

FEATURES

- Low Voltage Operation (1.8 to 5.5 V)
- Low On-Resistance - $R_{DS(ON)}$: 2Ω
- Off-Isolation and Crosstalk: $-55\text{ dB @ }10\text{ MHz}$
- Fast Switch – $25\text{ nS } t_{ON}$
- Low Charge Injection – Q_{INJ} : 4.7 pC
- Low Power Consumption – $4\ \mu\text{W}$
- High Accuracy High Bandwidth
- TTL and Low Voltage Logic Compatibility
- Low Power Consumption
- Reduced PCB Space

Applications

- Mixed Signal Routing
- Portable and Battery Operated Systems
- Low Voltage Data Acquisition MODEMS
- PCMCIA Cards
- Video Signal Switching
- Avionics
- MODEMS

TRUTH TABLE			
A1	A0	EN	ON Switch
X	X	0	None
0	0	1	S1
0	1	1	S2
1	0	1	S3
1	1	1	S4

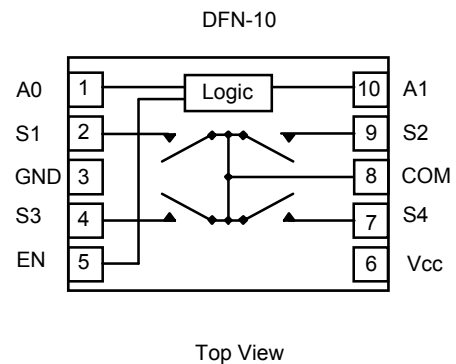
ORDERING INFORMATION		
Temp Range	Package	Part Number
-40 to 85°C	DFN-10	PA2034-T7

DESCRIPTION

The PA2034 is a low voltage, low r_{ON} , high bandwidth single 4 to 1 analog multiplexer.

It is designed for high performance switching of analog and video signals.

Combining low power; fast switching, low on-resistance, flatness and matching, plus small physical size, the PA2034 is ideal for portable and battery operated applications.

Functional Block Diagram

Absolute Maximum Ratings $T_A = 25\text{ }^\circ\text{C}$, unless otherwise noted		
Parameter	Limit	Unit
Reference V+ to Ground	-0.3 to 6.0	V
IN, COM, NC, NO ¹	-0.3 to (V _{cc} + 0.3V)	
Continuous Current (NO,NC,COM pins)	±50	mA
Peak Current (Pulsed at 1mS, 10% duty cycle)	±100	
Storage Temperature	-65 to +150	°C
Power Dissipation	320	mW

Notes:

- Signals on S_x, D_x, EN or A_x exceeding V+ or V- will be clamped by internal diodes. Limit forward diode current to maximum current ratings.
- All leads welded or soldered to PC Board.
- Derate 4.0 mW/°C above 70 °C.

Specifications (V+ = 3 Volts)

Parameter	Symbol	Test Conditions	Temp	Min	Typ	Max	Unit	
Analog Switch								
Analog Signal Range	V_{NO}, V_{NC}, V_{COM}		Full	0.0		V_{CC}	V	
On-Resistance	R_{ON}	$V_{CC} = 2.7V, V_{COM} = 0.9V- 1.5V$ $I_{NO}, I_{NC} = 10mA,$	Room Full		2.0	$\begin{matrix} 5 \\ 7 \end{matrix}$	Ω	
R_{ON} Matching	ΔR_{ON}				0.1	0.3		
R_{ON} Flatness	$R_{ON(FLAT)}$				0.3	1.5		
Switch Off Leakage Current	$I_{OFF(NO)}$ or $I_{OFF(NC)}$	$V+ = 3.3 V,$ $V_{NO}, V_{NC} = 1.0 V/3.0 V, V_{COM} = 3.0 V/1.0 V$	Room Full	-1 -10		-1 -10	nA	
	$I_{COM(OFF)}$		Room Full	-1 -10		-1 -10		
Channel On Leakage Current	$I_{COM(ON)}$	$V+ = 3.3 V, V_{NO}, V_{NC} = V_{COM} = 1.0V/3.0 V$	Room Full	-1 -10		-1 -10		
Digital Control								
Input High Voltage	V_{INH}		Full	2.0			VnA	
Input Low Voltage	V_{INL}		Full			0.4		
Input Capacitance	C_{in}		Full		4		pF	
Input Current	I_{INL} or I_{INH}	$V_{IN} = 0$ or $V+$	Full	-1		1	μA	
Dynamic Characteristics								
Turn On Time	t_{ON}	V_{NO} or $V_{NC} = 2.0 V, R_L = 300 \Omega, C_L = 35 pF$	Room Full		20	$\begin{matrix} 30 \\ 45 \end{matrix}$	nS	
Turn Off Time	t_{OFF}		Room Full		13	$\begin{matrix} 15 \\ 20 \end{matrix}$		
Break Before Make Time	t_{BBM}		Room Full		10.5			
Charge Injection	Q_{INJ}	$C_L = 1 nF, V_{GEN} = 0 V, R_{GEN} = 0 \Omega$	Room		-4.7		pC	
Off Isolation	OIRR	$R_L = 50 \Omega, C_L = 5 pF,$	Room		-109.3		dB	
Crosstalk	X_{TALK}		$f = 10 MHz$	Room		-67.3		
			$f = 1 MHz$	Room		-77		
			$f = 10 MHz$	Room		-67.3		
NO, NC OFF Capacitance	$C_{NO(off)}$ $C_{NC(off)}$	$V_{IN} = 0$ or $V+, f = 1 MHz$	Room		14		pF	
Chanel On Capacitance	C_{ON}		Room	42	67	77		
Power Supply								
Positive Supply Range	V+	$V_{IN} = 0$ or $V+$		2.7		3.3	V	
Negative Supply Current	I+				0.01	1.0	μA	

