QUICKSWITCH® PRODUCTS 3.3V HIGH SPEED 32-BIT MULTIWIDTH™ BUS SWITCH

IDTQS34XV245

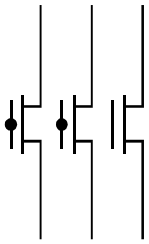
DESCRIPTION:

The QS34XV245 is a set of 32-bit high speed bus switches controlled by LVTTL-compatible active low enable signal. When closed, the switches exhibit near zero propagation delay without generating additional ground bounce or switching noise.

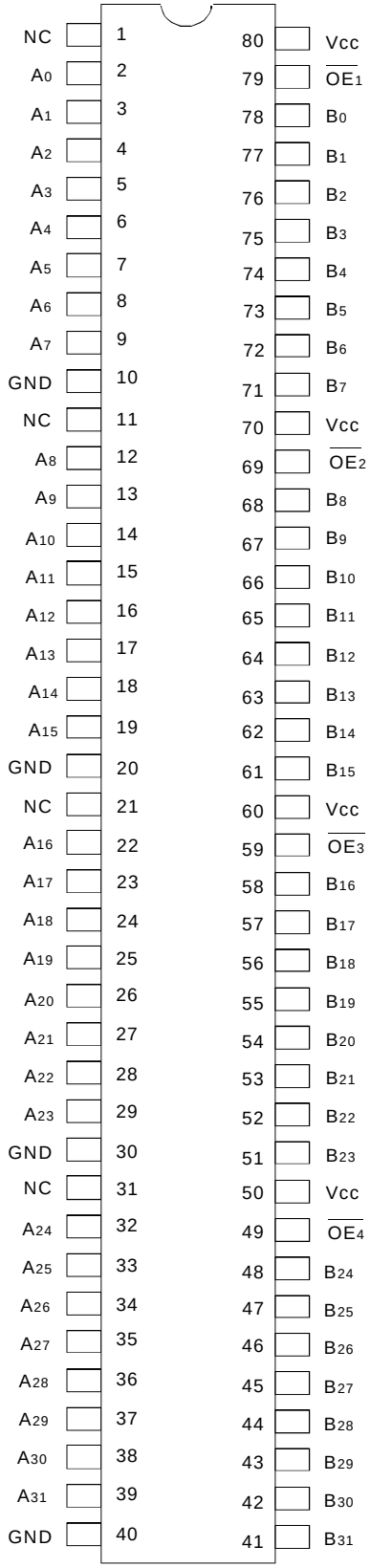
The QS34XV245 is specially designed for direct interface betweeen 3.3V and 2.5V devices without any external components. When operating from a 3.3V supply, the logic high level at the switch output is clamped to 2.5V when the switch input signal exceeds 2.5V. This device can be used for switching 2.5V buses without signal attenuation. The ON resistance at 3.3V V_{CC} is less than 5Ω typical, providing near zero propagation delay through the switch. Absence of DC path from switch I/O pins to V_{CC} or ground makes QS34XV245 an ideal device for hot swapping applications.

The QS34XV245 is characterized for operation from -40°C to +85°C.

FUNCTIONAL BLOCK DIAGRAM



PIN CONFIGURATION



DC ELECTRICAL CHARACTERISTICS OVER OPERATING RANGE

Following Conditions Apply Unless Otherwise Specified:

Industrial: T_A = –40°C to +85°C, V_{CC} = 3.3V ± 0.3V

Symbol	Parameter	Test Conditions	Min.	Typ.(1)	Max.	Unit
V_{IH}	Input HIGH Voltage Level	Guaranteed Logic HIGH for Control Inputs	2	—	—	V
V_{IL}	Input LOW Voltage Level	Guaranteed Logic LOW for Control Inputs	—	—	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	—	0.001	1	µA
R_{ON}	Switch ON Resistance	V_{CC} = Min., V_{IN} = 0V, I_{ON} = 8mA	—	5	7	Ω
		V_{CC} = Min., V_{IN} = 1.7V, I_{ON} = 8mA	—	15	20	Ω
		V_{CC} = 2.3V, V_{IN} = 0V, I_{ON} = 8mA	—	7	—	Ω
		V_{CC} = 2.3V, V_{IN} = 1.3V, I_{ON} = 8mA	—	25	—	Ω
V_P	Pass Voltage(2)	V_{IN} = V_{CC} = 3.3V, I_{OUT} = -5µA	2.5	2.7	2.9	V
		V_{IN} = V_{CC} = 2.5V, I_{OUT} = -5µA	—	1.8	—	V

NOTES:
1. Typical values are at V_{CC} = 3.3V, +25°C ambient.
2. Pass voltage is guaranteed, but not production tested.

