19-3270; Rev 0; 4/04

+3V至+5V、提供2500V_{RMS}隔离的RS-485/RS-422收发器，带有±15kV ESD保护

概述

MAX3535E/MXL1535E是隔离型RS-485/RS-422全双工收发器，在RS-485/RS-422侧与控制器或控制逻辑侧之间提供2500V_{RMS}电隔离。当隔离层两侧的共模电压(例如，地电位)相差很大时，这些器件可以跨越隔离层实现1000kbps的快速通信。隔离通过集成的高压电容实现。MAX3535E/MXL1535E还具有420kHz变压器驱动器，可以利用外部变压器向RS-485侧提供电源。

MAX3535E/MXL1535E中包括一个差分驱动器、一个接收器及其它内部电路，内部电路用来发送跨越隔离层(包括隔离电容)的RS-485信号和控制信号。MAX3535E/MXL1535E RS-485接收器为1/8单位负载，在同一条总线上最多允许挂接256个器件。

MAX3535E/MXL1535E提供真正的失效保护。驱动器输出与接收器输入在接口侧具有±15kV的静电放电(ESD)保护，符合人体模式(HBM)标准。

MAX3535E/MXL1535E可以选择驱动器的摆率，减小了电磁干扰(EMI)并降低反射。驱动器输出具有短路与过压保护。其他特性包括热插拔、隔离层故障检测等。

MAX3535E工作在+3V至+5.5V单电源。由于改善了次级电源范围，MAX3535E可以在+5V供电时使用降压型变压器，达到可观的节电效果。MXL1535E工作在+4.5V至+5.5V单电源。MXL1535E是与LTC1535功能/引脚兼容的改进版本。MAX3535E/MXL1535E具有0°C至+70°C的商用级温度范围和-40°C至+85°C的扩展级温度范围。

应用

隔离型RS-485系统

高共模电压系统

工业控制局域网

远程通信系统

典型应用电路在本资料的最后给出。

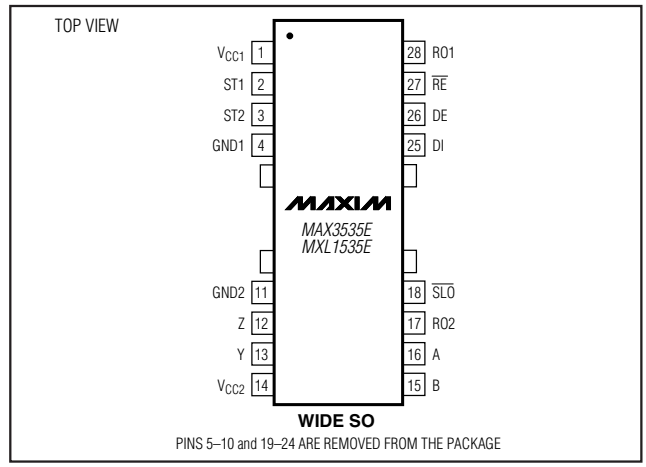
特性

- 使用片上高压电容，提供2500V_{RMS}的RS-485总线隔离
- 1000kbps全双工RS-485/RS-422通信
- +3V至+5.5V电源电压范围(MAX3535E)
- +4.5V至+5.5V电源电压范围(MXL1535E)
- 1/8单位负载的接收器，总线上允许挂接256个器件
- 具有HBM的±15kV ESD保护
- 通过引脚选择的摆率限制，可以控制EMI
- 热插拔保护驱动器使能输入
- 欠压锁定
- 隔离层故障检测
- 短路保护
- 热关断
- 具有传输线开路、短路失效保护的接收器输入

定购信息

PART	TEMP RANGE	PIN-PACKAGE	POWER-SUPPLY RANGE (V)
MAX3535ECWI	0°C to +70°C	28 Wide SO	+3.0 to +5.5
MAX3535EEWI	-40°C to +85°C	28 Wide SO	+3.0 to +5.5
MXL1535ECWI	0°C to +70°C	28 Wide SO	+4.5 to +5.5
MXL1535EEWI	-40°C to +85°C	28 Wide SO	+4.5 to +5.5

引脚说明



WIDE SO

PINS 5–10 and 19–24 ARE REMOVED FROM THE PACKAGE

+3V至+5V、提供2500V_{RMS}隔离的RS-485/RS-422收发器，带有±15kV ESD保护

ABSOLUTE MAXIMUM RATINGS

Logic Side—All Voltages Referenced to GND1.
V_{CC1} .....-0.3V to +6V
$\overline{RE}$, DE, DI.....-0.3V to +6V
RO1, ST1, ST2 .....-0.3V to (V_{CC1} + 0.3V)
Isolated Side—All Voltages Referenced to GND2.
V_{CC2} .....-0.3V to +8V
$\overline{SLO}$.....-0.3V to (V_{CC2} + 0.3V)
A, B .....±14V
RO2 .....-0.3V to the lower of (V_{CC2} + 0.3V) and +3.4V
Y, Z .....-8V to +13V
Digital Outputs Maximum Current
RO1, RO2 .....±20mA
Y, Z Maximum Current.....Short-Circuit Protected
ST1, ST2 Maximum Current.....±300mA
Continuous Power Dissipation (T_A = +70°C)
28-Pin Wide SO
(derate 9.5mW/°C above +70°C).....750mW
Operating Temperature Range
MXL1535ECWI, MAX3535ECWI .....0°C to +70°C
MXL1535EEWI, MAX3535EEWI.....-40°C to +85°C
Junction Temperature.....+150°C
Storage Temperature Range .....-65°C to +150°C
Lead Temperature (soldering, 10s) .....+300°C

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

DC ELECTRICAL CHARACTERISTICS TABLE (MAX3535E)

(V_{CC1} = +3.0V to +5.5V, V_{CC2} = +3.13V to +7.5V, T_A = -40°C to +85°C, unless otherwise noted. Typical values are at V_{CC1} = +3.3V, V_{CC2} = +5V, T_A = +25°C.)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
LOGIC-SIDE SUPPLY (V_{CC1}, GND1)						
Logic-Side Supply Voltage	V_{CC1}		3.0		5.5	V
Logic-Side Supply Current	I_{CC1}	Transformer not driven, ST1 and ST2 unconnected, $\overline{RE}$ = low, DE = high, f_{DATA} = 0, RO1 = no load		5.9	13	mA
V_{CC1} Undervoltage-Lockout Falling Trip	V_{UVL1}		2.53	2.69	2.85	V
V_{CC1} Undervoltage-Lockout Rising Trip	V_{UVH1}		2.63	2.80	2.97	V
LOGIC INPUTS (DI, DE, $\overline{RE}$)						
Input High Voltage, DE, DI, $\overline{RE}$	V_{IH}	V_{IH} is measured with respect to GND1	2.0			V
Input Low Voltage, DE, DI, $\overline{RE}$	V_{IL}	V_{IL} is measured with respect to GND1			0.8	V
Logic-Side Input Current, DE, DI	I_{INC}				±2	µA
LOGIC OUTPUTS (RO1, $\overline{RE}$)						
Receiver-Output High Voltage (RO1)	V_{RO1H}	I_{SOURCE} = 4mA, V_{CC1} = +4.5V	3.7			V
		I_{SOURCE} = 4mA, V_{CC1} = +3V	2.4			
Receiver-Output Low Voltage (RO1)	V_{RO1L}	I_{SINK} = 4mA, V_{CC1} = +4.5V			0.4	V
		I_{SINK} = 4mA, V_{CC1} = +3V			0.4	
Receiver-Output (RO1) Leakage Current	I_{OZR}	$\overline{RE}$ = high, V_{CC1} = +5.5V, 0 ≤ V_{RO1} ≤ V_{CC1}			±1	µA
$\overline{RE}$ Low Output Current for Fault Detect	I_{OL}	$\overline{RE}$ = +0.4V, fault not asserted	40	60	80	µA

DC ELECTRICAL CHARACTERISTICS TABLE (MAX3535E) (continued)

(V_{CC1} = +3.0V to +5.5V, V_{CC2} = +3.13V to +7.5V, T_A = -40°C to +85°C, unless otherwise noted. Typical values are at V_{CC1} = +3.3V, V_{CC2} = +5V, T_A = +25°C.)

PARAMETER	SYMBOL	CONDITIONS		MIN	TYP	MAX	UNITS
$\overline{RE}$ High Output Current for Fault Detect	I_{OH}	$\overline{RE}$ = V_{CC1} - 0.5V, fault asserted		-140	-100	-60	µA
TRANSFORMER DRIVER (ST1, ST2)							
DC-Converter Switching Frequency (ST1, ST2)	f_{SW}	ST1, ST2, not loaded		290	460	590	kHz
DC-Converter Total Impedance R_{OH} + R_{OL} (ST1, ST2)	R_{OHL}	V_{CC1} = +4.5V, Figure 13			1.6	2.6	Ω
		V_{CC1} = +3V, Figure 13			1.8	2.9	
ST1, ST2 Duty Cycle		ST1, ST2, not loaded		44	50	56	%
ISOLATED-SIDE SUPPLY (V_{CC2}, GND2)							
Isolated-Side Supply Voltage	V_{CC2}			3.13		7.50	V
Isolated-Side Supply Current	I_{CC2}	f_{DATA} = 0, $\overline{SLO}$ floating, RO2 = no load, A, B floating, Figure 1	R_L = 27Ω		56	70	mA
			R_L = ∞		10	16	
V_{CC2} Undervoltage-Lockout Falling Trip	V_{UVL2}			2.68	2.85	3.02	V
V_{CC2} Undervoltage-Lockout Rising Trip	V_{UVH2}			2.77	2.95	3.13	V
DRIVER OUTPUTS (Y, Z)							
Driver-Output High Voltage	V_{DOH}	No load, V_{DOH} is measured with respect to GND2				4	V
Differential Driver Output	V_{OD}	R_L = 50Ω (RS-422), V_{CC2} = +3.13V, Figure 1		2.0	2.35		V
		R_L = 27Ω (RS-485), V_{CC2} = +3.13V, Figure 1		1.5	1.95		
Driver Common-Mode Output Voltage	V_{OC}	R_L = 27Ω or 50Ω, V_{OC} is measured with respect to GND2, Figure 1		1.0		3.0	V
Change in Magnitude of Driver Differential Output Voltage for Complementary Output States	ΔV_{OD}	R_L = 27Ω or 50Ω, Figure 1				±0.2	V
Change in Magnitude of Driver Common-Mode Output Voltage for Complementary Output States	ΔV_{OC}	R_L = 27Ω or 50Ω, Figure 1				±0.2	V
Driver Short-Circuit Output Current	I_{OSD}	Driver enabled (DE =1) DI = high, V_Y > -7V DI = low, V_Z > -7V		-250			mA
		Driver enabled (DE =1) DI = high, V_Z < +12V DI = low, V_Y < +12V				+250	

DC ELECTRICAL CHARACTERISTICS TABLE (MAX3535E) (continued)

(V_{CC1} = +3.0V to +5.5V, V_{CC2} = +3.13V to +7.5V, T_A = -40°C to +85°C, unless otherwise noted. Typical values are at T_A = +25°C, V_{CC1} = +3.3V, V_{CC2} = +5V).

