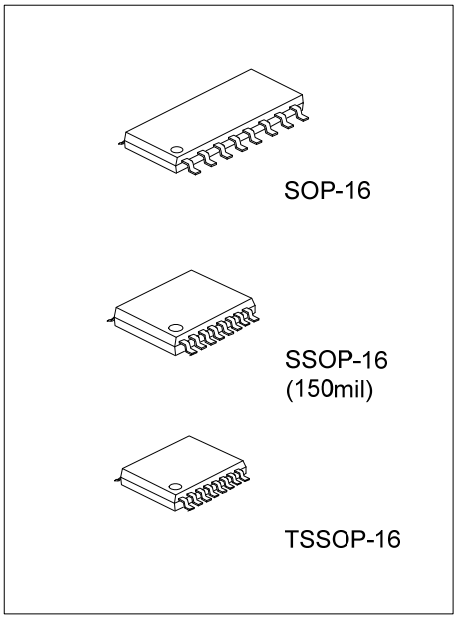
U74CBT3257C

CMOS IC

4-BIT 1-OF-2 FET MULTIPLEXER/ DEMULTIPLEXER



■ DESCRIPTION

The UTC **U74CBT3257C** is a 4-BIT 1-OF-2 FET multiplexer/ demultiplexer with Low ON-State Resistance (R_{ON}) and TTL-compatibility.

■ FEATURES

* Undershoot Protection for Off-Isolation on A and B Ports Up to -2V
* V_{CC} Operating Range From 4V to 5.5V
* Bidirectional Data Flow, With Near-Zero Propagation Delay
* Low ON-State Resistance (R_{ON}) Characteristics (R_{ON} =4Ω Typ.)
* Low Power Consumption I_{CC} =3μA (Max)
* Data and Control Inputs Provide Undershoot Clamp Diodes
* Data I/Os Support 0 to 5-V Signaling Levels (0.8V, 1.2V, 1.5V, 1.8V, 2.5V, 3.3V, 5V)
* Control Inputs Can be Driven by TTL or 5V/3.3V CMOS Outputs
* I_{OFF} Supports Partial-Power-Down Mode Operation
* Supports I^2C Bus Expansion

■ ORDERING INFORMATION

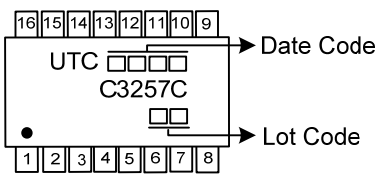
Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74CBT3257CL-S16-R	U74CBT3257CG-S16-R	SOP-16	Tape Reel
U74CBT3257CL-R16-R	U74CBT3257CG-R16-R	SSOP-16	Tape Reel
U74CBT3257CL-P16-R	U74CBT3257CG-P16-R	TSSOP-16	Tape Reel

U74CBT3257CG-S16-R

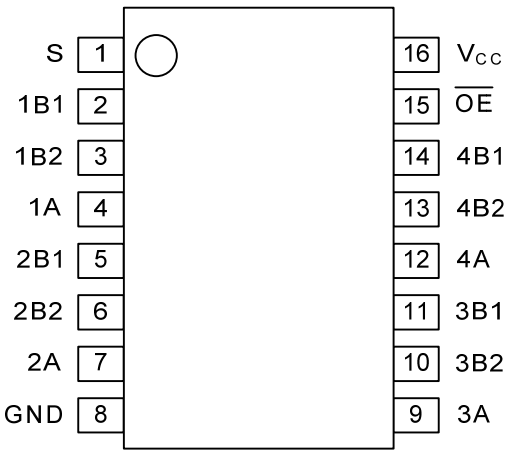
(1) Packing Type
(2) Package Type
(3) Green Package

(1) R: Tape Reel
(2) S16: SOP-16, R16: SSOP-16, P16: TSSOP-16
(3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING



