ADSANTEC
Ultra High-Speed Mixed Signal ASICs

Advanced Science And Novel Technology Company, Inc.
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Offices: 310-530-9400 / Fax: 310-530-9402
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ASNT5153-MOD
DC-64*Gbps* Broadband Digital 2:1 Multiplexer/Selector

- High speed broadband 2:1 Multiplexer/Selector (MUX)

- Exhibits low jitter and limited temperature variation over industrial temperature range

- Ideal for use as a high isolation selector switch or as a high speed 2-to-1 serializer

- Ideal for high speed proof-of-concept prototyping

- Fully differential CML input interface

- Fully differential CML output interface with 600*mV* single-ended swing

- Analog input clock common mode voltage control

- Single -3.3*V* power supply

- Power consumption: 500*mW*

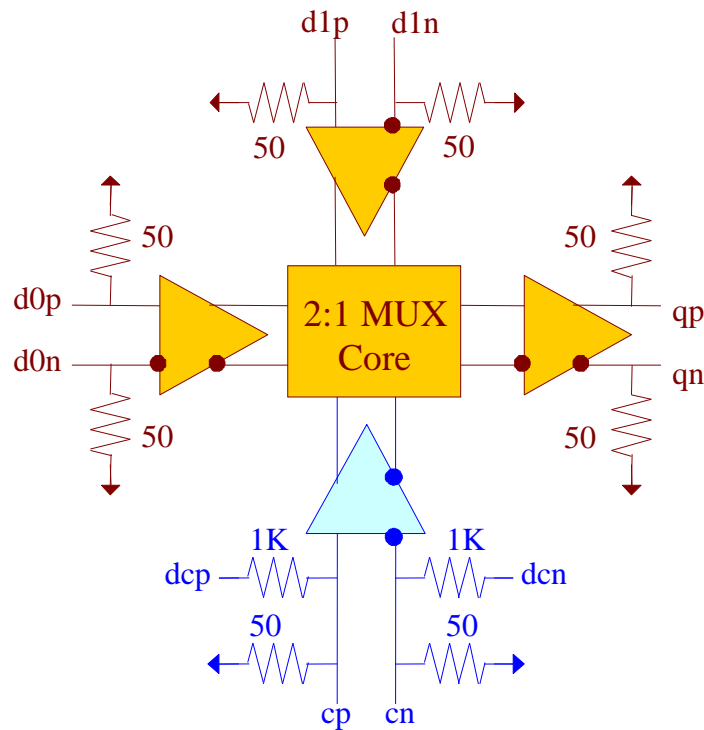- Fabricated in SiGe for high performance, yield, and reliability
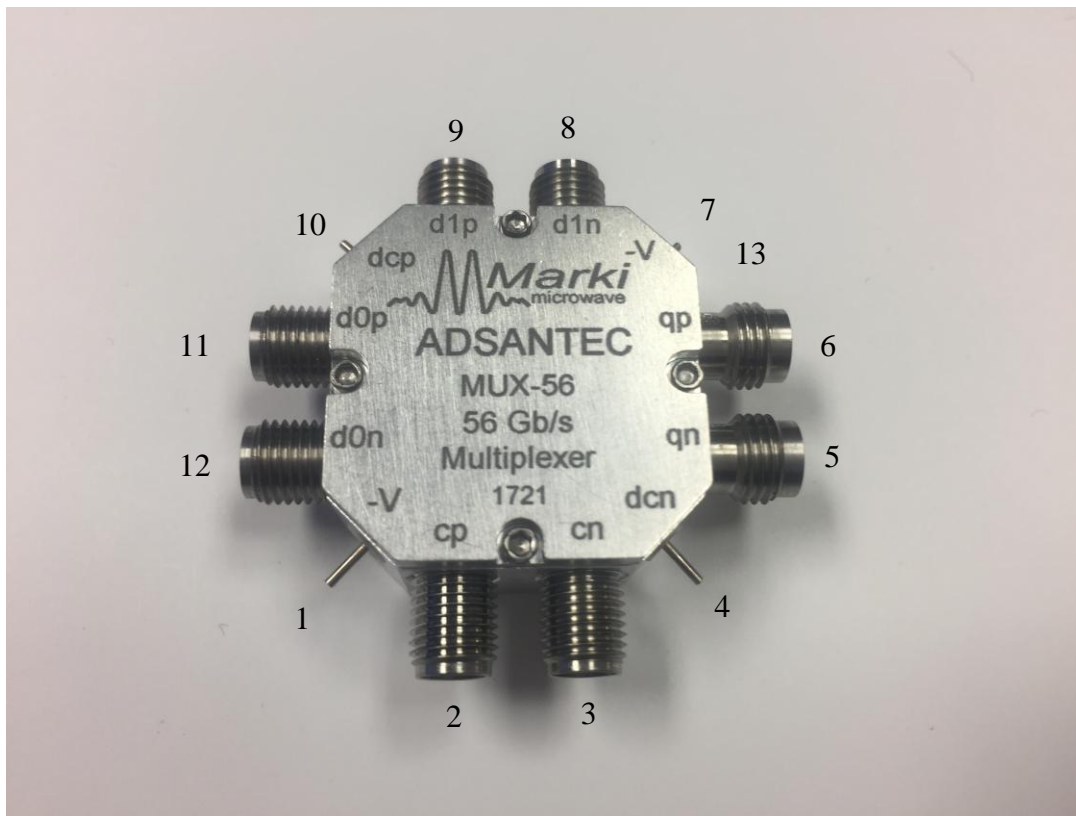
DESCRIPTION

