

# MAX14850

## 六通道数字隔离器

### 概述

MAX14850为6通道数字隔离器，采用Maxim专有工艺，单芯片设计在不同电源供电的电路之间提供结构紧凑、低成本、低功耗和稳定的高温特性。

器件具有四路单向通道，每路支持DC至50Mbps传输速率，四个通道中以两路为一组，在每个方向提供隔离数据传输。两个双向通道采用开漏输出，每路可支持DC至2Mbps通信速率。

独立的3.0V至5.5V电源分别用于隔离器两侧的供电，使器件也非常适合作电平转换器。MAX14850可用于隔离的SPI总线、带时钟扩展的I<sup>2</sup>C总线、RS-232、RS-485/RS-422总线和通用隔离应用。当作为总线隔离器时，其它通道可用于电源监测和复位信号。

MAX14850提供16引脚窄型SO (10mm x 4mm)封装，工作在-40°C至+125°C汽车级温度范围。

### 应用

工业控制系统  
I<sup>2</sup>C、SPI、SMBus、PMBus™接口  
隔离RS-232，RS-485/RS-422  
电信系统  
电池管理  
医疗系统

相关型号以及配合该器件使用的推荐产品，请参见：[china.maxim-ic.com/MAX14850.related](http://china.maxim-ic.com/MAX14850.related)。

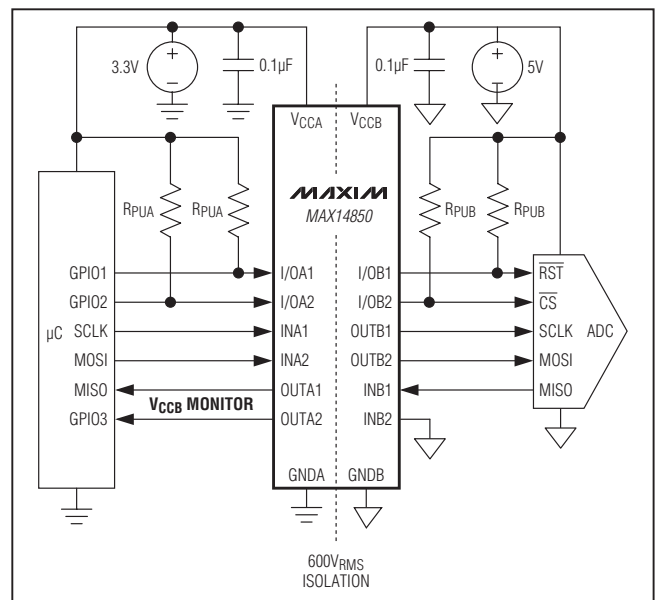
PMBus是SMIF, Inc.的商标。

### 优势与特性

- ◆ 高压保护
  - ◇ 600V<sub>RMS</sub> 60秒隔离
  - ◇ 单向输出短路保护
- ◆ 完整的数字隔离方案
  - ◇ 四路单向信号：2路输入/2路输出
  - ◇ 两路双向开漏信号
  - ◇ 50Mbps (最大值)单向数据传输速率
  - ◇ 2Mbps (最大值)双向数据传输速率
- ◆ 兼容多种接口标准
  - ◇ 带时钟扩展的I<sup>2</sup>C
  - ◇ SPI
  - ◇ RS-232、RS-422/RS-485
  - ◇ SMBus、PMBus接口

订购信息在数据资料的最后给出。

### 典型工作电路



典型工作电路(续)在数据资料的最后给出。

## 六通道数字隔离器

### ABSOLUTE MAXIMUM RATINGS

$V_{CCA}$ to GNDA .....	-0.3V to +6V
$V_{CCB}$ to GNDB .....	-0.3V to +6V
OUTA1, OUTA2 to GNDA .....	-0.3V to ( $V_{CCA} + 0.3V$ )
OUTB1, OUTB2 to GNDB .....	-0.3V to ( $V_{CCB} + 0.3V$ )
INB1, INB2, I/OA1, I/OA2 to GNDA .....	-0.3V to +6V
INA1, INA2, I/OB1, I/OB2 to GNDB .....	-0.3V to +6V
Short-Circuit Duration (OUTA <sub>-</sub> to GNDA or V <sub>CCA</sub> , OUTB <sub>-</sub> to GNDB or V <sub>CCB</sub> ) .....	Continuous
Continuous Current (I/OA <sub>-</sub> , I/OB <sub>-</sub> ) Pin .....	±50mA

Continuous Power Dissipation ( $T_A = +70^\circ\text{C}$ )	
SO (derate 13.3mW/ $^\circ\text{C}$ above $+70^\circ\text{C}$ ) .....	1067mW
Operating Temperature Range .....	-40 $^\circ\text{C}$ to +125 $^\circ\text{C}$
Junction Temperature .....	+150 $^\circ\text{C}$
Storage Temperature Range .....	-65 $^\circ\text{C}$ to +150 $^\circ\text{C}$
Lead Temperature (soldering, 10s) .....	+300 $^\circ\text{C}$
Soldering Temperature (reflow) .....	+260 $^\circ\text{C}$

### PACKAGE THERMAL CHARACTERISTICS (Note 1)

SO

Junction-to-Ambient Thermal Resistance ( $\theta_{JA}$ ) .....	75 $^\circ\text{C}/\text{W}$
Junction-to-Case Thermal Resistance ( $\theta_{JC}$ ) .....	24 $^\circ\text{C}/\text{W}$

**Note 1:** Package thermal resistances were obtained using the method described in JEDEC specification JESD51-7, using a four-layer board. For detailed information on package thermal considerations, refer to [china.maxim-ic.com/thermal-tutorial](http://china.maxim-ic.com/thermal-tutorial).

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.

### ELECTRICAL CHARACTERISTICS

( $V_{CCA} - V_{GNDA} = 3.0V$  to  $5.5V$ ,  $V_{CCB} - V_{GNDB} = 3.0V$  to  $5.5V$ ,  $T_A = -40^\circ\text{C}$  to  $+125^\circ\text{C}$ , unless otherwise noted. Typical values are at  $V_{CCA} - V_{GNDA} = 3.3V$ ,  $V_{CCB} - V_{GNDB} = 3.3V$ , and  $T_A = +25^\circ\text{C}$ .) (Note 2)

PARAMETER	SYMBOL	CONDITIONS		MIN	TYP	MAX	UNIT	
<b>DC CHARACTERISTICS</b>								
Supply Voltage	$V_{CCA}$	Relative to GNDA		3.0		5.5	V	
	$V_{CCB}$	Relative to GNDB		3.0		5.5		
Supply Current	$I_{CCA}$ , $I_{CCB}$	Unidirectional inputs at DC or 2Mbps; bidirectional inputs at DC or switching at 2Mbps. No load.	$V_{CCA} = +5V$ , $V_{CCB} = +5V$		7.2	11	mA	
			$V_{CCA} = +3.3V$ , $V_{CCB} = +3.3V$		6.2	9.5		
	All inputs switching at max data rate. No load. (Note 3)	$V_{CCA} = +5V$ , $V_{CCB} = +5V$	$T_A = +25^\circ\text{C}$		15	22		
		$V_{CCA} = +3.3V$ , $V_{CCB} = +3.3V$	$T_A = +125^\circ\text{C}$		17	24		
			$V_{CCA} = +3.3V$ , $V_{CCB} = +3.3V$	$T_A = +25^\circ\text{C}$		10	16	
				$T_A = +125^\circ\text{C}$		11	18	
Undervoltage Lockout Threshold	$V_{UVLO}$	$V_{CCA} - V_{GNDA}$ , $V_{CCB} - V_{GNDB}$ (Note 4)			2		V	
Undervoltage Lockout Hysteresis	$V_{UVLOHYS}$	$V_{CCA} - V_{GNDA}$ , $V_{CCB} - V_{GNDB}$ (Note 4)			0.1		V	

