



QUICKSWITCH® PRODUCTS HIGH-SPEED CMOS 10-BIT BUS SWITCH WITH ACTIVE HIGH AND LOW ENABLES

IDTQS32862

FEATURES:

- Enhanced N channel FET with no inherent diode to Vcc
- Undershoot clamp diodes on all switch and control inputs
- Active low and high enable control
- 25Ω resistors for low noise
- Available in SOIC and QSOP packages

APPLICATIONS

- Hot-swapping, hot-docking
- Voltage translation (5V to 3.3V)
- Power conservation
- Capacitance reduction and isolation
- Applications requiring Active-High enabling
- Clock gating
- Bus isolation

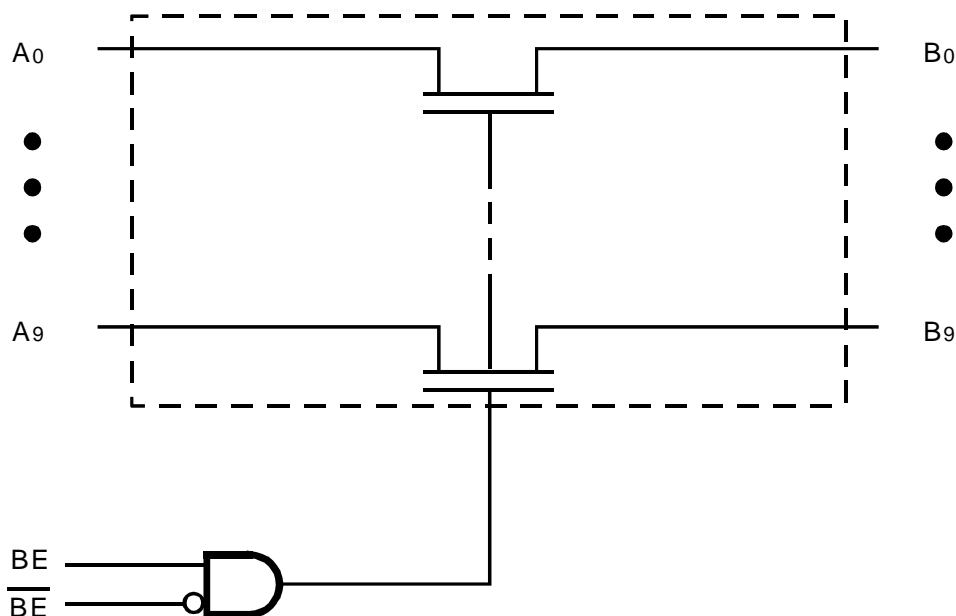
DESCRIPTION:

The QS32862 provides a set of ten high speed CMOS, TTL Compatible bus switches. The switches are controlled by independent active Low enable (\overline{BE}) and High enable (BE) controls.

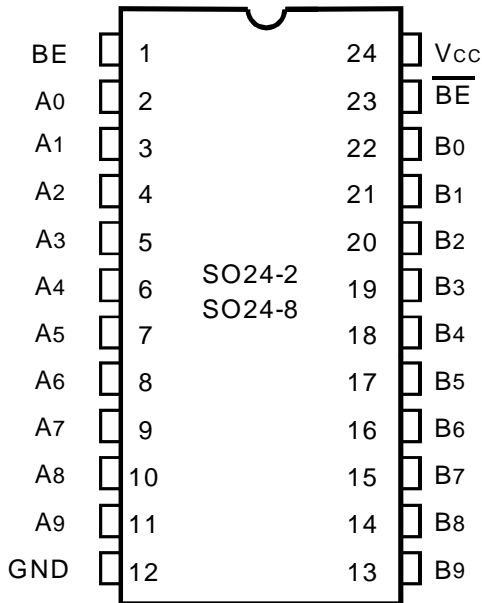
The QS32862 includes internal 25Ω series termination resistors to reduce reflection noise in high speed applications. When closed, the switch acts as the source (series) termination for the driver connected to it. The QS32862 is ideal for switching digital buses as well as hot-plugging, hot-docking, and voltage translation.

The QS32862 is characterized for operation at -40°C to +85°C.

FUNCTIONAL BLOCK DIAGRAM



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 |
| IOUT | DC Output Current | 120 | mA |
| P _{MAX} | Maximum Power Dissipation | 0.5 | W |
| T _{STG} | 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.
- Vcc Terminals.
- All terminals except Vcc.

CAPACITANCE

(TA = +25°C, f = 1.0MHz, VIN = 0V, VOUT = 0V)

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

NOTE:

- This parameter is guaranteed but not production tested.

