19-3284; Rev 1; 2/05

MAXIM

低电压、3.5Ω、SPDT、CMOS模拟开关

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µDFN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µDFN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

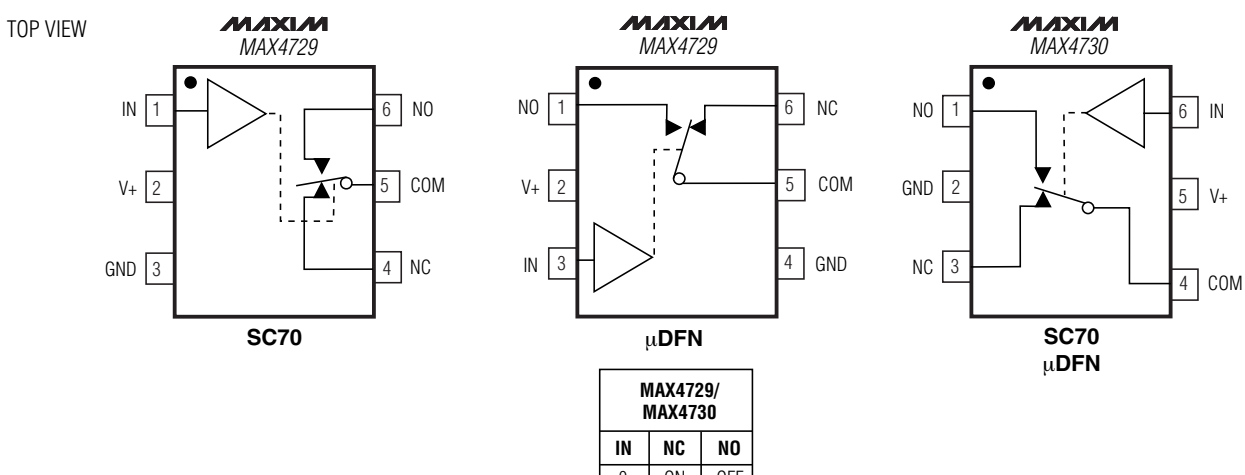
继电器替代品

定购信息

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 µDFN-6	—
MAX4730EXT-T	-40°C to +85°C	6 SC70-6	ABV
MAX4730ELT-T*	-40°C to +85°C	6 µDFN-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



MAX4729/MAX4730		
IN	**NC**	**NO**
0	ON	OFF
1	OFF	ON

SWITCHES SHOWN FOR LOGIC 0 INPUT.

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	
		V+ = 2.7V, I_{COM} = 10mA, V_{NO} or V_{NC} = 0.7V, 1.2V, 2V (MAX4730)	+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	
		V+ = 2.7V, I_{COM} = 10mA, V_{NO} or V_{NC} = 0.7V, 1.2V, 2V (MAX4730)	+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

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.

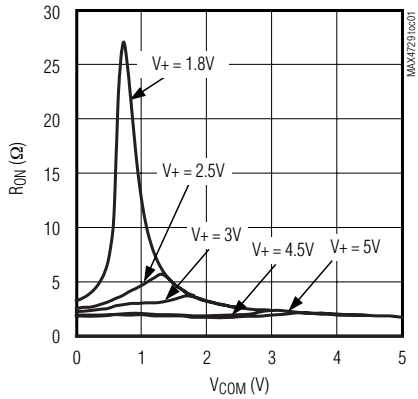
Note 7: Off-Isolation = 20log10 (VO / VI), where VO is V_{COM} and VI is either V_{NC} or V_{NO} from the network analyzer.

Note 8: Crosstalk is measured between the two switches.

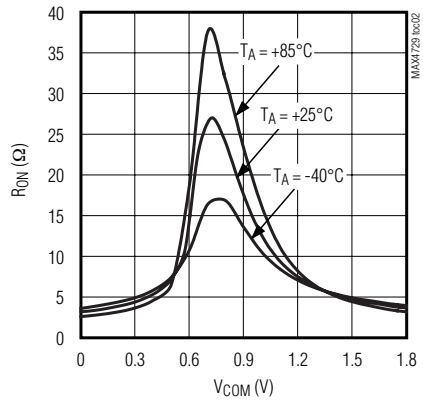
典型工作特性

(T_A = +25°C, unless otherwise noted.)

