QUICKSWITCH® PRODUCTS HIGH-SPEED CMOS QUICKSWITCH 32:16 MUX/DEMUX WITH 50Ω DAMPING RESISTOR

IDTQS3165233

FEATURES:

- Enhanced N channel FET with no inherent diode to Vcc
- Bidirectional switches connect inputs to outputs
- Zero propagation delay, zero ground bounce
- TTL-compatible input and output levels
- Undershoot clamp diodes on all switch and control pins
- Available in 56-pin SSOP and TSSOP Packages

APPLICATIONS

- Video, audio, graphics switching, muxing
- Hot-swapping, hot-docking
- Voltage translation (5V to 3.3V)
- Noise, charge sharing, ground bounce reduction
- Bus funneling

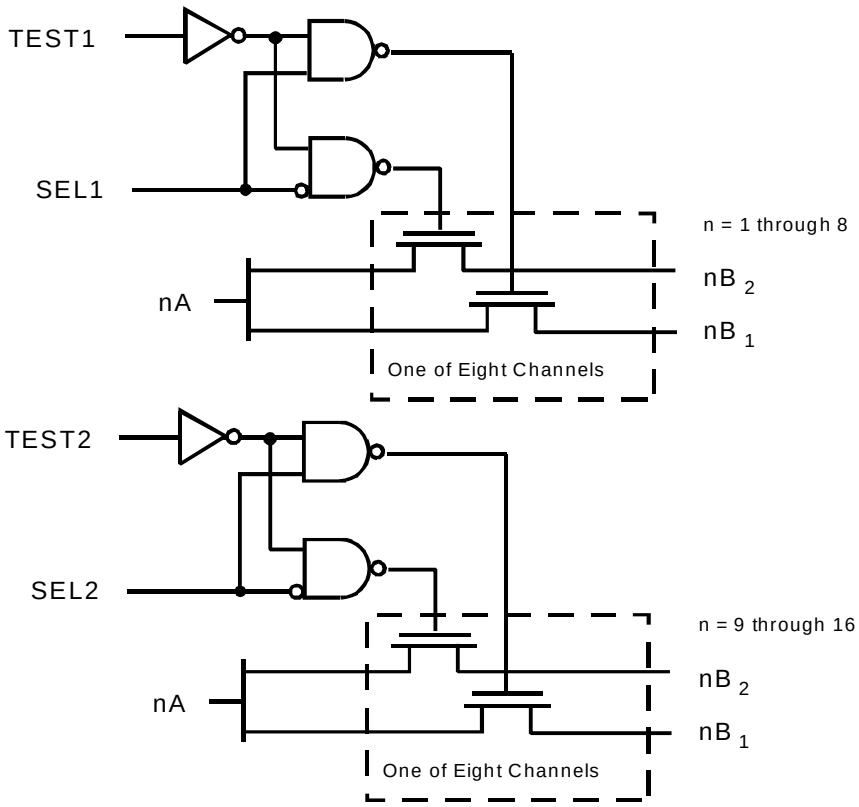
DESCRIPTION:

The QS3165233 is a 32-bit to 16-bit high-speed CMOS, TTL-compatible switch which can multiplex or demultiplex data. It can be used for memory interleaving where two memory banks need to be addressed simultaniously. It can also be used as two 16-bit to 8-bit multiplexers or as one 32-bit to 16-bit multiplexer. SELn inputs control the data flow. TESTn inputs control either one or two ports connection. The QS3165233 adds an internal 50Ω series termination resistor to each switch to reduce reflection noise in high-speed applications.

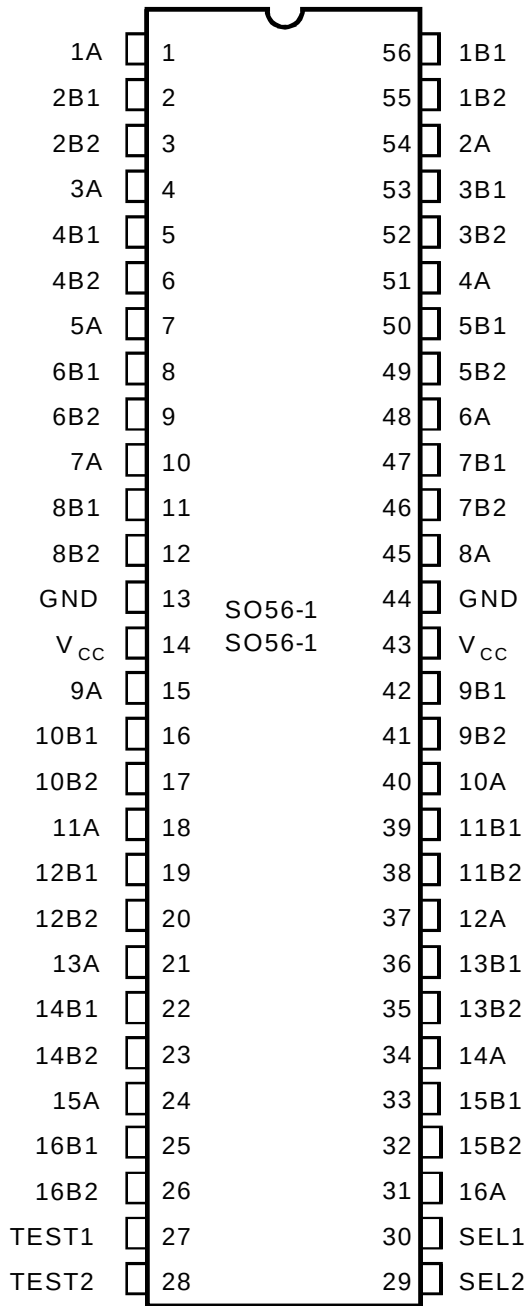
Mux/Demux devices provide an order of magnitude faster speed than equivalent logic devices.