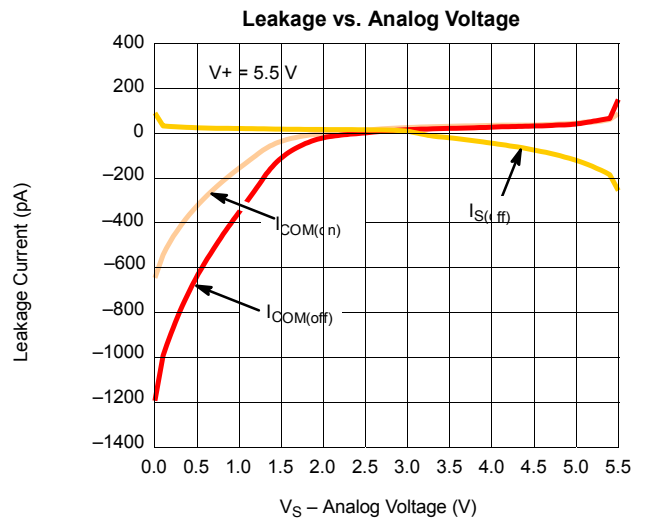
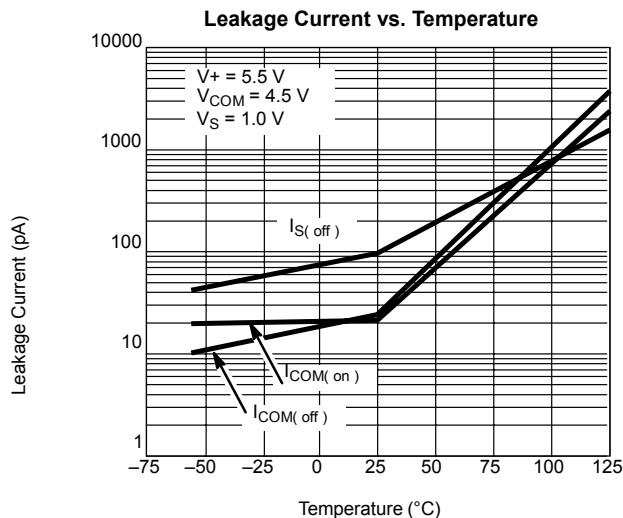
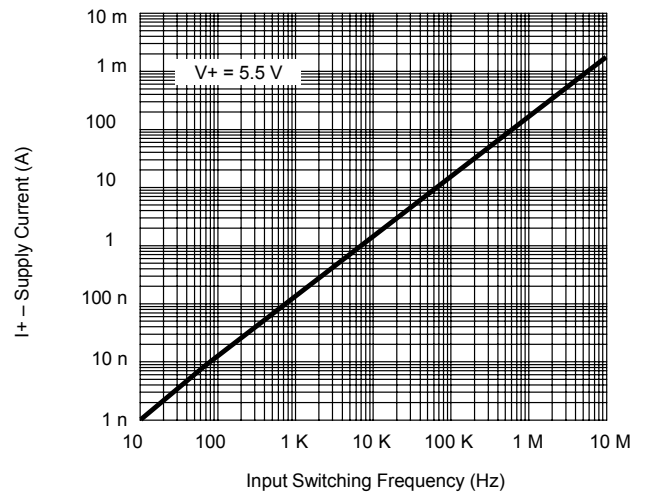
