National Semiconductor

PRELIMINARY
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CLC002
SMPTE 292M / 259M Serial Digital Cable Driver

General Description

The CLC002 SMPTE 292M / 259M serial digital cable driver is a monolithic, high-speed cable driver designed for use in SMPTE 292M / 259M serial digital video and ITU-T G.703 serial digital data transmission applications. The CLC002 drives 75Ω transmission lines (Belden 8281, Belden 1694A or equivalent) at data rates up to 1.485 Gbps.

The CLC002 provides two selectable slew rates for SMPTE 259M and SMPTE 292M compliance. The output voltage swing is adjustable from 800 mV_{P-P} to 1.0 V_{P-P} using an external resistor.

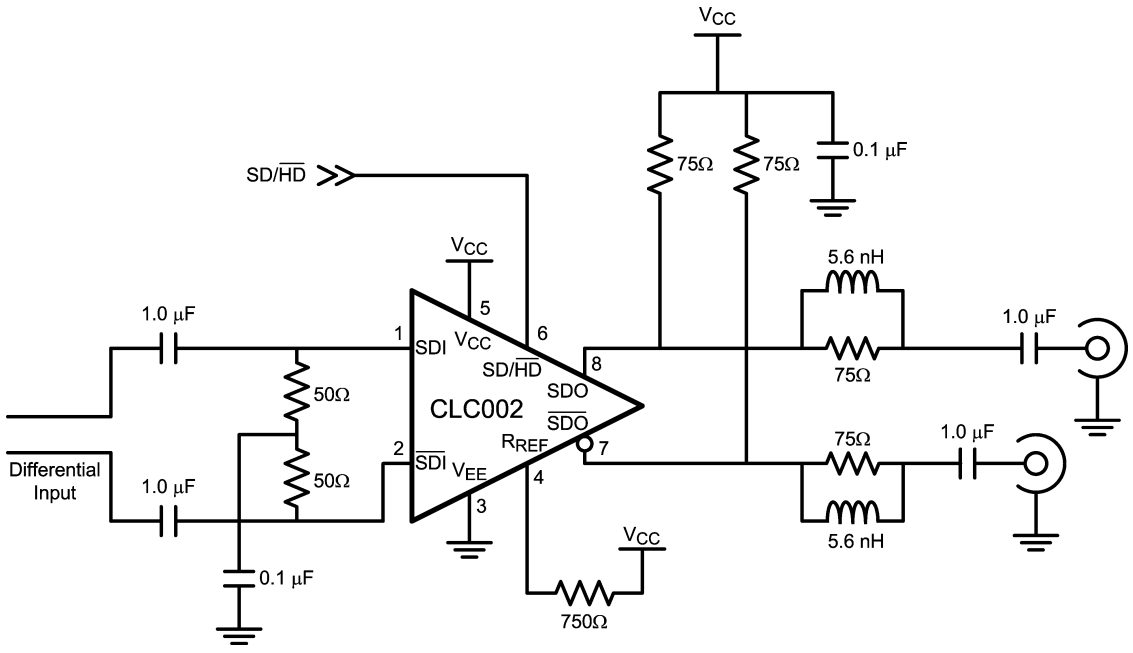
Features

- SMPTE 292M, SMPTE 344M and SMPTE 259M compliant
- Data rates to 1.485 Gbps
- Differential input
- 75Ω differential output
- Selectable slew rate
- Adjustable output amplitude
- Single 3.3V supply operation
- Replaces the GS1528 and GS1528A

Applications

- SMPTE 292M, SMPTE 344M, and SMPTE 259M serial digital interfaces
- Sonet/SDH and ATM interfaces
- Digital routers and distribution amplifiers
- Buffer applications

Typical Application



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Absolute Maximum Ratings (Note 1)

Supply Voltage:	–0.5V to 3.6V
Input Voltage (all inputs)	–0.3V to V_{CC}+0.3V
Output Current	28mA
ESD Rating (HBM)	2kV

Recommended Operating Conditions

Supply Voltage ($V_{CC} - V_{EE}$):	3.3V ±5%
Operating Free Air Temperature (T_A)	0˚C to +70˚C

DC Electrical Characteristics

Over Supply Voltage and Operating Temperature ranges, unless otherwise specified (Notes 2, 3).

Symbol	Parameter	Conditions	Reference	Min	Typ	Max	Units
V_{CMIN}	Input Common Mode Voltage		SDI, $\overline{SDI}$	1.6 + $V_{SDI}/2$		V_{CC} – $V_{SDI}/2$	V
V_{SDI}	Input Voltage Swing	Differential		100		2000	mV_{P-P}
I_{IN}	Input Current				3.5		µA
V_{CMOUT}	Output Common Mode Voltage		SDO, $\overline{SDO}$		V_{CC} – V_{SDO}		V
V_{SDO}	Output Voltage Swing	Single-ended, 75Ω load, R_{REF} = 750Ω 1%		720	800	880	mV_{P-P}
		Single-ended, 75Ω load, R_{REF} = TBD		900	1000	1100	mV_{P-P}
	SD/$\overline{HD}$ Input	Min for SD	SD/$\overline{HD}$	2.4			V
		Max for HD				0.8	V
I_{CC}	Supply Current				48		mA

AC Electrical Characteristics

Over Supply Voltage and Operating Temperature ranges, unless otherwise specified (Note 3).