## 六通道数字隔离器

**ELECTRICAL CHARACTERISTICS (continued)**

( $V_{CCA} - V_{GNDA} = 3.0V$  to  $5.5V$ ,  $V_{CCB} - V_{GNDB} = 3.0V$  to  $5.5V$ ,  $T_A = -40^{\circ}C$  to  $+125^{\circ}C$ , unless otherwise noted. Typical values are at  $V_{CCA} - V_{GNDA} = 3.3V$ ,  $V_{CCB} - V_{GNDB} = 3.3V$ , and  $T_A = +25^{\circ}C$ .) (Note 2)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
<b>ISOLATION CHARACTERISTICS</b>						
Isolation Voltage	$V_{ISO}$	$t = 60s$ (Note 5)	600			$V_{RMS}$
Working Isolation Voltage	$V_{IOWM}$	$V_{GNDB} - V_{GNDA}$ continuous (Note 3), 50-year life expectancy (Figure 4)			200	$V_{RMS}$
ESD Protection		All pins		$\pm 2.5$		kV
<b>LOGIC INPUTS AND OUTPUTS</b>						
Input Threshold Voltage	$V_{IT}$	I/OA1, I/OA2, relative to GNDA	0.5		0.7	V
Input Logic-High Voltage	$V_{IH}$	INA1, INA2, relative to GNDA	$0.7 \times V_{CCA}$		V	
		INB1, INB2, relative to GNDB	$0.7 \times V_{CCB}$			
		I/OA1, I/OA2, relative to GNDA	0.7			
		I/OB1, I/OB2, relative to GNDB	$0.7 \times V_{CCB}$			
Input Logic-Low Voltage	$V_{IL}$	INA1, INA2, relative to GNDA	0.8		V	
		INB1, INB2, relative to GNDB	0.8			
		I/OA1, I/OA2, relative to GNDA	0.5			
		I/OB1, I/OB2, relative to GNDB	$0.3 \times V_{CCB}$			
Output Logic-High Voltage	$V_{OH}$	OUTA1, OUTA2, relative to GNDA, source current = 4mA	$V_{CCA} - 0.4$		V	
		OUTB1, OUTB2, relative to GNDB, source current = 4mA	$V_{CCB} - 0.4$			
Output Logic-Low Voltage	$V_{OL}$	OUTA1, OUTA2, relative to GNDA, sink current = 4mA	0.8		V	
		OUTB1, OUTB2, relative to GNDB, sink current = 4mA	0.8			
		I/OA1, I/OA2, relative to GNDA, sink current = 10mA	0.6	0.9		
		I/OA1, I/OA2, relative to GNDA, sink current = 0.5mA	0.6	0.85		
		I/OB1, I/OB2, relative to GNDB, sink current = 30mA	0.4			
Input/Output Logic-Low Threshold Difference	$\Delta V_{TOL}$	I/OA1, I/OA2 (Note 6)	50			mV
Input Capacitance	$C_{IN}$	INA1, INA2, INB1, INB2, $f = 1MHz$		2		pF
<b>DYNAMIC SWITCHING CHARACTERISTICS</b>						
Common-Mode Transient Immunity	$dV_{ISO}/dt$	$V_{IN} = V_{CC\_}$ or $V_{GND\_}$ (Notes 3, 7)		1.5		kV/ $\mu s$

## 六通道数字隔离器

### ELECTRICAL CHARACTERISTICS (continued)

( $V_{CCA} - V_{GNDA} = 3.0V$  to  $5.5V$ ,  $V_{CCB} - V_{GNDB} = 3.0V$  to  $5.5V$ ,  $T_A = -40^{\circ}C$  to  $+125^{\circ}C$ , unless otherwise noted. Typical values are at  $V_{CCA} - V_{GNDA} = 3.3V$ ,  $V_{CCB} - V_{GNDB} = 3.3V$ , and  $T_A = +25^{\circ}C$ .) (Note 2)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Maximum Data Rate (Note 3)	$DR_{MAX}$	INA1 to OUTB1, INA2 to OUTB2, INB1 to OUTA1, INB2 to OUTA2	50			Mbps
		I/OA1 to I/OB1, I/OA2 to I/OB2, I/OB1 to I/OA1, I/OB2 to I/OA2	2			
Minimum Pulse Width	$PW_{MIN}$	INA1 to OUTB1, INA2 to OUTB2, INB1 to OUTA1, INB2 to OUTA2 (Note 3)	20			ns
Propagation Delay (Note 3)	$t_{DPLH}$ $t_{DPHL}$	INA1 to OUTB1, INA2 to OUTB2, INB1 to OUTA1, INB2 to OUTA2, $R_L = 1M\Omega$ , $C_L = 15pF$ , Figure 1	$V_{CCA} = V_{CCB} = +3.3V$	20	30	ns
			$V_{CCA} = V_{CCB} = +5V$	18	26	
		I/OA1 to I/OB1, I/OA2 to I/OB2, $R_1 = 1.6k\Omega$ , $R_2 = 180\Omega$ , $C_{L1} = C_{L2} = 15pF$ , Figure 2	$V_{CCA} = V_{CCB} = +3.3V$	30	100	
			$V_{CCA} = V_{CCB} = +5V$	30	100	
		I/OB1 to I/OA1, I/OB2 to I/OA2, $R_1 = 1k\Omega$ , $R_2 = 120\Omega$ , $C_{L1} = C_{L2} = 15pF$ , Figure 2	$V_{CCA} = V_{CCB} = +3.3V$	60	100	
			$V_{CCA} = V_{CCB} = +5V$	60	100	
Pulse-Width Distortion $ t_{DPLH} - t_{DPHL} $ (Notes 3, 8)	PWD	INA1 TO OUTB1, INA2 TO OUTB2, INB1 TO OUTA1, INB2 TO OUTA2, $R_L = 1M\Omega$ , $C_L = 15pF$ , Figure 1	$V_{CCA} = V_{CCB} = +3.3V$		7	ns
			$V_{CCA} = V_{CCB} = +5V$		7	
		I/OA1 to I/OB1, I/OA2 to I/OB2, $R_1 = 1.6k\Omega$ , $R_2 = 180\Omega$ , $C_{L1} = C_{L2} = 15pF$ , Figure 2	$V_{CCA} = V_{CCB} = +3.3V$		12	
			$V_{CCA} = V_{CCB} = +5V$		12	
		I/OB1 to I/OA1, I/OB2 to I/OA2, $R_1 = 1k\Omega$ , $R_2 = 120\Omega$ , $C_{L1} = C_{L2} = 15pF$ , Figure 2	$V_{CCA} = V_{CCB} = +3.3V$		60	
			$V_{CCA} = V_{CCB} = +5V$		50	

## 六通道数字隔离器

### ELECTRICAL CHARACTERISTICS (continued)

( $V_{CCA} - V_{GNDA} = 3.0V$  to  $5.5V$ ,  $V_{CCB} - V_{GNDB} = 3.0V$  to  $5.5V$ ,  $T_A = -40^{\circ}C$  to  $+125^{\circ}C$ , unless otherwise noted. Typical values are at  $V_{CCA} - V_{GNDA} = 3.3V$ ,  $V_{CCB} - V_{GNDB} = 3.3V$ , and  $T_A = +25^{\circ}C$ .) (Note 2)

PARAMETER	SYMBOL	CONDITIONS		MIN	TYP	MAX	UNIT
Channel-to-Channel Skew (Notes 3, 8)	$t_{DSKEWCC}$	OUTB1 to OUTB2 output skew, Figure 1	$V_{CCA} = V_{CCB} = +3.3V$			3	ns
			$V_{CCA} = V_{CCB} = +5V$			3	
		OUTA1 to OUTA2 output skew, Figure 1	$V_{CCA} = V_{CCB} = +3.3V$			3	
			$V_{CCA} = V_{CCB} = +5V$			3	
		I/OB1 to I/OB2 output skew, Figure 2	$V_{CCA} = V_{CCB} = +3.3V$			6	
			$V_{CCA} = V_{CCB} = +5V$			5	
		I/OA1 to I/OA2 output skew, Figure 2	$V_{CCA} = V_{CCB} = +3.3V$			20	
			$V_{CCA} = V_{CCB} = +5V$			20	
Part-to-Part Skew (Notes 3, 8)	$t_{DSKEWPP}$	$\Delta t_{DPLH}, \Delta t_{DPHL}$				8	ns
Rise Time (Note 3)	$t_R$	OUTA1, OUTA2, OUTB1, OUTB2, 10% to 90%, Figure 1				5	ns
Fall Time (Note 3)	$t_F$	OUTA1, OUTA2, OUTB1, OUTB2, 90% to 10%, Figure 1				5	ns
		I/OA1, I/OA2, 90% to 10%, $R_1 = 1.6k\Omega$ , $R_2 = 180\Omega$ , $C_{L1} = C_{L2} = 15pF$ , Figure 2	$V_{CCA} = V_{CCB} = +3.3V$	30	60		
			$V_{CCA} = V_{CCB} = +5V$	40	80		
		I/OB1, I/OB2, 90% to 10%, $R_1 = 1k\Omega$ , $R_2 = 120\Omega$ , $C_{L1} = C_{L2} = 15pF$ , Figure 2	$V_{CCA} = V_{CCB} = +3.3V$	3	6		
			$V_{CCA} = V_{CCB} = +5V$	3	5		

