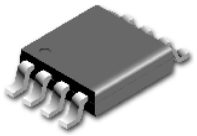
DESCRIPTION

The TJ485 is low-power transceivers for RS-485 and RS-422 communication. IC contains one driver and one receiver. The driver slew rates of the TJ485 is not limited, allowing them to transmit up to 2.5Mbps. These transceivers draw between 120μA and 500μA 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 TJ485 is designed for half-duplex applications.

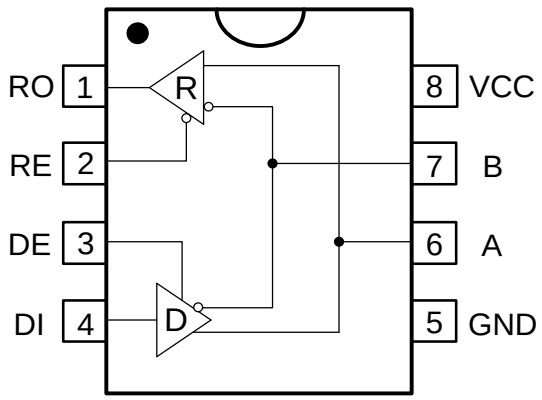
SOP-8



FEATURES

- Low Quiescent Current: 300μA
- -7V to +12V Common-Mode Input Voltage Range
- Three-State Outputs
- 30ns Propagation Delays, 5ns Skew
- 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

Pin Configuration and Logic Diagram



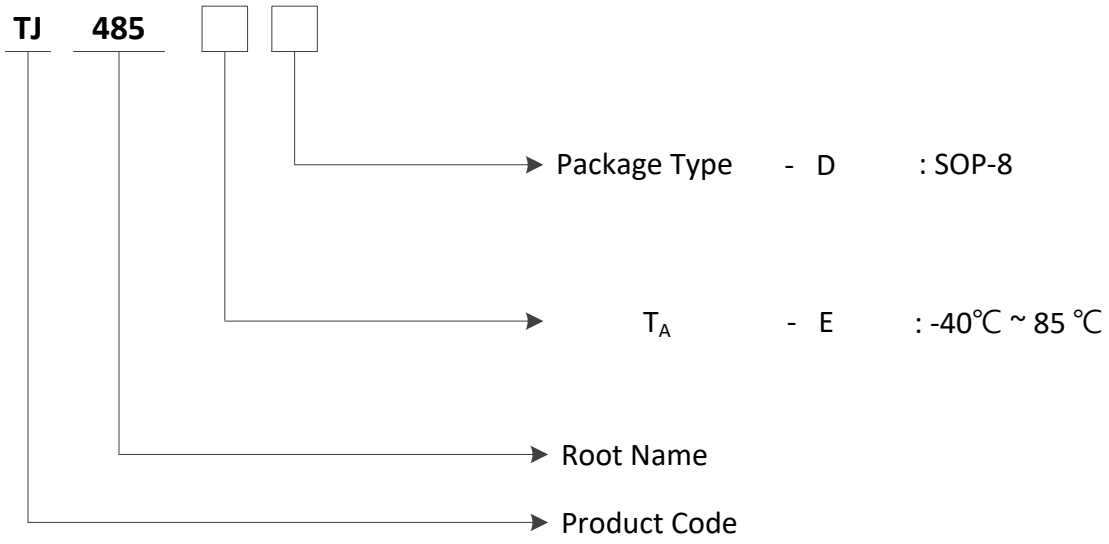
TRUTH TABLE

Transmission				
Inputs			Outputs	
RE	DE	DI	A	B
X	1	1	1	0
X	1	0	0	1
0	0	X	Z	Z
1	0	X	Z	Z

Receiver			
Inputs			Outputs
RE	DE	A-B	RO
0	0	≥ +0.2V	1
0	0	≤ -0.2V	0
0	0	Open	1
1	0	X	Z

Ordering Information

Package	Oder No.	Description	Marking	Compliance	Status
SOP-8	TJ485ED	RS-485/RS-422 Transceivers	TJ485E	RoHS, Green	Active



