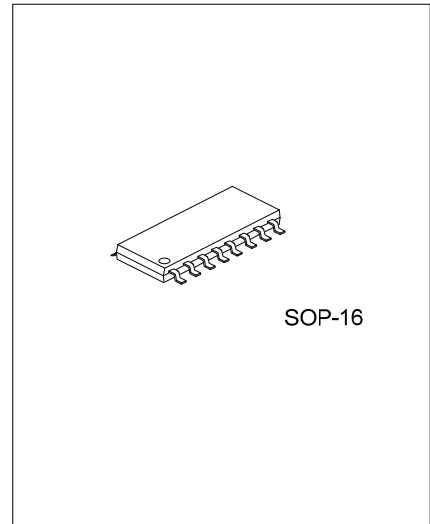




## UMX2215

CMOS IC

### LOW ON-RESISTANCE WIDE BANDWIDTH DUAL 4:1 MUX/DEMUX ANALOG SWITCH



#### DESCRIPTION

The **UMX2215** is a Rail-to-Rail Dual 4:1 multiplexer / demultiplexer CMOS switch designed with advanced CMOS technology. The On-Resistance is typically 4.5 ohm with signal voltage range from 0V to 5V. The **UMX2215** is integrated with ESD protection of system level up to +/-8KV and with low On-Resistance, high Off-Isolation, and wide bandwidth. It is a ideal high-performance, low-cost solution for digital or analog signal switch applications between signal sources.

#### FEATURES

- \*CMOS Technology for Bus and Analog Applications
- \*2V to 5.5V Supply Operation
- \* Rail-to-Rail Analog Signal Range at  $V_{DD}=2V$  to 5.5V
- \*Low On-Resistance: 4.5Ω at 5V
- \*High Off-Isolation: -66dB at 10MHz
- \*Low Crosstalk: -60dB at 10Mhz
- \*System Level ESD Protection Exceeds 8kV (direct contact) for Analog Signal I/O Pin

#### APPLICATIONS

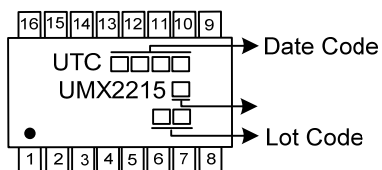
- \*Digital TV
- \*Cell Phones
- \* Computer Peripherals
- \*Portable Instrumentation

#### ORDERING INFORMATION

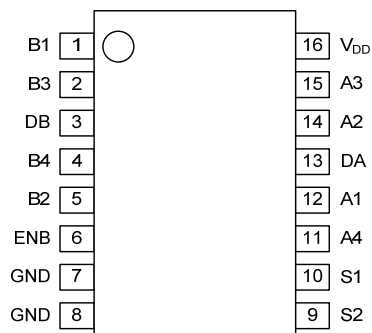
Ordering Number		Package	Packing
Lead Free	Halogen Free		
UMX2215L-S16-R	UMX2215G-S16-R	SOP-16	Tape Reel

<p>UMX2215G-S16-R</p> <ul style="list-style-type: none"> <li>(1)Packing Type</li> <li>(2)Package Type</li> <li>(3)Green Package</li> </ul>	<ul style="list-style-type: none"> <li>(1) R: Tape Reel</li> <li>(2) S16: SOP-16</li> <li>(3) G: Halogen Free and Lead Free, L: Lead Free</li> </ul>
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### MARKING



