0.4Ω Ultra Low ON-Resistance, Dual, SPDT Analog Switch

UM2268 ***QFN10 1.8×1.4***
UM2268A ***QFN10 2.1×1.6***

General Description

The UM2268/UM2268A is a dual, low-power single-pole/ double-throw (SPDT) analog switch that operates from a single +1.8V to +4.4V supply.
The UM2268/UM2268A features guaranteed on-resistance matching (0.04Ω TYP) between switches and guaranteed on resistance flatness over the signal range (0.08Ω TYP), as well as high off-isolation and low crosstalk. This ensures excellent linearity and low distortion when switching audio signals.
The UM2268 is available in Pb-free QFN10 package (1.8mm×1.4mm×0.55mm), while the UM2268A is available in Pb-free QFN10 package (2.1mm×1.6mm×0.55mm).

Applications

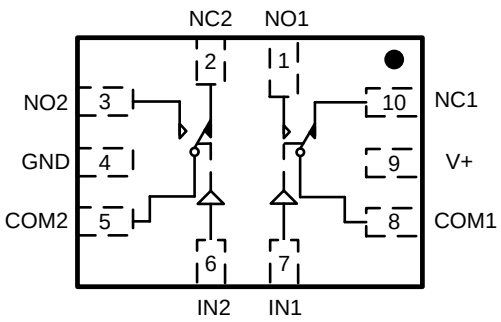
- Portable Instrumentation
- Battery-Operated Equipment
- Computer Peripherals
- Speaker and Earphone Switching
- Medical Equipment
- Audio and Video Switching

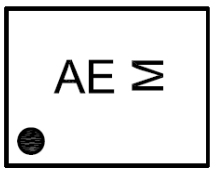
Features

- V_{CC} Operating Range: +1.8V to +4.4V
- Low On-Resistance: 0.4Ω(TYP) at +4.4V
- On-Resistance Matching: (0.04Ω TYP)
- On-Resistance Flatness: (0.08Ω TYP)
- -3dB Bandwidth:80MHz
- Low Off-Isolation: -78dB (100kHz)
- Low Crosstalk: -93dB (100kHz)
- TTL/CMOS Compatible
- Break-Before-Make Switching
- Rail-to-Rail Input and Output Operation
- Lead (Pb) Free QFN10 Package

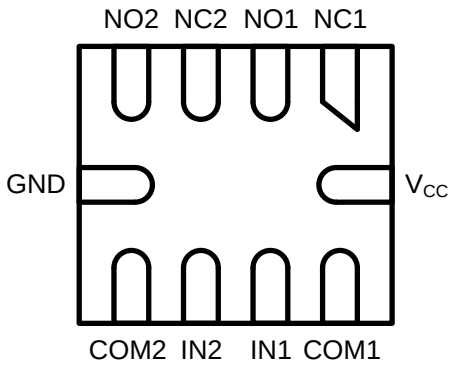
Pin Configurations

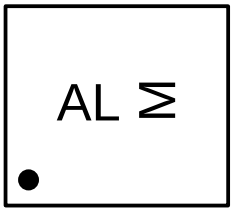
Top View





M: Month Code
UM2268
QFN10 1.8×1.4





M: Month Code
UM2268A
QFN10 2.1×1.6

Ordering Information

Part Number	Packaging Type	Marking Code	Shipping Qty
UM2268	QFN10 1.8mm×1.4mm	AE	3000pcs/7 Inch Tape & Reel
UM2268A	QFN10 2.1mm×1.6mm	AL	

Pin Description

UM2268	UM2268A	Name	Function
1,3	2,4	NO1,NO2	Normally-open terminal
10,2	1,3	NC1,NC2	Normally-closed terminal
4	5	GND	Ground
8,5	9,6	COM1,COM2	Common terminal
7,6	8,7	IN1,IN2	Digital control pin to connect the COM terminal to the NO or NC terminals
9	10	V+	Power Supply

Function Table

LOGIC	NO	NC
0	OFF	ON
1	ON	OFF

Absolute Maximum Ratings

Symbol	Parameter	Limit	Unit
V_+	Supply Voltage	0 to + 4.6	V
V_{IS}	Analog Switch Input Voltage	-0.3 to (V_{CC} + 0.3)	
V_{IN}	Digital Select Input Voltage	0 to + 4.6	
I_D	Continuous DC Current	250	mA
I_P	Peak Current	350	mA
T_O	Operating Temperature Range	- 40 to +85	℃
T_{STG}	Storage Temperature Range	- 65 to +150	
ESD	HBM	4000	V

Electrical Characteristics

V+ = +4.4V, GND = 0V, T_A = -40℃ to + 85℃. Unless otherwise noted.