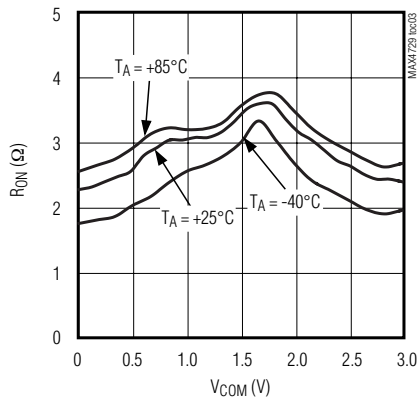
ON-RESISTANCE vs. V_{COM}



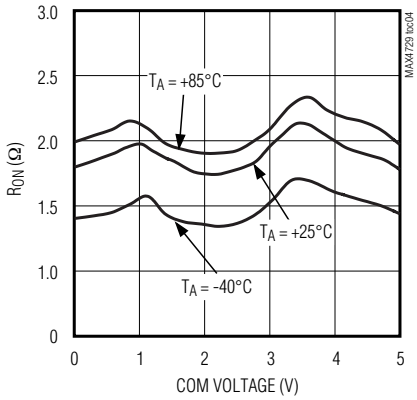
ON-RESISTANCE vs. V_{COM} (V+ = +1.8V)



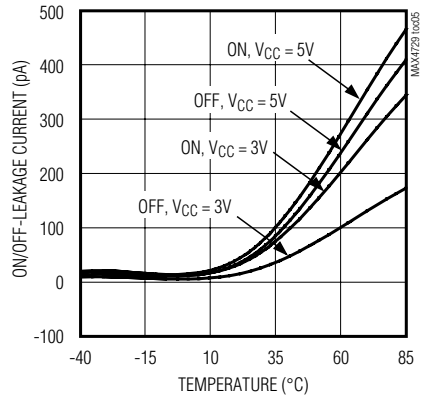
ON-RESISTANCE vs. V_{COM} (V+ = +3V)



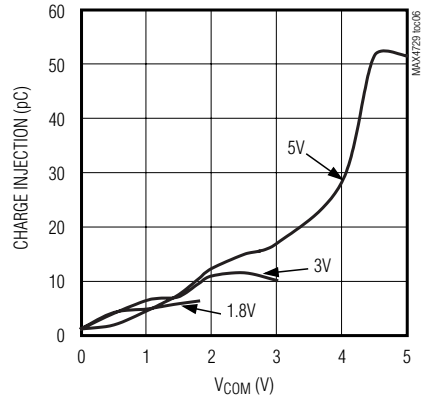
ON-RESISTANCE vs. V_{COM} (V+ = +5V)



