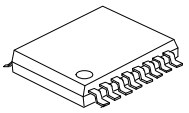
4.5Ω, LOW VOLTAGE QUAD, HIGH SPEED,SPDT ANALOG SWITCH



TSSOP-16

■ DESCRIPTION

The UTC **UMX4214** is a quad, SPDT (single-pole/double-throw), TTL/CMOS compatible analog switch. It operates from a 1.8V to 5.5V single power supply.

The UTC **UMX4214** features high-speed, low on-resistance, low voltage and high bandwidth. The high performances make it very suitable for multiple applications, such as portable equipment, audio and video signal routing, etc. Low power consumption is also one of the important reasons that make it a good choice.

■ FEATURES

* Single Supply Voltage Range: 1.8V ~ 5.5V
* Low On-Resistance: 4.5Ω (TYP)
* Rail-to-Rail Input and Output Operation
* TTL/CMOS Compatible
* Low On-Resistance Flatness
* Fast Switching Times:
  t_{ON}: 25ns
  t_{OFF}:25ns
* Low Power Consumption

■ ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen Free		
UMX4214L-P16-R	UMX4214G-P16-R	TSSOP-16	Tape Reel

UMX4214G-P16-R (1)Packing Type (2)Package Type (3)Green Package	(1) R: Tape Reel (2) P16: TSSOP-16 (3) G: Halogen Free and Lead Free, L: Lead Free

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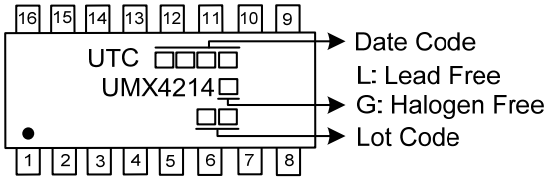
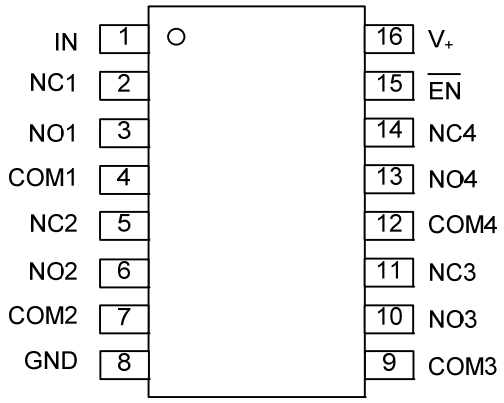
■ MARKING



■ PIN CONFIGURATION



■ PIN DESCRIPTION

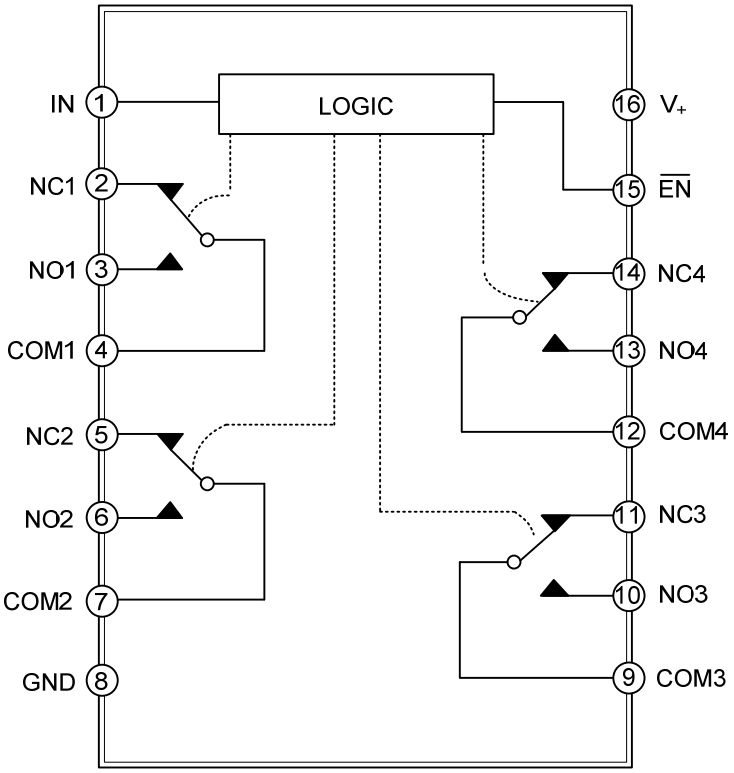
PIN NO.	PIN NAME	DESCRIPTION
1	IN	Digital Control Input Pin to Connect the COM Pins to the NO or NC Pins.
2, 5, 11, 14	NCx	Normally Closed Pins.
3, 6, 10, 13	NOx	Normally Open Pins.
4, 7, 9, 12	COMx	Common Pins.
8	GND	Ground.
15	$\overline{EN}$	Digital Enable Control. Normally connect to GND. Drive to logic high to set all switches off.
16	V_+	Positive Power Supply.