PIN DESCRIPTION

| Pin Names | I/O | Description |
|-----------------|-----|------------------------|
| BE | I | Active High Bus Enable |
| \overline{BE} | I | Active High Bus Enable |
| A0 – A9 | I/O | Bus A |
| B0 – B9 | I/O | Bus B |

FUNCTION TABLE(1)

| BE | \overline{BE} | A0 – A9 | Function |
|----|-----------------|---------|------------|
| L | L | Hi-Z | Disconnect |
| L | H | Hi-Z | Disconnect |
| H | L | B0 – B9 | Connect |
| H | H | Hi-Z | Disconnect |

NOTE:

- H = HIGH Voltage Level
L = LOW Voltage Level
Z = High-impedence

DC ELECTRICAL CHARACTERISTICS OVER OPERATING RANGE

Following Conditions Apply Unless Otherwise Specified:

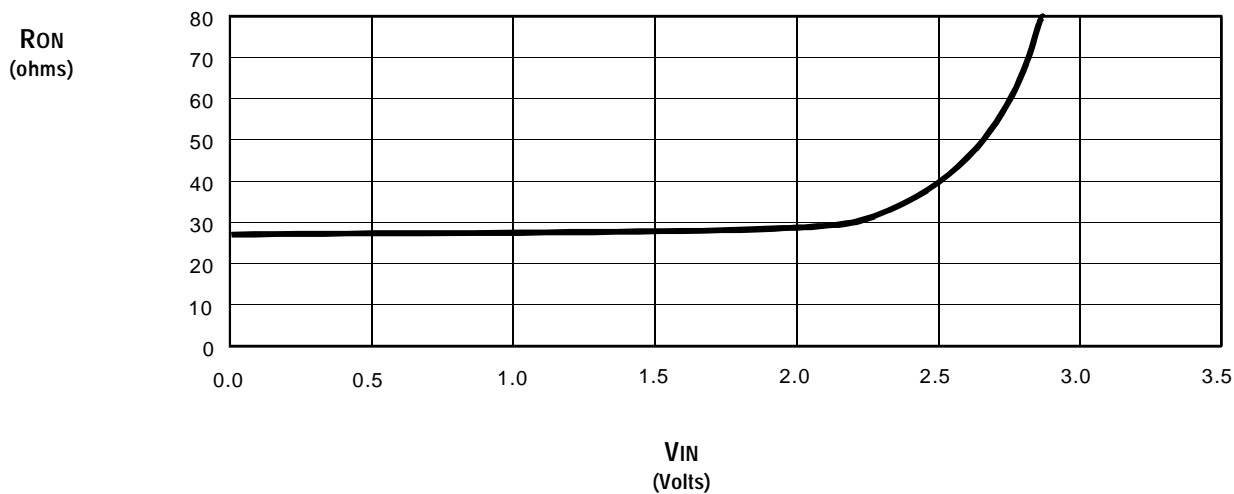
Industrial: $T_A = -40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$, $V_{CC} = 5.0\text{V} \pm 10\%$

| 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) | $0\text{V} \leq V_{IN} \leq V_{CC}$ | — | ± 0.01 | ± 1 | μA |
| I_{OZ} | Off-State Current (Hi-Z) | $0\text{V} \leq V_{OUT} \leq V_{CC}$, Switches OFF | — | ± 0.01 | ± 1 | μA |
| R_{ON} | Switch ON Resistance | $V_{CC} = \text{Min.}$, $V_{IN} = 0\text{V}$, $I_{ON} = 30\text{mA}$ | 20 | 28 | 40 | Ω |
| R_{ON} | Switch ON Resistance | $V_{CC} = \text{Min.}$, $V_{IN} = 2.4\text{V}$, $I_{ON} = 15\text{mA}$ | 20 | 35 | 48 | Ω |
| V_P | Pass Voltage ⁽²⁾ | $V_{IN} = V_{CC} = 5\text{V}$, $I_{OUT} = -5\mu\text{A}$ | 3.7 | 4 | 4.2 | V |

NOTES:

1. Typical values are at $V_{CC} = 5.0\text{V}$, $T_A = 25^{\circ}\text{C}$.
2. Pass voltage is guaranteed but not production tested.