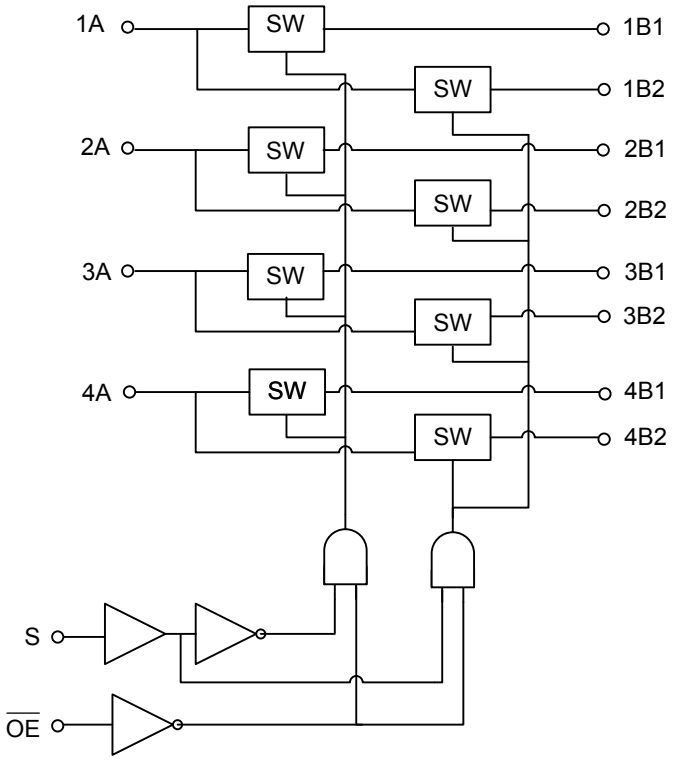
■ PIN CONFIGURATION



■ FUNCTION TABLE

INPUT		INPUT/OUTPUT	FUNCTION
$\overline{OE}$	S2	A	
L	L	B1	A port=B1 port
L	H	B2	A port=B2 port
H	X	Z	Disconnect

■ LOGIC DIAGRAM



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

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V_{CC}	-0.5 ~ 7	V
DC Input Voltage (Note 2, 3)	V_{IN}	-0.5 ~ 7	V
DC Switch Voltage (Note 2, 3)	$V_{IN(SW)}$ $V_{OUT(SW)}$	-0.5 ~7	V
Control Input Clamp Current	I_{IK}	-50	mA
DC V_{CC} or GND Current	I_{CC}	±100	mA
ON-State Switch Current	$I_{IN(SW)}$ $I_{OUT(SW)}$	±128	mA
Operating Temperature	T_{OPR}	-40 ~ +85	°C
Storage Temperature	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. All voltages are with respect to ground
3. The input and output voltage ratings may be exceeded if the input and output clamp-current ratings are observed.

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	SOP-16	θ_{JA}	73	°C/W
	SSOP-16		90	
	TSSOP-16		110	

■ RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT
Supply Voltage	V_{CC}	4		5.5	V
High-Level Control Input Voltage	V_{IH}	2		5.5	V
Low-Level Control Input Voltage	V_{IL}	0		0.8	V
Data Input Voltage	V_{IN}	0		5.5	V
Data Output Voltage	V_{OUT}	0		5.5	V

■ ELECTRICAL CHARACTERISTICS (T_A=25°C, unless otherwise specified)

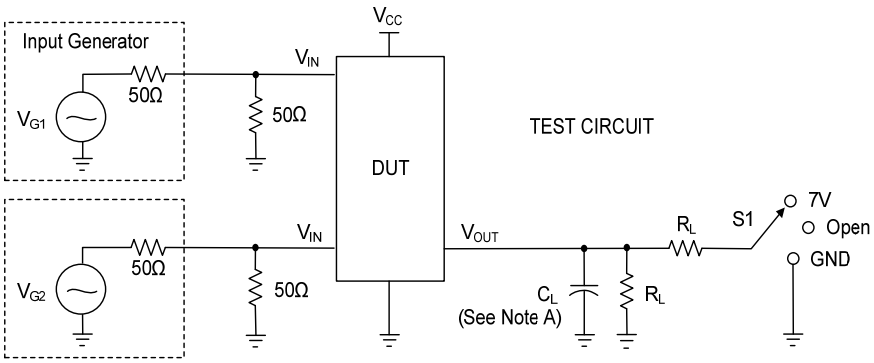
PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
Control Input Clamp Voltage	V_{IK}	V_{CC} =4.5V, I_{IN} = -18mA				-1.8	V
Data Inputs Clamp Voltage	V_{IKU}	V_{CC} =5V, 0mA >I_{IN} ≥ -50mA GND, Switch OFF				-2	V
Input Leakage Current	$I_{I(LEAK)}$	V_{CC} =5.5V, V_{IN} =V_{CC} or GND				±1	μA
Output OFF-State Current	I_{OZ}	V_{CC}=5.5V, V_{OUT}=0 to 5.5V, V_{IN}=0 V_{IN} =V_{CC} or GND, Switch OFF				±10	μA
Power OFF Leakage Current	I_{OFF}	V_{CC}=0, V_O=0 to 5.5V, V_{IN}=0				10	μA
Quiescent Supply Current	I_{CC}	V_{CC}=5.5 V, I_{IN} /I_{OUT} =0 V_{IN}=V_{CC} or GND, Switch ON or OFF				3	μA
Additional Quiescent Supply Current	ΔI_{CC}	V_{CC}=5.5V, One input at 3.4V, Other inputs at V_{CC} or GND				2.5	mA
Control Input Capacitance	C_{IN}	V_{IN}=3V or 0 V_{CC}=5V			3.5		pF
A Port Input Capacitance	$C_{IO(OFF)}$	V_{IN}/V_{OUT}=3V or 0, V_{CC}=5V			8.5		pF
B Port Input Capacitance		V_{IN}=V_{CC} or GND, Switch OFF			5.5		pF
Port Input Capacitance	$C_{IO(ON)}$	$V_{I/O}$=3V or 0, V_{IN}=V_{CC} or 0, Switch ON			16.5		pF
ON-Resistance	R_{ON}	V_{CC}=4V, V_{IN}=2.4V,I_{OUT} =-15mA			13	18	Ω
		V_{CC} =4.5V, V_{IN} =0	I_{OUT} =64mA		4	6	Ω
			I_{OUT} =30mA		4	6	Ω
		V_{CC} =4.5V, V_{IN} =2.4V	I_{OUT} =-15mA		8	12	Ω

