

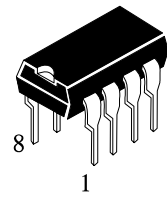
ILX485

Low-Power, Slew-Rate-Limited RS-485/RS-422 Transceivers

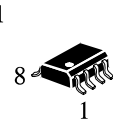
General Description

The ILX485 is low-power transceivers for RS-485 and RS-422 communication. IC contains one driver and one receiver. The driver slew rates of the ILX485 is not limited, allowing them to transmit up to 2.5Mbps.

These transceivers draw between 120 μ A and 500 μ A of supply current when unloaded or fully loaded with disabled drivers. All parts operate from a single 5V supply. Drivers are short-circuit current limited and are protected against excessive power dissipation by thermal shutdown circuitry that places the driver outputs into a high-impedance state. The receiver input has a fail-safe feature that guarantees a logic-high output if the input is open circuit. The MAX485 is designed for half-duplex applications.



N SUFFIX
PLASTIC



D SUFFIX
SOIC

Features

Low Quiescent Current: 300 μ A

-7V to +12V Common-Mode Input Voltage Range

Three-State Outputs

30ns Propagation Delays, 5ns Skew

Full-Duplex and Half-Duplex Versions Available

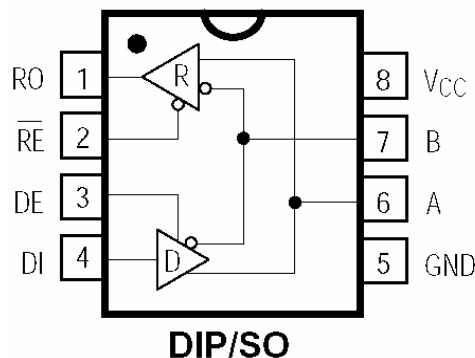
Operate from a Single 5V Supply

Allows up to 32 Transceivers on the Bus

Data rate: 2,5 Mbps

Current-Limiting and Thermal Shutdown for Driver Overload Protection

Pinning



ABSOLUTE MAXIMUM RATINGS

Supply Voltage (VCC) 12V Control Input Voltage -0.5V to (VCC + 0.5V) Driver Input Voltage (DI) -0.5V to (VCC+ 0.5V) Driver Output Voltage (A, B) -8V to +12.5V Receiver Input Voltage (A, B) -8V to +12.5V Receiver Output Voltage (RO) -0.5V to (VCC+0.5V)	Continuous Power Dissipation (TA= +70°C) 8-Pin Plastic DIP (derate 9.09mW/°C above +70°C) 727mW 8-Pin SO (derate 5.88mW/°C above +70°C) 471mW Operating Temperature Ranges 0°C to +70°C Storage Temperature Range -65°C to +160°C Lead Temperature (soldering, 10sec) +300°C
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DC ELECTRICAL CHARACTERISTICS

(V_{CC} = 5V ±5%, T_A = T_{MIN} to T_{MAX}, unless otherwise noted.) (Notes 1, 2)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Differential Driver Output (no load)	V _{OD1}				5	V
Differential Driver Output (with load)	V _{OD2}	R = 50 (RS-422)	2			V
		R = 27 (RS-485), Figure 4	1.5		5	
Change in Magnitude of Driver Differential Output Voltage for Complementary Output States	V _{OD}	R = 27 or 50, Figure 4			0.2	V
Driver Common-Mode Output Voltage	V _{OC}	R = 27 or 50, Figure 4			3	V
Change in Magnitude of Driver Common-Mode Output Voltage for Complementary Output States	V _{OD}	R = 27 or 50, Figure 4			0.2	V
Input High Voltage	V _{IH}	DE, DI, \overline{RE}	2.0			V
Input Low Voltage	V _{IL}	DE, DI, \overline{RE}			0.8	V
Input Current	I _{IN1}	DE, DI, \overline{RE}			±2	μA
Input Current (A, B)	I _{IN2}	DE = 0V; V _{CC} = 0V or 5.25V,	V _{IN} = 12V		1.0	mA
			V _{IN} = -7V		-0.8	
Receiver Differential Threshold Voltage	V _{TH}	-7V V _{CM} 12V	-0.2		0.2	V
Receiver Input Hysteresis	V _{TH}	V _{CM} = 0V		70		mV
Receiver Output High Voltage	V _{OH}	I _O = -4mA, VID = 200mV	3.5			V
Receiver Output Low Voltage	V _{OL}	I _O = 4mA, VID = -200mV			0.4	V
Three-State (high impedance) Output Current at Receiver	I _{OZR}	0.4V V _O 2.4V			±1	μA
Receiver Input Resistance	R _{IN}	-7V V _{CM} 12V	12			k

