

钍地半导体
Tudi Semiconductor

Product Specification

TUDI-LTC1483

Ultra-Low Power RS485 Low EMI Transceiver with Shutdown

网址 www.sztdbdt.com

用芯智造·卓越品质

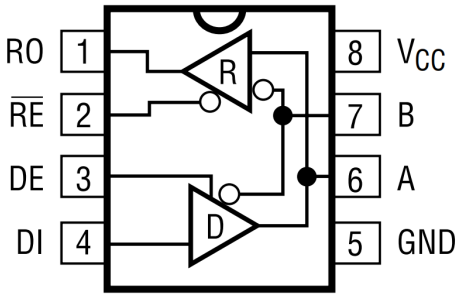
semiconductor device manufacturer

- Design
- research and development
- production
- and sales

FEATURES

- Low Power: ICC = 120 μ A Max with Driver Disabled
- ICC = 500 μ A Max with Driver Enabled, No Load
- 1 μ A Quiescent Current in Shutdown Mode
- Controlled Slew Rate Driver for Reduced EMI
- Single 5V Supply
- Drivers/Receivers Have ±10kV ESD Protection
- – 7V to 12V Common-Mode Range Permits ±7V Ground Difference Between Devices on the Data Line
- Thermal Shutdown Protection
- Power Up/Down Glitch-Free Driver Outputs Permit Live Insertion or Removal of Transceiver
- Driver Maintains High Impedance in Three-State or with the Power Off
- Up to 32 Transceivers on the Bus
- Pin Compatible with the LTC485

TOP VIEW



N8 PACKAGE
8-LEAD PDIP

S8 PACKAGE
8-LEAD PLASTIC SO

T_{JMAX} = 125 ° C, θ_{JA} = 130 ° C/ W (N8)
T_{JMAX} = 125 ° C, θ_{JA} = 150 ° C/ W (S8)

APPLICATIONS

- Battery-Powered RS485/RS422 Applications
- Low Power RS485/RS422 Transceiver
- Level Translato

DESCRIPTION

The LTC®1483 is an ultra-low power differential line trans-ceiver designed for data transmission standard RS485 applications with extended common-mode range (– 7V to 12V). It will also meet the requirements of RS422. The LTC1483 features output drivers with controlled slew rate, decreasing the EMI radiated from the RS485 lines, and improving signal fidelity with misterminated lines. The CMOS design offers significant power savings over its bipolar counterparts without sacrificing ruggedness against overload or ESD damage. Typical quiescent current is only 80 μ A while operating and less than 1 μ A in shutdown.

The driver and receiver feature three-state outputs, with the driver outputs maintaining high impedance over the entire common-mode range. Excessive power dissipation caused by bus contention or faults is prevented by a thermal shutdown circuit which forces the driver outputs into a high impedance state. The receiver has a fail-safe feature which guarantees a high output state when the inputs are left open. I/O pins are protected against multiple ESD strikes of over ± 10kV.

The LTC1483 is fully specified over the commercial and extended industrial temperature range and is available in 8-pin DIP and SO packages.

PIN FUNCTIONS

RO (Pin 1): Receiver Output. If the receiver output is enabled ($\overline{RE}$ low), then if A > B by 200mV, RO will be high. If A < B by 200mV, then RO will be low.

$\overline{RE}$ (Pin 2): Receiver Output Enable. A low enables the receiver output, RO. A high input forces the receiver output into a high impedance state.

DE (Pin 3): Driver Outputs Enable. A high on DE enables the driver output. A, B and the chip will function as a line driver. A low input will force the driver outputs into a high impedance state and the chip will function as a line receiver. If $\overline{RE}$ is high and DE is low, the part will enter a low power (1µA) shutdown state.

DI (Pin 4): Driver Input. If the driver outputs are enabled (DE high) then a low on DI forces the outputs A low and B high. A high on DI with the driver outputs enabled will force A high and B low.

GND (Pin 5): Ground.

A (Pin 6): Driver Output/Receiver Input.

