

Maximum Ratings

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

Storage Temperature.....	–65°C to +150°C
Supply Voltage to Ground Potential.....	–0.5V to +4.0V
DC Input Voltage.....	–0.5V to +5.5V
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.

Truth Table

Function	SEL
Y_N to I_{N0}	L
Y_N to I_{N1}	H

DC Electrical Characteristics ($T_A = -40^\circ\text{C}$ to $+85^\circ\text{C}$, $V_{DD} = 3.3\text{V} \pm 10\%$)

Parameter	Description	Test Conditions	Min.	Typ. ⁽²⁾	Max.	Units
V_{IH}	Input HIGH Voltage	Guaranteed HIGH level	2	-	-	V
V_{IL}	Input LOW Voltage	Guaranteed LOW level	–0.5	-	0.8	
V_{IK}	Clamp Diode Voltage	$V_{DD} = \text{Max.}$, $I_{IN} = -18\text{mA}$	-	–0.7	–1.2	
I_{IH}	Input HIGH Current	$V_{DD} = \text{Max.}$, $V_{IN} = V_{DD}$	-	-	± 5	μA
I_{IL}	Input LOW Current	$V_{DD} = \text{Max.}$, $V_{IN} = \text{GND}$	-	-	± 5	
I_{OFF}	Power Down Leakage Current	$V_{DD} = 0\text{V}$, $V_A = 0\text{V}$, $V_B \leq 3.6$	-	-	10	
R_{ON}	Switch On-Resistance ⁽³⁾	$V_{DD} = \text{Min.}$, $1.5\text{V} \leq V_{IN} \leq V_{DD}$, $I_{IN} = -40\text{mA}$	-	4	8	Ω
$R_{FLAT(ON)}$	On-Resistance Flatness ⁽⁴⁾	$V_{DD} = \text{Min.}$, V_{IN} @ 1.5V and V_{DD} , $I_{IN} = -40\text{mA}$	-	1	-	
ΔR_{ON}	On-Resistance match from center ports to any other port ⁽⁴⁾	$V_{DD} = \text{Min.}$, $1.5\text{V} \leq V_{IN} \leq V_{DD}$, $I_{IN} = -40\text{mA}$	-	0.9	2	

DC Electrical Characteristics ($T_A = -40^\circ\text{C}$ to $+85^\circ\text{C}$, $V_{DD} = 3.3\text{V} \pm 10\%$)

Parameter	Description	Test Conditions	Min.	Typ. ⁽²⁾	Max.	Units
V_{IH}	Input HIGH Voltage	Guaranteed HIGH level	2.0	-	-	V
V_{IL}	Input LOW Voltage	Guaranteed LOW level	-0.5	-	0.8	
V_{IK}	Clamp Diode Voltage	$V_{DD} = \text{Max.}$, $I_{IN} = -18\text{mA}$	-	-0.7	-1.2	
I_{IH}	Input HIGH Current	$V_{DD} = \text{Max.}$, $V_{IN} = V_{DD}$	-	-	± 5	μA
I_{IL}	Input LOW Current	$V_{DD} = \text{Max.}$, $V_{IN} = \text{GND}$	-	-	± 5	
I_{OFF}	Power Down Leakage Current	$V_{DD} = 0\text{V}$, $V_A = 0\text{V}$, $V_B \leq 3.6$	-	-	-	
R_{ON}	Switch On-Resistance ⁽³⁾	$V_{DD} = \text{Min.}$, $1.25\text{V} \leq V_{IN} \leq V_{DD}$, $I_{IN} = -10\text{mA}$ to -30mA	-	-	8	Ω
$R_{FLAT(ON)}$	On-Resistance Flatness ⁽⁴⁾	$V_{DD} = \text{Min.}$, $V_{IN} @ 1.25\text{V}$ and V_{DD} , $I_{IN} = -10\text{mA}$ to -30mA	-	1.0	-	
ΔR_{ON}	On-Resistance match from center ports to any other port ⁽⁴⁾	$V_{DD} = \text{Min.}$, $1.25\text{V} \leq V_{IN} \leq V_{DD}$, $I_{IN} = -10\text{mA}$ to -30mA	-	0.9	2.0	