PARAMETER	SYMBOL	CONDITIONS		MIN	TYP	MAX	UNITS
Driver Short-Circuit Foldback Output Current	I_{OSFD}	Driver enabled (DE =1)	DI = high -7V < V_Y < min[(V_{CC2} - 1V) +2V]			-25	µA
			DI = low -7V < V_Z < min[(V_{CC2} - 1V) +2V]				
			DI = high +1V < V_Z < +12V		+25		
			DI = low +1V < V_Y < +12V				
SLEW-RATE SELECT ($\overline{SLO}$)							
Input High Voltage $\overline{SLO}$	V_{IHS}	V_{IHS} is measured with respect to GND2		3.0			V
Input Low Voltage $\overline{SLO}$	V_{ILS}	V_{ILS} is measured with respect to GND2				1.0	V
$\overline{SLO}$ Pullup Resistor	R_{SLO}	V_{SLO} = +3V			100		kΩ
RECEIVER INPUTS (A, B)							
Receiver Input Current	I_{AB}	V_A or V_B = +12V				+125	µA
		V_A or V_B = -7V				-100	
Receiver Differential Threshold Voltage	V_{TH}	-7V ≤ V_{CM} ≤ +12V		-200	-90	-10	mV
Receiver-Input Hysteresis	ΔV_{TH}	-7V ≤ V_{CM} ≤ +12V, T_A = 0°C to +70°C		10	30	70	mV
		-7v ≤ V_{CM} ≤ +12V, T_A = -40°C to +85°C		5	30	70	
Receiver-Input Resistance	R_{IN}	-7V ≤ V_{CM} ≤ +12V (Note 1)		96		200	kΩ
Receiver-Input Open Circuit Voltage	V_{OAB}				2.6		V
RECEIVER OUTPUT (RO2)							
Receiver-Output (RO2) High Voltage	V_{RO2H}	I_{SOURCE} = 4mA, V_{CC2} = +3.13V		2.4			V
Receiver-Output (RO2) Low Voltage	V_{RO2L}	I_{SINK} = 4mA, V_{CC2} = +3.13V				0.4	V
ISOLATION							
Isolation Voltage (Notes 2, 3)	V_{ISO}	60s		2500			V_{RMS}
		1s		3000			
Isolation Resistance	R_{ISO}	T_A = +25°C, V_{ISO} = 50V (Note 3)		100	10,000		MΩ
Isolation Capacitance	C_{ISO}	T_A = +25°C			2		pF
ESD Protection		Human Body Model (A, B, Y, Z)			±15		kV

SWITCHING ELECTRICAL CHARACTERISTICS (MAX3535E)

(V_{CC1} = +3.0V to +5.5V, V_{CC2} = +3.13V to +7.5V, R_L = 27Ω, C_L = 50pF, T_A = -40°C to +85°C, unless otherwise noted. Typical values are at V_{CC1} = +3.3V, V_{CC2} = +5V, T_A = +25°C.)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Data Sample Jitter	t_J	Figure 6		220	285	ns
Maximum Data Rate	f_{DATA}	t_J = 25% of data cell, receiver and driver, $\overline{SLO}$ = high (Note 4)	877	1136		kbps
Self-Oscillating Frequency	f_{SOS}	$\overline{SLO}$ = high, Figure 5	250	450		kHz
		$\overline{SLO}$ = low, Figure 5	200	375		
Driver-Differential Output Delay Time	t_{DD}	$\overline{SLO}$ = high, Figures 2, 6		490	855	ns
		$\overline{SLO}$ = low, Figures 2, 6		850	1560	
Driver-Differential Output Transition Time	t_{TD}	$\overline{SLO}$ = high, Figures 2, 6		30	100	ns
		$\overline{SLO}$ = low, Figures 2, 6	120	220	1000	
Driver-Output Enable Time	t_{PZL}, t_{PZH}	$\overline{SLO}$ = high, DI = high or low, Figures 3, 7		730	1400	ns
Driver-Output Disable Time	t_{PHZ}, t_{PLZ}	$\overline{SLO}$ = high, DI = high or low, Figures 3, 7		720	1300	ns
Receiver-Propagation Delay Time to RO1	t_{PLH1}, t_{PHL1}	Figures 4, 8		440	855	ns
Receiver-Propagation Delay Time to RO2	t_{PLH2}, t_{PHL2}	Figures 4, 8		40		ns
RO1, RO2 Rise or Fall Time	t_R, t_F	Figures 4, 8		40		ns
Receiver-Output Enable Time RO1	t_{ZL},t_{ZH}	Figures 4, 9		30		ns
Receiver-Output Disable Time RO1	t_{LZ},t_{HZ}	Figures 4, 9		30		ns
Initial Startup Time (from Internal Communication Fault)		(Note 5)		1200		ns
Internal Communication Timeout Fault Time		(Note 5)		1200		ns

+3V至+5V、提供2500V_{RMS}隔离的RS-485/RS-422收发器，带有±15kV ESD保护

ELECTRICAL CHARACTERISTICS (MXL1535E)

(V_{CC1} = +4.5V to +5.5V, V_{CC2} = +4.5V to +7.5V, T_A = -40°C to +85°C, unless otherwise noted. Typical values are at V_{CC1} = +5V, V_{CC2} = +5V, T_A = +25°C.)

PARAMETER	SYMBOL	CONDITIONS		MIN	TYP	MAX	UNITS
Logic-Side Supply Voltage	V_{CC1}			4.5		5.5	V
Isolated-Side Supply Voltage	V_{CC2}			4.5		7.5	V
Logic-Side Supply Current	I_{CC1}	Transformer not driven, ST1 and ST2 unconnected, $\overline{RE}$ = low, DE = high, f_{DATA} = 0, RO1 = no load			5.9	13	mA
Isolated-Side Supply Current	I_{CC2}	f_{DATA} = 0, $\overline{SLO}$ floating, RO2 = no load, A, B floating, Figure 1	R_L = 27Ω		56	70	mA
			R_L = ∞		10	16	
Differential Driver Output	V_{OD}	R_L = 50Ω (RS-422), V_{CC2} = +4.5V, Figure 1		2.0	3.0		V
		R_L = 27Ω (RS-485), V_{CC2} = +4.5V, Figure 1		1.5	2.5		
Driver Output High Voltage	V_{DOH}	No load, V_{DOH} is measured with respect to GND2				5.0	V
Driver Common-Mode Output Voltage	V_{OC}	R_L = 27Ω or 50Ω, V_{OC} is measured with respect to GND2, Figure 1		1.0		3.0	V
Change in Magnitude of Driver Differential Output Voltage for Complementary Output States	ΔV_{OD}	R_L = 27Ω or 50Ω, Figure 1				±0.2	V
Change in Magnitude of Driver Common-Mode Output Voltage for Complementary Output States	ΔV_{OC}	R_L = 27Ω or 50Ω, Figure 1				±0.2	V
Driver Short-Circuit Output Current	I_{OSD}	Driver enabled (DE =1) DI = high, V_Y > -7V DI = low, V_Z > -7V		-250			mA
		Driver enabled (DE =1) DI = high, V_Z < +12V DI = low, V_Y < + 12V				+250	
Driver Short-Circuit Foldback Output Current	I_{OSFD}	Driver enabled (DE =1) DI = high -7V < V_Y < min[(V_{CC2} - 1V) +2V] DI = low -7V < V_Z < min[(V_{CC2} - 1V) +2V]				-25	mA
		Driver enabled (DE =1) DI = high +1V < V_Z < +12V DI = low +1V < V_Y < +12V		+25			

ELECTRICAL CHARACTERISTICS (MXL1535E) (continued)

(V_{CC1} = +4.5V to +5.5V, V_{CC2} = +4.5V to +7.5V, T_A = -40°C to +85°C, unless otherwise noted. Typical values are at V_{CC1} = +5V, V_{CC2} = +5V, T_A = +25°C.)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Input High Voltage, DE, DI, $\overline{RE}$	V_{IH}	V_{IH} is measured with respect to GND1	2.0	1.45		V
Input High Voltage, $\overline{SLO}$	V_{IHS}	V_{IHS} is measured with respect to GND2	4.0	2.1		V
Input Low Voltage, DE, DI, $\overline{RE}$	V_{IL}	V_{IL} is measured with respect to GND1		1.45	0.8	V
Input Low Voltage, $\overline{SLO}$	V_{ILS}	V_{ILS} is measured with respect to GND2		2.1	1.0	V
Logic-Side Input Current, DE, DI	I_{INC}				±2	µA
Receiver Input Current	I_{AB}	V_A or V_B = +12V			+0.25	mA
		V_A or V_B = -7V			-0.20	
Receiver Differential Threshold Voltage	V_{TH}	-7V ≤ V_{CM} ≤ +12V	-200	-90	-10	mV
Receiver-Input Hysteresis	ΔV_{TH}	-7V ≤ V_{CM} ≤ +12V, T_A = 0°C to +70°C	10	30	70	mV
		-7V ≤ V_{CM} ≤ +12V, T_A = -40°C to +85°C	5	30	70	
Receiver-Input Resistance	R_{IN}	-7V ≤ V_{CM} ≤ +12V (Note 1)	96	140	200	kΩ
Receiver-Input Open-Circuit Voltage	V_{OAB}			2.6		V
Receiver-Output High Voltage (RO1)	V_{RO1H}	I_{SOURCE} = 4mA, V_{CC1} = +4.5V	3.7	4.3		V
Receiver-Output Low Voltage (RO1)	V_{RO1L}	I_{SINK} = 4mA, V_{CC1} = +4.5V		0.4	0.8	V
Driver-Output Leakage Current	I_{OZ}	DE = low -7V < V_Y < +12V, -7V < V_Z < +12V		±30		µA
Driver-Output Leakage Current	I_{OZ}	DE = low -7V < V_Y < +12V, -7V < V_Z < +12V		±30	±100	µA
Receiver-Output (RO2) High Voltage	V_{RO2H}	I_{SOURCE} = 4mA, V_{CC2} = +4.5V	2.8	3.4		V
Receiver-Output (RO2) Low Voltage	V_{RO2L}	I_{SINK} = 4mA, V_{CC2} = +4.5V		0.4	0.8	V
DC-Converter Switching Frequency (ST1, ST2)	f_{SW}	ST1, ST2 not loaded	290	460	590	kHz

ELECTRICAL CHARACTERISTICS (MXL1535E) (continued)

(V_{CC1} = +4.5V to +5.5V, V_{CC2} = +4.5V to +7.5V, T_A = -40°C to +85°C, unless otherwise noted. Typical values are at V_{CC1} = +5V, V_{CC2} = +5V, T_A = +25°C.)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
DC-Converter Impedance High ST1, ST2	R_{OH}	Figure 13		4	6	Ω
DC-Converter Impedance Low ST1, ST2	R_{OL}	Figure 13		2.5	5	Ω
$\overline{RE}$ Low Output Current for Fault Detect	I_{OL}	$\overline{RE}$ = sink current, $\overline{RE}$ = +0.4V, fault not asserted	-40	-50	-80	µA
$\overline{RE}$ High Output Current for Fault Detect	I_{OH}	$\overline{RE}$ = source current, $\overline{RE}$ = +V_{CC1} - 0.5V, fault asserted	60	100	140	µA
V_{CC2} Undervoltage-Lockout Falling Trip	V_{UVL2}		2.68	2.85	3.02	V
V_{CC2} Undervoltage-Lockout Rising Trip	V_{UVH2}		2.77	2.95	3.13	V
V_{CC1} Undervoltage-Lockout Falling Trip	V_{UVL1}		2.53	2.69	2.85	V
V_{CC1} Undervoltage-Lockout Rising Trip	V_{UVH1}		2.63	2.80	2.97	V
Isolation Voltage (Note 2)	V_{ISO}	60s	2500			V_{RMS}
		1s	3000			
$\overline{SLO}$ Pullup Resistor	R_{SLO}	V_{SLO} = +3V		100		kΩ

SWITCHING ELECTRICAL CHARACTERISTICS (MXL1535E)

(V_{CC1} = +4.5V to +5.5V, V_{CC2} = +4.5V to +7.5V, R_L = 27Ω, C_L = 50pF, T_A = -40°C to +85°C, unless otherwise noted. Typical values are at V_{CC1} = +5V, V_{CC2} = +5V, T_A = +25°C.)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Data Sample Jitter	t_J	Figure 6		220	285	ns
Max Baud Rate	fMAX	$\overline{SLO}$ = high, Figure 5, (Note 6)	250	450		kBd
Driver-Differential Output Delay Time	t_{DD}	$\overline{SLO}$ = high, Figures 2, 6		430	855	ns
		$\overline{SLO}$ = low, Figures 2, 6		850	1560	
Driver-Differential Output Transition Time	t_{TD}	$\overline{SLO}$ = high, V_{CC2} = +4.5V		45	100	ns
		$\overline{SLO}$ = low, V_{CC2} = +4.5V	150	260	1000	
Driver-Output Enable Time	t_{PZL}, t_{PZH}	$\overline{SLO}$ = high, DI = high or low, Figure 3, 7		730	1400	ns
Driver-Output Disable Time	t_{PHZ}, t_{PLZ}	$\overline{SLO}$ = high, DI = high or low, Figures 3, 7		720	1300	ns
Receiver-Propagation Delay Time to RO1	t_{PLH1}, t_{PHL1}	Figures 4, 8		440	855	ns
Receiver-Propagation Delay Time to RO2	t_{PLH2}, t_{PHL2}	Figures 4, 8		40		ns
RO1, RO2 Rise or Fall Time	t_R, t_F	Figures 4, 8		40		ns
Receiver-Output Enable Time RO1	t_{ZL}, t_{ZH}	Figures 4, 9		30		ns
Receiver-Output Disable Time RO1	t_{LZ},t_{HZ}	Figures 4, 9		30		ns
Initial Startup Time (from Internal Communication Fault)		(Note 5)		1200		ns
Internal Communication Timeout Fault Time		(Note 5)		1200		ns
ST1, ST2 Duty Cycle		0°C to +70°C			56	%
		-40°C to +85°C			57	
ESD Protection		Human Body Model (A, B, Y, Z)		±15		kV

Note 1: Receiver inputs are 96kΩ minimum resistance, which is 1/8 unit load.