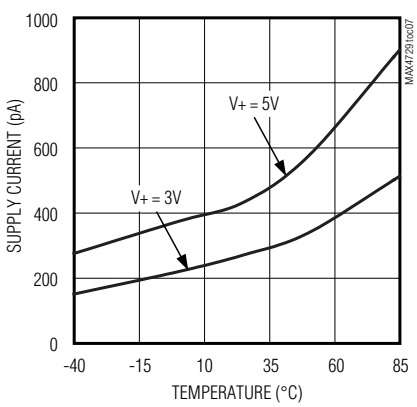
ON/OFF-LEAKAGE CURRENT vs. TEMPERATURE



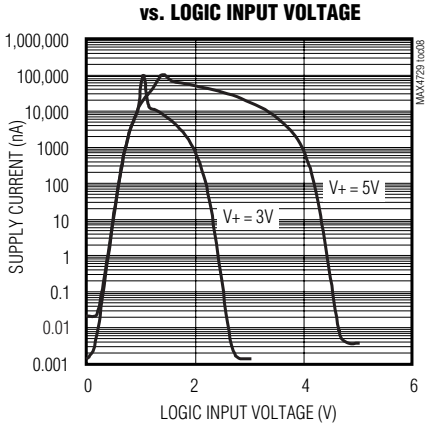
CHARGE INJECTION vs. V_{COM}



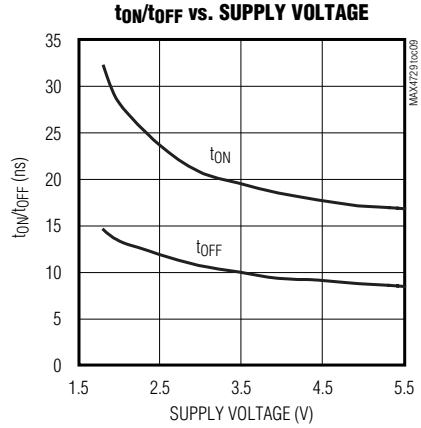
SUPPLY CURRENT vs. TEMPERATURE



SUPPLY CURRENT vs. LOGIC INPUT VOLTAGE



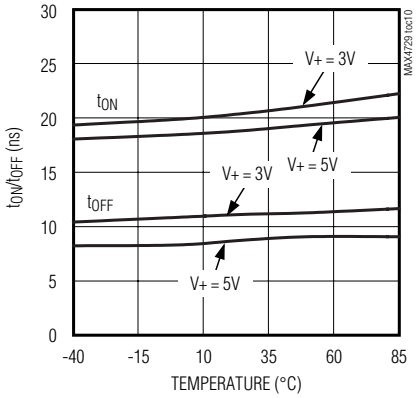
t_{ON}/t_{OFF} vs. SUPPLY VOLTAGE



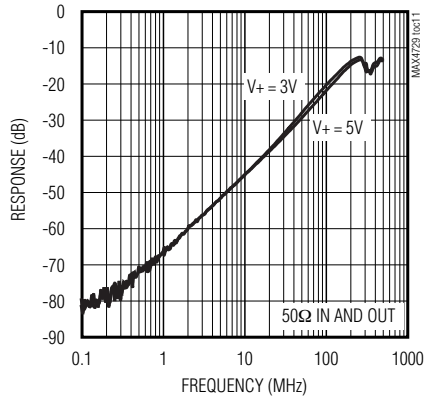
典型工作特性 (续)

(T_A = +25°C, unless otherwise noted.)