## 六通道数字隔离器

## INSULATION AND SAFETY CHARACTERISTICS

PARAMETER	SYMBOL	CONDITIONS	VALUE	UNIT
<b>IEC INSULATION AND SAFETY RELATED FOR SPECIFICATIONS FOR SOIC-16</b>				
External Tracking (Creepage)	CPG	IEC 60664-1	4.2	mm
External Air Gap (Clearance)	CLR	IEC 60664-1	4.2	mm
Minimum Internal Gap		Insulation thickness	0.0026	mm
Tracking Resistance (Comparative Tracking Index)	CTI	IEC 112/VDE 030 Part 1	175	V
Insulation Resistance Across Barrier	R <sub>ISO</sub>		1	GΩ
Capacitance Across Isolation Barrier	C <sub>IO</sub>	f = 1MHz	12	pF
<b>VDE IEC INSULATION CHARACTERISTICS</b>				
Surge Isolation Voltage	V <sub>IOSM</sub>	IEC 60747-17, section 5.3.1.6 and 5.4.6 for basic insulation	1	kV <sub>PEAK</sub>
Repetitive Peak Isolation Voltage	V <sub>IORM</sub>	IEC 60747-17, section 5.3.1.3	282	V <sub>PEAK</sub>
Rated Transient Isolation Voltage	V <sub>IOTM</sub>	IEC 60747-17, section 5.3.1.4	850	V <sub>PEAK</sub>
Safety Limiting Temperature	T <sub>S</sub>	IEC 60747-17, section 7.2.1	+150	°C
Safety Limiting Side A Power Dissipation	P <sub>SA</sub>	IEC 60747-17, section 7.2.1	0.75	W
Safety Limiting Side B Power Dissipation	P <sub>SB</sub>	IEC 60747-17, section 7.2.1	0.75	W
Apparent Charge Method	q <sub>pd</sub>	IEC 60747-17, section 7.4, method a and b	5	pC
Overvoltage Category		IEC 60664-1, single- or three-phase 50V DC or AC	I, II	—
Overvoltage Category		IEC 60664-1, single- or three-phase 100V DC or AC	I	—
Climatic Category			40/125/21	—
Pollution Degree		DIN VDE 0110, Table 1	2	—

**Note 2:** All units are production tested at T<sub>A</sub> = +25°C. Specifications over temperature are guaranteed by design. All voltages of side A are referenced to GNDA. All voltages of side B are referenced to GNDB, unless otherwise noted.

**Note 3:** Guaranteed by design. Not production tested.

**Note 4:** The undervoltage lockout threshold and hysteresis guarantee that the outputs are in a known state during a slump in the supplies. See the [Detailed Description](#) section for more information.

**Note 5:** The isolation is guaranteed for t = 60s, and tested at 120% of the guaranteed value for 1s.

**Note 6:**  $\Delta V_{TOL} = V_{OL} - V_{IL}$ . This is the minimum difference between the output logic-low voltage and the input logic threshold for the same I/O pin. This ensures that the I/O channels are not latched low when any of the I/O inputs are driven low (see the [Bidirectional Channels](#) section).

**Note 7:** The common-mode transient immunity guarantees that the device will hold its outputs stable when the isolation voltage changes at the specified rate.

**Note 8:** Pulse-width distortion is defined as the difference in propagation delay between low-to-high and high-to-low transitions on the same channel. Channel-to-channel skew is defined as the difference in propagation delay between different channels on the same device. Part-to-part skew is defined as the difference in propagation delays (for unidirectional channels) between different devices, when both devices operate with the same supply voltage, at the same temperature and have identical package and test circuits.

## 六通道数字隔离器

测试电路/时序图

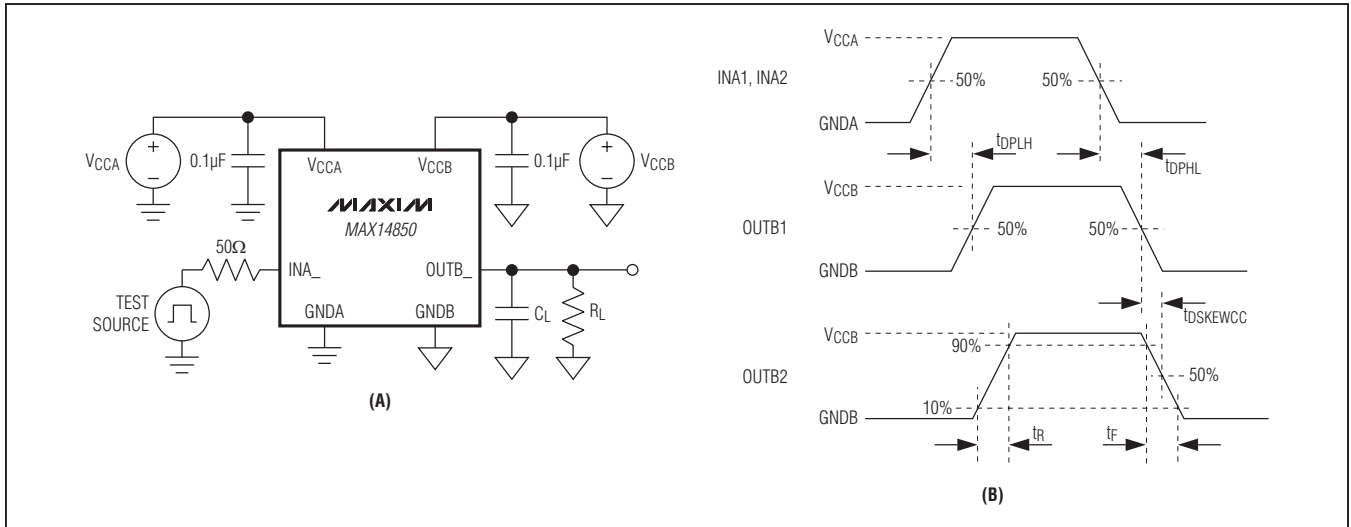


图1. 单向通道的测试电路(A)和时序图(B)

