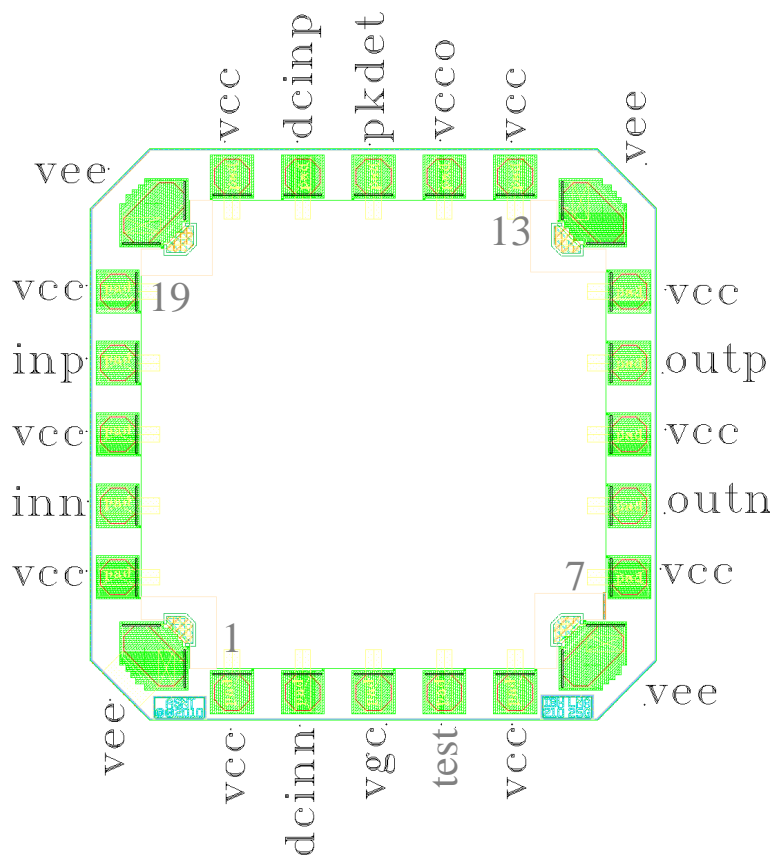




ASNT6142-BD DC-20GHz Linear amplifier

- Broadband (DC-20GHz) linear amplifier for receiver-side applications
- Features gain control, input offset adjustment, and input peak detector
- Exhibits low jitter and limited temperature variation over industrial temperature range
- Fully differential input interface with on-chip 50Ohm termination
- Fully differential output interface with on-chip 50Ohm termination
- Single +3.3V or -3.3V power supply
- Power consumption: 695mW
- Fabricated in SiGe for high performance, yield, and reliability



DESCRIPTION

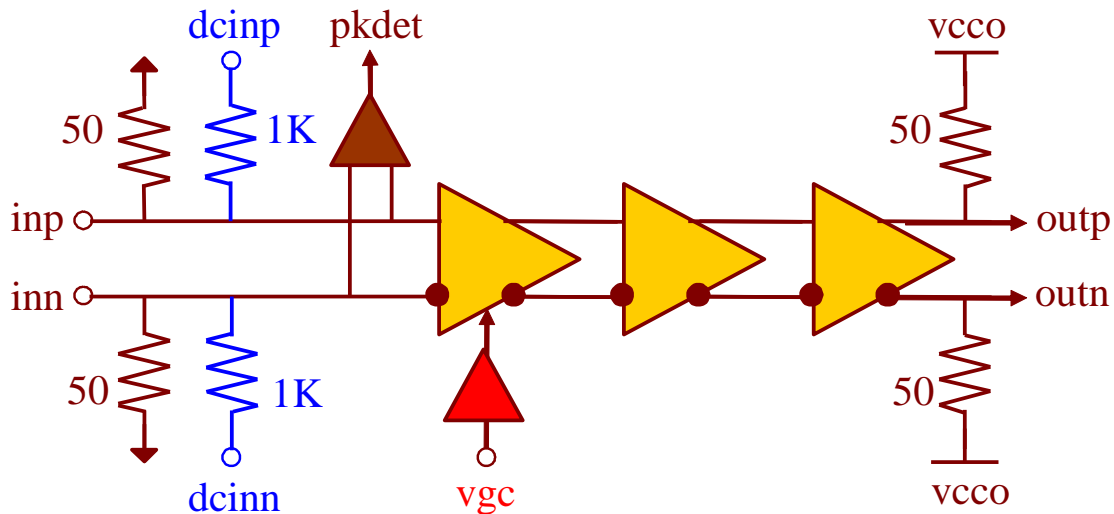


Fig. 1. Functional Block Diagram

The temperature-stable linear amplifier ASNT6142-BD, which is fabricated in an advanced SiGe technology, provides low-jitter broadband variable signal amplification between its input **inp/inn** and output **outp/outn** signal ports and is intended for use in high-speed communication systems. Gain adjustment is performed through the external control port **vgc**.