Capacitance ($T_A = 25^\circ\text{C}$, $f = 1\text{MHz}$)

Parameters ⁽⁵⁾	Description	Test Conditions	Typ.	Max.	Units
C_{IN}	Input Capacitance	$V_{IN} = 0\text{V}$	2.0	3.0	pF
$C_{OFF(IN0, IN1)}$	Port I Capacitance, Switch OFF		4.0	6.0	
$C_{ON(Y/I)}$	Y/I Capacitance, Switch ON		6.0	10.0	

Notes:

- For max. or min. conditions, use appropriate value specified under Electrical Characteristics for the applicable device type.
- Typical values are at $V_{DD} = 3.3\text{V}$, $T_A = 25^\circ\text{C}$ ambient and maximum loading.
- Measured by the voltage drop between Y and I pins at indicated current through the switch. On-Resistance is determined by the lower of the voltages on the two (Y & I) pins.
- This parameter is determined by device characterization but is not production tested.

Power Supply Characteristics

Parameters	Description	Test Conditions ⁽¹⁾	Min.	Typ. ⁽²⁾	Max.	Units
I_{CC}	Quiescent Power Supply Current	$V_{DD} = \text{Max.}$, $V_{IN} = \text{GND}$ or V_{DD}	-	-	800	μA

Notes:

- For max. or min. conditions, use appropriate value specified under Electrical Characteristics for the applicable device type.
- Typical values are at $V_{DD} = 3.3\text{V}$, $T_A = 25^\circ\text{C}$ ambient and maximum loading.
- Per TTL driven input (control inputs only); Y and I pins do not contribute to I_{CC} .

Dynamic Electrical Characteristics Over the Operating Range ($T_A = -40^\circ$ to $+85^\circ\text{C}$,
 $V_{CC} = 3.3V \pm 10\%$, $GND = 0V$)

Parameter	Description	Test Conditions	Min.	Typ. ⁽²⁾	Max.	Units
X_{TALK}	Crosstalk	See Test Diagram ($f = 10\text{ MHz}$)	-	-65	-	dB
O_{IRR}	OFF Isolation		-	-70	-	
BW	Bandwidth -3dB	See Test Diagram ($C_L = 0\text{ pF}$)	-	600	-	MHz

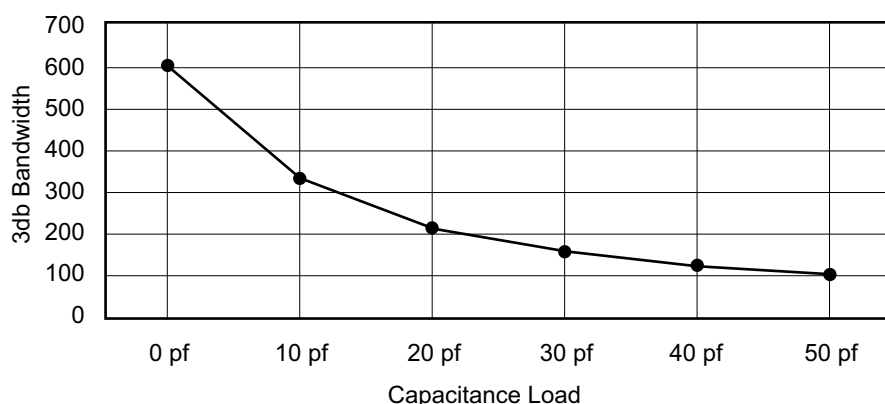
Switching Characteristics

Parameter	Description	Min.	Typ. ⁽²⁾	Max.	Units
t_{PD}	Propagation Delay ^(2,3)	-	0.25		ns
t_{PZH}, t_{PZL}	Line Enable Time - SEL to Y_N, I_N	0.5	-	15	
t_{PHZ}, t_{PLZ}	Line Disable Time - SEL to Y_N, I_N	0.5	-	9	
$t_{SK(o)}$	Output Skew between center port (Y_C to Y_D) to any other port ⁽²⁾	-	0.1	0.2	
$t_{SK(p)}$	Skew between opposite transitions of the same output ($t_{PHL} - t_{PLH}$) ⁽²⁾	-	0.1	0.2	