POWER SUPPLY 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} = 3V or V_{CC}, f = 0 per Control Input	—	50	µA
I_{CCD}	Dynamic Power Supply Current per MHz (3)	V_{CC} = Max., A and B Pins Open, Control Input Toggling @ 50% Duty Cycle	—	0.15	mA/MHz

NOTES:
1. For conditions shown as Min. or Max., use the appropriate values specified under DC Electrical Characteristics.
2. Per TLL driven input (V_{IN} = 3.4V). A and B pins do not contribute to ΔI_{CC}.
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} = 3.3V ± 0.3V

Symbol	Parameter	Min. (1)	Typ.	Max.	Unit
t_{PLH} t_{PHL}	Data Propagation Delay(2, 3) An to/from Bn	—	—	0.25	ns
t_{PZL} t_{PZH}	Switch Turn-On Delay $\overline{OE}n$ to An/Bn	0.5	—	6.5	ns
t_{PLZ} t_{PHZ}	Switch Turn-Off Delay(2) $\overline{OE}n$ to An/Bn	0.5	—	4	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 0.25ns at C_L = 30pF. 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.

TYPICAL ON RESISTANCE vs V_{IN} AT V_{CC} = 3.3V

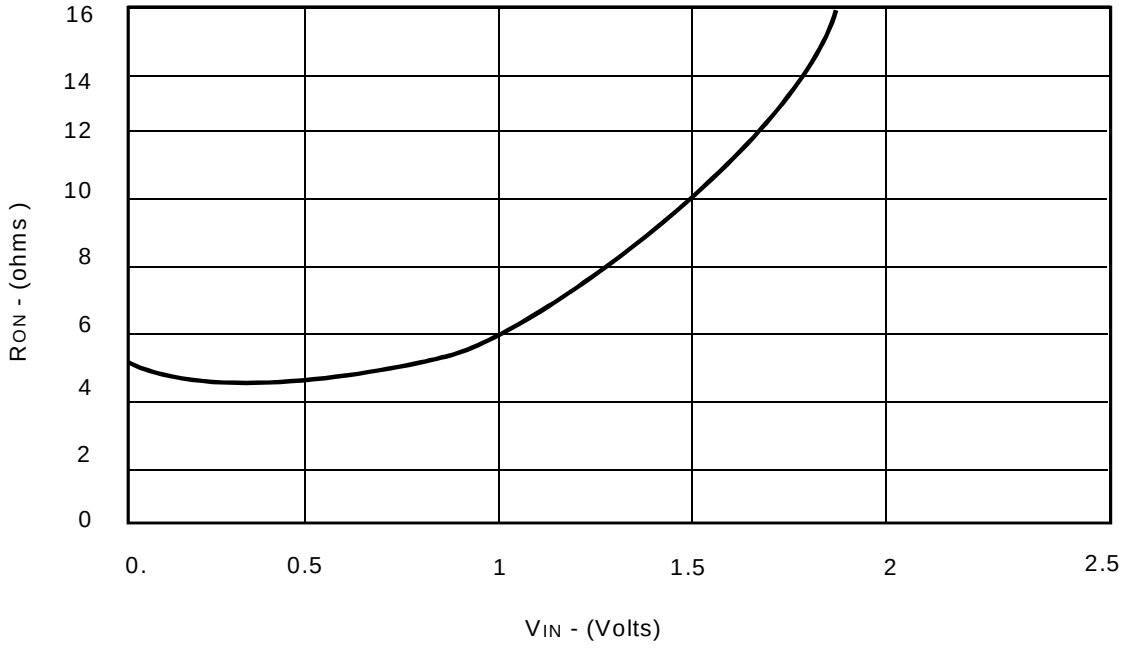
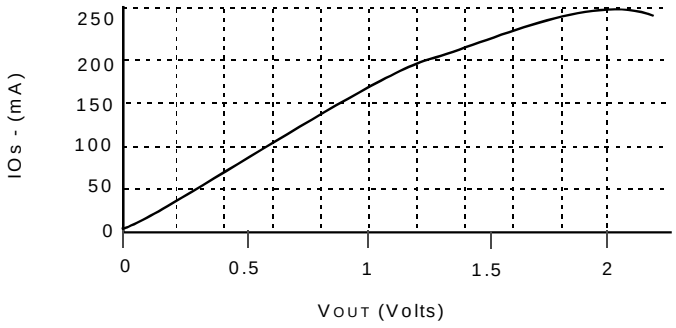
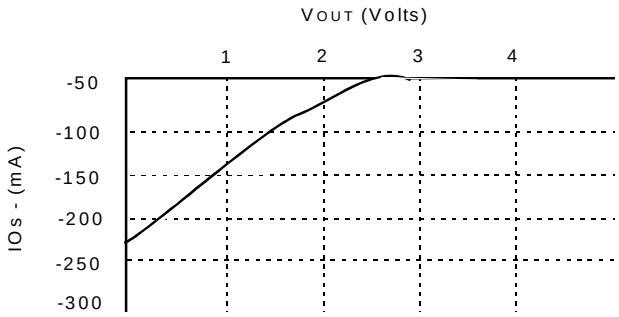


