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GV8500 Active Connect™ Multimedia Transmitter

Features

- 10.2 Gb/s HDMI 1.3b compatible
- 10.8 Gb/s DisplayPort 1.1 compatible
- 50Ω differential PECL input
- Pb-free and RoHS compliant
- Single 3.3V power supply operation
- Operating temperature range: 0°C to 70°C
- Small footprint (4mm x 4mm)

Applications

- Multi-rate HDMI interfaces
- Multi-rate DisplayPort interfaces

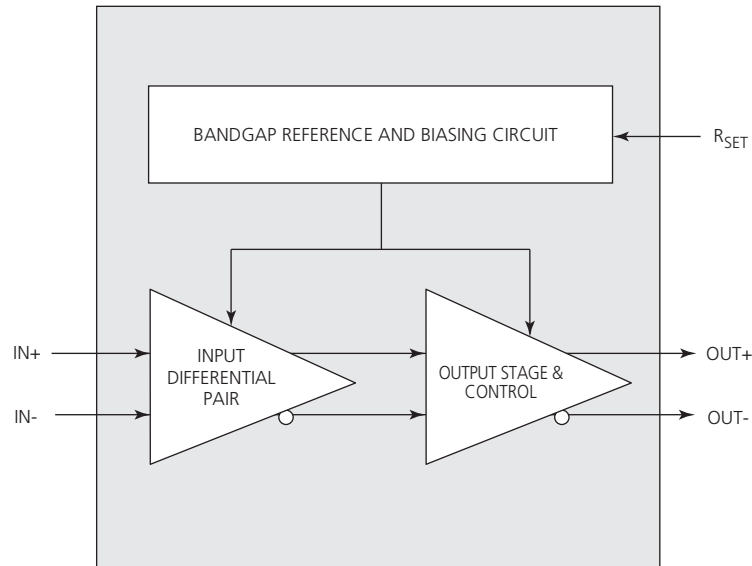
Description

The GV8500 is a high-speed BiCMOS integrated circuit designed to drive copper cables.

Power consumption is typically 168mW using a 3.3V power supply. The GV8500 is Pb-free, and the encapsulation compound does not contain halogenated flame retardant.

The GV8500 is designed to operate with the GV8501 multimedia receiver to enable long reach HDMI / DisplayPort connectivity.

This component and all homogeneous subcomponents are RoHS compliant.



GV8500 Functional Block Diagram

Revision History

Version	ECR	Date	Changes and/or Modifications
0	149328	February 2008	Update sections throughout.
A	148086	October 2007	New document.

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1. Pin Out

1.1 Pin Assignment

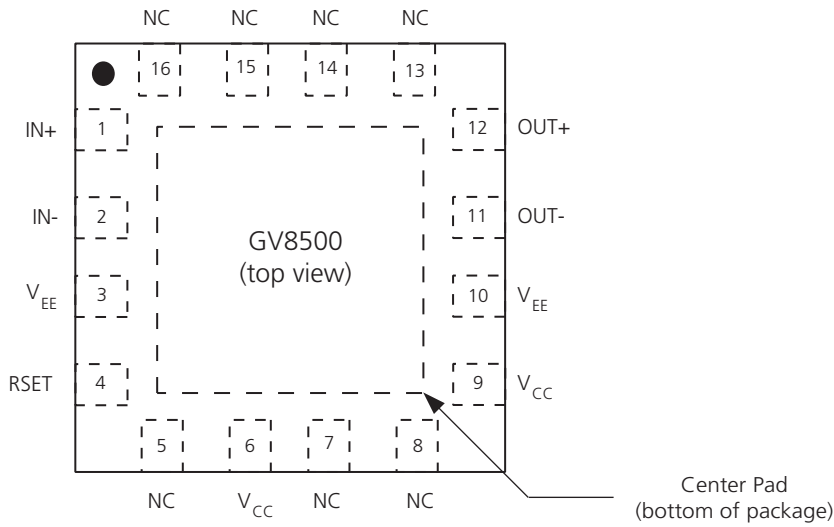


Figure 1-1: GV8500 16-Pin QFN

1.2 Pin Descriptions

Table 1-1: Pin Descriptions

Pin Number	Name	Type	Description
1, 2	IN+, IN-	Input	Differential inputs.
3, 10	V_{EE}	Power	Most negative power supply connection. Connect to GND.
4	R_{SET}	Input	External output amplitude control resistor.
5, 7, 8, 13, 14, 15, 16	NC	–	No Connect.
6, 9	V_{CC}	Power	Most positive power supply connection. Connect to +3.3V.
11, 12	OUT-, OUT+	Output	Differential outputs.
–	Center Pad	Power	Connect to most negative power supply plane. Refer to 6.3 Recommended PCB Footprint .