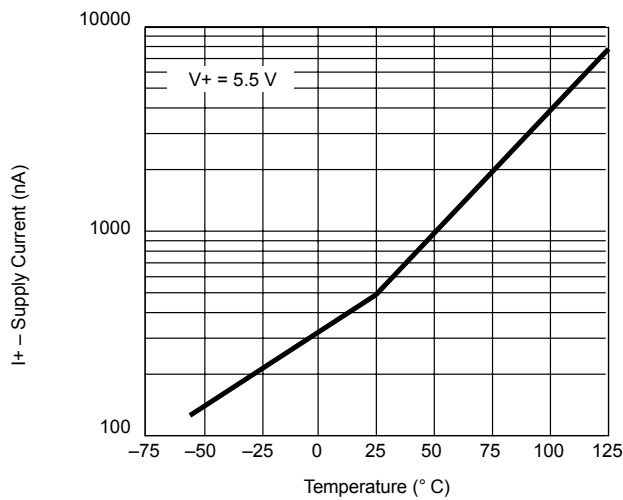
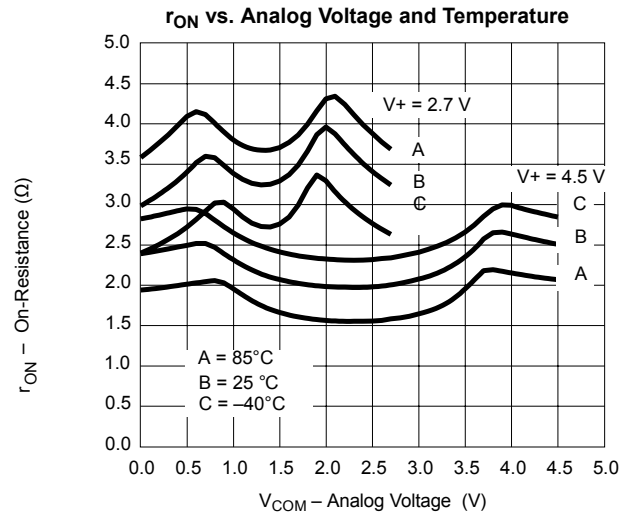
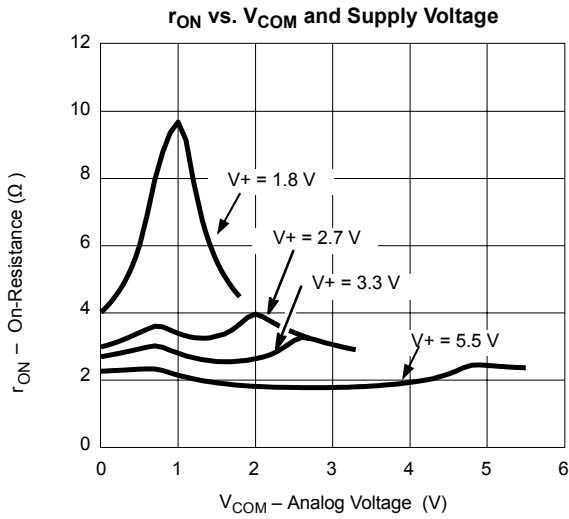
Notes:

- Room = 25°C, Full = as determined by the operating suffix.
- The algebraic convention whereby the most negative value is a minimum and the most positive a maximum is used in this data sheet.
- Typical values are for design aid only, not guaranteed nor subject to production testing.
- Guarantee by design, not subjected to production test.
- V_A, E_N = input voltage to perform proper function.
- Difference of min and max values.

Specifications (V+ = 5 Volts)

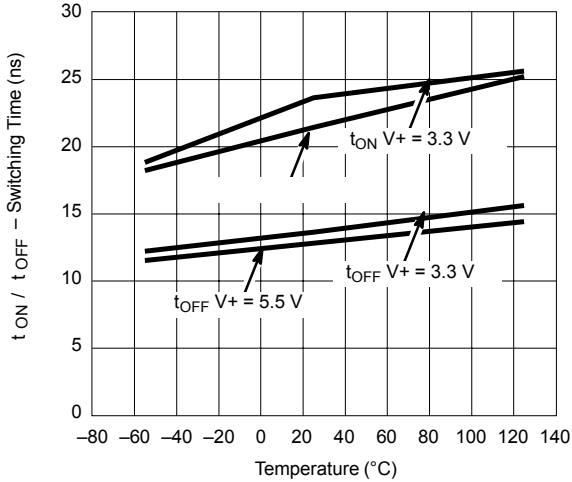
Parameter	Symbol	Test Conditions	Temp	Min	Typ	Max	Unit
Analog Switch							
Analog Signal Range	V_{NO}, V_{NC}, V_{COM}		Full	0.0		V_{CC}	V
On-Resistance	R_{ON}	$V_{CC} = 2.7V, V_{COM} = 0.9V - 1.5V$ $I_{NO}, I_{NC} = 10mA,$	Room		2.0	5	Ω
R_{ON} Matching	ΔR_{ON}		Full		0.1	0.3	
R_{ON} Flatness	$R_{ON(FLAT)}$				0.3	1.5	
Switch Off Leakage Current	$I_{OFF(NO)}$ or $I_{OFF(NC)}$	$V+ = 3.3 V,$ $V_{NO}, V_{NC} = 1.0 V/3.0 V, V_{COM} = 3.0 V/1.0 V$	Room	-1		-1	nA
	$I_{COM(OFF)}$		Full	-10		-10	
Channel On Leakage Current	$I_{COM(ON)}$	$V+ = 3.3 V, V_{NO}, V_{NC} = V_{COM} = 1.0V/3.0 V$	Room	-1		-1	
Full			Full	-10		-10	
Digital Control							
Input High Voltage	V_{INH}		Full	2.0			VnA
Input Low Voltage	V_{INL}		Full			0.4	
Input Capacitance	C_{in}		Full		4		pF
Input Current	I_{INL} or I_{INH}	$V_{IN} = 0$ or $V+$	Full	-1		1	μA
Dynamic Characteristics							
Turn On Time	t_{ON}	V_{NO} or $V_{NC} = 2.0 V, R_L = 300 \Omega, C_L = 35 pF$	Room		20	30	nS
Turn Off Time	t_{OFF}		Full		13	15	
Break Before Make Time	t_{BBM}		Full		10.5	20	
Charge Injection	Q_{INJ}	$C_L = 1 nF, V_{GEN} = 0 V, R_{GEN} = 0 \Omega$	Room		-4.7		pC
Off Isolation	OIRR	$R_L = 50 \Omega, C_L = 5 pF,$	f = 1 MHz	Room		-109.3	dB
			f = 10 MHz	Room		-67.3	
Crosstalk	X_{TALK}		f = 1 MHz	Room		-77	
			f = 10 MHz	Room		-67.3	
NO, NC OFF Capacitance	$C_{NO(off)}$ $C_{NC(off)}$	$V_{IN} = 0$ or $V+, f = 1 MHz$	Room		14		pF
Chanel On Capacitance	C_{ON}		Room	42	67	77	
Power Supply							
Positive Supply Range	V+	$V_{IN} = 0$ or $V+$		2.7		3.3	V
Negative Supply Current	I+				0.01		1.0

