PO3B22A

Wide Bandwidth, Dual 2:1 Mux/DeMux

High Bandwidth Potato Chip

FEATURES:

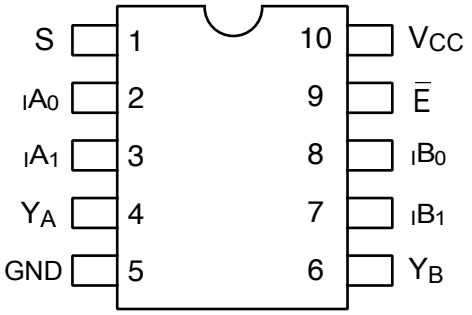
- Patented technology
- High signal -3db passing bandwidth at 1.2GHz
- Near-Zero propagation delay
- VCC = 1.65V to 3.6V
- Ultra-Low Quiescent Power: 0.1μA typical
- Ideally suited for low power applications
- Industrial operating temperature: -40°C to +85°C
- Available in 10pin wide MSOP package

DESCRIPTION:

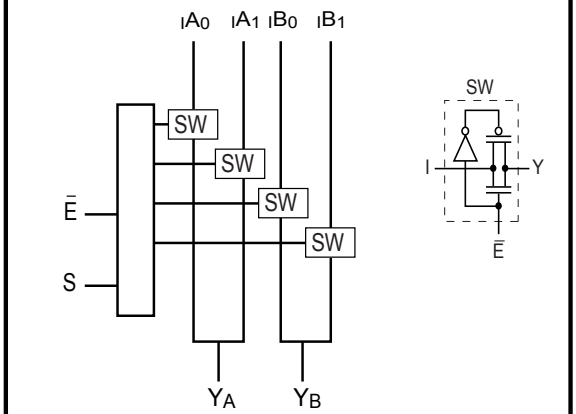
Potato Semiconductor's PO3B22A is designed for world top performance using submicron CMOS technology to achieve GHz high bandwidth.

The PO3B22A is a Wide Bandwidth, Dual 2:1 Mux/DeMux. The switch introduces no additional ground bounce noise or propagation delay.

Pin Configuration



Block Diagram



Pin Description

Pin Name	Description
$_IA_N$-$_IB_N$	Data Inputs
S	Select Inputs
$\overline{E}$	Enable
Y_A-Y_B	Data Outputs
GND	Ground
V_{CC}	Power

Truth Table

$\overline{E}$	S	Y_A	Y_B	Function
H	X	Hi-Z	Hi-Z	Disable
L	L	$_IA_0$	$_IB_0$	S = 0
L	H	$_IA_1$	$_IB_1$	S = 1

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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 +Vcc
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, In ≤ V_{CC}			±1	
R_{ON}	Switch On-Resistance	V_{CC} = Min., V_{IN} = 0.0V, I_{ON} = -48 mA or -64mA		12	16	Ω
		V_{CC} = Min., V_{IN} = V_{CC} , I_{ON} = -15 mA		12	16	

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}	Inout 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, In ≤ 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	

High Bandwidth Potato Chip

Power Supply Characteristics

Symbol	Description	Test Conditions (1)	Min	Typ	Max	Unit
Icc	Quiescent Power Supply Current	Vcc=Max, Vin=Vcc 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 Vcc = 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. VoH = Vcc – 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		8	
C_{OFFIN}	I_N Capacitance, Switch OFF		5	
C_{ON}	I_N/Y_N Capacitance, Switch ON		13	

Dynamic Electrical Characteristics Over the Operating Range

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

Parameter	Description	Test Condition	Typ.	Units
X_{TALK}	Crosstalk	R_L = 100Ω	-60	dB
O_{IRR}	Off-Isolation	R_L = 100Ω	-60	
BW	-3dB Bandwidth	R_L = 100Ω	1.2	GHz

Switching Characteristics over 3.3V Operating Range

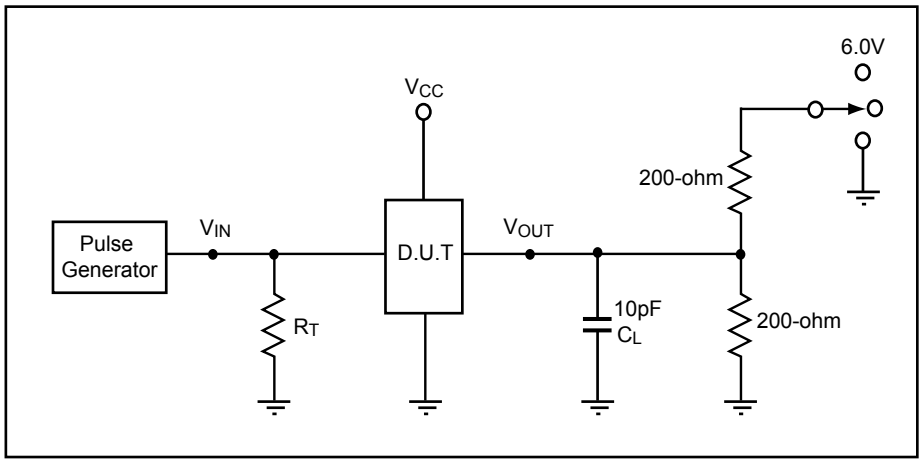
Parameters	Description	Conditions	Max.	Units
t_{PLH} t_{PHL}	Propogation Delay	See Test Diagram	0.3	ns
t_{PZH} t_{PZL}	Bus Enable Time	See Test Diagram	2.0	
t_{PHZ} t_{PLZ}	Bus Disable Time		3.0	

