QUICKSWITCH® PRODUCTS HIGH-SPEED CMOS QUICK-SWITCH 32-BIT LOW RESISTANCE MULTIWIDTH™ BUS SWITCHES

IDTQS34XR245

FEATURES:

- Enhanced N channel FET with no inherent diode to Vcc
- 2.5Ω bi-directional switches connect inputs to outputs
- Zero Propagation Delay, Zero ground bounce
- QS34XR245Q3 is 32-bit version of QS3R245
- Flow-through pinout for easy layout
- Undershoot Clamp Diodes on all Switch and Control Inputs
- TTL-Compatible Control Inputs
- Available in 80-pin MilliPaQ™ package (Q3)

APPLICATIONS:

- Low resistance applications
- Hot-docking, hot-swapping (low resistance for PCI, compact PCI)
- Bus Switching, Isolation
- Logic Replacement (Data Processing)
- Capacitance Isolation, reduction
- Power Conservation, Clock Gating
- Voltage Translation (5V to 3.3V)

DESCRIPTION:

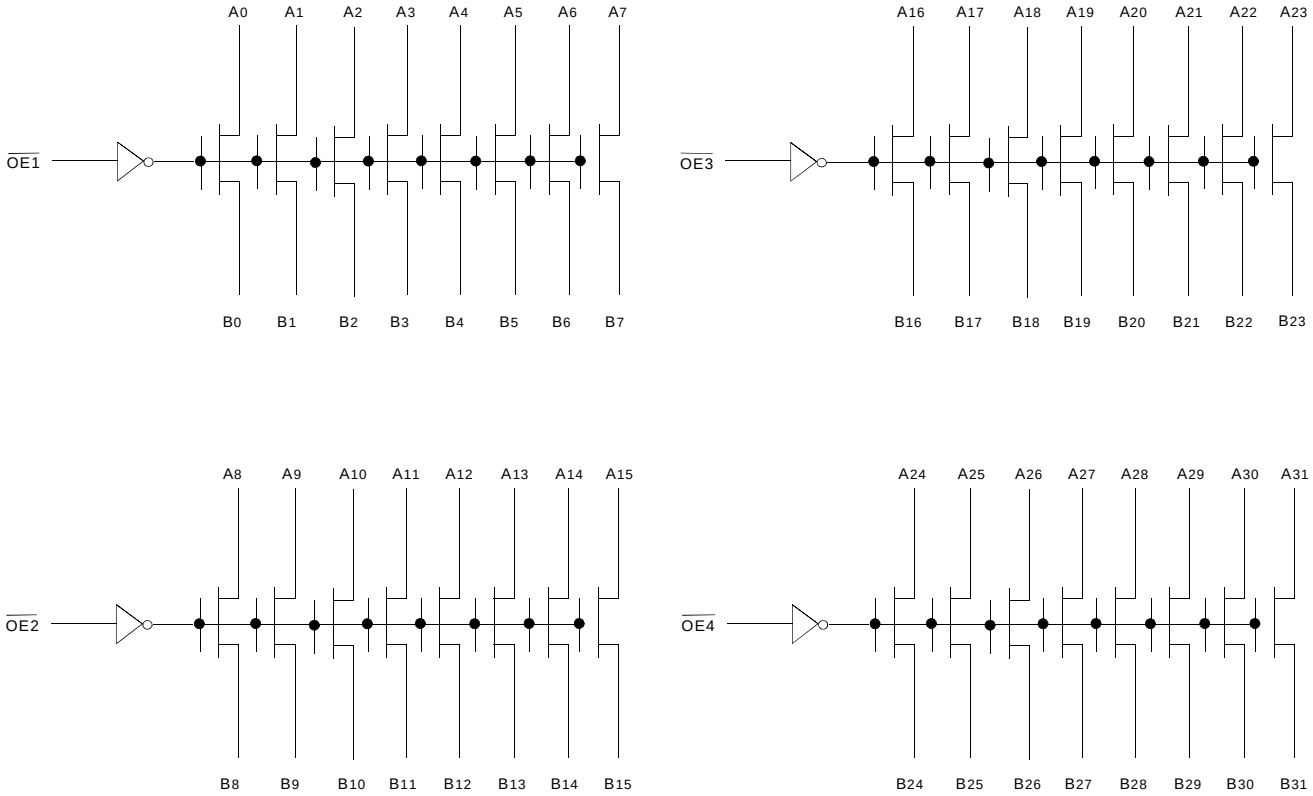
The QS34XR245 is a member of the MultiWidth™ family of QuickSwitch devices and provides a set of 32 high-speed low resistance CMOS compatible bus switches in a flow-through pin out.