Typical Characteristics: 25° C Unless Noted

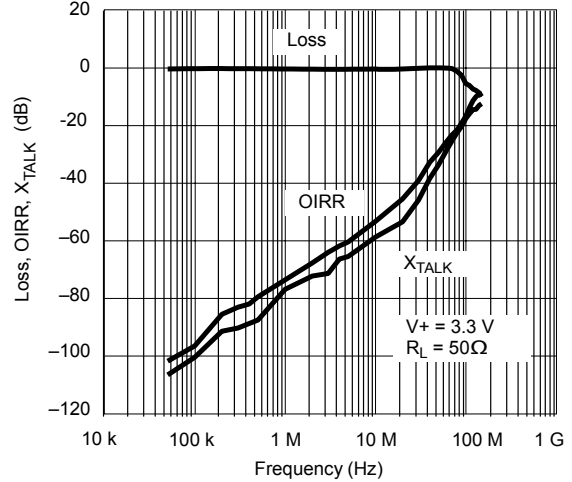


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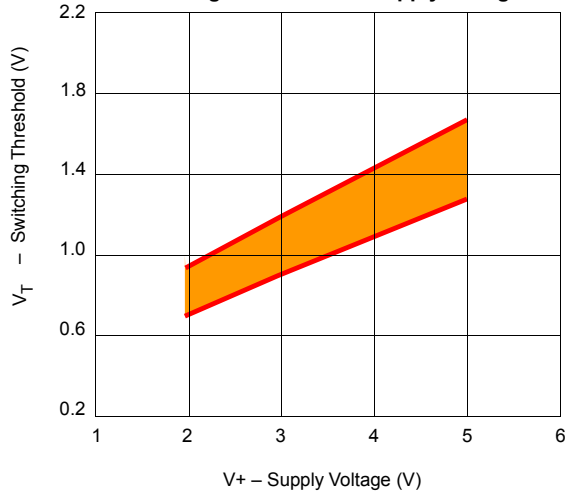
Switching Time vs. Temperature



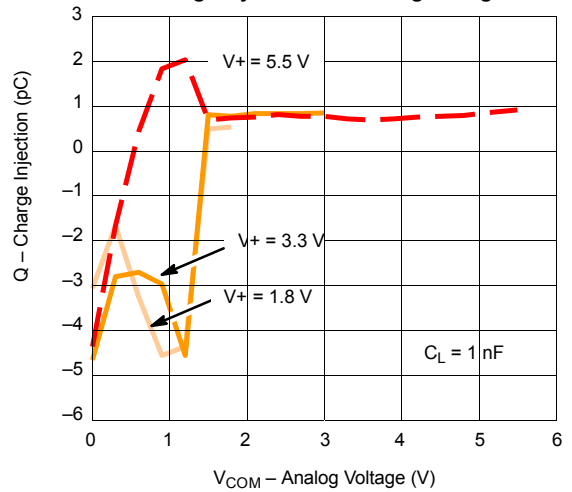
Insertion Loss, Off-Isolation Crosstalk vs. Frequency



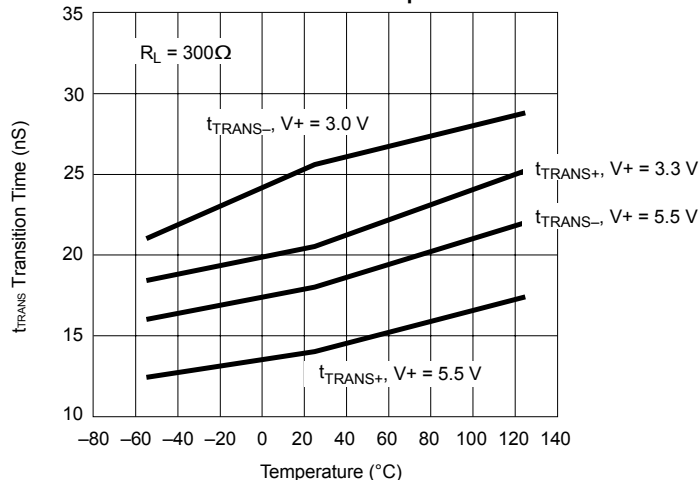
Switching Threshold vs. Supply Voltage



Charge Injection vs. Analog Voltage



Transition Time vs. Temperature



Test Circuits.

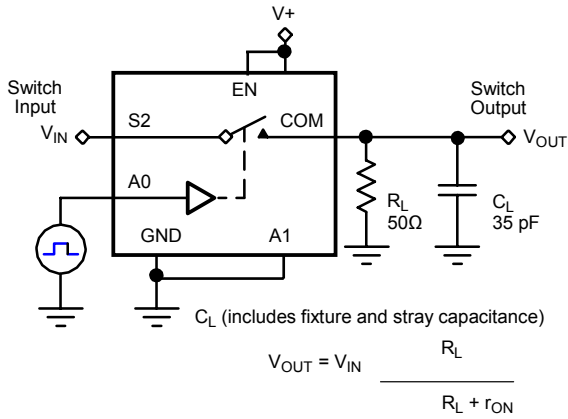
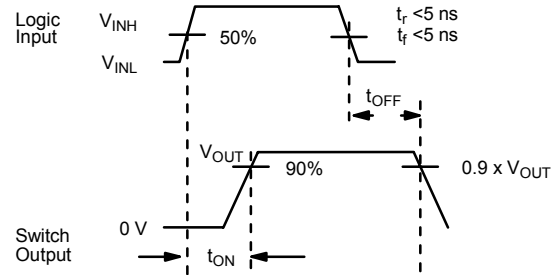