Fig. 1. Functional Block Diagram

The temperature stable and broadband ASNT5153-MOD SiGe IC can be utilized as either a high isolation selector switch or a high speed 2:1 serializer and is intended for use in high-speed measurement / test equipment. When employed as a selector switch, the IC can route one of its differential data input signals d0p/d0n or d1p/d1n to its differential output qp/qn while effectively blocking the other data input. Selection of a specific data input is achieved through appropriate external DC biasing of the selector signal inputs cp/cn. As a 2:1 serializer, the IC can receive high speed input data signals into d0p/d0n and d1p/d1n and effectively multiplex them into a double frequency rate NRZ output data signal by using a high speed input clock signal on its selector signal inputs cp/cn. The common-mode voltage levels of the input clock signals can be adjusted using the analog control inputs dcp/dcn.

The part's I/O's support the CML logic interface with on chip 50Ohm 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

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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 required input timing diagram is shown in Fig. 2. To ensure both maximum timing margins and low output signal jitter, limit the amount of peak to peak jitter on the input signals (D0, D1, and C) to only a few picoseconds.
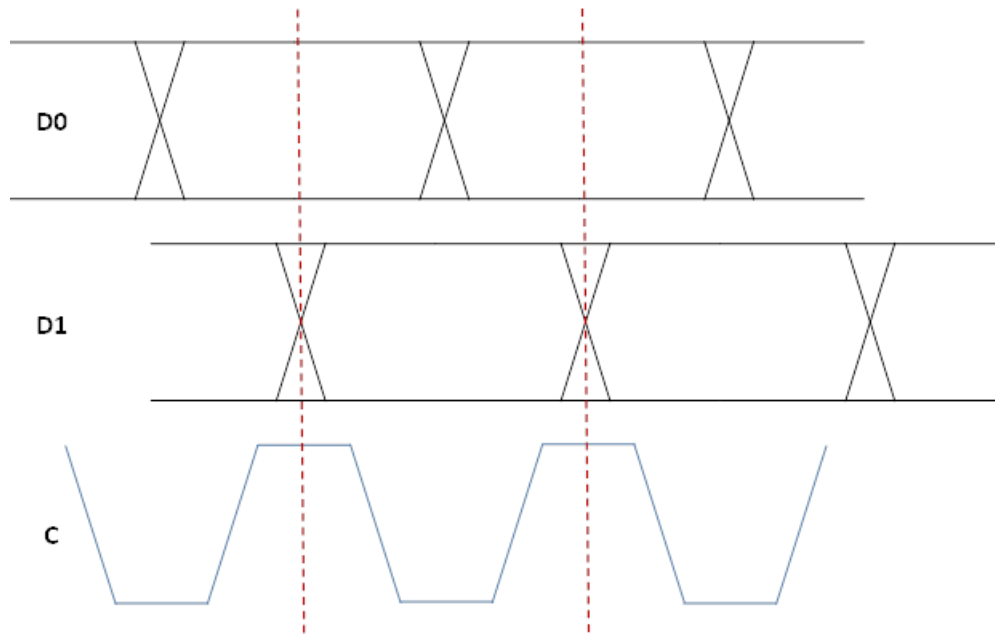
Fig. 2. Input Signal Timing Diagram