Symbol	Parameter	Test Conditions	Vcc (V)	Temp	Limits (–40 to 85 ℃)			Unit
					Min	Typ (Note1)	Max	
V+	Power Supply Range			Full	1.8		4.4	V
I_{CC}	Quiescent Supply Current	V_{IN} =V_+ or 0	4.4	Full			1.0	μA
I_{IN}	Input Leakage Current	V_{IN}=0V/4.4V	4.4	Full			1.0	μA
I_{OFF}	Power Off Leakage Current	V_{NO}/V_{NC}=3.3V/0.3V, V_{COM}=0.3V/3.3V	4.4	Full			1.0	μA
I_{ON}	Channel ON Leakage Current	V_{COM}=0.3V/3.3V V_{NO} or V_{NC}=0.3V/3.3V, or floating	4.4	Full			1.0	μA
R_{ON}	On-Resistance (Note2)	$V_{NO,}V_{NC}$ or V_{COM}=1.0V, I_{COM}=-100mA	4.4	Room Full		0.4	0.75 0.85	Ω
ΔR_{ON}	On Resistance Match Between Channels (Note2,3,4)	$V_{NO,}V_{NC}$ or V_{COM}=1.0V, I_{COM}=-100mA	4.4	Room Full		0.04	0.15 0.20	Ω
R_{FLAT}	On Resistance Flatness (Note2,3,5)	$V_{NO,}V_{NC}$ or V_{COM}=1.0V,2.5V I_{COM}=-100mA	4.4	Room Full		0.08	0.12 0.20	Ω
V_{IH}	Input High Voltage		4.4	Full	2.0			V
V_{IL}	Input Low Voltage		4.4	Full			0.5	V
t_{ON}	Turn On Time	V_{IN} =2.1V to 0V, R_L=50Ω,C_L=35pF, $V_{NO1,}$or V_{NC1}= $V_{NO2,}$or V_{NC2}=2.1V,Test Circuit1	4.4	Room		88		ns
t_{OFF}	Turn Off Time	V_{IN} =2.1V to 0V, R_L=50Ω,C_L=35pF, $V_{NO1,}$or V_{NC1}= $V_{NO2,}$or V_{NC2}=2.1V,Test Circuit1	4.4	Room		16		ns
t_{BBM}	Break Before Make Time (Note 6)	V_{IN} =2.1V to 0V, R_L=50Ω,C_L=35pF, $V_{NO1,}$or V_{NC1}= $V_{NO2,}$or V_{NC2}=2.1V,Test Circuit2	4.4	Room		6		ns
O_{IRR}	Off Isolation (Note 7)	V_{BIAS}=2.1V, Signal=0dBm, Test Circuit3 — 100kHz	4.4	Room		-78		dB
		1MHz		Room		-58		dB
X_{TALK}	Crosstalk	V_{BIAS}=2.1V, Signal =0dBm, Test Circuit4 — 100kHz	4.4	Room		-93		dB
		1MHz		Room		-90		dB
BW	-3dB Bandwidth	V_{BIAS}=2.1V, Signal = 0dBm, Test Circuit5	4.4	Room		80		MHz
Q	Charge Injection Select Input to Common I/O	V_G=0V,R_S=0Ω, C_L=1.0nF,Test Circuit6	4.4	Room		4.0		pC
C_{ON}	HSD+ HSD- ON Capacitance (Note8)		4.4	Room		56		pF

1: Typically values are at V_+=4.4V and T_A=+25℃.
2: Guaranteed by design. Resistance measurements do not include test circuit or package resistance.
3: Parameter is characterized but not tested in production.
4: ΔR_{ON} = $|R_{ON\,(NO1/NC1)} - R_{ON(NO2/NC2)}|$ measured at identical V_{CC}, temperature and voltage levels.
5: Flatness is defined as the difference between the maximum and minimum value of On Resistance over the specified range of conditions.
6: Guaranteed by Design.
7: Off Isolation = 20 log10 [V_{COM}/$V_{NO/NC}$].
8: T_A = +25, f = 1 MHz, Capacitance is characterized but not tested in production.

