GV8500 ActiveConnect™ Multimedia Transmitter

GV8500 Advance Information Note

Features

- 10.2 Gb/s HDMI 1.3 compatible
- 10.8 Gb/s DisplayPort V1.0 compatible
- 50Ω differential PECL input
- Pb-free and RoHS compliant
- Single 3.3V power supply operation
- Operating temperature range: 0°C to 70°C

Applications

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

Description

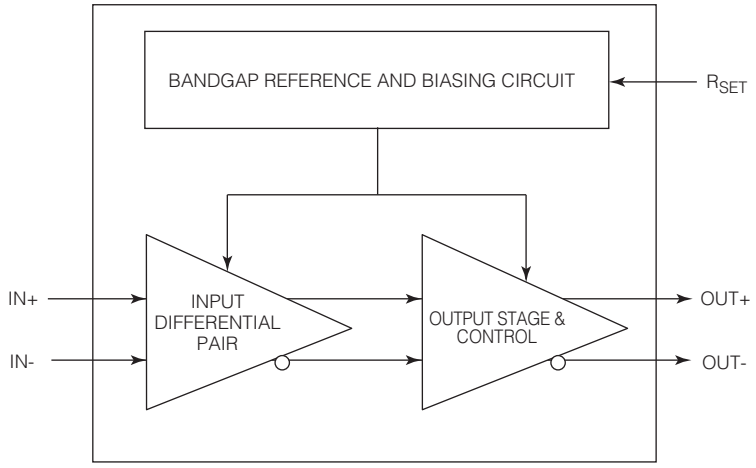
The GV8500 is a high-speed BiCMOS integrated circuit designed to drive 75Ω co-axial cables.

The GV8500 may drive data rates up to 3.4Gb/s for HDMI and DisplayPort applications.

The GV8500 accepts a LVPECL level differential input that may be AC coupled. External biasing resistors at the inputs are not required.

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.

This component and all homogeneous subcomponents are RoHS compliant.



GV8500 Functional Block Diagram

Contents

1. Pin Out

1.1 Pin Assignment

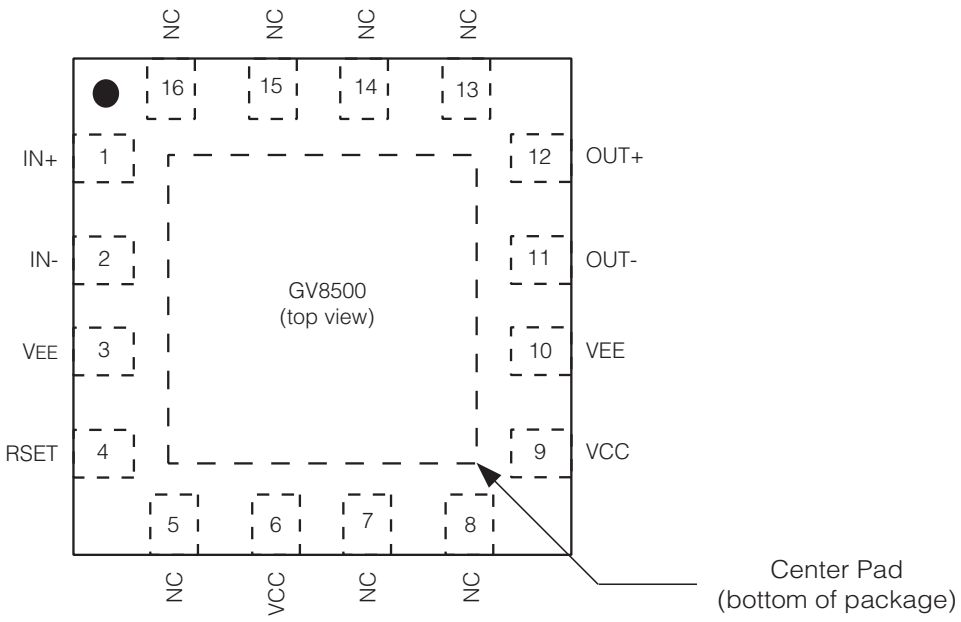


Figure 1-1: 16-Pin QFN

1.2 Pin Descriptions

Table 1-1: Pin Descriptions

Pin Number	Name	Timing	Type	Description
1,2	IN+, IN-	Analog	Input	Differential inputs.
3,10	V_{EE}	–	Power	Most negative power supply connection. Connect to GND.
4	R_{SET}	Analog	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+	Analog	Output	Differential outputs.
–	Center Pad	–	Power	Connect to most negative power supply plane following the recommendations in Recommended PCB Footprint on page 10.