ILX485

DC ELECTRICAL CHARACTERISTICS (continued)

($V_{CC} = 5V \pm 5\%$, $T_A = T_{MIN}$ to T_{MAX} , unless otherwise noted.) (Notes 1, 2)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
No-Load Supply Current (Note 3)	I_{CC}	DE = VCC		500	900	
		RE = 0V or V_{CC} DE = 0V		300	500	μA
Driver Short-Circuit Current, $V_o = \text{High}$	I_{OSD1}	-7V V_o 12V (Note 4)	35		250	mA
Driver Short-Circuit Current, $V_o = \text{Low}$		I_{OSD2}	-7V V_o 12V (Note 4)	35		250
Receiver Short-Circuit Current	I_{OSR}	0V V_o V_{CC}	7		95	mA

SWITCHING CHARACTERISTICS

($V_{CC} = 5V \pm 5\%$, $T_A = T_{MIN}$ to T_{MAX} , unless otherwise noted.) (Notes 1, 2)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Driver Input to Output	t_{PLH}	$R_{DIFF} = 54 \Omega$	10	30	60	ns
	t_{PHL}	$C_{1,1} = C_{1,2} = 100pF$	10	30	60	
Driver Output Skew to Output	t_{SKEW}	$R_{DIFF} = 54 \Omega$, $CL1 = CL2 = 100pF$		5	10	ns
Driver Enable to Output High	t_{ZH}	$C_i = 100pF$, S2 closed		40	70	ns
Driver Enable to Output Low	t_{ZL}	$C_i = 100pF$, S1 closed		40	70	ns
Driver Disable Time from Low	t_{LZ}	$C_i = 15pF$, S1 closed		40	70	ns
Driver Disable Time from High	t_{HZ}	$C_i = 15pF$, S2 closed		40	70	ns
$t_{PLH} - t_{PHL}$ Differential	t_{SKD}	$R_{DIFF} = 54 \Omega$		13		ns
Receiver Skew		$C_{1,1} = C_{1,2} = 100pF$				
Receiver Enable to Output Low	t_{ZL}	$C_{RL} = 15pF$, S1 closed		20	50	ns
Receiver Enable to Output High	t_{ZH}	$C_{RL} = 15pF$, S2 closed		20	50	ns
Receiver Disable Time from Low	t_{LZ}	$C_{RL} = 15pF$, S1 closed		20	50	ns
Receiver Disable Time from High	t_{HZ}	$C_{RL} = 15pF$, S2 closed		20	50	ns
Maximum Data Rate	f_{MAX}		2.5			Mbps

ILX485

Operation timing diagrams of ILX 485.