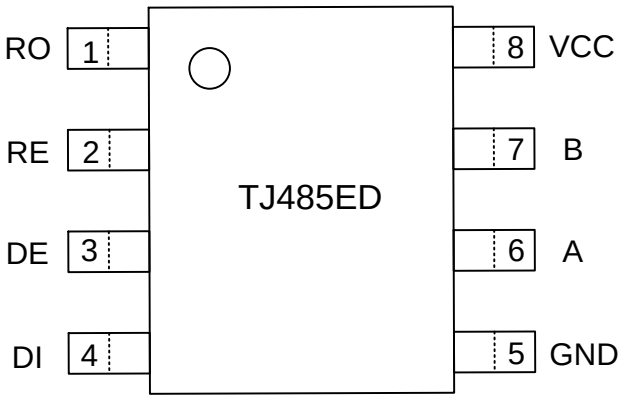
Absolute Maximum Ratings

Characteristic	Symbol	Min	Max	Unit
Supply Voltage	V_{CC}		12	V
Control Input Voltage	V_{DE}, V_{RE}	-0.5	V_{CC} + 0.5	V
Driver Input Voltage	V_{DI}	-0.5	V_{CC} + 0.5	V
Driver Output Voltage	A, B	-8	12.5	V
Receiver Input Voltage	A, B	-8	12.5	V
Receiver Output Voltage	V_{RO}	-0.5	V_{CC} + 0.5	V
Storage Temperature Range	T_{STG}	-65	150	℃

Operating Ratings

Characteristic	Symbol	Min	Max	Unit
Supply Voltage	V_{CC}	4.75	5.25	V
Operating Temperature Ranges	T_A	-40	85	℃

PIN CONFIGURATION



PIN DESCRIPTION

Pin No.	Symbol	Pin Descriptions
1	RO	Receiver Output
2	RE*	Receiver Output Enable
3	DE	Driver Output Enable
4	DI	Driver Input
5	GND	Ground
6	A	Non-inverting Driver Output and Receiver Input
7	B	Inverting Driver Output and Receiver Input
8	V_{CC}	Power Supply: 4.75V to 5.25V

ELECTRICAL CHARACTERISTICS

Unless otherwise specified: V_{CC} = 5V ± 5%, T_A = T_{MIN} to T_{MAX}

PARAMETER	Symbol	CONDITIONS		MIN	TYP	MAX	UNITS
Differential Driver Output (no load)	V_{OD1}					5	V
Differential Driver Output (with load)	V_{OD2}	R = 50Ω (RS-422), Figure 1		2			V
		R = 27Ω (RS-485), Figure 1		1.5		5	
Change in Magnitude of Driver Differential Output Voltage for Complementary Output States	ΔV_{OD}	R = 27Ω or 50Ω, Figure 1				0.2	V
Driver Common-Mode Output Voltage	V_{OC}	R = 27Ω or 50Ω, Figure 1				3	V
Change in Magnitude of Driver Common-Mode Output Voltage for Complementary Output States	ΔV_{OC}	R = 27Ω or 50Ω, Figure 1				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				±2	uA
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	ΔV_{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 ≤ V_O ≤ 2.4V				±1	uA
Receiver Input Resistance	R_{IN}	-7V ≤ V_{CM} ≤ 12V		12			kΩ
No-Load Supply Current	ICC	RE = 0V or V_{CC}	DE=V_{CC}		500	900	uA
			DE=0V		300	500	
Driver Short-Circuit Current, V_O = High	I_{OSD1}	-7V ≤ V_O ≤ 12V		35		250	mA
Driver Short-Circuit Current, V_O = Low	I_{OSD2}	-7V ≤ V_O ≤ 12V		35		250	mA
Receiver Short-Circuit Current	I_{OSR}	0V ≤ V_O ≤ V_{CC}		7		95	mA

