



# US5C3257

Preliminary

CMOS IC

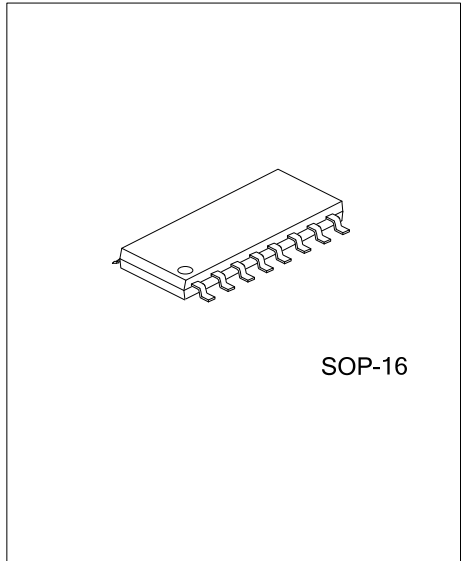
## QUAD 2:1 MUX/DEMUX BUS SWITCH

### DESCRIPTION

The UTC **US5C3257** is a QUAD 2:1 multiplexer/demultiplexer with low on-resistance and is pinout and function compatible with the TTL device. Inputs can be connected to outputs with low on resistance (5Ω) with no additional ground bounce noise or propagation delay.

### FEATURES

- \* 5Ω switches connect inputs to outputs
- \* ESD protection on pin
- \* Near zero propagation delay
- \* Ultra Low Quiescent Power (0.2μA Typical)
  - Ideally suited for notebook applications
- \* Direct bus connection when switches are ON
- \* Pin compatible with U74 series logic devices



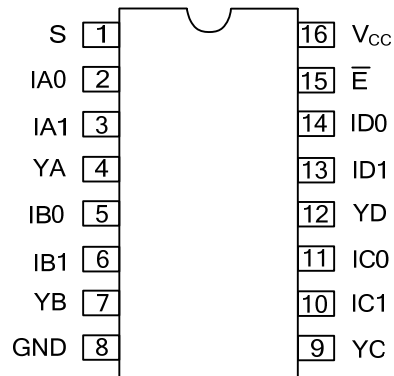
### ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen Free		
US5C3257L-S16-R	US5C3257G-S16-R	SOP-16	Tape Reel
US5C3257L-S16-T	US5C3257G-S16-T	SOP-16	Tube

Note: xx: Output Voltage, refer to Marking Information.

US5C3257L-S16-R └──┬── (1)Packing Type └──┬── (2)Package Type └──┬── (3)Halogen Free	(1) R: Tape Reel, T: Tube (2) S16: SOP-16 (3) L: Lead Free, G: Halogen Free
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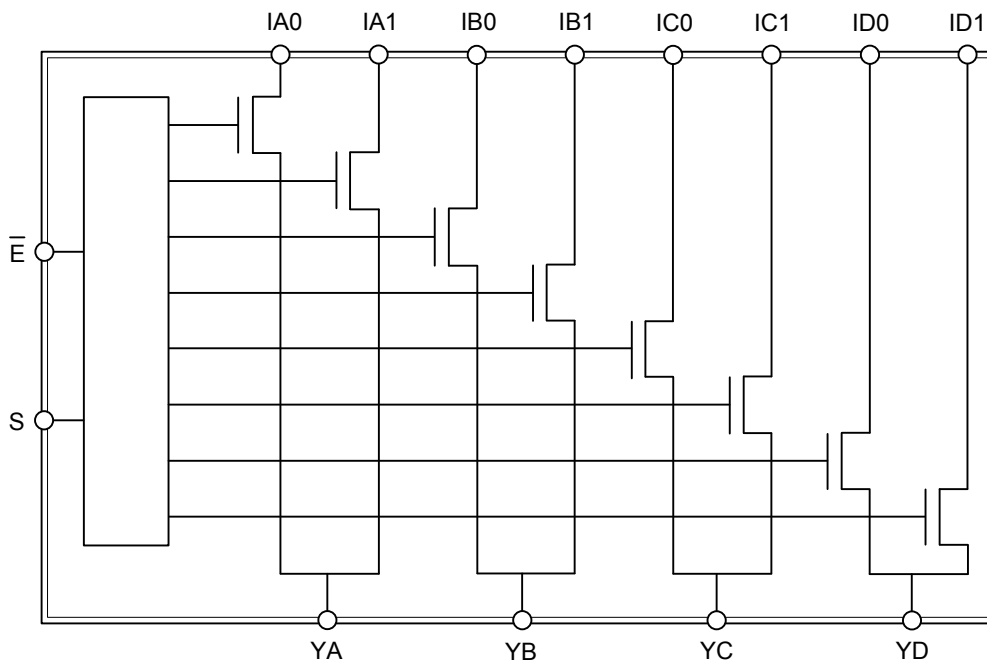
■ PIN CONFIGURATION



■ PIN DESCRIPTION

PIN NO.	PIN NAME	DESCRIPTION
1	S	Select Inputs
2, 3, 5, 6, 10, 11,13,14,	IAn-IDn	Data Inputs
4, 7, 9, 12	YA-YD	Data Outputs
8	GND	Ground
15	$\bar{E}$	Enable
16	V <sub>CC</sub>	Power

