3V至5.5V供电、±15kV ESD保护、限摆率真RS-485收发器

UM3483E/UM3486E *SOP8/DIP8*

描述

UM3483E、UM3486E是满足RS-485标准的3V至5.5V供电、±15kV ESD保护、限摆率差分收发器，这些器件包含一个驱动器和一个接收器，用于共模电压范围内（-7V to 12V）的数据传输。UM3483E具有限摆率驱动器，可充分降低EMI并减少因电缆端接不当引起的反射。UM3483E可实现数据速率高达500kbps的无误差数据传输，而部分限摆率的UM3486E支持高达2.5Mbps的传输速率。

UM3483E、UM3486E也具有增强型ESD保护。所有发射器输出和接收器输入均能耐受±15kV的IEC61000-4-2 空气间隙放电、±8kV的IEC61000-4-2 接触放电和±8kV的人体放电模型。

驱动器具有短路限流功能。通过热关断电路将驱动器输出置于高阻抗状态，以防功耗过大。并且接收器输入具有故障安全特性，可在总线开路、短路或空闲时确保输出保持逻辑高电平。

上电/断电无毛刺干扰驱动器输出允许进行收发器的带电插拔操作。CMOS 设计提供了显著的节能效果，同时又能防止过载或 ESD 损坏。典型静态电流在工作时仅为 300μA，而在关机模式中则为 1μA。

UM3483E、UM3486E适用于半双工通信，并采用SOP8和DIP8封装。

应用

- 电信
- 低功耗 RS-485 收发器
- 集成数字服务网络
- 工业控制局域网
- 用于 EMI 敏感应用的收发器
- 分组交换技术
- 电平转换器

特性

- RS-485 I/O 引脚提供 ESD 保护
  ±8kV，人体放电模型
  ±15kV，IEC61000-4-2 空气间隙放电
  ±8kV，IEC61000-4-2 接触放电
- 电源电压范围：3V 至 5.5V
- 增强型摆率限制有助于实现无误差数据传输
- 1μA 低电流关断模式
- -7V 至+12V 共模电压范围
- 支持总线连接多达 256 个节点
- 热关断
- 驱动过载限流保护

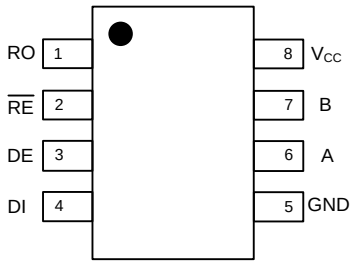
Ordering Information

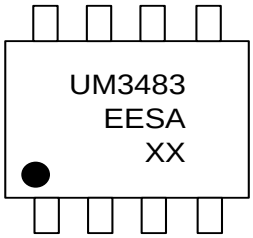
Part Number	Operating Temperature	Mark Code	Package Type	Shipping Qty
UM3483EESA	-40℃ to +85℃	UM3483EESA	SOP8	3000pcs/13 Inch Tape & Reel
UM3483EEPA	-40℃ to +85℃	UM3483EEPA	DIP8	50pcs/Tube
UM3486EESA	-40℃ to +85℃	UM3486EESA	SOP8	3000pcs/13 Inch Tape & Reel
UM3486EEPA	-40℃ to +85℃	UM3486EEPA	DIP8	50pcs/Tube

Selection Guide

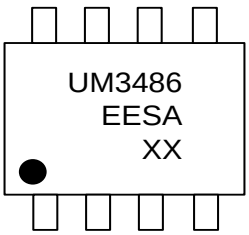
Part Number	Guaranteed Date Rate (Mbps)	Low-Power Shutdown	Slew-Rate Limited	Driver/ Receiver Enable	Shutdown Current (μA)	Transceivers On Bus	±15kV ESD Protection
UM3483E	0.5	Yes	Yes	Yes	1	256	Yes
UM3486E	2.5	Yes	Yes	Yes	1	256	Yes

Pin Configurations Top View





XX: Week Code
UM3483EESA
SOP8



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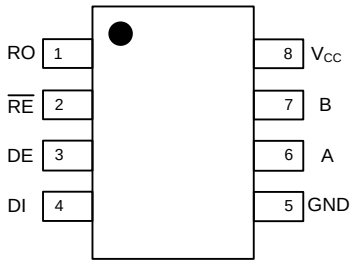

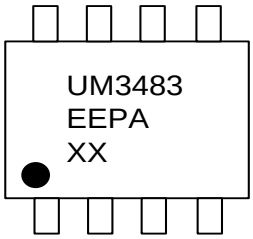

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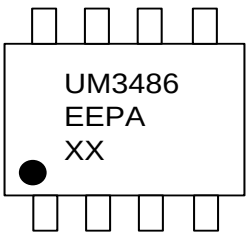


XX: Week Code
UM3486EEPA
DIP8

Absolute Maximum Ratings

Symbol	Parameter		Value	Unit
V_{CC}	Supply Voltage		+7	V
	Control Input Voltage (/RE, DE)		-0.3V to (V_{CC} + 0.3V)	V
	Driver Input Voltage (DI)		-0.3V to (V_{CC} + 0.3V)	V
	Driver Output Voltage (A, B)		-7 to +12	V
	Receiver Input Voltage (A, B)		-7 to +12	V
	Receiver Output Voltage (RO)		-0.3V to (V_{CC} + 0.3V)	V
P_D	Continuous Power Dissipation at TA = 70℃	DIP8	727	mW
		SOP8	471	
T_A	Ambient Temperature		-40 to +85	℃
T_{STG}	Storage Temperature Range		-65 to +160	℃
T_L	Lead Temperature for Soldering 10 seconds		+300	℃

DC Electrical Characteristics

(V_{CC} = +3V to 5.5V, T_A = T_{MIN} to T_{MAX}, unless otherwise noted. Typical values are at T_A = +25℃.)

Parameter	Symbol	Test Conditions		Min	Typ	Max	Unit
SUPPLY CURRENT							
Supply Current	I_{CC}	No load, DI = GND or V_{CC}	DE=V_{CC}, /RE=0V or V_{CC}	0.15		1	mA
			DE=0V, /RE=0V	0.15		1	
Supply Current in Shutdown Mode	I_{SHDN}	DE=0V, /RE=V_{CC}, DI=V_{CC} or 0V				1	μA
LOGIC							
Input High Voltage	V_{IH}	DE, DI, /RE		2.0			V
Input Low Voltage	V_{IL}	DE, DI, /RE				0.8	V
Logic Input Current	I_{IN1}	DE, DI, /RE				1	μA
Driver							
Differential Driver Output	V_{OD}	No Load Figure 1	V_{CC}=3.3V			3.3	V
			V_{CC}=5V			5	
		R_L=54Ω Figure 1	V_{CC}=3.3V	1.2			
			V_{CC}=5V	1.5			
		R_L=60Ω Figure 1	V_{CC}=3.3V	1.3			
			V_{CC}=5V	1.5			
Change in Magnitude of Driver Differential Output Voltage for Complementary Output States (Note 1)	ΔV_{OD}	R_L=54Ω or 100Ω, Figure 1				0.2	V
Driver Common-Mode Output Voltage	V_{OC}	R_L=54Ω or 100Ω, Figure 1				3	V
Change in Magnitude of Common-Mode Output Voltage (Note 1)	ΔV_{OC}	R_L=54Ω or 100Ω, Figure 1				0.2	V
Driver Short-Circuit Output Current	I_{OSD}	V_{OUT} = -7V				-250	mA
		V_{OUT} = 12V				+250	

DC Electrical Characteristics (Continued)

(V_{CC} = +3V to 5.5V, T_A = T_{MIN} to T_{MAX}, unless otherwise noted. Typical values are at T_A = +25℃.)

