

MAXIM

低电压、3.5Ω、SPDT、CMOS 模拟开关

MAX4729/MAX4730

概述

MAX4729/MAX4730 单刀/双掷 (SPDT) 开关采用 +1.8V 至 +5.5V 的单电源供电。在 +2.7V 电源下，这两款开关具有 3.5Ω 的低导通电阻 (R_{ON}) 和 0.45Ω 的 R_{ON} 平坦度。典型情况下，仅消耗 1nA 的电源电流，这使它们成为低功耗便携式应用的理想选择。MAX4729/MAX4730 在整个扩展温度范围内具有低泄漏电流，并具有和 TTL/CMOS 兼容的数字逻辑和出色的交流特性。

MAX4729/MAX4730 采用微型 6 引脚 SC70 和 6 引脚 μ DFN 封装。MAX4729/MAX4730 提供三种引脚配置结构以简化设计。MAX4729/MAX4730 工作在 -40°C 至 +85°C 扩展级温度范围。

特性

- ◆ 3.5Ω 低 R_{ON} (+2.7V 电源)
- ◆ 0.45Ω R_{ON} 平坦度 (+2.7V 电源)
- ◆ 0.05Ω 通道间 R_{ON} 匹配度 (+2.7V 电源)
- ◆ 微型 SC70 和 μ DFN 封装
- ◆ -3dB 带宽: 300MHz
- ◆ 低导通电容: 19.5pF
- ◆ 0.036% 的总谐波失真
- ◆ 低电源电流: 1nA
- ◆ +1.8V 至 +5.5V 单电源工作

应用

电池供电设备

音频与视频信号切换

低电压数据采集系统

采样保持电路

通信电路

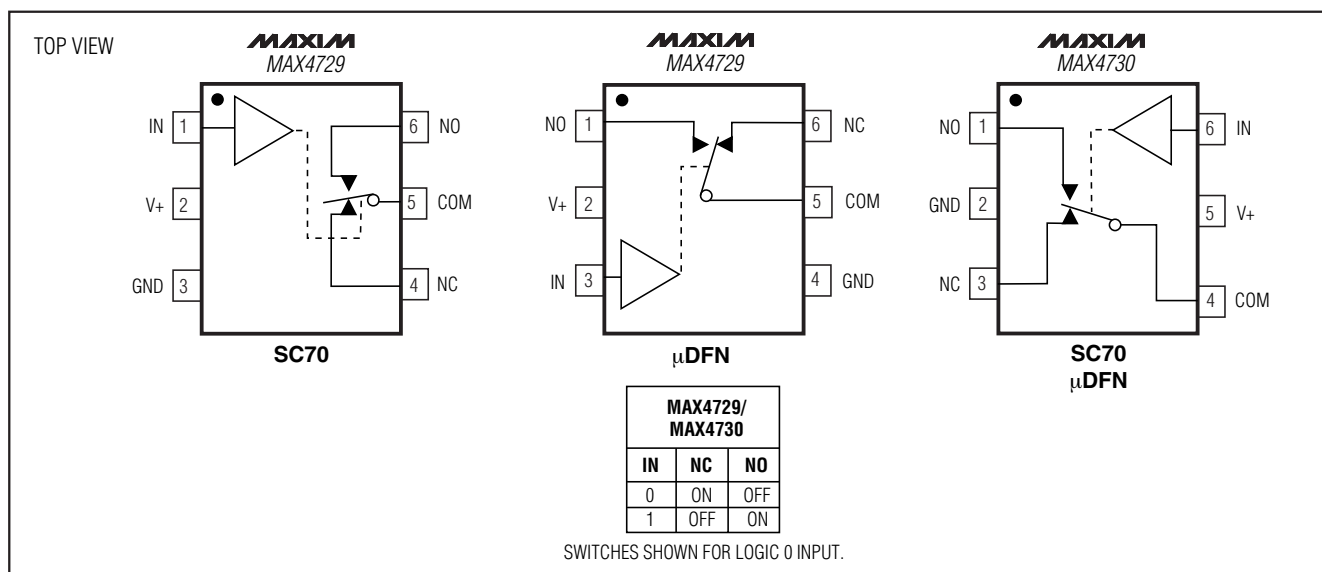
继电器替代品

订购信息

PART	TEMP RANGE	PIN-PACKAGE	TOP MARK
MAX4729EXT-T	-40°C to +85°C	6 SC70-6	ABU
MAX4729ELT-T*	-40°C to +85°C	6 μ DFN-6	—
MAX4730EXT-T	-40°C to +85°C	6 SC70-6	ABV
MAX4730ELT-T*	-40°C to +85°C	6 μ DFN-6	—

* 未来产品 — 供货信息请与工厂联系。

引脚配置/功能图/真值表



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ABSOLUTE MAXIMUM RATINGS

(All voltages referenced to ground)

