GENNUM CORPORATION

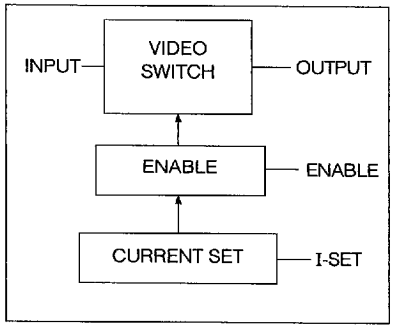
GB4600 Monolithic Unity Gain Video Buffer

DATA SHEET

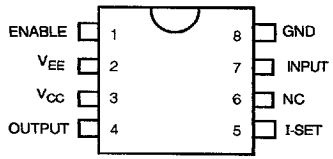
FEATURES

- **wideband, unity gain, stable operation (± 0.1 dB at 100 MHz when C_L = 27 pF) (full power BW = 120 MHz when C_L = 47 pF).**
- **selectable high and low current operating modes (I_L = 10 mA or I_L = 20 mA)**
- **drives high capacitance loads (C_L = 180 pF) to 70 MHz at -3 dB.**
- **extremely low differential phase and gain**
- **convenient 8 pin DIP / SOIC packaging**
- **100 µW disabled power consumption**

FUNCTIONAL BLOCK DIAGRAM



PIN CONNECTIONS



DESCRIPTION

The GB4600 is a high performance, monolithic unity gain video buffer made on Gennum's proprietary LSI process. The device features a stable wideband topology capable of driving high capacitance video busses.

Optimal system power/bandwidth can be achieved by using the high/low current mode select (I-SET). In addition, the GB4600 can be disabled by taking the ENABLE pin to ground. The ENABLE input is TTL and 5 V CMOS compatible.

The GB4600 operates from ±4.5 to ±5.5 V power supplies and typically draws 30 mA of current when I-SET is not connected. The supply current drops by approximately 50% when I-SET is directly connected to V_{EE}.

A typical application for the GB4600 is interfacing Gennum's wide range of video crosspoint switches. The 8 pin PDIP and 8 pin SOIC packaging is ideally suited for space restricted board layouts.

APPLICATIONS

- Input and output buffering in wide crosspoint matrices
- Inter-board video signal buffering
- Inter-system video signal buffering

AVAILABLE PACKAGING

8 pin PDIP
8 pin SOIC

ORDERING INFORMATION

Part Number	Package	Temperature Range
GB4600-CDA	8 PDIP	0° to 70°C
GB4600-CKA	8 SOIC	0° to 70°C

Revision Date: February 1994

ABSOLUTE MAXIMUM RATINGS

PARAMETER	VALUE
Supply Voltage	±7.5 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	$-5.5\ V \le V_{IN} \le 5.5\ V$
Logic Input Voltage	$-0.5\ V \le V_L \le 5.5\ V$

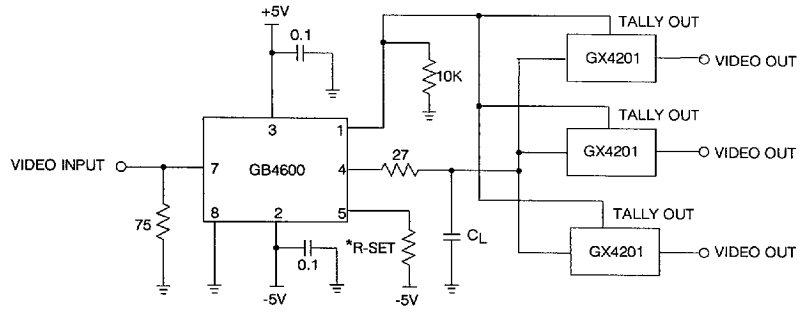
CAUTION
ELECTROSTATIC
SENSITIVE DEVICES
DO NOT OPEN PACKAGES OR HANDLE
EXCEPT AT A STATIC-FREE WORKSTATION

ELECTRICAL CHARACTERISTICS

V_S = ±5 V, T_A = 0° to 70°C, R_L = 10kΩ, C_L = 47 pF, R-SET = open circuit unless otherwise shown.

	PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
DC SUPPLY	Supply Voltage	V_S		±4.5	±5.0	±5.5	V
	Supply Current	I^+		-	30	37	mA
		I^-		-	30	37	mA
		I^+	R-SET = 0 Ω	-	16	20	mA
		I^-	R-SET = 0 Ω	-	16	20	mA
		I^+ (off)	Enable = 0	-	0	-	µA
		I^- (off)	Enable = 0	-	16	50	µA
STATIC	Analog Output Voltage	V_{OUT}	Unclipped Extremes	-1.8	-	2.2	V
	Analog Input Bias Current	IV_{BIAS}		-	12	-	µA
	Output Offset Voltage	V_{OS}	T_A = 25°C	-5	-	15	mV
	Output Offset Voltage Drift	ΔV_{OS}		-	50	100	µV/°C
LOGIC	Chip Enable Time	t_{ON}		-	100	-	ns
	Chip Disable Time	t_{OFF}		-	1	-	µs
	Logic Input Thresholds	V_{IH}		2.0	-	-	V
		V_{IL}		-	-	0.8	V
	Enable Bias Current	I_{BIAS}	Enable = 0, T_A = 25°C	-	-	5.0	µA
DYNAMIC	Insertion Loss	I.L.	f = 100 kHz, T_A = 25°C	-	-0.04	-	dB
	Frequency Response (±0.1dB)	F.R.	V_{IN} = 1 V p-p C_L = 27 pF	-	100	-	MHz
	Full Power (-3dB)	FPBW	V_{IN} = 1 V p-p,	-	120	-	MHz
	Input Resistance	R_{IN}		1.0	3.0	-	MΩ
	Input Capacitance	C_{IN}		-	1.1	-	pF
	Output Resistance	R_{OUT}		-	2	-	Ω
	Output Capacitance	C_{OUT}		-	5	-	pF
	Differential Gain	dg	f = 3.58 MHz	-	0.02	-	%
	Differential Phase	dp	f = 3.58 MHz	-	0.02	-	deg
	Off Isolation at 30 MHz		V_{IN} = 1 V p-p	75	80	-	dB
	Slew Rate	+SR	R-SET = 0 (I minimum) V_{IN} = 3 V p-p, C_L = 100 pF R_S = 12 Ω	-	250	-	V/µs
		-SR		-	100	-	V/µs
		+SR	V_{IN} = 3 V p-p, C_L = 100 pF R_S = 12 Ω	-	350	-	V/µs
		-SR		-	170	-	V/µs

GB4600



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

* The current will be maximum if the pin 5 is left open circuit. Any value of resistance from pin 5 to $-V_{EE}$ will reduce the current. The minimum current (50% of max.) will occur when R-SET = 0 Ω.

TYPICAL APPLICATION CIRCUIT

The circuit shown above uses the GB4600 as an input buffer driving several GX4201 video crosspoint ICs.

The GB4600 is capable of driving loads up to 100 pF to a -3 dB bandwidth of 80 MHz. For lighter loads, the bandwidth is extended to over 100 MHz.

Capacitor C_L is used to shape the response in conjunction with the 27 Ω series resistor from pin 4. The value shown will give a -1 dB response at 100 MHz with a total load capacitance (fixed plus actual) of 47 pF.

In order to disable the GB4600, pin 1 is driven from the TALLY outputs of the GX4201s. When all crosspoints are OFF, the voltage on pin 1 will be 0 volts, disabling the GB4600. Whenever any crosspoint is selected, the voltage on pin 1 rises to +5 volts and turns on the buffer. This configuration minimizes the current drain when a group of crosspoints are turned off.

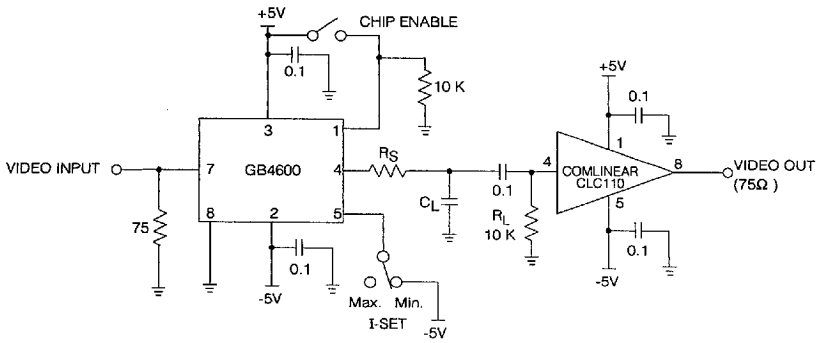
For other applications, the ENABLE input on the GB4600 may be controlled by any TTL or 5 volt CMOS device.