2. Electrical Characteristics

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
NOTE: Absolute Maximum Ratings are those values beyond which damage to the device may occur. Functional operation under these conditions or at any other condition beyond those indicated in the AC/DC Electrical Characteristic sections is not implied.	

2.2 DC Electrical Characteristics

Table 2-1: 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 + $\Delta V_{DDI}/2$	–	V_{CC} - $\Delta V_{DDI}/2$	V

2.3 AC Electrical Characteristics

Table 2-2: AC Electrical Characteristics

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

Parameter	Symbol	Conditions	Min	Typ	Max	Units	Notes
Serial Input Data Rate	DR	–	0.25	–	3.4	Gb/s	1
Serial Input Clock Rate	–	HDMI Clock, 1/10th Data Rate	25	–	340	MHz	–
Additive Jitter	–	3.4Gb/s	–	22	–	ps_{p-p}	–
	–	1.5Gb/s	–	20	–	ps_{p-p}	–
Rise/Fall Time	t_r, t_f	–	–	–	135	ps	2
Mismatch in Rise/Fall time	$\triangle t_r$, $\triangle t_f$	–	–	–	35	ps	–
Duty Cycle Distortion	–	–	–	–	30	ps	3
Overshoot	–	–	–	–	10	%	3
Output Voltage Swing	V_{OUT}	R_{SET} = 750Ω	750	800	850	mV_{p-p}	3
Input Voltage Swing	$\triangle V_{DDI}$	Differential	400	–	1560	mV_{p-p}	–

NOTES:

1. The input coupling capacitor must be set accordingly for lower data rates.
2. Rise/Fall time measured between 20% and 80%.
3. Single Ended into 75Ω external load.

2.4 Solder Reflow Profiles

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 2-1.The recommended standard Pb reflow profile is shown in Figure 2-2.

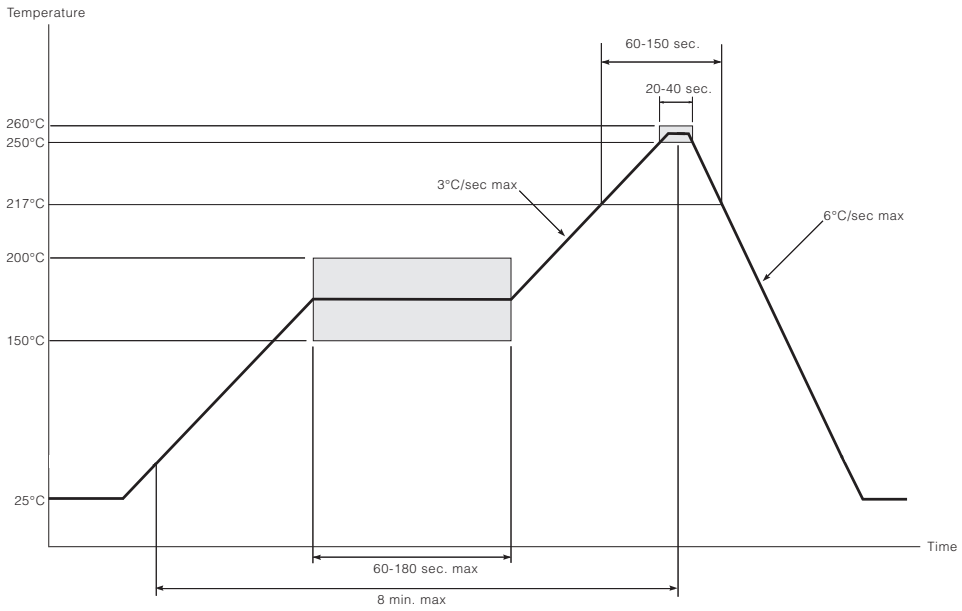


Figure 2-1: Maximum Pb-free Solder Reflow Profile (Preferred)