2. Electrical Characteristics

2.1 Absolute Maximum Ratings

Table 2-1: Absolute Maximum Ratings

Parameter	Value
Supply Voltage	-0.5V to 3.6 V _{DC}
Input ESD Voltage	4kV
Storage Temperature Range	-50°C < T _s < 125°C
Input Voltage Range (any input)	-0.3 to (V _{CC} +0.3)V
Operating Temperature Range	0°C to 70°C
Solder Reflow Temperature	260°C

2.2 DC Electrical Characteristics

Table 2-2: DC Electrical Characteristics

V_{CC} = 3.3V ±5%; T_A = 0°C to 70°C, unless otherwise shown

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Supply Voltage	V _{CC}	–	3.135	3.3	3.465	V
Power Consumption	P _D	T _A = 25°C	–	168	–	mW
Supply Current	I _s	T _A = 25°C	–	51	–	mA
Output Voltage	V _{CMOUT}	Common mode	–	V _{CC} - V _{OUT}	–	V
Input Voltage	V _{CMIN}	Common mode	1.4 + ΔV _{DDI} /2	–	V _{CC} - ΔV _{DDI} /2	V

2.3 AC Electrical Characteristics

Table 2-3: AC Electrical Characteristics

$V_{CC} = 3.3V \pm 5\%$; $T_A = 0^\circ C$ to $70^\circ C$, unless otherwise shown

Parameter	Symbol	Conditions	Min	Typ	Max	Units	Notes
Serial Input Data Rate	DR	–	0.25	–	3.4	Gb/s	
Serial Input Clock Rate	–	HDMI Clock, 1/10th Data Rate	25	–	340	MHz	
Additive Jitter	–	3.4Gb/s	–	22	–	ps _{p-p}	
	–	1.65Gb/s	–	20	–	ps _{p-p}	
Rise/Fall Time	t_r, t_f	–	–	–	135	ps	1
Output Voltage Swing	V_{OUT}	$R_{SET} = 750\Omega$	700	800	900	mV _{p-p}	2
Input Voltage Swing	ΔV_{DDI}	Differential	400	–	1560	mV _{p-p}	

1. Rise/Fall time measured between 20% and 80%.
2. Single Ended into 75Ω external load.

3. Input / Output Circuits

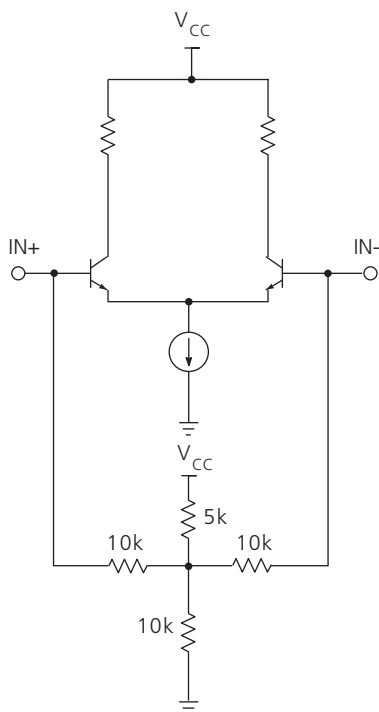


Figure 3-1: Differential Input Stage (IN+/IN-)

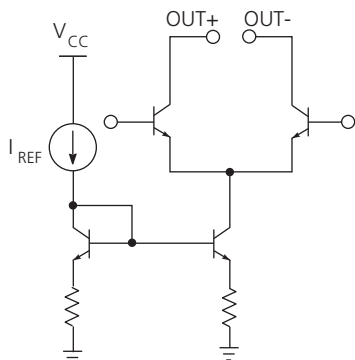


Figure 3-2: Differential Output Stage (OUT+/OUT-)

4. Detailed Description

4.1 Input Interfacing

IN+/IN- are high impedance differential inputs. The equivalent input circuit is shown in [Figure 3-1](#).