Parameter	Symbol	Test Conditions		Min	Typ	Max	Unit
RECEIVER							
Receiver Differential Threshold Voltage	V_{TH}	-7V≤V_{CM}≤12V		-0.2	-0.05	0.2	V
Receiver Input Hysteresis	ΔV_{TH}	V_{CM}=0V			25		mV
Receiver Input Resistance	R_{IN}	-7V≤V_{CM}≤12V		96			kΩ
Input Current (A, B)	I_{IN2}	DE=0V, V_{CC}=0V or +3V to 5.5V	V_{IN} = 12V			1	mA
			V_{IN} = -7V			-0.8	
Receiver Output High Voltage	V_{OH}	I_{OUT}=-1.5mA, V_{ID}=200mV, Figure 2		Vcc-1.5			V
Receiver Output Low Voltage	V_{OL}	I_{OUT}=2.5mA, V_{ID}=200mV, Figure 2				0.4	V
Three-State (High Impedance) Output Current at Receiver	I_{OZR}	0V≤V_{OUT}≤V_{CC}				1	μA
Receiver Short-Circuit Output Current	I_{OSR}	0V≤V_{RO}≤V_{CC}		±20		±60	mA
ESD Protection							
ESD Protection for A, B		Human Body Model			±8		kV
		IEC61000-4-2 Air Discharge			±15		
		IEC61000-4-2 Contact Discharge			±8		

Driver Switching Characteristics (UM3483E)

(V_{CC} = +3V to 5.5V, T_A = +25℃.)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Maximum Data Rate	f_{MAX}			500		kbps
Driver Differential Output Delay	t_{DD}	R_L=60Ω, Figure 3	250	500	1000	ns
Driver Differential Output Transition Time	t_{TD}	R_L=60Ω, Figure 3	250	500	750	ns
Driver Propagation Delay, Low-to-High Level	t_{PLH}	R_L=27Ω, Figure 4	250	550	1000	ns
Driver Propagation Delay, High-to-Low Level	t_{PHL}	R_L=27Ω, Figure 4	250	550	1000	ns
$\lvert t_{PLH} - t_{PHL} \rvert$ Driver Propagation Delay Skew (Note 2)	t_{PDS}	R_L=27Ω, Figure 4		10	30	ns
Driver-Output Enable/Disable Times						
Driver Output Enable Time to Low Level	t_{PZL}	R_L=110Ω, Figure 6		100	2500	ns
Driver Output Enable Time to High Level	t_{PZH}	R_L=110Ω, Figure 5		100	2500	ns
Driver Output Disable Time from High Level	t_{PHZ}	R_L=110Ω, Figure 5		100	100	ns
Driver Output Disable Time from Low Level	t_{PLZ}	R_L=110Ω, Figure 6		100	100	ns
Driver Output Enable Time from Shutdown to Low Level	t_{PSL}	R_L=110Ω, Figure 6		500	2500	ns
Driver Output Enable Time from Shutdown to High Level	t_{PSH}	R_L=110Ω, Figure 5		500	2500	ns

Driver Switching Characteristics (UM3486E)

(V_{CC} = +3V to 5.5V, T_A = +25℃.)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Maximum Data Rate	f_{MAX}			2500		kbps
Driver Differential Output Delay	t_{DD}	R_L=60Ω, Figure 3	20	50	100	ns
Driver Differential Output Transition Time	t_{TD}	R_L=60Ω, Figure 3	20	50	100	ns
Driver Propagation Delay, Low-to-High Level	t_{PLH}	R_L=27Ω, Figure 4	25	55	100	ns
Driver Propagation Delay, High-to-Low Level	t_{PHL}	R_L=27Ω, Figure 4	25	55	100	ns
$\lvert t_{PLH} - t_{PHL} \rvert$ Driver Propagation Delay Skew (Note 2)	t_{PDS}	R_L=27Ω, Figure 4		2	10	ns
Driver-Output Enable/Disable Times						
Driver Output Enable Time to Low Level	t_{PZL}	R_L=110Ω, Figure 6		60	100	ns
Driver Output Enable Time to High Level	t_{PZH}	R_L=110Ω, Figure 5		60	100	ns
Driver Output Disable Time from High Level	t_{PHZ}	R_L=110Ω, Figure 5		60	100	ns
Driver Output Disable Time from Low Level	t_{PLZ}	R_L=110Ω, Figure 6		60	100	ns
Driver Output Enable Time from Shutdown to Low Level	t_{PSL}	R_L=110Ω, Figure 6		500	800	ns
Driver Output Enable Time from Shutdown to High Level	t_{PSH}	R_L=110Ω, Figure 5		500	800	ns

Receiver Switching Characteristics

(V_{CC} = +3V to 5.5V, T_A = +25℃.)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Time to Shutdown	t_{SHDN}	UM3483E/UM3486E (Note 3)	50	200	600	ns
Receiver Propagation Delay, Low-to-High Level	t_{RPLH}	V_{ID}=0 to 3.0V, C_L=15pF, Figure 7		100	200	ns
		UM3483E				
Receiver Propagation Delay, High-to-Low Level	t_{RPHL}	V_{ID}=0 to 3.0V, C_L=15pF, Figure 7		100	200	ns
		UM3483E				
$\lvert t_{RPLH} - t_{RPHL} \rvert$ Receiver Propagation Delay Skew	t_{RPDS}	V_{ID}=0 to 3.0V, C_L=15pF, Figure 7			30	ns
		UM3483E				
Receiver Output Enable Time to Low Level	t_{PRZL}	C_L=15pF, Figure 8, UM3483E/UM3486E		20	100	ns
Receiver Output Enable Time to High Level	t_{PRZH}	C_L=15pF, Figure 8, UM3483E/UM3486E		20	100	ns
Receiver Output Disable Time from High Level	t_{PRHZ}	C_L=15pF, Figure 8, UM3483E/UM3486E		30	200	ns
Receiver Output Disable Time from Low Level	t_{PRLZ}	C_L=15pF, Figure 8, UM3483E/UM3486E		30	200	ns
Receiver Output Enable Time from Shutdown to Low Level	t_{PRSL}	C_L=15pF, Figure 8, UM3483E/UM3486E		20	100	ns
Receiver Output Enable Time from Shutdown to High Level	t_{PRSH}	C_L=15pF, Figure 8, UM3483E/UM3486E		20	100	ns

Note 1: ΔV_{OD} and ΔV_{OC} are the changes in V_{OD} and V_{OC}, respectively, when the DI input changes state.

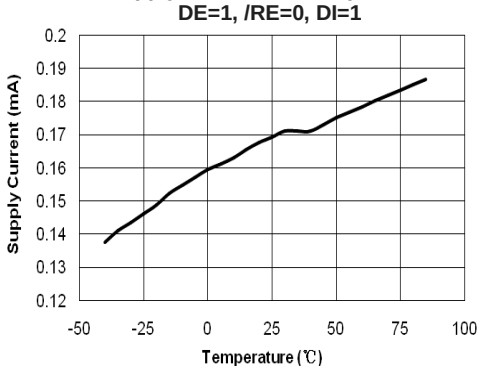
Note 2: Measured on $\lvert t_{PLH}$ (A)– t_{PHL} (A)$\rvert$ and $\lvert t_{PLH}$ (B)– t_{PHL} (B)$\rvert$.