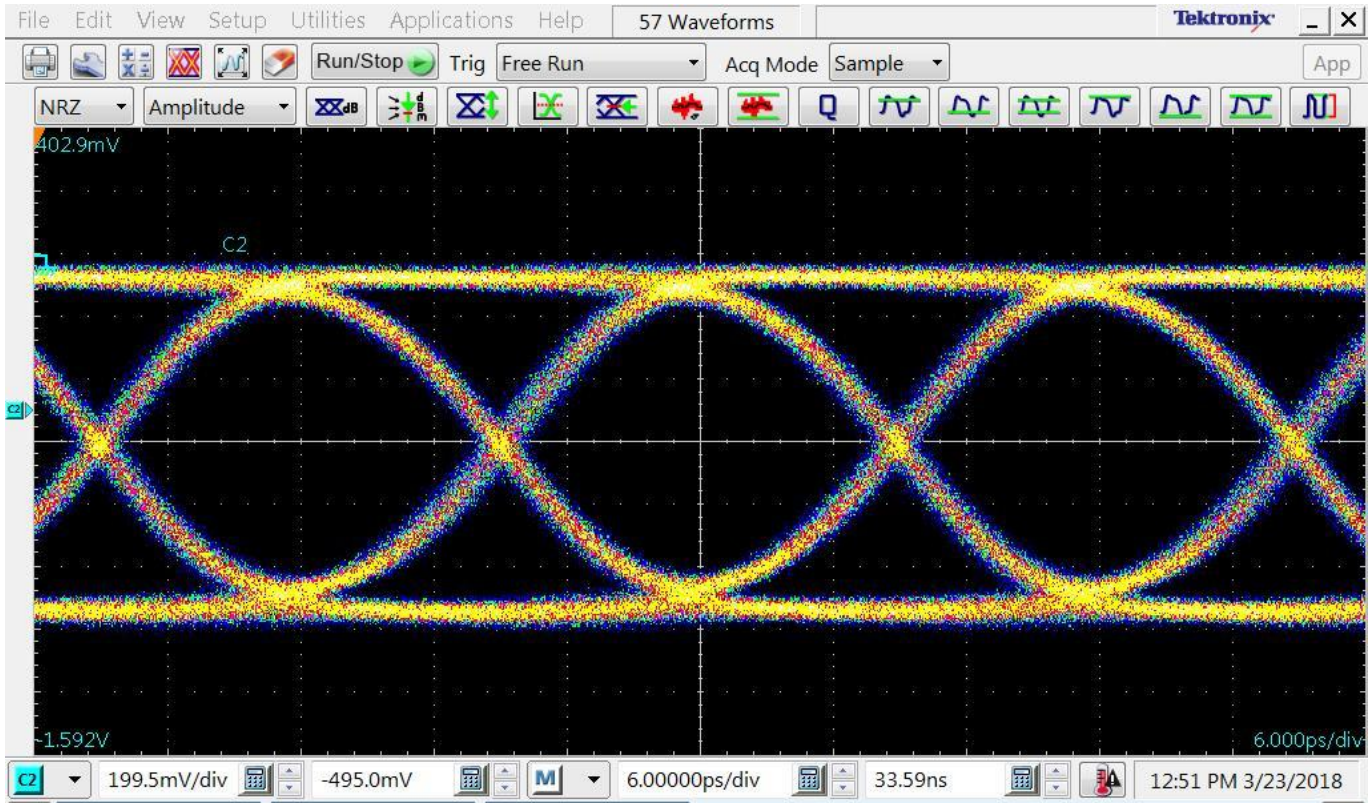An example of the output eye at 56*Gbps* is shown in Fig. 3.