Symbol	Parameter	Conditions	Reference	Min	Typ	Max	Units
DR_{SDI}	Input Data Rate		SDI, $\overline{SDI}$			1485	Mbps
t_{jit}	Additive Jitter	1.485 Gbps	SDO, $\overline{SDO}$		15		ps_{P-P}
		270 Mbps			25		ps_{P-P}
t_r,t_f	Output Rise Time, Fall Time	SD/$\overline{HD}$ = 0, 20% – 80%			TBD	220	ps
		SD/$\overline{HD}$ = 1, 20% – 80%		400	TBD	800	ps
	Mismatch in Rise/Fall Time					30	ps
t_{OS}	Output Overshoot	Note 4				8	%
RL_{SDO}	Output Return Loss			15	18-20		dB

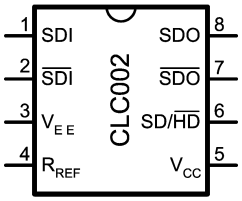
Note 1: "Absolute Maximum Ratings" are those parameter values beyond which the life and operation of the device cannot be guaranteed. The stating herein of these maximums shall not be construed to imply that the device can or should be operated at or beyond these values. The table of "Electrical Characteristics" specifies acceptable device operating conditions.

Note 2: Current flow into device pins is defined as positive. Current flow out of device pins is defined as negative. All voltages are stated referenced to V_{EE} = 0 Volts.

Note 3: Typical values are stated for V_{CC} = +3.3V and T_A = +25˚C.

Note 4: Specification is guaranteed by design.

Connection Diagram



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8-Pin SOIC
Order Number CLC002MA
See NS Package Number M08A

Pin Descriptions

Pin #	Name	Description
1	SDI	Serial data true input.
2	$\overline{SDI}$	Serial data complement input.
3	V_{EE}	Negative power supply (ground).
4	R_{REF}	Output driver level control. Connect a resistor to V_{CC} to set output voltage swing.
5	V_{CC}	Positive power supply (+3.3V).
6	SD/$\overline{HD}$	Output slew rate control. Output rise/fall time complies with SMPTE 292M when low and SMPTE 259M when high.
7	$\overline{SDO}$	Serial data complement output.
8	SDO	Serial data true output.

Device Operation

INPUT INTERFACING

The CLC002 accepts either differential or single-ended input.

OUTPUT INTERFACING

The CLC002 uses current mode outputs. Single-ended output levels range from 800 mV_{P-P} to 1.0 V_{P-P} ±10% into 75Ω AC-coupled coaxial cable. Output level is controlled by the value of R_{REF} connected between pin 4 and V_{CC}.

OUTPUT SLEW RATE CONTROL

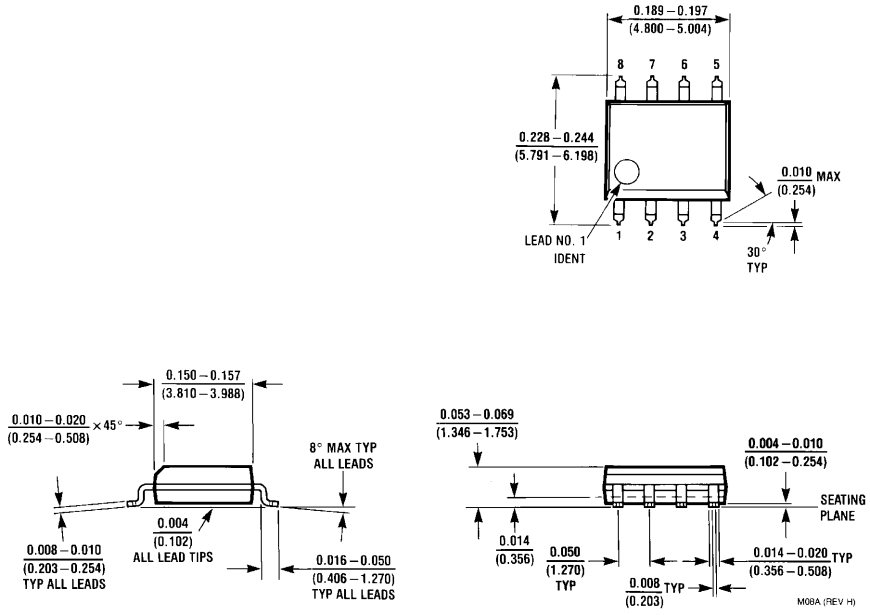
The CLC002 output rise and fall times are selectable for either SMPTE 259M or SMPTE 292M compliance via pin 6, SD/$\overline{HD}$. For slower rise and fall times, or SMPTE 259M compliance, SD/$\overline{HD}$ is set high. For faster rise and fall times, or SMPTE 292M compliance, SD/$\overline{HD}$ is set low.

REPLACING THE GENNUM GS1528

The CLC002 is form-fit-function compatible with the Gennum GS1528.

Physical Dimensions inches (millimeters)

unless otherwise noted



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Support Center
Email: new.feedback@nsc.com
Tel: 1-800-272-9959

www.national.com

National Semiconductor
Europe Customer Support Center
Fax: +49 (0) 180-530 85 86
Email: europe.support@nsc.com
Deutsch Tel: +49 (0) 69 9508 6208
English Tel: +44 (0) 870 24 0 2171
Français Tel: +33 (0) 1 41 91 8790

National Semiconductor
Asia Pacific Customer
Support Center
Email: ap.support@nsc.com

National Semiconductor
Japan Customer Support Center
Fax: 81-3-5639-7507
Email: jpn.feedback@nsc.com
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