

**SOTINY™ 1-Ohm, Low-Voltage  
Single-Supply SPDT Switch**

**Features**

- Low On-Resistance: 1-ohm max (+5V Supply)  
2-ohm max (+3V Supply)
- R<sub>ON</sub> Matching: 0.12-ohms max. at 25 °C
- R<sub>ON</sub> Flatness: 0.12-ohms max. (+5V Supply) at 25 °C
- Low 4nA Input Leakage at 25 °C
- +1.8V to +5.5V Single-Supply Operation
- Fast Switching Time (PI5A4624)
  - 50ns t<sub>ON</sub>
  - 50ns t<sub>OFF</sub>
- Break-Before-Make Switching Guaranteed (PI5A4624)
- Make-Before-Break Switching (PI5A4625)
- -57dB Off-Isolation at 1MHz
- TTL/CMOS Logic Compatible
- Low Power Consumption: 5µW
- Improved Direct Replacement for MAX4624 & MAX4625
- Packaging (Pb-free & Green available):
  - 6-pin Small Compact SOT-23 (T)

**Applications**

- Communication Circuits
- Cellular Phones
- Audio and Video Signal Routing
- Portable Battery-Operated Equipment
- Data Acquisition Systems
- Computer Peripherals
- Telecommunications
- Relay Replacement
- Wireless Terminals and Peripherals
- Hard Drives
- Modems

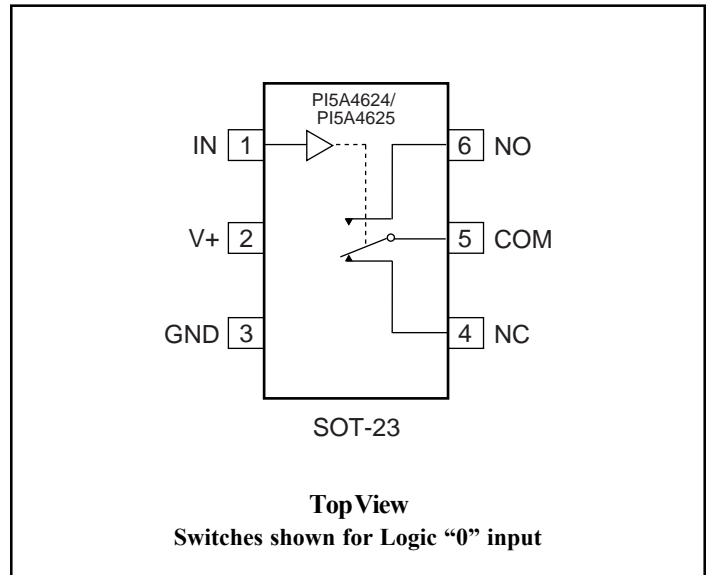
**Description**

The PI5A4624/PI5A4625 is an improved, direct replacement for the MAX4624/MAX4625 single-pole, double-throw (SPDT) analog switch. Improved specifications include a low maximum On-resistance of 1-ohm and fast switching times (t<sub>ON</sub> = 50ns max., t<sub>OFF</sub> = 50 max.) with 5V supply operation. With a 2.5V supply, resistance is a low 4-ohm max.

Specifications are given for 1.8V, 2.5V, 3.3V and 5V power supply operation. Operating voltage range is +1.8V to +5.5V.

To minimize PC board area use, the PI5A4624/ PI5A4625 is available in a compact 6-pin SOT-23 package.

**Functional Diagram, Pin Configuration**



**Truth Tables**

Logic	PI5A4624/PI5A4625	
	NC	NO
0	ON	OFF
1	OFF	ON



### Absolute Maximum Ratings

Voltages Referenced to GND

V+ ..... -0.5V to +5.5V

V<sub>IN</sub>, V<sub>COM</sub>, V<sub>NC</sub>, V<sub>NO</sub> (Note 1) ..... -0.5V to V<sub>+</sub>+0.3V  
or 30mA, whichever occurs first

Current (any terminal) ..... ±200mA

Peak Current, COM, NO, NC  
(Pulsed at 1ms, 10% duty cycle) ..... ±400mA

### Thermal Information

Continuous Power Dissipation

SOT23-6 (derate 7.1mW/°C above +70°C) ..... 0.5W

Storage Temperature ..... -65°C to +150°C

Lead Temperature (soldering, 10s) ..... +300°C

**Note:**

1. Signals on NC, NO, COM, or IN exceeding V<sub>+</sub> or GND are clamped by internal diodes. Limit forward diode current to 30mA.

**Caution:** Stresses beyond those listed under “Absolute Maximum Ratings” may cause permanent damage to the device. This is a stress only rating and operation of the device at these or any other conditions beyond those indicated in the operational sections of this specification is not implied.