■ FUNCTION TABLE

$\overline{EN}$	IN	NO	NC
L	L	OFF	ON
L	H	ON	OFF
H	√	All Switches Open	

Note: √ = Don't Care.

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATING

PARAMETER	SYMBOL	RATINGS	UNIT
V_+ to GND		-0.3 ~ 6	V
Analog, Digital Voltage Range (Note 1)		-0.3 ~ (V_+) + 0.3	V
Continuous Current NO, NC, or COM		±100	mA
Junction Temperature	T_J	+150	°C
Storage Temperature Range	T_{STG}	-65 ~ +150	°C

Notes: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.
2. Signals on NC, NO, or COM or INX exceeding V+ will be clamped by internal diodes. Limit forward diode current to maximum current ratings.

■ RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	RATINGS	UNIT
Operating Temperature Range	T_A	-40 ~ +85	°C

■ ELECTRICAL CHARACTERISTICS

(V_+ = 4.5V ~ 5.5V, GND = 0V, V_{IH} = 1.6V, V_{IL} = 0.5V, Full = -40°C ~ +85°C. Typical values are at V_+ = 5V, T_A = +25°C, unless otherwise specified)

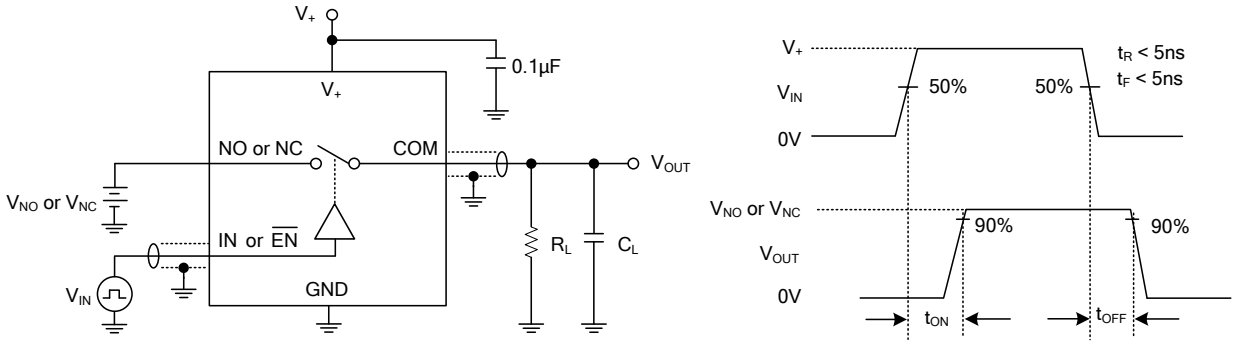
PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
ANALOG SWITCH							
Analog Signal Range	V_{NO}, V_{NC}, V_{COM}	T_A = -40 ~ +85°C		0		V_+	V
On-Resistance	R_{ON}	V_+=4.5V, V_{NO} or V_{NC}=1.2V, I_{COM}=-100mA	T_A = +25°C		4.5	7	Ω
			T_A=-40~+85°C			8	Ω
On-Resistance Match Between Channels	ΔR_{ON}	V_+=4.5V, V_{NO} or V_{NC}=1.2, I_{COM}=-100mA	T_A = +25°C		0.8	3.6	Ω
			T_A=-40~+85°C			4.2	Ω
On-Resistance Flatness	$R_{FLAT(ON)}$	V_+=4.5V, V_{NO} or V_{NC}=1.2V, 4.5V, I_{COM}=-100mA	T_A = +25°C		3	3.7	Ω
			T_A=-40~+85°C			4.5	Ω