Note 3: The transceivers are put into shutdown by bringing /RE high and DE low. If the inputs are in this state for less than 80ns, the parts are guaranteed not to enter shutdown. If the inputs are in this state for at least 300ns, the parts are guaranteed to have entered shutdown. See Low-Power Shutdown Mode section.

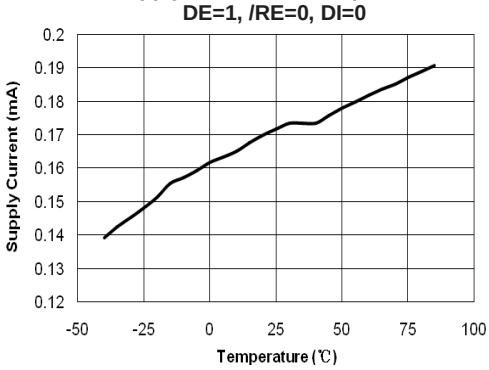
Typical Operating Characteristics

(V_{CC}=+3.3V, T_A=+25° C, unless otherwise noted.)

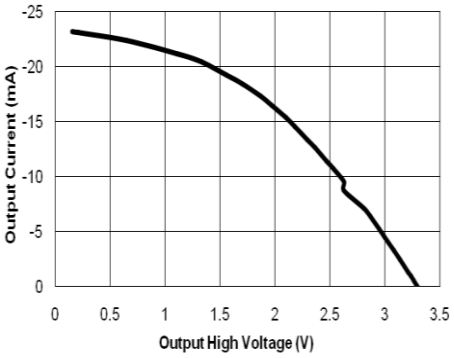
Supply Current vs. Temperature
DE=1, /RE=0, DI=1



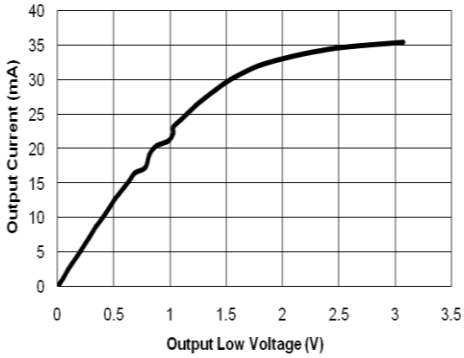
Supply Current vs. Temperature
DE=1, /RE=0, DI=0



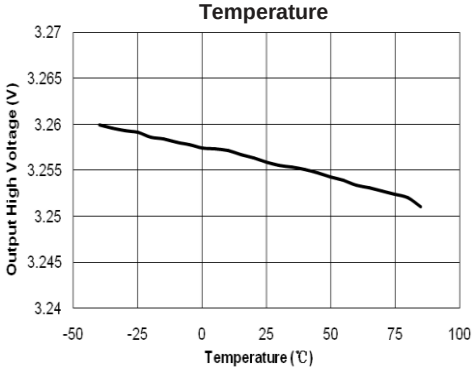
Output Current
vs. Receiver Output High Voltage



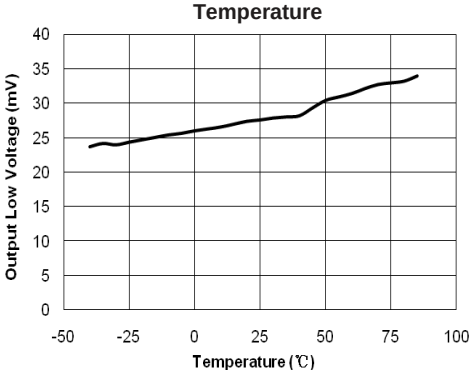
Output Current
vs. Receiver Output Low Voltage



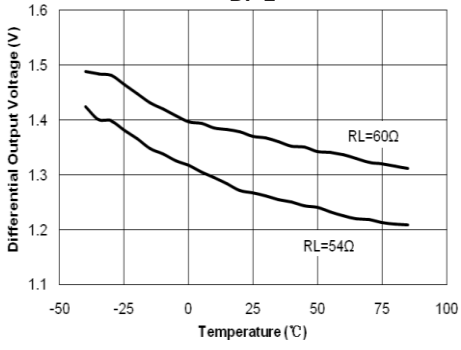
Receiver Output High Voltage vs.
Temperature



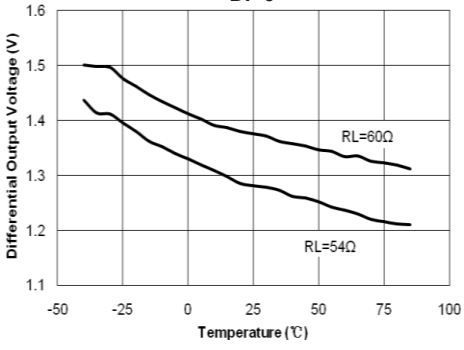
Receiver Output Low Voltage vs.
Temperature



Driver Differential Output Voltage vs. Temperature
DI=1



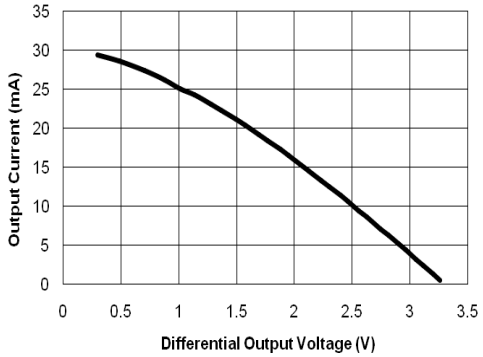
Driver Differential Output Voltage vs. Temperature
DI=0



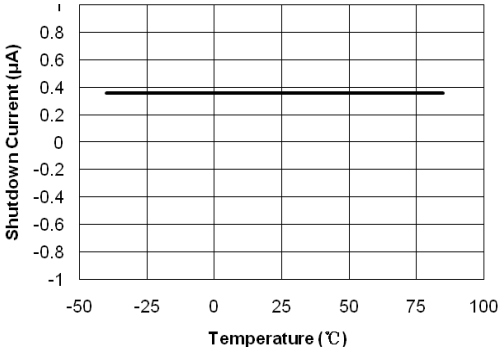
Typical Operating Characteristics (Continued)

(V_{CC}=+3.3V, T_A=+25° C, unless otherwise noted.)

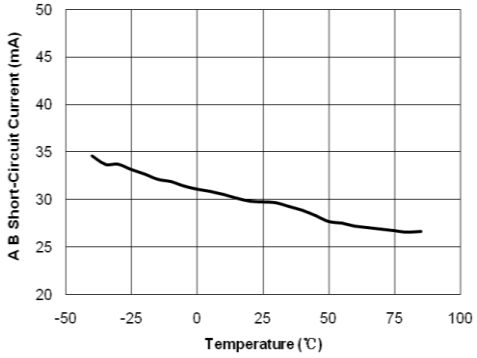
Differential Output Current vs. Differential Output Voltage



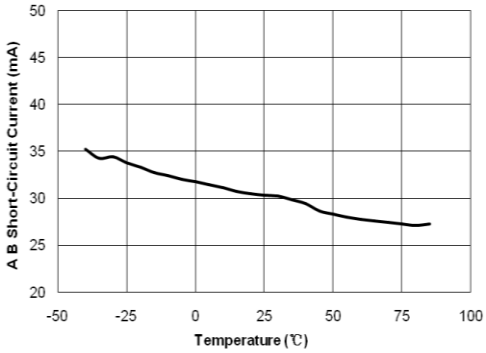
Shutdown Current vs. Temperature



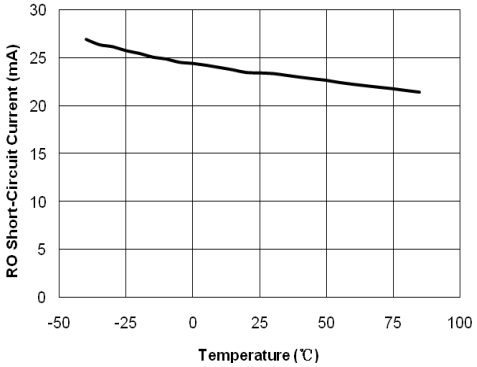
A B Short-Circuit Current vs. Temperature DI=1