■ BLOCK DIAGRAM



■ TRUTH TABLE

$\bar{E}$	S	YA	YB	YC	YD	Function
H	X	Hi-Z	Hi-Z	Hi-Z	Hi-Z	Disable
L	L	IA0	IB0	IC0	ID0	S=0
L	H	IA1	IB1	IC1	ID1	S=1

Note: H=High Voltage Level, L=Low Voltage Level

### ■ ABSOLUTE MAXIMUM RATING

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage to Ground Potential (Inputs & V <sub>CC</sub> Only)		-0.5~+7.0	V
Supply Voltage to Ground Potential (Outputs & D/O Only)		-0.5~+7.0	V
DC Input Voltage		-0.5~+7.0	V
DC Output Current		120	mA
Power Dissipation	P <sub>D</sub>	0.5	W
Storage Temperature	T <sub>STG</sub>	-55~+150	°C
Ambient Temperature with Power Applied	T <sub>OPR</sub>	-40~+85	°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

(Typical application at V<sub>CC</sub>=5 V, T<sub>A</sub>=25°C, unless otherwise noted)

PARAMETER	SYMBOL	TEST CONDITIONS (Note 1)	MIN	TYP (Note 1)	MAX	UNIT
Input HIGH Voltage	V <sub>IH</sub>	Guaranteed Logic HIGH Level	2.0			V
Input LOW Voltage	V <sub>IL</sub>	Guaranteed Logic LOW Level	-0.5		0.8	V
Input HIGH Current	I <sub>IH</sub>	V <sub>CC</sub> =Max., V <sub>IN</sub> =V <sub>CC</sub>			±1	µA
Input LOW Current	I <sub>IL</sub>	V <sub>CC</sub> =Max., V <sub>IN</sub> =GND			±1	µA
High Impedance Output Current	I <sub>OZH</sub>	0≤I, Y≤V <sub>CC</sub>			±1	µA
Clamp Diode Voltage	V <sub>IK</sub>	V <sub>CC</sub> =Min., I <sub>IN</sub> =-18mA		-0.7	-1.2	V
Short Circuit Current (Note 2)	I <sub>OS</sub>	I(Y)=0V, Y(I)=V <sub>CC</sub>	100			mA
Input Hysteresis at Control Pins	V <sub>H</sub>			150		mV
Switch On Resistance (Note 3)	R <sub>ON</sub>	V <sub>CC</sub> =Min., V <sub>IN</sub> =0.0V, I <sub>ON</sub> =48mA		5	7	Ω
		V <sub>CC</sub> =Min., V <sub>IN</sub> =2.4V, I <sub>ON</sub> =15mA		10	15	Ω

### ■ CAPACITANCE (T<sub>A</sub>=25°C, f=1MHz)

PARAMETER (Note 4)	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Input Capacitance	C <sub>IN</sub>	V <sub>IN</sub> =0V			6	pF
In/Yn Capacitance, Switch Off	C <sub>OFF</sub>	V <sub>IN</sub> =0V			6	pF
In/Yn Capacitance, Switch On	C <sub>ON</sub>	V <sub>IN</sub> =0V			14	pF

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

- Not more than one output should be shorted at one time. Duration of the test should not exceed one second.
- Measured by the voltage drop between I and Y pin at indicated current through the switch. ON resistance is determined by the lower of the voltages on the two (I, Y) pins.
- This parameter is determined by device characterization but is not production tested.

### ■ POWER SUPPLY CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITIONS (Note 1)	MIN	TYP (Note 2)	MAX	UNIT
Quiescent Power Supply Current	$I_{CC}$	$V_{CC}=\text{Max.}, V_{IN}=\text{GND or } V_{CC}$		0.1	3.0	$\mu\text{A}$
Supply Current per Input @ TTL HIGH	$\Delta I_{CC}$	$V_{CC}=\text{Max.}, V_{IN}=3.4\text{V}$ (Note 3)			2.5	mA
Supply Current per Input per MHz (Note 4)	$I_{CCD}$	$V_{CC}=\text{Max.}, I$ and $Y$ Pins Open $\overline{BE}=\text{GND},$ Control Input Toggling 50% Duty Cycle			0.25	mA/ MHz

Notes: 1. For Max. or Min. conditions, use appropriate value specified under Electrical Characteristics for the applicable device type.

2. Typical values are at  $V_{CC}=5.0\text{V}, T_A=25^\circ\text{C}$  ambient and maximum loading.

3. Per TTL driven input ( $V_{IN}=3.4\text{V}$ , control inputs only); I and Y pins do not contribute to  $I_{CC}$ .

4. This current applies to the control inputs only and represent the current required to switch internal capacitance at the specified frequency. The I and Y inputs generate no significant AC or DC currents as they transition. This parameter is not tested, but is guaranteed by design.

### ■ SWITCHING CHARACTERISTICS OVER OPERATING RANGE

PARAMETER	SYMBOL	TEST CONDITIONS (Note 1)	MIN	TYP	MAX	UNIT
Propagation Delay In to Yn (Note 2, 3)	$t_{LY}$	$C_L=50\text{pF}, R_L=500\Omega$			0.25	ns
Bus Select Time Sn to Yn	$t_{SY}$		0.5		5.2	ns
Bus Disable Time $\overline{E}$ to Yn	$t_{PZH} / t_{PZL}$		0.5		4.8	ns
Bus Disable Time $\overline{E}$ to Yn	$t_{PHZ} / t_{PLZ}$		0.5		5.0	ns

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