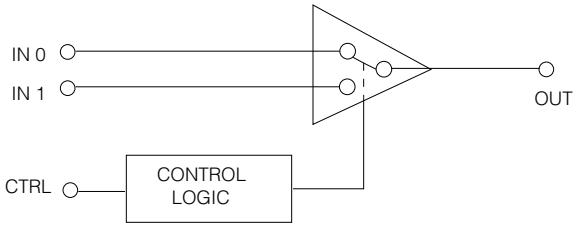
GY4102A Fast Toggling Video Switch

DATA SHEET

FEATURES

- **20 ns switching time (toggle)**
- **make-before-break switching**
- **100 MHz at ±0.1dB, bandwidth (flattened)**
- **typically 0.04 dB insertion loss at 1 MHz**
- **typically 0.03 % differential gain at 3.58 MHz**
- **typically 0.01 degree differential phase at 3.58 MHz**

FUNCTIONAL BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS

PARAMETER	VALUE
Supply Voltage	±6.0 V
Operating Temperature Range	0°C to 70° C
Storage Temperature Range	-65°C to 150° C
Lead Temperature (Soldering, 10 Sec)	260° C
Analog Input Voltage (IN 0, IN 1)	$V_{EE} < V_{IN} < V_{CC} + 0.3$ V
Control Input Voltage Range	-5 V $< V_{CTRL} < V_{CC} + 0.3$ V

ORDERING INFORMATION

Part Number	Package Type	Temperature Range
GY4102ACDA	8 pin PDIP	0 - 70°C
GY4102ACKA	8 pin SOIC	0 - 70°C

CIRCUIT DESCRIPTION

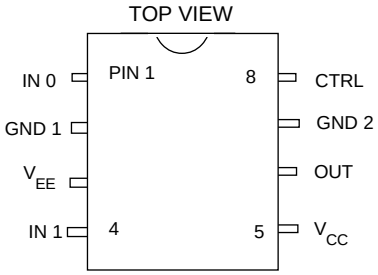
The GY4102A is a bipolar, monolithic SPDT video switch incorporating fast control logic. The analog signal path is characterised by low differential gain, low differential phase and low insertion loss, coupled with a ±0.1 dB bandwidth of typically 100 MHz into a 10 pF load, using an external series resistor.

In demanding video applications the GY4102A features a typical switching glitch of less than 30 mV over a 3 ns period. The device offers toggle rates up to 50 MHz. The control input is TTL and 5 V CMOS compatible.

APPLICATIONS

- Sub-pixel video switching
- Fast data sampling
- Modulation
- Special Effects video switching

PIN CONNECTIONS



8 PIN PDIP
8 PIN SOIC

TRUTH TABLE

CTRL	OUTPUT
0	IN 0
1	IN 1

AVAILABLE PACKAGING

- 8 pin PDIP
- 8 pin SOIC

GENNUM CORPORATION P.O. Box 489, Stn A, Burlington, Ontario, Canada L7R 3Y3 tel. (416) 632-2996 fax: (416) 632-2055 telex: 061-8525
Japan Branch: B-210 Miyamae Village, 2-10-42 Miyamae, Suginami-ku, Tokyo 168, Japan tel. (03) 3247-8838 fax: (03) 3247-8839

ELECTRICAL CHARACTERISTICS (V_S = ±5V DC, T_A = 0 - 70°C, C_L = 10pF, R_L = 10 kΩ unless otherwise shown)

	PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
DC SUPPLY	Supply Voltage	$\pm V_S$		4.5	5	5.5	V
	Supply Current	I+		-	23	30	mA
		I-		-	25	32	mA
LOGIC	Control Input Bias	I_{CTRL}	Control = 1	-	5	25	µA
	Logic Level threshold	V_{LOGIC}	1	2	-	-	V
			0	-	-	0.8	V
STATIC	Analog Input Bias Current	I_{BIAS}	Selected channel	-	12	30	µA
			Deselected channel	-	26	60	µA
	Signal Voltage Swing	V_{SIG}	Extremes before clipping occurs	-1.5	-	+3	V
	Output Offset Voltage	V_{OS}	T_A = 25°C	-6	+4	+14	mV
	Output Offset Voltage	$V_{OSCH-CH}$	T_A = 25°C channel to channel	-	1	5	mV
	Output Offset Drift	$\Delta V_{OS}/T$		-	+93	+200	µV/°C
DYNAMIC	Input Resistance	R_{IN}	Channel On	500	-	-	kΩ
	Input Capacitance	C_{IN}	Channel On	1.3	-	-	pF
	Frequency Response Flatness		DC - 100 MHz R_S = 33 Ω	-	±0.2	-	dB
			DC - 8 MHz R_S = 33 Ω	-	-	±0.01	dB
	Insertion Loss	I.L.	f = 1 MHz	-	0.04	-	dB
	Differential Gain	dg	f = colorburst 3.58 or 4.43 MHz	-	0.03	-	%
	Differential Phase	dp	f = colorburst 3.58 or 4.43 MHz	-	0.01	-	degrees
	Crosstalk (all hostile)	$XTALK_{AH}$	f = 10 MHz see fig. 3	75	80	-	dB
	Slew Rate	+SR	V_{IN}= 2 Vp-p T_A = 25°C	400	620	-	V/µs
		-SR		250	330	-	V/µs