B (Pin 7): Driver Output/Receiver Input.

V_{CC} (Pin 8): Positive Supply. 4.75V < V_{CC} < 5.25V.

ABSOLUTE MAXIMUM RATINGS

(Note 1)

Supply Voltage (V_{CC}) 12V
Control Input Voltage..... −0.5V to V_{CC} + 0.5V
Driver Input Voltage..... −0.5V to V_{CC} + 0.5V
Driver Output Voltage ..... ±14V
Receiver Input Voltage..... ±14V
Receiver Output Voltage ..... −0.5V to V_{CC} + 0.5V
Operating Temperature Range
LTC1483C ..... 0°C ≤ T_A ≤ 70°C
LTC1483I..... −40°C ≤ T_A ≤ 85°C
Storage Temperature Range ..... −65°C to 150°C
Lead Temperature (Soldering, 10 sec)..... 300°C

ELECTRICAL CHARACTERISTICS

V_{CC} = 5V, (Notes 2, 3) unless otherwise noted.

SYMBOL	PARAMETER	CONDITIONS		MIN	TYP	MAX	UNITS
V_{OD1}	Differential Driver Output Voltage (Unloaded)	I_O = 0	●			5	V
V_{OD2}	Differential Driver Output Voltage (with Load)	R = 50Ω (RS422) R = 27Ω (RS485), Figure 1	● ●	2 1.5		 5	V V
ΔV_{OD}	Change in Magnitude of Driver Differential Output Voltage for Complementary Output States	R = 27Ω or R = 50Ω, Figure 1	●			0.2	V
V_{OC}	Driver Common-Mode Output Voltage	R = 27Ω or R = 50Ω, Figure 1	●			3	V
$\Delta \lvert V_{OC} \rvert$	Change in Magnitude of Driver Common-Mode Output Voltage for Complementary Output States	R = 27Ω or R = 50Ω, Figure 1	●			0.2	V
V_{IH}	Input High Voltage	DE, DI, $\overline{RE}$	●	2			V
V_{IL}	Input Low Voltage	DE, DI, $\overline{RE}$	●			0.8	V
I_{IN1}	Input Current	DE, DI, $\overline{RE}$	●			±2	µA
I_{IN2}	Input Current (A, B)	DE = 0, V_{CC} = 0V or 5.25V, V_{IN} = 12V DE = 0, V_{CC} = 0V or 5.25V, V_{IN} = −7V	● ●			1.0 −0.8	mA mA
V_{TH}	Differential Input Threshold Voltage for Receiver	−7V ≤ V_{CM} ≤ 12V	●	−0.2		0.2	V
ΔV_{TH}	Receiver Input Hysteresis	V_{CM} = 0V	●		45		mV
V_{OH}	Receiver Output High Voltage	I_O = −4mA, V_{ID} = 200mV	●	3.5			V
V_{OL}	Receiver Output Low Voltage	I_O = 4mA, V_{ID} = −200mV	●			0.4	V
I_{OZR}	Three-State (High Impedance) Output Current at Receiver	V_{CC} = Max, 0.4V ≤ V_O ≤ 2.4V	●			±1	µA
R_{IN}	Receiver Input Resistance	−7V ≤ V_{CM} ≤ 12V	●	12	25		kΩ
I_{CC}	Supply Current	No Load, Output Enabled No Load, Output Disabled	● ●		300 80	500 120	µA µA
I_{SHDN}	Supply Current in Shutdown Mode	DE = 0, $\overline{RE}$ = V_{CC}			1	10	µA
I_{OSD1}	Driver Short-Circuit Current, V_{OUT} = HIGH	−7V ≤ V_O ≤ 12V	●	35		250	mA
I_{OSD2}	Driver Short-Circuit Current, V_{OUT} = LOW	−7V ≤ V_O ≤ 12V	●	35		250	mA
I_{OSR}	Receiver Short-Circuit Current	0V ≤ V_O ≤ V_{CC}	●	7		85	mA

SWITCHING CHARACTERISTICS

V_{CC} = 5V, (Notes 2, 3) unless otherwise noted.

