UNISONIC TECHNOLOGIES CO., LTD

US5C3125　　　　　Preliminary　　　　　*CMOS IC*

4-BIT BUS SWITCH WITH INDIVIDUAL ENABLES

TSSOP-14

■ **DESCRIPTION**

The UTC **US5C3125** consist of four independent 5Ω switches with fast individual enables. The "A" pin is connected to the "B" pin directly when the associated Bus Enable ($\overline{\text{BE}}$) pin is set to "Low". The bus switch introduces no additional propagation delay or additional ground bounce noise.

■ **FEATURES**

* Low on-resistor between two ports (5Ω typical)
* Near-Zero propagation delay
* Direct bus connection when switches are ON
* Ultra Low Quiescent Power (0.1µA typical)
 -Ideally suited for notebook applications
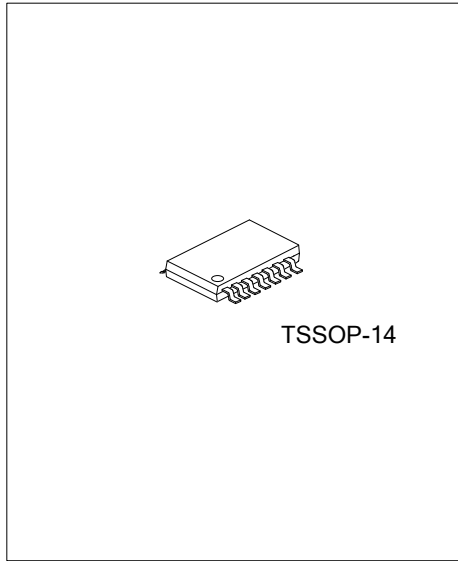
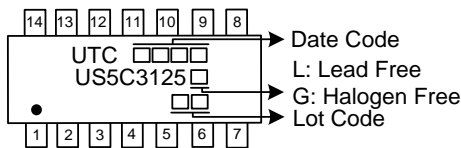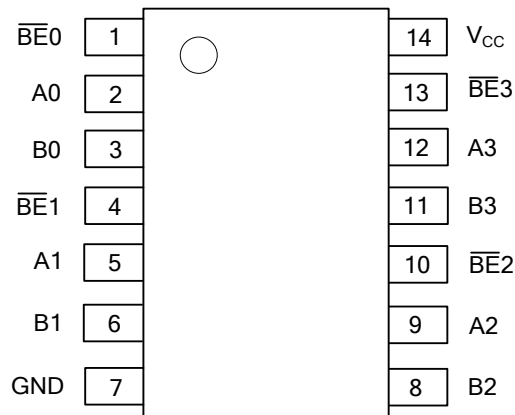■ **ORDERING INFORMATION**

Ordering Number		Package	Packing
Lead Free	Halogen Free		
US5C3125L-P14-R	US5C3125G-P14-R	TSSOP-14	Tape Reel

US5C3125G-P14-R

(1) Packing Type
(2) Package Type
(3) Green Package

(1) R: Tape Reel
(2) P14: TSSOP-14
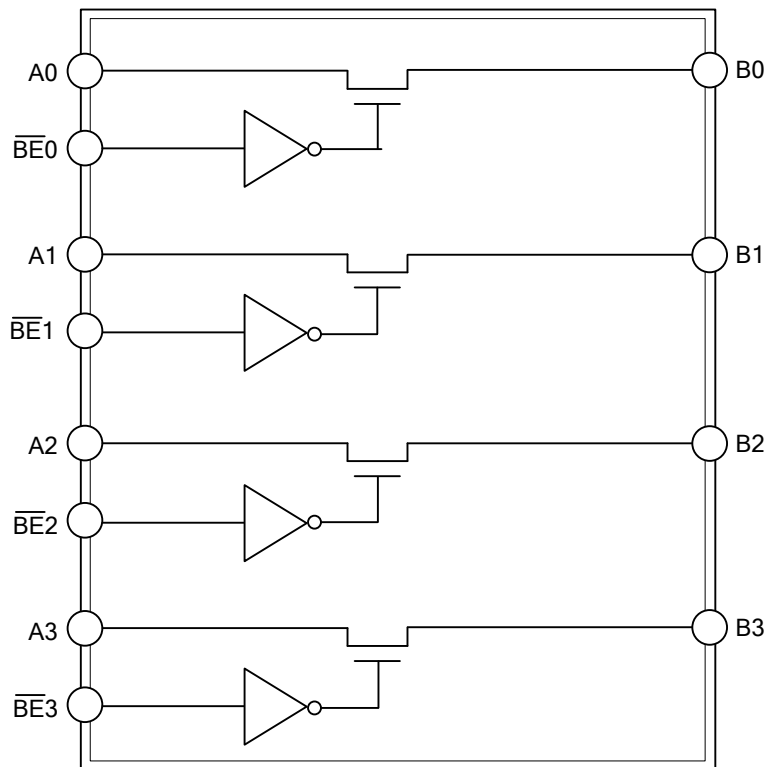(3) G: Halogen Free and Lead Free, L: Lead Free