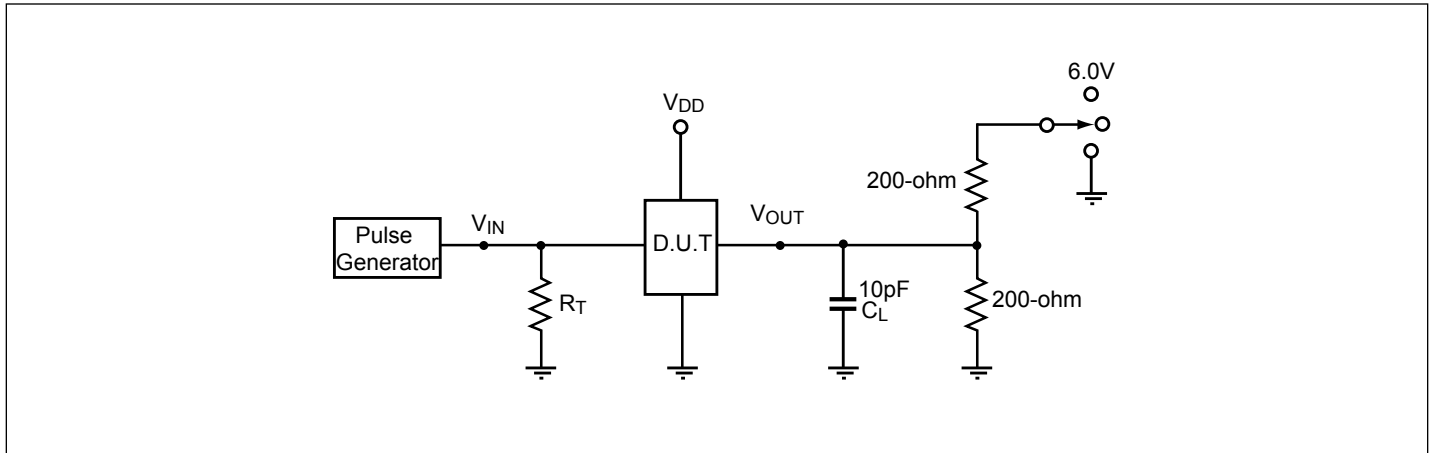
Notes:

- For max. or min. conditions, use appropriate value specified under Electrical Characteristics for the applicable device type.
- Guaranteed by design.
- The bus switch contributes no propagational delay other than the RC delay of the On-Resistance of the switch and the load capacitance. The time constant for the switch alone is of the order of 0.25ns for 10pF load. Since this time constant is much smaller than the rise/fall times of typical driving signals, it adds very little propagational delay to the system. Propagational 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 interactions with the load on the driven side.

Bandwidth vs. Capacitance



Test Circuit for Electrical Characteristics⁽¹⁾



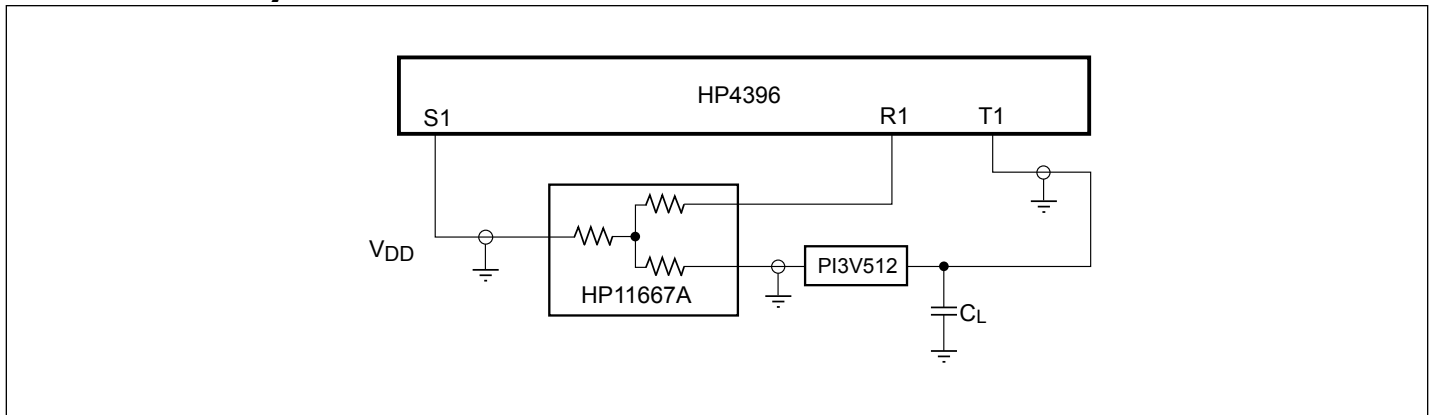
Notes:

1. C_L = Load capacitance: includes jig and probe capacitance.
2. R_T = Termination resistance: should be equal to Z_{OUT} of the Pulse Generator
3. Waveform 1 is for an output with internal conditions such that the output is low except when disabled by the output control.
Waveform 2 is for an output with internal conditions such that the output is high except when disabled by the output control.
4. All input impulses are supplied by generators having the following characteristics: $PRR \leq \text{MHz}$, $Z_O = 50\Omega$, $t_R \leq 2.5\text{ns}$, $t_F \leq 2.5\text{ns}$.
5. The outputs are measured one at a time with one transition per measurement.

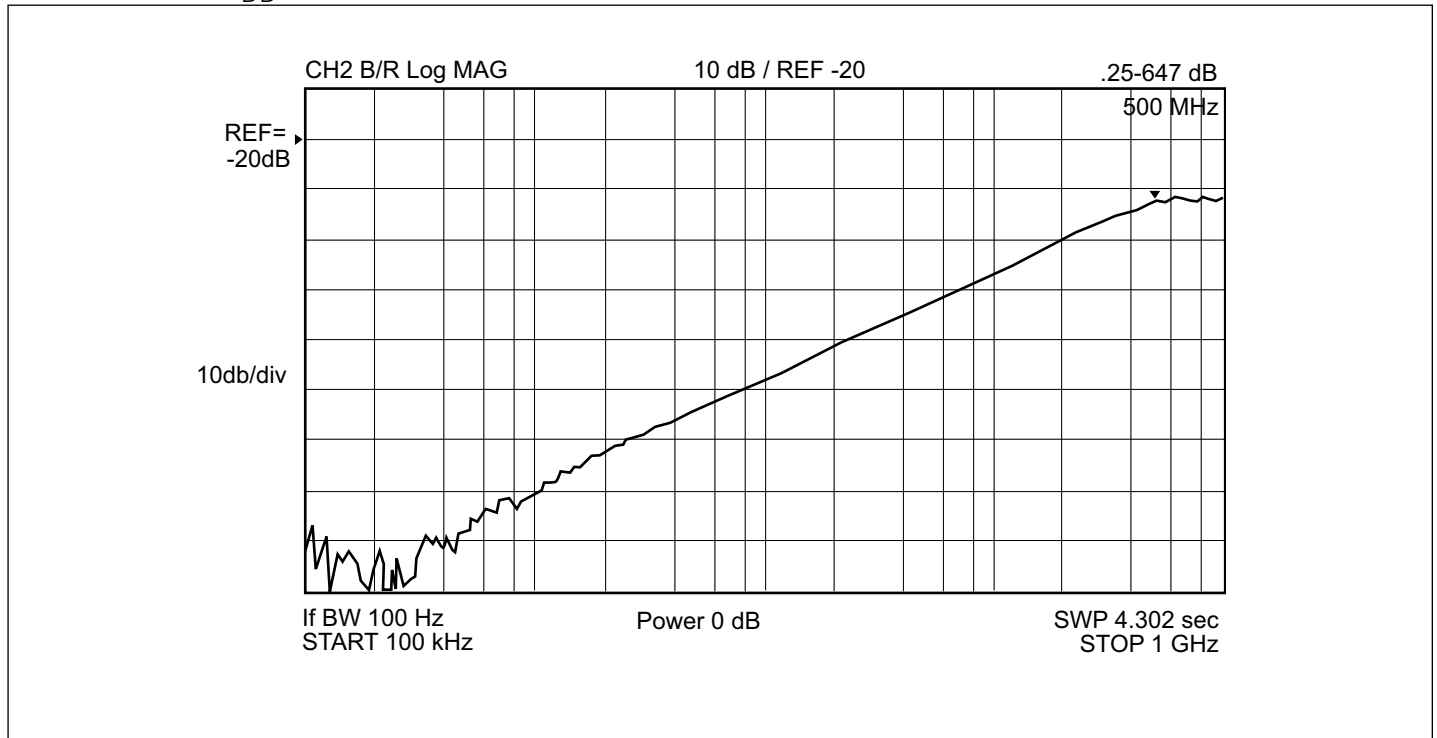
Switch Positions

Test	Switch
t_{PLZ} , t_{PZL} (output on I side)	6.0V
t_{PHZ} , t_{PZH} (output on I side)	GND
Prop Delay	Open

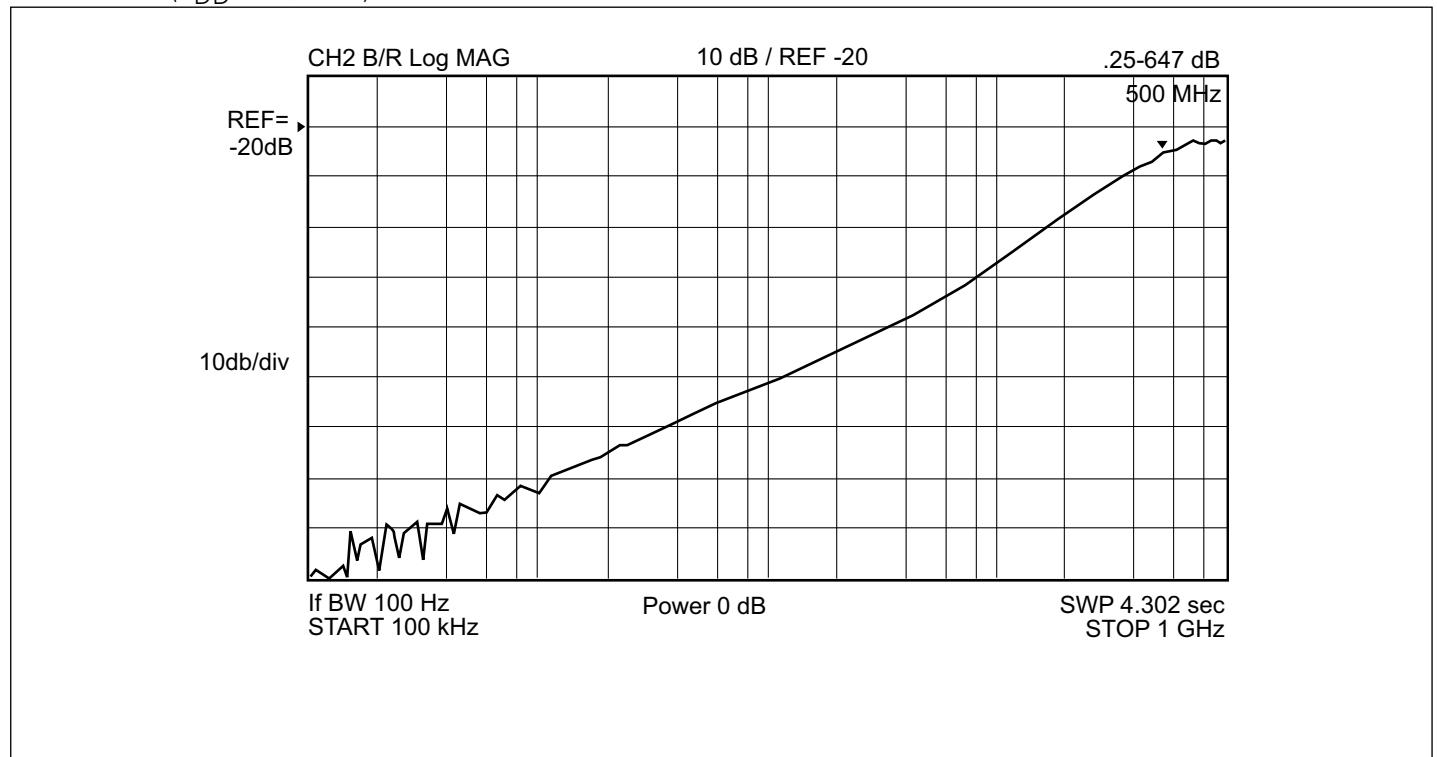
Test Circuit for Dynamic Electrical Characteristics