### Electrical Specifications - Single +5V Supply

(V<sub>+</sub> = +5V ± 10%, GND = 0V, V<sub>INH</sub> = 2.4V, V<sub>INL</sub> = 0.8V)

Parameter	Symbol	Conditions	Temp. (°C)	Min. <sup>(1)</sup>	Typ. <sup>(2)</sup>	Max. <sup>(1)</sup>	Units	
<b>Analog Switch</b>								
Analog Signal Range <sup>(3)</sup>	V <sub>ANALOG</sub>		Full	0		V+	V	
On Resistance	R <sub>ON</sub>	V <sub>+</sub> = 4.5V, I <sub>COM</sub> = -30mA, V <sub>NO</sub> or V <sub>NC</sub> = +2.5V	25		0.70	0.90	ohm	
			Full			1.1		
On-Resistance Match Between Channels <sup>(4)</sup>	ΔR <sub>ON</sub>		25		0.03	0.05		
			Full			0.10		
On-Resistance Flatness <sup>(5)</sup>	R <sub>FLAT(ON)</sub>	V <sub>+</sub> = 4.5V, I <sub>COM</sub> = -30mA, V <sub>NO</sub> or V <sub>NC</sub> = 0V, 1.5V, 2.5V	25		0.08	0.12		
			Full			0.15		
NO or NC Off Leakage Current <sup>(6)</sup>	I <sub>NO(OFF)</sub> or I <sub>NC(OFF)</sub>		V <sub>+</sub> = 5.5V, V <sub>COM</sub> = 0V V <sub>NO</sub> or V <sub>NC</sub> = 4.5V	25	2	0.01	2	nA
				Full	-20		20	
COM On Leakage Current <sup>(6)</sup>	I <sub>COM(ON)</sub>	V <sub>+</sub> = 5.5V, V <sub>COM</sub> = +4.5V V <sub>NO</sub> or V <sub>NC</sub> = +4.5V		25	-4		4	
				Full	-40	0.3	40	

**Electrical Specifications - Single +5V Supply (continued)**

(V<sub>+</sub> = +5V ± 10%, GND = 0V, V<sub>INH</sub> = 2.4V, V<sub>INL</sub> = 0.8V)

Parameter	Symbol	Conditions	Temp. (°C)	Min. <sup>(1)</sup>	Typ. <sup>(2)</sup>	Max. <sup>(1)</sup>	Units
<b>Analog Switch</b>							
Input High Voltage	V <sub>IH</sub>	Guaranteed Logic High Level	Full	2.4			V
Input Low Voltage	V <sub>IL</sub>	Guaranteed Logic LowLevel				0.8	
Input Current with Voltage High	I <sub>INH</sub>	V <sub>IN</sub> = 2.4V, all others = 0.8V		-1	0.005	1	μA
Input Current with Voltage Low	I <sub>INL</sub>	V <sub>IN</sub> = 0.8V, all others = 2.4V		-1	0.005	1	
<b>Dynamic</b>							
Turn-On-Time	t <sub>ON</sub>	V <sub>CC</sub> = 5V, Figure 1	25		20	35	ns
			Full			40	
Turn-Off-Time	t <sub>OFF</sub>		25		15	20	
			Full			35	
Break-Before-Make	t <sub>BBM</sub>	Figure 3 (PI5A4624 Only)	25	1	12	14.5	
			Full	1	17.5		
Make-Before-Break	t <sub>MBB</sub>	Figure 4 (PI5A4625 Only)	25	1	14	17	
			Full	1	20.5		
Charge Injection <sup>(3)</sup>	Q	C <sub>L</sub> - 1nF, V <sub>GEN</sub> = 0V, R <sub>GEN</sub> = 0ohm, Figure 2	25		40		pC
Off Isolation	OIRR	R <sub>L</sub> = 50ohms, f = 1MHz, Figure 5			-57		dB
CrossTalk <sup>(8)</sup>	X <sub>TALK</sub>	R <sub>L</sub> = 50ohms, f = 1MHz, Figure 6			-57		
NC or NO Capacitance	C <sub>NC/NO (OFF)</sub>	f = 1MHz, Figure 7			42		pF
COM Off Capacitance	C <sub>COM(OFF)</sub>				83		
COM On Capacitance	C <sub>COM(ON)</sub>		f = 1MHz, Figure 8			130	
<b>Supply</b>							
Power-Supply Range	V+		Full	1.8		5.5	V
Positive Supply Current	I+	V <sub>CC</sub> = 5.5V, V <sub>IN</sub> = 0V or V+			0.5		1