SWITCHING CHARACTERISTICS (V_S = ±5V, T_A = 0 - 70°C, C_L =10pF, R_S = 33 Ω, R_L = 10 kΩ)

PARAMETER	SYMBOL	CONDITIONS		MIN	TYP	MAX	UNITS
Delay Time (see Figure 7)	$t_{d\ (on\ 1)}$	V_{SIG} = 0 - 1 V		-	5.4	9	ns
	$t_{d\ (on\ 2)}$			-	8.2	13	ns
	$t_{d\ (off\ 1)}$	V_{SIG} = 1 - 0 V		-	6	11	ns
	$t_{d\ (off\ 2)}$			-	12.5	22	ns
Settling Time (see Figure 7a)	$t_{S\ (on)}$	To 0.5 IRE on 0 to 1 V output, T_A = 25°		-	9	15	ns
(see Figure 7b)	$t_{S\ (off)}$	To 0.5 IRE on 1 to 0 V output, T_A = 25°C		-	7	15	ns
Switching Transient * (Unfiltered)		POS.	Amplitude	-	+30	+50	mV
			Duration	-	3	5	ns
		NEG.	Amplitude	-	-20	-30	mV
			Duration	-	2	3	ns

* CH0 = CH1 = GND

TYPICAL PERFORMANCE CURVES FOR GY4102A

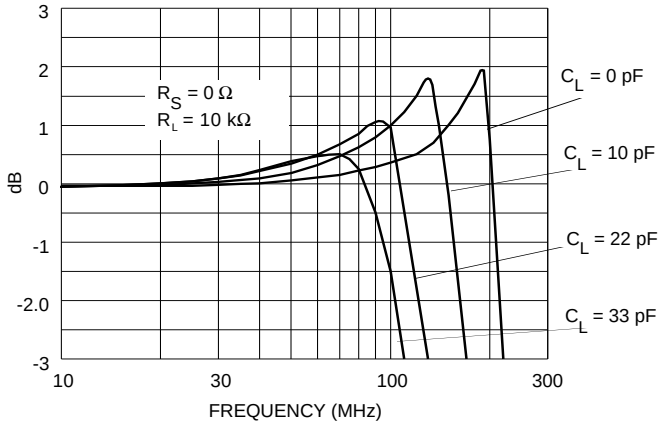


Fig. 1 GY4102A Frequency Response

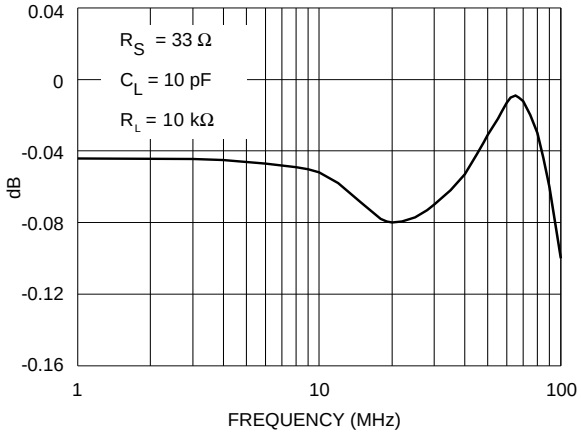


Fig. 2 GY4102A Flattened Frequency Response

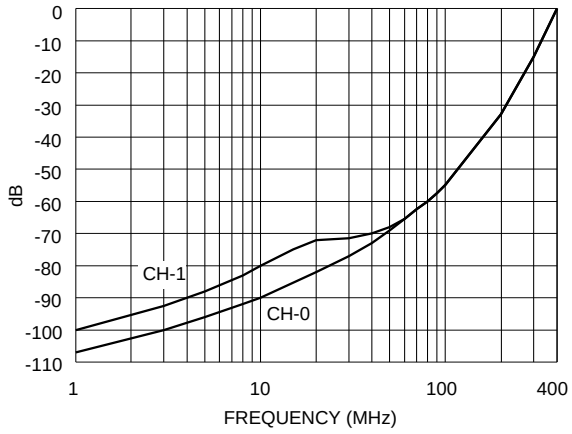


Fig. 3 GY4102A Crosstalk vs Frequency

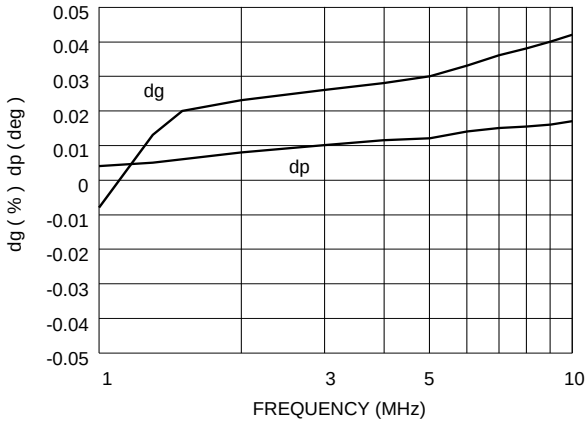
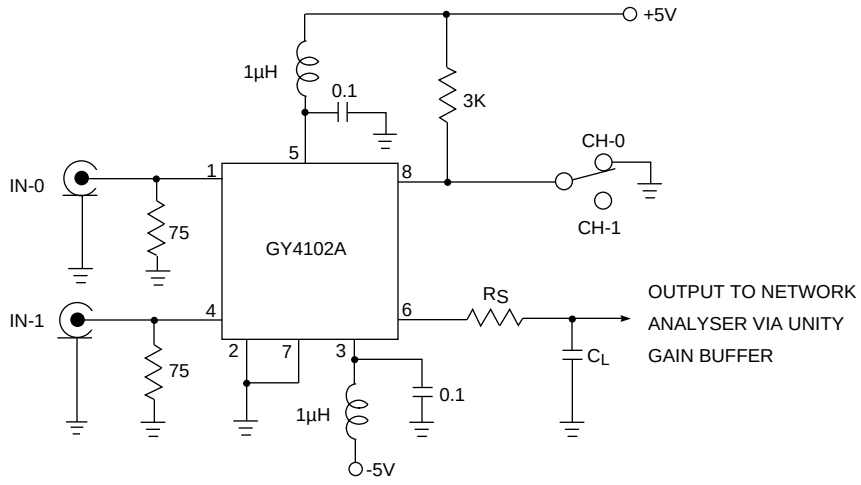


Fig. 4 GY4102A Differential Gain & Phase

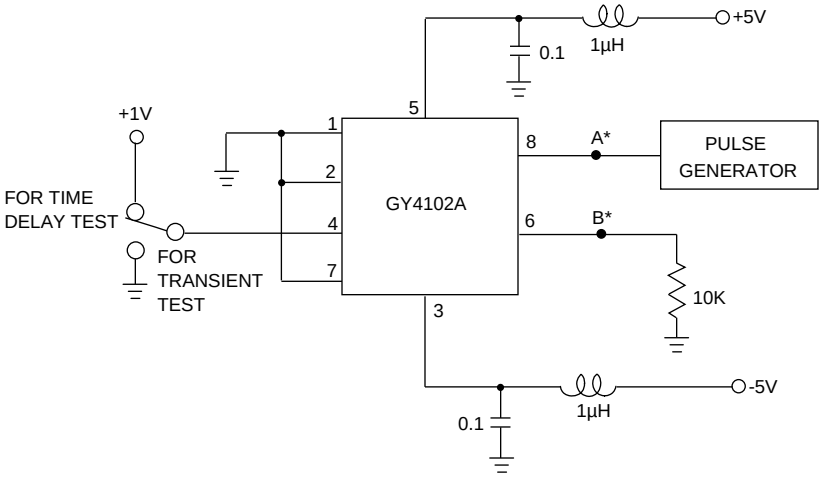
An evaluation board and application note on the GY4102A is available.
Please quote EB4102 for the board and AN 520 - 2 for the application note.
There is no charge for these items.