### PIN CONFIGURATION



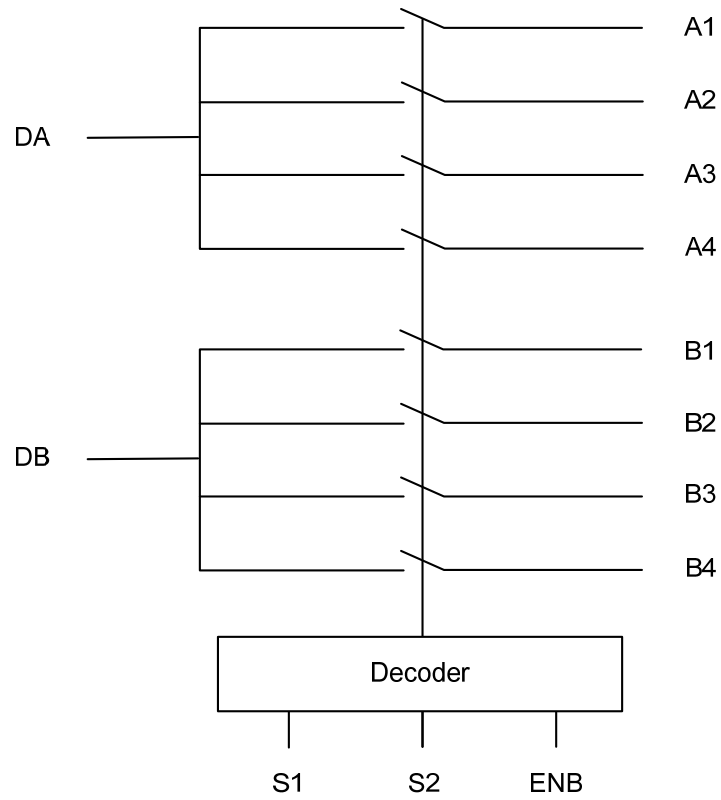
### PIN DESCRIPTION

PIN NO.	PIN NAME	DESCRIPTION
1, 2, 4, 5 11, 12, 14, 15	A1, A2, A3, A4 B1, B2, B3, B4	Analog Data I/O
3, 13	DA, DB	Analog Data I/O
6	ENB	Logic Control - Enable
7, 8	GND	Ground
9, 10	S1, S2	Logic Control - Selection
16	V <sub>DD</sub>	Power

### TRUTH TABLE

Selection	S1	S2	ENB
A1, B1	0	0	0
A2, B2	1	0	0
A3, B3	0	1	0
A4, B4	1	1	0
Disabled	X	X	1

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATING (T<sub>A</sub>=25°C, unless otherwise specified.)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage to Ground Potential		-0.5 ~ 7.0	V
DC Input Voltage	V <sub>IN</sub>	-0.5 ~ 7.0	V
DC Output Current	V <sub>OUT</sub>	120	mA
Power Dissipation	P <sub>D</sub>	0.5	W
Ambient Temperature with Power applied		-40 ~ +85	°C
Storage Temperature	T <sub>STG</sub>	-65 ~ +150	°C

Note: 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.

■ DC ELECTRICAL CHARACTERISTICS (V<sub>DD</sub>=5.0V, T<sub>A</sub>=-40~+85°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP (Note1)	MAX	UNIT
<b>SUPPLY POWER</b>						
Power Supply Current	I <sub>S</sub>	V <sub>DD</sub> =5V			±1	μA
Analog Signal Range	V <sub>SWITCH</sub>	V <sub>DD</sub> =5V	0		V <sub>DD</sub>	V
Input HIGH Voltage	V <sub>H</sub>	V <sub>DD</sub> =5V	3			V
Input LOW Voltage	V <sub>L</sub>	V <sub>DD</sub> =5V	-0.5		0.8	V
Input HIGH Current	I <sub>H</sub>	V <sub>IN</sub> =V <sub>DD</sub>			±1	μA
Input LOW Current	I <sub>L</sub>	V <sub>IN</sub> =GND			±1	μA
Analog I/O Leakage Current	I <sub>LK</sub>	Switch ON			±1	μA
ON-Resistance	R <sub>ON</sub>	I <sub>ON</sub> =30mA		4.5		Ω
Match Between Channels	ΔR <sub>ON</sub>	I <sub>ON</sub> =30mA		0.3		Ω
Ron Flatness	R <sub>FLAT</sub>	I <sub>ON</sub> =30mA		2		Ω

Note: Typical values are at V<sub>DD</sub>=5.0V, T<sub>A</sub>=25°C ambient.