V+, IN	-0.3V to +6V
COM, NO, NC (Note 1)	-0.3V to (V+ +0.3V)
Continuous Current (IN, V+, GND)	±30mA
Continuous Current (COM, NO, NC)	±80mA
Peak Current COM, NO, NC (Pulsed at 1ms, 10% Duty Cycle)	±150mA

Continuous Power Dissipation (T_A = +70°C)

6-Pin μDFN (derate 2.1mW/°C above +70°C)	168mW
6-Pin SC70 (derate 3.1mW/°C above +70°C)	245mW
Operating Temperature Range	-40°C to +85°C
Maximum Junction Temperature	+150°C
Storage Temperature Range	-65°C to +150°C
Lead Temperature (soldering, 10s)	+300°C

Note 1: Signals on NO, NC, or COM exceeding V+ or GND are clamped by internal diodes. Signals on IN exceeding GND are clamped by an internal diode. Limit forward-diode current to maximum current rating.

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+ = +2.7V to +3.6V, V_{IH} = +2.0V, V_{IL} = +0.4V, T_A = T_{MIN} to T_{MAX}, unless otherwise noted. Typical values are at T_A = +25°C.) (Note 2)

PARAMETER	SYMBOL	CONDITIONS	T _A	MIN	TYP	MAX	UNITS
ANALOG SWITCH							
Analog Signal Range	V _{COM} , V _{NO} , V _{NC}			0		V+	V
On-Resistance (Note 6)	R _{ON}	V+ = 2.7V, I _{COM} = 10mA, V _{NO} or V _{NC} = 0V to V+	+25°C	3.5	5.5		Ω
			T _{MIN} to T _{MAX}			5.7	
On-Resistance Match Between Channels (Notes 3, 6)	ΔR _{ON}	V+ = 2.7V, I _{COM} = 10mA, V _{NO} or V _{NC} = 0.7V, 1.2V, 2V (MAX4729)	+25°C	0.05	0.15		Ω
			T _{MIN} to T _{MAX}			0.2	
			+25°C	0.2	0.34		
			T _{MIN} to T _{MAX}			0.37	
On-Resistance Flatness (Note 4)	R _{FLAT(ON)}	V+ = 2.7V, I _{COM} = 10mA, V _{NO} or V _{NC} = 0.7V, 1.2V, 2V (MAX4729)	+25°C	0.8	1.5		Ω
			T _{MIN} to T _{MAX}			2.2	
			+25°C	0.45	0.95		
			T _{MIN} to T _{MAX}			1.3	
NO, NC Off-Leakage Current	I _{NO (OFF)} , I _{NC (OFF)}	V+ = 3.3V, V _{COM} = 1V, 3V, V _{NO} or V _{NC} = 3V, 1V	+25°C	-2	+0.01	+2	nA
			T _{MIN} to T _{MAX}	-3		+3	
COM On-Leakage Current	I _{COM (ON)}	V+ = 3.3V, V _{COM} = 1V or 3V, V _{NO} or V _{NC} = 1V, 3V, or float	+25°C	-3	+0.01	+3	nA
			T _{MIN} to T _{MAX}	-4		+4	
DIGITAL INPUTS							
Input Logic High	V _{IH}		T _{MIN} to T _{MAX}	2.0			V
Input Logic Low	V _{IL}		T _{MIN} to T _{MAX}			0.4	V
Input Leakage Current	I _{IN}	V _{IN} = 0V or 3.6V	T _{MIN} to T _{MAX}	-1	+0.005	+1	μA

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ELECTRICAL CHARACTERISTICS (continued)

(V+ = +2.7V to +3.6V, V_{IH} = +2.0V, V_{IL} = +0.4V, T_A = T_{MIN} to T_{MAX}, unless otherwise noted. Typical values are at T_A = +25°C.) (Note 2)

PARAMETER	SYMBOL	CONDITIONS	T _A	MIN	TYP	MAX	UNITS
DYNAMIC							
Turn-On Time (Note 5)	t _{ON}	V _{NO} , V _{NC} = 2V, R _L = 300Ω, C _L = 35pF, Figure 1	+25°C	18	45		ns
			T _{MIN} to T _{MAX}			45	
Turn-Off Time (Note 5)	t _{OFF}	V _{NO} , V _{NC} = 2V, R _L = 300Ω, C _L = 35pF, Figure 1	+25°C	10	26		ns
			T _{MIN} to T _{MAX}			26	
Break-Before-Make (Note 5)		V _{NO} , V _{NC} = 2V, R _L = 300Ω, C _L = 35pF, Figure 1	+25°C		5		ns
			T _{MIN} to T _{MAX}	1			
Charge Injection	Q	V _{GEN} = 0V, R _{GEN} = 0, C _L = 1.0nF, Figure 3			3		pC
NO, NC Off-Capacitance	C _{NO(OFF)} , C _{NC(OFF)}	f = 1MHz, Figure 4			6.5		pF
Switch On-Capacitance	C _{ON}	f = 1MHz, Figure 4			19.5		pF
Off-Isolation (Note 7)	V _{ISO}	V _{NO} = V _{NC} = 1V _{RMS} , R _L = 50Ω, C _L = 5pF, Figure 2	f = 1MHz		-67		dB
			f = 10MHz		-45		
On-Channel Bandwidth -3dB	BW	Signal = 0dBm, 50Ω in and out, Figure 2			300		MHz
Crosstalk (Note 8)	V _{CT}	NO or NC = 1V _{RMS} , C _L = 5pF, R _L = 50Ω, Figure 2	f = 1MHz		-67		dB
			f = 10MHz		-52		
Total Harmonic Distortion	THD	R _L = 600Ω, V _{NC} or V _{NO} = 2V _{P-P} , f = 20Hz to 20kHz	+25°C		0.035		%
POWER SUPPLY							
Power-Supply Range	V+			1.8		5.5	V
Positive Supply Current	I+	V+ = 5.5V, V _{IN} = 0V or 5.5V	+25°C		0.001		μA
			T _{MIN} to T _{MAX}			1	