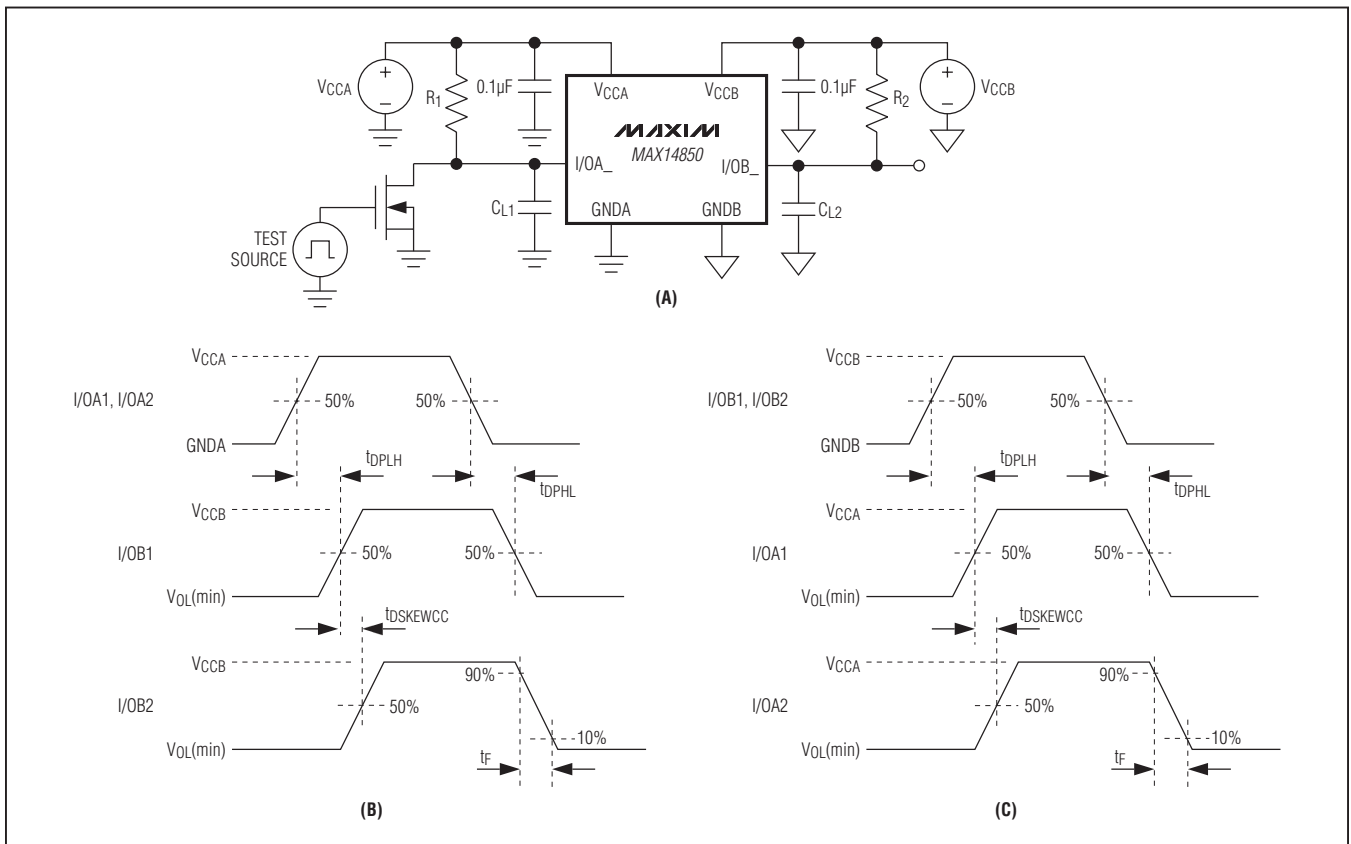
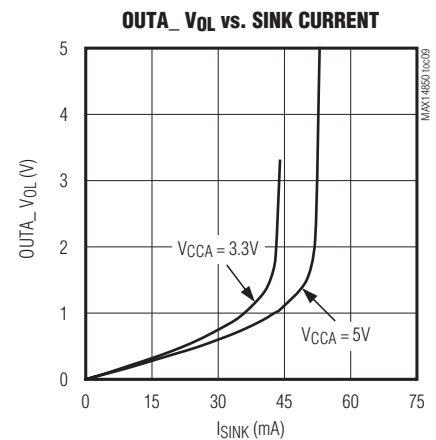
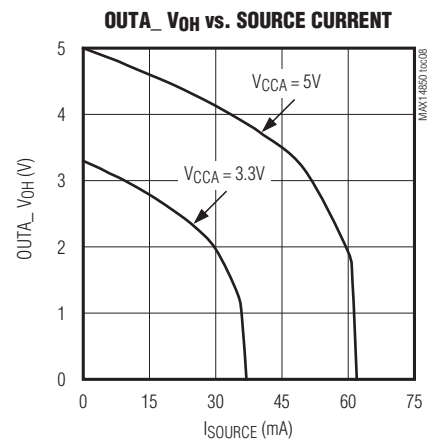
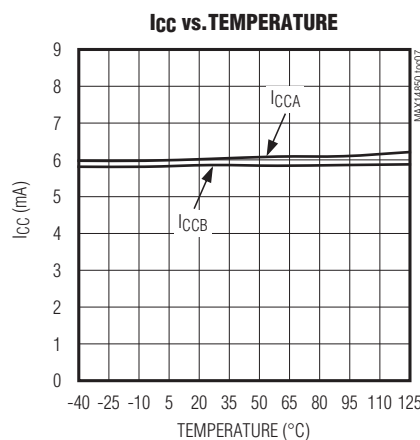
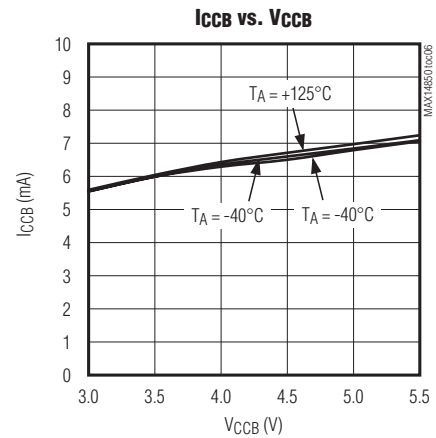
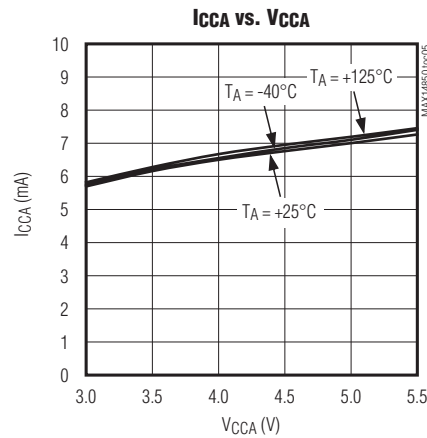
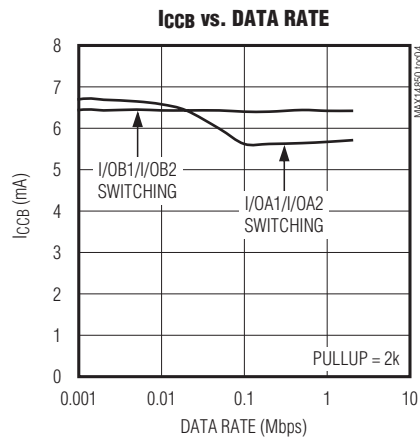
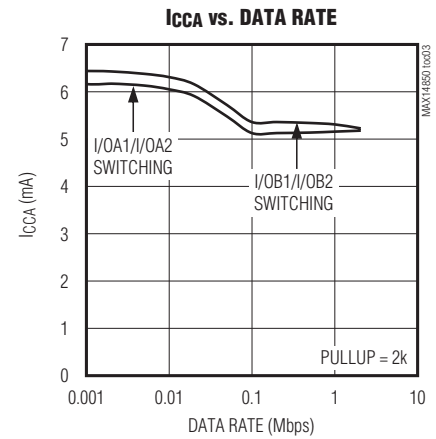
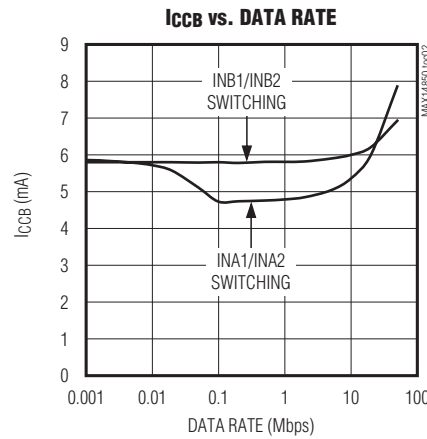
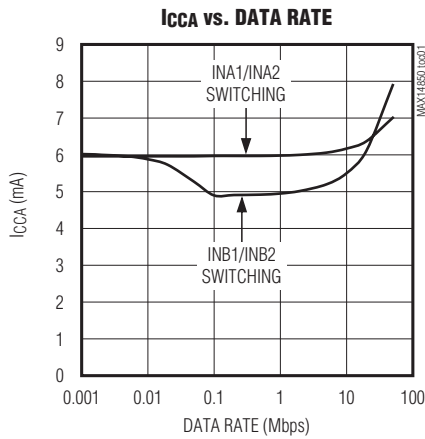


图2. 双向通道的测试电路(A)和时序图(B)及(C)

## 六通道数字隔离器

### 典型工作特性

( $V_{CCA} - V_{GNDA} = 3.3V$ ,  $V_{CCB} - V_{GNDB} = 3.3V$ , all inputs idle,  $T_A = +25^\circ C$ , unless otherwise noted.)