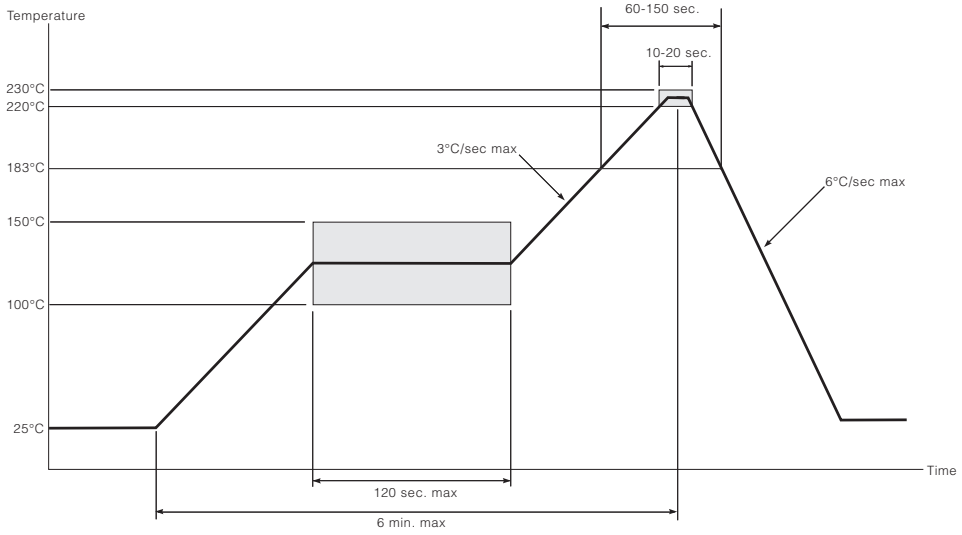


Figure 2-2: Standard Pb Reflow Profile

3. Input / Output Circuits

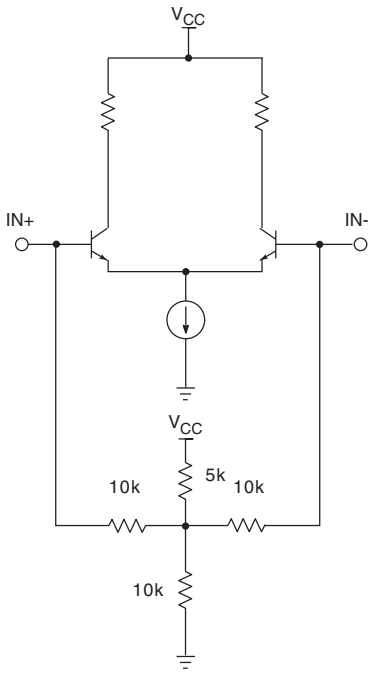


Figure 3-1: Differential Input Stage (IN+/IN-)

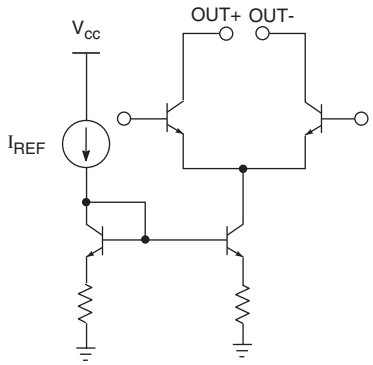


Figure 3-2: Differential Output Stage (OUT+/OUT-)

4. Detailed Description

4.1 Input Interfacing

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

Several conditions must be observed when interfacing to these inputs:

- The differential input signal amplitude must be between 400 and 1560mVpp.
- The common mode voltage range must be as specified in the DC Electrical Characteristics on page 4.
- For input trace lengths longer than approximately 1cm, the inputs should be terminated as shown in the Typical Application Circuit.

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.