This device is available in the MillipaQ package, the worlds first small outline 32-bit solution. The low on-resistance of the QS34XR245 allows inputs to be connected to outputs without adding propagation delay and without generating additional ground bounce noise. When Output Enable ($\overline{OEn}$) is low, the switches are turned on, connecting bus A to bus B. When $\overline{OEn}$ is high, the switches are turned off.

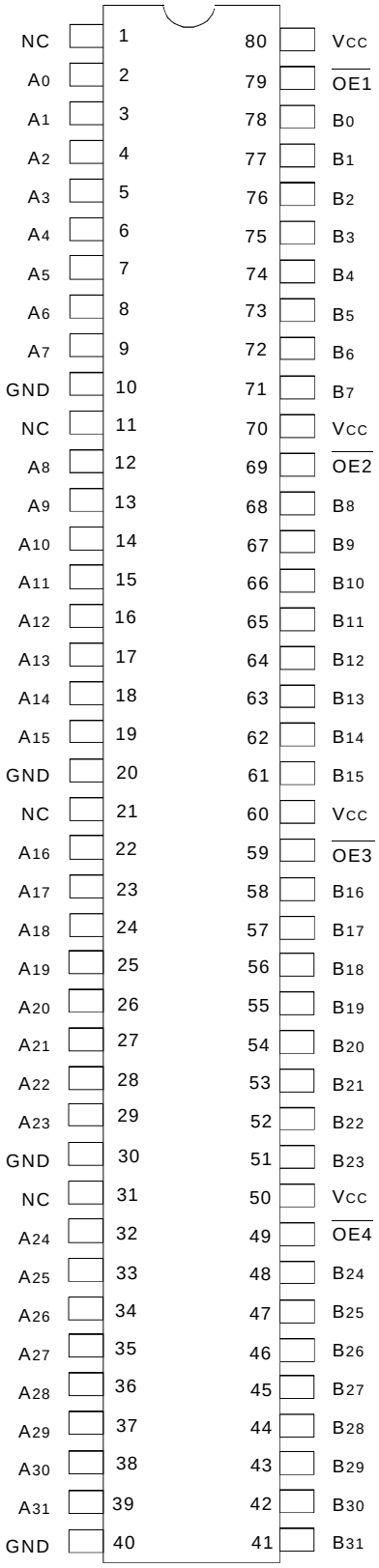
The QS34XR245 is ideally suited for 32/64 bit applications where board space is at a premium. The low resistance of QS34XR245 makes it ideal for PCI hot docking application.

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

FUNCTIONAL BLOCK DIAGRAM



PIN CONFIGURATION



MILLIPAQ (Q3)
TOP VIEW

ABSOLUTE MAXIMUM RATING(1)

Symbol	Description	Max.	Unit
V_{TERM}(2)	Supply Voltage to Ground	– 0.5 to 7	V
V_{TERM}(2	DC Switch Voltage V_S	– 0.5 to 7	V
V_{TERM}(2	DC Input Voltage V_{IN}	– 0.5 to 7	V
V_{AC}	AC Input Voltage (For a pulse width ≤ 20ns)	– 3	V
V_{OUT}	DC Output Current	120	mA
P_{MAX}	Maximum Power Dissipation (T_A = 85°C)	1.4	W
T_{STG}	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. V_{CC} terminals.
3. All terminals except V_{CC}.