Note 2: 60s test result is guaranteed by correlation from 1s result.

Note 3: V_{ISO} is the voltage difference between GND1 and GND2.

Note 4: The maximum data rate is specified using the maximum jitter value according to the formula: data rate = 1 / ($4t_J$). See the *Skew* section for more information.

Note 5: Initial startup time is the time for communication to recover after a fault condition. Internal communication timeout fault time is the time before a fault is indicated on $\overline{RE}$, after internal communication has stopped.

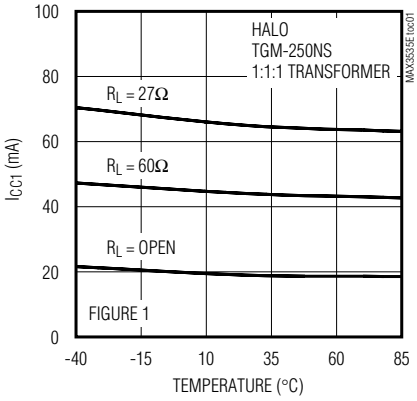
Note 6: Bd = 2 bits.

+3V至+5V、提供2500V_{RMS}隔离的RS-485/RS-422收发器，带有±15kV ESD保护

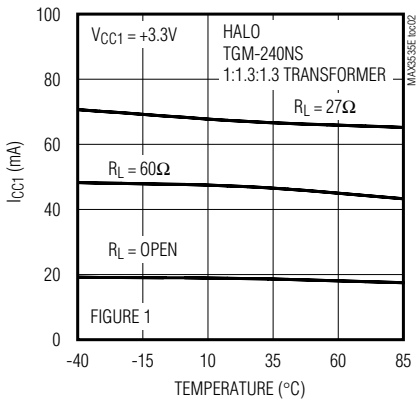
典型工作特性

(V_{CC1} = +5V, C_L = 50pF (Figure 1), unless otherwise noted.)

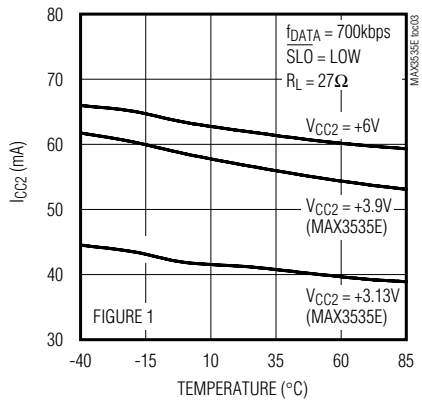
I_{CC1} SUPPLY CURRENT vs. TEMPERATURE



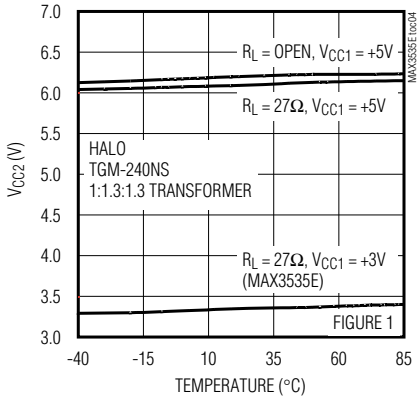
I_{CC1} SUPPLY CURRENT vs. TEMPERATURE



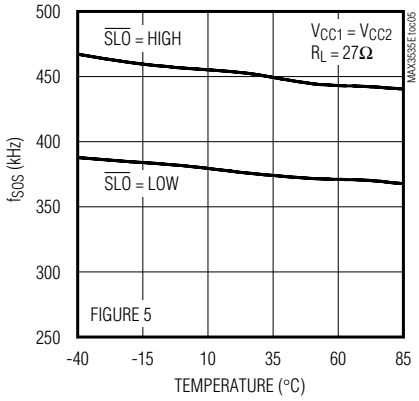
I_{CC2} SUPPLY CURRENT vs. TEMPERATURE



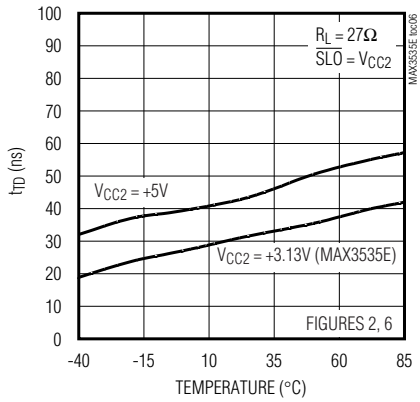
V_{CC2} SUPPLY VOLTAGE vs. TEMPERATURE



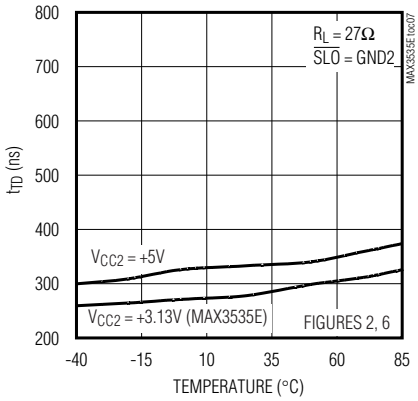
SELF-OSCILLATION FREQUENCY vs. TEMPERATURE



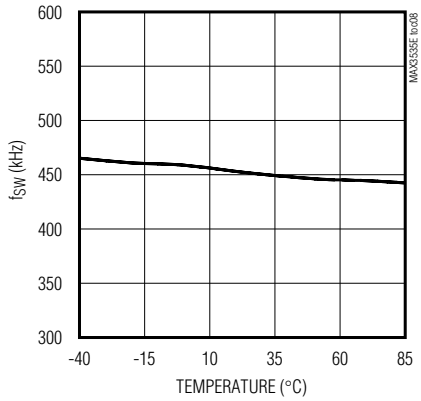
DRIVER DIFFERENTIAL OUTPUT TRANSITION TIME vs. TEMPERATURE



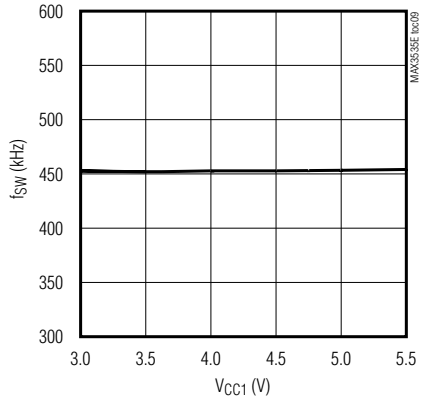
DRIVER DIFFERENTIAL OUTPUT TRANSITION TIME vs. TEMPERATURE



SWITCHER FREQUENCY vs. TEMPERATURE



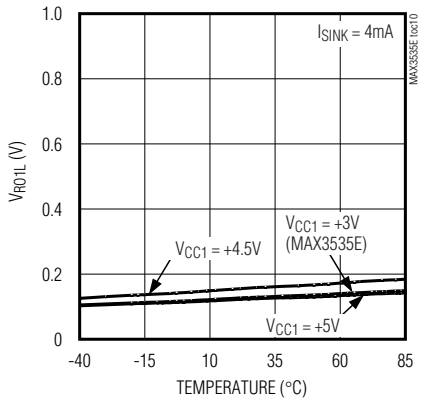
SWITCHER FREQUENCY vs. SUPPLY VOLTAGE



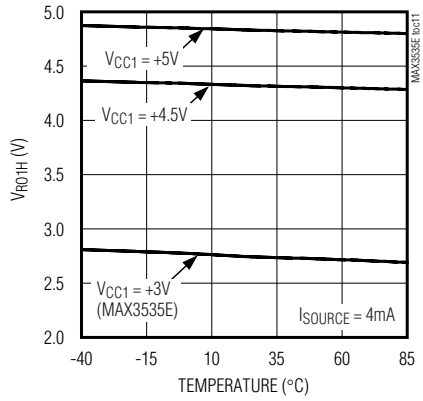
典型工作特性 (续)

(V_{CC1} = +5V, C_L = 50pF (Figure 1), unless otherwise noted.)

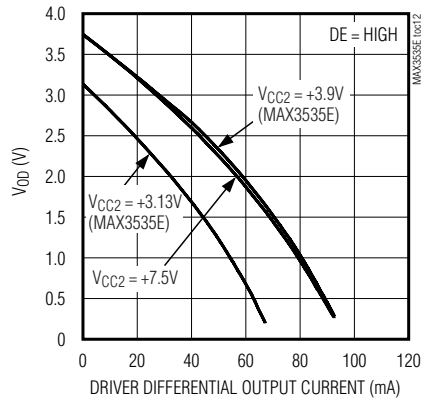
RECEIVER-OUTPUT (RO1) LOW VOLTAGE vs. TEMPERATURE



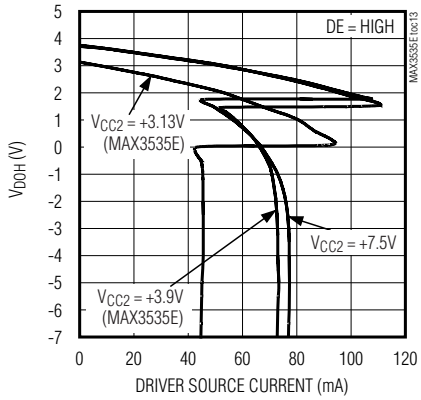
RECEIVER-OUTPUT (RO1) HIGH VOLTAGE vs. TEMPERATURE



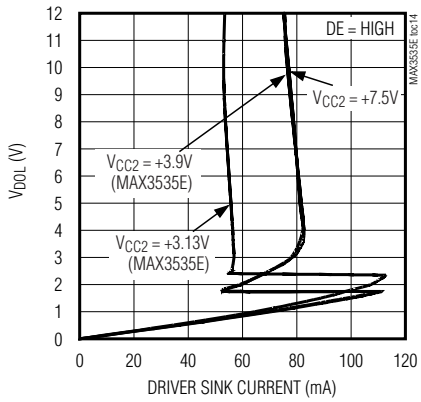
DRIVER DIFFERENTIAL OUTPUT VOLTAGE vs. DIFFERENTIAL OUTPUT CURRENT



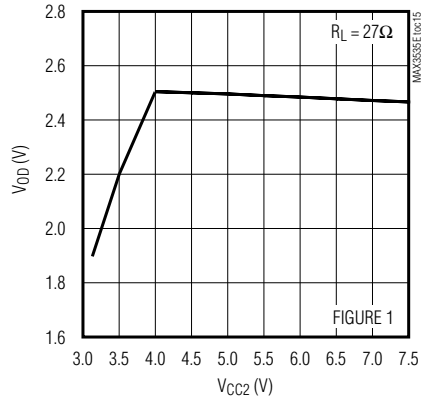
DRIVER-OUTPUT HIGH VOLTAGE vs. DRIVER SOURCE CURRENT



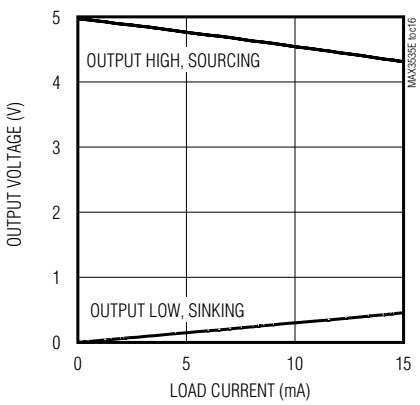
DRIVER-OUTPUT LOW VOLTAGE vs. DRIVER SINK CURRENT



