CMP485(H)S Series

LOW POWER ISOLATED RS485 TRANSCEIVER

FEATURES

- Isolated RS485 Transceivers
- 2.5kVrms Isolation
- 2Mbps or Low EMI 250kbps Data Rate
- Isolated DC Power up to 1W
- High ESD:15KV HBM on Transceiver Interface
- High Common Mode Transient Immunity:30KV/μs
- Single 5.0V Operation
- No External Components Required
- High Input Impedance RS485 Receiver
- Compatible with TIA/EIA-485-A Specification

APPLICATIONS

- Industral Networks
- Isolated RS485 Interface
- Motor Controllers
- Building Control Systems
- Distributed Control Systems

DESCRIPTION

The CMP485S is a complete galvanically isolated half-duplex RS485 transceiver designed for bi-directional data communication or multipoint bus transmission at rates up to 2Mbits per second. No external components are needed. Only a single 5.0V power supply is required on the input side. The both sides of the interface can be powered through the integrated, isolated, low noise, low power dc/dc converter. The internal digital isolators and an isolation power transformer provide 2500Vrms of isolation between the line transceiver and the logic interface. This device is ideal for systems where the ground loop is broken allowing for large common mode voltage variation. Uninterrupted communication is guaranteed for common mode transients greater than 30kV/μs.

Maximum data rates are 2Mbps. Their BiCMOS design allows low power operation without sacrificing performance. Transmit data and receive data are implemented with event driven low jitter processing. The driver of the device has an enable control line which is active HIGH.

Enhanced ESD protection allows this part to withstand up to ±15kV (human body model) on the transceiver interface pins to isolated supplies and ±10kV through the isolation barrier to logic supplies without latch-up or damage. The device is supplied in a low profile 10 pin DIP package.

SELECTION GUIDE

ORDER CODER	OPERATION VOLTAGE	COMM MODE	TX CHANNEL	RX CHANNEL	Data rate (KBPS)	NODE	ESD(KV)
CMP485L*	5	Half	1	1	10	256	15
CMP485L-3*	3.3	Half	1	1	10	256	15
CMP485H*	5	Half	1	1	250	256	15
CMP485H-3*	3.3	Half	1	1	250	256	15
CMP485LC**	5	Half	1	1	250	256	15
CMP485LC-3**	3.3	Half	1	1	250	256	15
CMP485HC**	5	Half	1	1	250	256	15
CMP485HC-3**	3.3	Half	1	1	250	256	15

*Controlling end to receive high-level

**Controlling end to receive low-level

ABSOLUTE MAXIMUM RATINGS

PARAMETER	RATING
Vcc to GND	-0.5V to +7V
Receiver differential input voltage rang	±15V
Diver output voltage rang	±15V
Power dispassion	2000mW
Isolation voltage	2500Vrms
Data transmission rate	2Mbps
Storage temperature	-55℃ to +150℃
Operation temperature	-40℃ to +125℃

RECEIVER FUNCTION TABLE

Differential inputs	CON	ROUT
V_{ID}≥0.2V	High level	High level
V_{ID}≤-0.2V	High level	Low level
-0.2V≤V_{ID}≤0.2V	High level	Undefined

RoHS MICRODC Green Technology

CE REACH

ELECTRICAL CHARACTERISTICS						
Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Supplies						
Power supply voltage	V_{CC}	4.75	5.0	5.25	V	
Isolated output voltage	V_{DD}	4.75	5.0	5.25	V	
Logic						
Logic input high level	V_{IH}	3.3			V	
Logic input low level	V_{IL}			1.5	V	
Logic high output level	V_{OH}	Vcc-0.1	5.0		V	Io=-20μA
Logic low output level	V_{OL}		0	0.1	V	Io=20μA
Driver						
Open circuit voltage	V_{OC}			6.0	V	
Differential voltage	V_{DIFF}	1.5		5.0	V	R_L=54Ω, C_L=50pF
Balance	V_B			±0.2	V	
Common-mode output	V_{COMD}			3.0	V	
Output current	I_{DO}	28.0			mA	R_L=54Ω
Short circuit current	I_{SC}			±250	mA	
Output transition time	t_{OT}		30		ns	
Propagation delay time	t_{PHL}		100	200	ns	R_L=54Ω, C_L=50pF
Propagation delay time	t_{PLH}		100	200	ns	R_L=54Ω, C_L=50pF
Drive output skew	t_{OS}		5	15	ns	
Receiver						
Common-mode range	V_{COMR}	-7.0		+12	V	
Receiver sensitivity	V_{SEN}			±0.2	V	
Input impedance	R_I	120	150		kΩ	
Propagation delay time	t_{PHL}			1200	ns	R_L=54Ω, C_L=15pF
Propagation delay time	t_{PLH}			1200	ns	R_L=54Ω, C_L=15pF
Differential receiver skew	t_{RS}		60		ns	