Figure 1. Switching Time



Note: Logic input waveform is inverted for switches that have the opposite logic sense control

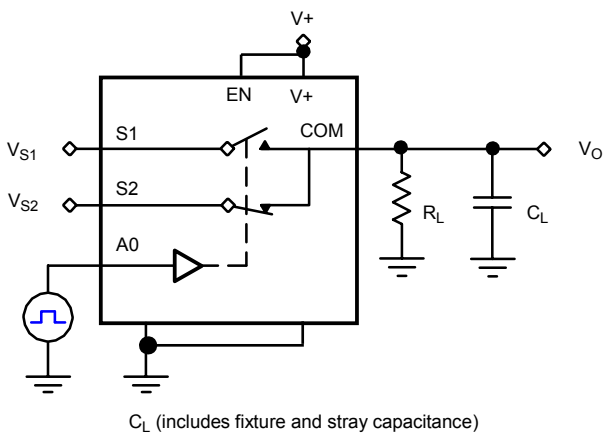


Figure 2. Break-Before-Make

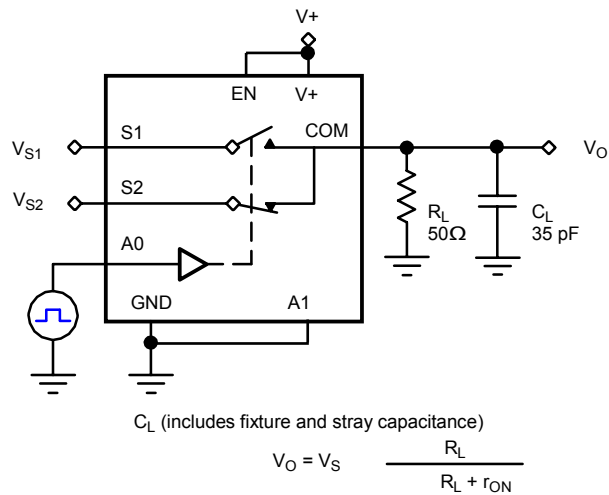
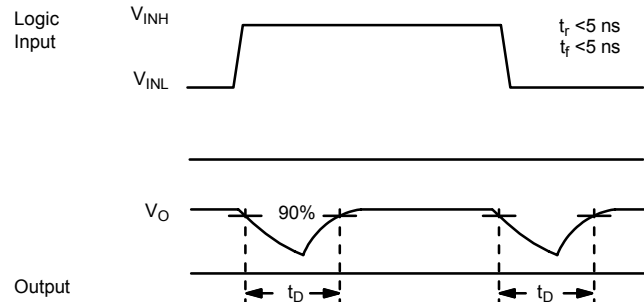
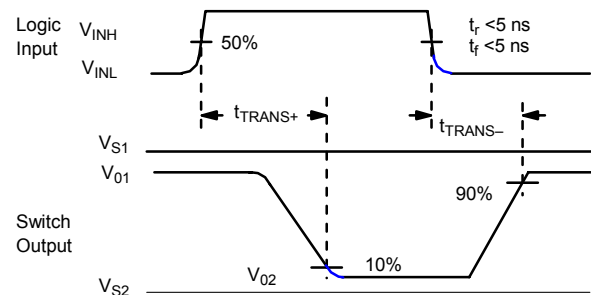