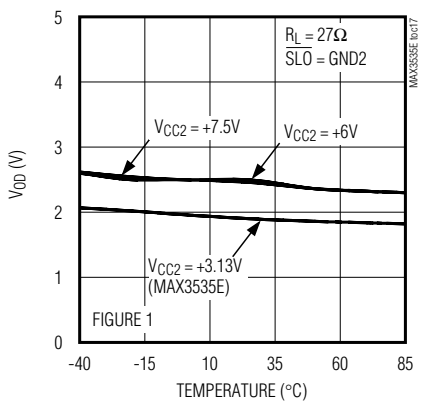
DRIVER DIFFERENTIAL OUTPUT VOLTAGE vs. V_{CC2} SUPPLY VOLTAGE



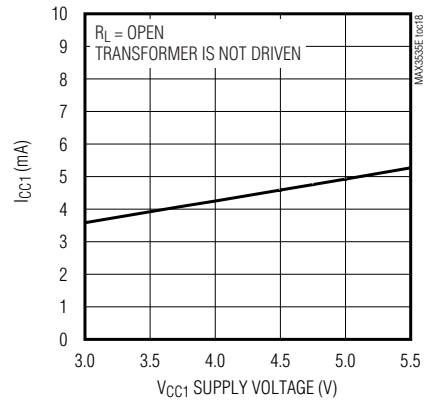
RECEIVER OUTPUT (RO1) VOLTAGE vs. LOAD CURRENT



DRIVER DIFFERENTIAL OUTPUT VOLTAGE vs. TEMPERATURE



I_{CC1} SUPPLY CURRENT vs. V_{CC1} SUPPLY VOLTAGE

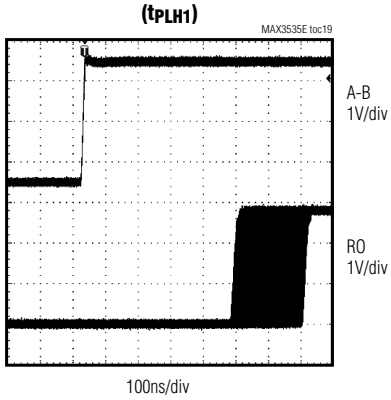


+3V至+5V、提供2500V_{RMS}隔离的RS-485/RS-422收发器，带有±15kV ESD保护

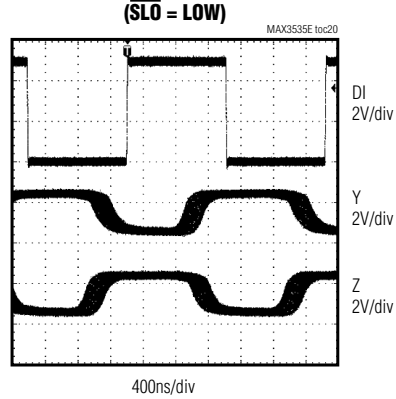
典型工作特性 (续)

(V_{CC1} = +5V, C_L = 50pF (Figure 1), unless otherwise noted.)

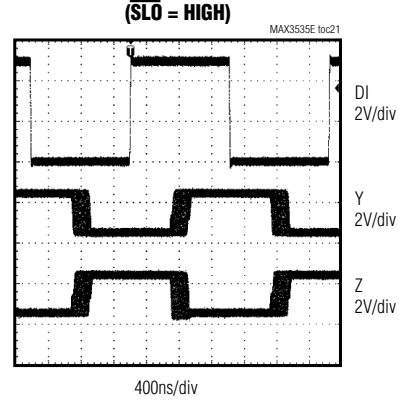
RECEIVER (RO1) PROPAGATION DELAY (t_{PLH1})



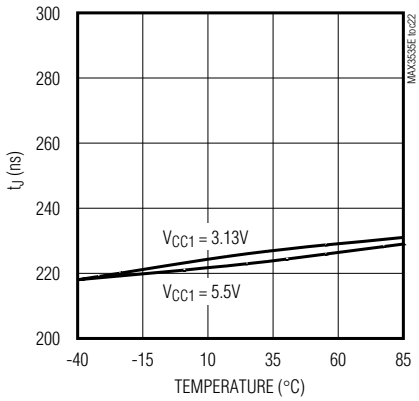
DRIVER PROPAGATION DELAY ($\overline{SLO}$ = LOW)



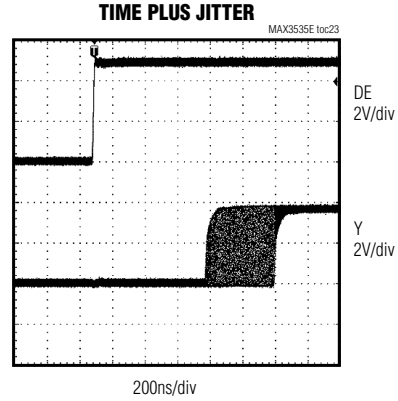
DRIVER PROPAGATION DELAY ($\overline{SLO}$ = HIGH)



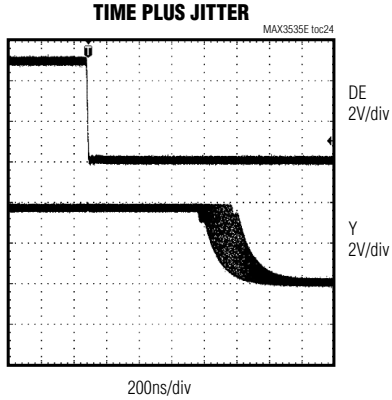
JITTER vs. TEMPERATURE



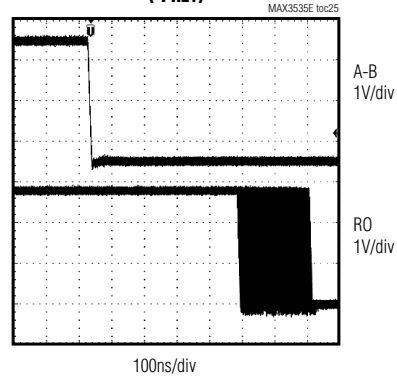
DRIVER ENABLE TIME PLUS JITTER



DRIVER DISABLE TIME PLUS JITTER



RECEIVER (RO1) PROPAGATION DELAY (t_{PHL1})



引脚描述

引脚	名称	隔离侧	功能
1	V_{CC1}	Logic	逻辑侧/变压器驱动器电源输入。用10µF和0.1µF电容将V_{CC1}旁路到GND1。
2	ST1	Logic	变压器驱动器相位1电源输出。连接ST1与隔离变压器初级线圈，向隔离层的隔离侧传送功率。
3	ST2	Logic	变压器驱动器相位2电源输出。连接ST2与隔离变压器初级线圈，向隔离层的隔离侧传送功率。
4	GND1	Logic	逻辑侧的地。对于隔离工作方式，不要与GND2连接。
5–10, 19–24	—	—	已从封装上去掉
11	GND2	Isolated	隔离侧的地。对于隔离工作方式，不要与GND1连接。
12	Z	Isolated	RS-485/RS-422反相驱动器输出。DE为低电平或隔离层出现故障时，输出浮空。(更多信息见“*详细说明*”部分。)
13	Y	Isolated	RS-485/RS-422同相驱动器输出。DE为低电平或隔离层出现故障时，输出浮空。(更多信息见“*详细说明*”部分。)
14	V_{CC2}	Isolated	隔离侧电源输入。连接V_{CC2}与变压器次级线圈的整流输出。用10µF和0.1µF电容将V_{CC2}旁路到GND2。
15	B	Isolated	RS-485/RS-422差分接收器反相输入
16	A	Isolated	RS-485/RS-422差分接收器同相输入
17	RO2	Isolated	隔离侧接收器输出，RO2始终有效。若A - B > -10mV，则RO2变为高电平。若A - B < -200mV，则RO2变为低电平。A与B浮空或短路时，失效保护电路使RO2变为高电平。
18	$\overline{SLO}$	Isolated	驱动器摆率控制逻辑输入。对于最高400kbps的数据速率，将$\overline{SLO}$接GND2；对于高速数据速率，将$\overline{SLO}$接V_{CC2}或浮空。
25	DI	Logic	驱动器输入。将DI置为低(高)电平，强制驱动器输出Y为低(高)电平，驱动器输出Z为高(低)电平。
26	DE	Logic	驱动器使能输入。DE为高电平时，驱动器输出有效并跟随驱动器输入(DI)变化。DE浮空时，驱动器被禁用。DE不影响接收器的通/断。
27	$\overline{RE}$	Logic	接收器输出使能与故障电流输出。$\overline{RE}$为低电平时，接收器输出(RO1)有效，并跟随接收器的差分输入A、B而变化，否则RO1悬空。$\overline{RE}$不影响RO2，也不禁用驱动器。被触发的故障输出是上拉电流，否则$\overline{RE}$提供下拉电流。
28	RO1	Logic	接收器输出。$\overline{RE}$为低电平时，RO1有效。若A - B > -10mV，则RO1变为高电平。若A - B < -200mV，则RO2变为低电平。A与B浮空或短路时，失效保护电路使RO1变为高电平。