Figure. 1

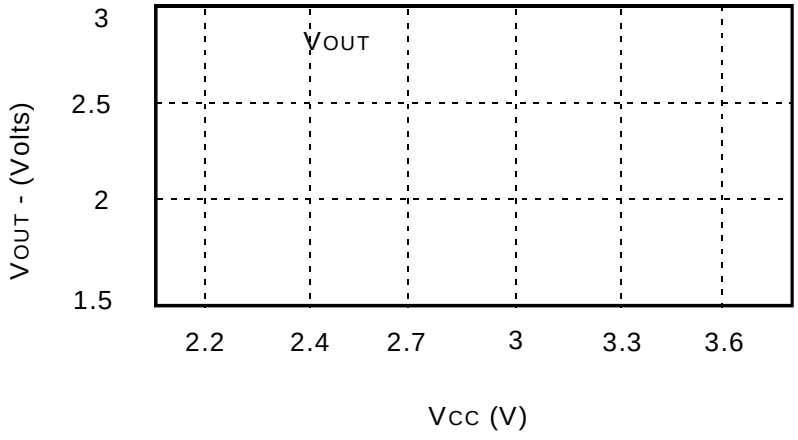
OUTPUT VI CHARACTERISTICS



Outputs Low Characteristic



Outputs High Characteristic



3.3V TO 2.5V VOLTAGE TRANSLATION

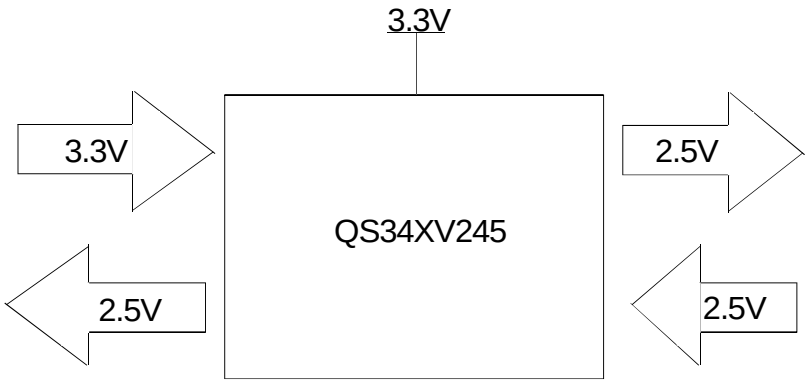


Figure. 5

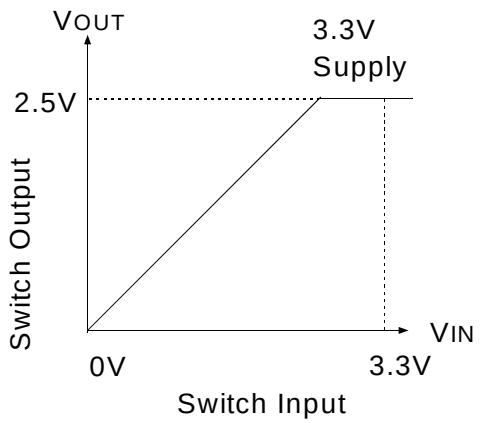