■ DYNAMIC CHARACTERISTICS (V<sub>DD</sub>=5.0V, T<sub>A</sub>=-40~+85°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP (Note1)	MAX	UNIT
Propagation Delay	t <sub>pd</sub>	R <sub>L</sub> =50Ω, C <sub>L</sub> =10pF (Note 1), see Fig.1		5		ns
Turn On Time	t <sub>ON</sub>	R <sub>L</sub> =50Ω, C <sub>L</sub> =10pF (Note 1), see Fig.2		40		ns
Turn OFF Time	t <sub>OFF</sub>	R <sub>L</sub> =50Ω, C <sub>L</sub> =10pF (Note 1), see Fig.2		5		ns
Capacitance, switch ON	C <sub>(ON)</sub>	V <sub>IN</sub> =0V, f=1MHz		8.6		pF
Bandwidth	BW	See Fig.3		200		MHz
Off Isolation	Q <sub>IRR</sub>	10MHz, see Fig.4		-66		dB
Crosstalk	X <sub>TALK</sub>	10MHz, see Fig.5		60		dB

Notes: 1. Typical values are at V<sub>DD</sub>=5.0V, T<sub>A</sub>=25°C ambient.

2. C<sub>L</sub> includes probe and jig capacitance.

■ DC ELECTRICAL CHARACTERISTICS ( $V_{DD}=3.3V$ ,  $T_A=-40\sim+85^{\circ}C$ , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP (Note1)	MAX	UNIT
<b>SUPPLY POWER</b>						
Power Supply Current	$I_S$	$V_{DD}=3.3V$			$\pm 1$	$\mu A$
Analog Signal Range	$V_{SWITCH}$		0		$V_{DD}$	V
Input HIGH Voltage	$V_H$		2			V
Input LOW Voltage	$V_L$		-0.5		0.8	V
Input HIGH Current	$I_H$	$V_{IN}=V_{DD}$			$\pm 1$	$\mu A$
Input LOW Current	$I_L$	$V_{IN}=GND$			$\pm 1$	$\mu A$
Analog I/O Leakage Current	$I_{LK}$	Switch ON			$\pm 1$	$\mu A$
ON-Resistance	$R_{ON}$	$I_{ON}=30mA$		7		$\Omega$
Match Between Channels	$\Delta R_{ON}$	$I_{ON}=30mA$		0.3		$\Omega$
Ron Flatness	$R_{FLAT}$	$I_{ON}=30mA$		4.5		$\Omega$

Note: Typical values are at  $V_{DD}=3.3V$ ,  $T_A=25^{\circ}C$  ambient.

■ DYNAMIC CHARACTERISTICS ( $V_{DD}=3.3V$ ,  $T_A=-40\sim+85^{\circ}C$ , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP (Note1)	MAX	UNIT
Propagation Delay	$t_{pd}$	$R_L=50\Omega$ , $C_L=10pF$ (Note 1), see Fig.1		5		ns
Turn On Time	$t_{ON}$	$R_L=50\Omega$ , $C_L=10pF$ (Note 1), see Fig.2		40		ns
Turn OFF Time	$t_{OFF}$	$R_L=50\Omega$ , $C_L=10pF$ (Note 1), see Fig.2		5		ns
Capacitance, switch ON	$C_{(ON)}$	$V_{IN}=0V$ , $f=1MHz$		8.6		pF
Bandwidth	BW	See Fig.3		200		MHz
Off Isolation	$Q_{IRR}$	10MHz, see Fig.4		-66		dB
Crosstalk	$X_{TALK}$	10MHz, see Fig.5		60		dB

Notes: 1. Typical values are at  $V_{DD}=3.3V$ ,  $T_A=25^{\circ}C$  ambient.

2.  $C_L$  includes probe and jig capacitance.