Source Off Leakage Current	$I_{NC(OFF)}$, $I_{NO(OFF)}$	V_+ = 5.5V, V_{NO} or V_{NC} = 3.3V/0.3V, V_{COM} = 0.3V/3.3V, T_A=-40~+85°C				1	μA
Channel On Leakage Current	$I_{NC(ON)}$, $I_{NO(ON)}$, $I_{COM(ON)}$	V_+=5.5V, V_{COM}=0.3V/3.3V, V_{NO} or V_{NC}=0.3V/3.3V, or floating, T_A=-40~+85°C				1	μA
DIGITAL INPUTS							
Input High Voltage	V_{INH}	T_A=-40~+85°C		1.6			V
Input Low Voltage	V_{INL}	T_A=-40~+85°C				0.5	V
Input Leakage Current	I_{IN}	V_+ =5.5V, V_{IN} = 0V or 5.5V, T_A=-40~+85°C				1	μA
DYNAMIC CHARACTERISTICS							
Turn-On Time	t_{ON}	V_{NO} or V_{NC} = 2V, C_L=35pF, R_L=300Ω, Test Circuit 1, T_A = +25°C			25		ns
Turn-Off Time	t_{OFF}				22		ns
Charge Injection Select Input to Common I/O	Q	V_G = GND, R_G = 0Ω, Q = C_L × V_{OUT}, C_L = 1nF, Test Circuit 2, T_A = +25°C			20		pC
Break-Before-Make Time Delay	t_D	V_{NO} or V_{NC} = 3V, R_L=300Ω, C_L=35pF, Test Circuit 3, T_A = +25°C			18		ns
Off Isolation	O_{ISO}	R_L=50Ω, f=10MHz, V_{BIAS}=350mV, Signal=0dBm, Test Circuit 4, T_A = +25°C	1MHz		-70		dB
			10MHz		-50		dB
Channel-to-Channel Crosstalk	X_{TALK}	R_L=50Ω, f=10MHz, V_{BIAS}=350mV, Signal=0dBm, Test Circuit 5, T_A = +25°C	1MHz		-90		dB
			10MHz		-60		dB
-3dB Bandwidth	BW	R_L=50Ω, Signal=0dBm, V_{BIAS}=350mV, Test Circuit 6, T_A = +25°C			300		MHz
Channel On Capacitance	C_{ON}	T_A = +25°C			42		pF
POWER REQUIREMENTS							
Power Supply Range	V_+	T_A=-40~+85°C		1.8		5.5	V
Power Supply Current	I_+	V_+ = 5.5V, V_{IN} = 0V or V_+, T_A=-40~+85°C				1	μA