4.2.1 Output Amplitude (RSET)

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.

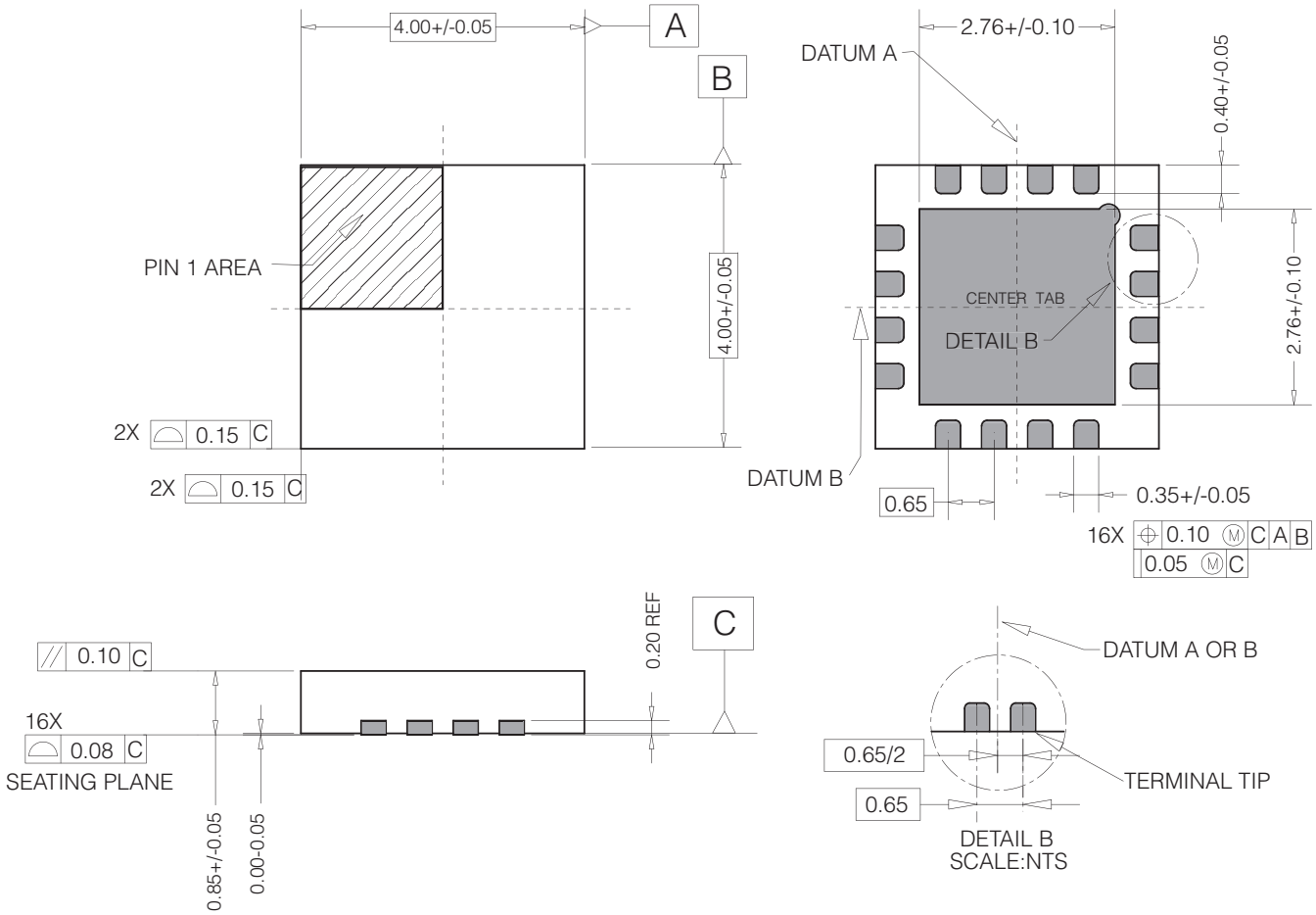
The R_{SET} resistor is part of the high speed output circuit of the GV8500. The resistor should be placed as close as possible to the R_{SET} pin. In addition, the PCB capacitance should be minimized at this node by removing the PCB groundplane beneath the R_{SET} resistor and the R_{SET} pin.

