

High Bandwidth Potato Chip

FEATURES:

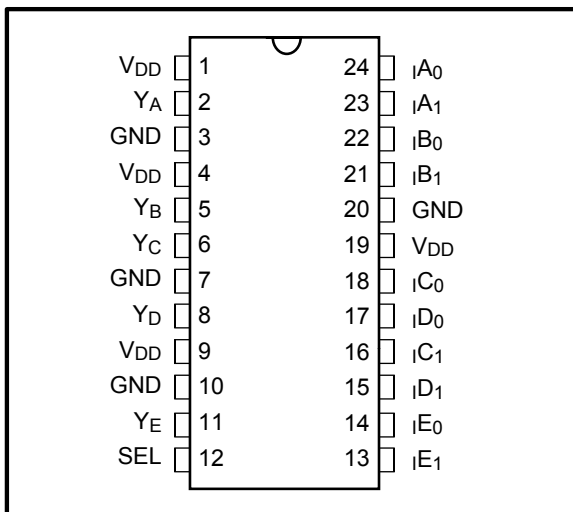
- Patented technology
- High signal -3db passing bandwidth at 1.25GHz
- Near-Zero propagation delay
- VCC = 1.65V to 3.6V
- Ultra-Low Quiescent Power: 0.1 μ A typical
- Ideally suited for low power applications
- Industrial operating temperature: -40°C to +85°C
- Available in 24pin QSOP package

DESCRIPTION:

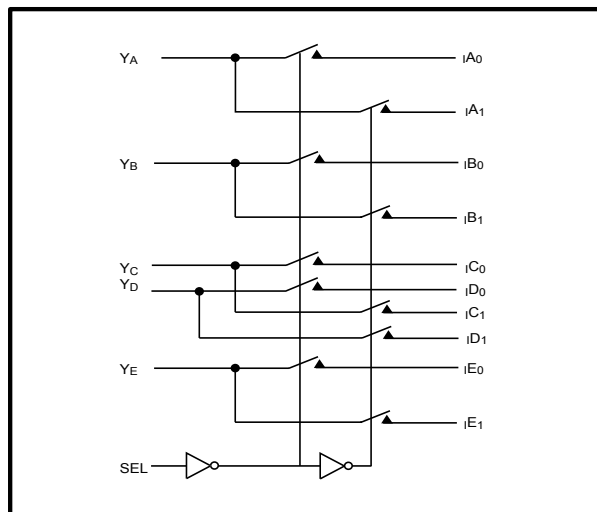
Potato Semiconductor's PO3B512A is designed for world top performance using submicron CMOS technology to achieve GHz high bandwidth.

The PO3B512A is a Wideband/Video Switch 5-Port, 2:1 Mux/DeMux. The switch introduces no additional ground bounce noise or propagation delay.

Pin Configuration



Block Diagram



Pin Description

Pin Name	Description
IA _N -IE _N	Data Inputs
SEL	Select Inputs
YA-YE	Data Outputs
GND	Ground
VCC	Power

Truth Table

Function	SEL
Y _N to iN ₀	L
Y _N to iN ₁	H

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Maximum Ratings

(Above which the useful life may be impaired. For user guidelines, not tested.)

Storage Temperature	-65°C to +150°C
Ambient Temperature with Power Applied	-40°C to +85°C
Supply Voltage to Ground Potential	-0.5V to +4.6V
DC Input Voltage	-0.5V to +V _{CC}
DC Output Current.....	120mA
Power Dissipation.....	0.5W

Note:

Stresses greater than those listed under 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.

DC Electrical Characteristics, 3.3V Supply

(Over the Operating Range, T_A = -40°C to +85°C, V_{CC} = 3.3V ±10%)

Parameters	Description	Test Conditions	Min.	Typ.	Max.	Units
V _{IH}	Input HIGH Voltage	Guaranteed Logic HIGH Level	2.0			V
V _{IL}	Input LOW Voltage	Guaranteed Logic LOW Level			0.8	
I _{IH}	Input HIGH Current	V _{CC} = Max., V _{IN} = V _{CC}			±1	μA
I _{IL}	Input LOW Current	V _{CC} = Max., V _{IN} = GND			±1	
I _{OZH}	High Impedance Output Current	0 ≤ Y, I _n ≤ V _{CC}			±1	
R _{ON}	Switch On-Resistance	V _{CC} = Min., V _{IN} = 0.0V, I _{ON} = -48 mA or -64mA		15	19	Ω
		V _{CC} = Min., V _{IN} = V _{CC} , I _{ON} = -15 mA		15	19	

DC Electrical Characteristics, 2.5V Supply

(Over Operating Range, T_A = -40°C to +85°C, V_{CC} = 2.5V ± 10%)