SYMBOL	PARAMETER	CONDITIONS		LTC1483 MIN	LTC1483 TYP	LTC1483 MAX	UNITS
t_{PLH}	Driver Input to Output	R_{DIFF} = 54Ω, C_{L1} = C_{L2} = 100pF, (Figures 3, 5)	●	150		1200	ns
t_{PHL}	Driver Input to Output		●	150		1200	ns
t_{SKEW}	Driver Output to Output		●		100	600	ns
t_r, t_f	Driver Rise or Fall Time		●	150		1200	ns
t_{ZH}	Driver Enable to Output High	C_L = 100pF (Figures 4, 6), S2 Closed	●	100		1500	ns
t_{ZL}	Driver Enable to Output Low	C_L = 100pF (Figures 4, 6), S1 Closed	●	100		1500	ns
t_{LZ}	Driver Disable Time from Low	C_L = 15pF (Figures 4, 6), S1 Closed	●	150		1500	ns
t_{HZ}	Driver Disable Time from High	C_L = 15pF (Figures 4, 6), S2 Closed	●	150		1500	ns
t_{PLH}	Receiver Input to Output	R_{DIFF} = 54Ω, C_{L1} = C_{L2} = 100pF, (Figures 3, 7)	●	30	140	200	ns
t_{PHL}	Receiver Input to Output		●	30	140	200	ns
t_{SKD}	$\lvert t_{PLH} - t_{PHL} \rvert$ Differential Receiver Skew		●		13		ns
t_{ZL}	Receiver Enable to Output Low	C_{RL} = 15pF (Figures 2, 8), S1 Closed	●		20	50	ns
t_{ZH}	Receiver Enable to Output High	C_{RL} = 15pF (Figures 2, 8), S2 Closed	●		20	50	ns
t_{LZ}	Receiver Disable from Low	C_{RL} = 15pF (Figures 2, 8), S1 Closed	●		20	50	ns
t_{HZ}	Receiver Disable from High	C_{RL} = 15pF (Figures 2, 8), S2 Closed	●		20	50	ns
f_{MAX}	Maximum Data Rate		●	250			kbits/s
t_{SHDN}	Time to Shutdown	DE = 0, $\overline{RE}$ = ⤓	●	50	200	600	ns
$t_{ZH(SHDN)}$	Driver Enable from Shutdown to Output High	C_L = 100pF (Figures 4, 6), S2 Closed	●			2000	ns
$t_{ZL(SHDN)}$	Driver Enable from Shutdown to Output Low	C_L = 100pF (Figures 4, 6), S1 Closed	●			2000	ns
$t_{ZH(SHDN)}$	Receiver Enable from Shutdown to Output High	C_L = 15pF (Figures 2, 8), S2 Closed	●			3500	ns
$t_{ZL(SHDN)}$	Receiver Enable from Shutdown to Output Low	C_L = 15pF (Figures 2, 8), S1 Closed	●			3500	ns

The ● denotes specifications which apply over the full operating temperature range.

Note 1: Absolute maximum ratings are those beyond which the safety of the device cannot be guaranteed.

Note 2: All currents into device pins are positive; all currents out ot device pins are negative. All voltages are referenced to device ground unless otherwise specified.

Note 3: All typicals are given for V_{CC} = 5V and T_A = 25°C.

FUNCTION TABLES

LTC1483 Transmitting

INPUTS			OUTPUTS	
$\overline{RE}$	DE	DI	B	A
X	1	1	0	1
X	1	0	1	0
0	0	X	Z	Z
1	0	X	Z*	Z*

*Shutdown mode for LTC1483

LTC1483 Receiving

INPUTS			OUTPUTS
$\overline{RE}$	DE	A – B	RO
0	0	≥0.2V	1
0	0	≤–0.2V	0
0	0	Inputs Open	1
1	0	X	Z*