A unique feature of the GB4600 is that its current drain can be reduced by adjusting the value of the resistor on the I-SET input, pin 5.

If R-SET is made zero ohms (a direct connection to $-V_{EE}$) then the supply current drops 50% from 36 mA to 18 mA.

A reduced current will reduce the bandwidth as shown in Figure 3. For values of R_S = 27 Ω and C_L = 47 pF, the -1 dB bandwidth shrinks from 100 MHz at maximum current to 80 MHz at minimum current.

As with any high frequency circuit, careful board layout with ample ground plane is critical.



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TEST CIRCUIT

TYPICAL PERFORMANCE CURVES FOR THE GB4600

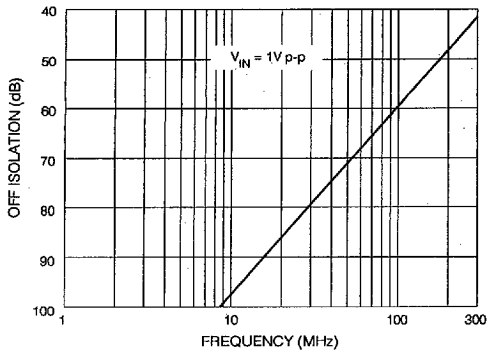

Fig. 1 Off - Isolation vs Frequency

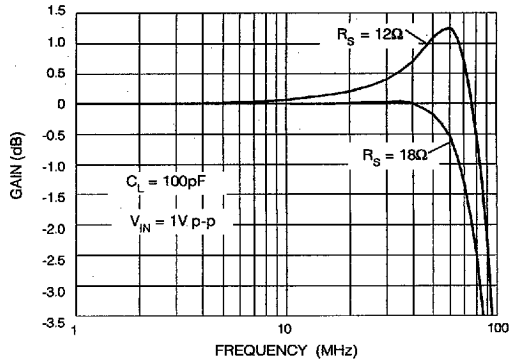

Fig. 2 Full Power Bandwidth (100 pF) vs Frequency

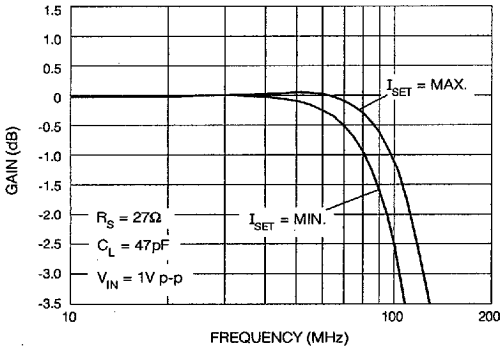

Fig. 3 I-SET Bandwidth vs Frequency

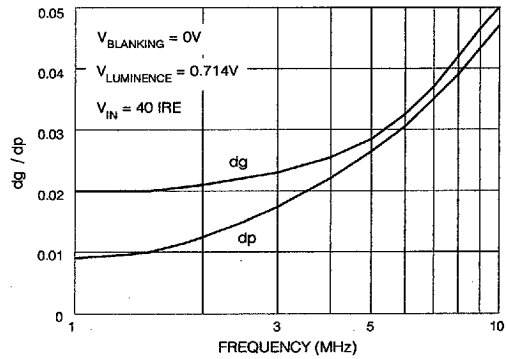

Fig. 4 Differential Gain and Phase vs Frequency

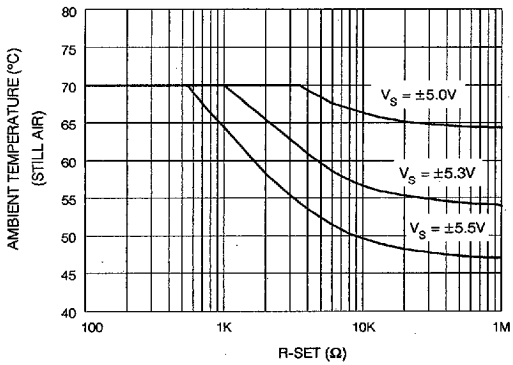

Fig. 5 SOIC Derating Curves

REVISION NOTES:
Upgraded to Data Sheet