SWITCHING CHARACTERISTICS

Unless otherwise specified: V_{CC} = 5V ± 5%, $T_A = T_{MIN}$ to T_{MAX}

PARAMETER	Symbol	CONDITIONS	MIN	TYP	MAX	UNITS
Driver Input to Output	t_{PLH}	R_L = 54Ω C_L = 100pF	10	30	60	ns
	t_{PHL}		10	30	60	ns
Driver Output Skew to Output	t_{SKEW}	R_L = 54Ω, C_L = 100pF		5	10	ns
Driver Enable to Output High	t_{ZH}	C_L = 100pF, R_L = 1KΩ		40	70	ns
Driver Enable to Output Low	t_{ZL}	C_L = 100pF, R_L = 1KΩ		40	70	ns
Driver Disable Time from Low	t_{HZ}	C_L = 15pF, R_L = 1KΩ		40	70	ns
Driver Disable Time from High	t_{LZ}	C_L = 15pF, R_L = 1KΩ		40	70	ns
| tPLH - tPHL | Differential Receiver Skew	t_{SKD}	R_L = 54Ω C_L = 100pF		13		ns
Receiver Enable to Output Low	t_{ZL}	C_L = 15pF		20	50	ns
Receiver Enable to Output High	t_{ZH}	C_L = 15pF		20	50	ns
Receiver Disable Time from Low	t_{LZ}	C_L = 15pF		20	50	ns
Receiver Disable Time from High	t_{HZ}	C_L = 15pF		20	50	ns
Maximum Data Rate	f_{MAX}		2.5			Mbps