■ **MARKING**

```
14 13 12 11 10 9 8
   UTC  □□□□
   US5C3125□
            □□
 1  2  3  4  5  6  7
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→ Date Code
L: Lead Free
G: Halogen Free
Lot Code

QW-R121-038.a

US5C3125

■ PIN CONFIGURATION

■ PIN DESCRIPTION

PIN NO.	PIN NAME	DESCRIPTION
1, 4, 10, 13	$\overline{BE}$ n	Switch Enable
2, 5, 9, 12	A3-A0	Bus A
3, 6, 8, 11	B3-B0	Bus B
7	GND	Ground
14	V_{CC}	Power

■ BLOCK DIAGRAM

■ **ABSOLUTE MAXIMUM RATING** (T_A =25°C , unless otherwise specified)

(Above which the useful life may be impaired.　For user guidelines, not tested.)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage to Ground Potential (Inputs & V_{CC} 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_D	0.5	W
Ambient Temperature with Power Applied	T_A	-40 ~ +125	°C
Storage Temperature Range	T_{STG}	-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** (T_A =25°C , unless otherwise specified)

(Over the Operating Range, T_A=-40°C~+85°C, V_{CC}=5V±10%)

PARAMETER	SYMBOL	TEST CONDITIONS (Note 1)		MIN	TYP (Note 2)	MAX	UNIT
Input HIGH Voltage	V_{IH}	Guaranteed Logic HIGH Level		2.0			V
Input LOW Voltage	V_{IL}	Guaranteed Logic LOW Level		-0.5		0.8	V
Input HIGH Current	I_{IH}	V_{CC}=Max., V_{IN}=V_{CC}				±1	µA
Input LOW Current	I_{IL}	V_{CC}=Max., V_{IN}=GND				±1	µA
High Impedance Output Current	I_{OZH}	0≤A, B≤V_{CC}				±1	µA
Clamp Diode Voltage	V_{IK}	V_{CC}=Min., I_{IN}=-18mA			-0.7	-1.2	V
Short Circuit Current (Note 3)	I_{OS}	A (B)=0V, B (A)=V_{CC}			100		mA
Input Hysteresis at Control Pins	V_H				150		mV
Switch On-Resistance (Note 4)	R_{ON}	V_{CC}=Min., V_{IN}=0.0V	I_{ON}=48mA		5	7	Ω
		V_{CC}=Min., V_{IN}=2.4V	I_{ON}=15mA		10	15	Ω
		V_{CC}=4V, V_{IN}=2.4V	I_{ON}=15mA		26	38	Ω

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}=5.0V, T_A=25°C ambient and maximum loading.
　　　3. Not more than one output should be shorted at one time.　Duration of the test should not exceed one second.
　　　4. Measured by the voltage drop between A and B pin at indicated current through the switch. On-Resistance is determined by the lower of the voltages on the two (A, B) pin

■ **CAPACITANCE** (f=1MHz, T_A =25°C , unless otherwise specified)

PARAMETER (Note 1)	SYMBOL	TEST CONDITIONS (Note 1)	MIN	TYP	MAX	UNIT
Input Capacitance	C_{IN}				6	pF
A/B Capacitance, Switch Off	C_{OFF}	V_{IN}=0V			6	pF
A/B Capacitance, Switch On	C_{ON}				8	pF

Note: 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}=Max.	V_{IN}=GND or V_{CC}		0.1	3.0	µA
Supply Current per Input @ TTL HIGH	$\triangle I_{CC}$		V_{IN}=3.4V (Note 3)			2.5	mA
Supply Current per Input per MHz (Note 4)	I_{CCD}	V_{CC} = Max. A and B Pins Open, $\overline{BE}$ n=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.

2. Typical values are at V_{CC}=5.0V, +25°C ambient.

3. Per TTL driven input (V_{IN}=3.4V, control inputs only); A and B 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 specifed frequency.

   The A and B inputs generate no signifcant 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 Time Signal (Note 1, 2) A to B, B to A	t_{PLH}/t_{PHL}	C_L=50pF, R_L=500Ω		0.25		ns
Bus Enable Time	t_{PZH}/t_{PZL}	C_L=50pF, R_L=500Ω	0.5		5.4	ns
Bus Disable Time	t_{PHZ}/t_{PLZ}	C_L=50pF, R_L=500Ω	0.5		4.7	ns

Notes: 1. This parameter is guaranteed but not tested on Propagation Delays.

2. The bus switch contributes no propagational delay other than the RC delay of the On-Resistance of the switch and the load capacitance. The time constant for the switch alone is of the order of 0.25ns for 50pF load. Since this time constant is much smaller than the rise/fall times of typical driving signals, it adds very little propagational delay to the system. Propagational delay of the bus switch when used in a system is determined by the driving circuit on the driving side of the switch and its interaction with the load on the driven side.

■ TRUTH TABLE (Note 1)

$\overline{BE}$ n	An	Bn	V_{CC}	Function
X (Note 2)	Hi-Z	Hi-Z	GND	Disconnect
H	Hi-Z	Hi-Z	V_{CC}	Disconnect
L	Bn	An	V_{CC}	Connect

Notes: 1. H=High Voltage Level, L=Low Voltage Level

   Hi-Z=High Impedance, X=Don't Care

2. A pull-up resistor should be provided for power-up protection.