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



POWER SUPPLY CHARACTERISTICS

| Symbol | Parameter | Test Conditions ⁽¹⁾ | Typ. ⁽²⁾ | Max. | Unit |
|------------------|---|--|---------------------|------|--------|
| I _{CCQ} | Quiescent Power Supply Current | V _{CC} = Max., V _{IN} = GND or V _{CC} , f = 0 | 0.2 | 3 | μA |
| ΔI _{CC} | Power Supply Current per Control Input HIGH | V _{CC} = Max., V _{IN} = 3.4V ⁽³⁾ , f = 0 | — | 2.5 | mA |
| I _{CCD} | Dynamic Power Supply Current per MHz ⁽⁴⁾ | V _{CC} = Max., A and B pins open, BE, \overline{BE} inputs Toggling at 50% Duty Cycle | — | 0.25 | mA/MHz |

NOTES:

- For conditions shown as Min. or Max., use the appropriate values specified under DC Electrical Characteristics.
- Typical values are at V_{CC} = 5.0V, T_A = 25°C ambient.
- Per TLL driven input (V_{IN} = 3.4V, control inputs only). A and B pins do not contribute to ΔI_{CC}.
- 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%

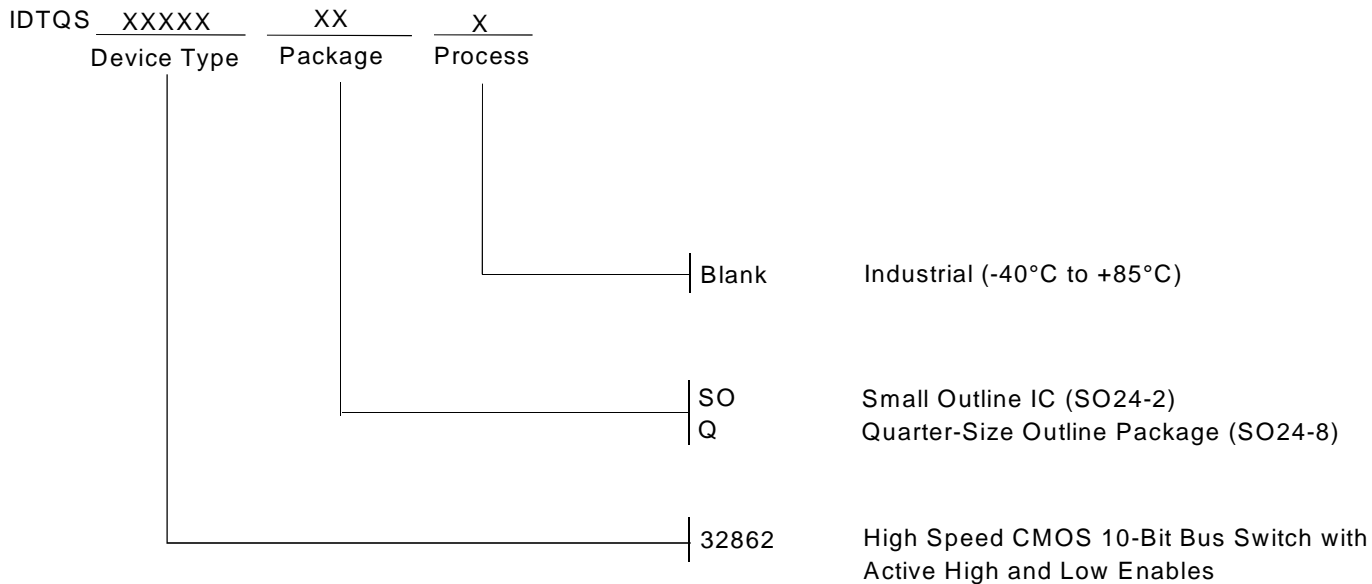
C_{LOAD} = 50pF, R_{LOAD} = 500Ω unless otherwise noted.

| Symbol | Parameter | Min. ⁽¹⁾ | Typ. | Max. | Unit |
|--------------------------------------|---|---------------------|------|------|------|
| t _{PLH} t _{PHL} | Data Propagation Delay ^(2,3) A to B or B to A | — | — | 1.25 | ns |
| t _{PZL} t _{PZH} | Switch Turn-on Delay \overline{BE} or BE to A to B | 1.5 | — | 75 | ns |
| t _{PLZ} t _{PHZ} | Switch Turn-off Delay ⁽²⁾ \overline{BE} or BE to A to B | 1.5 | — | 5.5 | ns |

NOTES:

- Minimums are guaranteed but not production tested.
- This parameter is guaranteed but not production tested.
- The time constant for the switch alone is of the order of 1.25ns for C_L = 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



CORPORATE HEADQUARTERS
2975 Stender Way
Santa Clara, CA 95054

for SALES:
800-345-7015 or 408-727-6116
fax: 408-492-8674
www.idt.com*

*To search for sales office near you, please click the sales button found on our home page or dial the 800# above and press 2.
The IDT logo, QuickSwitch, and SynchroSwitch are registered trademarks of Integrated Device Technology, Inc.