Parameters	Description	Test Conditions	Min.	Typ.	Max.	Units
V _{IH}	Input HIGH Voltage	Guaranteed Logic HIGH Level	1.8		V _{CC} + 0.3	V
V _{IL}	Input LOW Voltage	Guaranteed Logic LOW Level	-0.3		0.8	
I _{IH}	Input HIGH Current	V _{CC} = Max., V _{IN} = V _{CC}			±1	μA
I _{IL}	Input LOW Current	V _{CC} = Max., V _{IN} = GND			±1	
I _{OZH}	High Impedance Current	0 ≤ Y, I _n ≤ V _{CC}			±1	
R _{ON}	Switch On Resistance	V _{CC} = Min., V _{IN} = 0.0V, I _{ON} = -48mA		18	22	Ω
		V _{CC} = Min., V _{IN} = 2.25V, I _{ON} = -15mA		18	22	

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Power Supply Characteristics

Symbol	Description	Test Conditions (1)	Min	Typ	Max	Unit
I_{cc}	Quiescent Power Supply Current	V _{cc} =Max, V _{in} =V _{cc} or GND	-	0.1	3	uA

Notes:

1. For conditions shown as Max. or Min., use appropriate value specified under Electrical Characteristics for the applicable device type.
2. Typical values are at V_{cc} = 3.3V, 25°C ambient.
3. This parameter is guaranteed but not tested.
4. Not more than one output should be shorted at one time. Duration of the test should not exceed one second.
5. V_{oH} = V_{cc} – 0.6V at rated current

Capacitance (T_A = 25°C f = 1 MHz)

Parameters	Description	Test Conditions	Typical	Units
C _{IN}	Input Capacitance	V _{IN} = 0V	3	pF
C _{OFFYN}	Y _N Capacitance, Switch OFF		4.4	
C _{OFFIN}	I _N Capacitance, Switch OFF		3.5	
C _{ON}	I _N /Y _N Capacitance, Switch ON		7.9	

Dynamic Electrical Characteristics Over the Operating Range

(T_A = -40° to +85°, V_{CC} = 3.3V ± 10%)

Parameter	Description	Test Condition	Typ.	Units
X _{TALK}	Crosstalk	R _L = 50Ω	-60	dB
O _{IRR}	Off-Isolation	R _L = 50Ω	-60	
BW	-3dB Bandwidth	R _L = 50Ω	1.25	GHz

Switching Characteristics over 3.3V Operating Range

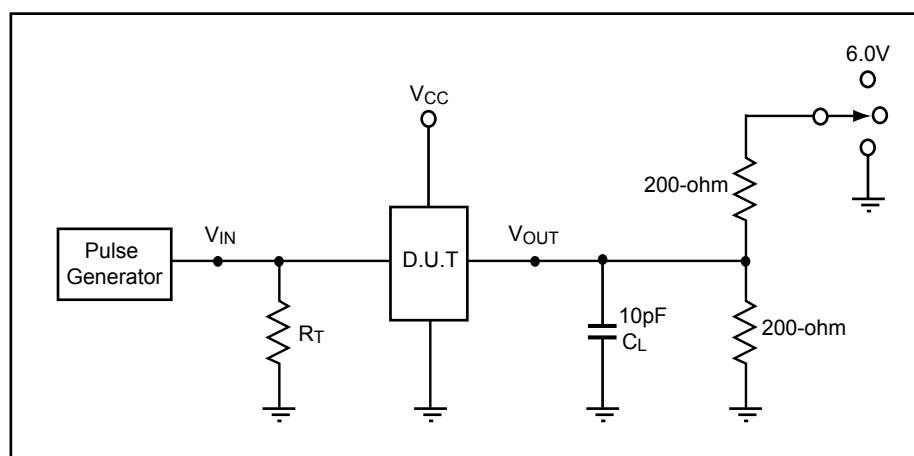
Parameters	Description	Conditions	Max.	Units
t _{PLH} t _{PHL}	Propagation Delay	See Test Diagram	0.3	ns
t _{PZH} t _{PZL}	Bus Enable Time	See Test Diagram	2.0	
t _{PHZ} t _{PLZ}	Bus Disable Time		3.0	

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Switching Characteristics over 2.5V Operating Range

Parameters	Description	Conditions	Max.	Units
t_{PLH} t_{PHL}	Propagation Delay	See Test Diagram	0.3	ns
t_{PZH} t_{PZL}	Bus Enable Time	See Test Diagram	2.0	
t_{PHZ} t_{PLZ}	Bus Disable Time		3.0	