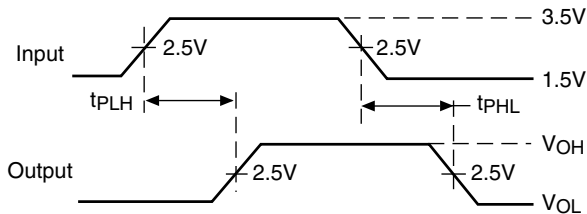
Off Isolation (V_{DD} 3.3V, 25°C)



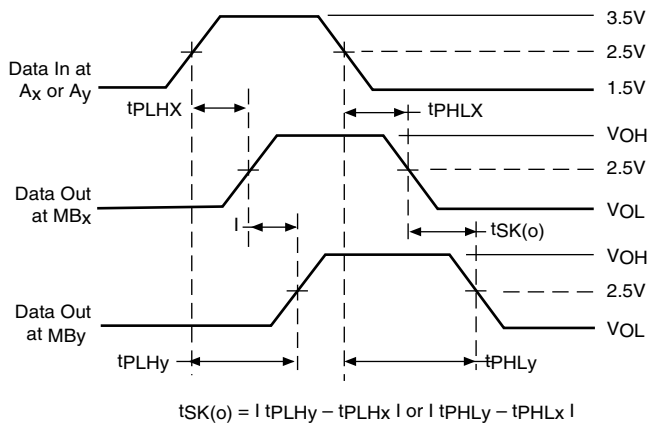
Crosstalk (V_{DD} 3.3V, 25°C)



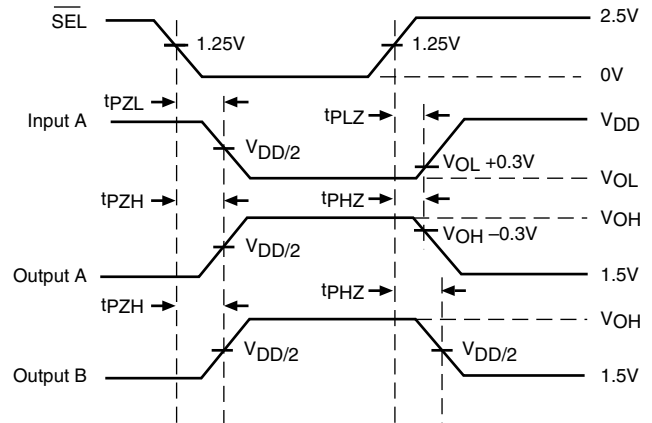
Switching Waveforms



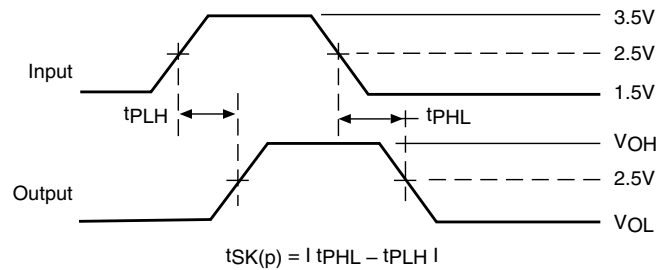
Voltage Waveforms Propagation Delay Times