■ SWITCHING CHARACTERISTICS C_L=50$_P$F (see TEST CIRCUIT AND WAVEFORMS)

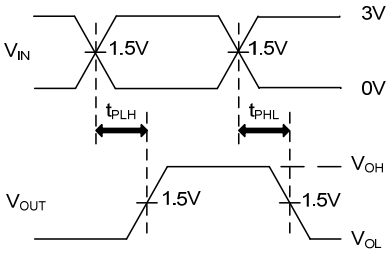
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
From input (A or B) to output (B or A) (Note)	t_{PD}	V_{CC}=4V, C_L=50pF, R_L=500Ω			0.24	ns
		V_{CC}= 5V±0.5V, C_L=50pF, R_L=500Ω			0.15	ns
From input S to output A	$t_{PD(S)}$	V_{CC}=4V, C_L=50pF, R_L=500Ω			7.2	ns
		V_{CC}= 5V±0.5V, C_L=50pF, R_L=500Ω	1.5		6.6	ns
From input S to output B	t_{EN}	V_{CC}=4V, C_L=50pF, R_L=500Ω			6.3	ns
		V_{CC}= 5V±0.5V, C_L=50pF, R_L=500Ω	1.5		5.8	ns
From input $\overline{OE}$ to output (A or B)		V_{CC}=4V, C_L=50pF, R_L=500Ω			10.3	ns
		V_{CC}= 5V±0.5V, C_L=50pF, R_L=500Ω	1.5		8.8	ns
From input S to output B	t_{DIS}	V_{CC}=4V, C_L=50pF, R_L=500Ω			6.5	ns
		V_{CC}= 5V±0.5V, C_L=50pF, R_L=500Ω	1.5		6.0	ns
From input $\overline{OE}$ to output (A or B)		V_{CC}=4V, C_L=50pF, R_L=500Ω			5.9	ns
		V_{CC}= 5V±0.5V, C_L=50pF, R_L=500Ω	1.5		5.9	ns

Note: The propagation delay is the calculated RC time constant of the typical ON-state resistance of the switch and the specified load capacitance, when driven by an ideal voltage source (zero output impedance).

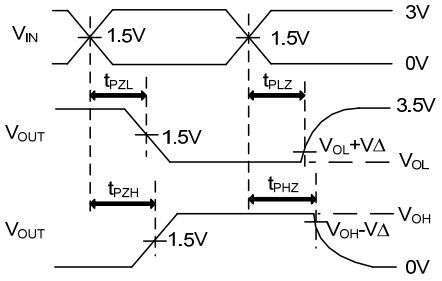
■ TEST CIRCUIT AND WAVEFORMS



TEST	V_{CC}	V_I	t_R / t_F	VΔ	S1	C_L	R_L
t_{PLH}/t_{PHL}	4V	V_{CC} or GND	≤2.5ns		Open	50pF	500Ω
	5V±0.5V	V_{CC} or GND	≤2.5ns		Open	50pF	500Ω
t_{PLZ}/t_{PZL}	4V	GND	≤2.5ns	0.3V	7V	50pF	500Ω
	5V±0.5V	GND	≤2.5ns	0.3V	7V	50pF	500Ω
t_{PHZ}/t_{PZH}	4V	V_{CC}	≤2.5ns	0.3V	Open	50pF	500Ω
	5V±0.5V	V_{CC}	≤2.5ns	0.3V	Open	50pF	500Ω



PROPAGATION DELAY TIMES



ENABLE AND DISABLE TIMES

Notes: 1. C_L includes probe and jig capacitance.
2. All input pulses are supplied by generators having the following characteristics: PRR≤10MHz, Z_O=50Ω, tr≤2.5ns, tf≤2.5 ns.
3. The outputs are measured one at a time with one transition per measurement.
4. t_{PLZ} and t_{PHZ} are the same as tdis.
5. t_{PZL} and t_{PZH} are the same as ten.
6. t_{PLH} and t_{PHL} are the same as tpd(s).
7. All parameters and waveforms are not applicable to all devices.