Note 2: SC70 and μDFN parts are 100% tested at T_A = +25°C. Limits across the full-temperature range are guaranteed by design and correlation.

Note 3: ΔR_{ON} = R_{ON(MAX)} - R_{ON(MIN)}.

Note 4: R_{ON} flatness is defined as the difference between the maximum and minimum value of on-resistance as measured over the specified analog signal ranges.

Note 5: Guaranteed by design.

Note 6: μDFN is guaranteed by design.

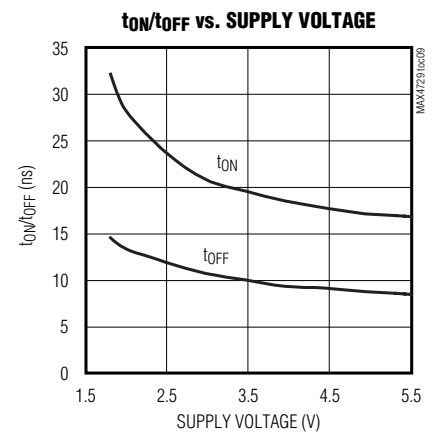
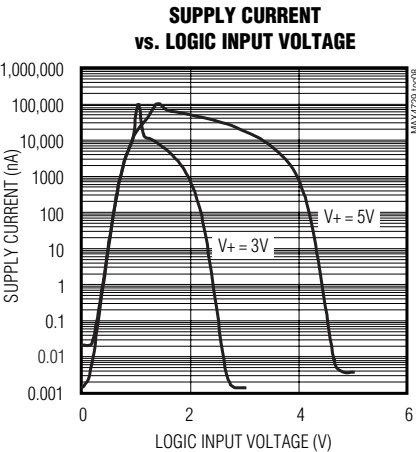
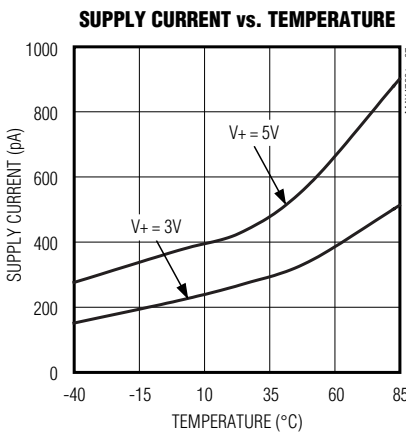
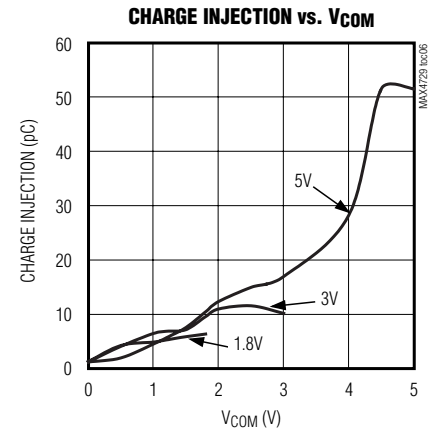
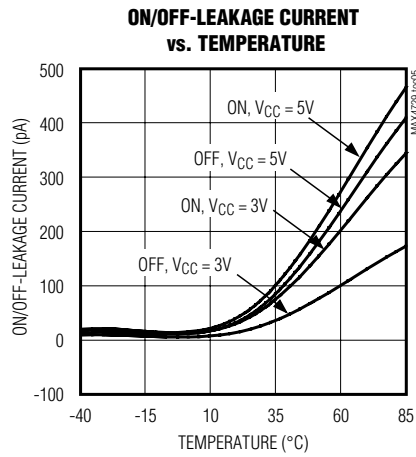
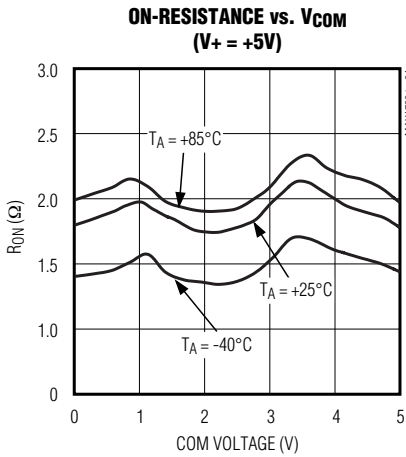
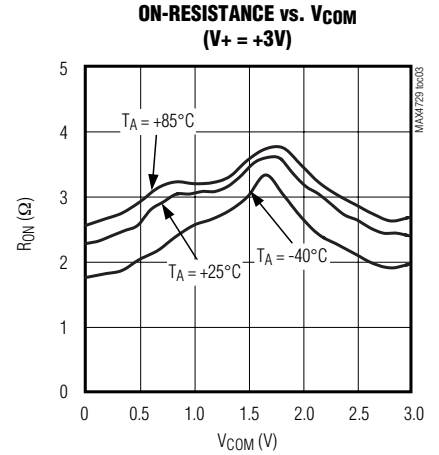
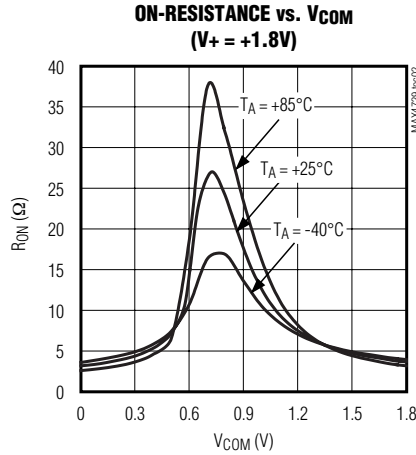
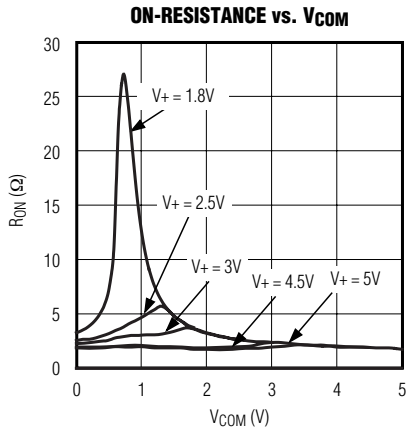
Note 7: Off-Isolation = 20log₁₀ (V_O / V_I), where V_O is V_{COM} and V_I is either V_{NC} or V_{NO} from the network analyzer.