Output Skew - $t_{SK(o)}$



Voltage Waveforms Enable and Disable Times



Pulse Skew - $t_{SK(p)}$

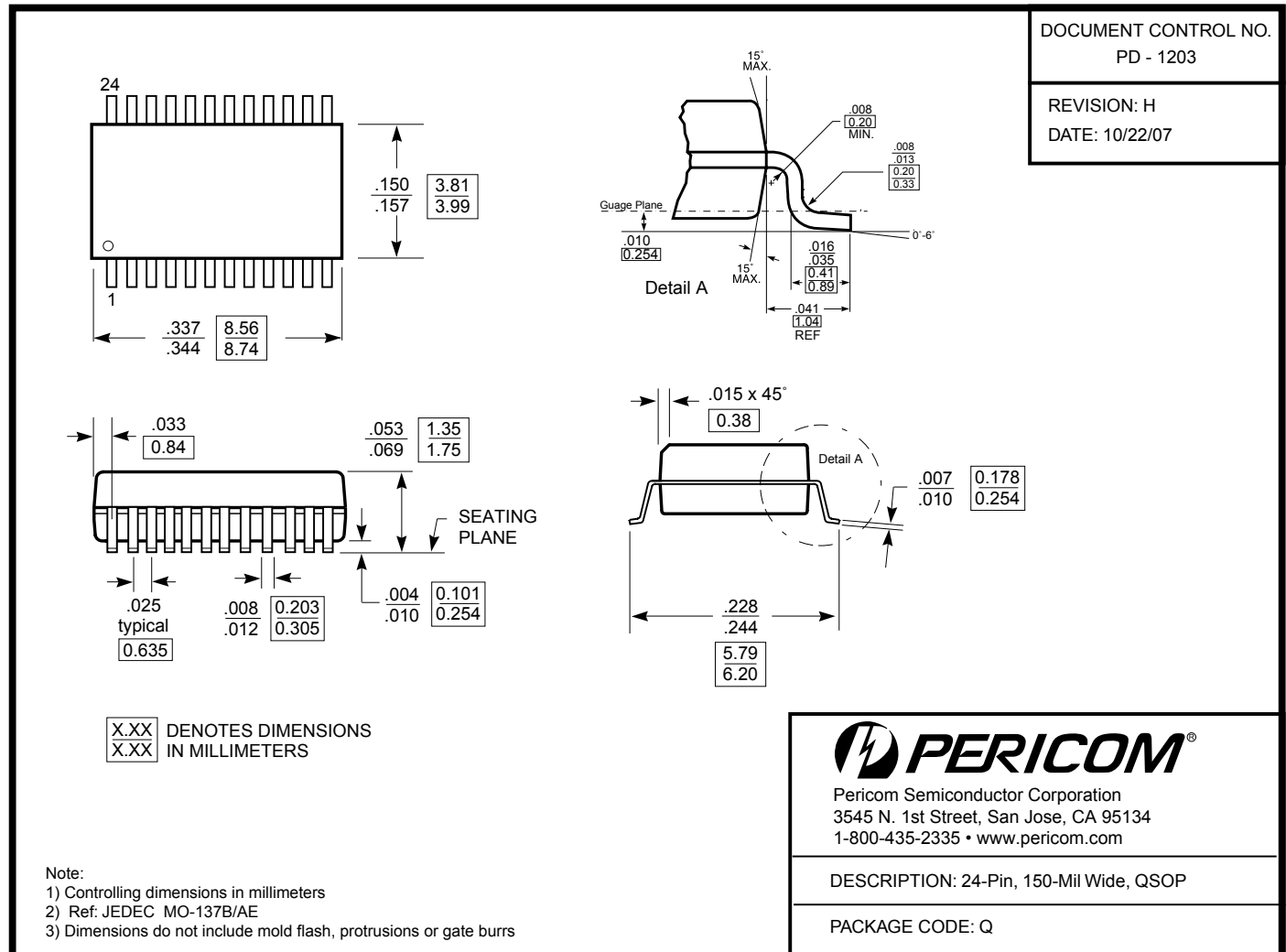
Applications Information

Logic Inputs

The logic control inputs can be driven up to +3.6V regardless of the supply voltage. For example, given a +3.3V supply, the output enables or select pins may be driven low to 0V and high to 3.6V. Driving IN Rail-to-Rail® minimizes power consumption.

Rail-to-Rail is a registered trademark of Nippon Motorola, Ltd

Packaging Mechanical: 24-pin QSOP (Q)



07-0475

Ordering Information

Ordering Code	Package Code	Package Description
PI3V512QE	Q	Pb-free & Green, 24-pin 150 mil wide plastic QSOP

Notes:

1. Thermal characteristics can be found on the company web site at www.pericom.com/packaging/