

Features

- CMOS Technology for Bus and Analog Applications
- Low propagation delay
- Low typical On-Resistance
- Signal passing bandwidth, 220 MHz
- Wide V_{DD} Range: 1.65V to 5.5V
- Rail-to-Rail Signal Range
- High Off Isolation: -65dB @ 10MHz
- Crosstalk Rejection Reduces Signal Distortion: -66dB @ 10MHz
- Break-Before-Make Switching
- Extended Industrial Temperature Range: -40°C to 125°C
- ESD protection : 2kV(HBM)
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)
- Halogen and Antimony Free. "Green" Device (Note 3)
- For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/104/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please [contact us](#) or your local Diodes representative.
<https://www.diodes.com/quality/product-definitions/>
- Packaging (Pb-free & Green):
 - 10-pin UQFN (ZUA), 2mm x 1.5mm
 - 10-pin MSOP (U), 3mm x 3mm

Applications

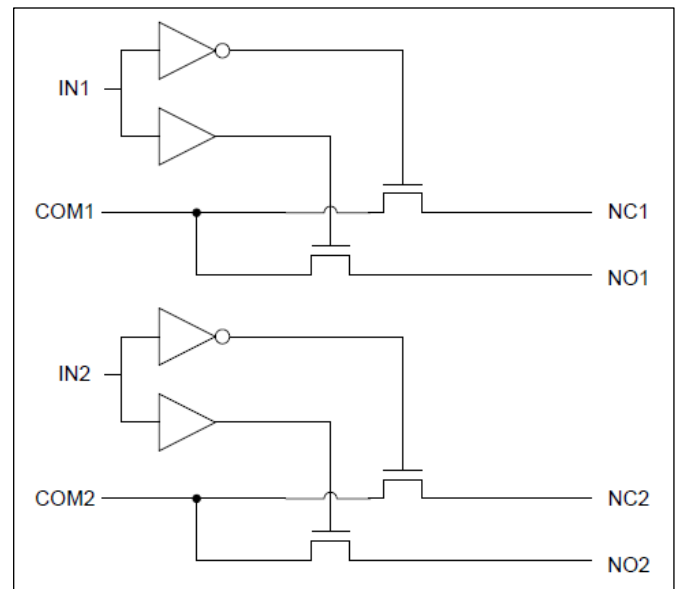
- Sample-and-Hold Circuits
- Battery-Powered Equipment
- Audio and Video Signal Routing
- Communication Circuits

Description

The DIODES™ PI5A23157 is a Dual SPDT Analog Switch. The device can be used as an analog switch or as a low-delay bus switch, and has a wide operating power supply voltage, 1.65V to 5.5V

Break-before-make switching prevents both switches being enabled simultaneously. This eliminates signal disruption during switching.

Block Diagram



Notes:

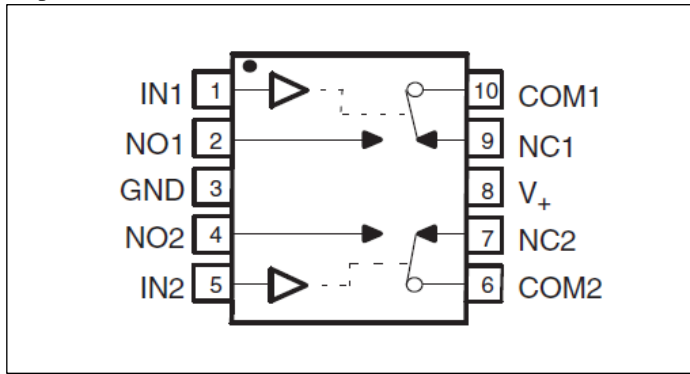
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
2. See <https://www.diodes.com/quality/lead-free/> for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.

DIODES is a trademark of Diodes Incorporated in the United States and other countries.

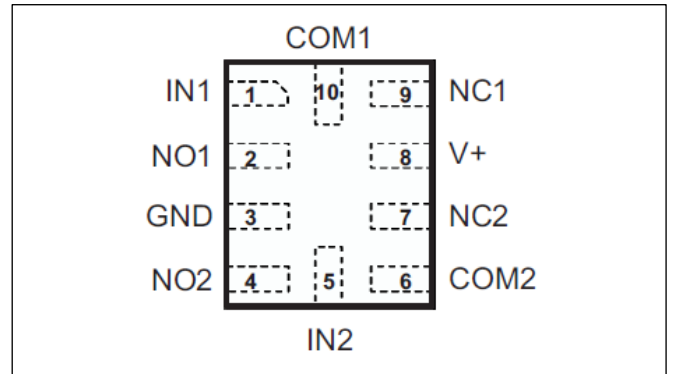
The Diodes logo is a registered trademark of Diodes Incorporated in the United States and other countries.

Pin Configuration

(Top view)



MSOP-10



UQFN-10

Pin Description

Pin#	Pin Name	Type	Description
1	IN1	I	Select pin for Switch 1
2	NO1	I/O	Normally Open I/O for Switch 1
3	GND	-	Ground
4	NO2	I/O	Normally Open I/O for Switch 2
5	IN2	I	Select pin for Switch 2
6	COM2	I/O	Common I/O for Switch 2
7	NC2	I/O	Normally Closed I/O for Switch 2
8	V+	-	Power Supply Pin
9	NC1	I/O	Normally Closed I/O for Switch 1
10	COM1	I/O	Common I/O for Switch 1

Function Table

IN _x	NC TO COM, COM TO NC	NO TO COM, COM TO NO
L	ON	OFF
H	OFF	ON

Maximum Ratings

Storage Temperature.....	-65°C to +150°C
Ambient Temperature with Power Applied.....	-40°C to +125°C
Supply Voltage V_{DD}	-0.5V to +6V
Control Input Voltage V_{INX}	0V to +6V
DC Input Voltage V_{INPUT}	-0.5V to +6V
Continuous Current NO_NC_COM_.....	±50mA
ESD(HBM)	2kV
ESD(CDM)	1kV

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.

The input and output negative voltage ratings may be exceeded if the input and output diode current ratings are observed.

Control input must be held HIGH or LOW; it must not float.

Recommended Operating Conditions

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_+	Operating Voltage	-	1.65	-	5.5	V
V_{IN}	Control Input Voltage	-	0	-	V_{DD}	V
V_{INPUT}	Switch Input Voltage	-	-0.3	-	V_{DD}	V
T_A	Operating Temperature	-	-40	25	125	°C

DC Electrical Characteristics

+5V Supply ($V_+ = 4.5V$ to $5.5V$, $T_A = -40°C$ to $85°C$, unless otherwise noted. Typical values are at $5V$ and $+25°C$.)