Fig. 3. Eye diagram at 56Gb/s

POWER SUPPLY CONFIGURATION

The part operates with a negative supply (vcc = 0.0*V* = ground and vee = −3.3*V*).

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 max voltage limits are referenced to ground.

Table 1. Absolute Maximum Ratings

Parameter	Min	Max	Units
Supply Voltage (vee)		-4.8	*V*
Power Consumption		0.72	*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			
d0p	11	CML input	Differential data input signals with internal SE 50Ohm termination to VCC
d0n	12		
d1p	9	CML input	Differential data input signals with internal SE 50Ohm termination to VCC
d1n	8		
cp	2	CML input	Differential clock input signals with internal SE 50Ohm termination to VCC
cn	3		
dcp	10	Analog inputs	cp common mode control voltage
dcn	4		cn common mode control voltage
qp	6	CML output	Differential data output signals with internal SE 50Ohm termination to VCC. Also require external SE 50Ohm termination to VCC
qn	5		
Supply and Termination Voltages			
Name	**Description**		**Pin Number**
GND	Ground (0V)		13
-V	Negative power supply (-3.3*V*)		1, 7

ELECTRICAL CHARACTERISTICS

PARAMETER	MIN	TYP	MAX	UNIT	COMMENTS
General Parameters					
-V	-3.1	-3.3	-3.5	*V*	±6%
GND		0.0		*V*	External ground
*I*vee		150		*mA*	
Power consumption		500		*mW*	
Junction temperature	-25	50	125	*°C*	
HS Input Data (d0p/d0n, d1p/d1n)					
Data rate	DC		40	*Gbps*	When used as a selector
Frequency	DC		20	*GHz*	When used as a selector
Data rate	DC		32	*Gbps*	When used as a multiplexer
Swing	50		800	*mV*	Differential or SE, p-p
CM Voltage Level	vcc-0.8		vcc	*V*	Must match for both inputs
HS Input Clock (cp/cn)					
Frequency	DC		32	*GHz*	
Swing	50		800	*mV*	Differential or SE, p-p
CM Voltage Level	vcc-0.8		vcc	*V*	Must match for both inputs
Duty cycle	45	50	55	*%*	
HS Output Data (qp/qn)					
Data rate	DC		40	*Gbps*	When used as a selector
Frequency	DC		20	*GHz*	When used as a selector
Data rate	DC		64	*Gbps*	When used as a multiplexer
Logic "1" level		vcc		*V*	
Logic "0" level		vcc-0.6		*V*	With external 50*Ohm* DC termination
Rise/Fall times	4	6	8	*ps*	20%-80%
Output Jitter			<1	*ps*	Peak-to-peak
Common Mode Control Ports (dcp/dcn)					
Input Signal Range	-3.3		0.0	*V*	