Note 8: Crosstalk is measured between the two switches.

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典型工作特性

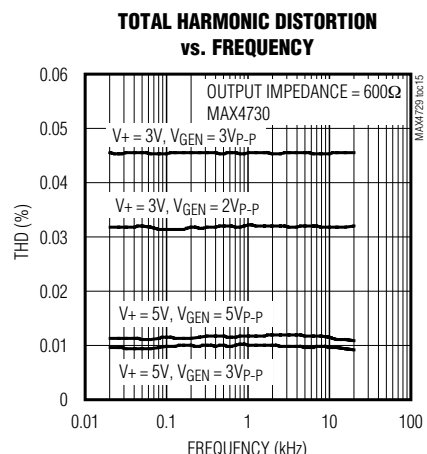
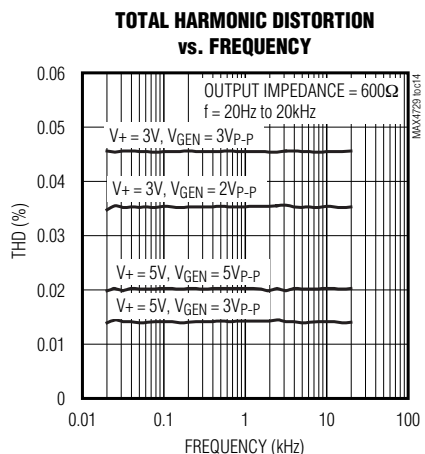
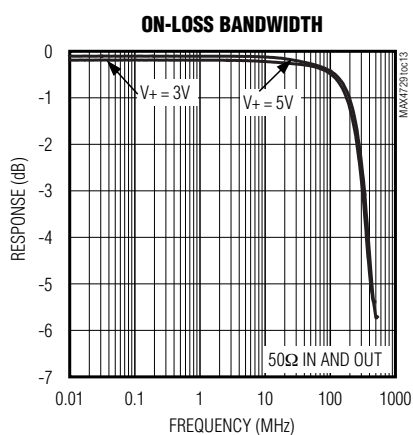
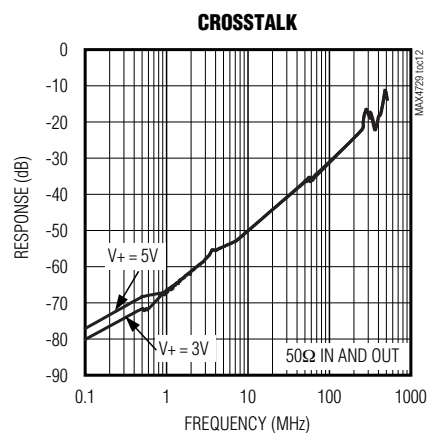
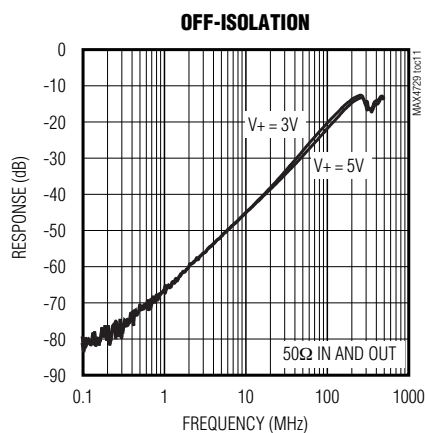
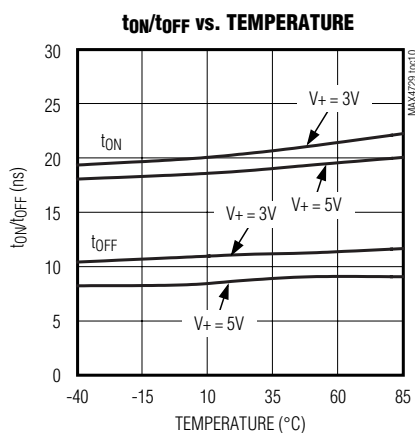
($T_A = +25^\circ\text{C}$, unless otherwise noted.)