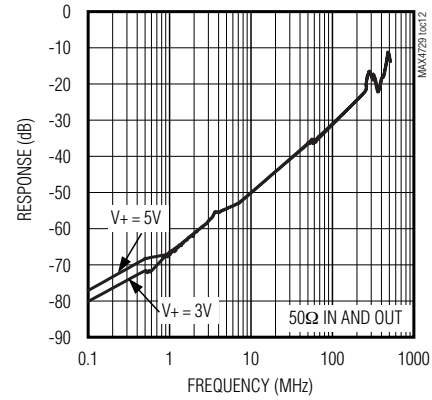
t_{ON}/t_{OFF} vs. TEMPERATURE



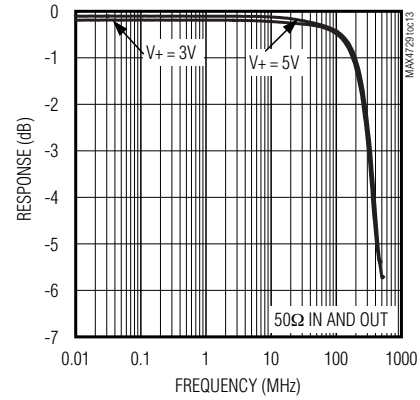
OFF-ISOLATION



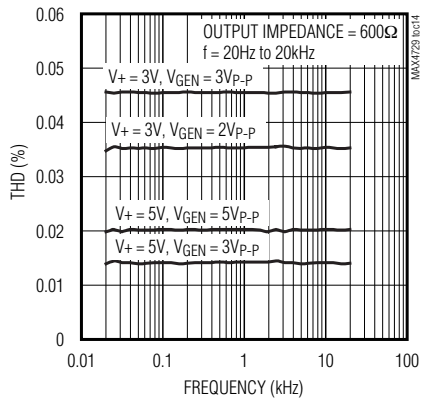
CROSSTALK



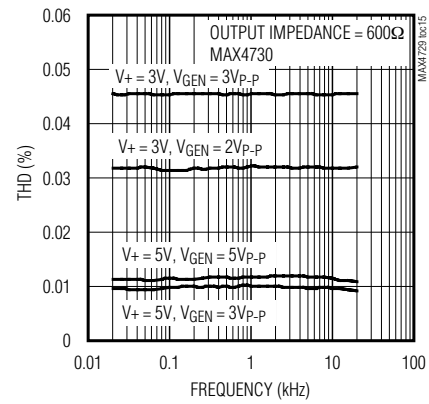
ON-LOSS BANDWIDTH



TOTAL HARMONIC DISTORTION vs. FREQUENCY



TOTAL HARMONIC DISTORTION vs. FREQUENCY



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

低电压、3.5Ω、SPDT、CMOS模拟开关

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。

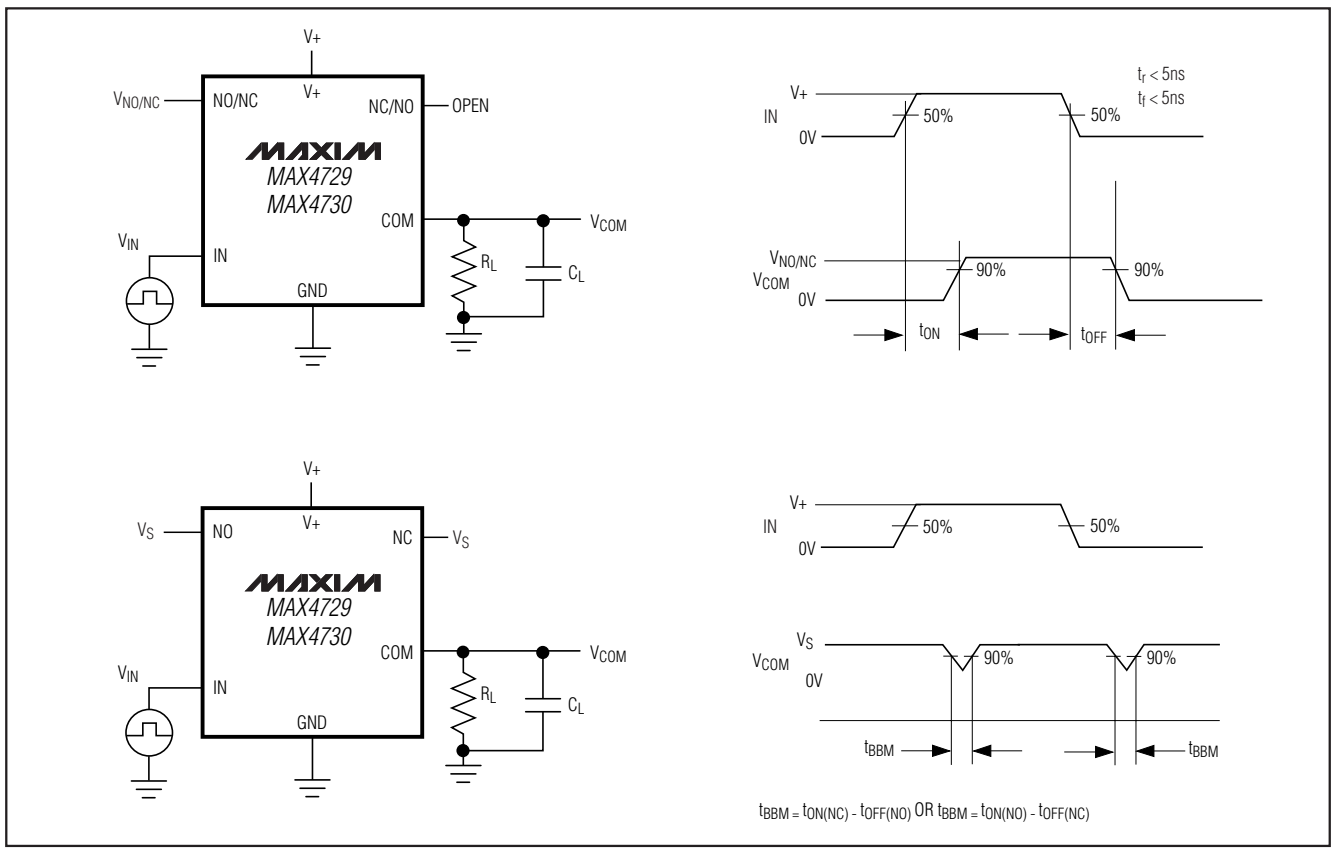


图1. 开关时间

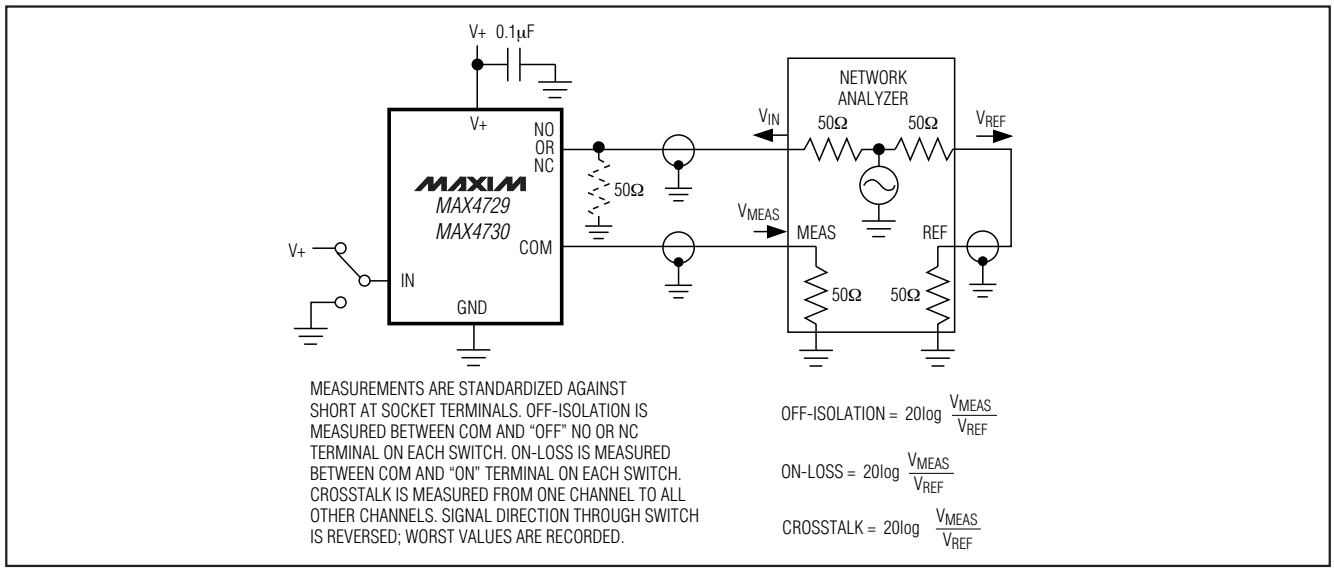


图 2. 关断隔离 /导通损耗带宽、串扰

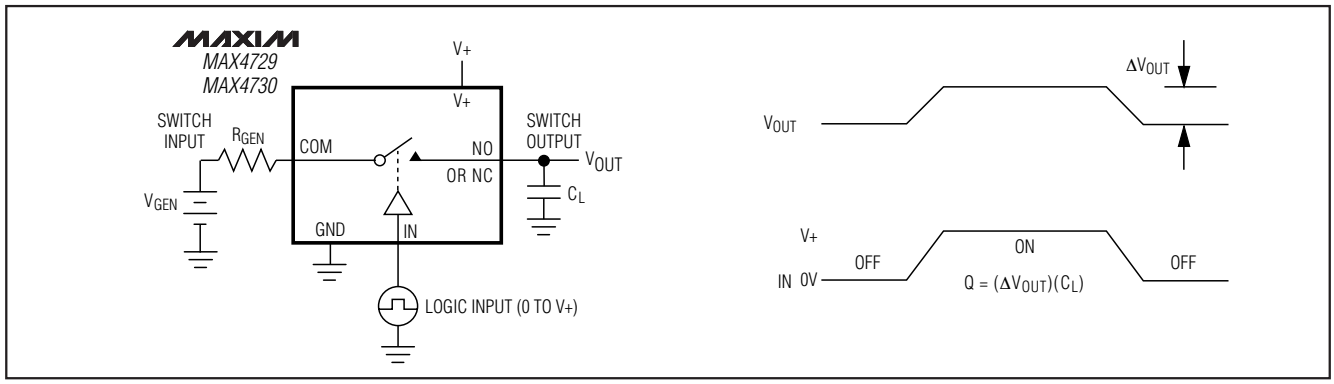


图 3. 电荷注入

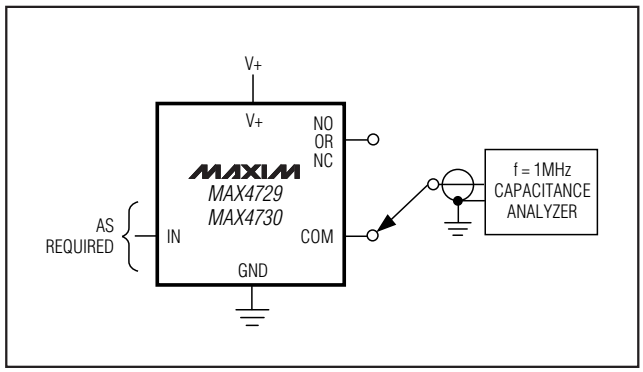


图 4. NO、NC 和 COM 电容

芯片信息

TRANSISTOR COUNT: 190

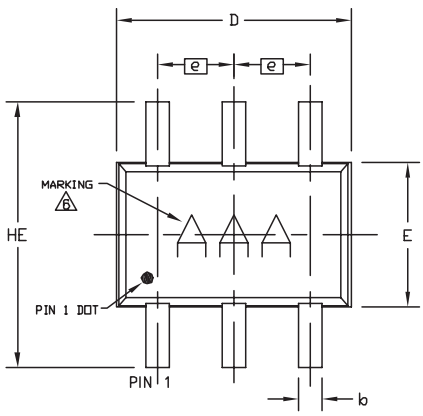
PROCESS: CMOS

