

# QUICKSWITCH® PRODUCTS HIGH-SPEED CMOS QUICKSWITCH 16:8 MULTIPLEXER

IDTQS3390

#### **FEATURES**:

- Enhanced N channel FET with no inherent diode to Vcc
- · 16:8 multiplexer function with zero delay
- $5\Omega$  bidirectional switches connect inputs to outputs
- · Zero propagation delay, zero ground bounce
- Low power CMOS proprietary technology
- · Undershoot clamp diodes on all switch and control inputs
- · Direct bidirectional connection for mux, demux
- · Available in SOIC and QSOP packages

## **APPLICATIONS:**

- · Video, audio, graphics switching, muxing
- · Hot-swapping, hot-docking
- Voltage translation (5V to 3.3V)

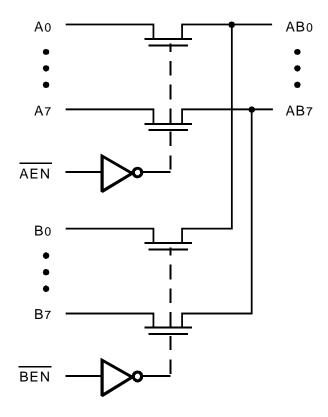
#### **DESCRIPTION:**

The QS3390 provides a 16:8 multiplexer logic switch. The low ON resistance ( $5\Omega$ ) of the QS3390 allows inputs to be connected to the outputs without adding propagation delay and without generating additional ground bounce noise.

Mux/Demux devices provide an order of magnitude faster speed than equivalent logic devices.

The QS3390 is characterized for operation at -40°C to +85°C.

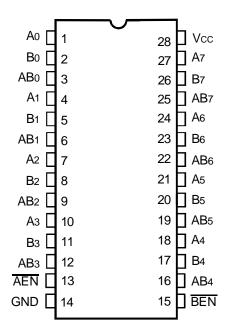
### FUNCTIONAL BLOCK DIAGRAM



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MARCH 2000

#### **PIN CONFIGURATION**



SOIC/ QSOP/ TSSOP TOP VIEW

## ABSOLUTE MAXIMUM RATINGS(1)

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

#### NOTES:

- 1. 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°C, f = 1MHz, Vin = 0V, Vout = 0V)

Pins	Тур.	Max. <sup>(1)</sup>	Unit	
Control Inputs		4	5	pF
Quickswitch Channels	Demux	5	7	pF
(Switch OFF)	Mux	9	10	

#### NOTE:

#### **PIN DESCRIPTION**

Pin Names	I/O	Description		
A0 - A9	I/O	Bus A		
Bo - B9	I/O	Bus B		
ĀĒN, BĒN	I	Bus Switch Enable		

## FUNCTION TABLE(1)

ĀĒN	BEN	A0 - A9	B0 - B9	Function
Н	Н	Off	Off	Disconnect
L	Н	On	Off	A to AB
Н	L	Off	On	B to AB
L	L	On	On	A, B to AB

#### NOTE:

1. H = HIGH Voltage Level L = LOW Voltage Level

<sup>1.</sup> This parameter is guaranteed but not production tested.

# DC ELECTRICAL CHARACTERISTICS OVER OPERATING RANGE

Following Conditions Apply Unless Otherwise Specified:

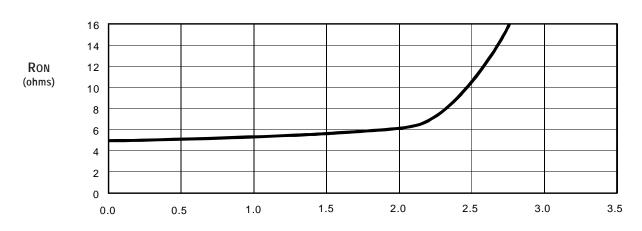
Industrial: TA = -40°C to +85°C, VCC =  $5V \pm 5\%$ 

Symbol	Parameter	Test Conditions	Min.	Typ. <sup>(1)</sup>	Max.	Unit
VIH	Input HIGH Voltage	Guaranteed Logic HIGH for Control Pins	2	_	_	V
VIL	Input LOW Voltage	Guaranteed Logic LOW for Control Pins	_	_	0.8	V
lin	Input Leakage Current (Control Inputs)	0V ≤ VIN ≤ VCC	_	_	±1	μΑ
loz	Off-State Current (Hi-Z)	OV ≤ Vout ≤ Vcc	_	_	±1	μΑ
Ron	Switch ON Resistance	Vcc = Min., VIN = 0V, ION = 30mA		5	7	Ω
		VCC = Min., VIN = 2.4V, ION = 15mA	_	10	15	
VP	Pass Voltage <sup>(2)</sup>	$V_{IN} = V_{CC} = 5V$ , $I_{OUT} = -5\mu A$	3.7	4	4.2	V

#### NOTES:

- 1. Typical values are at Vcc = 5V and TA = 25°C.
- 2. Pass voltage is guaranteed but not production tested.

# TYPICAL ON RESISTANCE vs Vin AT Vcc = 5V



VIN (Volts)

## POWER SUPPLY CHARACTERISTICS

Symbol	Parameter	Test Conditions <sup>(1)</sup>	Max.	Unit
Icco	Quiescent Power Supply Current	Vcc = Max., Vin = GND or Vcc, f = 0	3	μА
Δlcc	Power Supply Current per Input HIGH(2)	Vcc = Max., Vin = 3.4V, f = 0	1.5	mA
ICCD	Dynamic Power Supply Current per MHz <sup>(3)</sup>	Vcc = Max., A, B, and AB 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 (V<sub>IN</sub> = 3.4V, control inputs only). A, B, and AB pins do not contribute to Δlcc.
- 3. This current applies to the control inputs only and represents the current required to switch internal capacitance at the specified frequency. The A, B, and AB inputs generate no significant AC or DC currents as they transition. This parameter is guaranteed but not production tested.

## SWITCHING CHARACTERISTICS OVER OPERATING RANGE

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

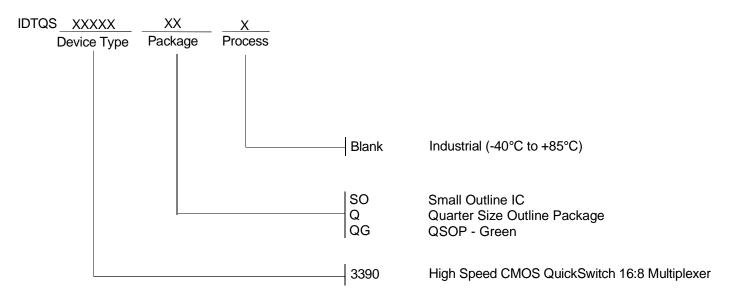
CLOAD = 50pF, RLOAD =  $500\Omega$  unless otherwise noted.

Symbol	Parameter	Min. <sup>(1)</sup>	Тур.	Max.	Unit
tPLH	Data Propagation Delay <sup>(2)</sup>	_	_	0.25 <sup>(3)</sup>	ns
t <sub>PHL</sub>	A, B, to/from AB				
tPZL	Switch Turn-On Delay	1.5	_	6.5	ns
tpzh	AEN, BEN to A, B, AB				
tPLZ	Switch Turn-Off Delay <sup>(2)</sup>	1.5	_	5.5	ns
tphz	AEN, BEN to A, B, AB				

#### 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 C<sub>L</sub> = 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.

## ORDERING INFORMATION





CORPORATE HEADQUARTERS

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