## FEATURES

- -3 dB bandwidth, 300 MHz with $\mathrm{C}_{\mathrm{L}}=0 \mathrm{pF}$
- off isolation at $100 \mathrm{MHz}, 80 \mathrm{~dB}$
- differential phase and gain at $4.43 \mathrm{MHz}, 0.01^{\circ}$ \& 0.02\%
- $800 \mu \mathrm{~W}$ 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



## TRUTH TABLE

| EN | OUT | TALLY |
| :---: | :---: | :--- |
| 0 | HIGH Z | OFF |
| 1 | $I N$ | ON |

## ABSOLUTE MAXIMUM RATINGS

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

## CIRCUIT DESCRIPTION

The GX4201 is a wideband $1 \times 1$ 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 $\mathrm{V}_{\mathrm{cc}}$ 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

TOP VIEW

8 PIN SOIC


ELECTRICAL CHARACTERISTICS $\left(\mathrm{V}_{\mathrm{S}}= \pm 5 \mathrm{~V} \mathrm{DC}, 0^{\circ} \mathrm{C}<\mathrm{T}_{\mathrm{A}}<70^{\circ} \mathrm{C}, \mathrm{I}_{\mathrm{L}}=6 \mathrm{~mA}\right)$

|  | PARAMETER | SYMBOL | CONDITIONS | MIN | TYP | MAX | UNITS |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| DC SUPPLY | Supply Voltage | $\pm \mathrm{V}_{\text {S }}$ |  | $\pm 4.5$ | $\pm 5$ | $\pm 5.5$ | V |
|  | Supply Current <br> (not including external current load) | I+ | EN=1 | - | 13.5 | 17 | mA |
|  |  |  | $\mathrm{EN}=0$ | - | 80 | 140 | $\mu \mathrm{A}$ |
|  |  | I- | EN=1 | - | 12.5 | 16 | mA |
|  |  |  | $\mathrm{EN}=0$ | - | 80 | 140 | $\mu \mathrm{A}$ |
| STATIC | Analog Output Voltage Swing | $\mathrm{V}_{\text {OUT }}$ | Extremes before clipping occurs | -2 | - | 3 | V |
|  | Analog Input Bias Current | $\mathrm{I}_{\text {BIAS }}$ |  | - | 12 | - | $\mu \mathrm{A}$ |
|  | Output Offset Voltage | $\mathrm{V}_{\text {os }}$ | $\mathrm{T}_{\mathrm{A}}=25^{\circ} \mathrm{C}$ | -10 | - | 10 | mV |
| LOGIC | Output Offset Voltage Drift- | $\Delta \mathrm{V}_{\mathrm{OS}} / \Delta \mathrm{T}$ |  | - | -25 | -80 | $\mu \mathrm{V} /{ }^{\circ} \mathrm{C}$ |
|  | Crosspoint Turn-On Time | $\mathrm{t}_{\mathrm{ON}}$ | Control input to appearance of signal at output. | - | 200 | 400 | ns |
|  | Crosspoint <br> Turn-Off Time | $\mathrm{t}_{\text {OFF }}$ | Control input to disappearance of signal at output. | 0.5 | 1.0 | - | $\mu \mathrm{s}$ |
|  | Logic Input <br> Thresholds | $\mathrm{V}_{1 H}$ | 1 | 2.0 | - | - | V |
|  |  | $\mathrm{V}_{\text {IL }}$ | 0 | - | - | 0.8 | V |
|  | Enable <br> Bias Current | $I_{\text {BIAS(EN) }}$ | $E N=0$ | - | 0.3 | 2 | $\mu \mathrm{A}$ |
|  | TALLY Output | $\mathrm{V}_{\mathrm{OH}}$ | $\mathrm{EN}=1, \mathrm{I}_{\mathrm{O}}=1 \mathrm{~mA}$ | 4.80 | 4.89 | 4.93 | V |
| DYNAMIC | Insertion Loss | I.L. | 1V p-p sine or sq.wave, $\mathrm{T}_{\mathrm{A}}=25^{\circ} \mathrm{C}$ at $100 \mathrm{kHz} \mathrm{R}_{\mathrm{L}}=100 \mathrm{~K}, \mathrm{C}_{\mathrm{L}}=30 \mathrm{pF}$ | 0.015 | 0.025 | 0.040 | dB |
|  | $\begin{aligned} & \text { Bandwidth ( }-3 \mathrm{~dB} \text { ) } \\ & \text { See Fig. } \end{aligned}$ | B.W. | small signal $C_{L}=0 \mathrm{pF}$ | - | 300 | - | MHz |
|  | Input Resistance | $\mathrm{R}_{\text {IN }}$ | $\mathrm{EN}=1$ | 1.0 | 3.0 | - | $\mathrm{M} \Omega$ |
|  | Input Capacitance | $\mathrm{C}_{\text {IN }}$ | $\mathrm{EN}=0$ | - | 1.1 | - | pF |
|  | Output Resistance | $\mathrm{R}_{\text {OUT }}$ | EN = 1 | - | 7 | - | $\Omega$ |
|  | Output Capacitance See Fig. 5 | $\mathrm{C}_{\text {OUT }}$ | $\mathrm{EN}=0$ | - | 1.1 | - | pF |
|  | Differential Gain | dg | at 3.58 MHz | - | - | 0.04 | \% |
|  | $\begin{aligned} & \text { Differential Phase } \\ & \text { See Fig. } 6 \end{aligned}$ | dp | $\mathrm{V}_{\mathrm{IN}}=40 \mathrm{IRE}$ | - | - | 0.04 | degrees |
|  | Off Isolation See Fig. 4 |  | Enabled GX4201 on output $f=100 \mathrm{MHz} \quad \mathrm{~V}_{\mathbb{N}}=1 \mathrm{Vp-p}$ | - | 80 | - | dB |
|  | Slew Rate | +SR |  | 250 | 400 | - |  |
|  |  | -SR | $\mathrm{V}_{\mathrm{IN}}=3 \mathrm{~V} p-\mathrm{p}\left(\mathrm{C}_{\mathrm{L}}=0 \mathrm{pF}\right)$ | 250 | 350 | - | $\mathrm{V} / \mathrm{\mu s}$ |

