

QUICKSWITCH® PRODUCTS HIGH-SPEED LOW POWER 10-BIT BUS EXCHANGE SWITCH

IDTQS3L383

FEATURES:

- Enhanced N channel FET with no inherent diode to Vcc
- 5Ω bidirectional switches connect inputs to outputs
- · Zero propagation delay, zero added ground bounce
- Ultra low power with 0.2µA typical Icc
- · Undershoot clamp diodes on all switch and control inputs
- · Bus exchange allows nibble swap
- Available in QSOP package

APPLICATIONS:

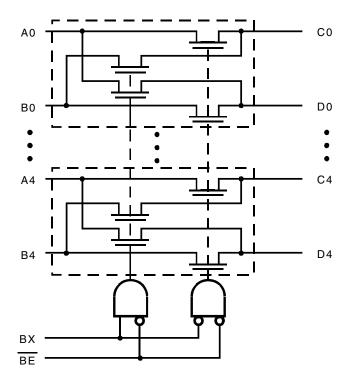
- · Hot-swapping, hot-docking
- Voltage translation (5V to 3.3V)
- · Resource sharing
- · Crossbar switching

DESCRIPTION:

The QS3L383 provides ten high-speed CMOS TTL-compatible bus switches. The low ON resistance of the QS3L383 allows inputs to be connected to outputs without adding propagation delay and without generating additional ground bounce noise. The Bus Enable ($\overline{\mbox{BE}}$) 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 QS3L383 is characterized for operation at -40°C to +85°C.

FUNCTIONAL BLOCK DIAGRAM

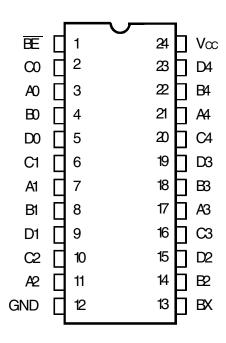


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INDUSTRIAL TEMPERATURE RANGE

JANUARY 2004

PIN CONFIGURATION



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:

- 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. ⁽¹⁾	Unit
Control 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	Pin Names I/O Description	
A0 - A4, B0 - B4	A4, B0 - B4 I/O A and B Buses	
C0 - C4, D0 - D4	I/O	C and D Buses
BE I Bus Switch Enable		Bus Switch Enable
BX I		Bus Exchange

FUNCTION TABLE(1)

BE	вх	A0 - A4	B0 - B4	Function
Н	Χ	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-Impedance

DC ELECTRICAL CHARACTERISTICS OVER OPERATING RANGE

Following Conditions Apply Unless Otherwise Specified:

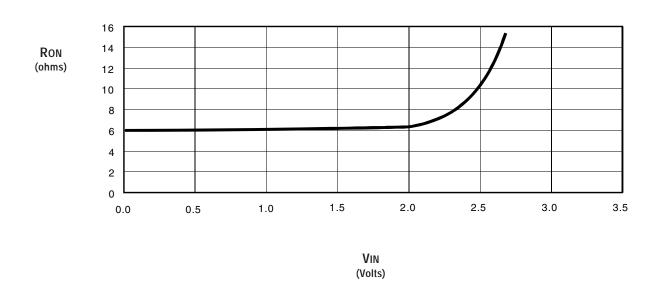
Industrial: TA = -40° C to $+85^{\circ}$ C, VcC = $5V \pm 5\%$

Symbol	Parameter	Test Conditions	Min.	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	_	_	8.0	V
lin	Input Leakage Current (Control Inputs)	0V ≤ VIN ≤ VCC	_	0.01	±1	μA
loz	Off-State Current (Hi-Z)	OV ≤ Vout ≤ Vcc, Switches OFF	_	0.01	±1	μA
Ron	Switch ON Resistance ⁽²⁾	Vcc = Min., Vin = 0V, Ion = 30mA		6	8	Ω
		Vcc = Min., Vin = 2.4V, Ion = 15mA	_	12	17	
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. Ron 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⁾	Тур.	Max.	Unit
Icco	Quiescent Power Supply Current	Vcc = Max., Vin = GND or Vcc, f = 0	0.2	3	μΑ
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 (3)	Vcc = Max., A - D Pins Open,	_	0.25	mA/MHz
		Control Inputs Toggling @ 50% Duty Cycle			

NOTES:

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

SWITCHING CHARACTERISTICS OVER OPERATING RANGE

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

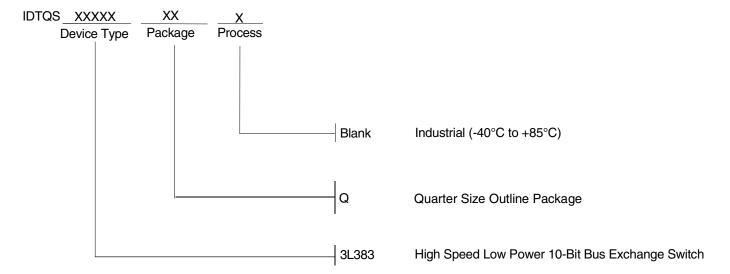
CLOAD = 50pF, RLOAD = 500Ω unless otherwise noted.

Symbol	Parameter	Min. ⁽¹⁾	Тур.	Max.	Unit
tplh	Data Propagation Delay ⁽²⁾	_	_	0.25 ⁽³⁾	ns
t PHL	AxBx to CxDx, CxDx to AxBx				
tpzl	Switch Turn-On Delay	1.5	_	6.5	ns
tpzh	BE to Ax, Bx, Cx, Dx				
tPLZ	Switch Turn-Off Delay ⁽²⁾	1.5	_	5.5	ns
t PHZ	BE to Ax, Bx, Cx, Dx				
tBX	Switch Multiplex Delay	1.5	_	6.5	ns
	BX to Ax, Bx, Cx, Dx				

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_L = 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





6024 Silver Creek Valley Road San Jose, CA 95138 for SALES:

800-345-7015 or 408-284-8200 fax: 408-284-2775 www.idt.com

for Tech Support: logichelp@idt.com