The GV8500 inputs are self-biased, allowing for simple AC coupling to the device.

4.2 Output Interfacing

The GV8500 outputs are current mode, and will drive typically 800mV into a 75Ω load. These outputs are protected from accidental static damage with internal ESD protection diodes. The GV8500 is designed to operate with the GV8501 multimedia receiver to enable long reach HDMI/ DisplayPort connectivity.

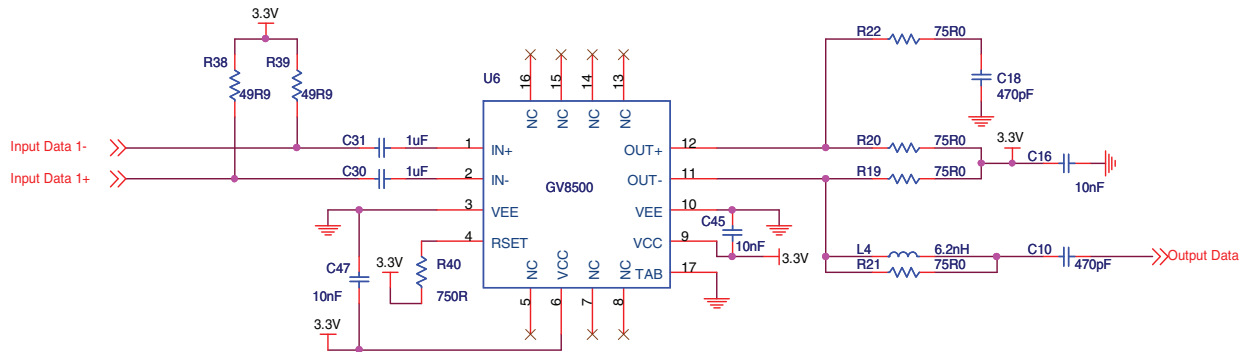
4.2.1 Output Amplitude (R_{SET})

The output amplitude of the GV8500 is set by the value of the R_{SET} resistor. In order to produce an 800mV_{p-p} output with a nominal ±7% tolerance, a value of 750Ω is required. A ±1% SMT resistor should be used.

The R_{SET} resistor is part of the high-speed output circuit of the GV8500. The resistor should be placed as close as possible to the R_{SET} pin. In addition, the PCB capacitance should be minimized at this node by removing the PCB groundplane beneath the R_{SET} resistor and the R_{SET} pin.

5. Application Information

This is a recommended circuit from one of Gennum's Reference Design Kits (RDks).



Note: The TMDS polarity (i.e. Input Data 1- to IN+ & Input Data 1+ to IN-) has been implemented to enable top-layer placement of the HDMI connectors on both Tx & Rx PCBs.

Figure 5-1: Recommended Circuit

See RDK documents for more information.