**Notes:**

1. The algebraic convention, where most negative value is a minimum and most positive is a maximum, is used in this data sheet.
2. Typical values are for DESIGN AID ONLY, not guaranteed or subject to production testing.
3. Guaranteed by design.
4. ΔRON = RON max. - RON min.
5. Flatness is defined as the difference between the maximum and minimum value of On-resistance measured.
6. Leakage parameters are 100% tested at maximum rated hot temperature and guaranteed by correlation at +25°C.
7. Off Isolation = 20log<sub>10</sub> [ V<sub>COM</sub> / (V<sub>NO</sub> or V<sub>NC</sub>) ]. See Figure 5
8. Between any two switches. See Figure 6.

### Electrical Specifications - Single +3.3V Supply

(V+ = +3.3V ± 10%, GND = 0V, V<sub>INH</sub> = 2.0V, V<sub>INL</sub> = 0.6V)

Parameter	Symbol	Conditions	Temp. (°C)	Min. <sup>(1)</sup>	Typ. <sup>(2)</sup>	Max. <sup>(1)</sup>	Units
<b>Analog Switch</b>							
Analog Signal Range <sup>(3)</sup>	V <sub>ANALOG</sub>			0		V+	V
On-Resistance	R <sub>ON</sub>	V+ = 3V, I <sub>COM</sub> = -24mA V <sub>NO</sub> or V <sub>NC</sub> = 2.0V	25		1.4	1.8	ohm
			Full			2.2	
On-Resistance Match Between Channels <sup>(4)</sup>	ΔR <sub>ON</sub>	V+ = 3.3V, I <sub>COM</sub> = -24mA V <sub>NO</sub> or V <sub>NC</sub> = 0.8V, 2.0V	25		0.04	0.05	
			Full		0.11		
On-Resistance Flatness	R <sub>FLAT(ON)</sub>	V+ = 3.3V, I <sub>COM</sub> = -24mA V <sub>NO</sub> or V <sub>NC</sub> = 0.8V, 2.0V	25		0.17	0.2	
			Full		0.25		
<b>Dynamic</b>							
Turn-On-Time	t <sub>ON</sub>	V+ = 3.3V, V <sub>NO</sub> or V <sub>NC</sub> = 2.0V, Figure	25		30	40	ns
			Full			55	
Turn-Off-Time	t <sub>OFF</sub>		25		20	25	
			Full			40	
Break-Before-Make	t <sub>BBM</sub>	Figure 3 (PI5A4624 Only)	25	1	21	29	
Make-Break-Before	t <sub>MBB</sub>	Figure 4 (PI5A4625 Only)	25	1	13	17.5	
Charge Injection <sup>(3)</sup>	Q	C <sub>L</sub> - 1nF, V <sub>GEN</sub> = 0V, R <sub>GEN</sub> = 0V, Figure 2	25		30		pC
<b>Supply</b>							
Positive Supply Current	I+	V+ = 3.6V, V <sub>IN</sub> = 0V or V+ All Channels on or off	Full		0.5	1	μA
<b>Logic Input</b>							
Input High Voltage	V <sub>IH</sub>	Guaranteed Logic High Level	Full	2			V
Input Low Voltage	V <sub>IL</sub>	Guaranteed Logic LowLevel	Full			0.6	
Input High Current	I <sub>INH</sub>	V <sub>IN</sub> = 2.4V, all others = 0.8V	Full	-1		1	μA
Input Low Current	I <sub>INL</sub>	V <sub>IN</sub> = 0.8V, all others = 2.4V	Full	-1		1	

**Notes:**

1. The algebraic convention, where most negative value is a minimum and most positive is a maximum, is used in this data sheet.
2. Typical values are for DESIGN AID ONLY, not guaranteed or subject to production testing.
3. Guaranteed by design.
4. ΔR<sub>ON</sub> = R<sub>ON</sub> max. - R<sub>ON</sub> min.
5. Flatness is defined as the difference between the maximum and minimum value of On-resistance measured.

