

QUICKSWITCH® PRODUCTS HIGH-SPEED CMOS QUADRUPLE BUS SWITCH WITH INDIVIDUAL ACTIVE LOW ENABLES

FEATURES:

- · Enhanced N channel FET with no inherent diode to Vcc
- Pin compatible with the 74'125 function
- · Zero propagation delay, zero added ground bounce
- · Undershoot clamp diodes on all switch and control inputs
- Available in QSOP and SOIC packages

APPLICATIONS:

- Hot-swapping, hot-docking
- Voltage translation (5V to 3.3V)
- Power conservation
- Capacitance reduction and isolation (mass storage, work stations)
- Logic replacement (data processing)
- Clock gating
- Bus isolation

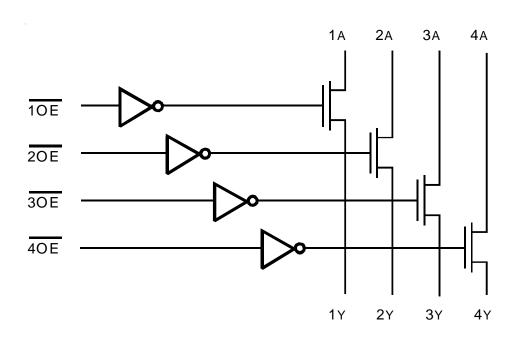
DESCRIPTION:

The QS3125 provides a set of four high-speed low resistance CMOS switches connecting inputs to outputs without propagation delay and without generating additional ground bounce noise. Individual enables (\overline{OE}) are used to turn on the switches. The QS3125 is ideal for signal and control switching since the device adds no noise, ground bounce, propagation delay, or significant power consumption to the system. The QS3125 can also be used for analog switching applications such as video.

QuickSwitch devices provide an order of magnitude faster speed than conventional logic devices.

The QS3125 is characterized for operation at -40°C to +85°C.

FUNCTIONAL BLOCK DIAGRAM



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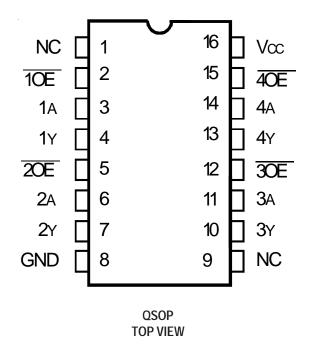
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INDUSTRIAL TEMPERATURE RANGE

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PINCONFIGURATION



ABSOLUTE MAXIMUM RATINGS⁽¹⁾

Symbol	Description	Max	Unit
VTERM ⁽²⁾	Supply Voltage to Ground	–0.5 to +7	V
VTERM ⁽³⁾	DC Switch Voltage Vs	–0.5 to +7	V
VTERM ⁽³⁾	DC Input Voltage VIN	–0.5 to +7	V
VAC	AC Input Voltage (pulse width ≤20ns)	-3	V
Ιουτ	DC Output Current	120	mA
Рмах	Maximum Power Dissipation (TA = 85°C)	0.5	W
Tstg	Storage Temperature	-65 to +150	°C

NOTES:

 Stresses greater than those listed under ABSOLUTE MAXIMUM RATINGS may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect reliability.

2. Vcc terminals.

3. All terminals except Vcc .

CAPACITANCE (TA = $+25^{\circ}$ C, f = 1MHz, VIN = 0V, VOUT = 0V)

Pins	Тур.	Max. ⁽¹⁾	Unit
OE (Inputs)	3	5	рF
Quickswitch Channels (Switch OFF)	5	7	pF

NOTE:

1. This parameter is guaranteed but not production tested.

PIN DESCRIPTION

Pin Names	I/O	Description	
1a - 4a	I/O	Bus A	
1y - 4y	I/O	Bus Y	
10E - 40E	I	Bus Switch Enable	

FUNCTION TABLE⁽¹⁾

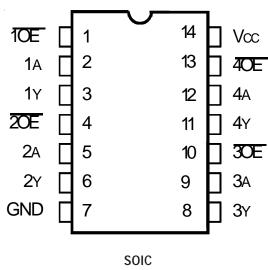
XOE	хА	xY	Function
L	H	Н	Connect
L	L	L	Connect
Н	Х	Х	Disconnect

NOTE:

1. H = HIGH Voltage Level

L = LOW Voltage Level

X = Don't Care



TOP VIEW

DC ELECTRICAL CHARACTERISTICS OVER OPERATING RANGE

Following Conditions Apply Unless Otherwise Specified: Industrial: TA = -40° C to $+85^{\circ}$ C, VCC = 5V \pm 5%