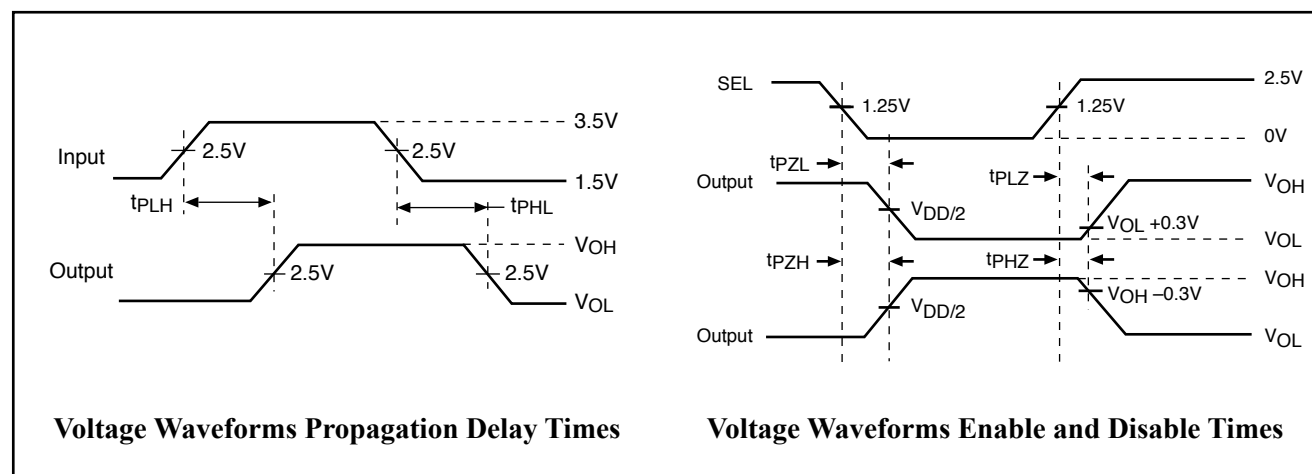
Test Circuit for Electrical Characteristics



Switch Positions

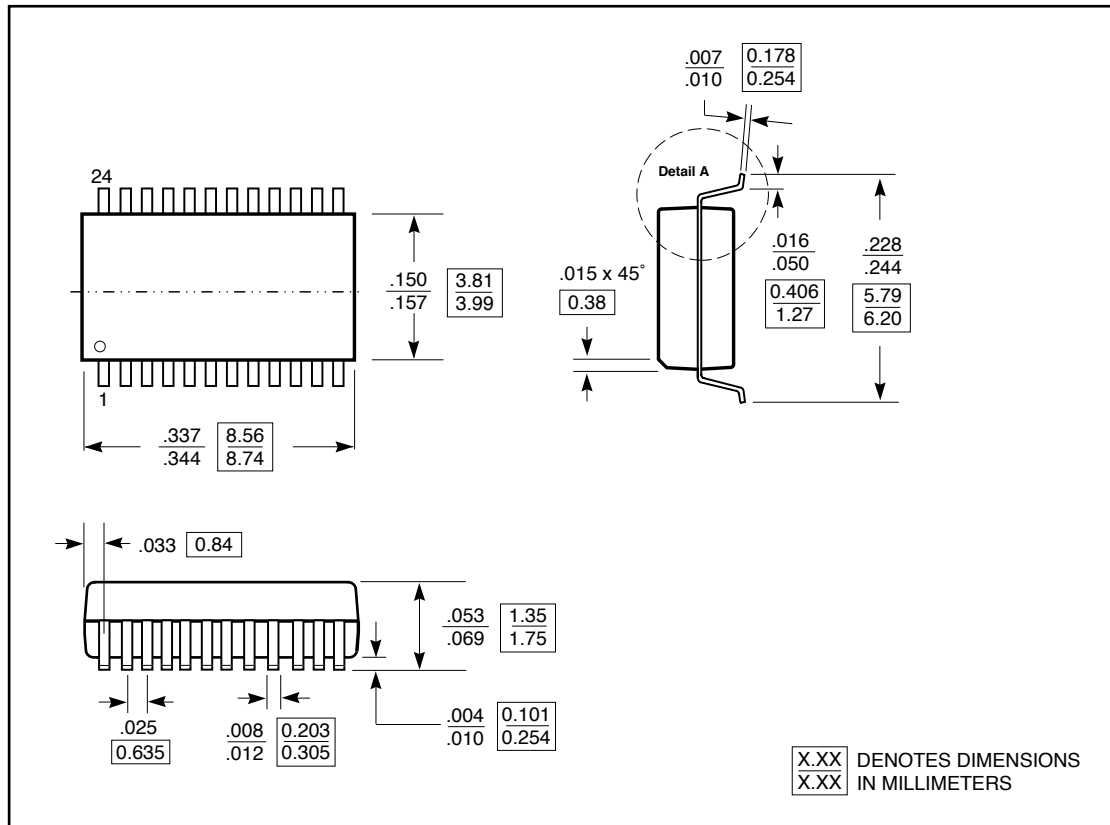
Test	Switch
t_{PLZ} , t_{PZL}	6.0V
t_{PHZ} , t_{PZH}	GND
Prop Delay	Open

Switching Waveforms



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Packaging Mechanical: 24-pin QSOP



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Ordering Information

Ordering Code	Package			Top-Marking	T _A
PO3B512AQU	24-pin QSOP	Tube	Pb-free & Green	PO3B512AQ	-40°C to 85°C
PO3B512AQR	24-pin QSOP	Tape and reel	Pb-free & Green	PO3B512AQ	-40°C to 85°C

IC Package Information

PACKAGE CODE	PACKAGE TYPE	TAPE WIDTH (mm)	TAPE PITCH (mm)	PIN 1 LOCATION	TAPE TRAILER LENGTH	QTY PER REEL	TAPE LEADER LENGTH	QTY PER TUBE
Q	QSOP 24	16	8	Top Left Corner	39 (12")	3000	64 (20")	55