Parameter	Symbol	Test Conditions	Temp.	Min.	Typ.	Max.	Units
ANALOG SWITCH							
Analog Signal Range	V_{NO}, V_{NC}, V_{COM}			0	-	V_+	V
On-Resistance	R_{ON}	$I_{COM} = -30mA, 0 \leq V_{NO}$ or $V_{NC} \leq V_+$, <i>Test Circuit 1</i>	-40°C to 85°C	-	-	10	Ω
			-40°C to 125°C	-	-	15	
On-Resistance Match Between Channels	ΔR_{ON}	$I_{COM} = -30mA, V_{NO}$ or $V_{NC} = 3.15V$, <i>Test Circuit 1</i>	+25°C	0.15			Ω
On-Resistance Flatness	R_{ONF}	$I_{COM} = -30mA, 0 \leq V_{NO}$ or $V_{NC} \leq V_+$, <i>Test Circuit 1</i>	+25°C	4			Ω
NC/NO Channel-Off Leakage Current	$I_{OFF(NO)}$ or $I_{OFF(NC)}$	V_{NO} or $V_{NC} = 0$ to V_+ , $V_{COM} = 0$ to V_+	+25°C	-1	0.05	1	μA
			-40°C to 85°C	-1		1	
NC/NO Channel-ON Leakage Current	$I_{ON(NO)}$ or $I_{ON(NC)}$	V_{NO} or $V_{NC} = 0$ to V_+ , $V_{COM} = 0$ to V_+	+25°C	-0.1		0.1	μA
			-40°C to 85°C	-1		1	
COM - On Leakage Current	$I_{COM(ON)}$	V_{NO} or $V_{NC} = \text{open} \& V_{COM} = 0$ to V_+	+25°C	-0.1		0.1	μA
			-40°C to 85°C	-1		1	
DIGITAL INPUTS (IN1, IN2)							
Input Logic High	V_{IH}	-	-40°C to 85°C	0.7xV+			V
			-40°C to 125°C	3.1			
Input Logic Low	V_{IL}	-	-40°C to 85°C			0.3xV+	
IN Input Leakage Current	I_{IN}	$V_+ = 5.5, V_{IN} = 0$ or $5.5V$	+25°C	-1	0.05	1	μA
			-40°C to 85°C	-1		1	
DYNAMIC CHARACTERISTICS							
Turn-On Time	t_{ON}	$V_{NC} = GND, V_{NO} = V_+$ or $V_{NC} = V_+$, $V_{NO} = GND, R_L = 500\Omega, C_L = 50pF$. See <i>Test Circuit Figure 2</i> .	-40°C to 85°C	1.7		11.5	ns
			-40°C to 125°C	1.2		12	ns
Turn-Off Time	t_{OFF}	$V_{NC} = GND, V_{NO} = V_+$ or $V_{NC} = V_+$, $V_{NO} = GND, R_L = 500\Omega, C_L = 50pF$. See <i>Test Circuit Figure 2</i> .	-40°C to 85°C	0.8		7.5	ns
			-40°C to 125°C	0.5		8	ns
Break-Before-Make Delay	t_{BBM}	$V_{NC} = V_{NO} = V_+/2, R_L = 50\Omega, C_L = 35pF$ See <i>Test Circuit Figure 3</i> .	-40°C to 85°C	0.5			ns
Charge injection	Q_C	$V_{gen} = 0V; R_{gen} = 0, R_L = 1M\Omega,$ $C_L = 35pF$	+25°C		7		pC

Parameter	Symbol	Test Conditions	Temp.	Min.	Typ.	Max.	Units
3dB Bandwidth	f_{3dB}	$R_L=50\ \Omega$. See Test Circuit Figure 6.	+25°C	-	220	-	MHz
COM-NC/NO and NC-NO Isolations	O_{ISO}	$R_L=50\ \Omega$, $f=10\text{MHz}$ See Test Circuit Figure 4.	+25°C	-	-65	-	dB
Channel-to-Channel Crosstalk	X_{TALKD}	$R_L=50\ \Omega$, $f=10\text{MHz}$ See Test Circuit Figure 5.	+25°C	-	-66	-	dB
Total harmonic distortion	THD	$R_L=600\ \Omega$, $C_L=50\text{pF}$ $f=600\text{Hz} \sim 20\text{KHz}$.	+25°C		0.01%		
SUPPLY							
Power Supply Current	I_{CC}	$V_{IN}=GND$ or $V+$, Switch ON or OFF	+25°C	-	-	1	μA
			-40°C to 85°C	-	-	10	

+3.3V Supply ($V+ = 3\text{V}$ to 3.6V , $T_A = -40^\circ\text{C}$ to 85°C , unless otherwise noted. Typical values are at 3.3V and $+25^\circ\text{C}$.)