Electrical Characteristics

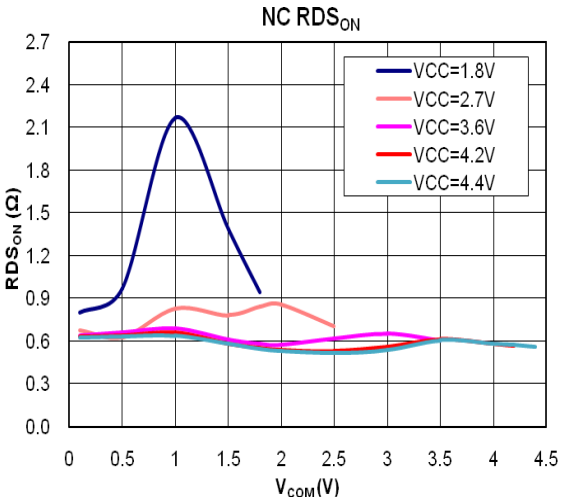
V+ = +2.7V to +3.6V, T_A = -40℃ to + 85℃. Unless otherwise noted.

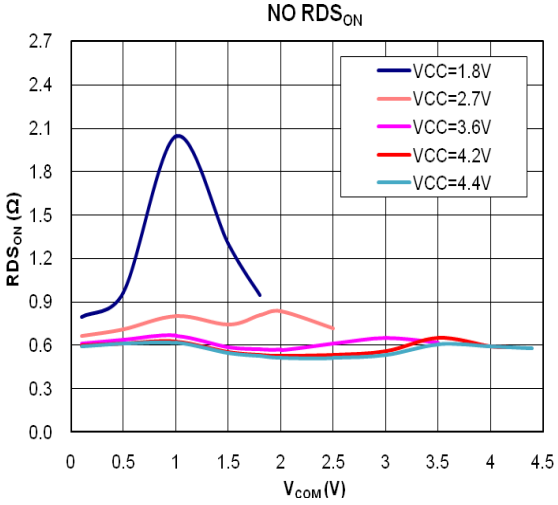
Symbol	Parameter	Test Conditions		Vcc (V)	Temp	Limits (–40 to 85 ℃)			Unit
						Min	Typ (Note1)	Max	
V_{NO},V_{NC}, V_{COM}	Analog Signal Range				Full	0		V+	V
I_{IN}	Input Leakage Current	V_{IN}=0V/2.7V		2.7	Full			1.0	μA
I_{OFF}	Power Off Leakage Current	V_{NO}/V_{NC}=3.3V/0.3V, V_{COM}=0.3V/3.3V		3.6	Full			1.0	μA
I_{ON}	Channel ON Leakage Current	V_{COM}=0.3V/3.3V V_{NO} or V_{NC}=0.3V/3.3V, or floating		3.6	Full			1.0	μA
R_{ON}	On-Resistance (Note2)	$V_{NO,}V_{NC}$ or V_{COM}=1.0V, I_{COM}=-100mA		2.7	Room Full		0.75	1.10 1.20	Ω
ΔR_{ON}	On Resistance Match Between Channels (Note2,3,4)	$V_{NO,}V_{NC}$ or V_{COM}=1.0V, I_{COM}=-100mA		2.7	Room Full		0.03	0.15 0.20	Ω
R_{FLAT}	On Resistance Flatness (Note2,3,5)	$V_{NO,}V_{NC}$ or V_{COM}=1.0V,2.5V I_{COM}=-100mA		2.7	Room Full		0.10	0.18 0.20	Ω
V_{IH}	Input High Voltage			3.0	Full	1.5			V
V_{IL}	Input Low Voltage			3.0	Full			0.4	V
t_{ON}	Turn On Time	V_{IN} =1.5V to 0V, R_L=50Ω,C_L=35pF, $V_{NO1,}$or V_{NC1}= $V_{NO2,}$or V_{NC2}=1.5V,Test Circuit1		3.0	Room		100		ns
t_{OFF}	Turn Off Time	V_{IN} =1.5V to 0V, R_L=50Ω,C_L=35pF, $V_{NO1,}$or V_{NC1}= $V_{NO2,}$or V_{NC2}=1.5V,Test Circuit1		3.0	Room		20		ns
t_{BBM}	Break Before Make Time (Note 6)	V_{IN} =1.5V to 0V, R_L=50Ω,C_L=35pF, $V_{NO1,}$or V_{NC1}= $V_{NO2,}$or V_{NC2}=1.5V,Test Circuit2		3.0	Room		9.2		ns
O_{IRR}	Off Isolation (Note 7)	V_{BIAS}=2.1V, Signal = 0dBm, Test Circuit3	100kHz	3.0	Room		-78		dB
			1MHz		Room		-58		dB
X_{TALK}	Crosstalk	V_{BIAS}=2.1V, Signal = 0dBm, Test Circuit4	100kHz	3.0	Room		-93		dB
			1MHz		Room		-90		dB
BW	-3dB Bandwidth	V_{BIAS}=2.1V, Signal=0dBm, Test Circuit5		3.0	Room		80		MHz
Q	Charge Injection Select Input to Common I/O	V_G=0V,R_S=0Ω, C_L=1.0nF, Test Circuit6		3.0	Room		3.0		pC
C_{ON}	HSD+ HSD- ON Capacitance (Note8)			3.0	Room		56		pF