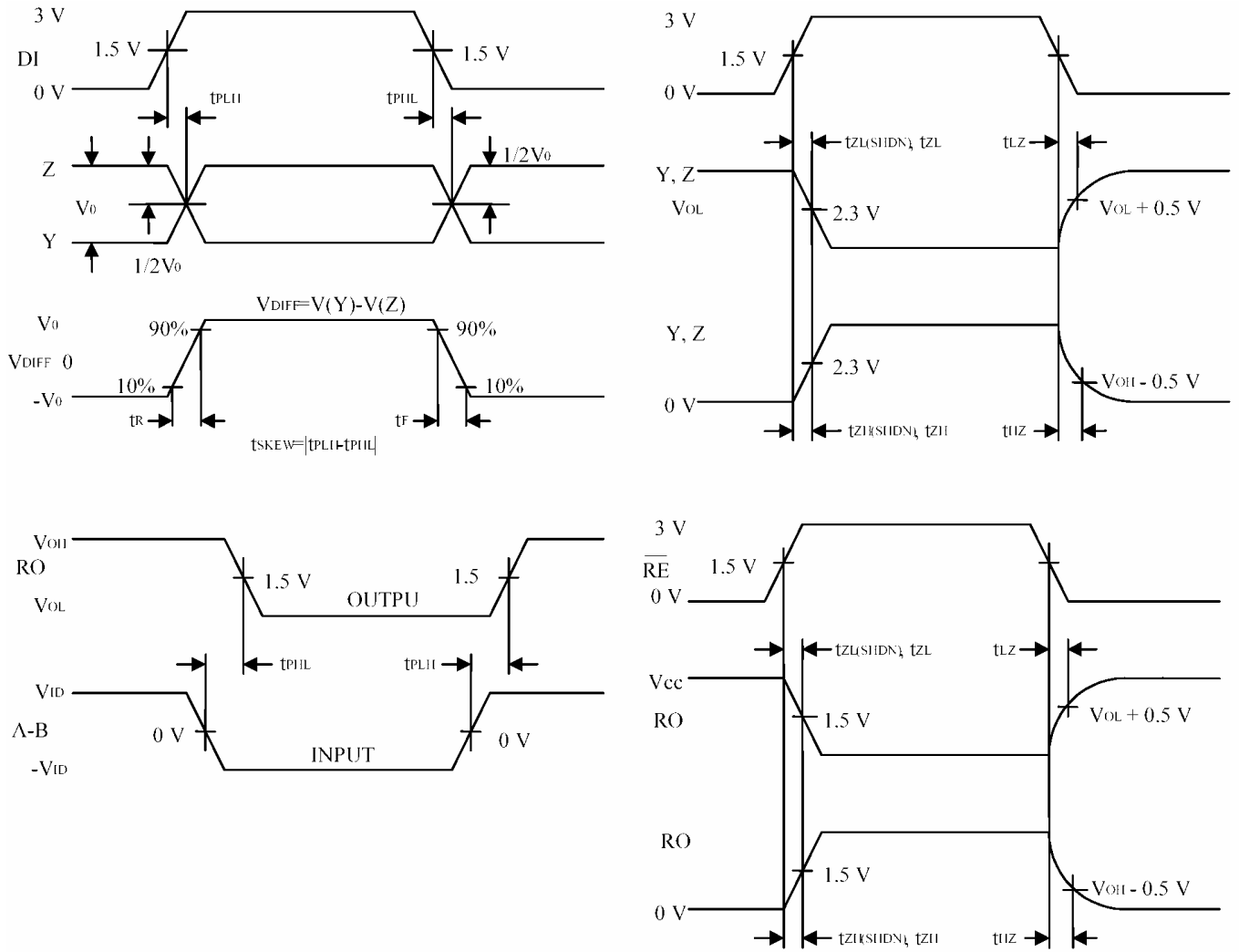


Table of ILX 485 operation.

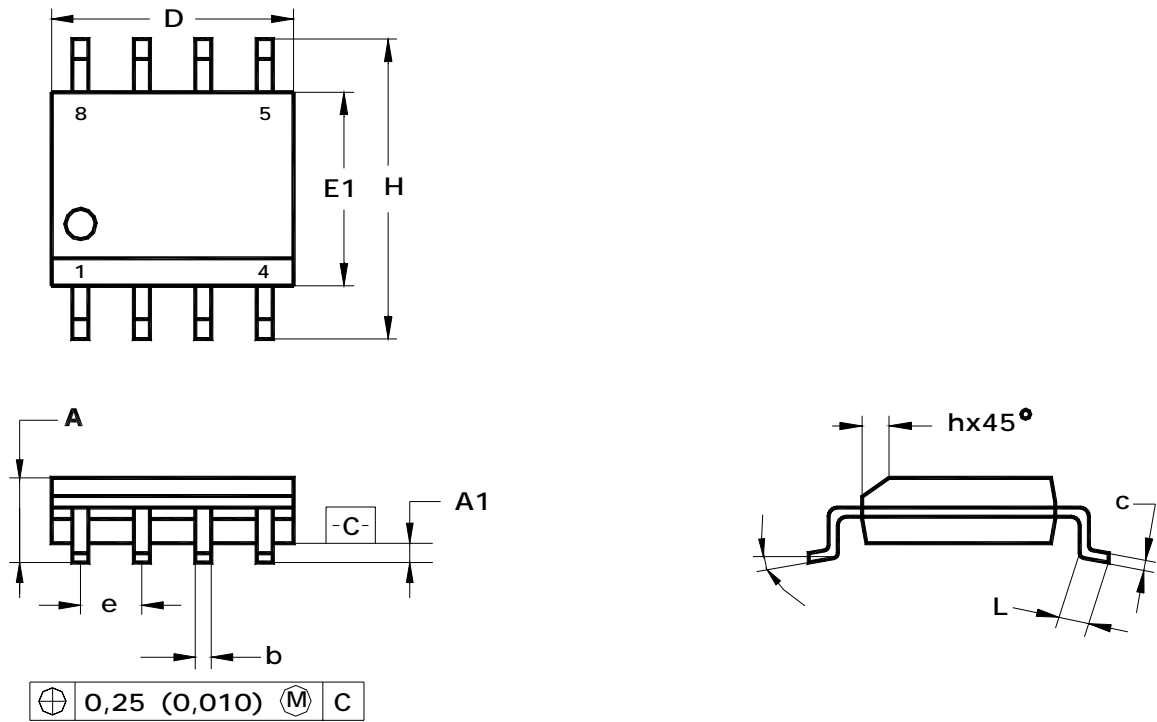
Transmission					Receipt			
Inputs			Outputs		Inputs			Outputs
RE	DE	DI	Z	Y	RE	DE	A-B	RO
X	1	1	0	1	0	0	+0.2V	1
X	1	0	1	0	0	0	-0.2V	0
0	0	X	Z	Z	0	0	open	1
1	0	X	Z	Z	1	0	X	Z