Symbol	Parameter	Test Conditions	Min.	Тур. ⁽¹⁾	Max.	Unit
Vih	Input HIGH Voltage	Guaranteed Logic HIGH for Control Inputs	2	—	—	V
VIL	Input LOW Voltage	Guaranteed Logic LOW for Control Inputs	—	—	0.8	V
lin	Input Leakage Current (Control Inputs)	$0V \le VIN \le VCC$	—	—	±1	μA
loz	Off-State Current (Hi-Z)	$0V \le VOUT \le VCC$, Switches OFF	—	-	±1	μA
Ron	Switch ON Resistance ⁽²⁾	VCC = Min., VIN = 0V, ION = 30mA	—	5	7	Ω
		Vcc = Min., VIN = 2.4V, ION = 15mA	—	10	15	
Vp	Pass Voltage ⁽³⁾	$VIN = VCC = 5V$, $IOUT = -5\mu A$	3.7	4	4.2	V

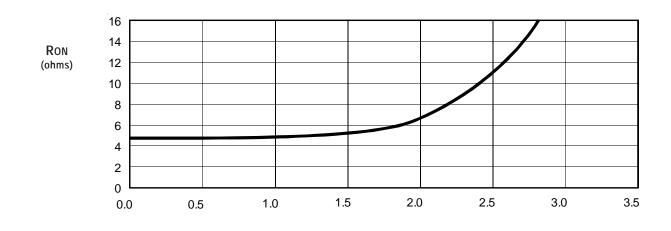
NOTES:

1. Typical values are at Vcc = 5V and TA = 25° C.

2. Row is guaranteed but not production tested.

3. Pass voltage is guaranteed but not production tested.

TYPICAL ON RESISTANCE vs VIN AT Vcc = 5V





POWER SUPPLY CHARACTERISTICS

Symbol	Parameter	Test Conditions ⁽¹⁾	Max.	Unit
lcco	Quiescent Power Supply Current	Vcc = Max., VIN = GND or Vcc, f = 0	3	μA
Δlcc	Power Supply Current per Input HIGH ⁽²⁾	Vcc = Max., VIN = 3.4V, f = 0	2.5	mA
ICCD	Dynamic Power Supply Current per MHz ⁽³⁾	Vcc = Max., A and Y Pins Open, Control Inputs Toggling @ 50% Duty Cycle	0.25	mA/MHz

NOTES:

1. For conditions shown as Min. or Max., use the appropriate values specified under DC Electrical Characteristics.

2. Per TTL-driven input (VIN = 3.4V, control inputs only). A and Y pins do not contribute to Δ Icc.

3. This current applies to the control inputs only and represents the current required to switch internal capacitance at the specified frequency. The A and Y inputs generate no significant AC or DC currents as they transition. This parameter is guaranteed but not production tested.

SWITCHING CHARACTERISTICS OVER OPERATING RANGE

 $T_{A} = -40^{\circ}C \text{ to } +85^{\circ}C, V_{CC} = 5V \pm 5\%$

 $C_{LOAD} = 50 pF$, $R_{LOAD} = 500 \Omega$ unless otherwise noted.

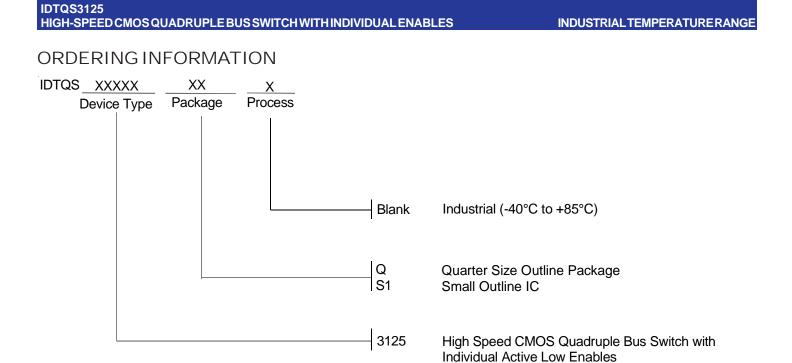
Symbol	Parameter	Min. ⁽¹⁾	Тур.	Max.	Unit
tPLH	Data Propagation Delay ⁽²⁾	—	—	0.25 ⁽³⁾	ns
t PHL	A to Y				
tPZL	Switch Turn-On Delay	1.5	_	6.5	ns
tPZH	OE to xA/xY				
tPLZ	Switch Turn-Off Delay ⁽²⁾	1.5		5.5	ns
tphz	OE to xA/xY				

NOTES:

1. Minimums are guaranteed but not production tested.

2. This parameter is guaranteed but not production tested.

3. The bus switch contributes no propagation 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 at CL = 50pF. Since this time constant is much smaller than the rise and fall times of typical driving signals, it adds very little propagation delay to the system. Propagation 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.





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