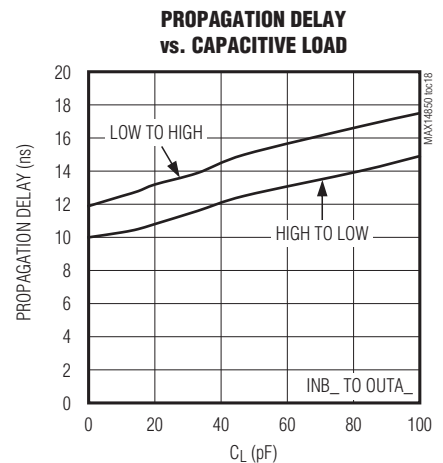
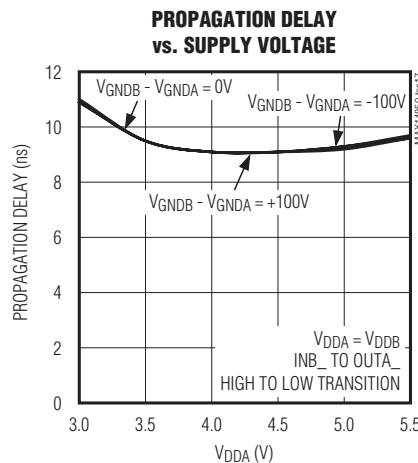
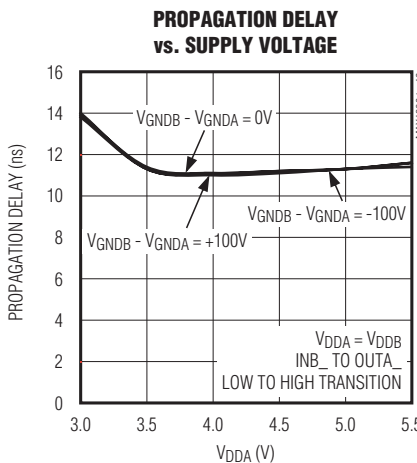
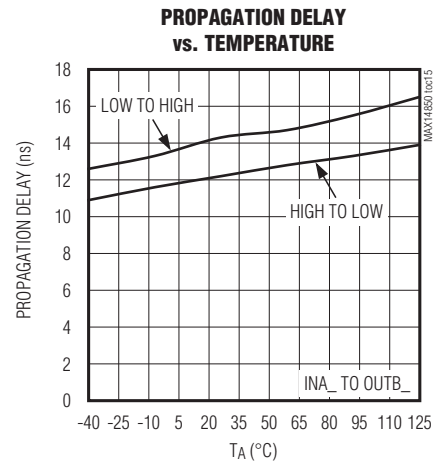
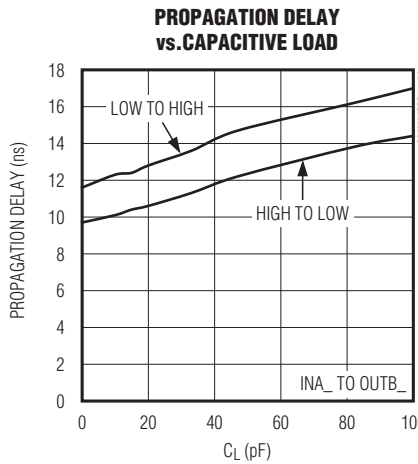
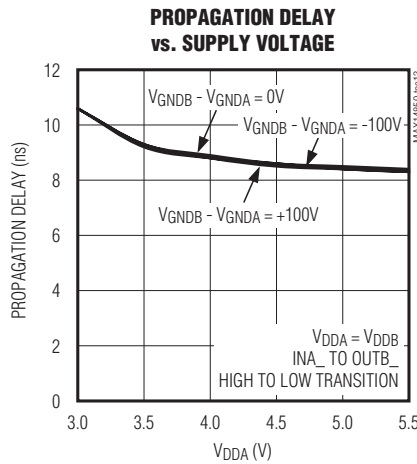
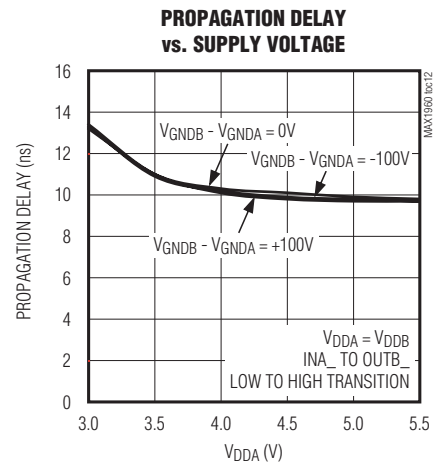
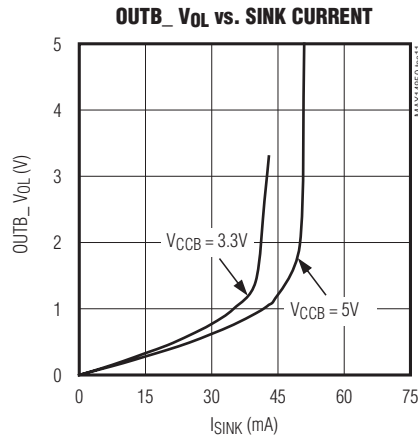
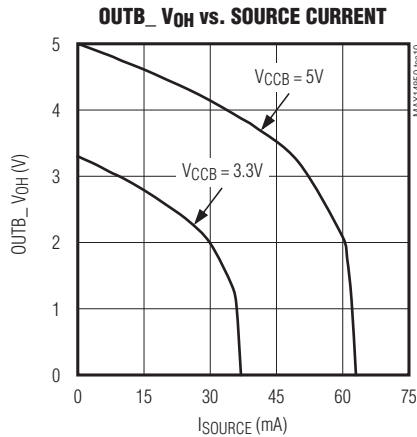




## 六通道数字隔离器

典型工作特性(续)

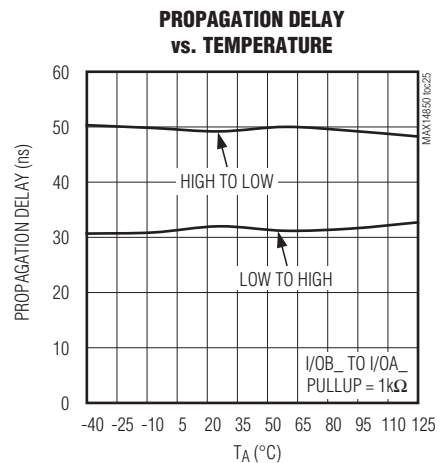
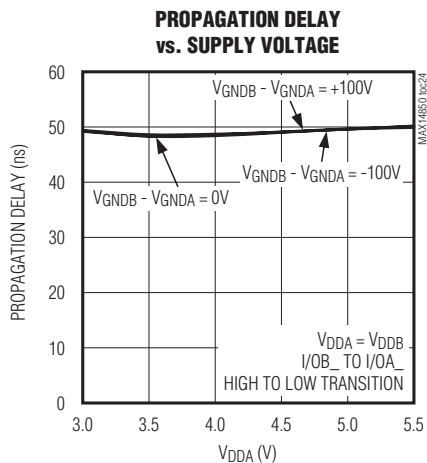
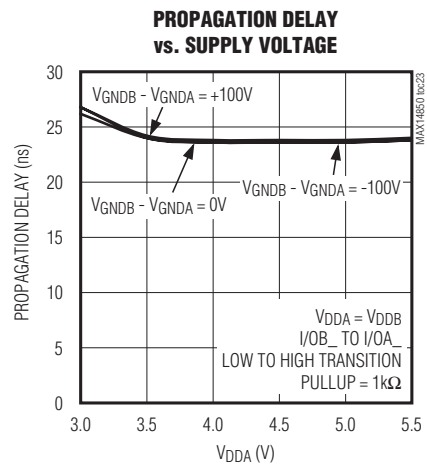
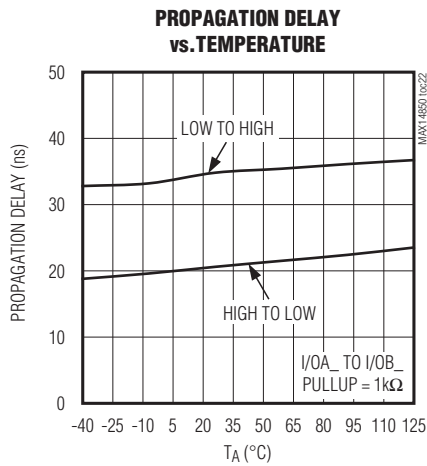
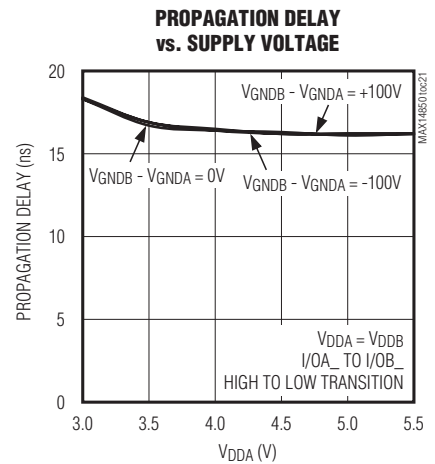
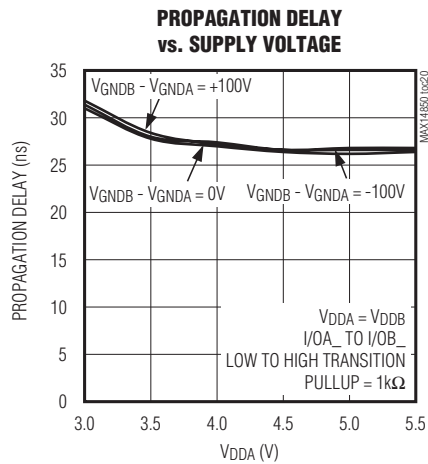
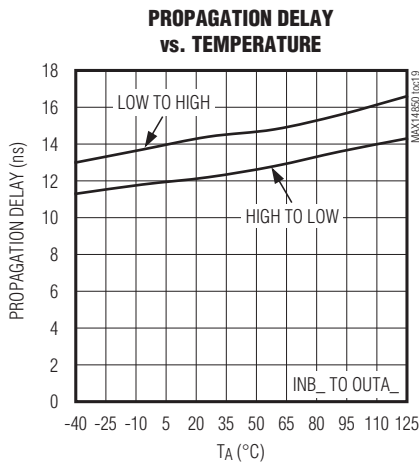
( $V_{CCA} - V_{GNDA} = 3.3V$ ,  $V_{CCB} - V_{GNDB} = 3.3V$ , all inputs idle,  $T_A = +25^\circ C$ , unless otherwise noted.)