X-don't care

Z-high resistance

ILX485

N SUFFIX PLASTIK SOP (MS-012AA)

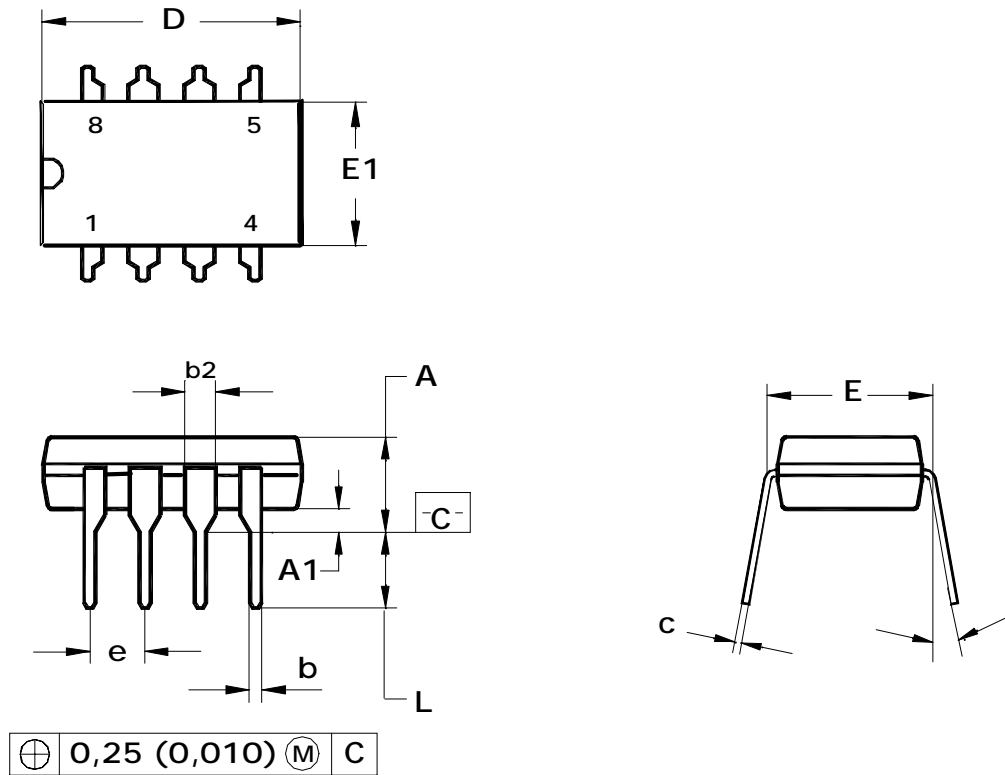


Note: dimensions D, E1 do not include flash which shall not be more than 0.25 (0.010) per one side.

Fig. 9 – Package overall dimensions

Table 6 – Package dimensions

	D	E1	H	b	e		A	A1	c	L	h
Mm											
min	4.80	3.80	5.80	0.33	1.27	0	1.35	0.10	0.19	0.41	0.25
max	5.00	4.00	6.20	0.51		8	1.75	0.25	0.25	1.27	0.50
Inch											
min	0.1890	0.1497	0.2284	0.013	0.100	0	0.0532	0.0040	0.0075	0.016	0.0099
max	0.1968	0.1574	0.2440	0.020		8	0.0688	0.0090	0.0098	0.050	0.0196



Note: D, E1 Dimensions do not include flash which shall not be more than 0.25 (0.010) per one side

Package overall dimensions

	D	E1	A	b	b2	e		L	E	c	A1
Mm											
min	9.02	6.07		0.36	1.14		0	2.93	7.62	0.20	0.38
max	10.16	7.11	5.33	0.56	1.78	2.54	15	3.81	8.26	0.36	
Inch											
min	0.355	0.240		0.014	0.045		0	0.115	0.300	0.008	0.015
max	0.400	0.280	0.210	0.022	0.070	0.1	15	0.150	0.325	0.014	