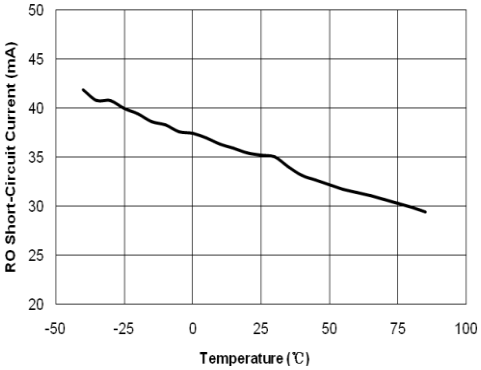
A B Short-Circuit Current vs. Temperature DI=0



RO Short-Circuit Current vs. Temperature R0=1



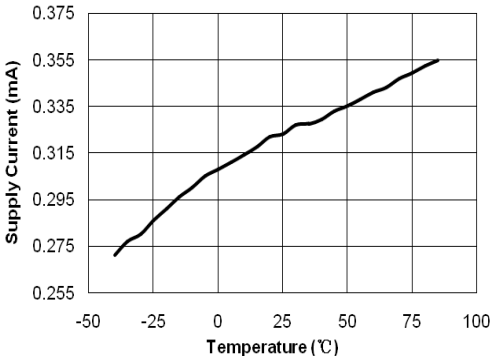
RO Short-Circuit Current vs. Temperature R0=0



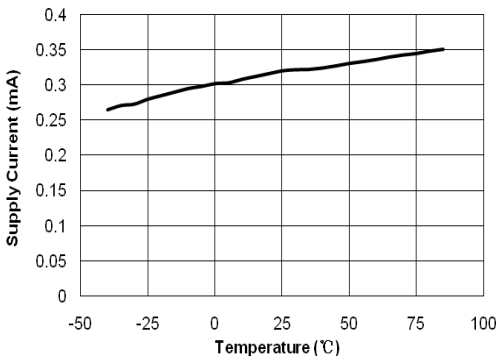
Typical Operating Characteristics (Continued)

(V_{CC}=+5.0V, T_A=+25° C, unless otherwise noted.)

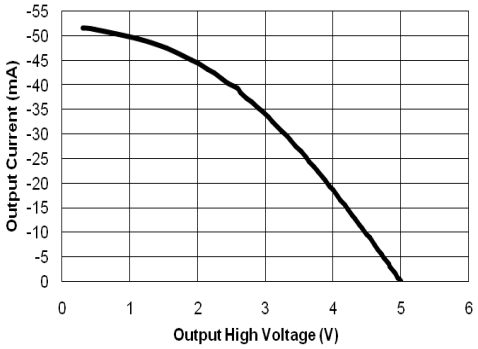
Supply Current vs. Temperature
DE=1, /RE=0, DI=1



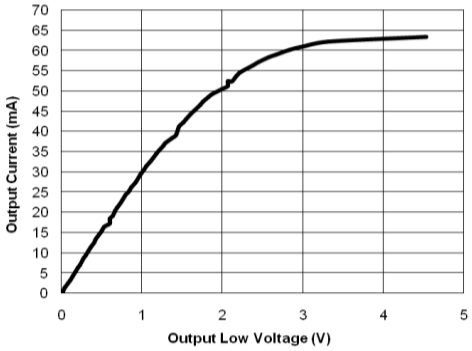
Supply Current vs. Temperature
DE=1, /RE=0, DI=0



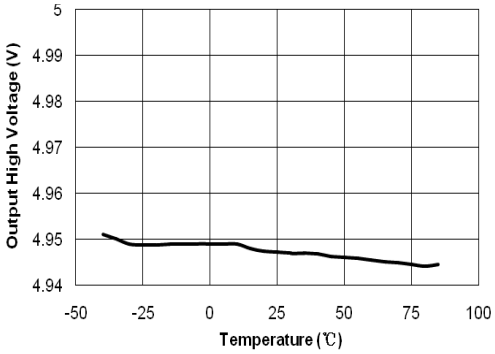
Output Current
vs. Receiver Output High Voltage



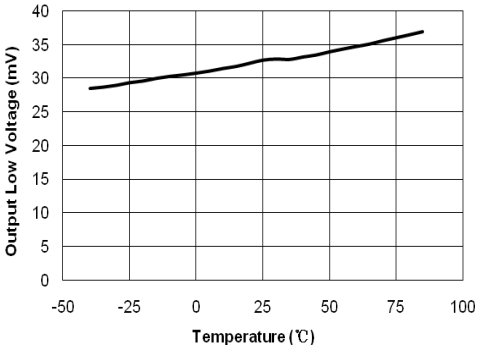
Output Current
vs. Receiver Output Low Voltage



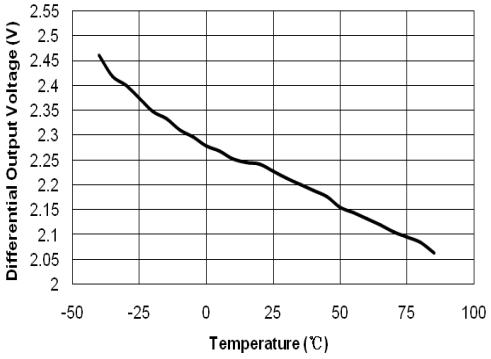
Receiver Output High Voltage vs. Temperature



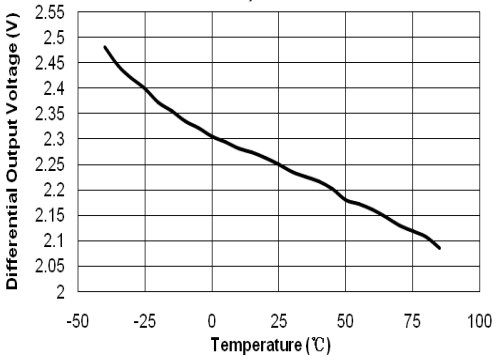
Receiver Output Low Voltage vs. Temperature



Driver Differential Output Voltage vs. Temperature
DI=1, RL=54Ω



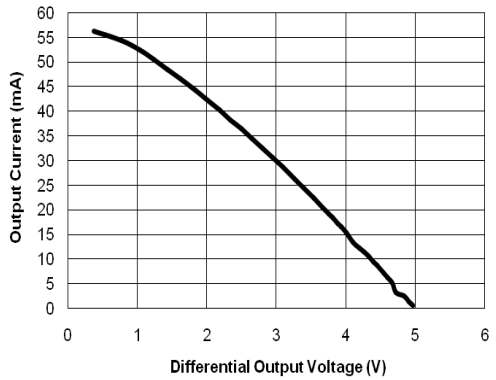
Driver Differential Output Voltage vs. Temperature
DI=0, RL=54Ω



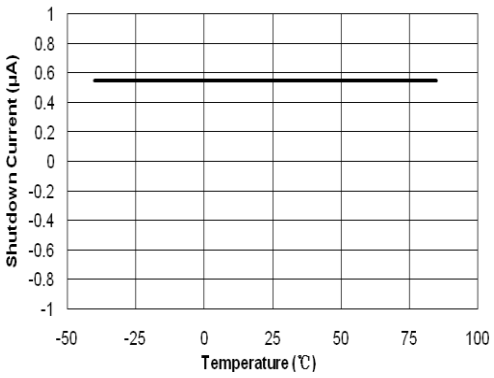
Typical Operating Characteristics (Continued)

(V_{CC}=+5.0V, T_A=+25° C, unless otherwise noted.)