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典型工作特性 (续)

($T_A = +25^\circ\text{C}$, unless otherwise noted.)



引脚说明

引脚			名称	功能
MAX4729		MAX4730		
SC70	μDFN	SC70/μDFN		
1	3	6	IN	逻辑控制输入
2	2	5	V+	正电源输入
3	4	2	GND	地
4	6	3	NC	模拟开关常闭端
5	5	4	COM	模拟开关公共端
6	1	1	NO	模拟开关常开端

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详细说明

MAX4729/MAX4730 单刀/双掷 (SPDT) 开关采用 +1.8V 至 +5.5V 的单电源供电。在 2.7V 电源下，这两款开关具有 3.5Ω 的低导通电阻 (R_{ON}) 和 0.45Ω 的 R_{ON} 平坦度。典型情况下，仅消耗 1nA 的电源电流，这使它们成为低功耗便携式应用的理想选择。MAX4729/MAX4730 在整个温度范围内具有低泄漏电流，并具有 TTL/CMOS 兼容的数字逻辑和出色的交流特性。

应用信息

数控输入

MAX4729/MAX4730 可以接受高达 +5.5V 的逻辑输入电平，而与电源电压无关。例如，+3.3V 电源供电时，IN 引

脚低电平可低至 GND，高电平可达 +5.5V，从而允许在一个系统中使用混合逻辑电平。使用 2.7V 至 3.6V 电源供电时，逻辑门限设置为 $V_{IL} = 0.4V$ (最大)， $V_{IH} = 2V$ (最小)。

供电顺序和过压保护

警告： 不要超出 Absolute Maximum Ratings 中的额定值，超过规定的额定值会造成器件永久损坏。所有 CMOS 器件都推荐使用正确的供电顺序。总是在加载模拟信号前先加 $V+$ ，尤其是在模拟信号没有限流的情况下。