GY4102A TEST CIRCUITS



All resistors in ohms, all capacitors in microfarads unless otherwise stated

Fig. 5 Frequency Response



*USE ULTRA LOW CAPACITANCE SCOPE PROBES AT POINTS A & B

PULSE GENERATOR CHARACTERISTICS $t_r = t_f \leq 1$ ns $V_o = 5$ V $p_{rr} \leq 20$ MHz

All resistors in ohms, all capacitors in microfarads unless otherwise stated

Fig. 6 Switching Transient / Time Delays

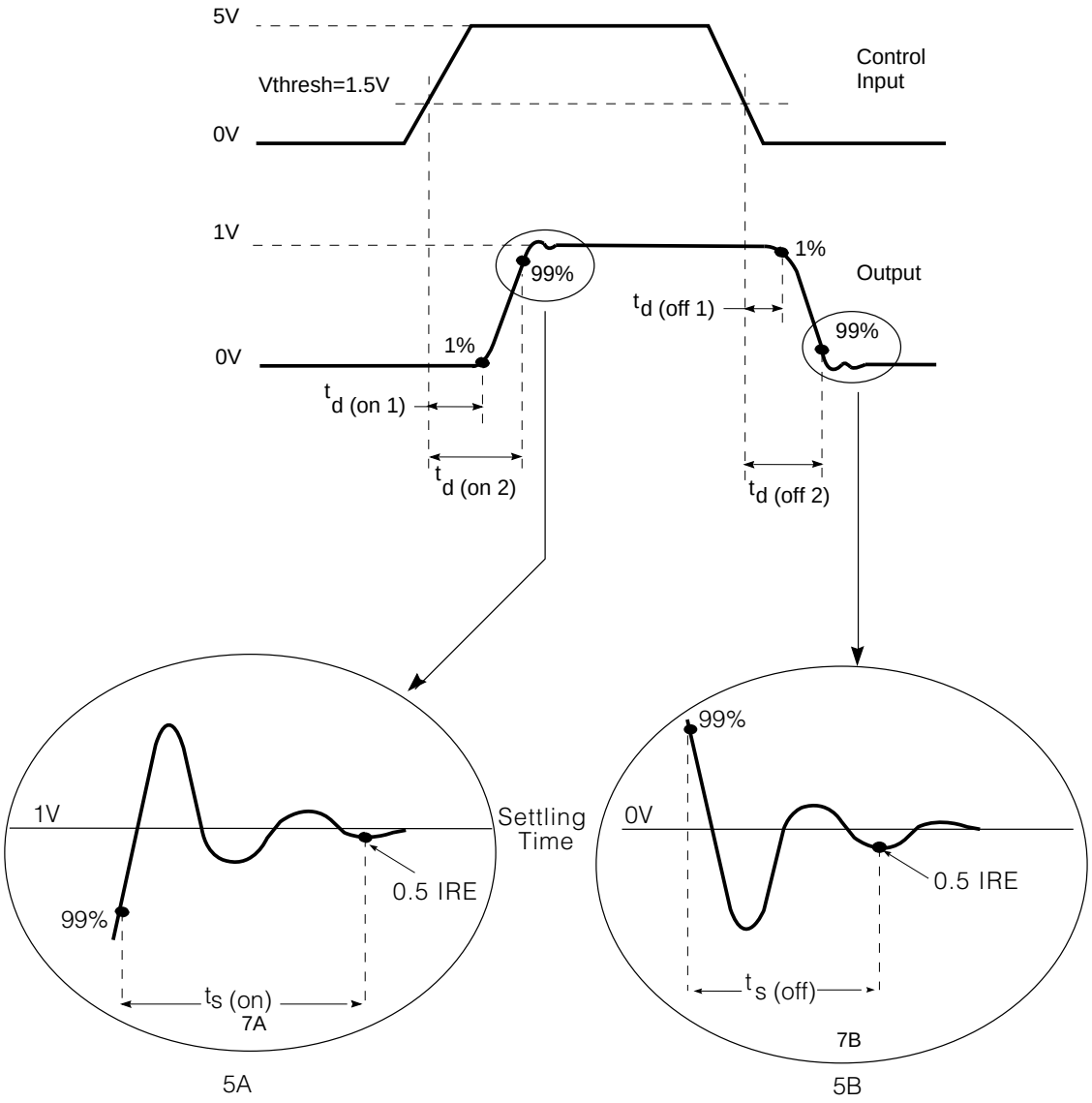


Fig. 7 Delay Time

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

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 SHEET
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.