### Electrical Specifications - Single +2.5V Supply

(V+ = +2.5V ± 10%, GND = 0V, V<sub>INH</sub> = 1.8V, V<sub>INL</sub> = 0.6V)

Parameter	Symbol	Conditions	Temp. (°C)	Min. <sup>(1)</sup>	Typ. <sup>(2)</sup>	Max. <sup>(1)</sup>	Units
<b>Analog Switch</b>							
Analog Signal Range <sup>(3)</sup>	V <sub>ANALOG</sub>			0		V+	V
On-Resistance	R <sub>ON</sub>	V+ = 2.5V, I <sub>COM</sub> = -8mA V <sub>NO</sub> or V <sub>NC</sub> = 1.8V	25		1.6	2	Ohm
			Full			2.7	
On-Resistance Match Between Channels <sup>(4)</sup>	ΔR <sub>ON</sub>	V+ = 2.5V, I <sub>COM</sub> = -8mA V <sub>NO</sub> or V <sub>NC</sub> = 0.8V, 1.8V	25		0.13	0.16	
			Full		0.2		
On-Resistance Flatness	R <sub>FLAT(ON)</sub>	V+ = 2.5V, I <sub>COM</sub> = -8mA V <sub>NO</sub> or V <sub>NC</sub> = 0.8V, 1.8V	25		0.25	0.3	
			Full		0.45		
<b>Dynamic</b>							
Turn-On-Time	t <sub>ON</sub>	V+ = 2.5V, V <sub>NO</sub> or V <sub>NC</sub> = 1.8V, Figure 1	25		40	55	ns
			Full			70	
Turn-Off-Time	t <sub>OFF</sub>	V+ = 2.5V, V <sub>NO</sub> or V <sub>NC</sub> = 1.8V, Figure 1	25		30	40	
			Full			55	
Break-Before-Make	t <sub>BBM</sub>	Figure 3 PI5A4624 Only)	25	1	33	39	
Make-Break-Before	t <sub>MBB</sub>	Figure 4 PI5A4625 Only)	25	1	9	13	
Charge Injection <sup>(3)</sup>	Q	C <sub>L</sub> - 1nF, V <sub>GEN</sub> = 0V, R <sub>GEN</sub> = 0V, Figure 2	25		20		pC
<b>Supply</b>							
Positive Supply Current	I+	V+ = 2.75V, V <sub>IN</sub> = 0V or V+ All Channels on or off	Full		0.5	1	μA
<b>Logic Input</b>							
Input High Voltage	V <sub>IH</sub>	Guaranteed Logic High Level	Full	1.8			V
Input Low Voltage	V <sub>IL</sub>	Guaranteed Logic LowLevel	Full			0.6	
Input High Current	I <sub>INH</sub>	V <sub>IN</sub> = 2.0V, all others = 0.8V	Full	-1		1	μA
Input Low Current	I <sub>INL</sub>	V <sub>IN</sub> = 0.8V, all others = 2.0V	Full	-1		1	

**Notes:**

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2. Typical values are for DESIGN AID ONLY, not guaranteed or subject to production testing.
3. Guaranteed by design.
4. ΔR<sub>ON</sub> = R<sub>ON</sub> max. - R<sub>ON</sub> min.
5. Flatness is defined as the difference between the maximum and minimum value of On-resistance measured.

### Electrical Specifications - Single +1.8V Supply

(V+ = +1.8V ± 10%, GND = 0V, V<sub>INH</sub> = 1.5V, V<sub>INL</sub> = 0.6V)

Parameter	Symbol	Conditions	Temp. (°C)	Min. <sup>(1)</sup>	Typ. <sup>(2)</sup>	Max. <sup>(1)</sup>	Units	
<b>Analog Switch</b>								
Analog Signal Range <sup>(3)</sup>	V <sub>ANALOG</sub>			0		V+	V	
On-Resistance	R <sub>ON</sub>	V+ = 1.8V, I <sub>COM</sub> = -2mA V <sub>NO</sub> or V <sub>NC</sub> = 1.5V	25		2.8	4	Ohm	
			Full			5		
On-Resistance Match Between Channels <sup>(4)</sup>	ΔR <sub>ON</sub>	V+ = 1.8V, I <sub>COM</sub> = -2mA V <sub>NO</sub> or V <sub>NC</sub> = 0.6V, 1.5V	25		0.44	0.6		
			Full		0.7			
On-Resistance Flatness	R <sub>FLAT(ON)</sub>	V+ = 1.8V, I <sub>COM</sub> = -2mA V <sub>NO</sub> or V <sub>NC</sub> = 0.6V, 1.5V	25		0.5	0.6		
			Full		0.9			
<b>Dynamic</b>								
Turn-On-Time	t <sub>ON</sub>	V+ = 1.8V, V <sub>NO</sub> or V <sub>NC</sub> = 1.5V, Figure 1	25		65	70	ns	
			Full			95		
Turn-Off-Time	t <sub>OFF</sub>		25		40	55		
			Full			70		
Break-Before-Make	t <sub>BBM</sub>		Figure 3 (PI5A4624 Only)	25	1	60		72
Make-Break-Before	t <sub>MBB</sub>		Figure 4 (PI5A4625 Only)	25	1	10		14
Charge Injection <sup>(3)</sup>	Q	C <sub>L</sub> = 1nF, V <sub>GEN</sub> = 0V, R <sub>GEN</sub> = 0V, Figure 2	25		10		pC	
<b>Supply</b>								
Positive Supply Current	I+	V+ = 2.0V, V <sub>IN</sub> = 0V or V+ All Channels on or off	Full		0.5	1	μA	
<b>Logic Input</b>								
Input High Voltage	V <sub>IH</sub>	Guaranteed Logic High Level	Full	1.8			V	
Input Low Voltage	V <sub>IL</sub>	Guaranteed Logic LowLevel	Full			0.6		
Input High Current	I <sub>INH</sub>	V <sub>IN</sub> = 1.5V, all others = 0.8V	Full	-1		1	μA	
Input Low Current	I <sub>INL</sub>	V <sub>IN</sub> = 0.8V, all others = 1.5V	Full	-1		1		