## 六通道数字隔离器

典型工作特性(续)

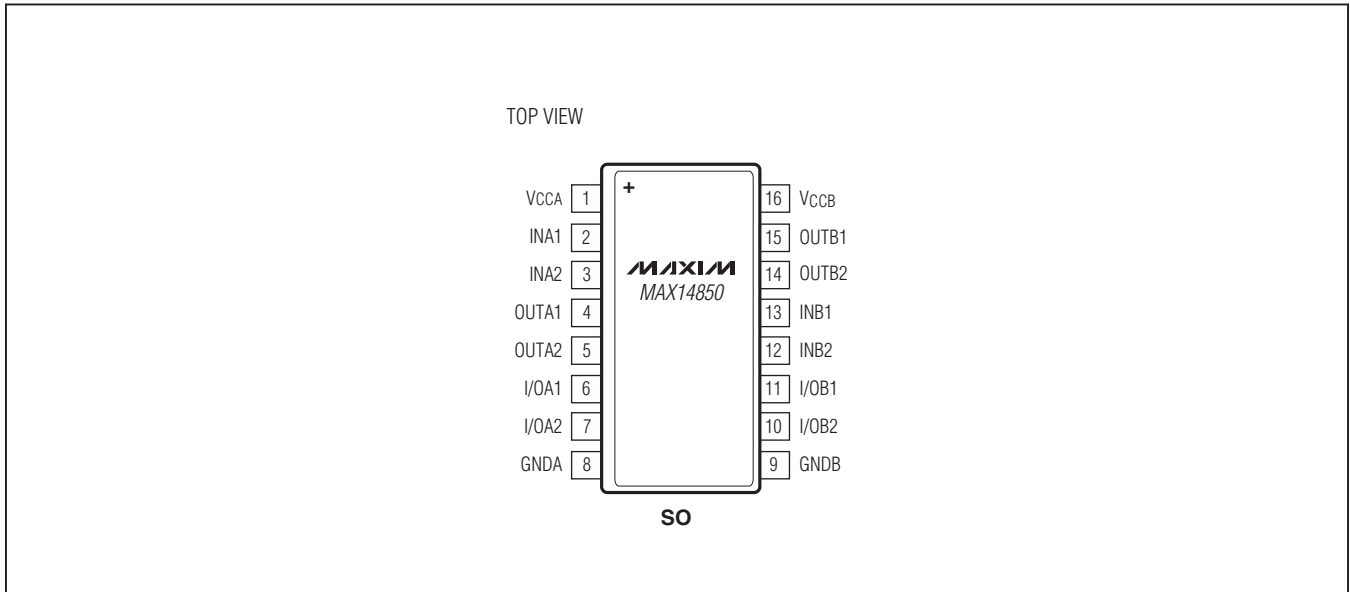
( $V_{CCA} - V_{GNDA} = 3.3V$ ,  $V_{CCB} - V_{GNDB} = 3.3V$ , all inputs idle,  $T_A = +25^\circ C$ , unless otherwise noted.)



# MAX14850

## 六通道数字隔离器

### 引脚配置



### 引脚说明

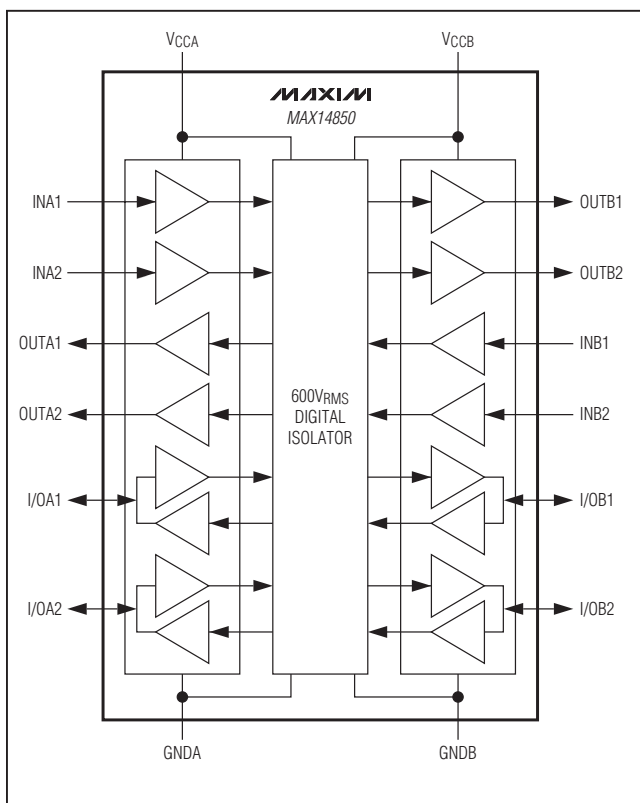
引脚	名称	功能	电压基准
1	V <sub>CCA</sub>	A侧逻辑电源电压，利用0.1μF陶瓷电容将V <sub>CCA</sub> 旁路至GNDA。	GNDA
2	INA1	A侧逻辑输入1，INA1转换至OUTB1。	GNDA
3	INA2	A侧逻辑输入2，INA2转换至OUTB2。	GNDA
4	OUTA1	A侧逻辑输出1，OUTA1为推挽式输出。	GNDA
5	OUTA2	A侧逻辑输出2，OUTA2为推挽式输出。	GNDA
6	I/OA1	A侧双向输入/输出1，I/OA1转换至I/OB1或反方向转换，为开漏输出。	GNDA
7	I/OA2	A侧双向输入/输出2，I/OA2转换至I/OB2或反方向转换，为开漏输出。	GNDA
8	GNDA	A侧接地参考端。	—
9	GNDB	B侧接地参考端。	—

## 六通道数字隔离器

引脚说明(续)

引脚	名称	功能	电压基准
10	I/OB2	B侧双向输入/输出2, I/OB2转换至I/OA2或反方向转换, 为开漏输出。	GNDB
11	I/OB1	B侧双向输入/输出1, I/OB1转换至I/OA1或反方向转换, 为开漏输出。	GNDB
12	INB2	B侧逻辑输入2, INB2转换至OUTA2。	GNDB
13	INB1	B侧逻辑输入1, INB1转换至OUTA1。	GNDB
14	OUTB2	B侧逻辑输出2, OUTB2为推挽式输出。	GNDB
15	OUTB1	B侧逻辑输出1, OUTB1为推挽式输出。	GNDB
16	V <sub>CCB</sub>	B侧逻辑电源电压, 利用0.1μF陶瓷电容将V <sub>CCB</sub> 旁路至GNDB。	GNDB