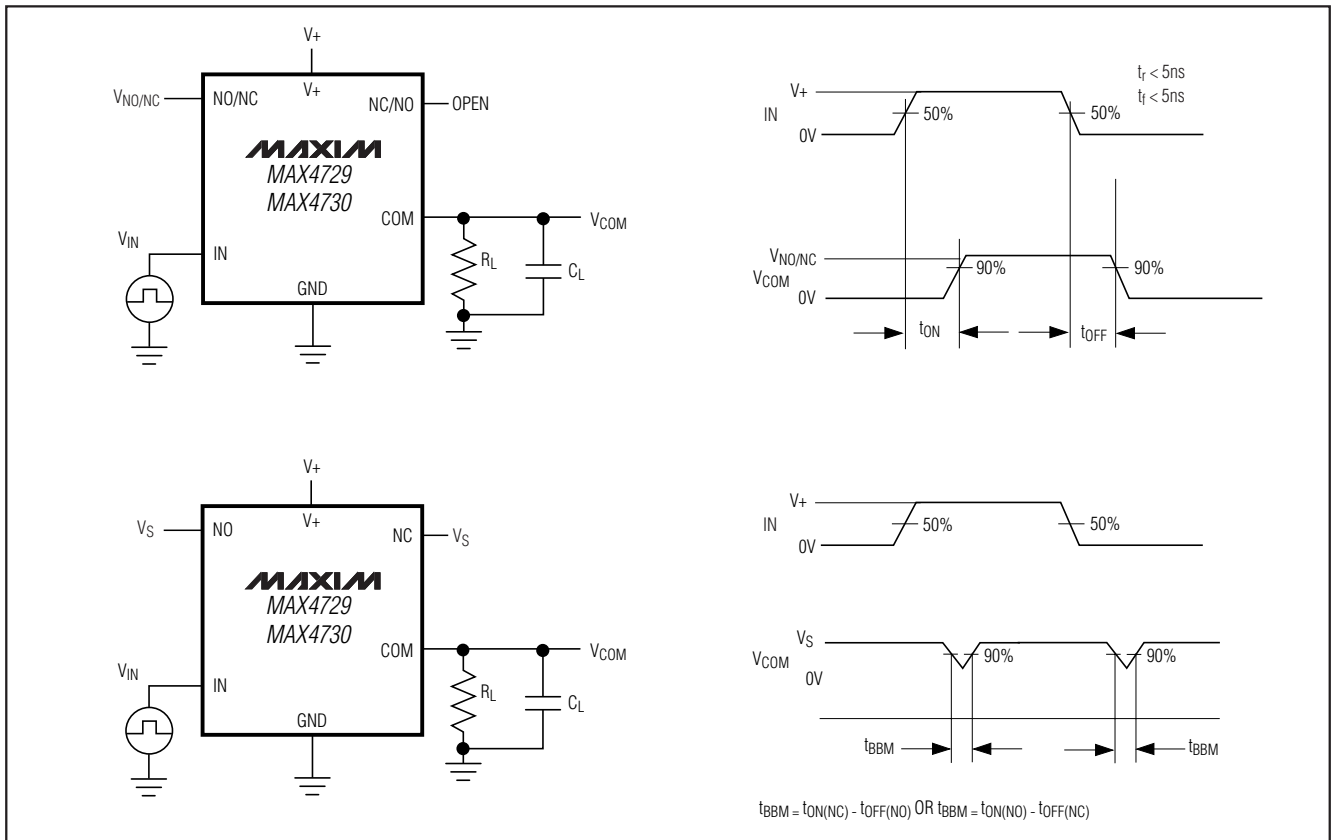


图 1. 开关时间

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MAX4729/MAX4730

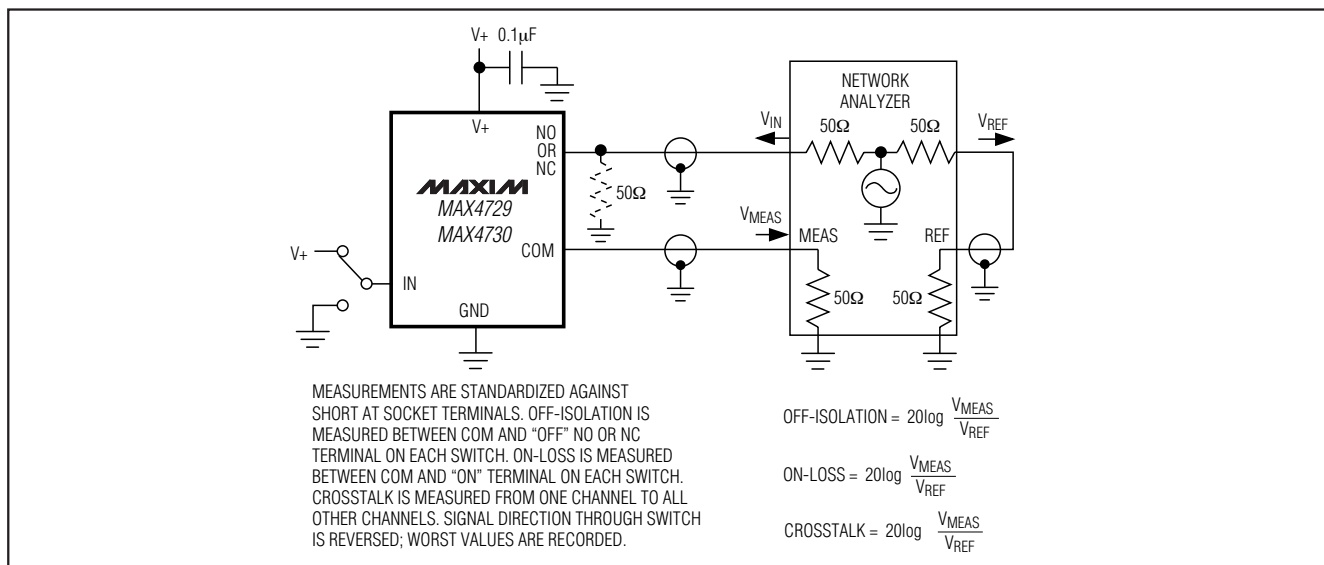


图 2. 关断隔离 / 导通损耗带宽、串扰

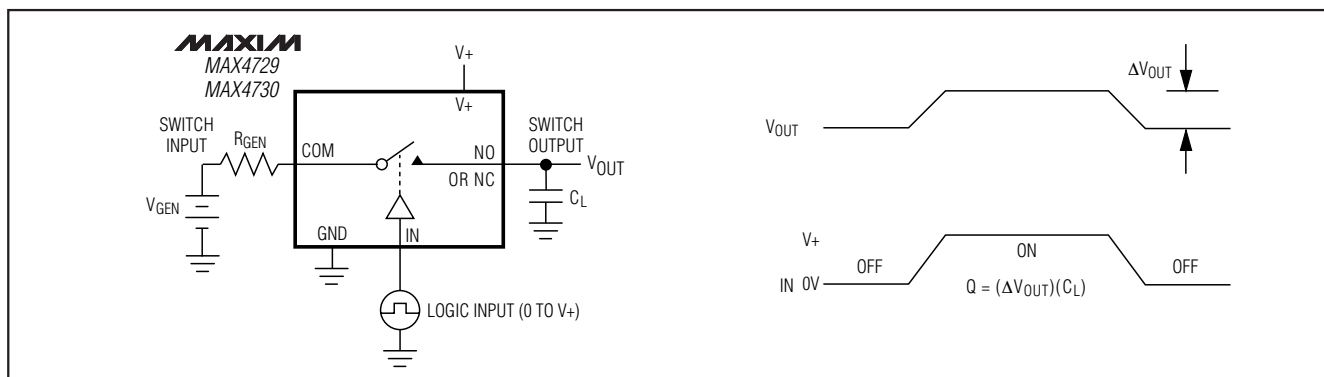


图 3. 电荷注入

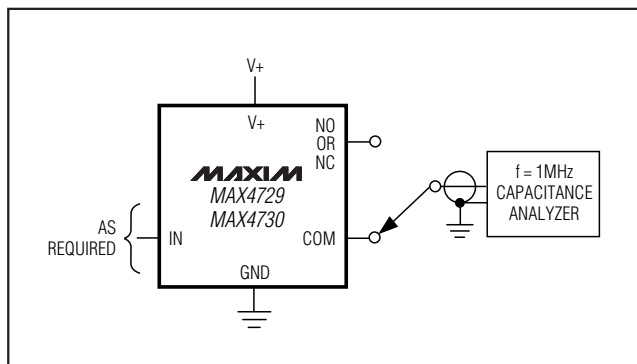


图 4. NO、NC 和 COM 电容