+3V至+5V、提供2500V_{RMS}隔离的RS-485/RS-422收发器，带有±15kV ESD保护

测试电路

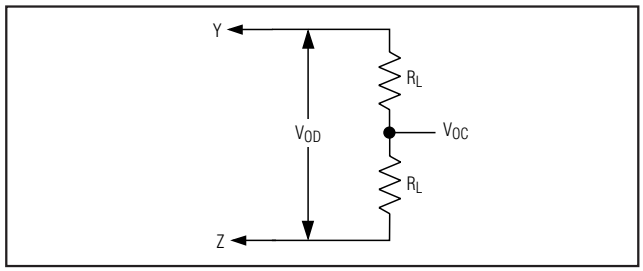


图 1. 驱动器直流测试负载

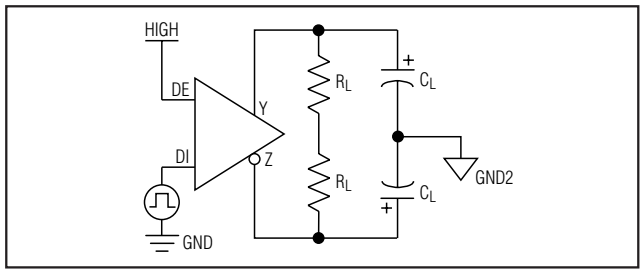


图 2. 驱动器时序测试电路

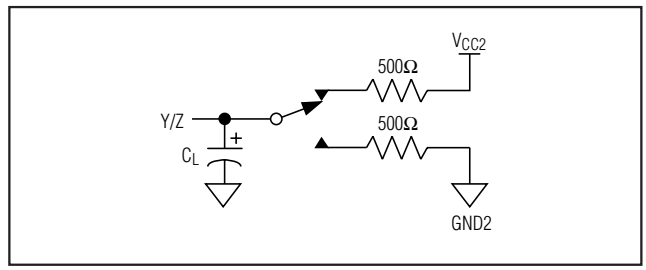


图 3. 驱动器时序测试负载

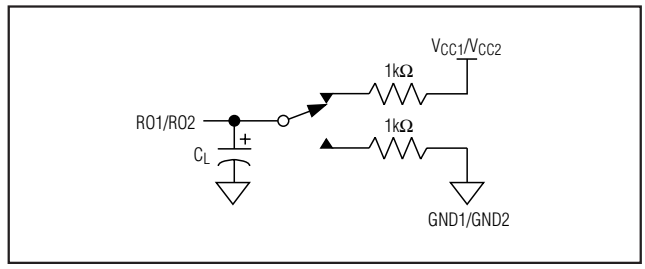


图 4. 接收器时序测试负载

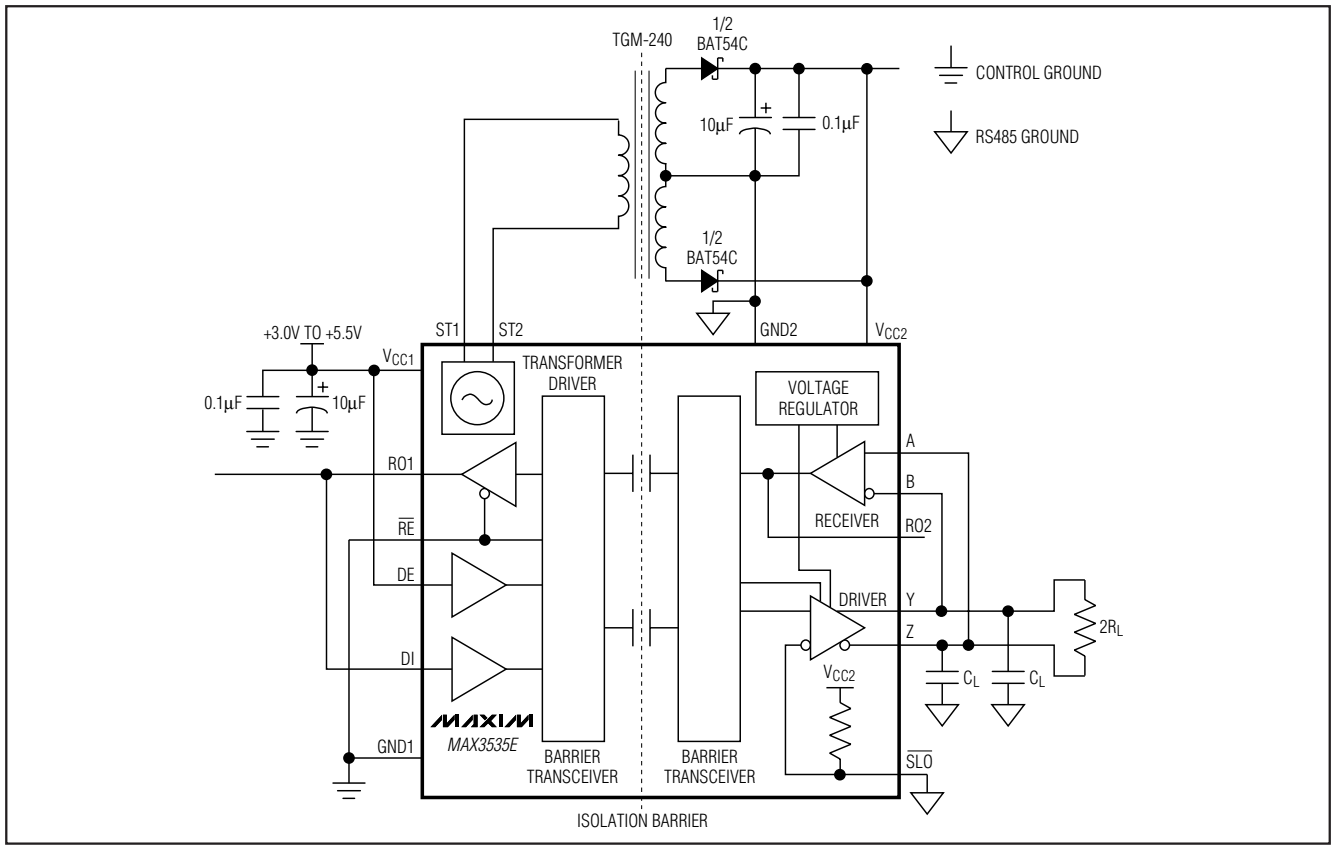


图 5. 自激配置

开关波形

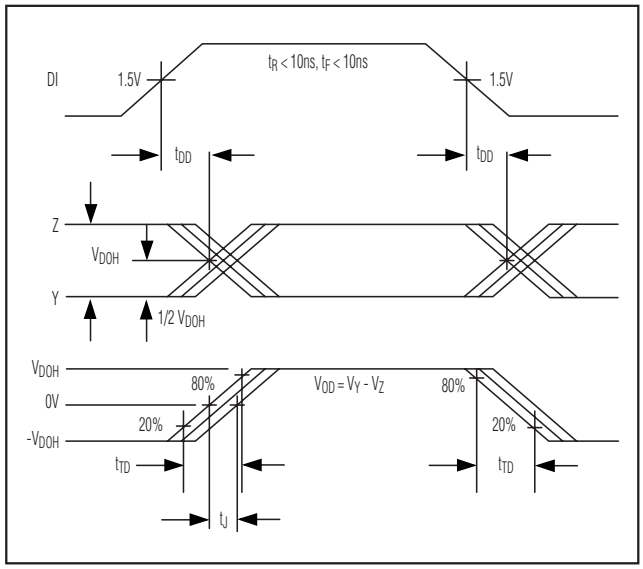


图 6. 驱动器传输延时

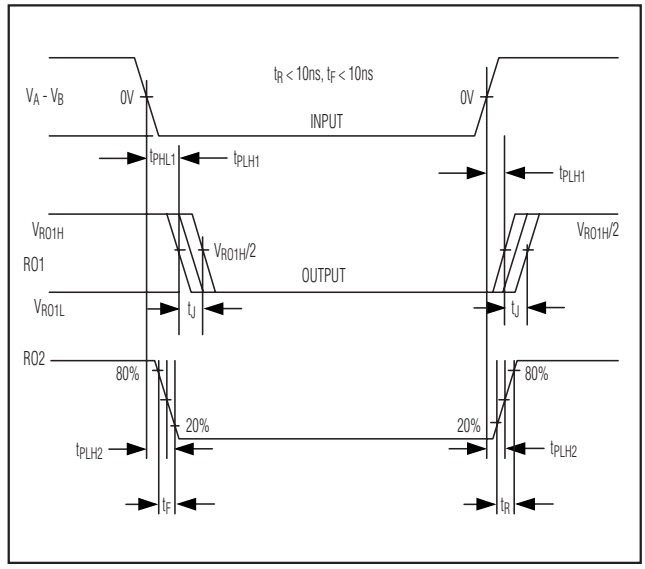


图 8. 接收器传输延时

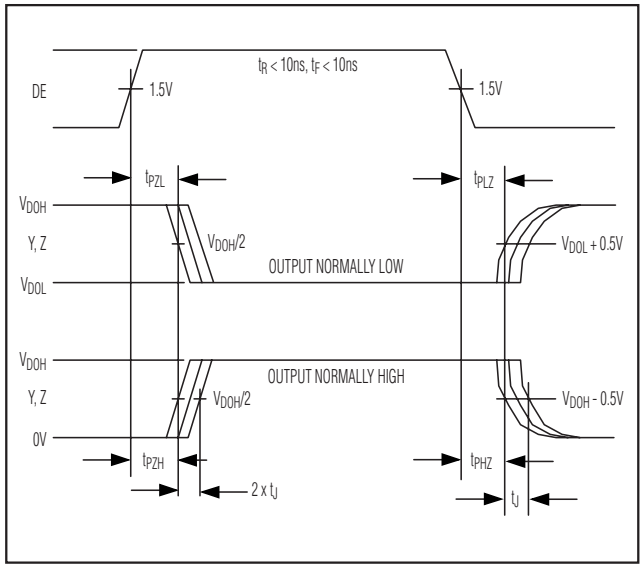


图 7. 驱动器使能与禁用时序

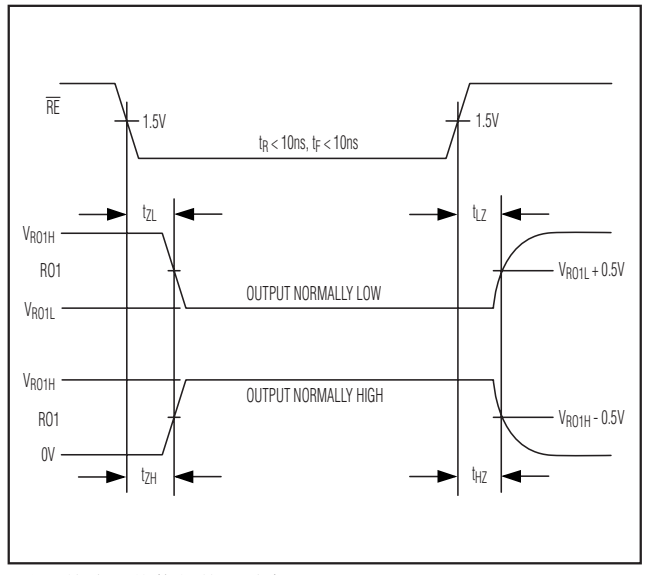


图 9. 接收器使能与禁用时序

+3V至+5V、提供2500V_{RMS}隔离的RS-485/RS-422收发器，带有±15kV ESD保护

详细说明

MAX3535E/MXL1535E是隔离型RS-485/RS-422全双工收发器，在RS-485/RS-422隔离侧与控制器或控制逻辑侧之间提供2500V_{RMS}电隔离。当隔离层两侧的共模电压(例如，地电势)相差很大时，这些器件可以跨越隔离层实现1000kbps的快速通信。隔离层由两部分组成。第一部分是电容隔离层(集成的高压电容)，允许在逻辑侧与RS-485/RS-422隔离侧之间进行数据传输。数据在被传送到隔离层的另一侧之前，经过采样与编码，这会为通信系统引入采样抖动和进一步的延时。

隔离层的第二部分由提供初级线圈与次级线圈之间必要隔离的外部变压器组成，使得工作电源能够从逻辑侧越过隔离层，传输到隔离侧。外部变压器的初级线圈与MAX3535E/MXL1535E的420kHz变压器驱动器输出ST1、ST2相连。由于MXL1535E与MAX3535E各自的隔离侧与逻辑侧工作在不同的电源电压，因此不同的器件必须使用不同的隔离变压器(见“*变压器选择*”部分)。外部只需要隔离变压器、两个二极管和两个低电压10µF退耦电容即可构成完整的系统(见“*典型应用电路*”)。

MAX3535E/MXL1535E中包括一个差分驱动器、一个接收器和其它内部电路，内部电路用来跨越隔离层(包括隔离电容)发送RS-485信号与逻辑信号。MAX3535E/MXL1535E接收器为1/8单位负载，在同一条总线上最多允许挂接256个器件。

MAX3535E/MXL1535E具有失效保护电路，当接收器输入开路或短路时，或当终端匹配的传输线上所有的驱动器均处于禁用状态时，可以确保接收器输出为逻辑高电平(见“*失效保护*”部分)。

MAX3535E/MXL1535E具有驱动器摆率控制，数据速率低于400kbps时，可以降低由于电缆的不良匹配所引起的电磁干扰(EMI)和反射。驱动器输出为供出或吸入电流提供短路保护，并具有过压保护。其他特性包括热插拔功能，上电后，若驱动器逻辑信号浮空，可以保持驱动器关闭。MAX3535E/MXL1535E具有出错检测电路，出现故障时可通知处理器，并在故障消除前禁用驱动器。

失效保护

接收器输入短路或开路时，或当终端匹配的传输线上所有的驱动器均处于禁用状态时，MAX3535E/MXL1535E可以确保接收器输出为逻辑高电平。接收器阈值固定在-10mV至-200mV之间。若差分接收器输入电压(A - B)大于或等于-10mV，RO1为逻辑高电平(表2)。在所有发送器禁用的情况下，通过终端匹配电阻将接收器的差分输入电压拉至0。由于MAX3535E/MXL1535E的接收器阈值设置，使RO1引脚的逻辑高电平具有10mV的最小噪声裕量。

驱动器输出保护

有两种机制用来防止由于故障或总线竞争引起的过高电流和功耗。第一是输出级的折返式电流限制，在整个共模电压范围内对短路情况提供立即保护；第二是热关断电路，当管芯温度超过+150°C时，强制驱动器输出进入高阻状态。

故障监视 $\overline{RE}$

$\overline{RE}$既可以用作输入也可以用作输出。用作输入时，$\overline{RE}$控制接收器输出使能(RO1)。用作输出时，$\overline{RE}$用来指示器件工作故障。这种双重功能通过输出驱动级实现，该输出驱动级可以由大多数逻辑门电路过驱动。当外部门电路没有有源驱动$\overline{RE}$时，它可以通过100µA内部上拉电流驱动为高电平(出现故障)，也可以通过60µA内部下拉电流驱动为低电平(无故障)。使用$\overline{RE}$控制接收器使能输出功能时，必须用一个门电路驱动，该门电路应具有足够的供出与吸收电流能力，以克服内部驱动。