■ TEST CIRCUIT AND WAVEFORMS

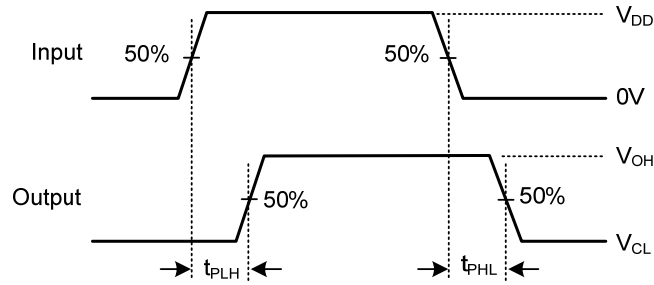


Fig. 1 Propagation Delay

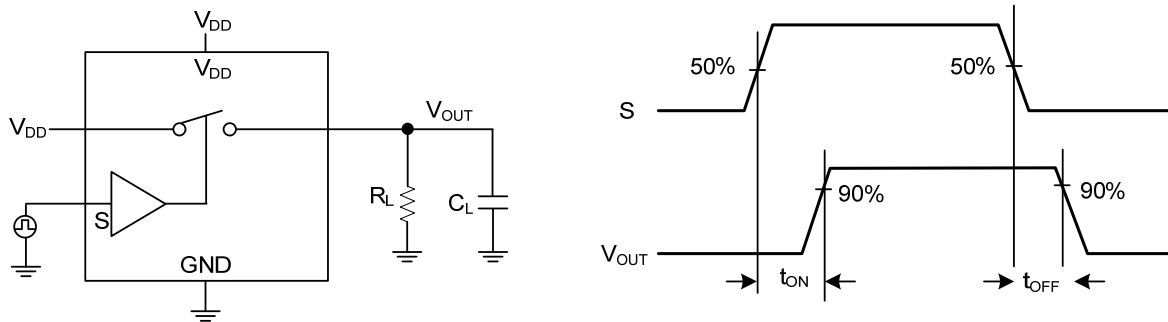


Fig. 2 Switching Time

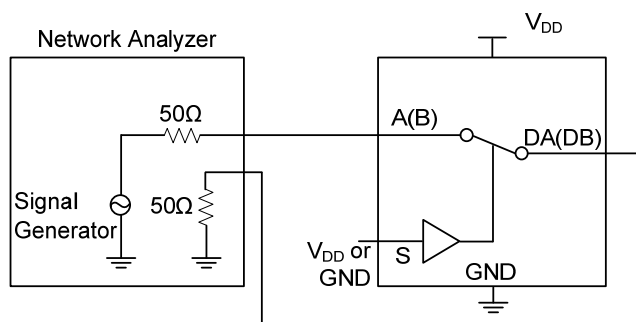


Fig. 3 Bandwidth

■ TEST CIRCUIT AND WAVEFORMS

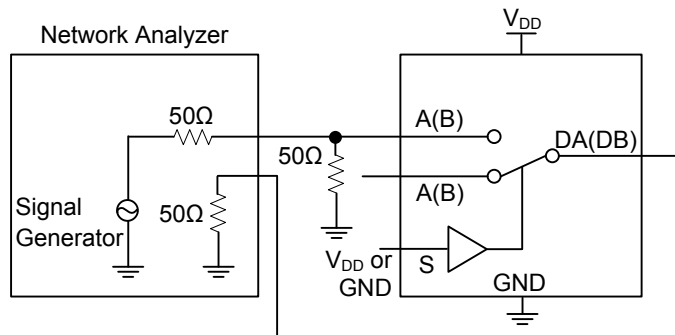


Fig. 4 Off Isolation

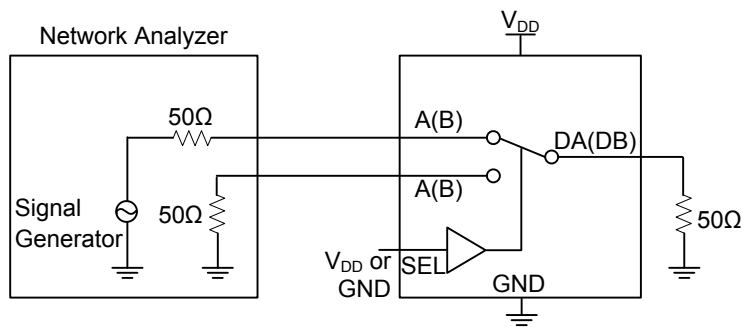


Fig. 5 Crosstalk

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