## 功能框图



## 详细说明

MAX14850为6通道数字隔离器, 在额定600V<sub>RMS</sub>电压下能够提供60秒的隔离。该款数字隔离器采用Maxim专有的工艺技术, 具有低功耗、低成本、较高的抗电磁干扰(EMI)能力和稳定的温度特性等优势。器件采用单芯片设计, 能够为具有不同地电位的信号提供隔离, 并保护敏感电路或人机接口电路不受瞬态高压/大电流的影响。六个通道中的四路为单向通道, 以两路为一组, 在每个方向提供隔离数据传输, 四个单向通道均支持高达50Mbps数据速率。其余两个通道为双向通道, 数据速率可达2Mbps。

MAX14850可为I<sup>2</sup>C、SPI/MICROWIRE®及其它串行总线提供隔离。器件具有两路电源输入V<sub>CCA</sub>和V<sub>CCB</sub>, 独立设置器件两侧的逻辑电平。V<sub>CCA</sub>和V<sub>CCB</sub>分别以GND A和GND B为参考。MAX14850具有刷新模式, 在输入为直流时可确保数据精度。

## 数字隔离

MAX14850能够为具有不同地电位的数字信号传输提供隔离, 器件支持高达200V<sub>RMS</sub>的连续隔离, 以及高达850V的瞬态压差。

MICROWIRE是National Semiconductor Corporation的注册商标。

## 六通道数字隔离器

**地隔离/电平转换**

MAX14850可承受600V<sub>RMS</sub>的地电位差，即允许V<sub>GNDA</sub>与V<sub>GNDB</sub>之间存在高达850VDC的压差。此外，只要每侧电压保持在有效的3.0V至5.5V范围，器件即可在(V<sub>CCA</sub> - V<sub>GNDA</sub>)高于或低于(V<sub>CCB</sub> - V<sub>GNDB</sub>)时实现逻辑电平转换。

**单向和双向通道**

MAX14850可同时提供单向和双向信号传输，每个单向通道仅可用于功能框图所示方向，双向通道的信号传输无需方向控制。

**单向通道**

器件具有四路单向通道，每个通道可独立工作，确保支持DC至50Mbps的数据速率。每个单向通道采用推挽式输出驱动，无需上拉电阻。输出能够驱动TTL和CMOS逻辑输入。

**双向通道**

器件具有两个双向通道，采用开漏输出。双向通道无需方向控制输入，一侧的逻辑低电平将拉低另一侧的相应引脚，同时避免了器件的数据锁存。I/OA1和I/OA2输入的逻辑低电平门限(V<sub>IT</sub>)比I/OA1和I/OA2输出的逻辑低电平门限至少低50mV，可以防止A侧的输出逻辑低电平被作为输入低电平而转换到B侧，避免器件闭锁。

I/OA1、I/OA2、I/OB1和I/OB2引脚具有开漏输出，需要上拉电阻拉至对应的电源，以提供逻辑高电平输出。在确保输出低电平的前提下，B侧吸电流可达30mA，A侧吸电流可达10mA (参见*Electrical Characteristics*表)。

器件的双向通道支持I<sup>2</sup>C时钟扩展。

**启动和欠压锁定**

器件内部监测V<sub>CCA</sub>和V<sub>CCB</sub>电源的欠压条件。上电、断电或正常工作期间的电源电压跌落都有可能产生欠压事件。当在任一侧电源检测到欠压故障时，无论输入状态如何，均将自动控制两侧的所有输出。双向输出变为高阻态，通过开漏输出的外部上拉电阻拉至高电平。欠压条件下，单向输出由内部拉至V<sub>CCA</sub>或V<sub>CCB</sub>电源电压。

在任一侧的电源检测到欠压条件时，所有单向通道的输出引脚将拉高至电源(表1)；双向通道的输出为高阻态，通过外部上拉电阻拉至电源电压。

**安全规范认证**

MAX14850通过UL、CSA和IEC 60747-5-2安全认证。按照UL1577规范，在720V<sub>RMS</sub> V<sub>ISO</sub>等效条件下(时间为1秒钟，见表2)，MAX14850 100%通过测试。

图3所示为上电和断电期间的输出。

表1. 欠压条件期间的输出

V <sub>IN</sub>	V <sub>CCA</sub>	V <sub>CCB</sub>	V <sub>OUTA</sub>	V <sub>OUTB</sub>
1	Powered	Powered	1	1
0	Powered	Powered	0	0
X	Under Voltage	Powered	Follows V <sub>CCA</sub>	1
X	Powered	Under Voltage	1	Follows V <sub>CCB</sub>

表2. 安全规范认证(已申请)

SAFETY AGENCY	STANDARD	ISOLATION NUMBER	FILE NUMBER
UL	UL1577 Recognized	600V <sub>RMS</sub> isolation voltage for 60 seconds	Pending
VDE	Approved to 60747-17	Basic insulation, 600V <sub>RMS</sub> for 60 seconds	Pending

## 六通道数字隔离器

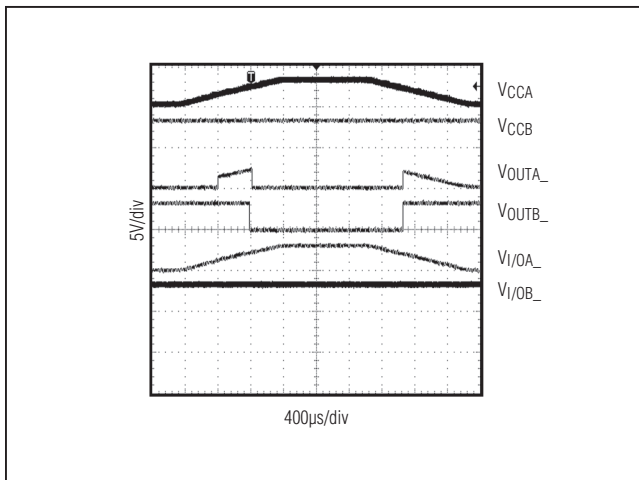


图3. 欠压锁定

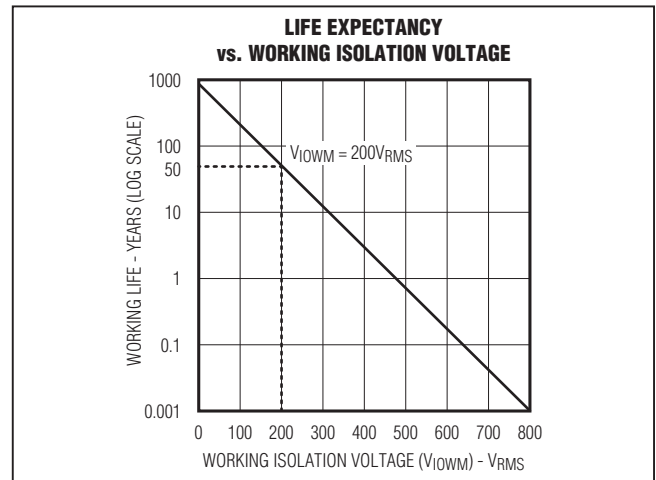


图4. 平均寿命与隔离电压的关系

### 应用信息

#### 连续隔离对寿命的影响

连续工作在高压条件下，使得绝缘性能随着时间推移而下降。电压越高，劣化速度越快。尽管MAX14850采用了高质量绝缘材料，隔离层在长时间连续承受高压时，也会发生劣化。图4所示为MAX14850平均工作寿命与隔离电压的关系曲线。

#### 电源排序

MAX14850没有特定的供电顺序要求，每一侧的逻辑电平由VCCA和VCCB分别设置。每路电源都允许保持在正常的供电状态，与另一侧电源是否供电以及供电电压的大小无关。