Figure 3. Transition Time



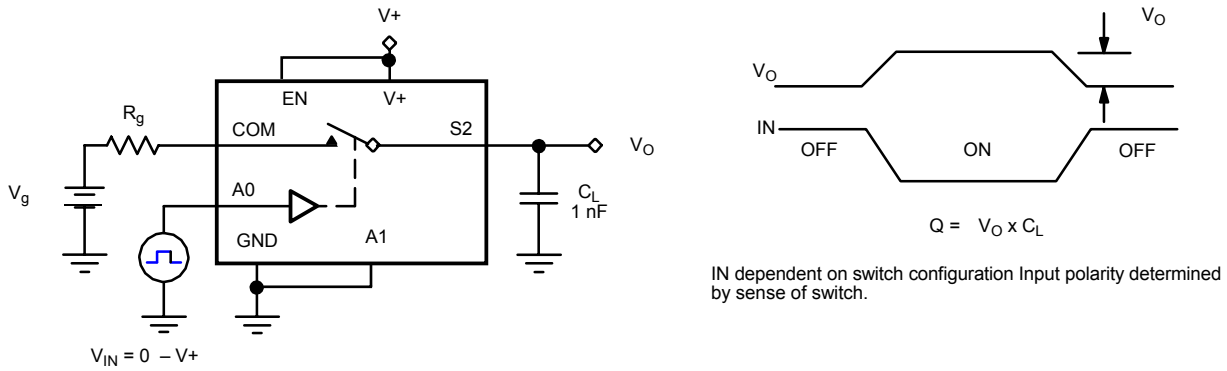


Figure 4. Charge Injection

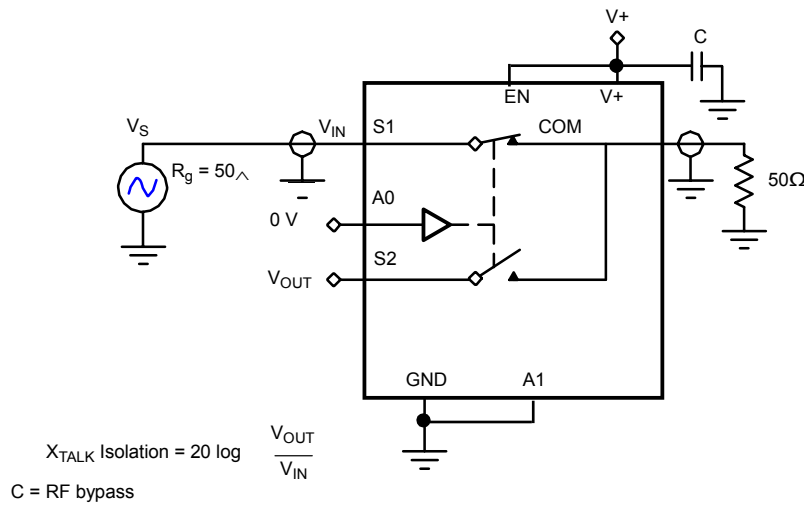


Figure 5. Crosstalk

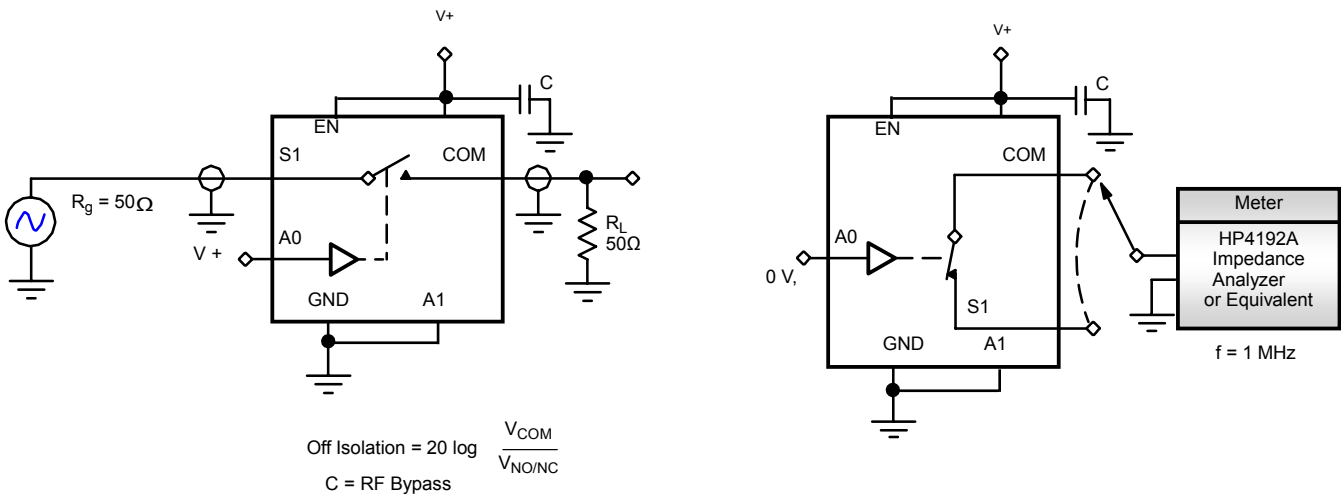
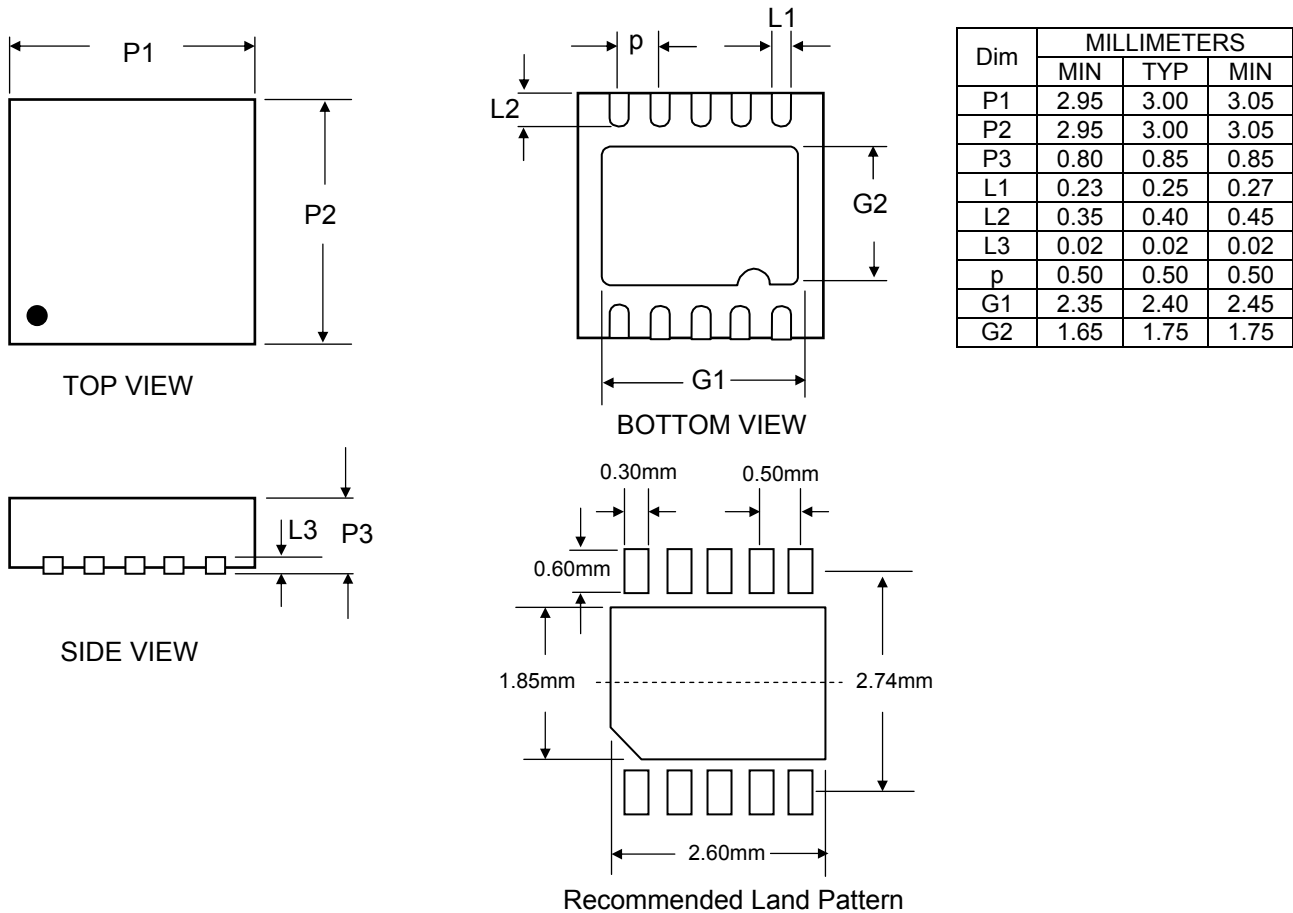


Figure 6. Off Isolation

Package Outline and Dimensions DFN-10



Tape and Reel Specifications

Reel Dia	A0	B0	K0	D	E	F	W	P0	P2	P	t-max
178 (7")	3.00±0.10	3.00±0.10	0.85±0.10	1.50±0.10	1.75±0.10	3.50±0.05	12.00±0.30	4.00±0.10	2.00±0.05	4.00±0.10	0.25