■ ELECTRICAL CHARACTERISTICS

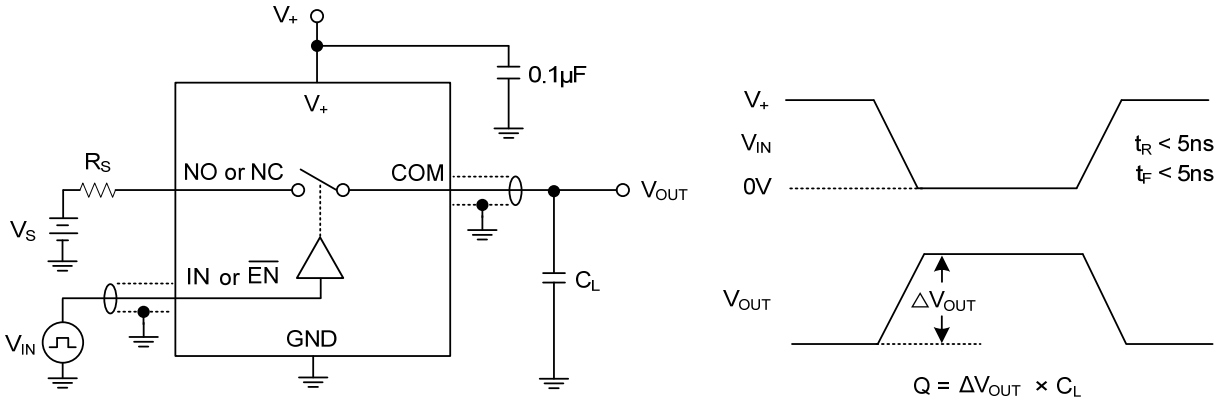
(V_+ = 2.7V~ 3.6V, V_{IH} = 1.6V, V_{IL} = 0.4V, Full = -40°C ~ +85°C. Typical values are at V_+ = 3V, T_A = +25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
ANALOG SWITCH							
Analog Signal Range	V_{NO}, V_{NC}, V_{COM}	T_A = -40 ~ +85°C		0		V_+	V
On-Resistance	R_{ON}	V_+=2.7V, V_{NO} or V_{NC}=1.2V, I_{COM}=-100mA	T_A = +25°C		8	15.5	Ω
			T_A=-40~+85°C			18.5	Ω
On-Resistance Match Between Channels	ΔR_{ON}	V_+=2.7V, V_{NO} or V_{NC}=1.2, I_{COM}=-100mA	T_A = +25°C		1.6	4	Ω
			T_A=-40~+85°C			4.6	Ω
On-Resistance Flatness	$R_{FLAT(ON)}$	V_+=2.7V, V_{NO} or V_{NC}=1.2V, 4.5V, I_{COM}=-100mA	T_A = +25°C		7	9.4	Ω
			T_A=-40~+85°C			13	Ω
Source Off Leakage Current	$I_{NC(OFF)}$, $I_{NO(OFF)}$	V_+ = 3.6V, V_{NO} or V_{NC} = 3.3V/0.3V, V_{COM} = 0.3V/3.3V, T_A=-40~+85°C				1	μA
Channel On Leakage Current	$I_{NC(ON)}$, $I_{NO(ON)}$, $I_{COM(ON)}$	V_+=3.6V, V_{COM}=0.3V/3.3V, V_{NO} or V_{NC}=0.3V/3.3V, or floating, T_A=-40~+85°C				1	μA
DIGITAL INPUTS							
Input High Voltage	V_{INH}	T_A=-40~+85°C		1.5			V
Input Low Voltage	V_{INL}	T_A=-40~+85°C				0.4	V
Input Leakage Current	I_{IN}	V_+ =5.5V, V_{IN} = 0V or 3.6V, T_A=-40~+85°C				1	μA
DYNAMIC CHARACTERISTICS							
Turn-On Time	t_{ON}	V_{NO} or V_{NC} = 2V, C_L=35pF, R_L=300Ω, Test Circuit 1, T_A = +25°C			38		ns
Turn-Off Time	t_{OFF}				55		ns
Charge Injection Select Input to Common I/O	Q	V_G = GND, R_G = 0Ω, Q = C_L × V_{OUT}, C_L = 1nF, Test Circuit 2, T_A = +25°C			20		pC
Break-Before-Make Time Delay	t_D	V_{NO} or V_{NC} = 2V, R_L=300Ω, C_L=35pF, Test Circuit 3, T_A = +25°C			20		ns
Off Isolation	O_{ISO}	R_L=50Ω, f=10MHz, V_{BIAS}=350mV, Signal=0dBm, Test Circuit 4, T_A = +25°C	1MHz		-70		dB
			10MHz		-50		dB
Channel-to-Channel Crosstalk	X_{TALK}	R_L=50Ω, f=10MHz, V_{BIAS}=350mV, Signal=0dBm, Test Circuit 5, T_A = +25°C	1MHz		-90		dB
			10MHz		-60		dB
-3dB Bandwidth	BW	R_L=50Ω, Signal=0dBm, V_{BIAS}=350mV, Test Circuit 6, T_A = +25°C			300		MHz
Channel On Capacitance	C_{ON}	T_A = +25°C			42		pF