Parameter	Symbol	Test Conditions	Temp.	Min.	Typ.	Max.	Units
ANALOG SWITCH							
Analog Signal Range	V_{NO} , V_{NC} , V_{COM}			0	-	$V+$	V
On-Resistance	R_{ON}	$I_{COM} = -24\text{mA}$, $0 \leq V_{NO}$ or $V_{NC} \leq V+$, Test Circuit 1	-40°C to 85°C	-		18	Ω
			-40°C to 125°C	-		23	
On-Resistance Match Between Channels	ΔR_{ON}	$I_{COM} = -24\text{mA}$, V_{NO} or $V_{NC} = 2.1\text{V}$, Test Circuit 1	+25°C		0.2		Ω
On-Resistance Flatness	R_{ONF}	$I_{COM} = -24\text{mA}$, $0 \leq V_{NO}$ or $V_{NC} \leq V+$, Test Circuit 1	+25°C		9		Ω
NC/NO Channel-Off Leakage Current	$I_{OFF(NO)}$ or $I_{OFF(NC)}$	V_{NO} or $V_{NC} = 0$ to $V+$, $V_{COM} = 0$ to $V+$	+25°C	-1	0.05	1	μA
			-40°C to 85°C	-1		1	
NC/NO Channel-ON Leakage Current	$I_{ON(NO)}$ or $I_{ON(NC)}$	V_{NO} or $V_{NC} = 0$ to $V+$, $V_{COM} = 0$ to $V+$	+25°C	-0.1		0.1	μA
			-40°C to 85°C	-1		1	
COM - On Leakage Current	$I_{COM(ON)}$	V_{NO} or $V_{NC} = \text{open}$ & $V_{COM} = 0$ to $V+$	+25°C	-0.1		0.1	μA
			-40°C to 85°C	-1		1	
DIGITAL INPUTS (IN1, IN2)							
Input Logic High	V_{IH}	-	-40°C to 85°C	$0.7xV+$			V
Input Logic Low	V_{IL}	-	-40°C to 85°C			$0.3xV+$	
IN Input Leakage Current	I_{IN}	$V+ = 3.6$, $V_{IN}=0$ or 3.6V	+25°C	-1	0.05	1	μA
			-40°C to 85°C	-1		1	
DYNAMIC CHARACTERISTICS							
Turn-On Time	t_{ON}	$V_{NC}=GND$, $V_{NO} = V+$ or $V_{NC}= V+$, $V_{NO}=GND$, $R_L=500\ \Omega$, $C_L=50\text{pF}$. See Test Circuit Figure 2.	-40°C to 85°C	2.5		13	ns
			-40°C to 125°C	2.0		14	ns
Turn-Off Time	t_{OFF}	$V_{NC}=GND$, $V_{NO} = V+$ or $V_{NC}= V+$, $V_{NO}=GND$, $R_L=500\ \Omega$, $C_L=50\text{pF}$. See Test Circuit Figure 2.	-40°C to 85°C	1.5		8.5	ns
			-40°C to 125°C	1.0		9	ns
Break-Before-Make Delay	t_{BBM}	$V_{NC}=V_{NO}=V+/2$, $R_L=50\ \Omega$, $C_L=35\text{pF}$ See Test Circuit Figure 3.	-40°C to 85°C	0.5			ns
Charge injection	Q_C	$V_{gen}=0\text{V}$; $R_{gen}=0$ $R_L=1\text{Mohm}$, $C_L=35\text{pF}$	+25°C		3		pC
3dB Bandwidth	f_{3dB}	$R_L=50\ \Omega$. See Test Circuit Figure 6.	+25°C	-	220	-	MHz
COM-NC/NO and NC-NO Isolations	O_{ISO}	$R_L=50\ \Omega$, $f=10\text{MHz}$ See Test Circuit Figure 4.	+25°C	-	-65	-	dB
Channel-to-Channel Crosstalk	X_{TALKD}	$R_L=50\ \Omega$, $f=10\text{MHz}$ See Test Circuit Figure 5.	+25°C	-	-66	-	dB
Total harmonic	THD	$R_L=600\ \Omega$, $C_L=50\text{pF}$ $f=600\text{Hz} \sim$	+25°C		0.015%		

Parameter	Symbol	Test Conditions	Temp.	Min.	Typ.	Max.	Units
distortion		20KHZ.					
SUPPLY							
Power Supply Current	I _{CC}	V _{IN} =GND or V+, Switch ON or OFF	+25°C	-	-	1	μA
			-40°C to 85°C	-	-	10	

+2.5V Supply (V+ = 2.3V to 2.7V, T_A = -40°C to 85°C, unless otherwise noted. Typical values are at 2.5V and +25°C.)

Parameter	Symbol	Test Conditions	Temp.	Min.	Typ.	Max.	Units
ANALOG SWITCH							
Analog Signal Range	V _{NO} , V _{NC} , V _{COM}			0	-	V+	V
On-Resistance	R _{ON}	I _{COM} = -8mA, 0 ≤ V _{NO} or V _{NC} ≤ V+, Test Circuit 1	-40°C to 85°C	-		45	Ω
			-40°C to 125°C	-		50	
On-Resistance Match Between Channels	ΔR _{ON}	I _{COM} = -8mA, V _{NO} or V _{NC} = 1.6V, Test Circuit 1	+25°C	0.5			Ω
On-Resistance Flatness	R _{ONF}	I _{COM} = -8mA, 0 ≤ V _{NO} or V _{NC} ≤ V+, Test Circuit 1	+25°C	27			Ω
NC/NO Channel-Off Leakage Current	I _{OFF (NO)} or I _{OFF (NC)}	V _{NO} or V _{NC} = 0 to V+, V _{COM} = 0 to V+	+25°C	-1	0.05	1	μA
			-40°C to 85°C	-1		1	
NC/NO Channel-ON Leakage Current	I _{ON (NO)} or I _{ON (NC)}	V _{NO} or V _{NC} = 0 to V+, V _{COM} = 0 to V+	+25°C	-0.1		0.1	μA
			-40°C to 85°C	-1		1	
COM - On Leakage Current	I _{COM (ON)}	V _{NO} or V _{NC} = open & V _{COM} = 0 to V+	+25°C	-0.1		0.1	μA
			-40°C to 85°C	-1		1	
DIGITAL INPUTS (IN1, IN2)							
Input Logic High	V _{IH}	-	-40°C to 85°C	0.7xV+			V
Input Logic Low	V _{IL}	-	-40°C to 85°C			0.3xV+	
IN Input Leakage Current	I _{IN}	V+ = 2.7, V _{IN} =0 or 2.7V	+25°C	-1	0.05	1	μA
			-40°C to 85°C	-1		1	
DYNAMIC CHARACTERISTICS							
Turn-On Time	t _{ON}	V _{NC} =GND, V _{NO} = V+ or V _{NC} = V+, V _{NO} =GND, R _L =500Ω, C _L =50pF. See Test Circuit Figure 2.	-40°C to 85°C	3.5		14	ns
			-40°C to 125°C	2.5		17	ns
Turn-Off Time	t _{OFF}	V _{NC} =GND, V _{NO} = V+ or V _{NC} = V+, V _{NO} =GND, R _L =500Ω, C _L =50pF. See Test Circuit Figure 2.	-40°C to 85°C	2		9.5	ns
			-40°C to 125°C	1.5		10	ns
Break-Before-Make Delay	t _{BBM}	V _{NC} =V _{NO} =V+/2, R _L =50Ω, C _L =35pF See Test Circuit Figure 3.	-40°C to 85°C	0.5			ns
3dB Bandwidth	f _{3dB}	R _L =500Ω. See Test Circuit Figure 6.	+25°C	-	220	-	MHz
COM-NC/NO and NC-NO Isolations	O _{ISO}	R _L =500Ω, f=10MHz See Test Circuit Figure 4.	+25°C	-	-65	-	dB
Channel-to-Channel Crosstalk	X _{TALKD}	R _L =500Ω, f=10MHz See Test Circuit Figure 5.	+25°C	-	-66	-	dB
Total harmonic distortion	THD	R _L =600Ω, C _L =50pF f=600Hz ~ 20KHZ.	+25°C		0.025%		
SUPPLY							
Power Supply Current	I+	V _{IN} =GND or V+, Switch ON or OFF	+25°C	-	-	1	μA
			-40°C to 85°C	-	-	10	

+1.8V Supply ($V_+ = 1.65V$ to $1.95V$, $T_A = -40^\circ C$ to $85^\circ C$, unless otherwise noted. Typical values are at $1.8V$ and $+25^\circ C$.)