The part's I/Os support the CML logic interface with on chip 50Ω 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.

The on-chip peak detector delivers a single-ended output voltage **pkdet** proportional to the input signal's amplitude. Additional control ports **dcinp** and **dcinn** can be used for input signal common-mode voltage adjustment. For optional output common-mode voltage adjustment, the output termination resistors are connected to a separate positive supply voltage **vcco**.

POWER SUPPLY CONFIGURATION

The part can operate with either a negative supply (**vcc** = 0.0V=ground and **vee** = -3.3V), or a positive supply (**vcc** = +3.3V and **vee** = 0.0V=ground). In case of the positive supply, all I/Os need AC termination when connected to any devices with 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 and **vee** = -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 (assumed vcc).

Table 1. Absolute Maximum Ratings

Parameter	Min	Max	Units
Supply Voltage (vee)		-3.6	V
Power Consumption		0.8	W
RF Input Voltage Swing (SE)		1.0	V
Case Temperature		+90	°C
Storage Temperature	-40	+100	°C
Operational Humidity	10	98	%
Storage Humidity	10	98	%

TERMINAL FUNCTIONS

TERMINAL			DESCRIPTION
Name	No.	Type	
High-Speed I/Os			
inp	20	CML input	Differential high-speed data inputs with internal SE 50Ω termination to vcc
inn	22		
outp	10	CML output	Differential high-speed data outputs with internal SE 50Ω termination to vcc. Require external SE 50Ω termination to vcc
outn	8		
Low-Speed I/Os			
dcinp	16	Analog Input	inp common mode control voltage
dcinn	2	Input	inn common mode control voltage
vgc	3	Input	Low-speed amplitude adjustment tuning input
pkdet	15	Output	Analog voltage generated by the peak detector
Supply and Termination Voltages			
Name	Description		Pin Number
vcc	Positive power supply (+3.3V or 0V)		1, 5, 7, 9, 11, 13, 17, 19, 21, 23
vcco	Positive power supply (+3.3V or 0V)		14
vee	Negative power supply (0V or -3.3V)		6, 12, 18, 24
test	Control voltage, keep not connected!		4



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}		210		mA	
Power consumption		695		mW	
Junction temperature	-25	50	85	°C	
HS Input Data (inp/inn)					
Bandwidth		20		GHz	-3dB
CM level	-0.8		0	V	
Input noise density		1.5		nV/sqrt(Hz)	High Gain
S11		-10		dB	DC to 20GHz
HS Output Data (outp/outn)					
CM level		-0.6		V	
S22		-8		dB	DC to 20GHz
Small-signal gain		22		dB	At 10GHz, vgc1=vgc2=-3.3V
Small-signal gain		10		dB	At 10GHz, vgc1=vgc2=0V
Output referred 1dB compression point		2.7		dBm	Single-Ended, 20GHz
THD		0.2		%	At 350mVp-p output swing, SE
Low-Speed Control Input (vgc)					
Voltage range	vee		vcc	V	
Input Impedance		2		KOhm	
DC Offset Control Inputs (dcinp/dcinn)					
Voltage range	vee		vcc	V	
Input Impedance		1		KOhm	

DIE INFORMATION

The die has external dimensions of 1.2x1.2mm² with an approximate thickness of 280μm, and includes 24 octagonal pads: 5 on each side and 4 corner pads. The pad frame parameters are presented in Table 2.

Table 2. Pad Frame Parameters

Pad Type	Metal dimensions, μm	Opening dimensions, μm	Step, μm
Side pad	80x80	74x74	150
Corner pad	155x80	149x74	n/a



The part's identification name is ASNT6142-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 mark the part as a bare die.

This device complies with the Restriction of Hazardous Substances (RoHS) per EU 2002/95/EC for all six substances.

REVISION HISTORY

Revision	Date	Changes
2.0.1	05-2013	Corrected title Updated pin out drawing Corrected description Added power supply configuration section Corrected terminal functions Corrected electrical characteristics Added die information section Added revision history table Updated format
1.0	03-2009	First release