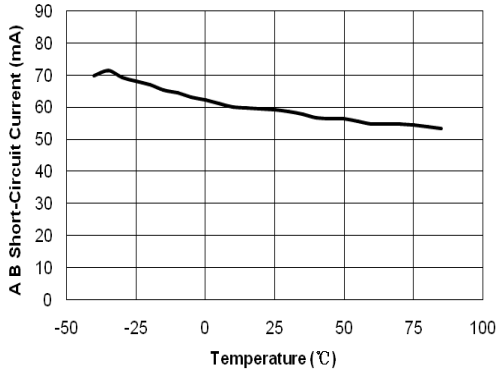
Differential Output Current vs. Differential Output Voltage



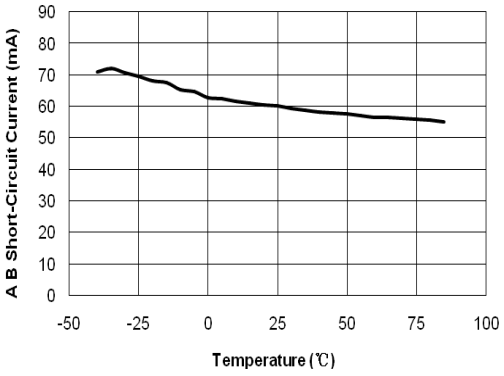
Shutdown Current vs. Temperature



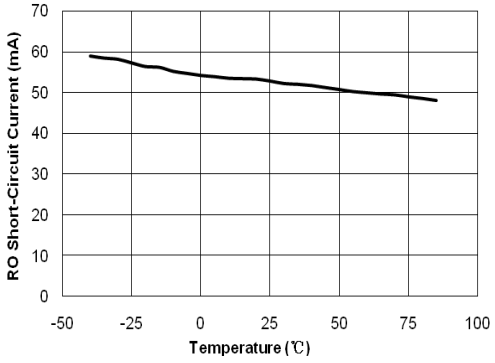
A B Short-Circuit Current vs. Temperature DI=1



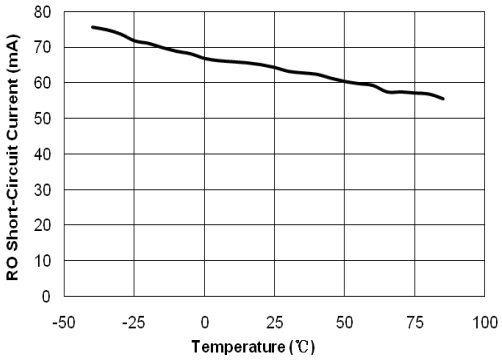
A B Short-Circuit Current vs. Temperature DI=0



RO Short-Circuit Current vs. Temperature R0=1



RO Short-Circuit Current vs. Temperature R0=0



Pin Description

Pin Number	Symbol	Function
1	RO	Receiver Output. If A＞B by -50mV, RO will be high; if A＜B by 200mV, RO will be low.
2	$\overline{RE}$	Receiver Output Enable. RO is enabled when $\overline{RE}$ is low; RO is high impedance when $\overline{RE}$ is high. Drive $\overline{RE}$ high and DE low to enter low-power shutdown mode.
3	DE	Driver Output Enable. The driver outputs are enabled by bringing DE high. They are high impedance when DE is low. If $\overline{RE}$ is high and DE is low, the device will enter a low-power shutdown mode. If the driver outputs are enabled, the parts function as line drivers. While they are high impedance, they function as line receivers if $\overline{RE}$ is low.
4	DI	Driver Input. A low on DI forces output A low and output B high. Similarly, a high on DI forces output A high and output B low.
5	GND	Ground
6	A	Non-inverting Receiver Input and Non-inverting Driver Output
7	B	Inverting Receiver Input and Inverting Driver Output.
8	V_{CC}	Positive Supply: 3.0V≤V_{CC}≤5.5V

RS-485 Communication Function Table

Table1. Transmitting

INPUTS			OUTPUTS		MODE
$\overline{RE}$	DE	DI	B	A	
X	1	1	0	1	Normal
X	1	0	1	0	Normal
0	0	X	High-Z	High-Z	Normal
1	0	X	High-Z	High-Z	Shutdown

X=Don’t care; High-Z=High impedance

Table2. Receiving

INPUTS			OUTPUTS	MODE
$\overline{RE}$	DE	A, B	RO	
0	X	>-50mV	1	Normal
0	X	<-200mV	0	Normal
0	X	Inputs Open	1	Normal
1	0	X	High-Z	Shutdown