ELECTRICAL CHARACTERISTICS						
Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Isolation voltage			2500		Vrms	Flash tested for 1s
Isolation capacitance			40		pF	

DRIVER FUNCTION TABLE			
TIN	CON	A	B
High level	High level	High level	Low level
Low level	High level	Low level	Low level
Irrelevant	Low level	High impedance	High impedance

TEMPERATURE CHARACTERISTICS				
Parameter	Min.	Typ.	Max.	Unit
Operating temperature range	-40		+85	℃
Storage temperature range	-40		+125	℃

APPLICATION NOTES

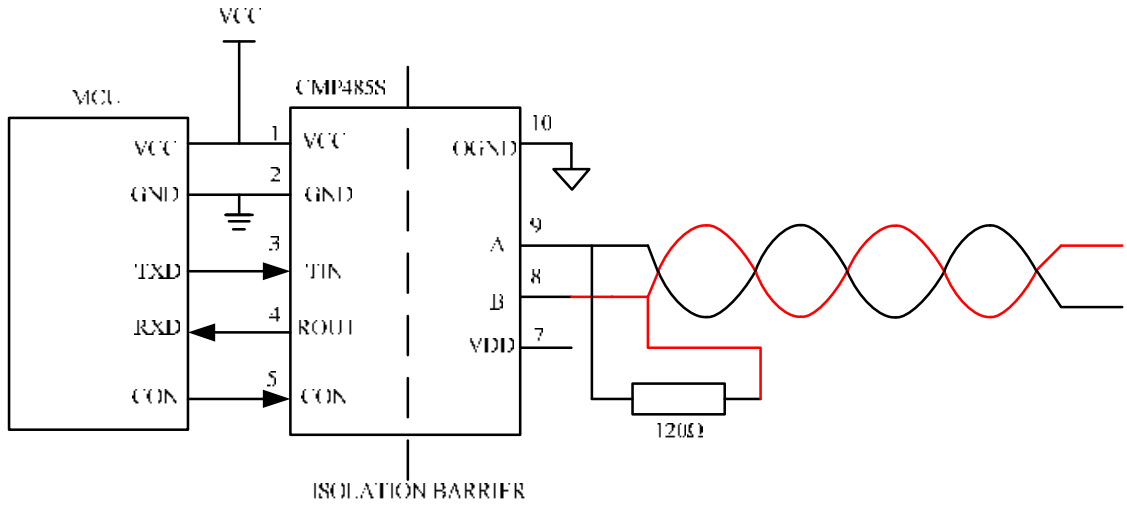
The increased use of balanced data transmission lines, (distributing data to several system components and peripherals over relatively long lines) has brought about the need for multiple driver/receiver combinations on a single twisted pair line. This resulted in an upgraded version of EIA RS-422, named EIA-485. EIA-485 takes into account EIA RS-422 requirements for balanced line data transmission, and allows for multiple drivers and receivers. The CMP485S is a low power isolated differential interface providing EIA-485 compatibility. The use of a differential communications interface such as the CMP485S allows data transmission at high rates and over long distances to be accomplished. This is because effects of external noise sources and cross talk are much less pronounced on the data signal. Any external noise source coupling onto the differential lines will appear as an extra common mode voltage which the receiver is insensitive to. The difference between the signal levels on the two lines will therefore remain the same. Similarly a change in the local ground potential at one end of the line will appear as just another change in the common mode voltage level of the signals. Twisted pair cable is commonly used for differential communications since its twisted nature tends to cause cancellation of the magnetic fields generated by the current flowing through each wire, thus reducing the effective inductance of the pair. Computer and industrial serial inter facing are areas where noise can seriously affect the integrity of data transfer, and a proven route to improve noise performance for any interface system is galvanic isolation. Galvanic isolation removes the ground loop currents from data lines and hence the impressed noise voltage which affects the signal is also eliminated. The isolation feature of the CMP485S also means that common mode noise effects are removed and many forms of radiated noise are reduced to negligible limits.

