

GX4201 Wideband, Monolithic 1x1 Video Crosspoint Switch

DATA SHEET

FEATURES

- -3 dB bandwidth, 300 MHz with C₁ = 0 pF
- off isolation at 100 MHz, 80 dB
- differential phase and gain at 4.43 MHz, 0.01 $^\circ$ & 0.02%
- + 800 μW disabled power consumption
- input signal levels from -2 V to +3 V
- logic input compatible with TTL and 5 V CMOS
- open collector TALLY output

FUNCTIONAL BLOCK DIAGRAM



PATENT PENDING

TRUTH TABLE

EN	OUT	TALLY
0	HIGH Z	OFF
1	IN	ON

ABSOLUTE MAXIMUM RATINGS

Parameter	Value		
Supply Voltage	±7.5 V		
Operating Temperature Range	$0^{\circ} \text{ C} \leq \text{T}_{\text{A}} \leq 70^{\circ} \text{ C}$		
Storage Temperature Range	-65° C \leq T _S \leq 150° C		
Lead Temperature (Soldering, 10 S	ec) 260° C		
Analog Input Voltage	$-5.5 \text{ V} \le \text{V}_{\text{IN}} \le 5.5 \text{ V}$		
Logic Input Voltage	$-0.5~\mathrm{V} \leq \mathrm{V_{L}} \leq 5.5~\mathrm{V}$		
Output Load Current	12mA		
High Level TALLY Output Current	2 mA		

CIRCUIT DESCRIPTION

The GX4201 is a wideband 1x1 video crosspoint implemented in bipolar monolithic technology. The device is characterized by excellent differential gain and phase in the enabled state, and very high off-isolation in the disabled state. The fully buffered unilateral signal path ensures negligible output to input feedback while delivering minimal output switching transients through make-before-break switching.

For use in NxM routing matrices, the device features a very high, nearly constant input impedance, coupled with very high output impedance in the disabled state. This allows multiple GX4201's to be paralleled at the input and output without additional circuitry. An open collector PNP to $V_{\rm CC}$ TALLY output provides indication of crosspoint selection.

To maximize system bandwidth, an external current source is used to bias the output device of the crosspoint. One external current source is required per output bus. For less demanding applications, a load resistor can be used in place of the output current source, causing a slight increase in differential phase. Non-additive mixing will occur on the output bus if more than one paralleled GX4201 is enabled at a time.

The GX4201 is one of a series of wideband video crosspoints utilizing Gennum's proprietary LSI process.

APPLICATIONS

- very high quality video switching
- HDTV
- computer graphics
- RF switching/routing
- PCM/data routing

PIN CONNECTIONS



Document No. 510 - 74 - 5

$\textbf{ELECTRICAL CHARACTERISTICS} \quad (V_{_{\rm S}}=\pm5 \text{V DC}, \ 0^{\circ}\text{C} < \text{T}_{_{\rm A}} < 70^{\circ}\text{C}, \ \text{I}_{_{\rm L}}=6 \ \text{mA})$

	PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
	Supply Voltage	±V _S		±4.5	±5	±5.5	V
DC		I+	EN=1		13.5	17	mA
SUPPLY	Supply Current		EN=0	-	80	140	μA
	(not including external	I-	EN=1	-	12.5	16	mA
	current load)		EN=0	-	80	140	μA
	Analog Output Voltage Swing	V _{OUT}	Extremes before clipping occurs	-2	-	3	V
STATIC	Analog Input Bias Current	I _{BIAS}		-	12	-	μΑ
	Output Offset Voltage	V _{os}	$T_A = 25^{\circ}C$	-10	-	10	mV
	Output Offset Voltage Drift-	$\Delta V_{OS} / \Delta T$		-	-25	-80	μV/°C
	Crosspoint Turn-On Time	t _{on}	Control input to appearance of signal at output.	-	200	400	ns
LOGIC	Crosspoint Turn-Off Time	t _{OFF}	Control input to disappearance of signal at output.	0.5	1.0	-	μs
	Logic Input	V _{IH}	1	2.0	-	_	V
	Thresholds	V _{IL}	0	-	-	0.8	V
	Enable Bias Current	I _{BIAS(EN)}	EN = 0	-	0.3	2	μΑ
	TALLY Output	V _{OH}	EN = 1, I _O = 1mA	4.80	4.89	4.93	V
	Insertion Loss	I.L.	1V p-p sine or sq.wave, $T_A = 25^{\circ}C$ at 100 kHz R _L =100K, C _L =30pF	0.015	0.025	0.040	dB
	Bandwidth (-3dB) See Fig. 1	B.W.	small signal $C_L = 0 \text{ pF}$	-	300	-	MHz
	Input Resistance	R _{IN}	EN = 1	1.0	3.0	-	MΩ
DYNAMIC	Input Capacitance	C _{IN}	EN = 0	-	1.1	-	pF
	Output Resistance	R _{OUT}	EN = 1	-	7	-	Ω
	Output Capacitance See Fig. 5	C _{OUT}	EN = 0	-	1.1		pF
	Differential Gain	dg	at 3.58 MHz		-	0.04	%
	Differential Phase See Fig. 6	dp	V _{IN} = 40 IRE	-	-	0.04	degrees
	Off Isolation See Fig. 4		Enabled GX4201 on output $f = 100 \text{ MHz} V_{IN} = 1 \text{ V } \text{ p-p}$	-	80		dB
1	Slew Rate	+SR		250	400		
		-SR	V _{IN} = 3V p-p (C _L = 0 pF)	250	350	-	V/µs

ORDERING INFORMATION

PART NUMBER	PACKAGE TYPE	TEMPERATURE RANGE			
GX4201-CKA	8 PIN SOIC	0° to 70°C			
GX4201-CDA	8 PIN DIP	0° to 70°C			
GX4201-CTA	8 PIN SOIC TAPE	0° to 70°C			

TYPICAL PERFORMANCE CURVES OF THE GX4201

For all graphs, $V_S = \pm 5 \text{ V DC}$ and $T_A = 25^{\circ}\text{C}$. The curves shown below represent typical batch sampled results.



continued over











510 - 74 - 5



Fig. 10 Burn-in Test Circuit



Fig. 11a Switching Transient Test Circuit





NOTE: Off-isolation can be increased by eliminating the signal path through the power supplies. This is demonstrated by replacing the enabled crosspoint with a 10Ω load resistor as shown in the passive load circuit.

Active Load

Fig. 12 Off-isolation Test Circuits

Passive Load

-5 V

All capacitors in farads, all resistors in ohms unless otherwise stated.



AVAILABLE PACKAGING

8 pin DIP 8 pin SOIC - TAPE

CAUTION ELECTROSTATIC SENSITIVE DEVICES DO NOT OPEN PACKAGES OR HANDLE EXCEPT AT A STATIC-REE WORKSTATION



8 pin SOIC

DOCUMENT IDENTIFICATION

PRODUCT PROPOSAL This data has been compiled for market investigation purposes only, and does not constitute an offer for sale.

ADVANCE INFORMATION NOTE This product is in development phase and specifications are subject to change without notice. Gennum reserves the right to remove the product at any time. Listing the product does not constitute an offer for sale.

PRELIMINARY DATA SHEET The product is in a preproduction phase and specifications are subject to change without notice.

DATA SHEFT

The product is in production. Gennum reserves the right to make changes at any time to improve reliability, function or design, in order to provide the best product possible.

Gennum Corporation assumes no responsibility for the use of any circuits described herein and makes no representations that they are free from patent infringement.

© Copyright AUG.1989 Gennum Corporation. Revision Date: January 1993. All rights reserved. Printed in Canada.