The QS3165233 is characterized for operation at -40°C to +85°C.

FUNCTIONAL BLOCK DIAGRAM



PIN CONFIGURATION



SSOP/ TSSOP
TOP VIEW

PIN DESCRIPTION

Pin Names	I/O	Description
nA	I/O	Bus A
nB_1, nB_2	I/O	Bus B
SEL_1, SEL_2	I	Data Select
$TEST_1$, $TEST_2$	I	Port Select

ABSOLUTE MAXIMUM RATINGS (1)

Symbol	Description		Max.	Unit
V_{TERM}(2)	Supply Voltage to Ground		– 0.5 to +7	V
V_{TERM}(3)	DC Switch Voltage V_S		– 0.5 to +7	V
V_{TERM}(3)	DC Input Voltage V_{IN}		– 0.5 to +7	V
V_{AC}	AC Input Voltage (pulse width ≤20ns)		-3	V
I_{OUT}	DC Output Current		120	mA
P_{MAX}	Maximum Power	SSOP	.93	W
	Dissipation (T_A = 85°C)	TSSOP	.77	
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. Vcc Terminals.
3. All terminals except Vcc.

CAPACITANCE

(T_A = +25°C, f = 1.0MHz, V_{IN} = 0V, V_{OUT} = 0V)

Pins		Typ.	Max. (1)	Unit
Control Inputs		5	5.5	pF
Quickswitch Channels	Mux	8.5	10	pF
(Switch OFF)	Demux	6	7	pF

NOTE:
1. This parameter is guaranteed but not production tested.

FUNCTION TABLE(1)

n = 1 through 8

SEL_1	$TEST_1$	nA	Function
L	L	nB_1	nA to nB_1
H	L	nB_2	nA to nB_2
X	H	nB_1, nB_2	nA to nB_1 and nB_2

n = 9 through 16

SEL_2	$TEST_2$	nA	Function
L	L	nB_1	nA to nB_1
H	L	nB_2	nA to nB_2
X	H	nB_1, nB_2	nA to nB_1 and nB_2

NOTE:
1. H = HIGH Voltage Level
   L = LOW Voltage Level
   X = Don't Care

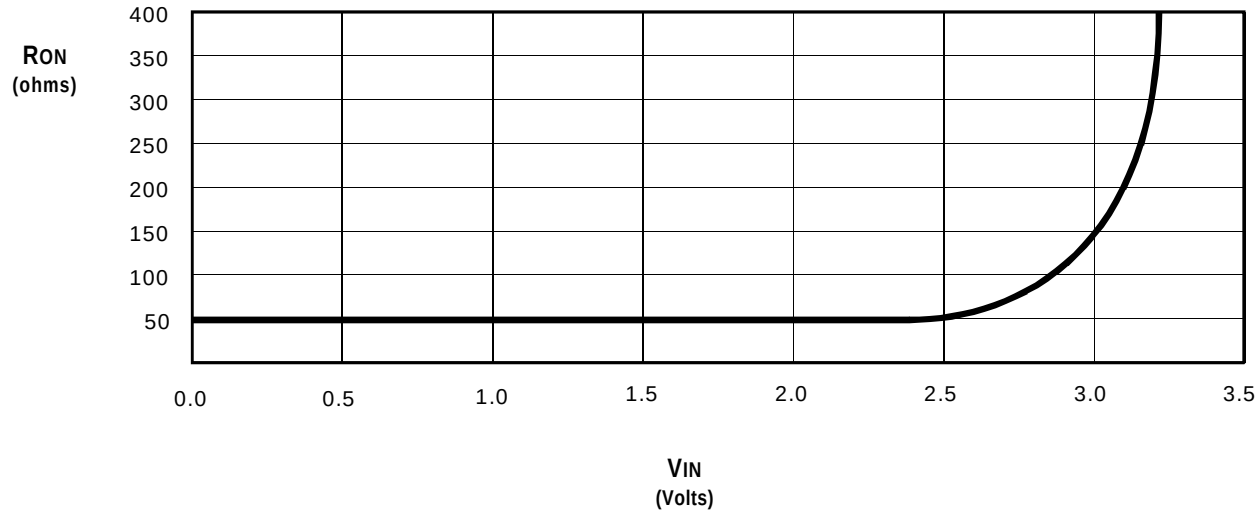
DC ELECTRICAL CHARACTERISTICS OVER OPERATING RANGE

