

# EVVOSEMI<sup>®</sup>

THINK CHANGE DO



ESD



TVS



MOS



LDO



Diode



Sensor



DC-DC

## Product Specification

▶ Domestic	Part Number	ADM485ARZ
▶ Overseas	Part Number	ADM485ARZ
▶ Equivalent	Part Number	ADM485ARZ

EV is the abbreviation of name EVVO

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

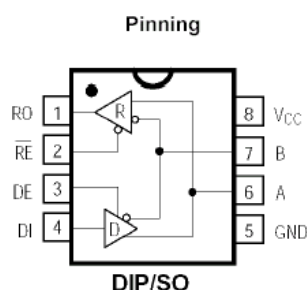
### General Description

The ADM485 is low-power transceivers for RS-485 and RS-422 communication. IC contains one driver and one receiver. The driver slew rates of the ADM485 is not limited, allowing them to transmit up to 2.5Mbps.

These transceivers draw between 120 $\mu$ A and 500 $\mu$ 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 ADM485 is designed for half-duplex applications.

### Features

- Low Quiescent Current: 300 $\mu$ 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



## ABSOLUTE MAXIMUM RATINGS

Supply Voltage ( $V_{CC}$ ) 12V  
 Control Input Voltage -0.5V to ( $V_{CC} + 0.5V$ )  
 Driver Input Voltage (DI) -0.5V to ( $V_{CC} + 0.5V$ )  
 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 ( $V_{CC} + 0.5V$ )

Continuous Power Dissipation ( $T_A = +70^\circ\text{C}$ )  
 8-Pin Plastic DIP (derate 9.09mW/ $^\circ\text{C}$  above  $+70^\circ\text{C}$ ) 727mW  
 8-Pin SO (derate 5.88mW/ $^\circ\text{C}$  above  $+70^\circ\text{C}$ ) 471mW  
 Operating Temperature Ranges  $0^\circ\text{C}$  to  $+70^\circ\text{C}$   
 Storage Temperature Range  $-65^\circ\text{C}$  to  $+160^\circ\text{C}$   
 Lead Temperature (soldering, 10sec)  $+300^\circ\text{C}$

## DC ELECTRICAL 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
Differential Driver Output (no load)	$V_{OD1}$				5	V
Differential Driver Output (with load)	$V_{OD2}$	R = 50 $\Omega$ (RS-422)	2			V
		R = 27 $\Omega$ (RS-485), Figure 4	1.5		5	
Change in Magnitude of Driver Differential Output Voltage for Complementary Output States	$\Delta V_{OD}$	R = 27 $\Omega$ or 50 $\Omega$ , Figure 4			0.2	V
Driver Common-Mode Output Voltage	$V_{OC}$	R = 27 $\Omega$ or 50 $\Omega$ , Figure 4			3	V
Change in Magnitude of Driver Common-Mode Output Voltage for Complementary Output States	$\Delta V_{OC}$	R = 27 $\Omega$ or 50 $\Omega$ , Figure 4			0.2	V
Input High Voltage	$V_{IH}$	DE, DI, RE	2.0			V
Input Low Voltage	$V_{IL}$	DE, DI, RE			0.8	V
Input Current	$I_{IN1}$	DE, DI, RE			$\pm 2$	$\mu\text{A}$
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	$V_{TH}$	$-7V \leq V_{CM} \leq 12V$	-0.2		0.2	V
Receiver Input Hysteresis	$\Delta V_{TH}$	$V_{CM} = 0V$		70		mV
Receiver Output High Voltage	$V_{OH}$	$I_O = -4mA$ , $V_{ID} = 200mV$	3.5			V
Receiver Output Low Voltage	$V_{OL}$	$I_O = 4mA$ , $V_{ID} = -200mV$			0.4	V
Three-State (high impedance) Output Current at Receiver	$I_{OZR}$	$0.4V \leq V_O \leq 2.4V$			$\pm 1$	$\mu\text{A}$
Receiver Input Resistance	$R_{IN}$	$-7V \leq V_{CM} \leq 12V$				k $\Omega$