X=Don’t care; High-Z=High impedance

Test Circuit

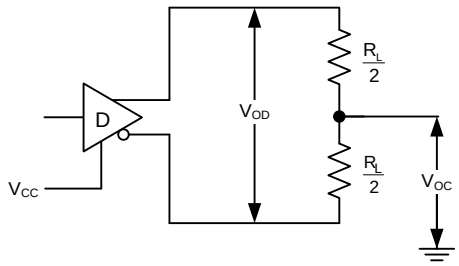


Figure 1. Driver V_{OD} and V_{OC}

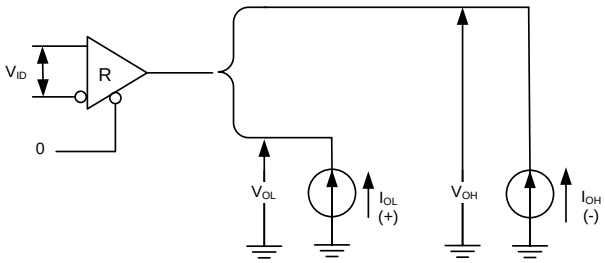


Figure 2. Receiver V_{OH} and V_{OL}

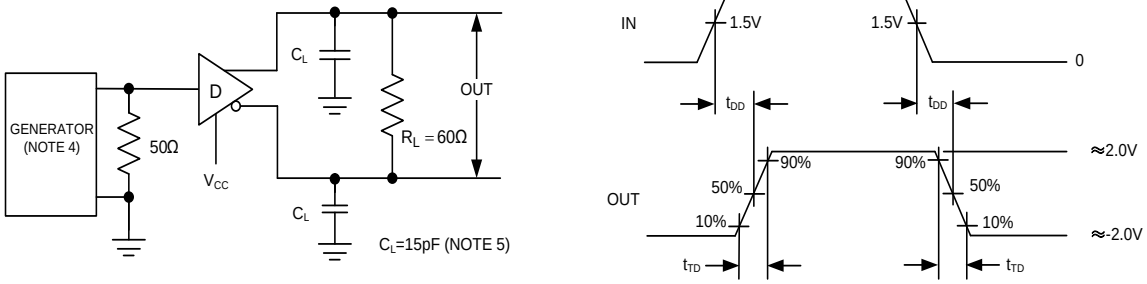


Figure 3. Driver Differential Output Delay and Transition Times

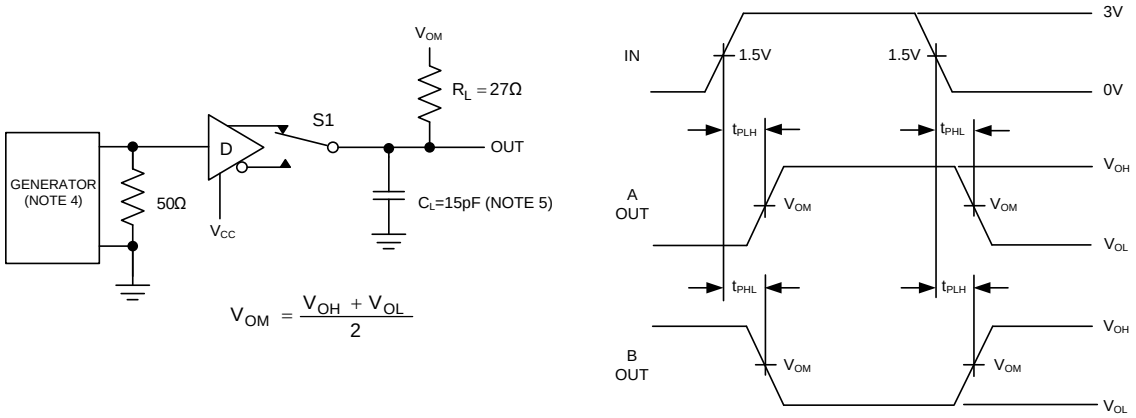


Figure 4. Driver Propagation Times

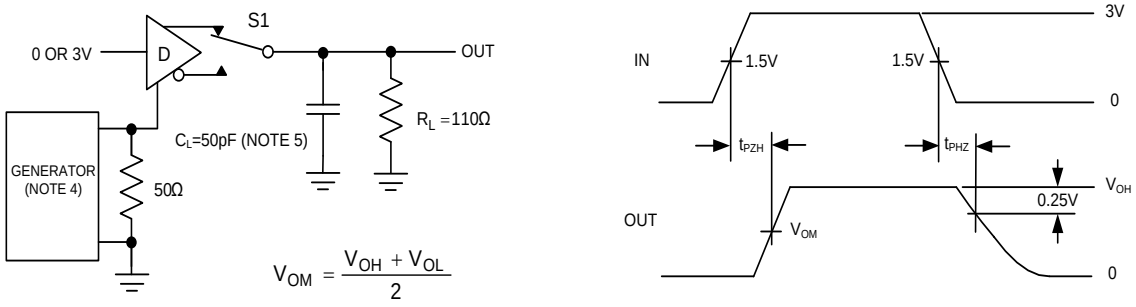


Figure 5. Driver Enable and Disable Times (t_{PZH}, t_{PSH}, t_{PHZ})

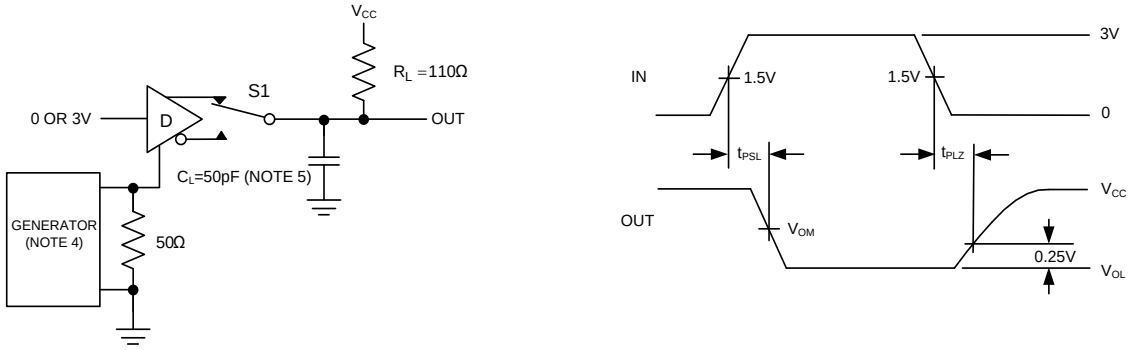


Figure 6. Driver Enable and Disable Times (t_{PZL}, t_{PSL}, t_{PLZ})

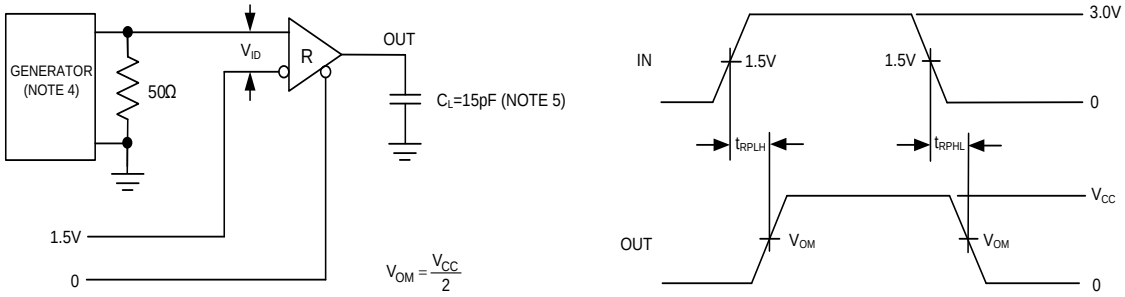


Figure 7. Receiver Propagation Delay

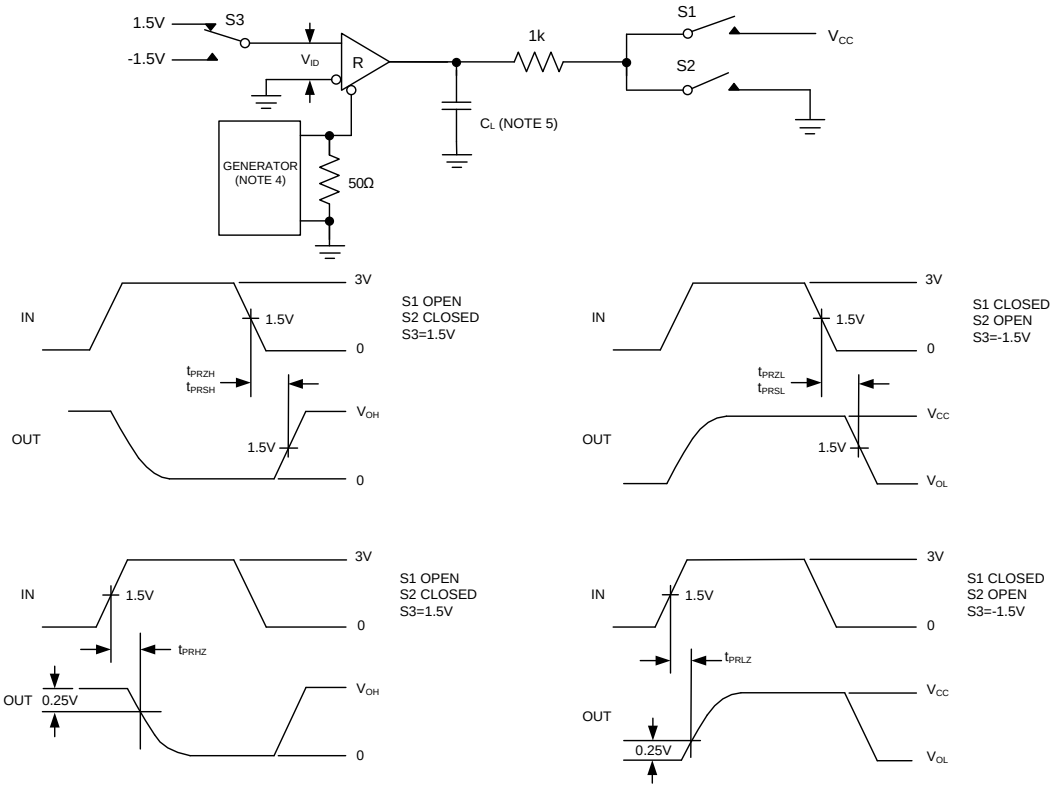


Figure 8. Receiver Enable and Disable Times

Note 4: The input pulse is supplied by a generator with the following characteristics: f=250kHz, 50% duty cycle, $t_r \leq 6.0$ns, $z_o=50\Omega$.
Note 5: C_L includes probe and stray capacitance.