Parameter	Symbol	Test Conditions	Temp.	Min.	Typ.	Max.	Units
ANALOG SWITCH							
Analog Signal Range	V_{NO}, V_{NC}, V_{COM}			0	-	V_+	V
On-Resistance	R_{ON}	$I_{COM} = -4mA, 0 \leq V_{NO}$ or $V_{NC} \leq V_+$, <i>Test Circuit 1</i>	$-40^\circ C$ to $85^\circ C$	-		140	Ω
			$-40^\circ C$ to $125^\circ C$	-		180	
On-Resistance Match Between Channels	ΔR_{ON}	$I_{COM} = -4mA, V_{NO}$ or $V_{NC} = 1.15V$, <i>Test Circuit 1</i>	$+25^\circ C$	1			Ω
On-Resistance Flatness	R_{ONF}	$I_{COM} = -4mA, 0 \leq V_{NO}$ or $V_{NC} \leq V_+$, <i>Test Circuit 1</i>	$+25^\circ C$	110			Ω
NC/NO Channel-Off Leakage Current	$I_{OFF(NO)}$ or $I_{OFF(NC)}$	V_{NO} or $V_{NC} = 0$ to V_+ , $V_{COM} = 0$ to V_+	$+25^\circ C$	-1	0.05	1	μA
			$-40^\circ C$ to $85^\circ C$	-1		1	
NC/NO Channel-ON Leakage Current	$I_{ON(NO)}$ or $I_{ON(NC)}$	V_{NO} or $V_{NC} = 0$ to V_+ , $V_{COM} = 0$ to V_+	$+25^\circ C$	-0.1		0.1	μA
			$-40^\circ C$ to $85^\circ C$	-1		1	
COM - On Leakage Current	$I_{COM(ON)}$	V_{NO} or $V_{NC} =$ open & $V_{COM} = 0$ to V_+	$+25^\circ C$	-0.1		0.1	μA
			$-40^\circ C$ to $85^\circ C$	-1		1	
DIGITAL INPUTS (IN1, IN2)							
Input Logic High	V_{IH}	-	$-40^\circ C$ to $85^\circ C$	$0.75 \times V_+$			V
Input Logic Low	V_{IL}	-	$-40^\circ C$ to $85^\circ C$			$0.25 \times V_+$	
IN Input Leakage Current	I_{IN}	$V_+ = 1.95, V_{IN} = 0$ or $1.95V$	$+25^\circ C$	-1	0.05	1	μA
			$-40^\circ C$ to $85^\circ C$	-1		1	
DYNAMIC CHARACTERISTICS							
Turn-On Time	t_{ON}	$V_{NC} = GND, V_{NO} = V_+$ or $V_{NC} = V_+$, $V_{NO} = GND, R_L = 500\Omega, C_L = 50pF$. See <i>Test Circuit Figure 2</i> .	$-40^\circ C$ to $85^\circ C$	7		24	ns
			$-40^\circ C$ to $125^\circ C$	5.5		27	ns
Turn-Off Time	t_{OFF}	$V_{NC} = GND, V_{NO} = V_+$ or $V_{NC} = V_+$, $V_{NO} = GND, R_L = 500\Omega, C_L = 50pF$. See <i>Test Circuit Figure 2</i> .	$-40^\circ C$ to $85^\circ C$	3		13	ns
			$-40^\circ C$ to $125^\circ C$	2		16	ns
Break-Before-Make Delay	t_{BBM}	$V_{NC} = V_{NO} = V_+/2, R_L = 50\Omega, C_L = 35pF$ See <i>Test Circuit Figure 3</i> .	$-40^\circ C$ to $85^\circ C$	0.5			ns
3dB Bandwidth	f_{3dB}	$R_L = 50\Omega$. See <i>Test Circuit Figure 6</i> .	$+25^\circ C$	-	220	-	MHz
COM-NC/NO and NC-NO Isolations	O_{ISO}	$R_L = 50\Omega, f = 10MHz$ See <i>Test Circuit Figure 4</i> .	$+25^\circ C$	-	-65	-	dB
Channel-to-Channel Crosstalk	X_{TALKD}	$R_L = 50\Omega, f = 10MHz$ See <i>Test Circuit Figure 5</i> .	$+25^\circ C$	-	-66	-	dB
Total harmonic distortion	THD	$R_L = 600\Omega, C_L = 50pF, f = 600Hz \sim 20KHz$.	$+25^\circ C$		0.015%		
SUPPLY							
Power Supply Current	I_+	$V_{IN} = GND$ or V_+ , Switch ON or OFF	$+25^\circ C$	-	-	1	μA
			$-40^\circ C$ to $85^\circ C$	-	-	10	

Capacitance

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Units
NC/NO Off Capacitance	$C_{NC/NO (OFF)}$	V_{NC} or $V_{NO} = V_{DD}$ or GND, Switch OFF $f = 1\text{MHz}$, See Test Circuit Figure 7.	-	5.5	-	pF
NC/NO On Capacitance	$C_{NC/NO (ON)}$	V_{NC} or $V_{NO} = V_{DD}$ or GND, Switch ON $f = 1\text{MHz}$, See Test Circuit Figure 8.	-	17.5	-	
COM On Capacitance	$C_{COM (ON)}$	V_{NC} or $V_{NO} = V_{DD}$ or GND, Switch ON $f = 1\text{MHz}$, See Test Circuit Figure 8.	-	17.5	-	
Digital Input Capacitance	C_{IN}	$f = 1\text{MHz}$	-	2.8	-	

Test Circuits and Timing Diagrams

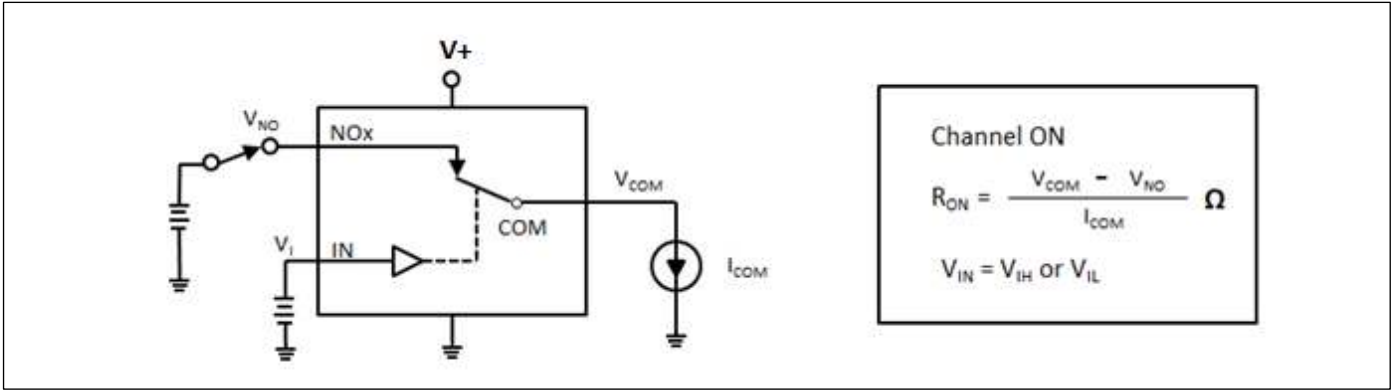


Figure 1. On Resistance

Notes:

- Unused input (NC or NO) must be grounded.