**DC ELECTRICAL CHARACTERISTICS (continued)**

 (V<sub>CC</sub> = 5V ±5%, T<sub>A</sub> = T<sub>MIN</sub> to T<sub>MAX</sub>, unless otherwise noted.) (Notes 1, 2)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
No-Load Supply Current (Note 3)	I <sub>CC</sub>	DE = V <sub>CC</sub>		500	900	μA
		RE = 0V or V <sub>CC</sub>		300	500	
		DE = 0V				
Driver Short-Circuit Current,						
	I <sub>OSD1</sub>	-7V ≤ V <sub>O</sub> ≤ 12V (Note 4)	35		250	mA
V <sub>O</sub> = High						
Driver Short-Circuit Current,						
	I <sub>OSD2</sub>	-7V ≤ V <sub>O</sub> ≤ 12V (Note 4)	35		250	mA
V <sub>O</sub> = Low						
Receiver Short-Circuit Current	I <sub>OSR</sub>	0V ≤ V <sub>O</sub> ≤ V <sub>CC</sub>	7		95	mA

**SWITCHING CHARACTERISTICS**

 (V<sub>CC</sub> = 5V ±5%, T<sub>A</sub> = T<sub>MIN</sub> to T<sub>MAX</sub>, unless otherwise noted.) (Notes 1, 2)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Driver Input to Output	t <sub>PLH</sub>	R <sub>DIFF</sub> = 54 $\Omega$	10	30	60	ns
	t <sub>PHL</sub>	C <sub>L1</sub> = C <sub>L2</sub> = 100pF	10	30	60	
Driver Output Skew to Output	t <sub>SKEW</sub>	R <sub>DIFF</sub> = 54 $\Omega$ , C <sub>L1</sub> = C <sub>L2</sub> = 100pF		5	10	ns
Driver Enable to Output High	t <sub>ZH</sub>	C <sub>L</sub> = 100pF, S2 closed		40	70	ns
Driver Enable to Output Low	t <sub>ZL</sub>	C <sub>L</sub> = 100pF, S1 closed		40	70	ns
Driver Disable Time from Low	t <sub>LZ</sub>	C <sub>L</sub> = 15pF, S1 closed		40	70	ns
Driver Disable Time from High	t <sub>HZ</sub>	C <sub>L</sub> = 15pF, S2 closed		40	70	ns
t <sub>PLH</sub> - t <sub>PHL</sub>   Differential	t <sub>SKD</sub>	R <sub>DIFF</sub> = 54 $\Omega$		13		ns
Receiver Skew		C <sub>L1</sub> = C <sub>L2</sub> = 100pF				
Receiver Enable to Output Low	t <sub>ZL</sub>	C <sub>R</sub> = 15pF, S1 closed		20	50	ns
Receiver Enable to Output High	t <sub>ZH</sub>	C <sub>R</sub> = 15pF, S2 closed		20	50	ns
Receiver Disable Time from Low	t <sub>LZ</sub>	C <sub>R</sub> = 15pF, S1 closed		20	50	ns
Receiver Disable Time from High	t <sub>HZ</sub>	C <sub>R</sub> = 15pF, S2 closed		20	50	ns
Maximum Data Rate	f <sub>MAX</sub>		2.5			Mbps