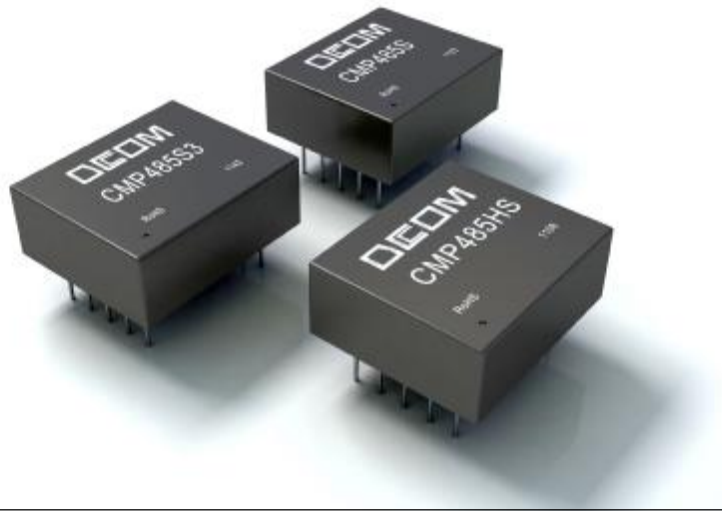
If two or more CMP485S are used and drivers are shorted directly, the driver outputs can not supply enough current to activate the thermal shutdown. Thus the internal shutdown circuit will not prevent contention faults when two drivers are active on the same bus at the same time.

Figure 1 demonstrates how the differential lines of the CMP485S can be connected to form a transceiver. Data direction is controlled by the CON pin. This means the device can receive when the CON is low and transmit when the CON is high. As the driver is active high, to reduce the power dissipation even further, it is advisable to disable the driver when not transmitting data.

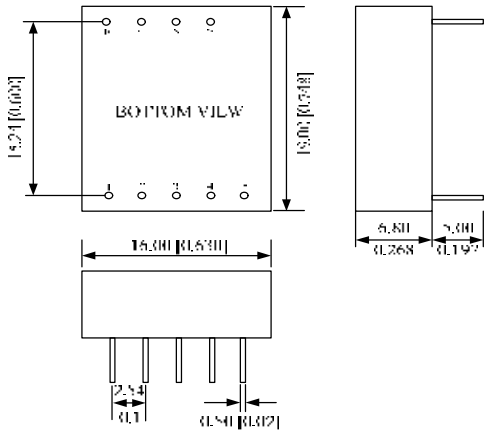
TYPICAL APPLICATIONS

Figure 1



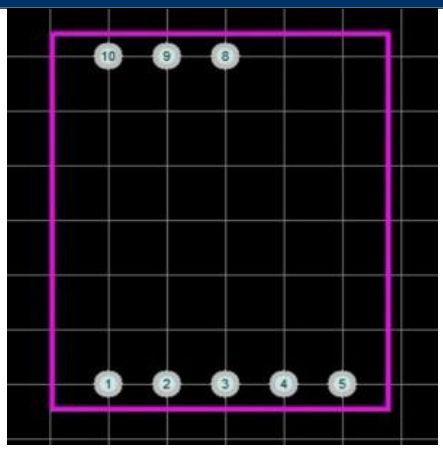


MECHANICAL DIMENSIONS



Note:
Unit:mm[inch]
Pin section tolerances:±0.10mm[±0.004inch]
General tolerances:±0.25mm[±0.010inch]

RECOMMENDED FOOTPRINT



Note:
Unit:mm[inch]
Pin section tolerances:±0.10mm[±0.004inch]
General tolerances:±0.25mm[±0.010inch]

FOOTPRINT DETAILS

Pin	Function	Description
1	VCC	Power supply (logic side)
2	GND	Ground
3	TIN	Driver input data, TTL/CMOS logic
4	ROUT	Receiver output data, TTL/CMOS logic
5	CON	Driver/receiver transform control input
6	NC	No internal connection
7	VDD	Isolated power supply (bus side)
8	B	Inverting Driver Output/Receiver Input
9	A	Non-inverting Driver Output/Receiver Input
10	OGND	Isolated ground

Specifcations can be changed any time without notice.

RoHS COMPLIANT INFORMATION

This series is compatible with RoHS soldering systems with a peak wave solder temperature of 300°C for 10 seconds. The pin termination finish on the SIP package type is Tin Plate, Hot Dipped over Matte Tin with Nickel Preplate. The DIP types are Matte Tin over Nickel Preplate. Both types in this series are backward compatible with Sn/Pb soldering systems.

REACH COMPLIANT INFORMATION

This series has proven that this product does not contain harmful chemicals, it also has harmful chemical substances through the registration, inspection and approval.