没有有源驱动$\overline{RE}$时，它将作为缺省的指示器 (表 3)。$\overline{RE}$上的低电平说明该器件功能正确，而高电平说明出现故障。出现故障指示有四种原因：

1) V_{CC1}上的电压低于欠压锁定阈值 (标称值为2.69V)。

2) V_{CC2}上的电压低于欠压锁定阈值 (标称值为2.80V)。

3) 存在妨碍 MAX3535E/MXL1535E与隔离层另一侧通信的问题。

4) 管芯温度超过+150°C的标称值，使器件进入热关断。

故障出现时，若 $\overline{RE}$为低电平，则 RO1切换到逻辑高电平状态 (表 3)。接收器输入端的开路或短路不会造成故障报警，不过，这样也会使 RO1进入逻辑高电平状态 (参见“*失效保护*”部分)。

使用微控制器双向 I/O口线或三态缓冲器读取 $\overline{RE}$的状态可以得到故障信息，如图 10所示。使用三态缓冲器时，无论何时 $\overline{RE}$上的电压需要被强制为逻辑高电平或逻辑低电平，都应使驱动器有效。为获得故障信息读取 $\overline{RE}$时，应禁用驱动器。

摆率控制逻辑

$\overline{SLO}$输入用来选择驱动器输出为高摆率或低摆率。将$\overline{SLO}$接 GND2，选择低摆率输出，数据速率不超过 400kbps时可以降低由于传输线的不良匹配所引起的 EMI和信号反射。由于降低摆率会减小驱动器输出信号的上升与下降时间，有效抑制了输出高频成份和谐波。$\overline{SLO}$浮空或接至 V_{CC2}，选择高摆率，允许高速数据通信。

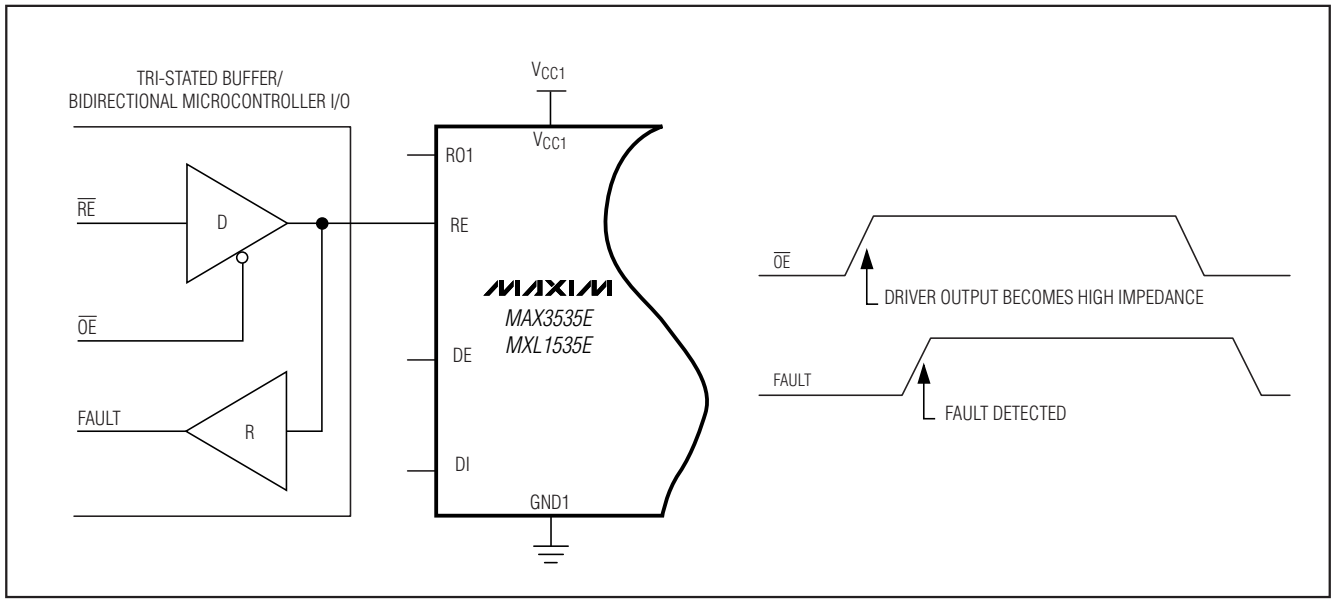


图 10. 读取故障状态

+3V至+5V、提供2500V_{RMS}隔离的RS-485/RS-422收发器，带有±15kV ESD保护

功能表

表1. 发送逻辑

TRANSMITTING LOGIC			
INPUTS		OUTPUTS	
DE	DI	Y	Z
1	1	1	0
1	0	0	1
0	X	High impedance	High impedance

表2. 接收逻辑

RECEIVING LOGIC			
INPUTS		OUTPUTS	
$\overline{RE}$	$V_A - V_B$	RO1	RO2
0	>-10mV	1	1
0	<-200mV	0	0
0	Inputs open/shorted	1	1
1	>-10mV	High impedance	1
1	<-200mV	High impedance	0
1	Inputs open/shorted	High impedance	1

表3. 故障模式

FUNCTION		NORMAL MODE	FAULT MODES				
		$V_{CC1} > V_{UVH1}$, $V_{CC2} > V_{UVH2}$	$V_{CC1} < V_{UVL1}$, $V_{CC2} > V_{UVH2}$	$V_{CC1} > V_{UVH1}$, $V_{CC2} < V_{UVL2}$	$V_{CC1} < V_{UVL1}$, $V_{CC2} < V_{UVL2}$	THERMAL SHUTDOWN	INTERNAL COMMUNICATION FAULT
Transformer driver (ST1, ST2)		On	On	On	On	Off	On
RO1	$\overline{RE}$ = 0	Active	High	High	High	High	High
	$\overline{RE}$ = V_{CC1}	High impedance	High impedance	High impedance	High impedance	High impedance	High impedance
	$\overline{RE}$ = floating	Active	High impedance	High impedance	High impedance	High impedance	High impedance
RO2		Active	Active	Active	Active	Active	Active
Driver outputs (Y, Z)		Active	High impedance	High impedance	High impedance	High impedance	High impedance
Internal barrier communication		Active	Disabled	Disabled	Disabled	Disabled	Communication attempted
Fault indicator on $\overline{RE}$		Low (60µA pull-down)	High (100µA pullup)	High (100µA pullup)	High (100µA pullup)	High (100µA pullup)	High (100µA pullup)

应用信息

典型应用

MAX3535E/MXL1535E收发器简化了多点传输线上的双向数据通信。图11所示是一个典型的RS-485多点网络应用电路。图12所示电路中，MAX3535E/MXL1535E用作线路中继器，适合于长度超过4000英尺的电缆。为了降低反射，在线路两端需要以特征阻抗端接，使主线路以外的分支尽可能短。