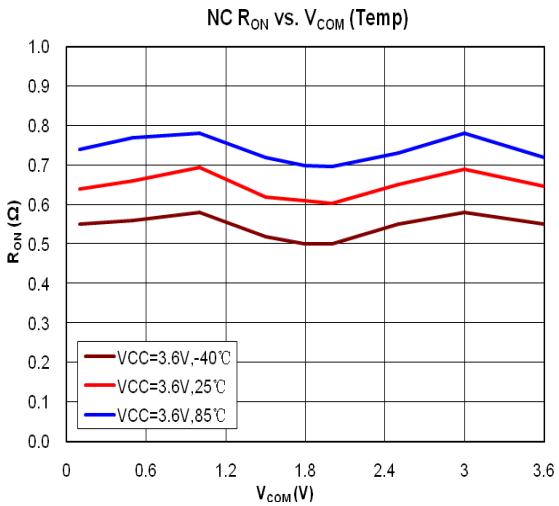
1: T_A=+25℃.
2: Guaranteed by design. Resistance measurements do not include test circuit or package resistance.
3: Parameter is characterized but not tested in production.
4: $\Delta R_{ON} = | R_{ON\,(NO1/NC1)} - R_{ON(NO2/NC2)} |$ measured at identical V_{CC}, temperature and voltage levels.
5: Flatness is defined as the difference between the maximum and minimum value of On Resistance over the specified range of conditions.
6: Guaranteed by Design.
7: Off Isolation = 20 log10 [V_{COM}/$V_{NO/NC}$].
8: T_A = +25, f = 1 MHz, Capacitance is characterized but not tested in production.

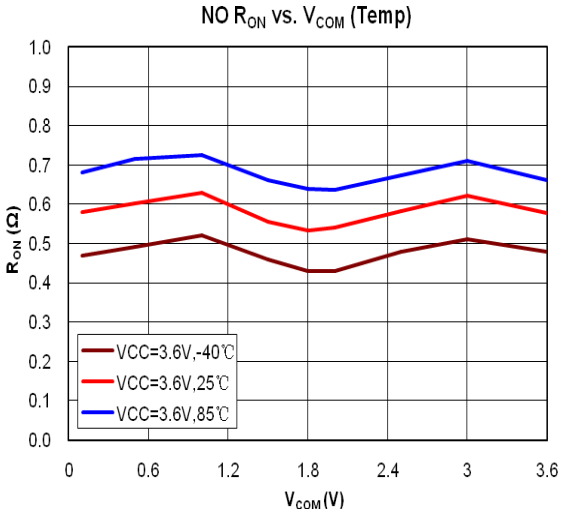
Typical Operating Characteristics

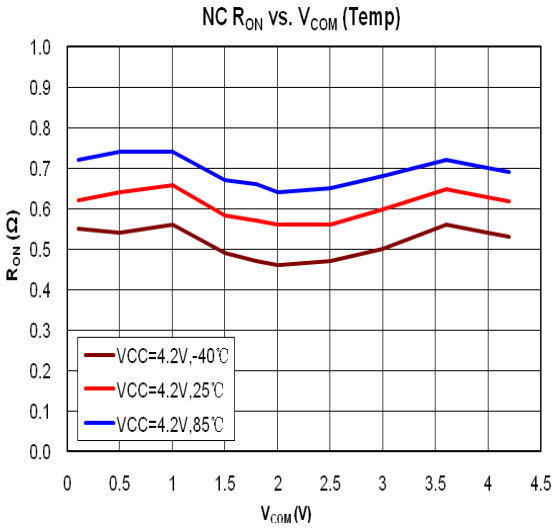
(T_A=+25℃. Unless otherwise noted.)