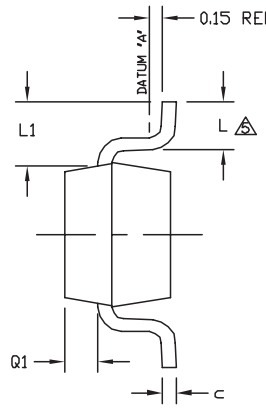
低电压、3.5Ω、SPDT、CMOS模拟开关

封装信息

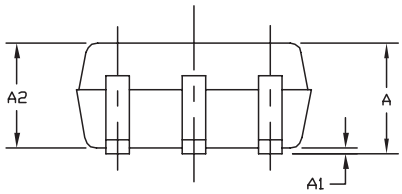
(本数据资料提供的封装图可能不是最近的规格，如需最近的封装外型信息，请查询 www.maxim-ic.com.cn/packages。)

SC70, 6LEPS





COMMON DIMENSIONS		
SYMBOL	MIN	MAX
A	0.80	1.10
A1	0.00	0.10
A2	0.80	1.00
b	0.15	0.30
c	0.10	0.18
D	1.80	2.20
e	0.65 BSC.	
E	1.15	1.35
HE	1.80	2.40
L	0.10	0.41
L1	0.425 TYP.	
Q1	0.10	0.40



NOTE:
1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSIONS ARE INCLUSIVE OF PLATING.
3. DIMENSIONS ARE EXCLUSIVE OF MOLD FLASH & METAL BURR.
4. COPLANARITY 4 MILS. MAX.
5. FOOT LENGTH MEASURED AT INTERCEPT POINT BETWEEN DATUM "A" AND LEAD SURFACE.
6. MARKING IS FOR PACKAGE ORIENTATION REFERENCE ONLY.
7. LEAD CENTERLINES TO BE AT TRUE POSITION AS DEFINED BY BASIC DIMENSION "e", ±0.05.

-DRAWING NOT TO SCALE-

