

QUICKSWITCH® PRODUCTS HIGH-SPEED CMOS 10-BIT BUS EXCHANGE SWITCH

IDTQS32383

FEATURES:

- Enhanced N channel FET with no inherent diode to Vcc
- 5 Ω bidirectional switches connect inputs to outputs
- Zero ground bounce
- Undershoot clamp diodes on all switch and control pins
- Bus exchange allows nibble swap
- Available in SOIC and QSOP Packages
- 25Ω version for low noise

APPLICATIONS

- Hot-swapping, hot-docking
- Voltage translation (5V to 3.3V)
- Resource sharing
- Crossbar switching

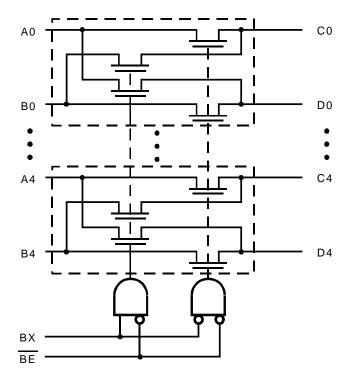
DESCRIPTION:

The QS32383 provides ten high-speed CMOS TTL-compatible bus switches. The low ON resistance of the QS32383 allows inputs to be connected to outputs without adding propagation delay and without generating additional ground bounce noise. The Bus Enable ($\overline{\rm BE}$) signal turns the switches on. The Bus Exchange (BX) signal provides nibble swap of the AB and CD pairs of signals. This exchange configuration allows byte swapping of buses in systems. It can also be used as a 5-wide 2-to-1 multiplexer and to create low delay barrel shifters, etc.

The QS32383 adds an internal 25Ω resistor to reduce reflection noise in high-speed applications. When the switch is closed, it acts as the source termination for the driver connected to it.

The QS32383 is characterized for operation at -40°C to +85°C.

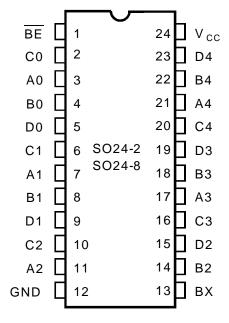
FUNCTIONAL BLOCK DIAGRAM



INDUSTRIAL TEMPERATURE RANGE

OCTOBER 2000

PIN CONFIGURATION



SOIC/ QSOP TOP VIEW

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
Іоит	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

 $(TA = +25^{\circ}C, f = 1.0MHz, Vin = 0V, Vout = 0V)$

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

NOTE:

1. This parameter is guaranteed but not production tested.

PIN DESCRIPTION

Pin Names	I/O	Description
A0-A4, B0-B4	I/O	Buses A, B
C0-C4, D0-D4	I/O	Buses C, D
BE	I	Bus Switch Enable
BX		Bus Exchange

FUNCTION TABLE(1)

BE	вх	A0 - A4	B0 - B4	Function
Н	Х	Hi-Z	Hi-Z	Disconnect
L	L	C0 - C4	D0 - D4	Connect
L	Н	D0 - D4	C0 - C4	Exchange

NOTE:

1. H = HIGH Voltage Level

L = LOW Voltage Level

X = Don't care

Z = High-Impedence

DC ELECTRICAL CHARACTERISTICS OVER OPERATING RANGE

Following Conditions Apply Unless Otherwise Specified:

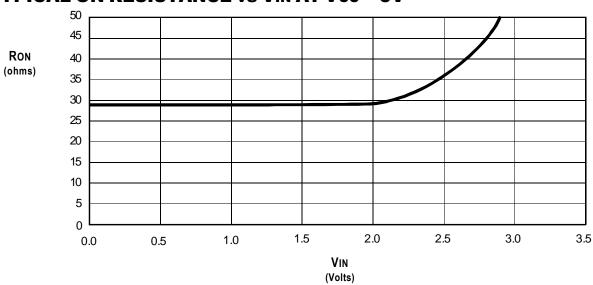
Industrial: $T_A = -40$ °C to +85°C, $V_{CC} = 5.0V \pm 5$ %

Symbol	Parameter	Test Conditions	Min.	Typ. ⁽¹⁾	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	_	±0.01	±1	μΑ
loz	Off-State Current (Hi-Z)	0V ≤ Vouт ≤ Vcc, Switches OFF	_	±0.01	±1	μΑ
Ron	Switch ON Resistance	Vcc = Min., VIN = 0V, ION = 30mA	20	28	40	Ω
Ron	Switch ON Resistance	Vcc = Min., VIN = 2.4V, ION = 15mA	20	35	48	Ω
VP	Pass Voltage (2)	VIN = Vcc = 5V, Ιουτ = -5μΑ	3.7	4	4.2	V

NOTES:

- 1. Typical values are at $V_{CC} = 5.0V$, $T_A = 25$ °C.
- 2. 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
Iccq	Quiescent Power Supply Current	Vcc = Max., Vin = GND or Vcc, f = 0	3	mA
∆lcc	Power Supply Current per Control 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 B pins open	0.25	mA/MHz
		Control Input Toggling at 50% Duty Cycle		

NOTES:

- 1. For conditions shown as Min. or Max., use the appropriate values specified under DC Electrical Characteristics.
- 2. Per TLL driven input (VIN = 3.4V, control inputs only). A, B, C, and D 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 B inputs generate no significant AC or DC currents as they transition. This parameter is guaranteed but not production tested.

SWITCHING CHARACTERISTICS OVER OPERATING RANGE

 $T_A = -40$ °C to +85°C, $V_{CC} = 5.0V \pm 5\%$

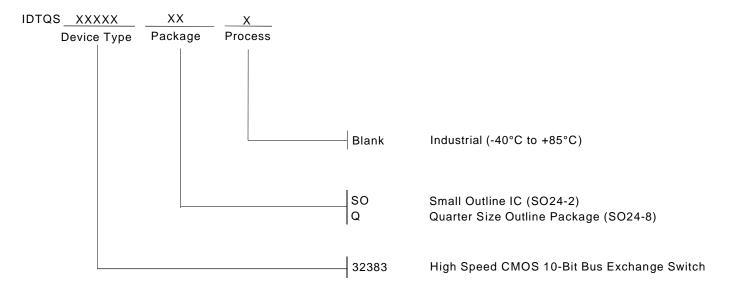
CLOAD = 50pF, RLOAD = 500Wunless otherwise noted.

Symbol	Parameter	Min. ⁽¹⁾	Тур.	Max.	Unit
tPLH	Data Propagation Delay (2,3)			1.25 ⁽³⁾	
tPHL	AxBx to CxDx, CxDx to AxBx	ı	_	1.25 (%)	ns
tPZL	Switch Turn-on Delay	1.5		7.5	20
tpzh	BE to Ax, Bx, Cx, Dx	1.0	_	7.5	ns
tPLZ	Switch Turn-off Delay (2)	1.5		G F	
tPHZ	BE to Ax, Bx, Cx, Dx	1.5	_	6.5	ns
t BX	Switch Multiplex Delay	1.5		7.5	-
	BX to Ax, Bx, Cx, Dx	1.5	_	7.5	ns

NOTES:

- 1. Minimums are guaranteed but not production tested.
- 2. This parameter is guaranteed but not production tested.
- 3. The time constant for the switch alone is of the order of 1.25ns for CL = 50pF. The bus switch contributes no propagation delay other than the RC delay of the ON resistance of the switch and the load capacitance. 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





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