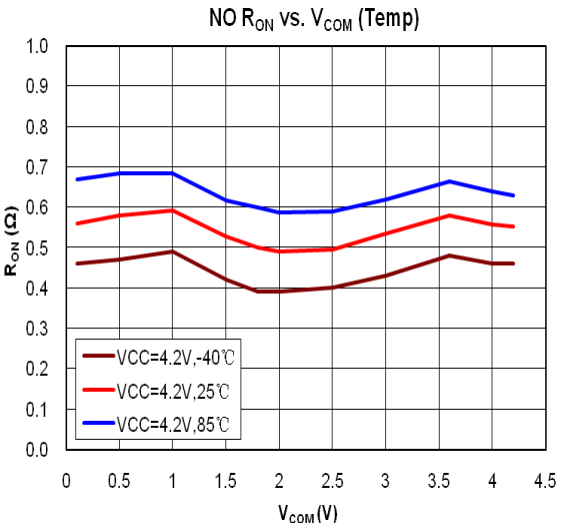






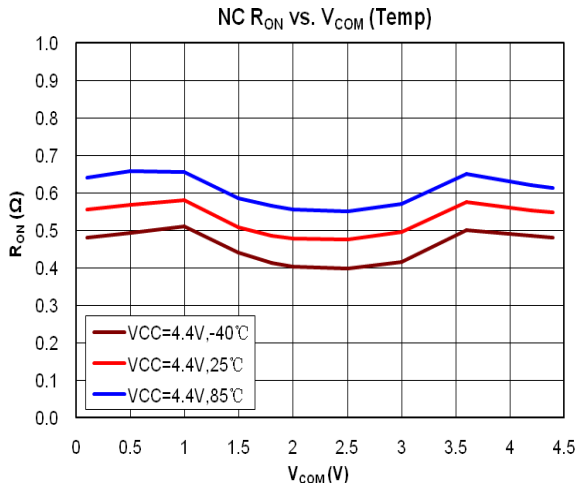


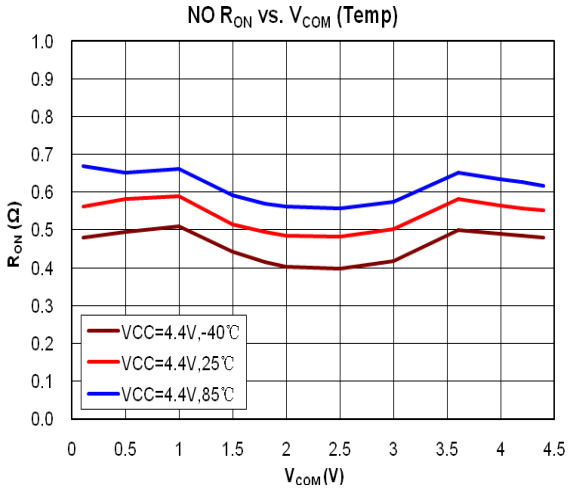


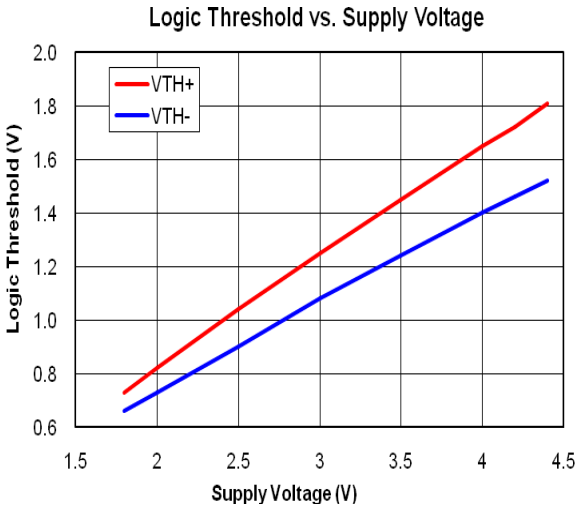


Typical Operating Characteristics (Continued)

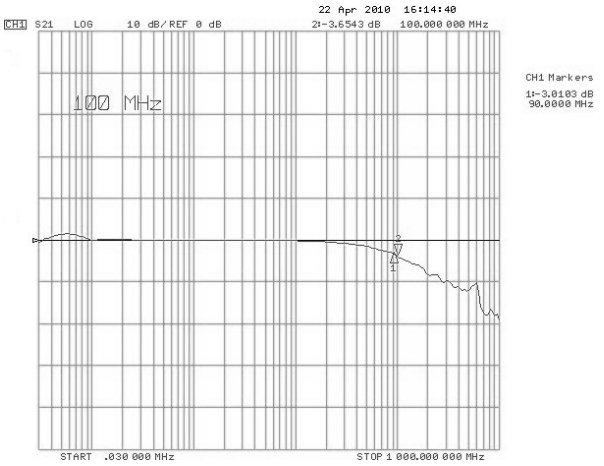
(T_A=+25℃. Unless otherwise noted.)