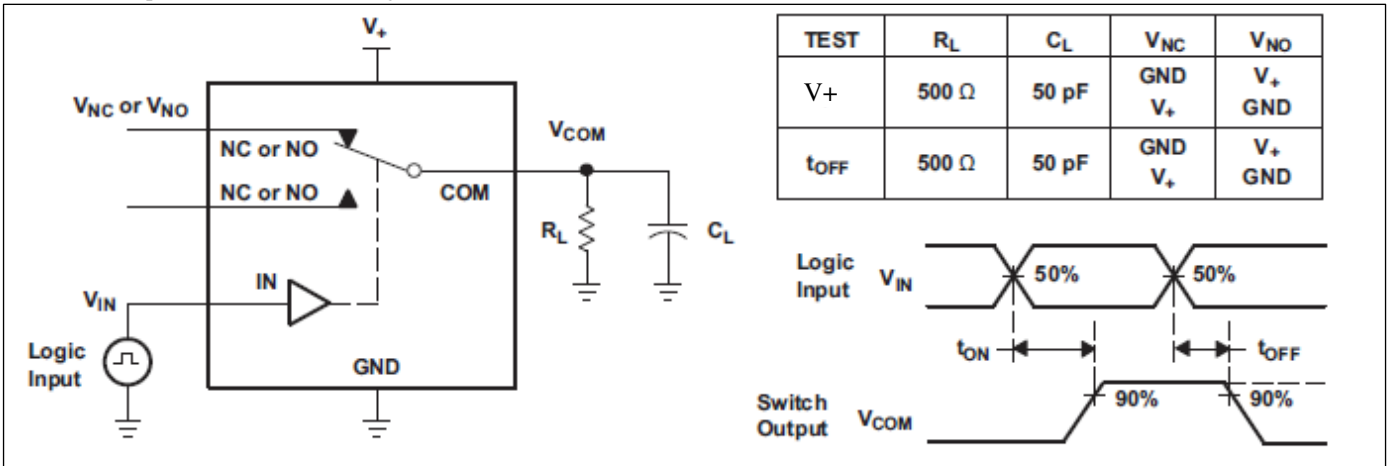


Figure 2. Switching Times

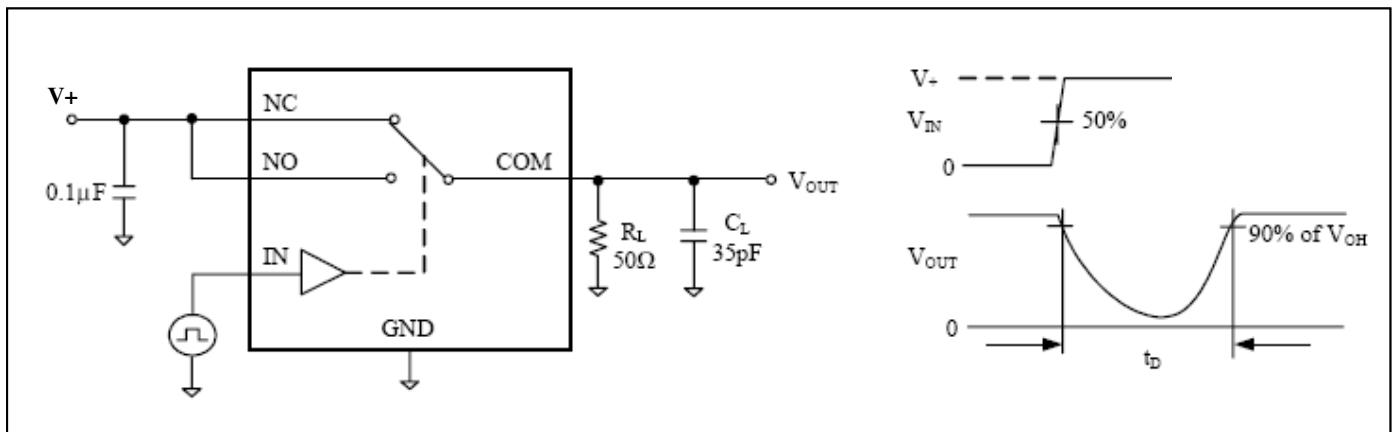


Figure 3. Break Before Make Interval Timing

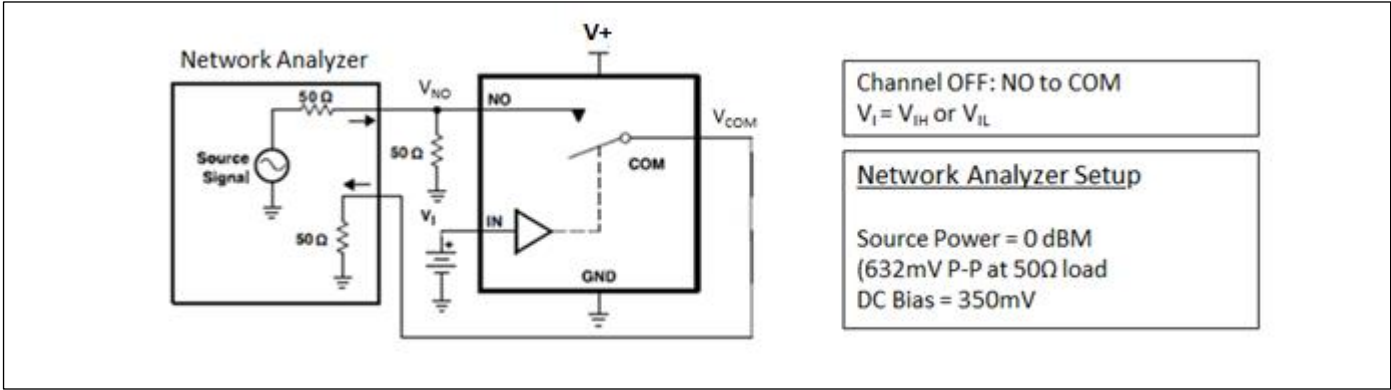


Figure 4. OFF Isolation (O_{ISO})