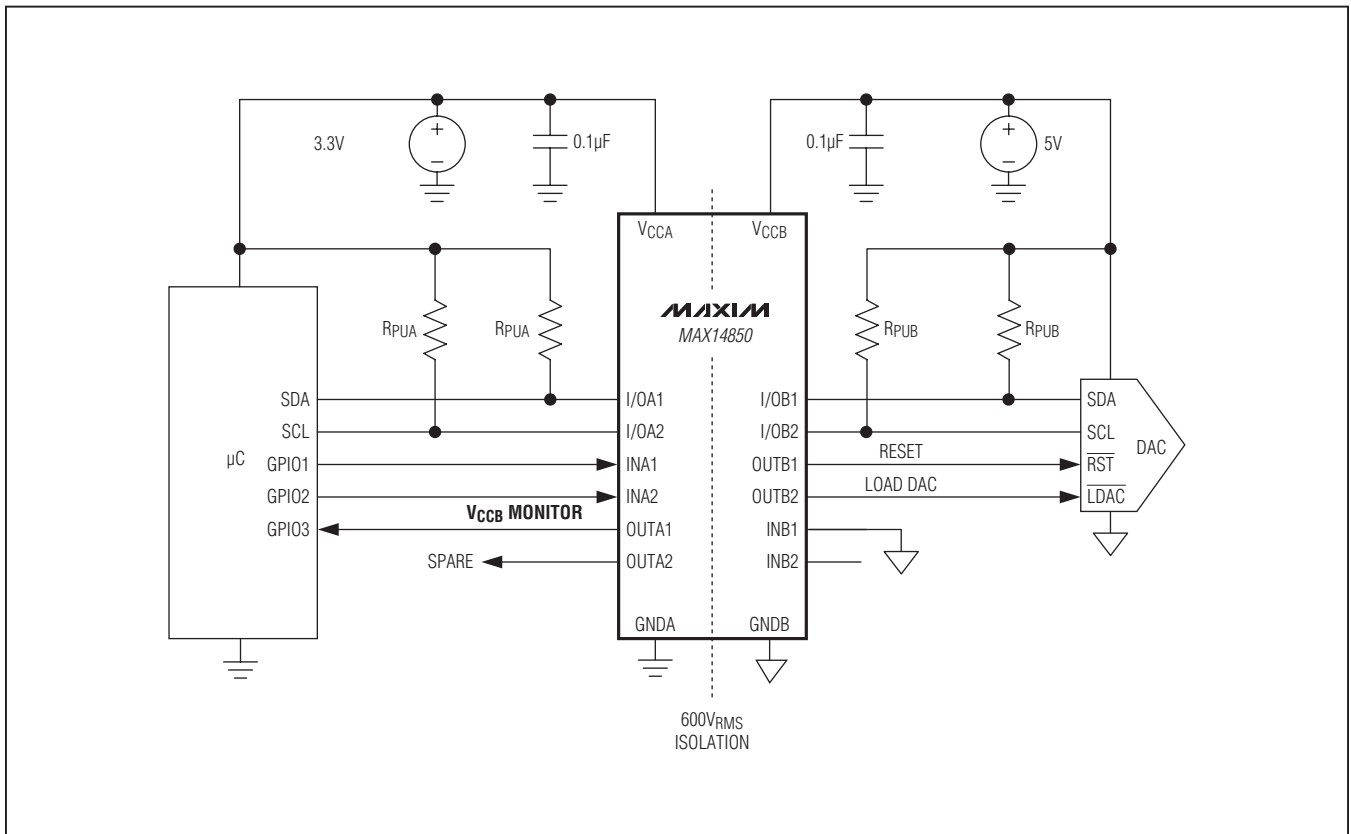
#### 电源去耦

为降低电源纹波以及引起数据误码的几率，利用0.1µF陶瓷电容分别将VCCA和VCCB旁路至GNDA和GNDB，旁路电容应尽量靠近电源输入引脚安装。

# MAX14850

## 六通道数字隔离器

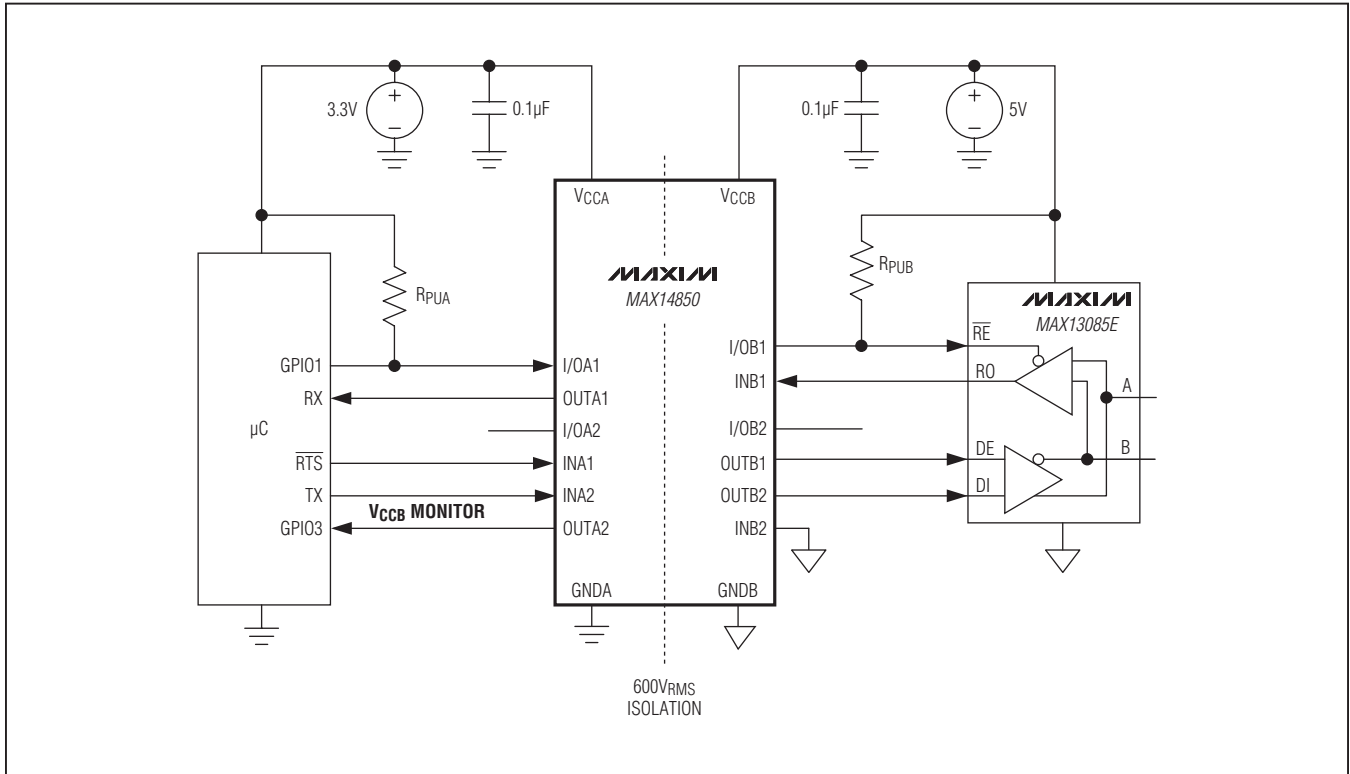
典型工作电路(续)



# MAX14850

## 六通道数字隔离器

典型工作电路(续)



### 订购信息

PART	TEMP RANGE	PIN-PACKAGE
MAX14850ASE+	-40°C to +125°C	16 SO

+表示无铅(Pb)/符合RoHS标准的封装。

### 芯片信息

PROCESS: BiCMOS

### 封装信息

如需最近的封装外形信息和焊盘布局(占位面积), 请查询[china.maxim-ic.com/packages](http://china.maxim-ic.com/packages)。请注意, 封装编码中的“+”、“#”或“-”仅表示RoHS状态。封装图中可能包含不同的尾缀字符, 但封装图只与封装有关, 与RoHS状态无关。

封装类型	封装编码	外形编号	焊盘布局编号
16 SO	S16+3	<a href="#">21-0041</a>	<a href="#">90-0097</a>



# MAX14850

## 六通道数字隔离器

### 修订历史

修订号	修订日期	说明	修改页
0	3/12	最初版本。	—

### Maxim北京办事处

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电话: 010-6211 5199

传真: 010-6211 5299

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**Maxim Integrated Products, 120 San Gabriel Drive, Sunnyvale, CA 94086 408-737-7600** \_\_\_\_\_ 17