Typical Operating Circuit

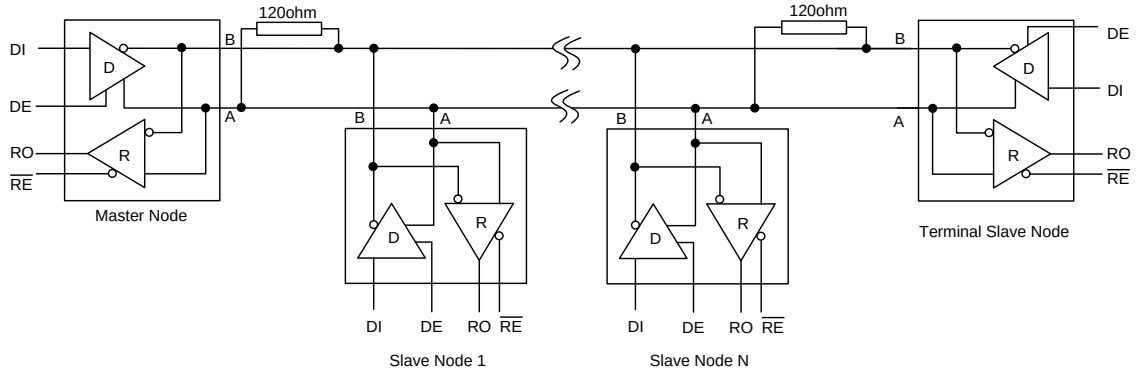


Figure 9. Typical Half-Duplex RS-485 Network

Detail Description

The UM3483E, UM3486E are low-power transceivers for RS-485 communications. The UM3483E can transmit and receive at data rates up to 500kbps, and the UM3486E at up to 2.5Mbps. The UM3483E, UM3486E are half-duplex. Driver Enable (DE) and Receiver Enable ($\overline{RE}$) pins are included on the UM3483E, UM3486E. When disabled, the driver and receiver outputs are high impedance.

Fail-Safe

The UM3483E, UM3486E guarantees a logic-high receiver output when the receiver inputs are shorted or open, or when they are connected to a terminated transmission line with all drivers disabled. This is done by setting the receiver threshold between -50mV and -200mV. If the differential receiver input voltage (A-B) is greater than or equal to -50mV, RO is logic high. If A-B is less than or equal to -200mV, RO is logic low. In the case of a terminated bus with all transmitters disabled, the receiver's differential input voltage is pulled to 0V by the termination. With the receiver thresholds of the UM3483E, UM3486E, this results in a logic high with a 50mV minimum noise margin. Unlike previous fail-safe devices, the -50mV to -200mV threshold complies with the ±200mV EIA/TIA-485 standard.

±15kV ESD Protection

As with all Union devices, ESD-protection structures are incorporated on all pins to protect against electrostatic discharges encountered during handling and assembly. The driver outputs and receiver inputs of the UM3483E, UM3486E have extra protection against static electricity. Union's engineers have developed state-of-the-art structures to protect these pins against ESD of ±15kV without damage. The ESD-protected pins are tested with reference to the ground pin in a power-down condition. They are tested to ±8kV using the Human Body Model.

Applications Information

256 Transceivers on the Bus

The standard RS-485 receiver input impedance is 12kΩ (one unit load), and the standard driver can drive up to 32 unit loads. The Union family of transceivers have a 1/8 unit load receiver input impedance (96kΩ), allowing up to 256 transceivers to be connected in parallel on one communication line. Any combination of these devices and/or other RS-485 transceivers with a total of 32 unit loads or less can be connected to the line.

Reduced EMI and Reflections

The UM3483E, UM3486E are slew-rate-limited, minimizing EMI and reducing reflections caused by improperly terminated cables. In general, a transmitter's rise time relates directly to the length of an unterminated stub, which can be driven with only minor waveform reflections. The following equation expresses this relationship conservatively:

Length=t_{RISE}/(10×1.5ns/ft)

Where t_{RISE} is the transmitter's rise time.

A system can work well with longer unterminated stubs, even with severe reflections, if the waveform settles out before the UART samples them.

Low-Power Shutdown Mode

Low-power shutdown mode is initiated by bringing both $\overline{RE}$ high and DE low. In shutdown, the device typically draws only 1μA of supply current. $\overline{RE}$ and DE may be driven simultaneously; the parts are guaranteed not to enter shutdown if $\overline{RE}$ is high and DE is low for less than 50ns. If the inputs are in this state for at least 600ns, the parts are guaranteed to enter shutdown. Enable times t_{PZH} and t_{PZL} in the Switching Characteristics tables assume the part was not in a low-power shutdown state. Enable times t_{PSH} and t_{PSL} assume the parts were shut down. It takes drivers and receivers longer to become enabled from low-power shutdown mode (t_{PSH}, t_{PSL}) than from driver/receiver-disable mode (t_{PZH}, t_{PZL}).

Driver Output Protection

Two mechanisms prevent excessive output current and power dissipation caused by faults or bus contention. First, a foldback current limit on the output stage, provides immediate protection against short circuits over the whole common-mode voltage range. Second, a thermal shutdown circuit, forces the driver outputs into a high-impedance state if the die temperature becomes excessive.

Propagation Delay

Skew time is simply the difference between the low-to-high and high-to-low propagation delay. Small driver/receiver skew times help maintain a symmetrical mark-space ratio (50% duty cycle). The receiver skew time, $|t_{RPLH} - t_{RPHL}|$, is under 10ns (20ns for the UM3483E). The driver skew times 12ns for the UM3486E, and typically under 50ns for the UM3483E.

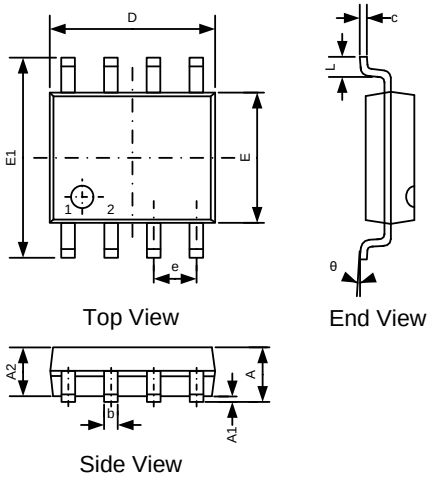
Typical Applications

The UM3483E, UM3486E transceivers are designed for bidirectional data communications on multipoint bus transmission lines. To minimize reflections, the line should be terminated at both ends in its characteristic impedance, and stub lengths of the main line should be kept as short as possible. The slew-rate-limited UM3483E and the partially slew-rate-limited UM3486E are more tolerant of imperfect termination.