5. Application Information

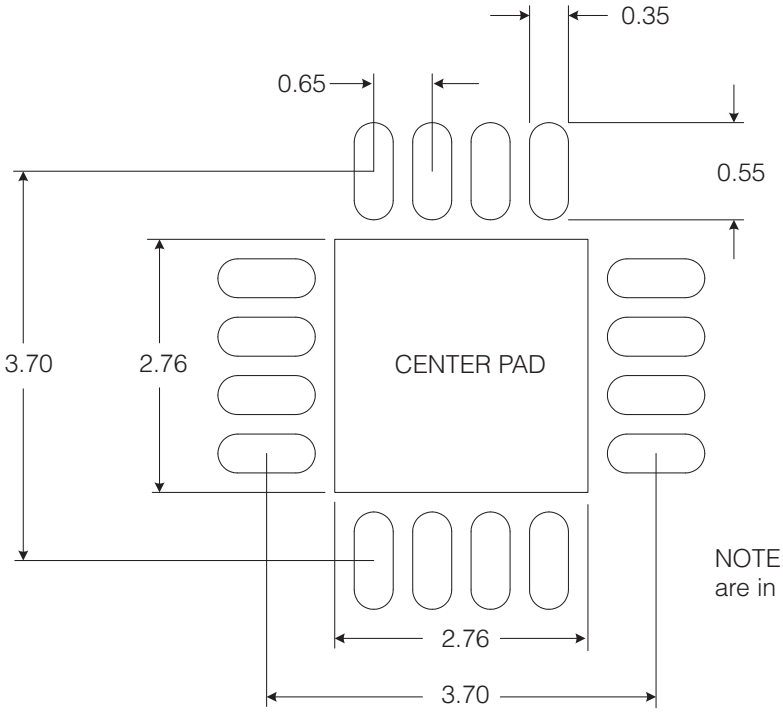
Contact vbapps@gennum.com for information

6. Package & Ordering Information

6.1 Package Dimensions



6.2 Recommended PCB Footprint



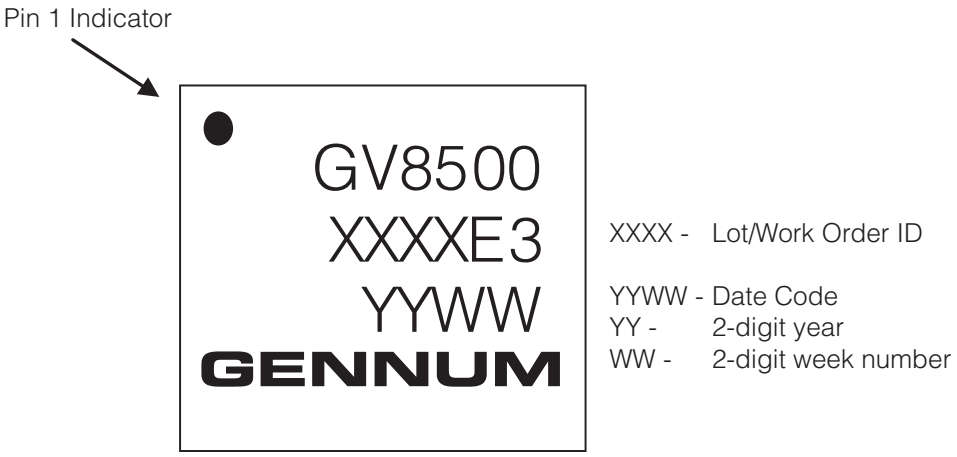
The Center Pad should be connected to the most negative power supply plane (VEE) by a minimum of 5 vias.

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

6.3 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

6.4 Marking Diagram



6.5 Ordering Information

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

7. Revision History

Version	ECR	PCN	Date	Changes and/or Modifications
A	148086	–	October 2007	New document.

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

DOCUMENT IDENTIFICATION
ADVANCE INFORMATION NOTE
The product is in a 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.

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