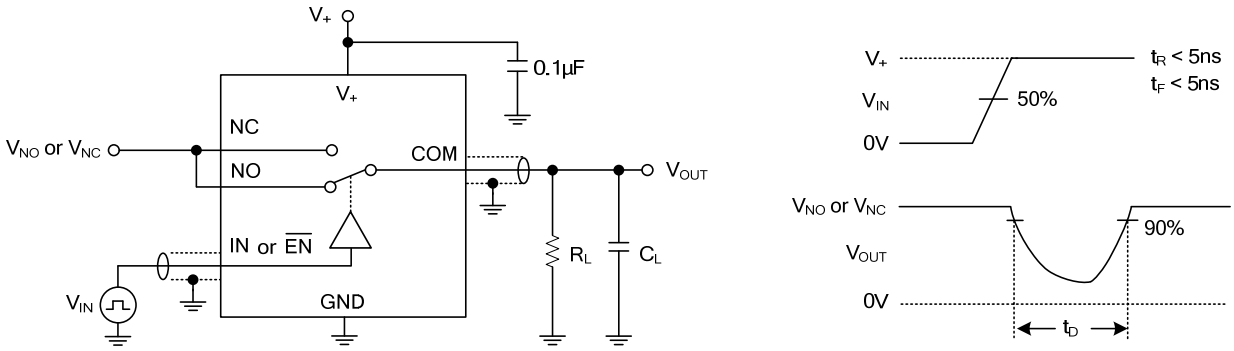
■ TEST CIRCUIT



Test Circuit 1. Switching Times

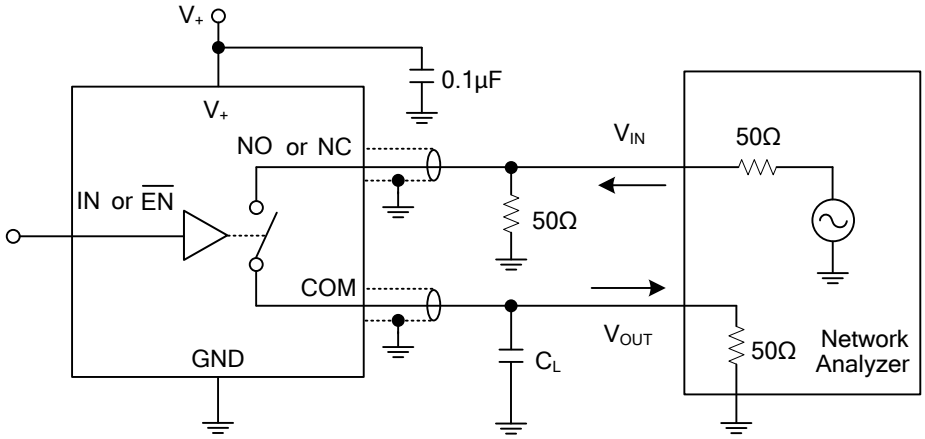


Test Circuit 2. Charge Injection

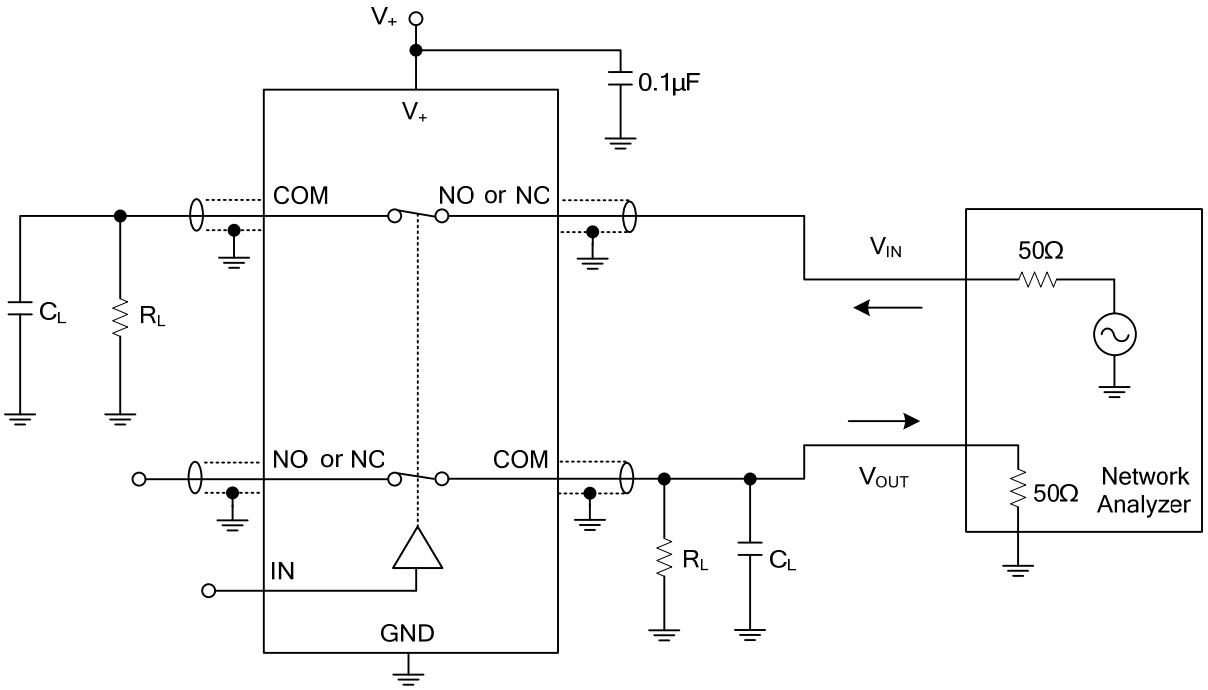


Test Circuit 3. Break-Before-Make Time Delay, t_D

■ TEST CIRCUIT



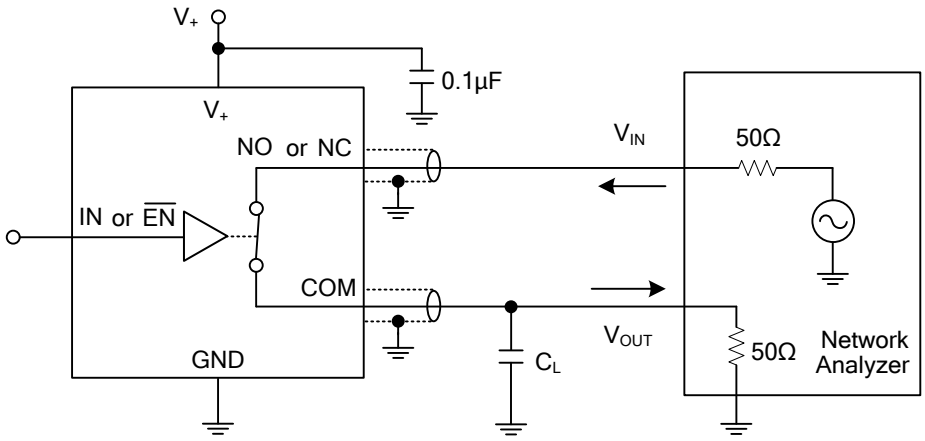
Test Circuit 4. Off Isolation



Channel-to-Channel Crosstalk = -20 log (V_{NO} or V_{NC}/V_{OUT})

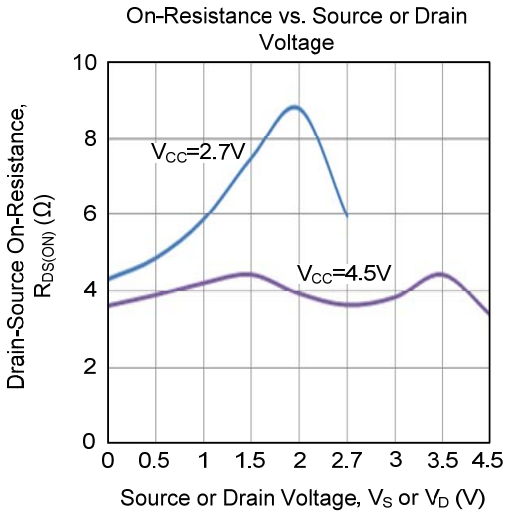
Test Circuit 5. Channel-to-Channel Crosstalk

■ TEST CIRCUIT



Test Circuit 6. -3dB Bandwidth

■ TYPICAL CHARACTERISTICS



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