#### Notes:

1. The algebraic convention, where most negative value is a minimum and most positive is a maximum, is used in this data sheet.
2. Typical values are for DESIGN AID ONLY, not guaranteed or subject to production testing.
3. Guaranteed by design.
4. ΔR<sub>ON</sub> = R<sub>ON</sub> max. - R<sub>ON</sub> min.
5. Flatness is defined as the difference between the maximum and minimum value of On-resistance measured.

Test Circuits/Timing Diagrams

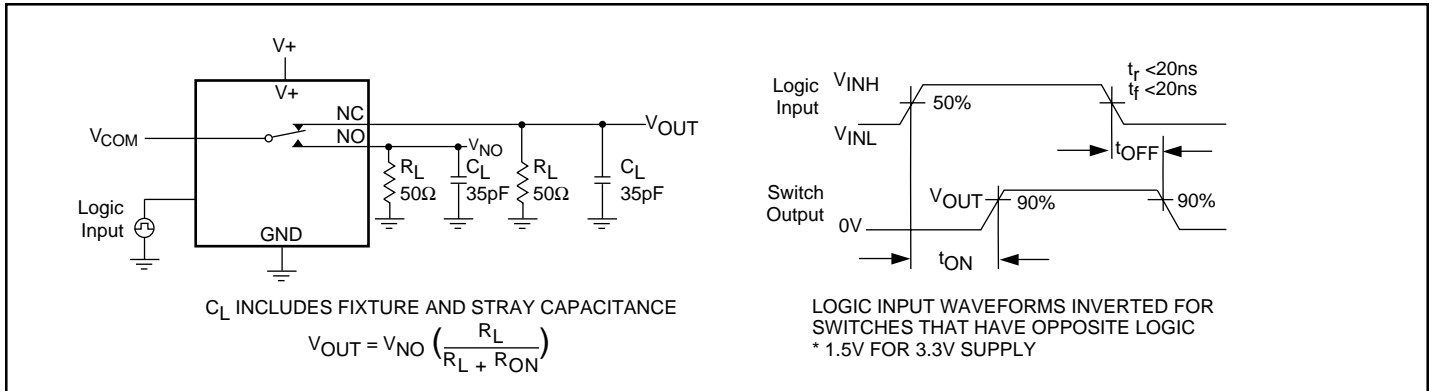


Figure 1. Switching Time

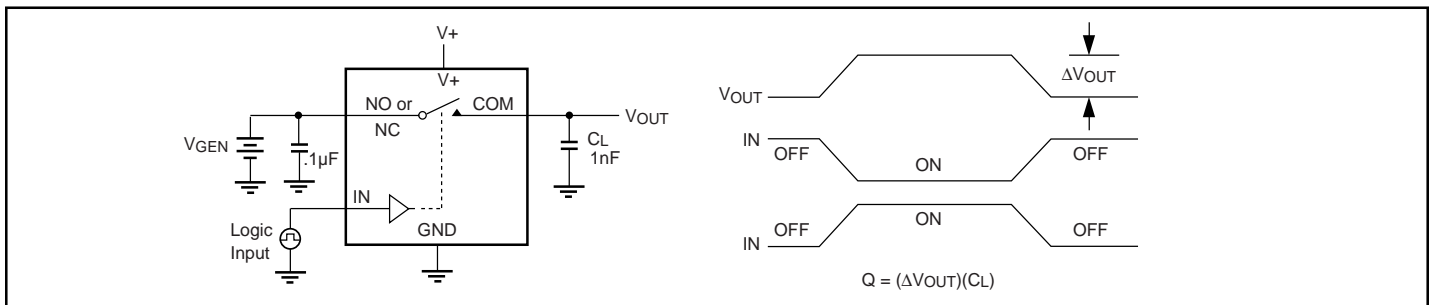


Figure 2. Charge Injection

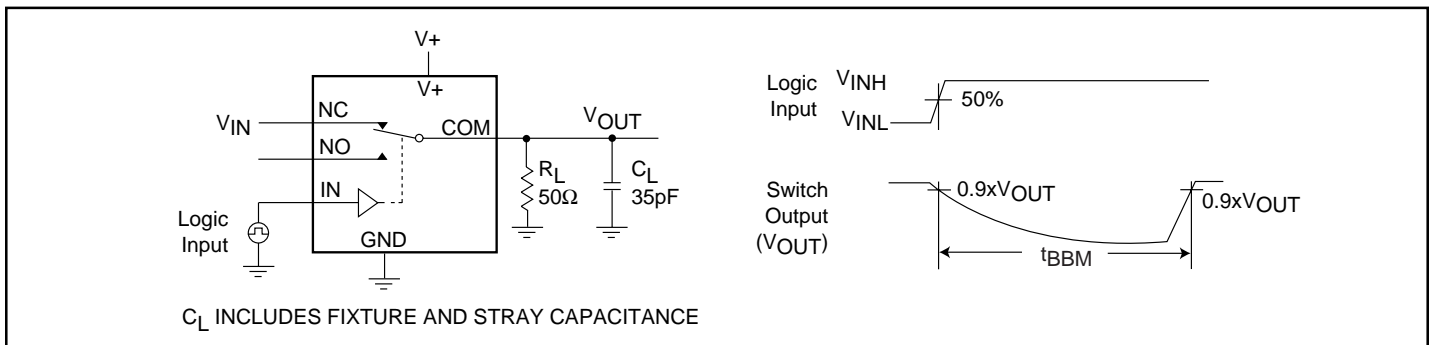


Figure 3. Break-Before-Make Interval (PI5A4624)

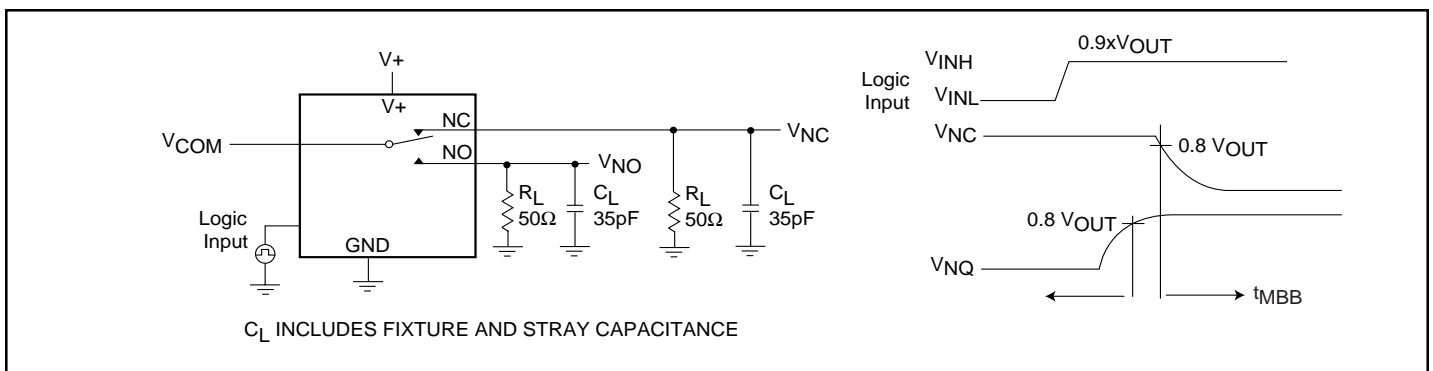


Figure 4. Make-Before-Break Interval (PI5A4625)

Test Circuits/Timing Diagrams (continued)