芯片信息

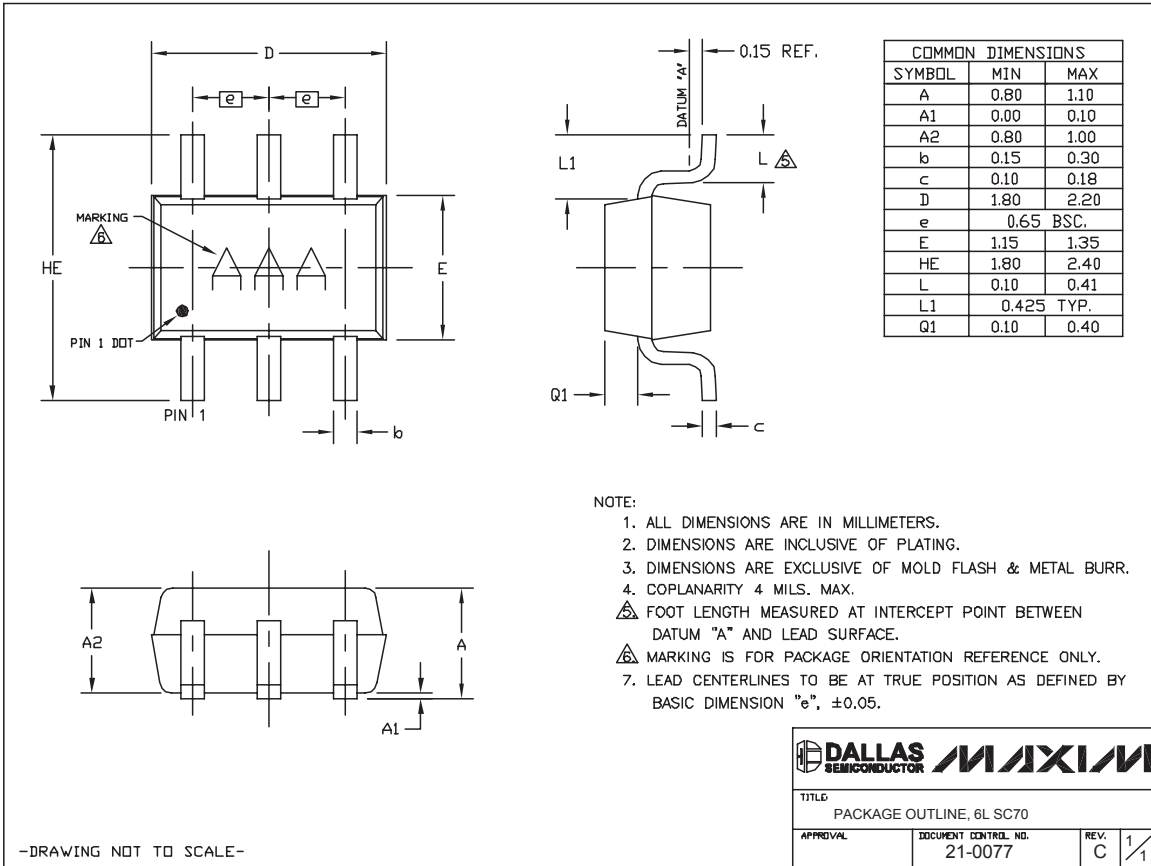
TRANSISTOR COUNT: 190

PROCESS: CMOS

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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.cn/packages。)



SC70, 6LEPS

DALLAS SEMICONDUCTOR **MAXIM**

TITLE: PACKAGE OUTLINE, 6L SC70

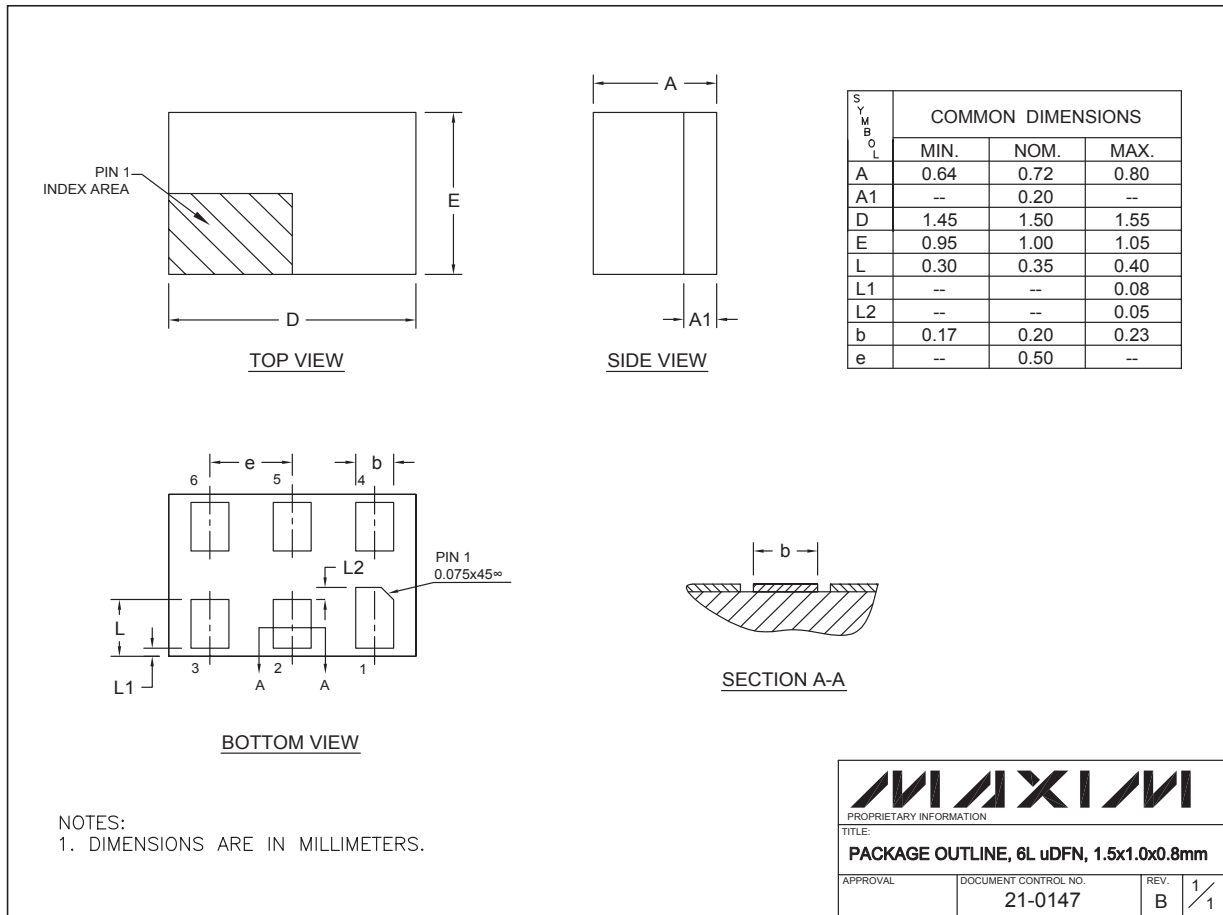
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封装信息 (续)

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MAX4729/MAX4730



6L uDFN EPSS

MAXIM 北京办事处

北京 8328 信箱 邮政编码 100083

免费电话: 800 810 0310

电话: 010-6201 0598

传真: 010-6201 0298

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