CAPACITANCE (T_A = +25°C, f = 1MHz, V_{IN} = 0V, V_{OUT} = 0V)

Pins			MillipaQ		
Symbol	Parameter(1)	Conditions	Typ.	Max.	Unit
C_{IN}	Control Inputs		3	4	pF
CI/O	Quickswitch Channels	Switch OFF	7	8	pF

NOTE:
1. As applicable to the device type.

PIN DESCRIPTION

Pin Names	Description
$\overline{OE}$n	Output Enable
An	Data I/Os
Bn	Data I/Os

FUNCTION TABLE(1)

$\overline{OE}$n	Function
H	Disconnected
L	An = Bn

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

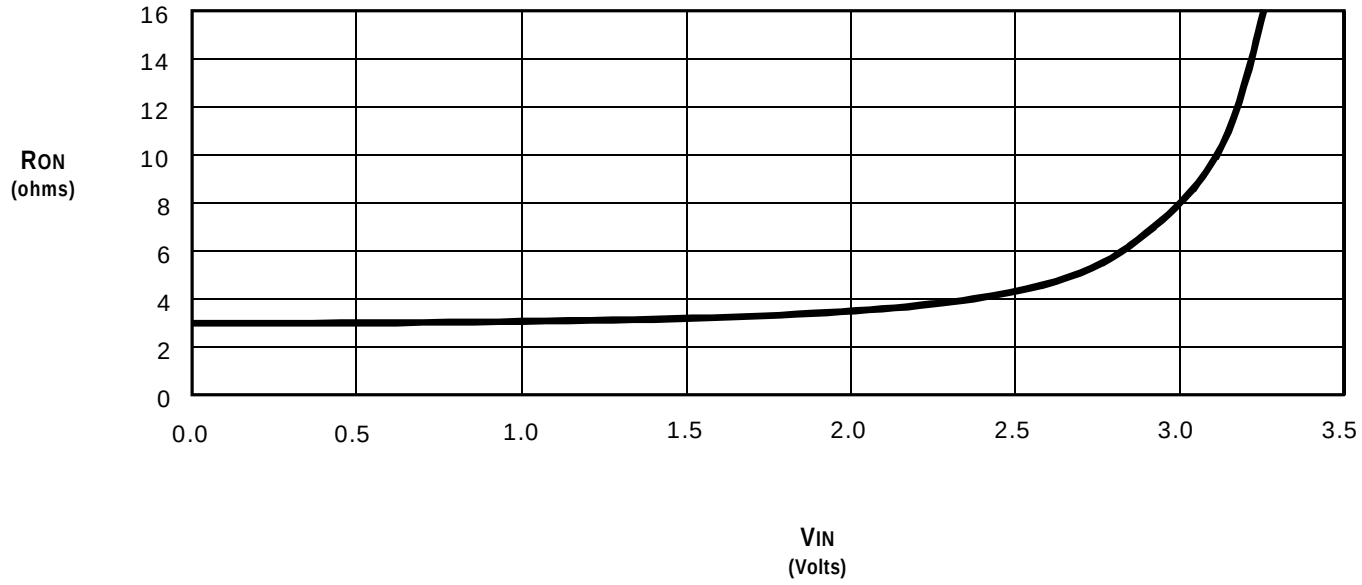
DC ELECTRICAL CHARACTERISTICS OVER OPERATING RANGE

Following Conditions Apply Unless Otherwise Specified:
Industrial: T_A = -40°C to +85°C, V_{CC} = 5.0V ± 10%