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)	$0V \le V_{IN} \le Vcc$	—	—	±1	µA
I_{OZ}	Off-State Current (Hi-Z)	$0V \le V_{OUT} \le Vcc$	—	—	±1	µA
R_{ON}	Switch ON Resistance (2)	Vcc = Min., V_{IN} = 0V, I_{ON} = 30mA	35	50	70	Ω
R_{ON}	Switch ON Resistance (2)	Vcc = Min., V_{IN} = 2.4V, I_{ON} = 15mA	35	55	75	Ω
V_P	Pass Voltage (3)	V_{IN} = Vcc = 5V, I_{OUT} = -5µA	3.7	4	4.2	V

NOTES:
1. Typical values are at V_{CC} = 5.0V, T_A = 25°C.
2. Max value of R_{ON} is guaranteed but not production tested.
3. Pass voltage is guaranteed but not production tested.

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



POWER SUPPLY CHARACTERISTICS

Symbol	Parameter	Test Conditions[1]	Max.	Unit
I_{CCQ}	Quiescent Power Supply Current	V_{CC} = Max., V_{IN} = GND or Vcc, f = 0	3	µA
ΔI_{CC}	Power Supply Current per Control Input HIGH [2]	V_{CC} = Max., V_{IN} = 3.4V, f = 0	1.5	mA
I_{CCD}	Dynamic Power Supply Current per MHz[3]	V_{CC} = Max., A and B pins open Control Input Toggling at 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 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.

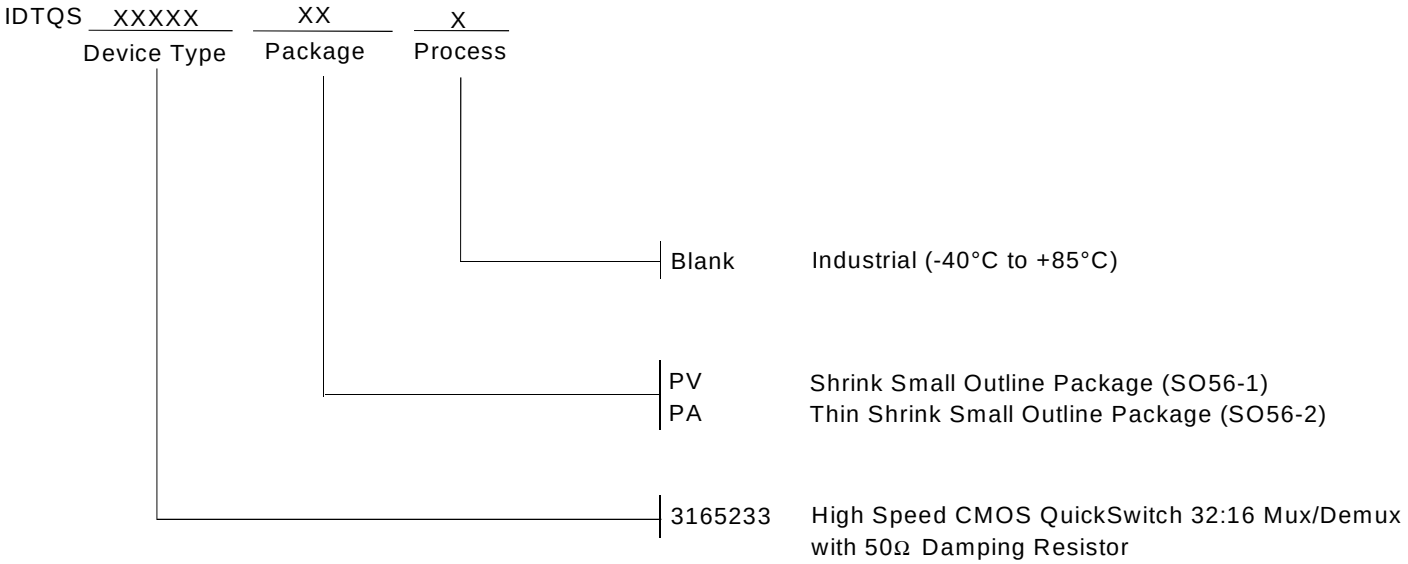
SWITCHING CHARACTERISTICS OVER OPERATING RANGE

T_A = -40°C to +85°C, V_{CC} = 5.0V ± 10%
C_{LOAD} = 50pF, R_{LOAD} = 500Ω unless otherwise noted.

Symbol	Parameter	Min. [1]	Typ.	Max.	Unit
t_{PLH} t_{PHL}	Data Propagation Delay [2,4] nA to nBx, nBx to nA	—	—	2.5 [3]	ns
t_{BX}	Switch Multiplex Delay SEL to nA	1.5	—	7.5	ns
t_{PZL} t_{PZH}	Switch Turn-on Delay SEL, TEST to nBx	1.5	—	7.5	ns
t_{PLZ} t_{PHZ}	Switch Turn-off Delay [2] SEL, TEST to nBx	1.5	—	5.8	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 2.5ns at C_L = 50pF.
4. 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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