6. Package & Ordering Information

6.1 Package Dimensions

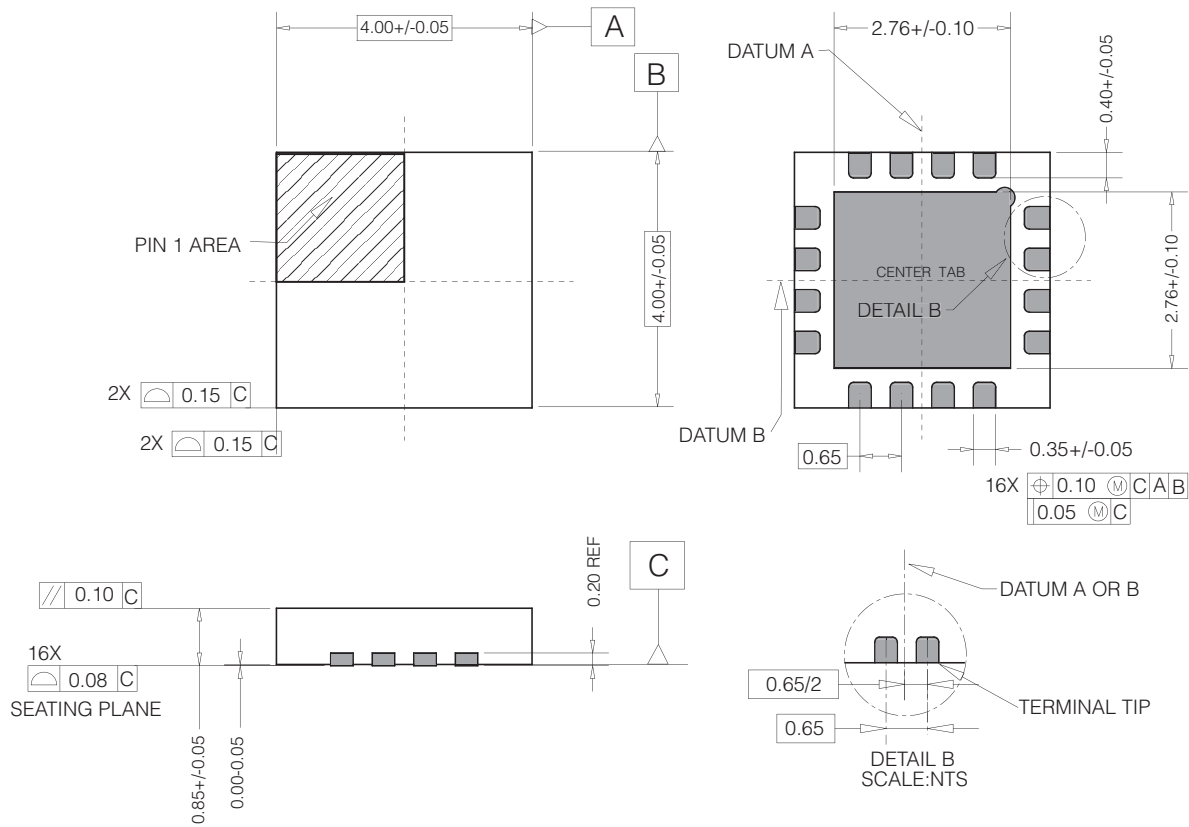


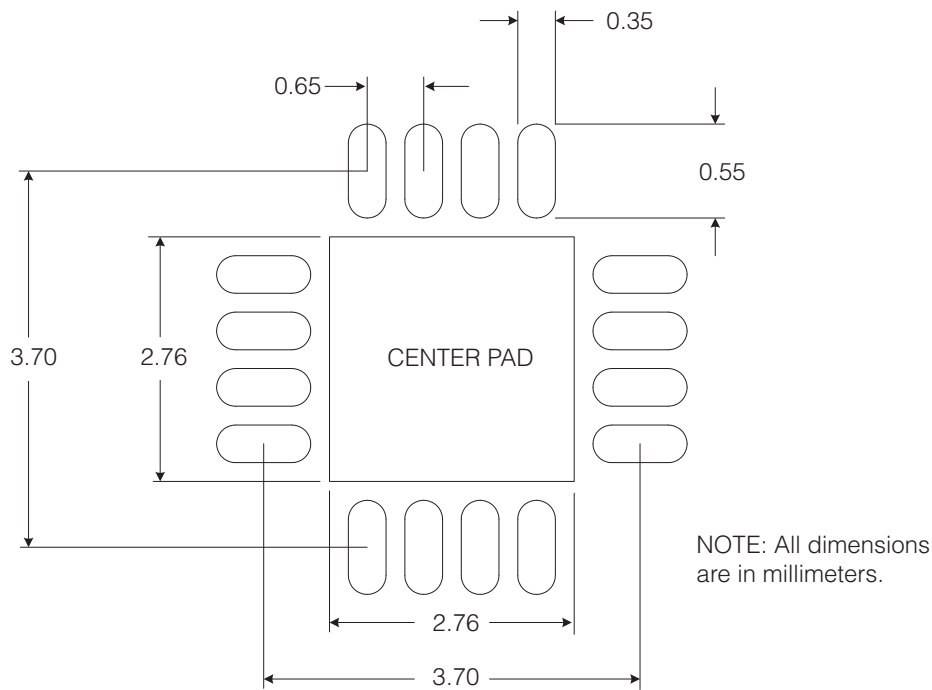
Figure 6-1: GV8500 Package Dimensions

6.2 Packaging Data

Table 6-1: Packaging Data

Parameter	Value
Package Type	4mm x 4mm 16-pin QFN
Package Drawing Reference	JEDEC M0220
Moisture Sensitivity Level	3
Junction to Case Thermal Resistance, θ_{j-c}	31.0°C/W
Junction to Air Thermal Resistance, θ_{j-a} (at zero airflow)	43.8°C/W
Psi, Ψ	11.0°C/W
Pb-free and RoHS compliant	Yes

6.3 Recommended PCB Footprint



Note: Suggested dimensions only. Final dimensions should conform to customer design rules and process optimizations.