PACKAGE INFORMATION

The part is housed in a custom metal module shown in Fig. 4.
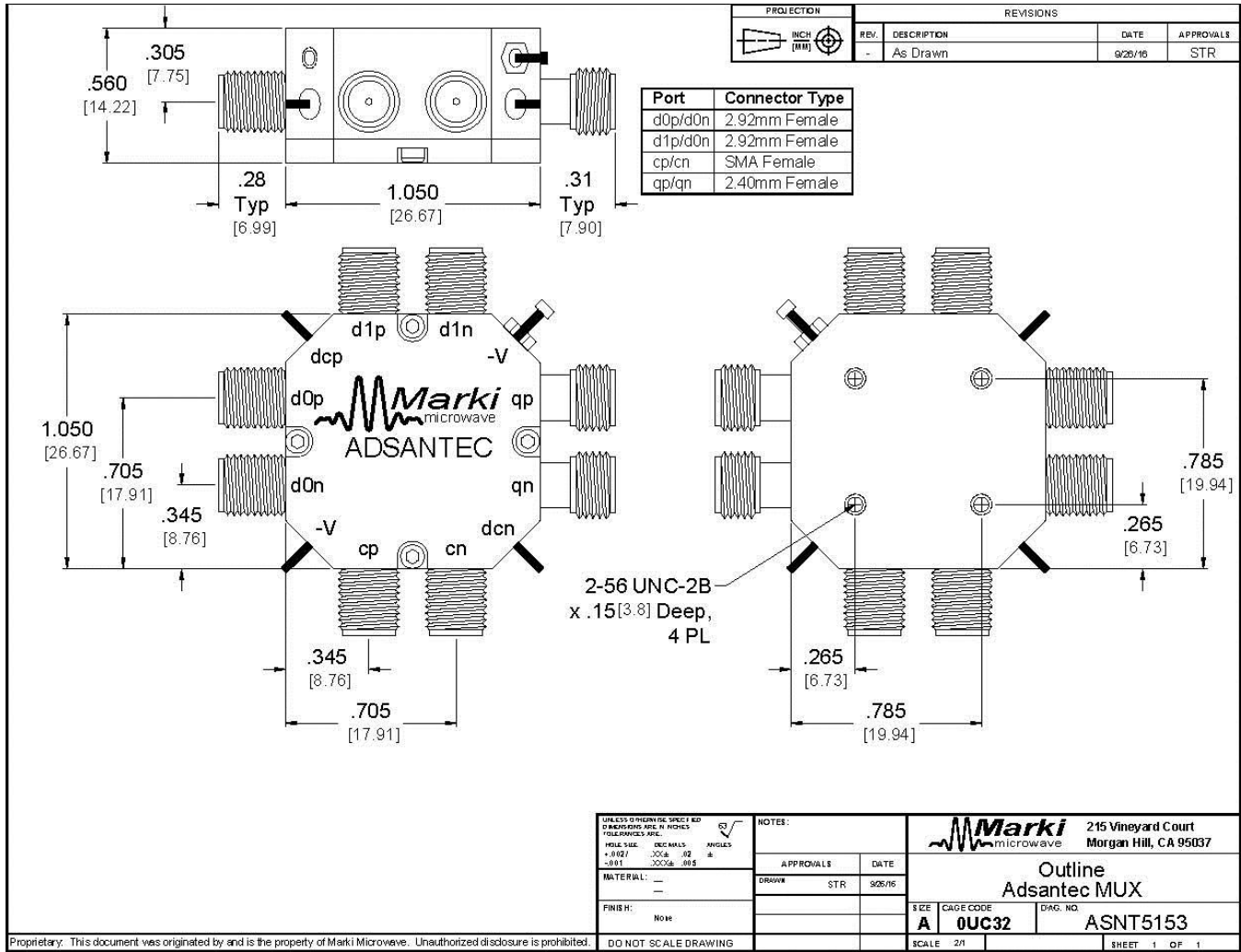
Fig. 4. ASNT5153-MOD Package Drawing

REVISION HISTORY

Revision	Date	Changes
1.1.2	07-2019	Updated Letterhead
1.1.1	05-2018	Renamed figures Added Fig. 3
1.0.1	06-2017	First release