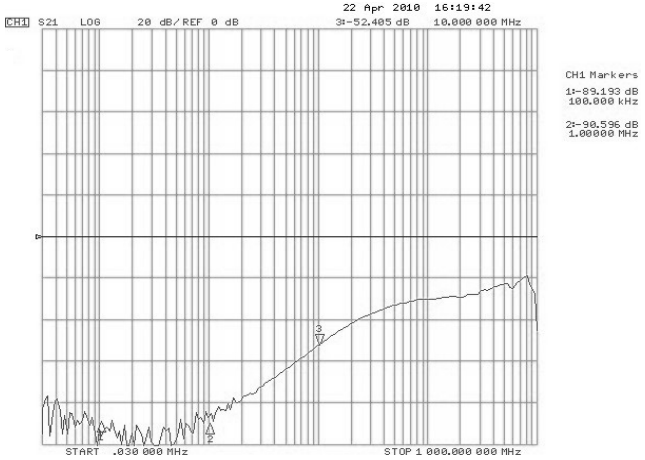




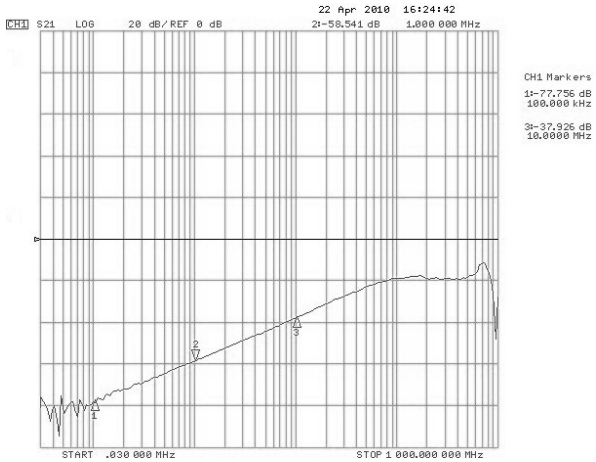
Bandwidth



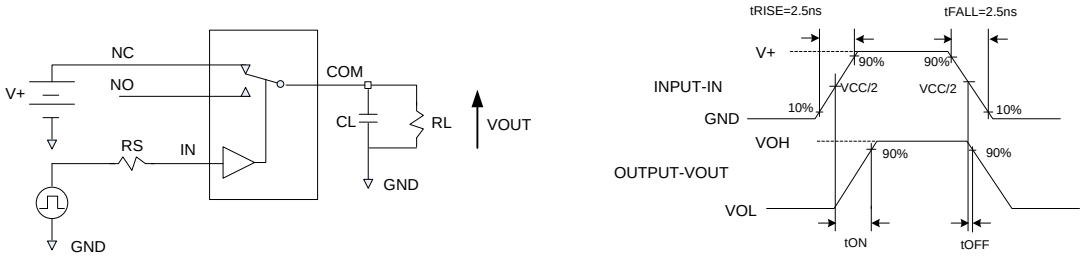
Crosstalk



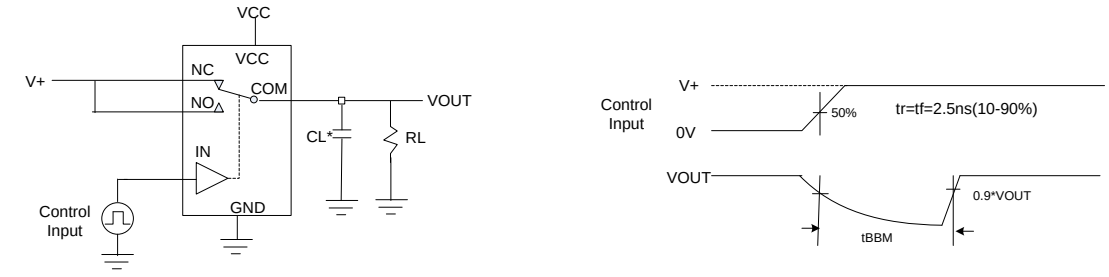
Off Isolation



Test Circuits

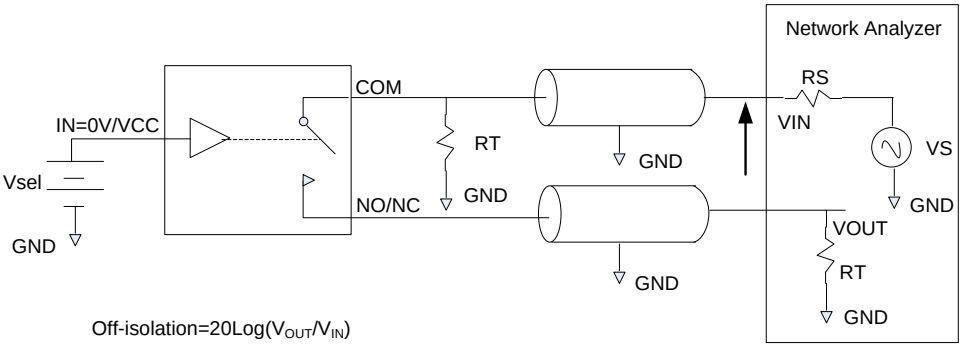


Test Circuit 1. Switching Timing (ton, toff)