Package Information

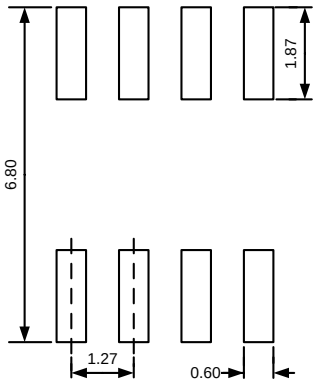
UM3483EESA/UM3486EESA SOP8

Outline Drawing



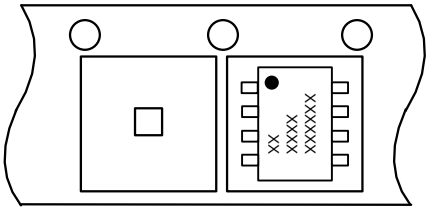
Symbol	DIMENSIONS					
	MILLIMETERS			INCHES		
	Min	Typ	Max	Min	Typ	Max
A	1.35	1.55	1.75	0.053	0.061	0.069
A1	0.10	-	0.25	0.004	-	0.010
A2	1.25	-	1.65	0.049	-	0.065
b	0.30	-	0.51	0.012	-	0.020
c	0.15	-	0.25	0.006	-	0.010
D	4.70	4.90	5.10	0.185	0.193	0.200
E	3.80	3.90	4.00	0.150	0.154	0.157
E1	5.80	6.00	6.20	0.228	0.236	0.244
e	1.27BSC			0.050 BSC		
L	0.40	-	1.27	0.016	-	0.050
θ	0 °	-	8 °	0 °	-	8 °

Land Pattern



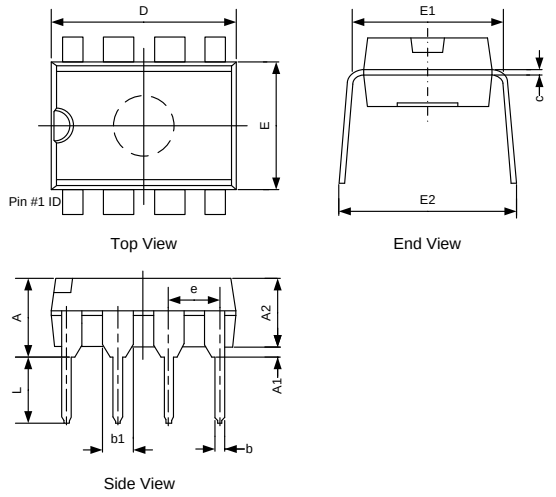
NOTES:
1. Compound dimension: 4.90×3.90;
2. Unit: mm;
3. General tolerance ±0.05mm unless otherwise specified;
4. The layout is just for reference.

Tape and Reel Orientation



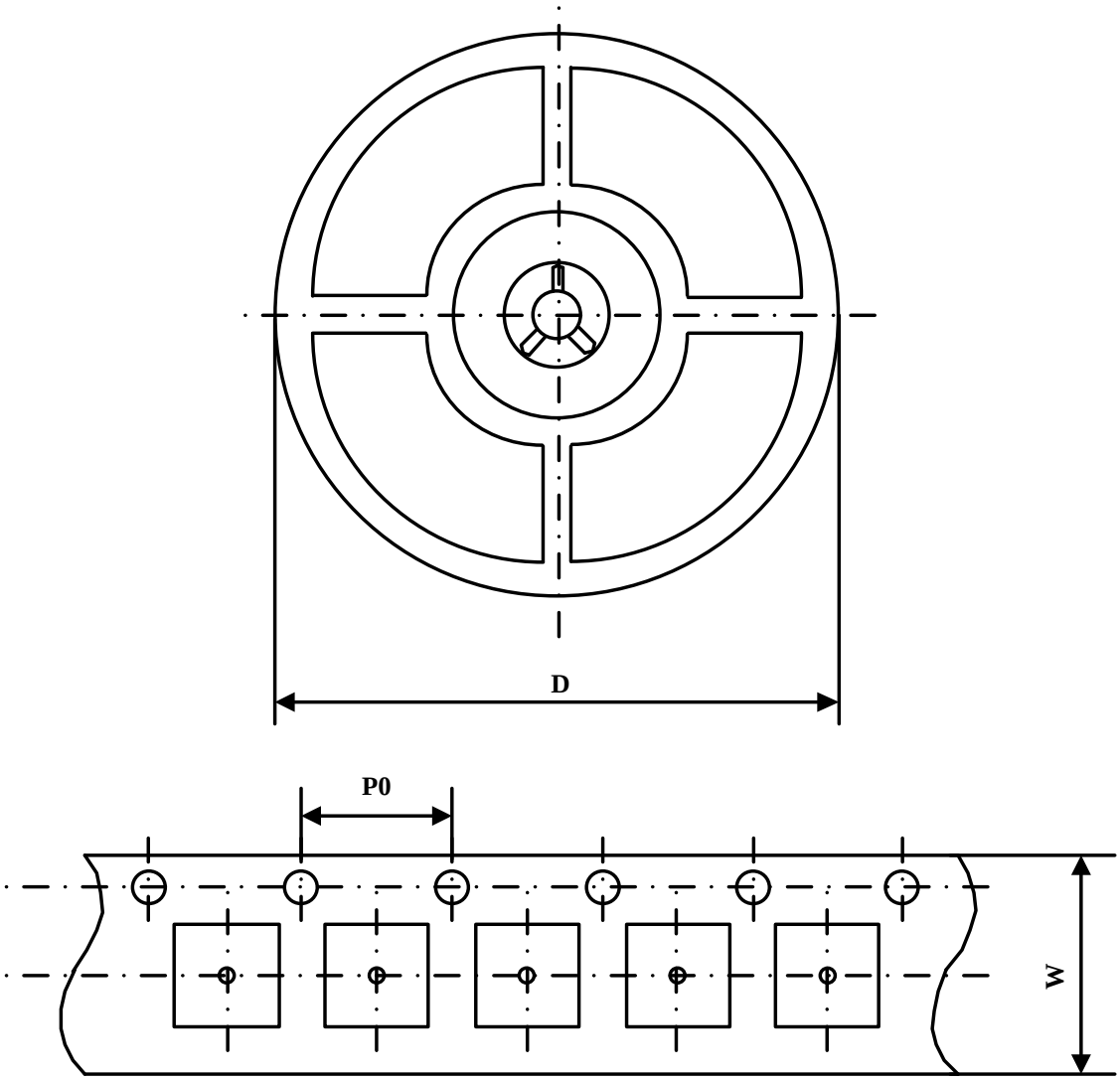
UM3483EEPA/UM3486EEPA DIP8

Outline Drawing



DIMENSIONS						
Symbol	MILLIMETERS			INCHES		
	Min	Typ	Max	Min	Typ	Max
A	3.71	-	4.80	0.146	-	0.189
A1	0.38	-	-	0.015	-	-
A2	3.20	3.40	3.60	0.126	0.134	0.142
b	0.38	-	0.57	0.015	-	0.022
b1	1.52BSC			0.060BSC		
c	0.20	0.28	0.36	0.008	0.011	0.014
D	9.00	9.20	9.50	0.354	0.362	0.374
E	6.20	6.40	6.60	0.244	0.252	0.260
E1	7.32	-	7.92	0.288	-	0.312
E2	8.40	-	9.05	0.331	-	0.356
e	2.54TYP			0.100TYP		
L	3.00	3.30	3.60	0.118	0.130	0.142

Packing Information



Part Number	Package Type	Carrier Width(W)	Pitch(P0)	Reel Size(D)
UM3483EESA	SOP8	12 mm	4 mm	330 mm
UM3486EESA	SOP8	12 mm	4 mm	330 mm

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http://www.union-ic.com/index.aspx?cat_code=RoHSDeclaration

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