### Operation timing diagrams of ADM485

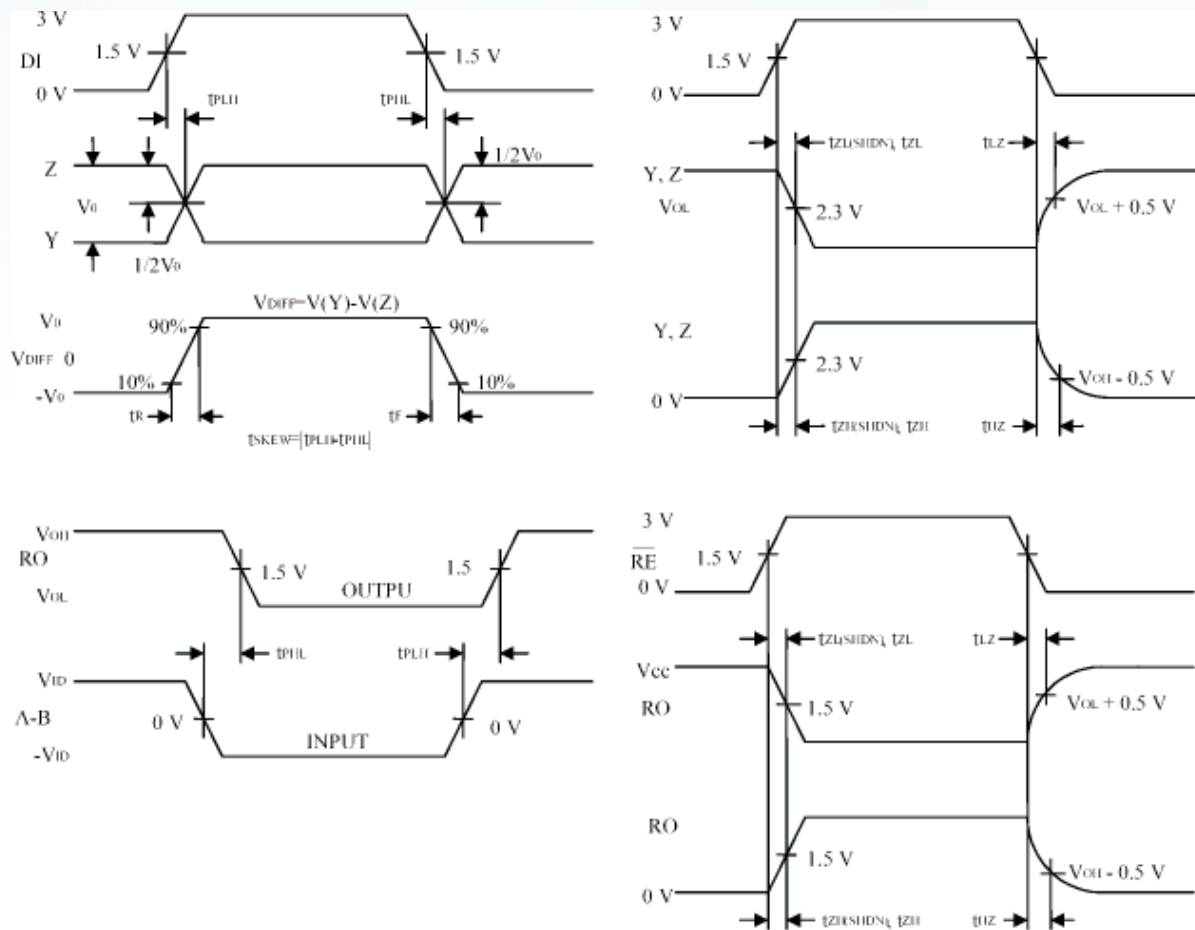


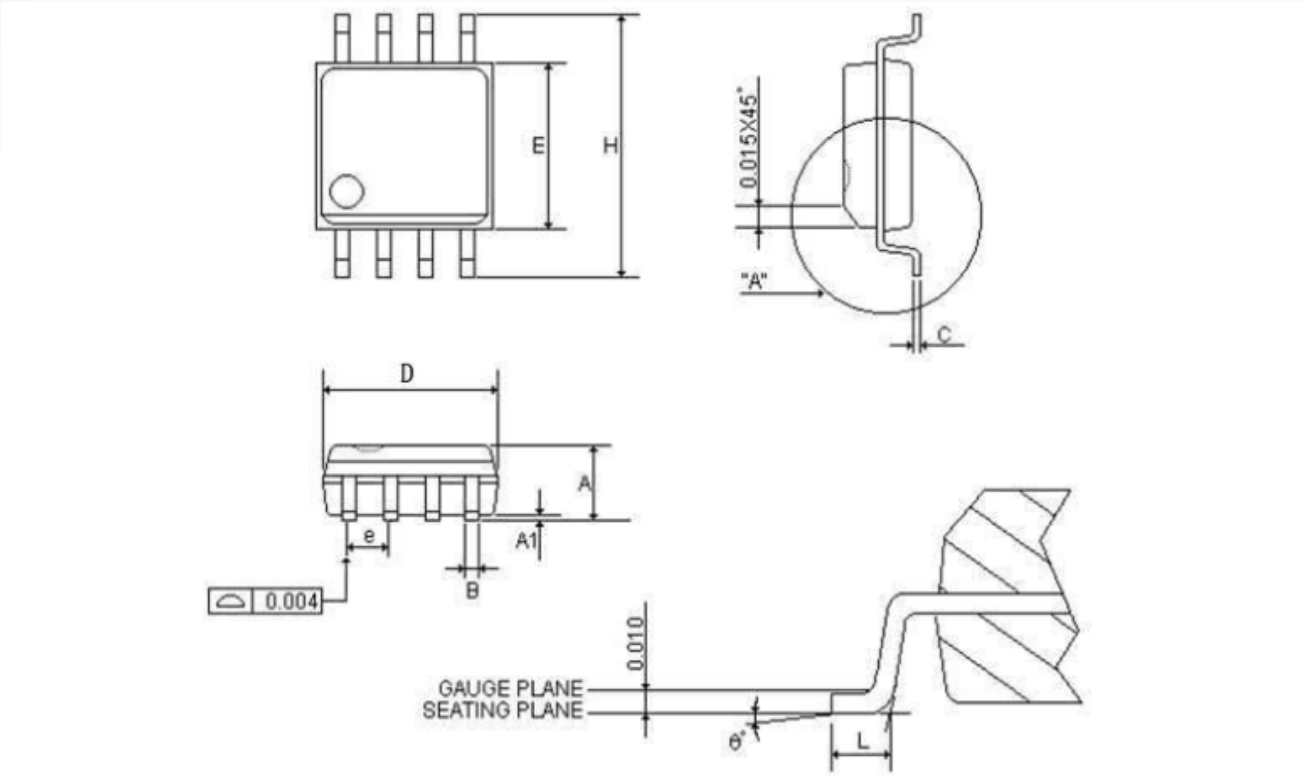
Table of ADM485 operation

Transmission					Receipt			
Inputs			Outputs X		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

SOP 8



SYMBOLS	MIN	NOR	MAX	MIN	NOR	MAX
	(inch)			(mm)		
A	0.058	0.064	0.068	1.4732	1.6256	1.7272
A1	0.004	-	0.010	0.1016	-	0.254
B	0.013	0.016	0.020	0.3302	0.4064	0.508
C	0.0075	0.008	0.0098	0.1905	0.2032	0.2490
D	0.186	0.191	0.196	5.9944	6.1214	6.1976
E	0.150	0.154	0.157	3.81	3.9116	3.9878
e	-	0.050	-	-	1.27	-
H	0.228	0.236	0.244	5.7912	5.9944	6.1976
L	0.015	0.025	0.050	0.381	0.635	1.27
0°	0°	-	8°	0°	-	8°

## Disclaimer

EVVOSEMI ("EVVO") reserves the right to make corrections, enhancements, improvements, and other changes to its products and services at any time, and to discontinue any product or service without notice.

EVVO warrants the performance of its hardware products to the specifications applicable at the time of sale in accordance with its standard warranty. Testing and other quality control techniques are used as deemed necessary by EVVO to support this warranty. Except where mandated by government requirements, testing of all parameters of each product is not necessarily performed.

Customers should obtain and confirm the latest product information and specifications before final design, purchase, or use. EVVO makes no warranty, representation, or guarantee regarding the suitability of its products for any particular purpose, nor does EVVO assume any liability for application assistance or customer product design. EVVO does not warrant or accept any liability for products that are purchased or used for any unintended or unauthorized application.

EVVO products are not authorized for use as critical components in life support devices or systems without the express written approval of EVVOSEMI.

The EVVO logo and EVVOSEMI are trademarks of EVVOSEMI or its subsidiaries in relevant jurisdictions. EVVO reserves the right to make changes without further notice to any products herein.