Symbol	Parameter	Test Conditions	Min.	Typ.(1)	Max.	Unit
V_{IH}	Input HIGH Voltage	Guaranteed Logic HIGH for Control Pins	2	—	—	V
V_{IL}	Input LOW Voltage	Guaranteed Logic LOW for Control Pins	—	—	0.8	V
I_{IN}	Input Leakage Current (Control Inputs)	$0V \le V_{IN} \le V_{CC}$	—	—	±1	µA
I_{OZ}	Off-State Current (Hi-Z)	$0V \le V_{OUT} \le V_{CC}$, Switches OFF	—	—	±1	µA
R_{ON}	Switch ON Resistance	V_{CC} = Min., V_{IN} = 0V, I_{ON} = 30mA	—	2.5	5	Ω
R_{ON}	Switch ON Resistance	V_{CC} = Min., V_{IN} = 2.4V, I_{ON} = 15mA	—	4	8.5	Ω
V_P	Pass Voltage (2)	V_{IN} = V_{CC} = 5V, I_{OUT} = -5µA	3.7	4	4.3	V

NOTES:
1. Typical values indicate V_{CC} = 5V and T_A = 25°C.
2. Pass Voltage is guaranteed, but not production tested.

TYPICAL ON RESISTANCE vs V_{IN} AT V_{CC} = 5V



OUTPUT DRIVE CHARACTERISTICS

Symbol	Parameter	Test Conditions[1]	Min.	Max.	Unit
I_{CCQ}	Quiescent Power Supply Current	V_{CC} = Max., V_{IN} = GND or V_{CC}, f = 0	—	12	µA
ΔI_{CC}	Power Supply Current[2] per Input HIGH	V_{CC} = Max., V_{IN} = 3.4V, f = 0	—	2.5	mA
Q_{CCD}	Dynamic Power Supply Current per MHz [3]	V_{CC} = Max., A and B Pins Open, Control Input Toggling @ 50% Duty Cycle	—	.25	mA/MHz

SWITCHING CHARACTERISTICS OVER OPERATING RANGE

T_A = -40°C to +85°C, V_{CC} = 5.0V ± 10%

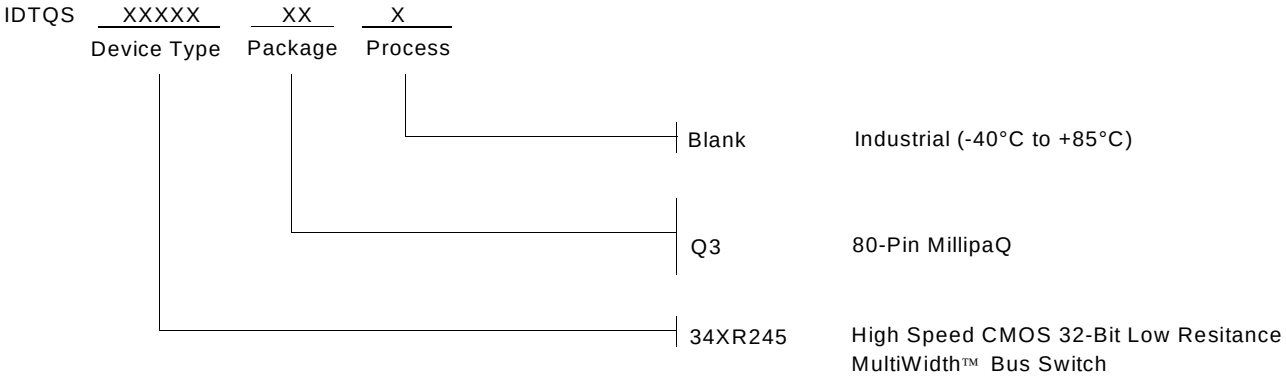
C_{LOAD} = 50pF, R_{LOAD} = 500Ω unless otherwise noted.

Symbol	Parameter	Min.	Typ.	Max.	Unit
t_{PLH} t_{PHL}	Data Propagation Delay[1,2] An to Bn, Bn to An	—	—	0.12	ns
t_{PZH} t_{PZL}	Switch Turn-On Delay $\overline{OE}$ to An/Bn	0.5	—	5.6	ns
t_{PHZ} t_{PLZ}	Switch Turn-Off Delay[1] $\overline{OE}$ to An/Bn	0.5	—	4.5	ns

NOTES:

1. This parameter is guaranteed, but not production tested.
2. 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 .12ns for CL = 50pF. Since this time constant is much smaller than the rise/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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