Figure 6-2: GV8500 PCB Footprint

The Center Pad should be connected to the most negative power supply plane (V_{EE}) by a minimum of 5 vias.

6.4 Marking Diagram



Figure 6-3: GV8500 Marking Diagram

6.5 Solder Reflow Profile

The device is manufactured with Matte-Sn terminations and is compatible with both standard eutectic and Pb-free solder reflow profiles. MSL qualification was performed using the maximum Pb-free reflow profile, shown in Figure 6-4.

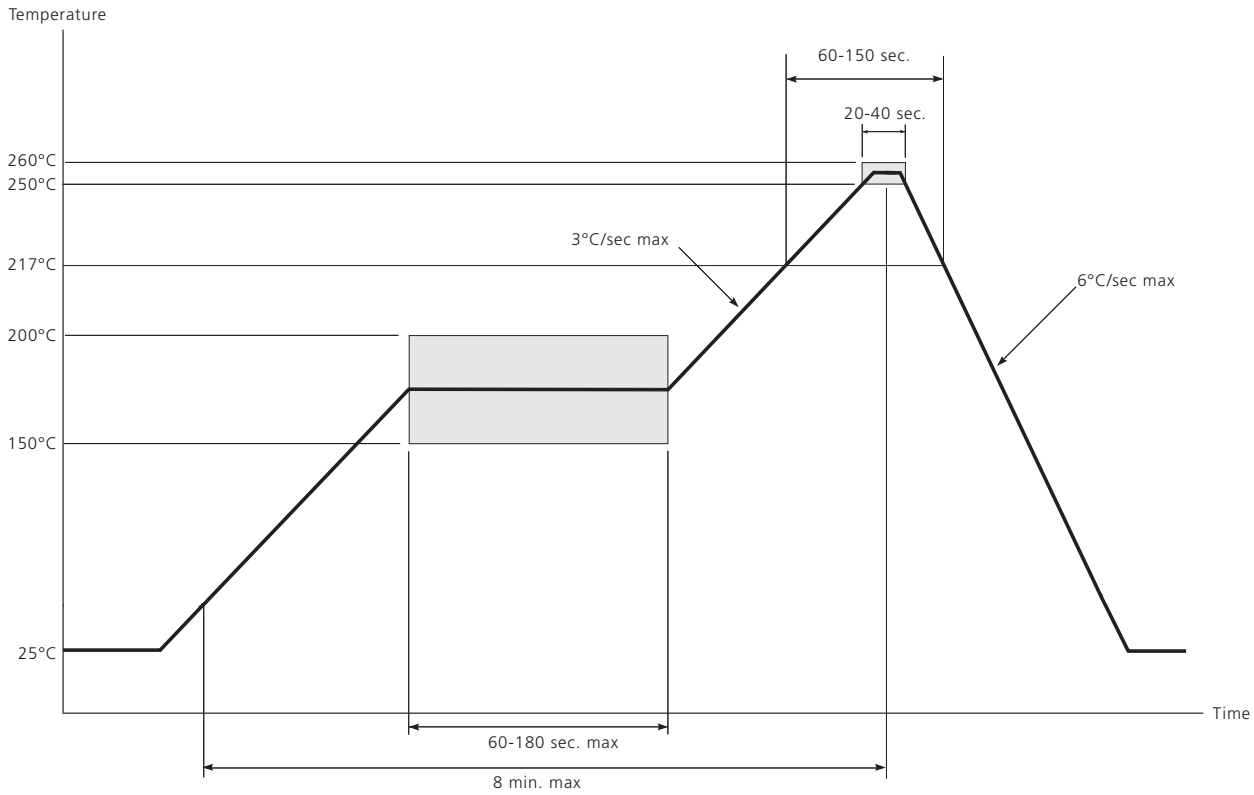


Figure 6-4: Maximum Pb-free Solder Reflow Profile (Preferred)

6.6 Ordering Information

Part Number	Package	Temperature Range
GV8500-CNE3	16-pin QFN	0°to 70°C

CAUTION

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

**DOCUMENT IDENTIFICATION
PRELIMINARY DATA SHEET**

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

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