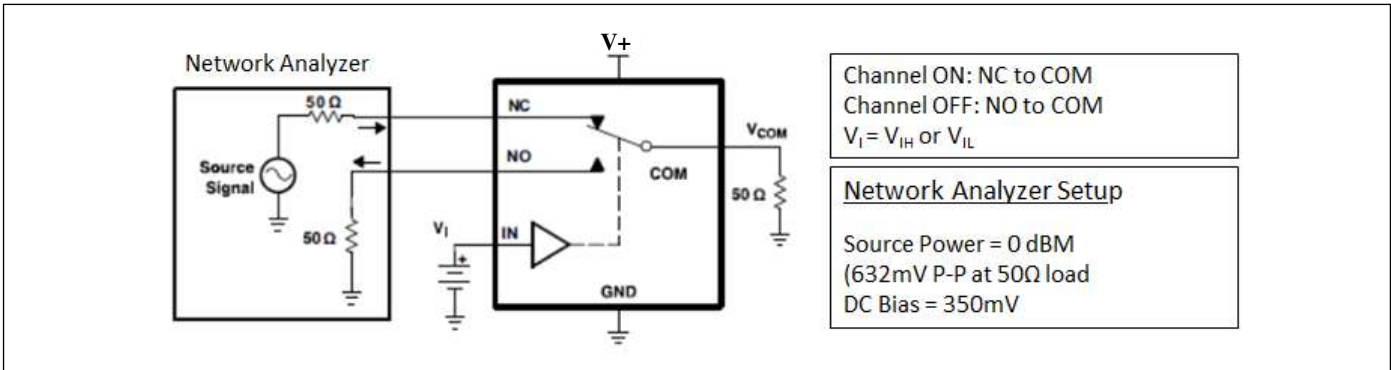


Figure 5. Channel-to-Channel Crosstalk

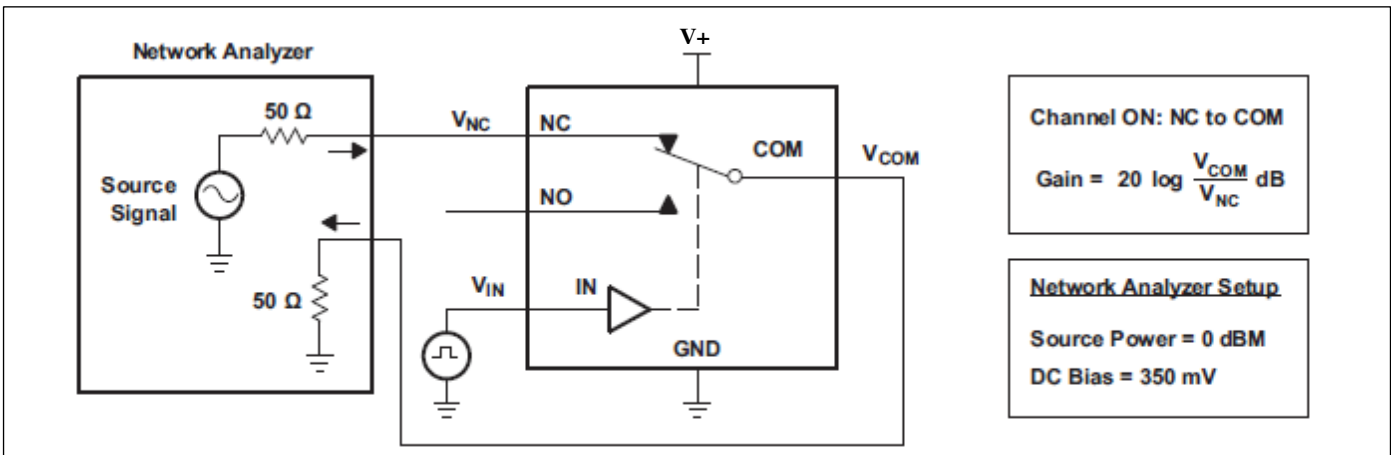


Figure 6. Bandwidth

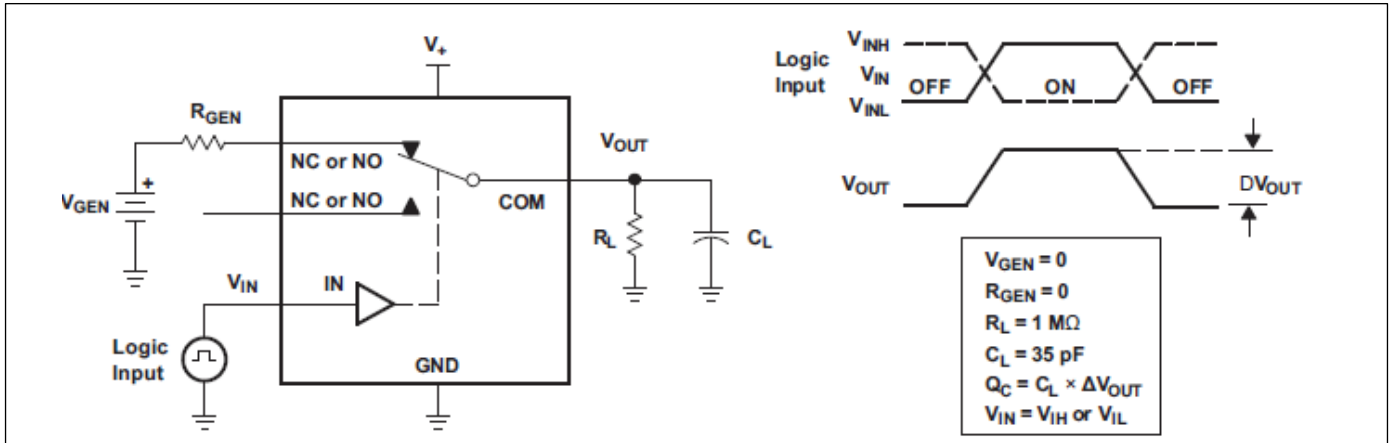


Figure 7. Charge Injection (Q_C)