High Bandwidth Potato Chip

Switching Characteristics over 2.5V Operating Range

Parameters	Description	Conditions	Max.	Units
t_{PLH} t_{PHL}	Propogation 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	

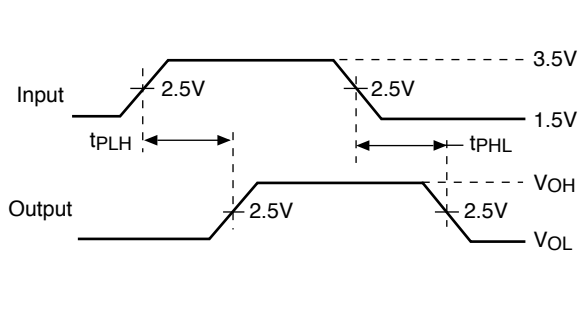
Test Circuit for Electrical Characteristics



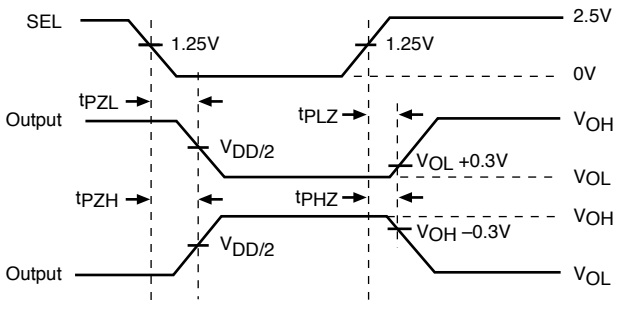
Switch Positions

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

Switching Waveforms

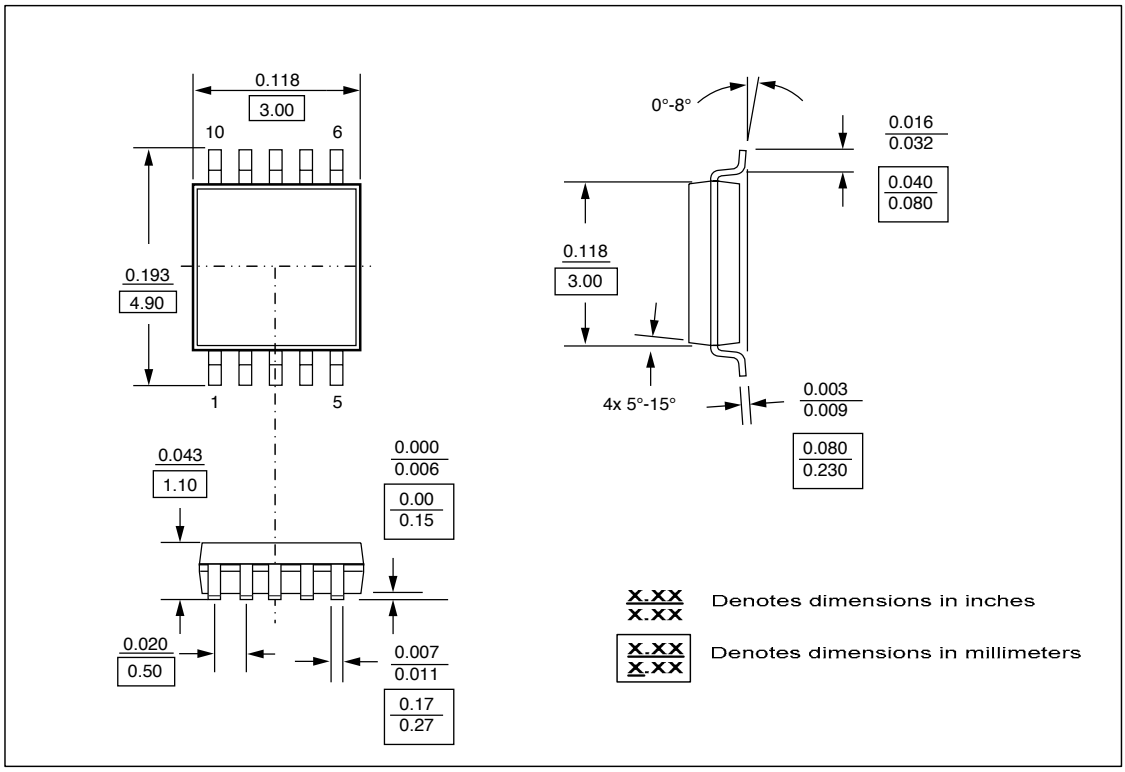


Voltage Waveforms Propagation Delay Times



Voltage Waveforms Enable and Disable Times

Packaging Mechanical Drawing: 10 pin MSOP



IC Ordering Information

Ordering Code	Package		Top-Marking	T_A
PO3B22AMU for Tube	MSOP 10	Pb-free & Green	PO3B22AM	-40°C to 85°C
PO3B22AMR for Tape & Reel	MSOP 10	Pb-free & Green	PO3B22AM	-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
M	MSOP 10	12	8	Top Left Corner	39 (12")	3000	64 (20")	80