Figure. 6

2.5V TO 1.8V VOLTAGE TRANSLATION

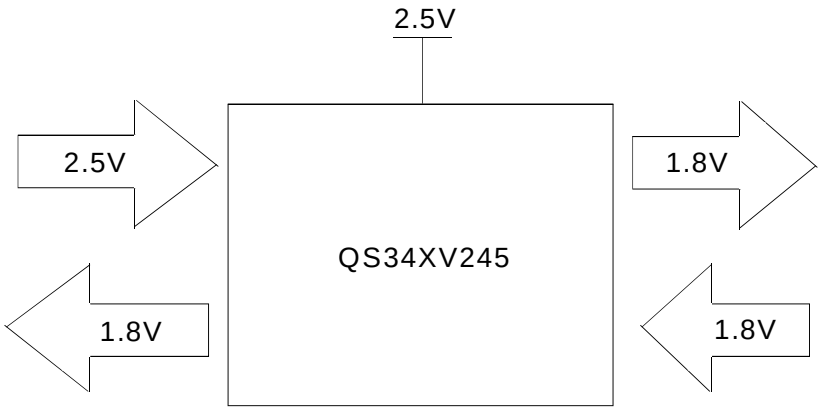


Figure. 7

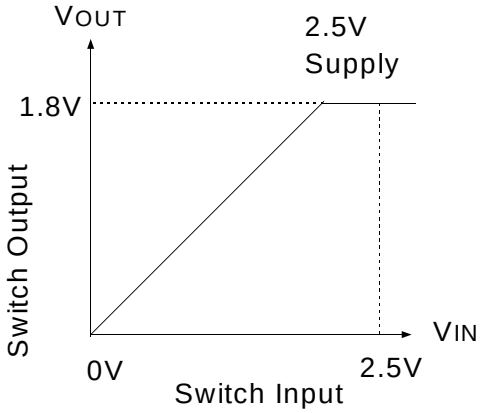
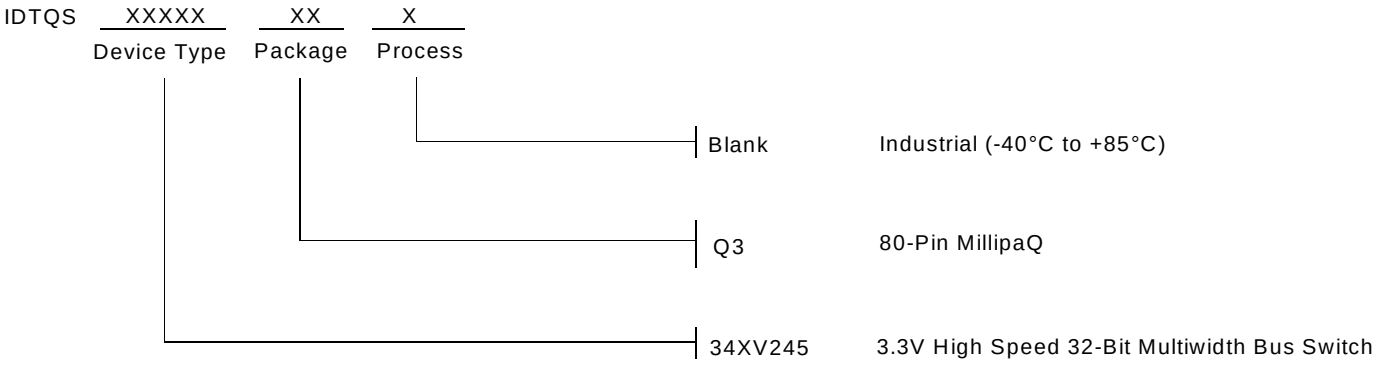


Figure. 8

ORDERING INFORMATION



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