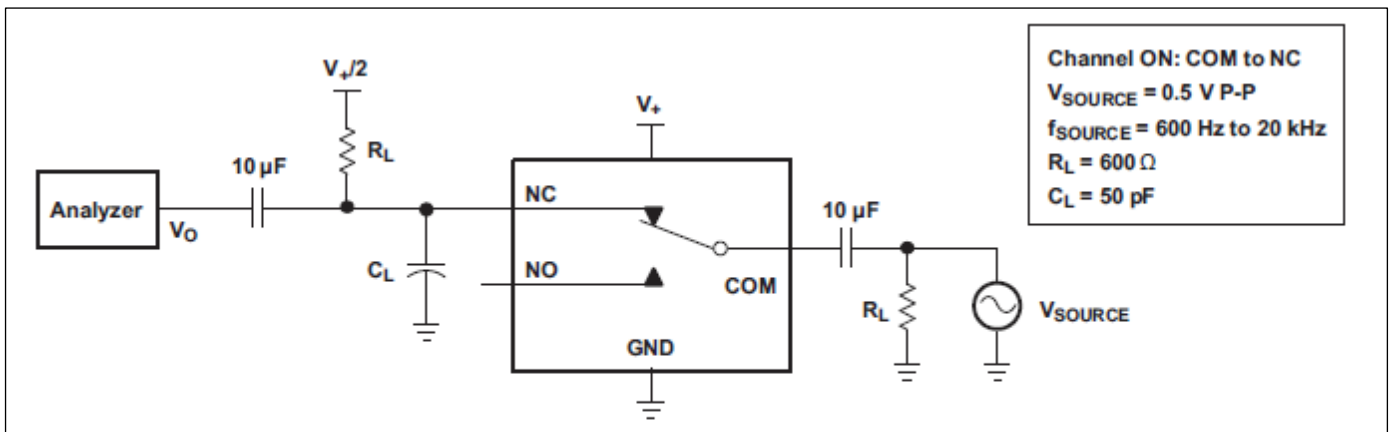


Figure 8. Total Harmonic Distortion (THD)

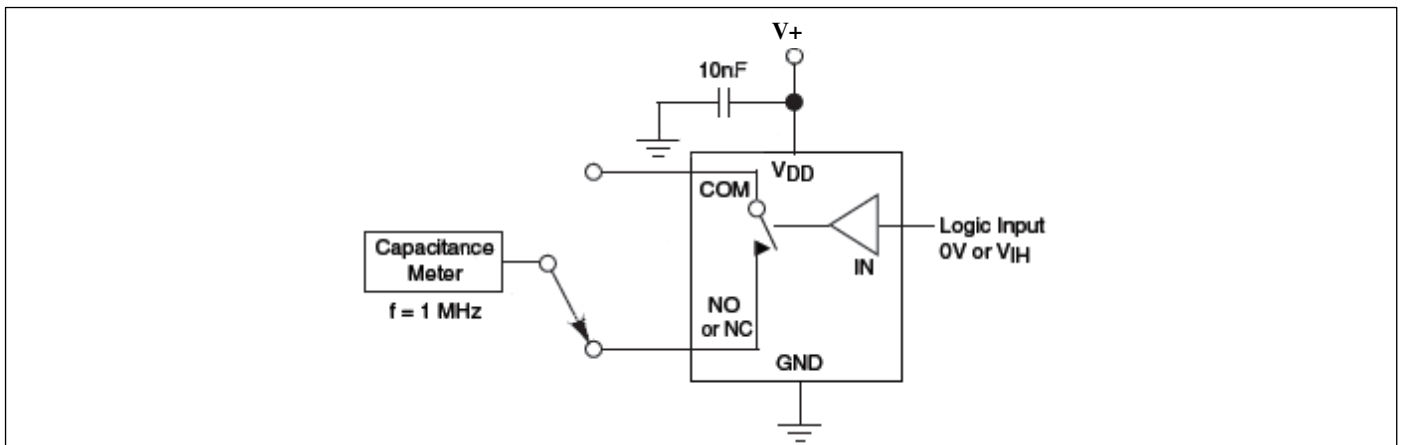


Figure 9. Channel Off Capacitance

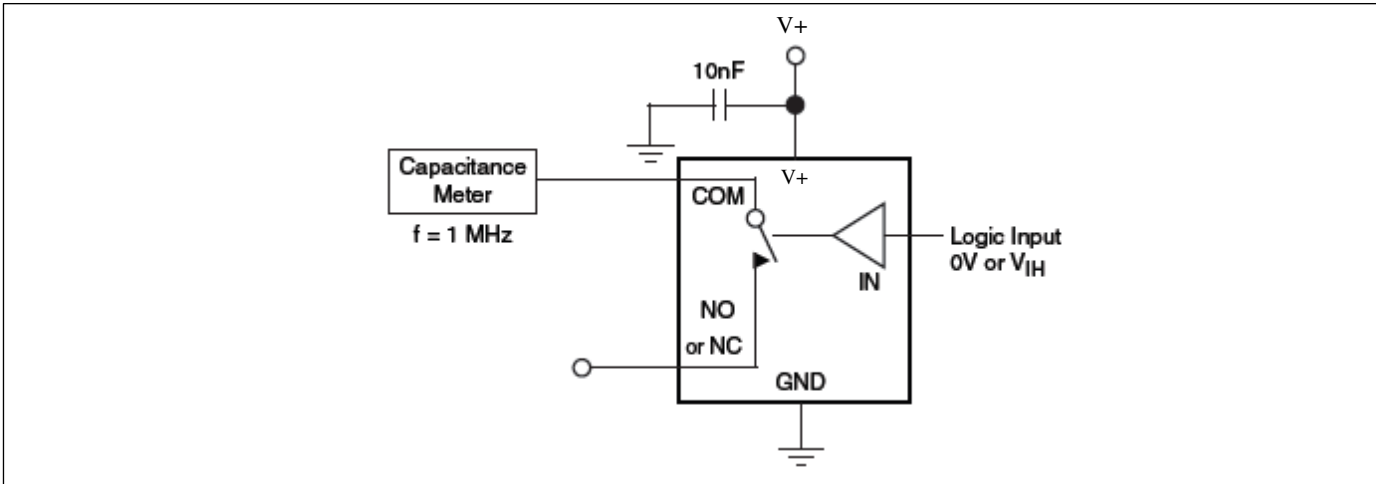
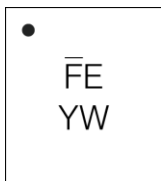


Figure 10. Channel On Capacitance

Part Marking

ZUA Package



FE: PI5A23157ZUAE

Y: Date Code (Year)

W: Date Code (Workweek)

Line above 1st character denotes Lead-free and pin 1 indicator

U Package



Y: Date Code (Year)

W: Date Code (Workweek)

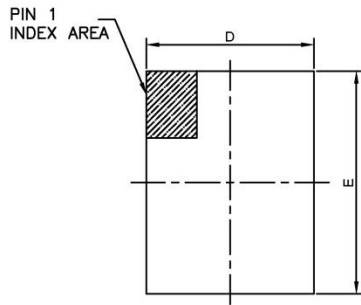
1st X: Assembly Site Code

2nd X: Fab Site Code

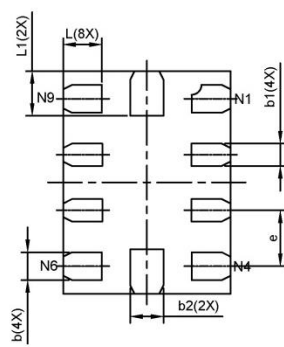
Bar above 2nd "X" means Cu wire

Packaging Mechanical

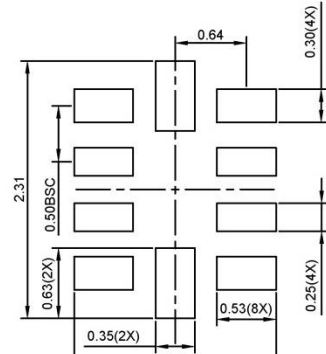
10-UQFN (ZUA)



