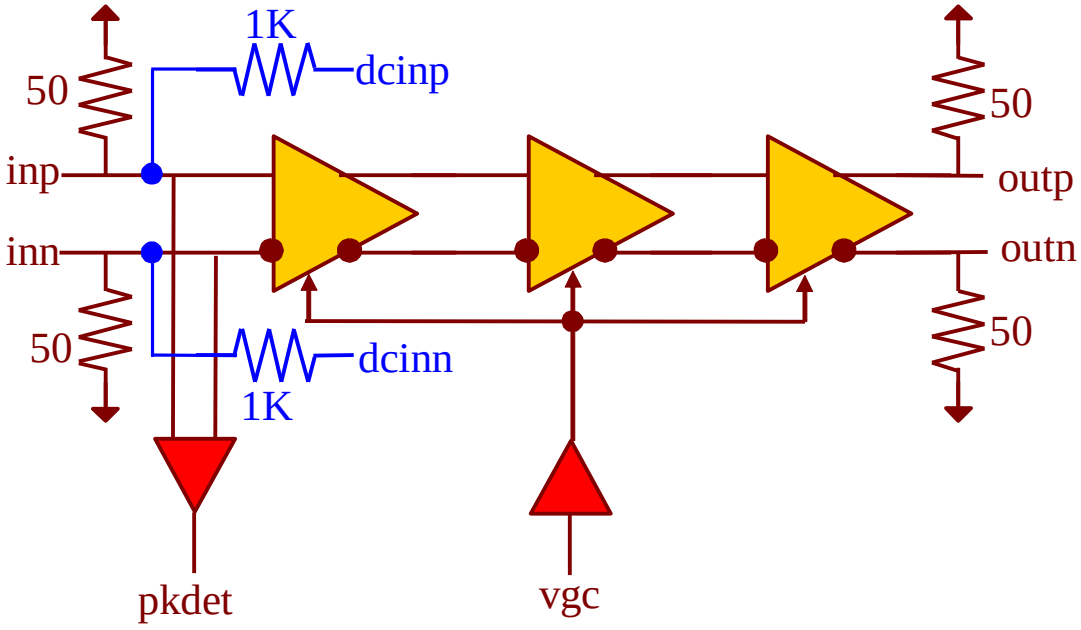

Fig. 1. Functional Block Diagram

The temperature stable ASNT5136-KMC SiGe IC provides low jitter broadband variable signal amplification between its input and output signal ports and is intended for use in high-speed communication systems. The circuit shown in Fig. 1 accepts an analog signal at its input differential port inp/inn and delivers a voltage-limited output signal at the output differential port outp/outn. The common-mode voltage levels of input signals can be adjusted using analog control inputs dcinp/dcinn. The total gain can be externally adjusted through the gain control port vgc. The input amplitude can be monitored using the analog output voltage pkdet.

The part's I/Os support the CML logic interface with on chip 50*Ohms* 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 = 0.0*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 50*Ohms* 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*.

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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)		-3.6	*V*
Power Consumption		0. 4	*W*
RF Input Voltage Swing (SE)		1.0	*V*
Case Temperature		+90	*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			
inp	21	CML input	Differential data inputs with internal SE 50*Ohms* termination to vcc.
inn	23		
outp	11	CML output	Differential high-speed signal outputs with internal SE 50*Ohms* termination to vcc. Require external SE 50*Ohms* termination to vcc.
outn	9		
dcinp	17	Analog inputs	inp common mode control voltage.
dcinn	3		inn common mode control voltage.
vgc	5	Analog inputs	Gain control voltage.
pkdet	15	Analog output	Analog voltage representing input signal's amplitude.

Supply And Termination Voltages		
Name	**Description**	**Pin Number**
vcc	Positive power supply. (+3.3*V* or 0)	2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24
vee	Negative power supply. (0*V* or -3.3*V*)	1, 7, 13, 19

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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		110		*mA*	
Power consumption		365		*mW*	
Junction temperature	-25	50	125	*°C*	
Input (inp/inn)					
Data Rate	0		45	*Gbps*	
Voltage swing, pk-pk	10	200	500	*mV*	Single ended, unused input not connected or AC terminated
CM Voltage Level	vcc-0.8	vcc-0.3	vcc+0.3	*V*	Must match for both inputs
Output (outp/outn)					
Data Rate	0		45	*Gbps*	
Logic “1” level		vcc		*V*	
Logic “0” level		vcc-0.3		*V*	With external 50*Ohms* DC termination
Rise/Fall Times	10	12	14	*ps*	20%-80%
Additive Jitter			1	*ps*	Peak-to-peak
Gain Control Port (vgc)					
Bandwidth	0.0		100	*MHz*	
Input Signal Range	-1.0		0.0	*V*	
Gain Variation	32	35	38	*dB*	< ±5%
Common Mode Control Ports (dcinp/dcinn)					
Input Signal Range	-3.3		0.0	*V*	
Peak Detector Output (pkdet)					
Bandwidth	0.0		1.0	*KHz*	
Output Signal Range	-1.0		0.0	*V*	

PACKAGE INFORMATION

The die is housed in a custom 24-pin CQFP package shown in Fig. 2. The package’s leads will be trimmed to a length of 1.0*mm*. After trimming, the package’s leads will be further processed as follows:

1. The lead’s gold plating will be removed per the following sections of J-STD-001D:
   - 3.9.1 Solderability
   - 3.2.2 Solder Purity Maintenance
   - 3.9.2 Solderability Maintenance
   - 3.9.3 Gold Removal
2. The leads will be tinned with Sn63Pb37 solder

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The package provides a center heat slug located on its back side to be used for heat dissipation. ADSANTEC recommends for this section 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 ASNT5136-KMC. 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.