*Shutdown mode for LTC1483

TEST CIRCUITS

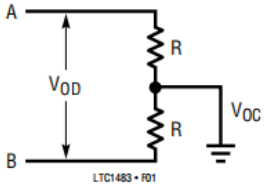


Figure 1. Driver DC Test Load

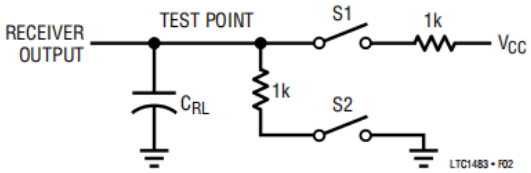


Figure 2. Receiver Timing Test Load

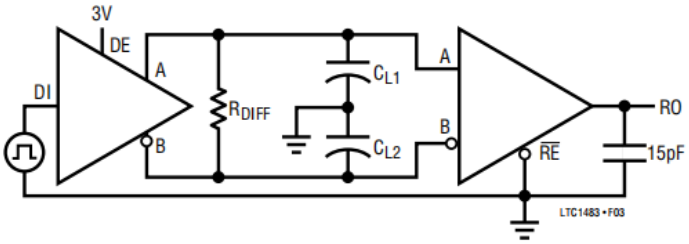


Figure 3. Driver/Receiver Timing Test Circuit

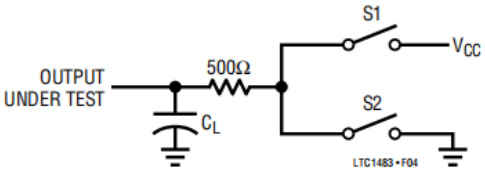


Figure 4. Driver Timing Test Load

SWITCHING TIME WAVEFORMS

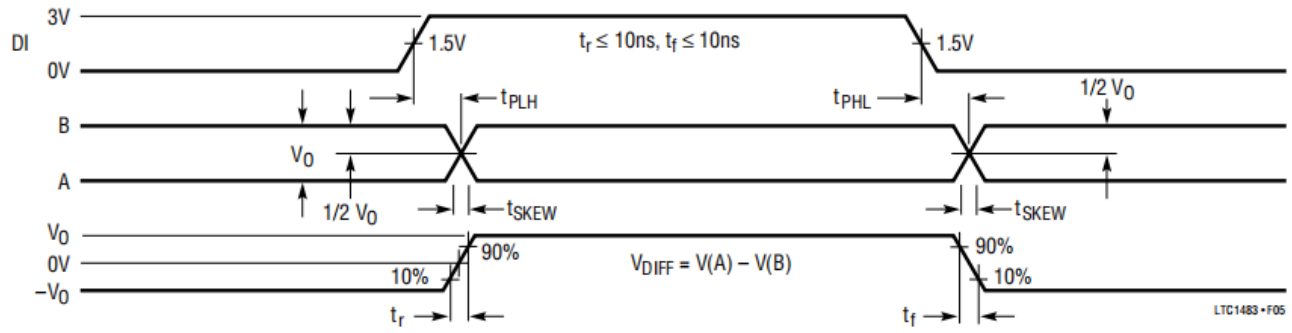