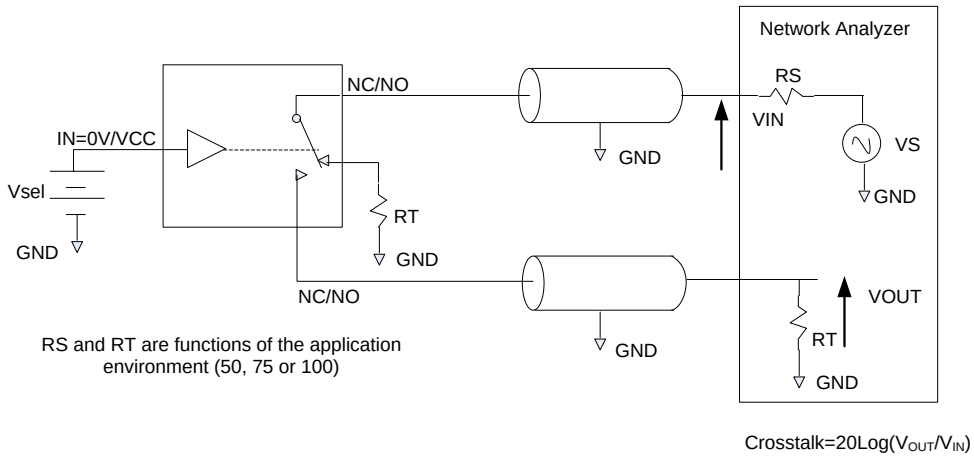


CL* includes fixture and stray capacitance

Test Circuit 2. Break-Before-Make Timing

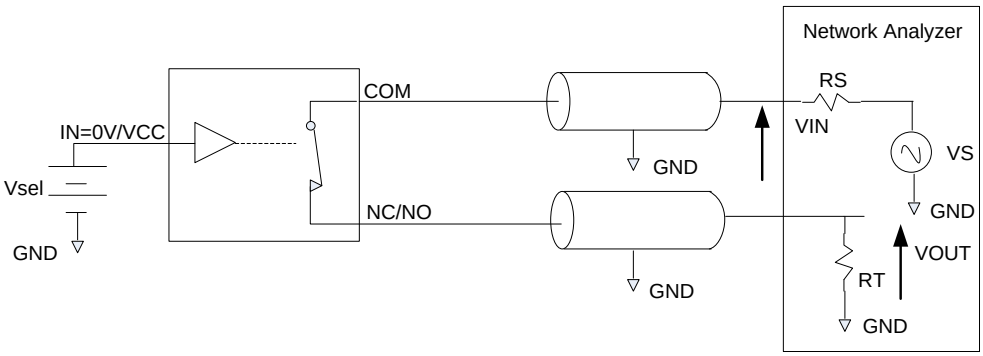


Test Circuit 3. Off-Isolation

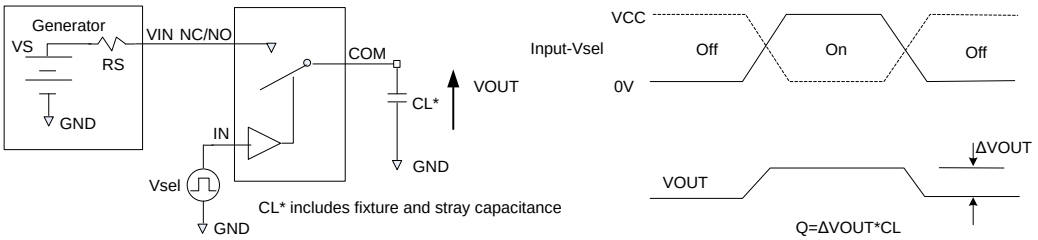


Crosstalk=20Log(V_{OUT}/V_{IN})