TEST CIRCUITS

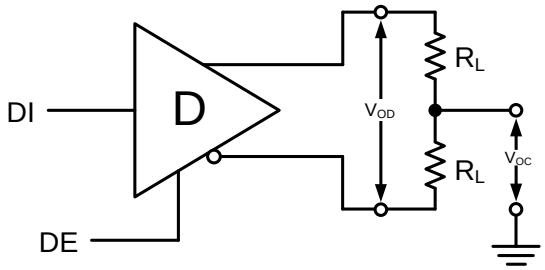


Figure. 1

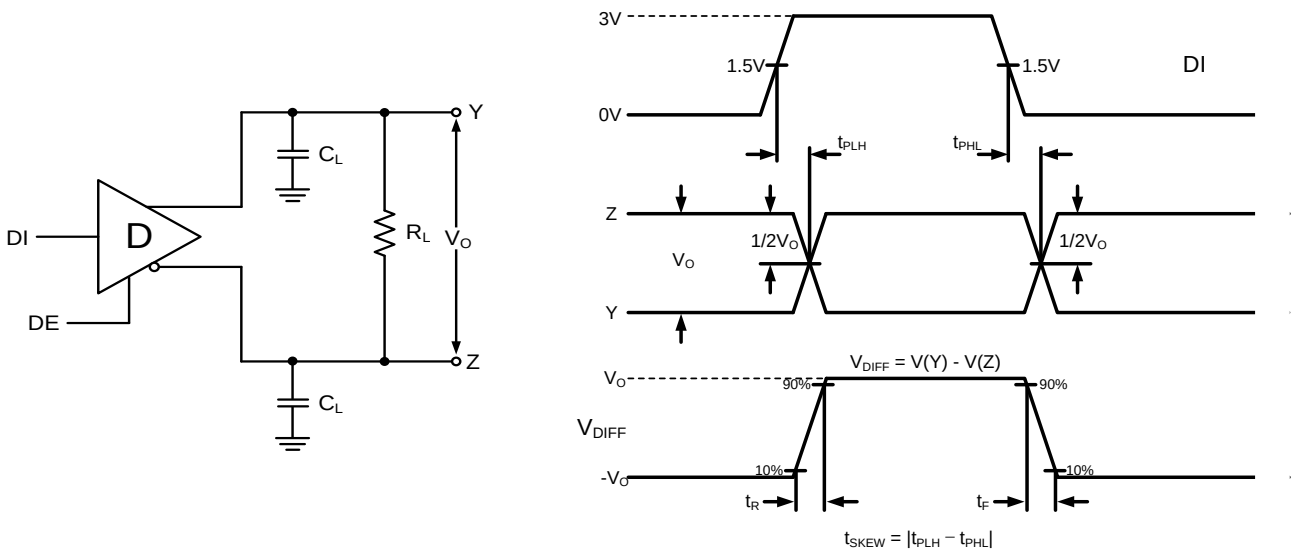


Figure. 2

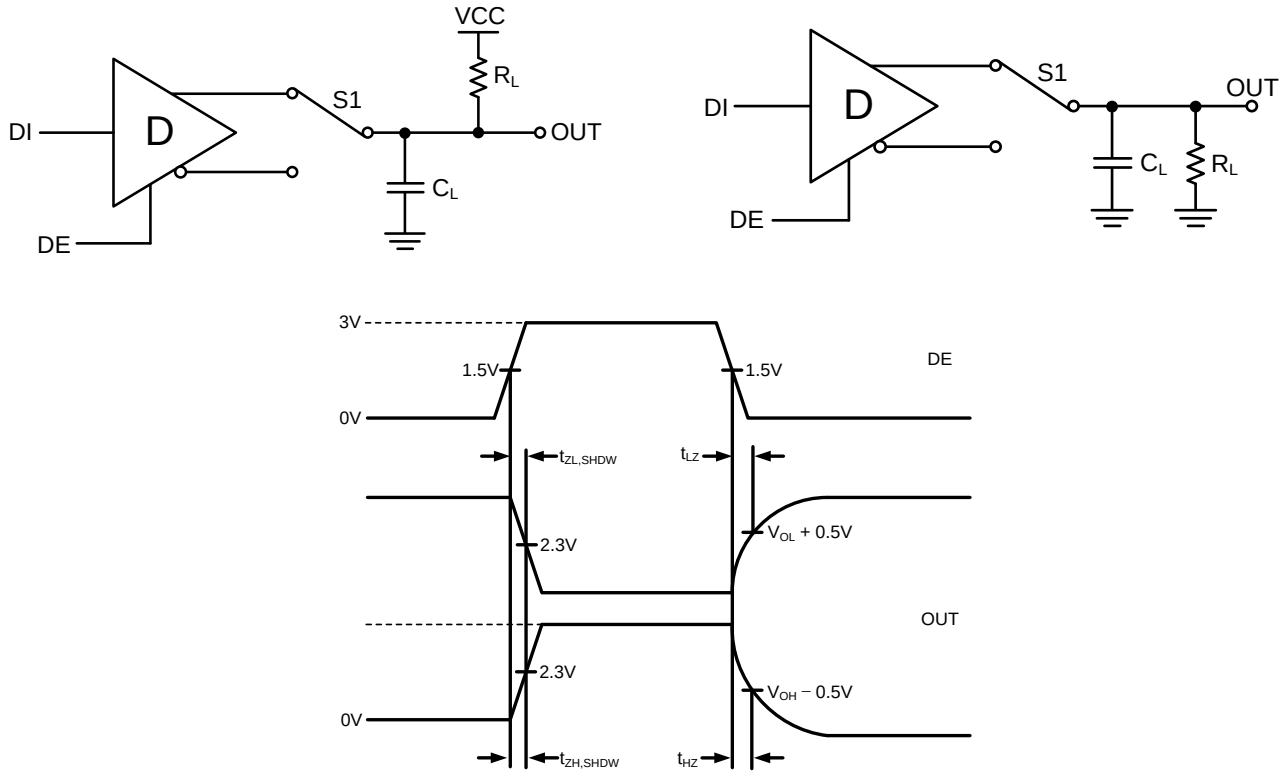


Figure. 3

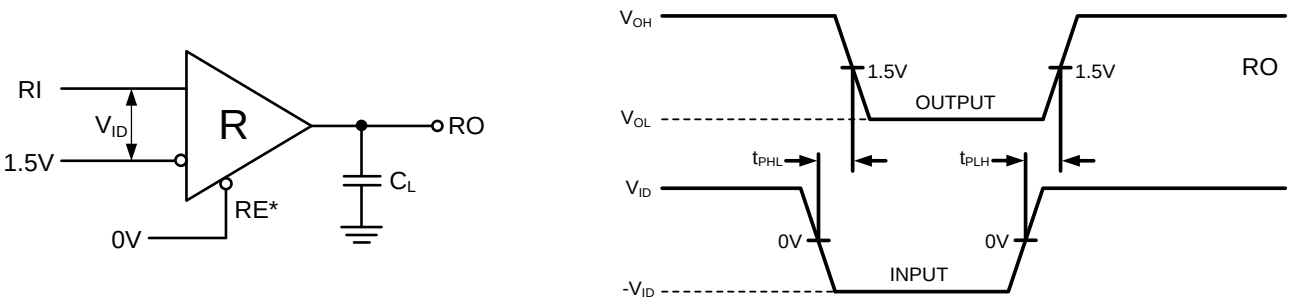


Figure. 4

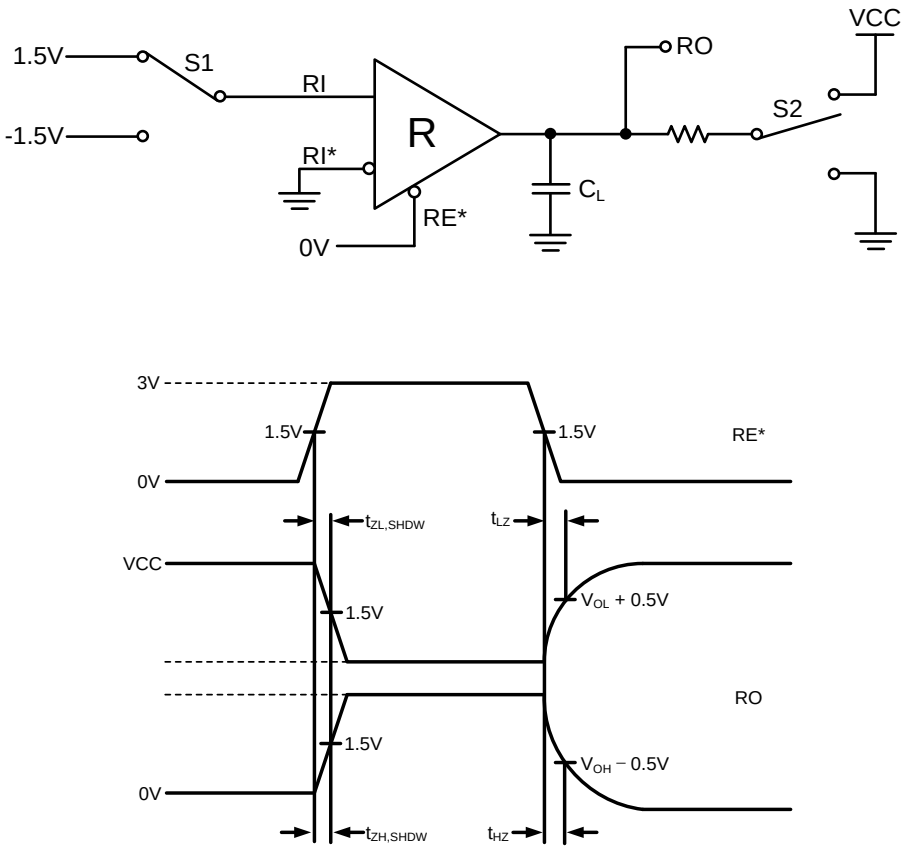

1.5V
S1
-1.5V
RI
RI*
R
RE*
0V
RO
VCC
S2
C_L
3V
1.5V
0V
RE*
$t_{ZL,SHDW}$
t_{LZ}
VCC
1.5V
V_{OL} + 0.5V
RO
1.5V
V_{OH} − 0.5V
0V
$t_{ZH,SHDW}$
t_{HZ}

Figure. 5

PRELIMINARY REVISION NOTICE

The information in this datasheet can be revised without any notice.