Figure 5. Driver Propagation Delays

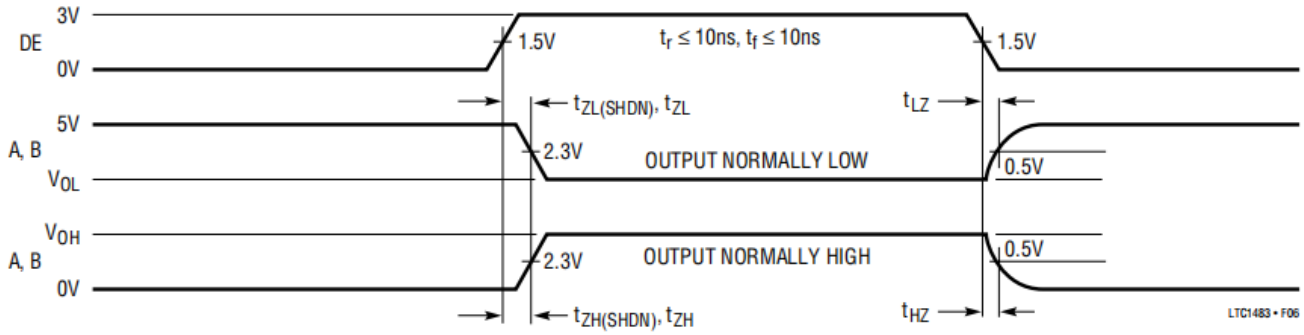
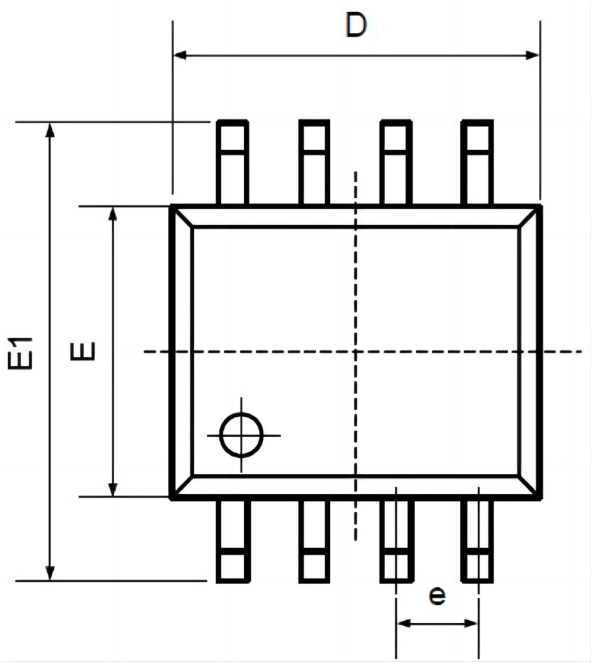


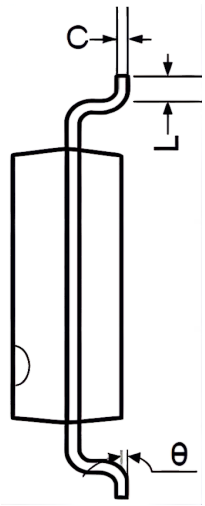
Figure 6. Driver Enable and Disable Times

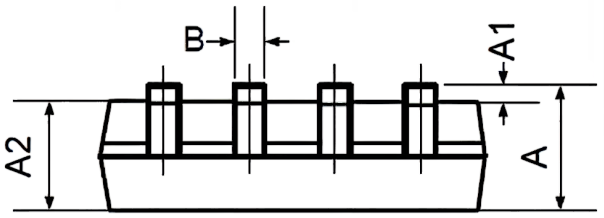
ORDERING INFORMATION

Order Number	Package	Package Quantity	Marking On The park
LTC1483CN8-TUDI	DIP8	Tube,50,A box of 2000	LTC1483CN8
LTC1483CS8-TUDI	SOP8	Tape,Reel,2500	1483
LTC1483IS8-TUDI	SOP8	Tape,Reel,2500	1483I