Test Circuit 4. Channel-to-Channel Crosstalk



Test Circuit 5. Bandwidth

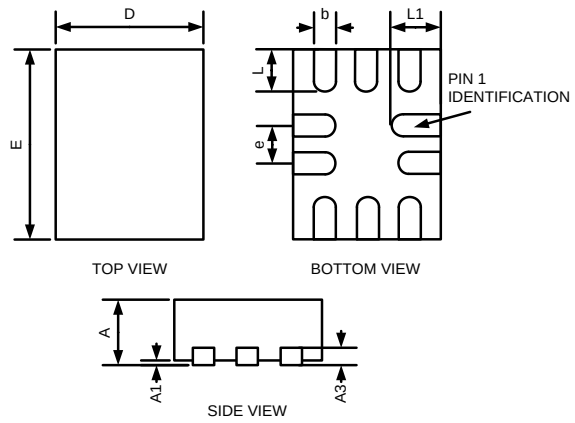


Test Circuit 6. Charge Injection Test

Package Information

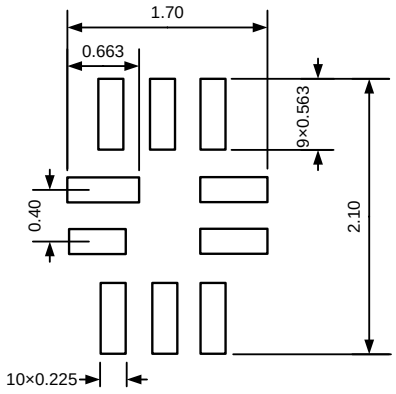
UM2268 QFN10 1.8×1.4

Outline Drawing



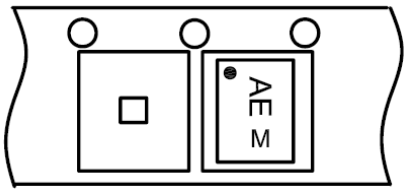
DIMENSIONS			
Symbol	MILLIMETERS		
	MIN	TYP	MAX
A	0.50	0.55	0.60
A1	0.00	-	0.05
A3	0.15REF		
D	1.35	1.40	1.45
E	1.75	1.80	1.85
b	0.15	0.20	0.25
L	0.30	0.40	0.50
L1	0.40	0.50	0.60
e	0.40BSC		

Land Pattern



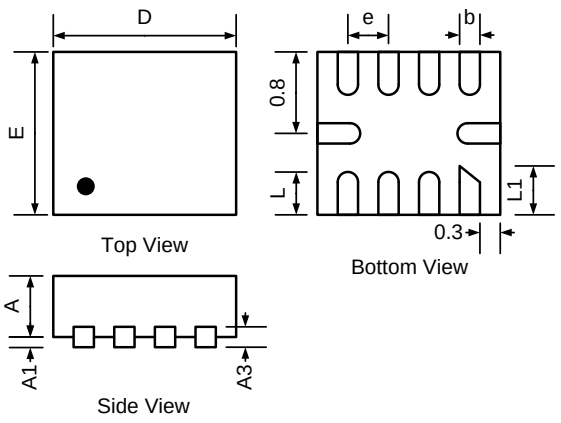
NOTES:
1. Compound dimension: 1.80×1.40;
2. Unit: mm;
3.General tolerance ±0.05mm unless otherwise specified;
4. The layout is just for reference.

Tape and Reel Orientation



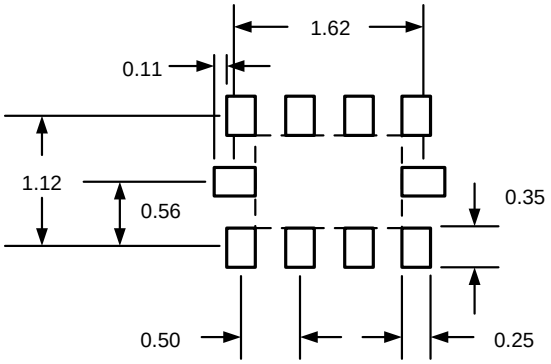
UM2268A QFN10 2.1×1.6

Outline Drawing



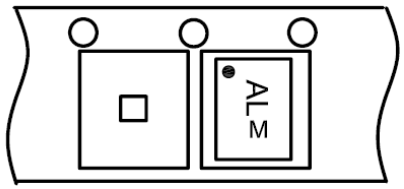
DIMENSIONS			
Symbol	MILLIMETERS		
	MIN	TYP	MAX
A	0.50	0.55	0.60
A1	0.00	-	0.05
A3	0.15 REF		
D	2.05	2.10	2.15
E	1.55	1.60	1.65
L	0.35	0.40	0.45
L1	0.40	0.45	0.50
e	0.50BSC		

Land Pattern



NOTES:
1. Compound dimension: 2.10×1.60;
2. Unit: mm;
3.General tolerance ±0.05mm unless otherwise specified;
4. The layout is just for reference.

Tape and Reel Orientation



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