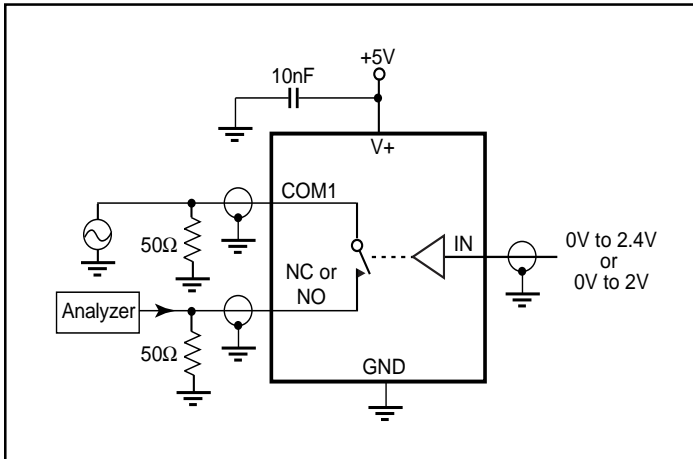


Figure 5. Off Isolation/On-Channel Bandwidth

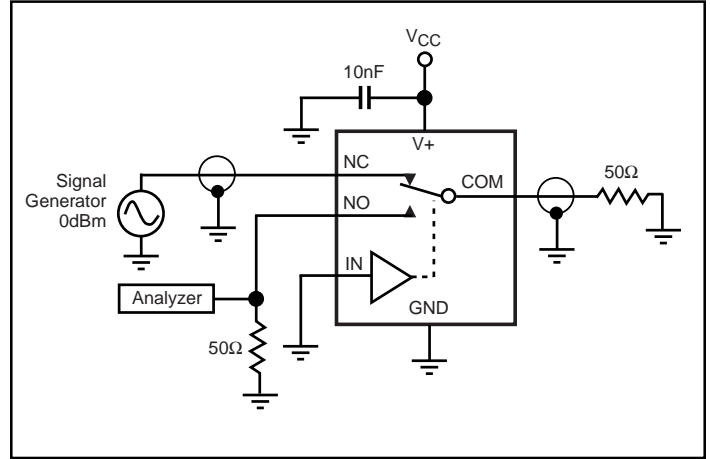


Figure 6. Crosstalk

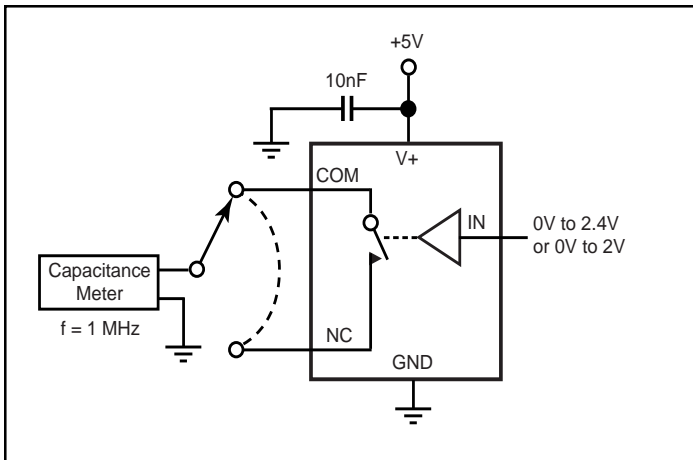


Figure 7. Channel-Off Capacitance

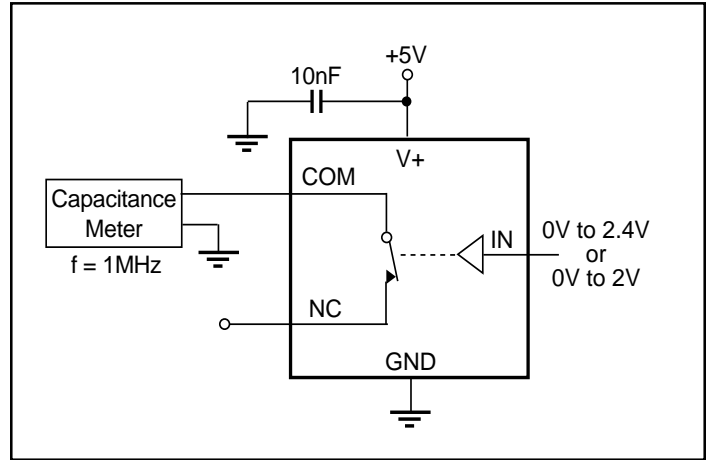


Figure 8. Channel-On Capacitance

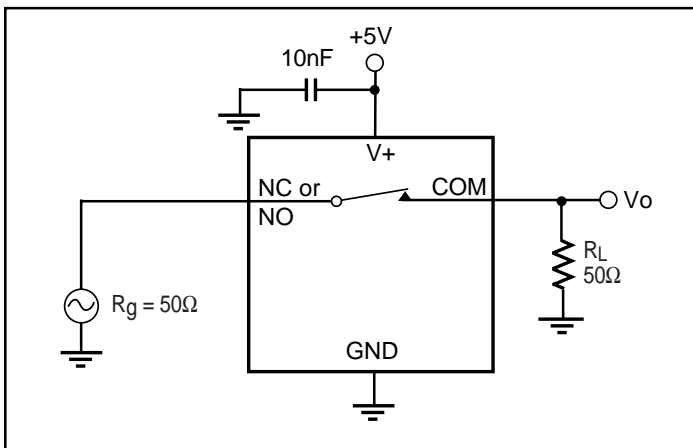
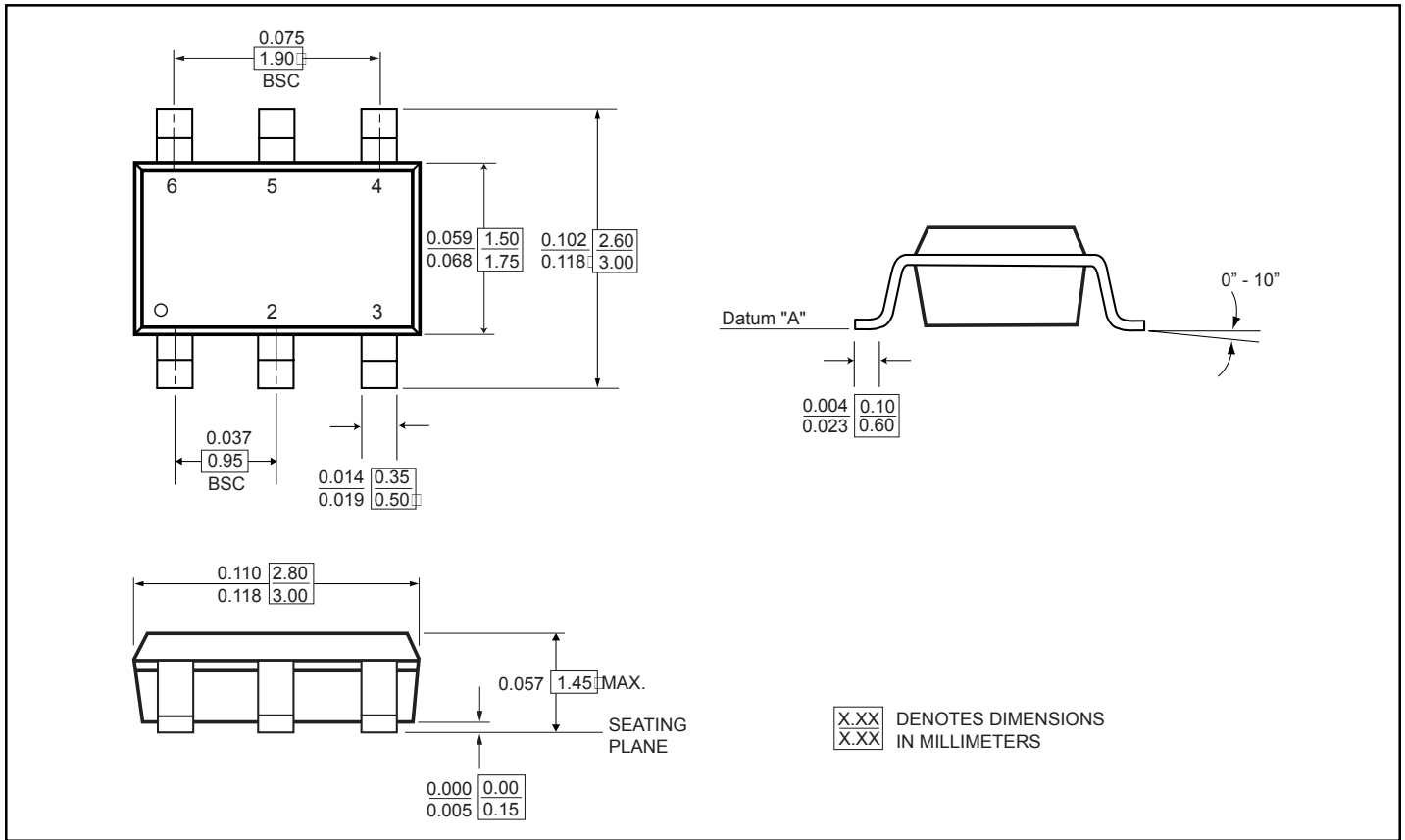


Figure 9. Bandwidth



**Packaging Mechanical: 6-Pin SOT-23 (T)**



**Ordering Information**

Ordering Code	Package Code	Package Description	Top Marking
PI5A4624TX	T	6-pin SOT-23	ZK
PI5A4624TEX	T	Pb-free & Green, 6-pin SOT-23	ZK
PI5A4625TX	T	6-pin SOT-23	ZJ
PI5A4625TEX	T	Pb-free & Green, 6-pin SOT-23	ZJ

**Notes:**

1. Thermal Characteristics can be found on the world wide web at [www.pericom.com/packaging/](http://www.pericom.com/packaging/)
2. Number of transistors : 753 (Both devices)
3. X = Tape and reel