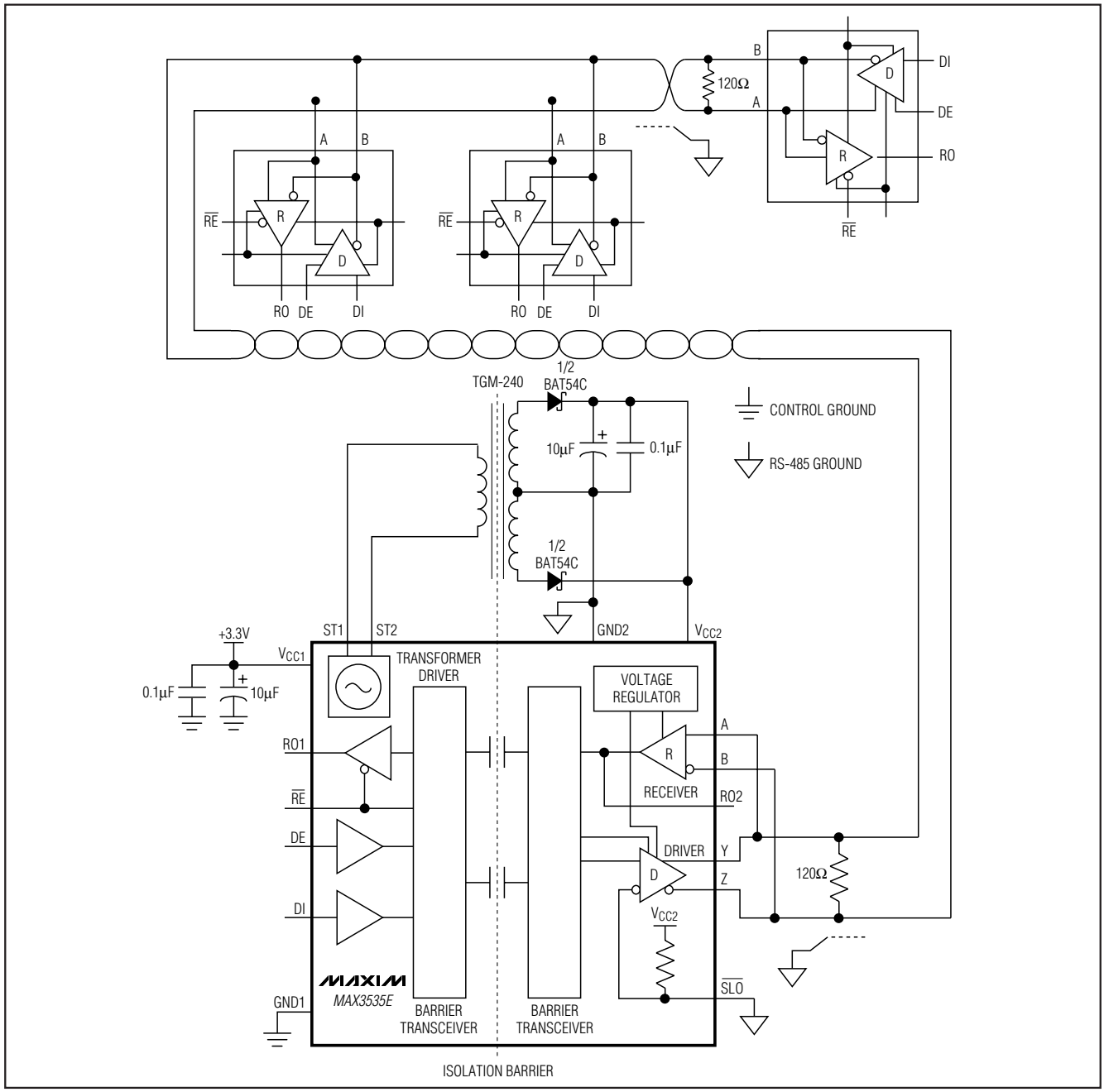


图11. 典型的半双工、多点RS-485网络

+3V至+5V、提供2500V_{RMS}隔离的RS-485/RS-422收发器，带有±15kV ESD保护

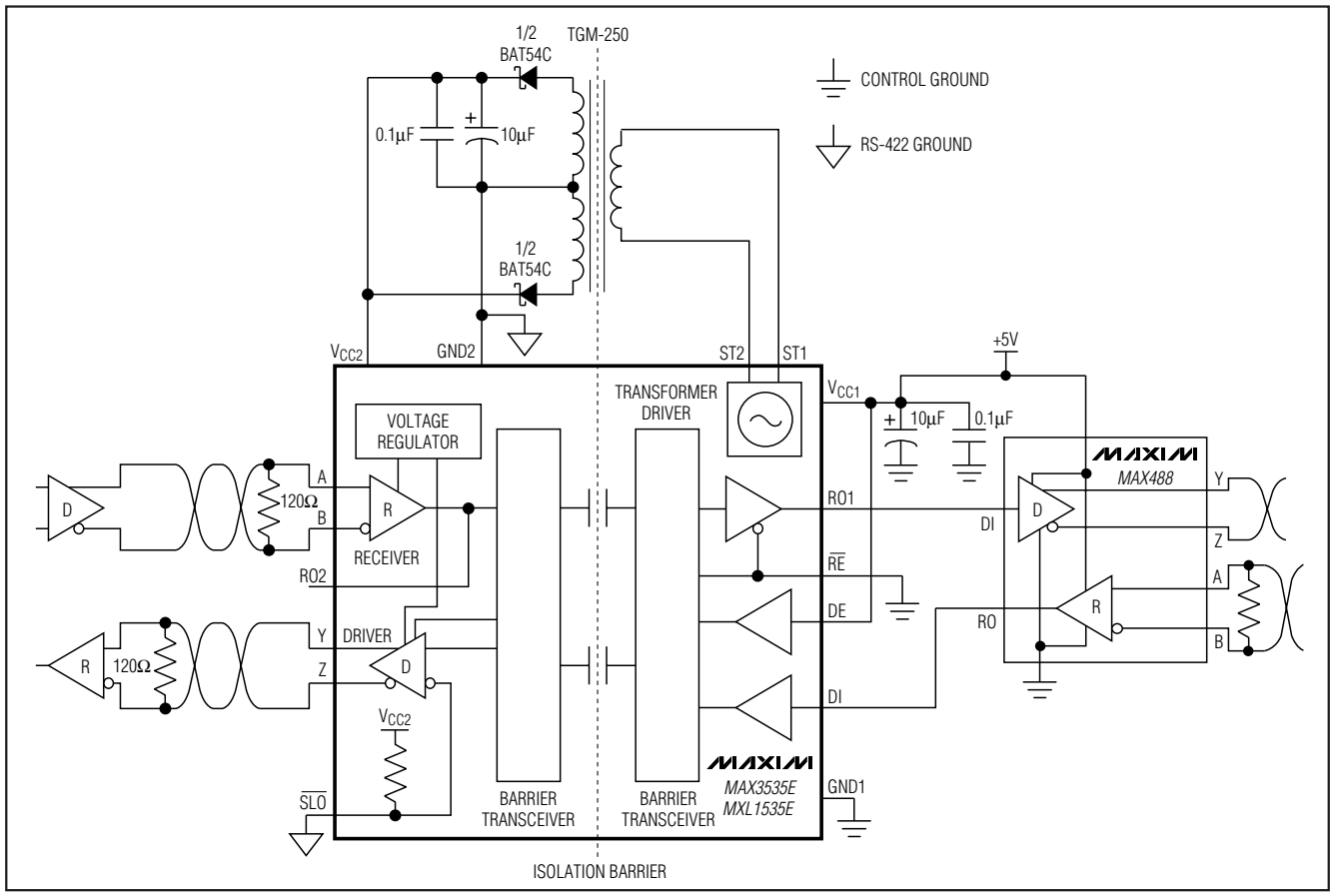


图 12. MAX3535E/MXL1535E用作RS-422线路中继器

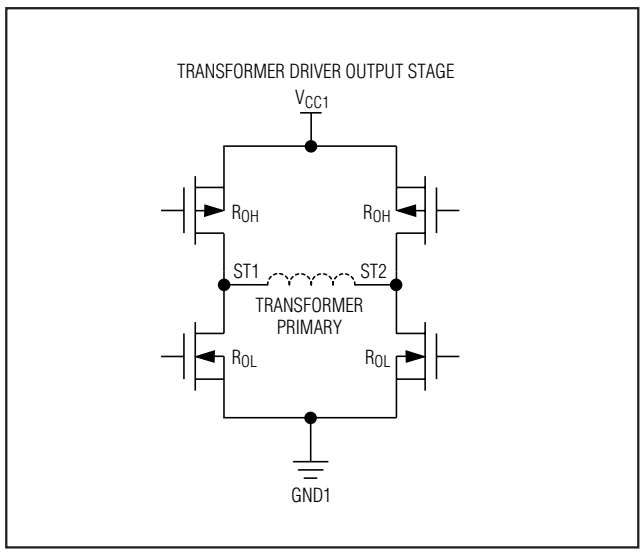


图 13. 变压器驱动输出级

变压器选择

MXL1535E是LTC1535引脚兼容的升级版本，为LTC1535设计的任何变压器都适用于MXL1535E (见表4)。所有这些变压器的匝数比约为1:1.3CT。

MAX3535E可以与表4列出的变压器一起工作，还可以使用为MAX845和MAX253设计的更小、更薄的变压器。420kHz变压器驱动器使用单初级线圈、带中心抽头的次级线圈变压器。选择变压器时，不要超过其ET乘积，即最大初级线圈电压与振荡器最大周期(最低振荡频率)的乘积。这样可以确保变压器不会进入饱和状态。计算变压器初级线圈的最小ET乘积如下：

$$ET = V_{MAX} / (2 \times f_{MIN})$$

式中，V_{MAX}是最坏情况下的最大电源电压，f_{MIN}是电源电压下的最小频率。使用+5.5V与290kHz计算出所要求的最小ET乘积为9.5V-µs。表5给出的用于MAX845的商

+3V至+5V、提供2500V_{RMS}隔离的RS-485/RS-422收发器，带有±15kV ESD保护

用变压器满足上述要求。在绝大部分情况下，MAX3535E可以使用中心抽头初级线圈的一半，另一个初级线圈的末端浮空。表5中大部分变压器的匝数比为1:1:1或1:1:1:1。

+3.3V下工作(最大值+3.6V)时，所需初级线圈的ET乘积是6.2V-µs。以上提到的所有变压器都满足该要求。表6列出了一些其他的变压器型号，其升压匝数比专为+3.3V应用设计。表6中大多数变压器匝数比都是1:1:1.3:1.3。

使用HALO TGM-010或Midcom 95061变压器，可以在最大厚度小于0.1in内构建一个完整的隔离型RS-485/RS-422收发器。在最坏情况下：高温、低V_{CC1}、满负载，为了减小功耗，可以通过选择变压器匝数比产生V_{CC2}所需的最小直流电压(+3.13V)。对于隔离端的轻负载，应保证V_{CC2}电压不超过+7.5V。例如，CTX01-14659变压器在RS-485驱动器满负载时得到的V_{CC1}电源电流为85mA(典型值)。使用TGM250 1:1:1变压器将V_{CC1}电源电流降至65mA(典型值)，同时在V_{CC2}电源处保持良好的裕量。有些情况下，采用具有少量降压作用的变压器可以进一步节省功耗。用户也可以自行绕制变压器，在Ferronics11-050B磁芯上初级线圈匝数为23匝，次级线圈为20:20匝，即可保证很好地工作，V_{CC1}电源电流为51mA(典型值)。

表4. 用于MXL1535E/MAX3535E的变压器

MANUFACTURER	PART NUMBER	ISOLATION VOLTAGE (1s)	PHONE NUMBER
Cooper Electronic Technologies, Inc.	CTX01-14659	500V	561-241-7876
Cooper Electronic Technologies, Inc.	CTX01-14608	3750V_{RMS}	561-241-7876
EPCOS AG (Germany) (USA)	B78304-A1477-A3	500V	0 89-626-2-80-00 800-888-7724
Midcom, Inc.	31160R	1250V	605-886-4385
Pulse FEE (France)	P1597	500V	33-3-85-35-04-04
Sumida Corporation (Japan)	S-167-5779	100V	03-3667-3320
Transpower Technologies, Inc.	TTI7780-SM	500V	775-852-0145

表5. 用于+5V下MAX3535E的变压器

MANUFACTURER	PART NUMBER	ISOLATION VOLTAGE (1s)	PHONE NUMBER	WEBSITE
HALO Electronics, Inc.	TGM-010	500V_{RMS}	650-903-3800	www.haloelectronics.com/6pin.html
	TGM-250	2000V_{RMS}		
	TGM-350	3000V_{RMS}		
	TGM-450	4500V_{RMS}		
BH Electronics, Inc.	500-1749	3750V_{RMS}	952-894-9590	www.bhelectronics.com/PDFs/DC-DCConverterTransformers.pdf
Coilcraft, Inc.	U6982-C	1500V_{RMS}	800-322-2645 44-1236-730595	www.coilcraft.com/minitrans.cfm
Newport/C&D Technologies	7825355	1500V	520-295-4300	www.dc-dc.com/products/productline.asp?ED=9
	7625335	4000V		
Midcom, Inc.	95061	1250V	605-886-4385	www.midcom-inc.com
PCA Electronics, Inc.	EPC3115S-5	700V DC	818-894-5791	www.pca.com/Datasheets/EPC3117S-X.pdf
Rhombus Industries, Inc.	T-1110	1800V_{RMS}	714-898-0960	www.rhombus-ind.com/pt-cat/maxim.pdf
Premier Magnetics, Inc.	PM-SM15	1500V_{RMS}	949-452-0511	www.premiermag.com/pdf/pmsm15.pdf

+3V至+5V、提供2500V_{RMS}隔离的RS-485/RS-422收发器，带有±15kV ESD保护

表6. 用于+3.3V下MAX3535E的变压器

MANUFACTURER	PART NUMBER	ISOLATION VOLTAGE (1s)	PHONE NUMBER	WEBSITE
HALO Electronics, Inc.	TGM-040	500V_{RMS}	650-903-3800	www.haloelectronics.com/6pin.html
	TGM-240	2000V_{RMS}		
	TGM-340	3000V_{RMS}		
	TGM-340	4500V_{RMS}		
BH Electronics, Inc.	500-2582	2000V_{RMS}	952-894-9590	www.bhelectronics.com/PDFs/DC-DCConverterTransformers.pdf
Coilcraft, Inc.	Q4470-C	1500V_{RMS}	800-322-2645 44-1236-730595	www.coilcraft.com/minitrans.cfm
Newport/C&D Technologies	78253335	1500V	520-295-4300	www.dc-dc.com/products/productline.asp?ED=9
	76253335	4000V		
Midcom, Inc.	95062	1250V	605-886-4385	www.midcom-inc.com
	95063	1250V		
PCA Electronics, Inc.	EPC3115S-2	700V DC	818-894-5791	www.pca.com/Datasheets/EPC3117S-X.pdf
Rhombus Industries, Inc.	T-1107	1800V_{RMS}	714-898-0960	www.rhombus-ind.com/pt-cat/maxim.pdf
Premier Magnetics Inc.	PM-SM16	1500V_{RMS}	949-452-0511	www.premiermag.com/pdf/pmsm15.pdf

±15kV ESD保护

与其他Maxim器件相同，所有引脚都采用了ESD保护结构，用来防护处理与装配过程的静电放电。驱动器输出与接收器输入提供额外的静电保护能力。Maxim的工程师开发出了优异的电路结构，为这些引脚提供保护，使其能够承受±15kV的ESD冲击。ESD保护电路在所有状态下都可承受高ESD。出现ESD冲击后，MAX3535E/MXL1535E继续工作而不会锁定。ESD保护可以用不同的方法测试。该产品系列的发送器输出与接收器输入均使用人体模型定义的±15kV保护电路。