DALLAS SEMICONDUCTOR MAXIM

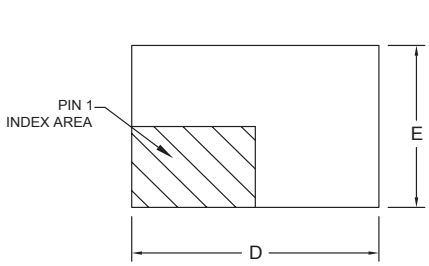
TITLE: PACKAGE OUTLINE, 6L SC70

APPROVAL	DOCUMENT CONTROL NO.	REV.	
	21-0077	C	1/1

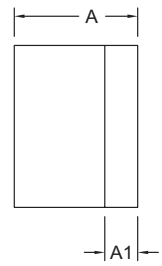
封装信息 (续)

(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。)

6L UDFN.EPS

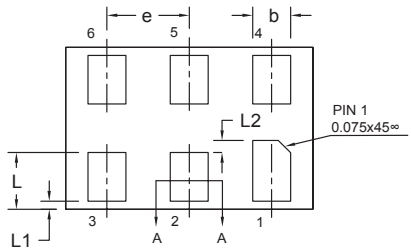


TOP VIEW

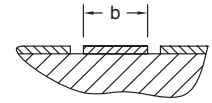


SIDE VIEW

SYMBOL	COMMON DIMENSIONS		
	MIN.	NOM.	MAX.
A	0.64	0.72	0.80
A1	--	0.20	--
D	1.45	1.50	1.55
E	0.95	1.00	1.05
L	0.30	0.35	0.40
L1	--	--	0.08
L2	--	--	0.05
b	0.17	0.20	0.23
e	--	0.50	--



BOTTOM VIEW



SECTION A-A

NOTES:
1. DIMENSIONS ARE IN MILLIMETERS.

PROPRIETARY INFORMATION

TITLE:
PACKAGE OUTLINE, 6L uDFN, 1.5x1.0x0.8mm

APPROVAL	DOCUMENT CONTROL NO.	REV.	
	21-0147	B	1/1

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