## ORDERING INFORMATION

| PART NUMBER | PACKAGE TYPE | TEMPERATURE RANGE |
| :--- | :--- | :---: |
| GX4201-CKA | 8 PIN SOIC | $0^{\circ}$ to $70^{\circ} \mathrm{C}$ |
| GX4201-CDA | 8 PIN DIP | $0^{\circ}$ to $70^{\circ} \mathrm{C}$ |
| GX4201-CTA | 8 PIN SOIC TAPE | $0^{\circ}$ to $70^{\circ} \mathrm{C}$ |

TYPICAL PERFORMANCE CURVES OF THE GX4201
For all graphs, $\mathrm{V}_{\mathrm{S}}= \pm 5 \mathrm{~V} \mathrm{DC}$ and $\mathrm{T}_{\mathrm{A}}=25^{\circ} \mathrm{C}$. The curves shown below represent typical batch sampled results.


Fig. 1 Gain vs Frequency


Fig. 3 Gain vs Frequency


Fig. 2 Phase vs Frequency


Fig. 4 Off Isolation vs Frequency


Fig. $5 \mathrm{C}_{\text {IN }}$ vs Frequency


Fig. $7 \mathrm{dg} / \mathrm{dp}$ vs Input Bias


Fig. $6 \mathrm{C}_{\text {out }}$ vs Bias


Fig. 8 dg/dp vs Frequency


Fig. $9 \mathrm{dg} / \mathrm{dp}$ vs $\mathrm{R}_{\mathrm{L}}$


Fig. 10 Burn-in Test Circuit


Fig. 11a Switching Transient Test Circuit


Fig. 11b Switching Transient
 load circuit.

Fig. 12 Off-isolation Test Circuits


## AVAILABLE PACKAGING



| 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 |
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| DATA SHEET |
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