ESD测试条件

±15kV ESD测试规范只应用在A、B、Y与Z I/O引脚，测试电压以GND2为参考。所有其他引脚均为±2kV ESD保护。

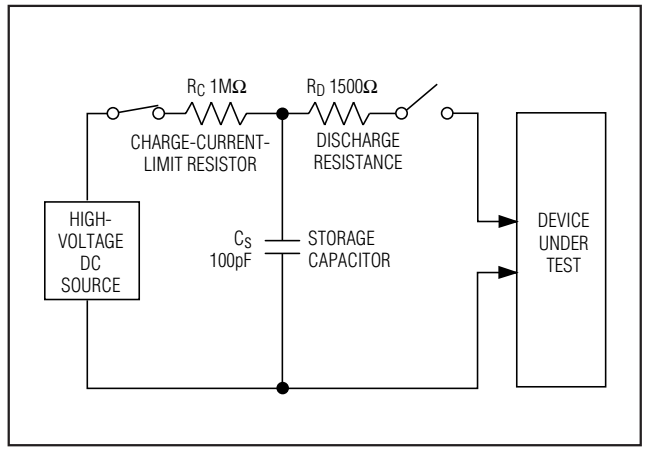


图14. 人体模式ESD测试模型

人体模式

图14所示为人体测试模式，图15所示是向低阻放电时产生的电流波形。该模型向100pF电容充电至所需的ESD电压，然后通过1.5kΩ电阻向测试装置放电。

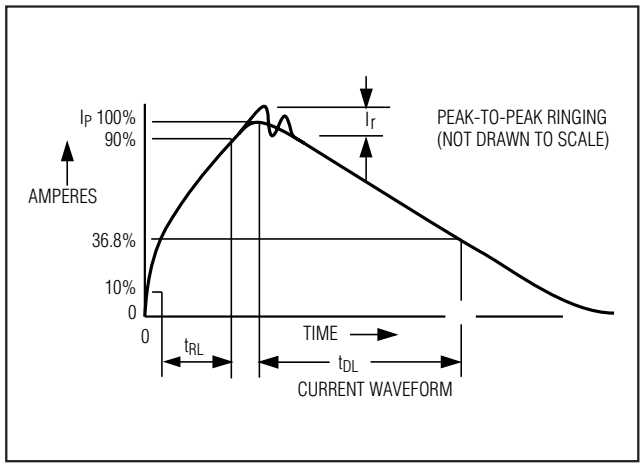


图 15. 人体模式电流波形

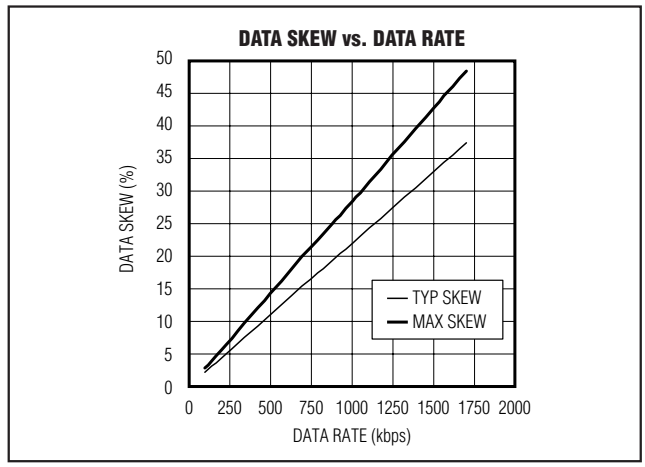


图 16. 数据偏移与数据速率曲线

机器模式

机器模式ESD测试采用200pF存储电容和零放电电阻，对所有引脚进行测试。其目的是模拟制造过程中由于操作和装配接触引起的应力。制造过程中所有引脚都需要这种保护，而不只是输入与输出引脚。因此，在印刷电路板装配后，机器模式与I/O端口几乎无关。

偏移

图5所示自激配置是测试MAX3535E/MXL1535E速度的最好方法。对接收器与发送器组合来说，该配置下250kHz的振荡频率相当于至少500kbps的数据速率。实际应用中，数据通常能够以高得多的速率发送、接收，通常受限于所允许的抖动和数据偏移。若系统可以容忍25%的数据偏移（t_{PLH1}与t_{PHL1}之差），285ns最大抖动规范相当于877kbps的数据速率。更低的数据速率将获得更小的失真与抖动（图16）。也可运行在更高的速率下，但会引起更大的失真与抖动。为了避免内部隔离层的通信干扰，接收器与驱动器的数据速率应始终限制在1.75Mbps以下。

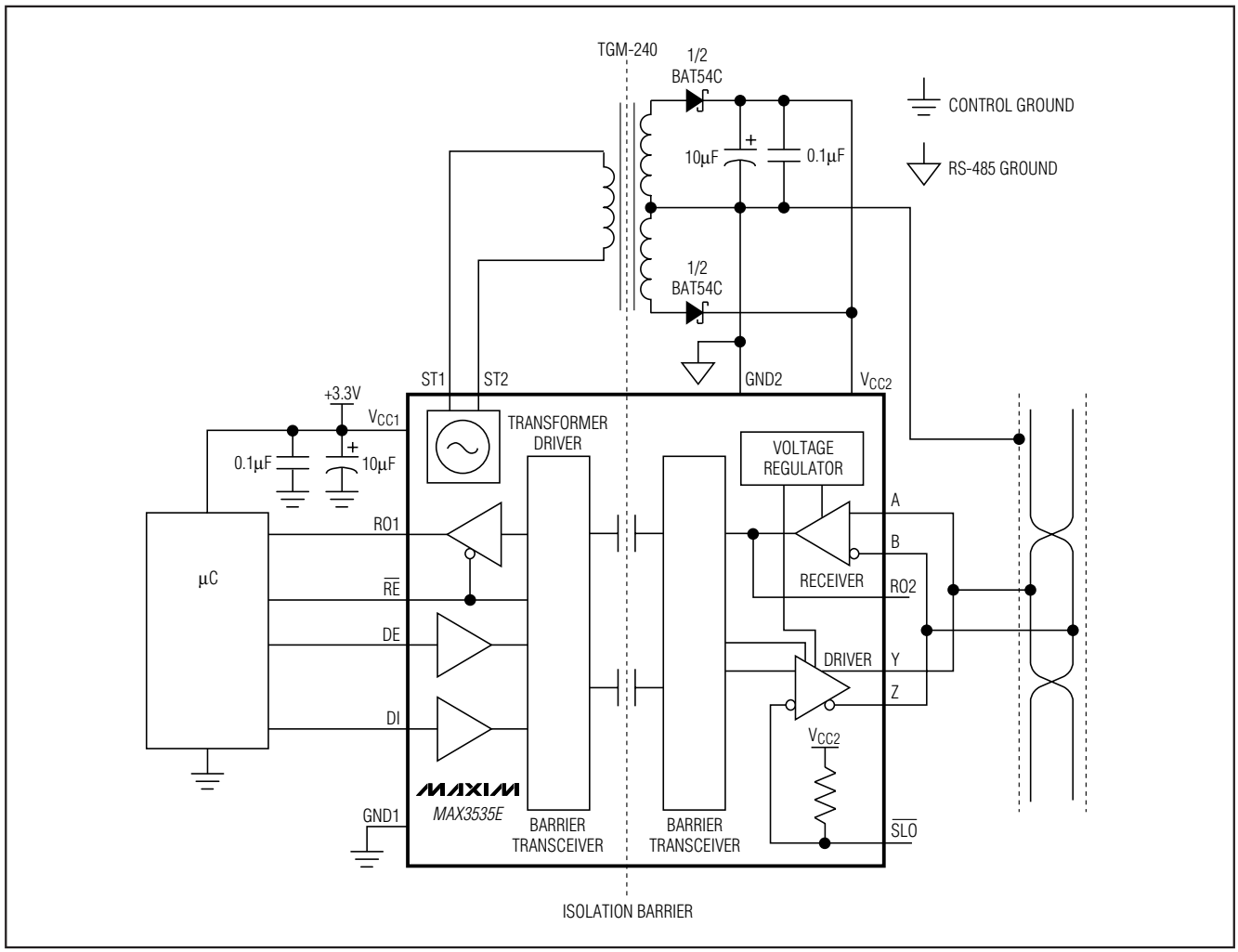
布线注意事项

MAX3535E/MXL1535E引脚配置进一步减小了线路连接的长度，可以实现最优的印刷电路板布线：

- 为达到最大隔离度，除了MAX3535E/MXL1535E和变压器外，电路布局不应该破坏隔离层。从隔离层一侧引出的连线和元件摆放位置不应靠近隔离层另一侧的连线和元件。
- 隔离层每一侧与地相连的屏蔽线有助于截取可能耦合进DI与$\overline{SOL}$输入端的电容电流。在双面板或多层电路板中，这些屏蔽线应出现在每一层。
- 尽可能增大隔离层的宽度。建议GND1与GND2之间至少应有0.25in的间距。

+3V至+5V、提供2500V_{RMS}隔离的RS-485/RS-422收发器，带有±15kV ESD保护

典型应用电路



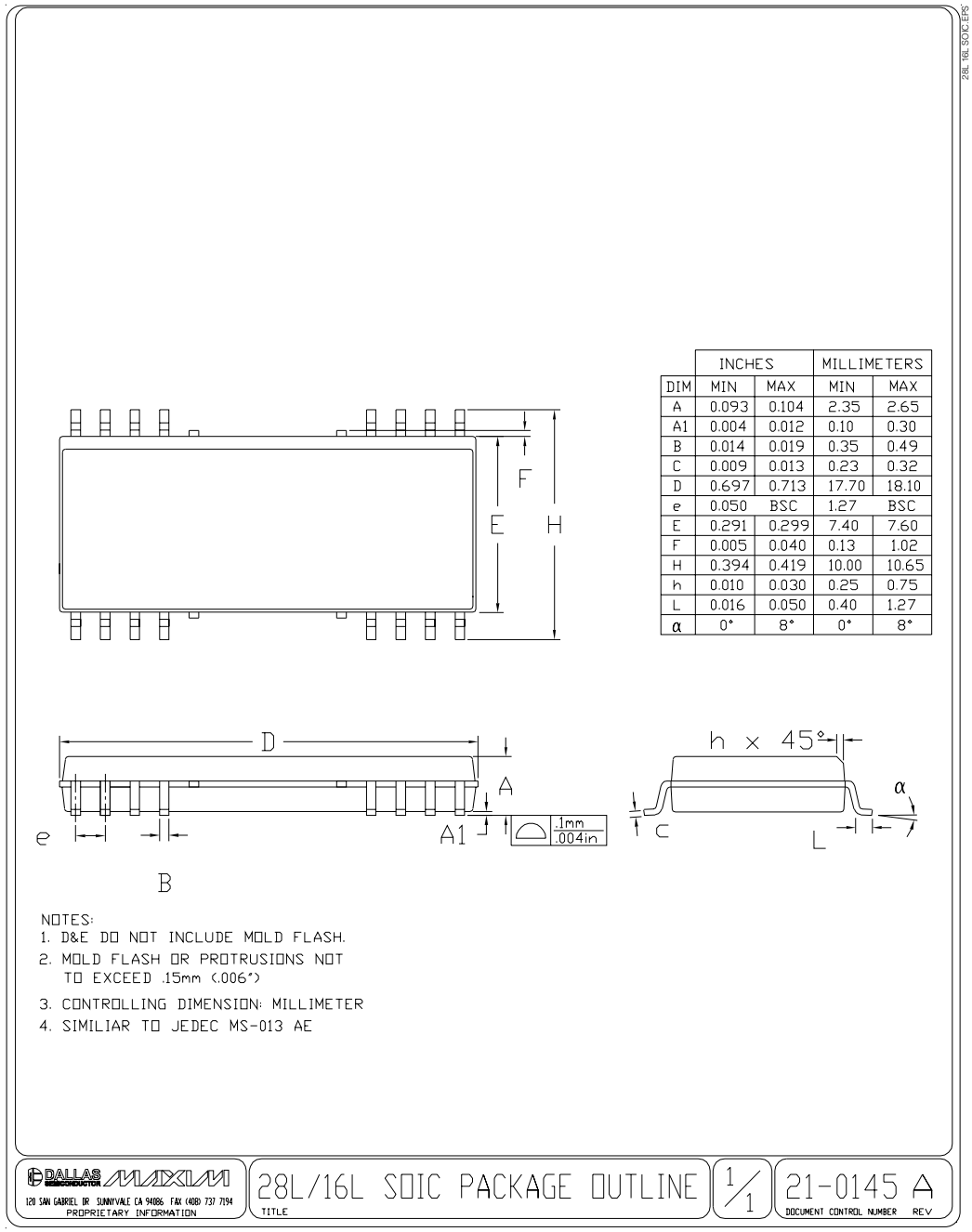
芯片信息

PROCESS: BiCMOS

TRANSISTOR COUNT: 7379

封装信息

(本数据资料提供的封装图可能不是最近的规格，如需最近的封装外型信息，请查询 www.maxim-ic.com/packages。)



	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	0.093	0.104	2.35	2.65
A1	0.004	0.012	0.10	0.30
B	0.014	0.019	0.35	0.49
C	0.009	0.013	0.23	0.32
D	0.697	0.713	17.70	18.10
e	0.050	BSC	1.27	BSC
E	0.291	0.299	7.40	7.60
F	0.005	0.040	0.13	1.02
H	0.394	0.419	10.00	10.65
h	0.010	0.030	0.25	0.75
L	0.016	0.050	0.40	1.27
α	0°	8°	0°	8°