Package SOP8

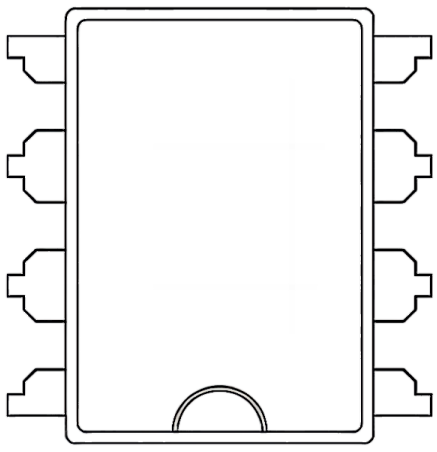


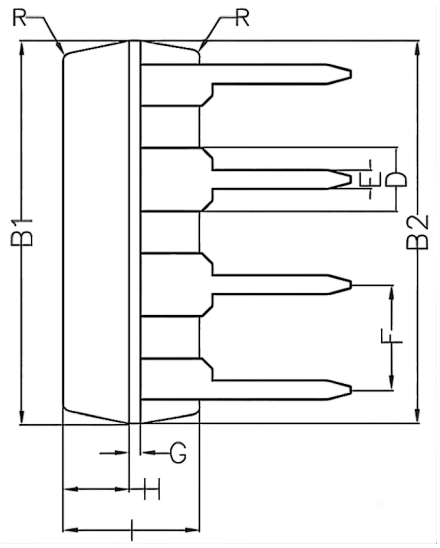


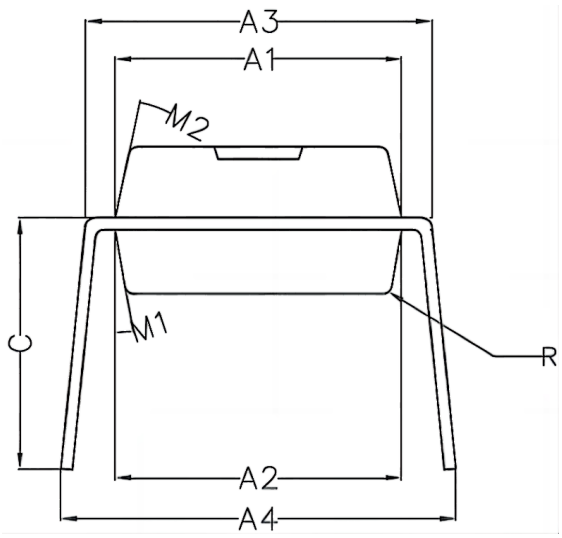


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
B	0.330	0.510	0.013	0.020
C	0.190	0.250	0.007	0.010
D	4.780	5.000	0.188	0.197
E	3.800	4.000	0.150	0.157
E1	5.800	6.300	0.228	0.248
e	1.270TYP		0.050TYP	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

Package DIP8







Symbol	Min	Non	Max
A1	6.28	6.33	6.38
A2	6.33	6.38	6.43
A3	7.52	7.62	7.72
A4	7.80	8.40	9.00
B1	9.15	9.20	9.25
B2	9.20	9.25	9.30
C		5.57	
D		1.52	
E	0.43	0.45	0.47
F		2.54	
G		0.25	
H	1.54	1.59	1.64
工	3.22	3.27	3.32
R		0.20	
M1	9°	10°	11°
M2	11°	12°	13°

Important statement:

●TUDI Semiconductor reserves the right to modify the product manual without prior notice! Before placing an order, customers need to confirm whether the obtained information is the latest version and verify the completeness of the relevant information.

●Any semi-guide product is subject to failure or malfunction under specified conditions. It is the buyer's responsibility to comply with safety standards when using TUDI Semiconductor products for system design and whole machine manufacturing.And take the appropriate safety measures to avoid the potential in the risk of loss of personal injury or loss of property situation!

●TUDI Semiconductor products have not been licensed for life support, military, and aerospace applications,and therefore TUDI Semiconductor is not responsible for any consequences arising from the use of this product in these areas.

●If any or all TUDI Semiconductor products (including technical data, services) described or contained in this document are subject to any applicable local export control laws and regulations, they may not be exported without an export license from the relevant authorities in accordance with such laws.

●The specifications of any and all TUDI Semiconductor products described or contained in this document specify the performance, characteristics, and functionality of said products in their standalone state, but do not guarantee the performance, characteristics, and functionality of said products installed in Customer's products or equipment. In order to verify symptoms and conditions that cannot be evaluated in a standalone device, the Customer should ultimately evaluate and test the device installed in the Customer's product device.

●TUDI Semiconductor documentation is only allowed to be copied without any alteration of the content and with the relevant authorization.TUDI Semiconductor assumes no responsibility or liability for altered documents.

●TUDI Semiconductor is committed to becoming the preferred semiconductor brand for customers, and TUDI Semiconductor will strive to provide customers with better performance and better quallity products.