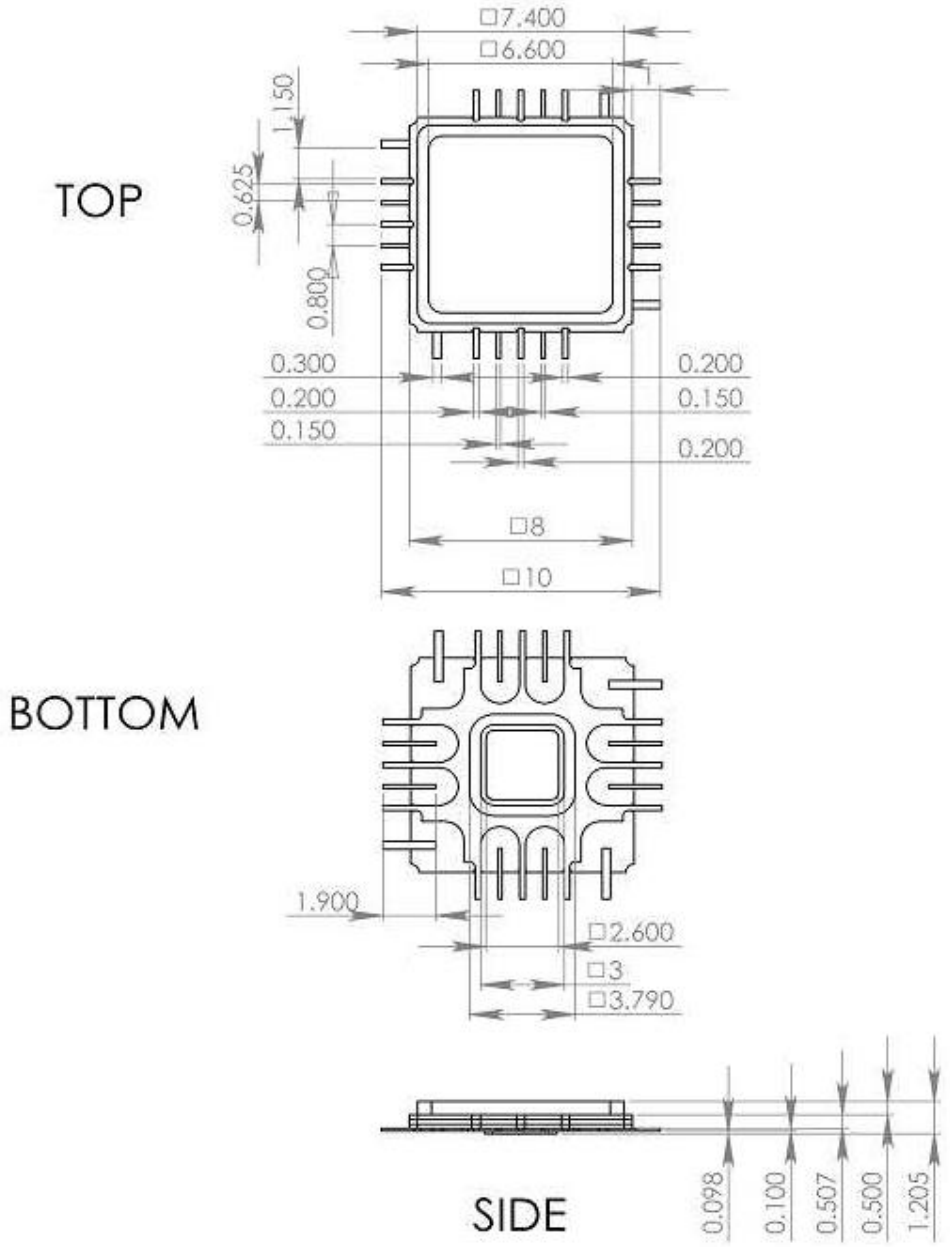

Fig. 2. CQFP 24-Pin Package Drawing (All Dimensions in mm)

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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
2.2.2	11-2024	Updated Package Information
2.1.2	04-2020	Updated Package Information
2.0.2	07-2019	Updated Letterhead
2.0.1	03-2013	Corrected title Added pin out drawing Corrected functional block diagram Corrected description Added power supply configuration Added absolute maximum ratings Corrected terminal functions table Corrected electrical characteristics Corrected package information Added package mechanical drawing Corrected format
1.0	07-2008	Initial Release