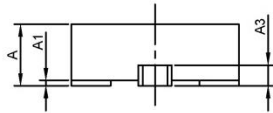
TOP VIEW



BOTTOM VIEW



RECOMMENDED LAND PATTERN(unit:mm)



SIDE VIEW

PKG. DIMENSIONS(MM)			
SYMBOL	Min	NOM	Max
A	0.50	0.60	0.65
A1	0.00	0.02	0.05
A3	0.15 REF		
D	1.45	1.50	1.55
E	1.95	2.00	2.05
b	0.20	0.25	0.30
b1	0.15	0.20	0.25
b2	0.25	0.30	0.35
e	0.50 BSC		
L	0.25	0.35	0.45
L1	0.30	0.40	0.50

Notes:
1. Ref: JEDEC MO-288B.



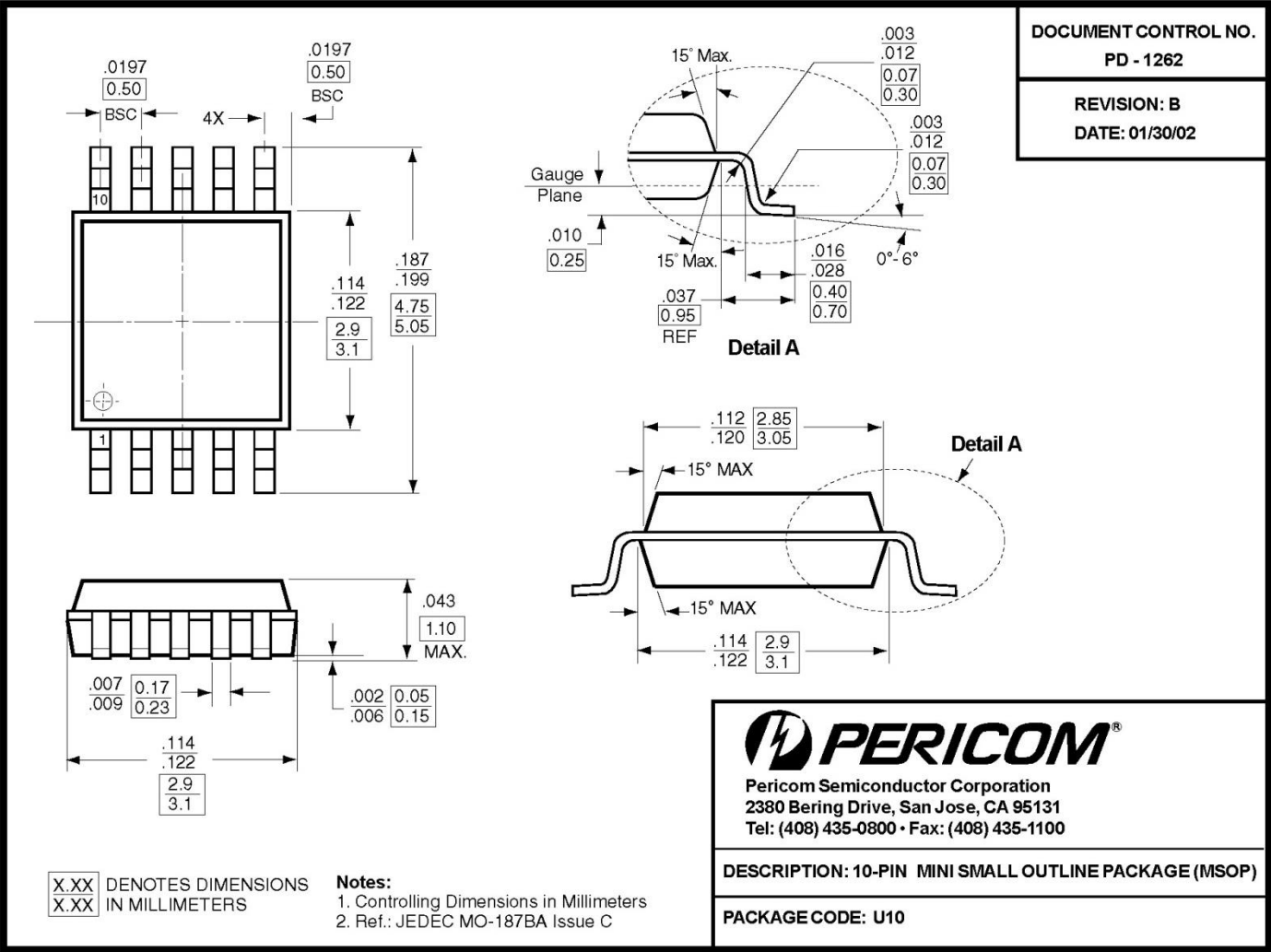
DATE: 01/06/17

DESCRIPTION: 10-Pin, UQFN, 1.5X2.0
PACKAGE CODE: ZUA(ZUA10)
DOCUMENT CONTROL#: PD-2220
REVISION: --

17-0002

PI5A23157

10-MSOP (U)



For latest package info.
please check: <http://www.diodes.com/design/support/packaging/pericom-packaging/packaging-mechanicals-and-thermal-characteristics/>

Ordering Information

Part Number	Packaging Code	Package Description
PI5A23157ZUAEX	ZUA	10-Pin, 1.5mm x 2.0mm (UQFN)
PI5A23157UEX	U	10-Pin, Mini Small Outline Package (MSOP)

- Notes:**
- No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
 - See <https://www.diodes.com/quality/lead-free/> for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
 - Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
 - E = Pb-free and Green
 - X suffix = Tape/Reel

IMPORTANT NOTICE

1. DIODES INCORPORATED AND ITS SUBSIDIARIES ("DIODES") MAKE NO WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, WITH REGARDS TO ANY INFORMATION CONTAINED IN THIS DOCUMENT, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT OF THIRD PARTY INTELLECTUAL PROPERTY RIGHTS (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION).
2. The Information contained herein is for informational purpose only and is provided only to illustrate the operation of Diodes products described herein and application examples. Diodes does not assume any liability arising out of the application or use of this document or any product described herein. This document is intended for skilled and technically trained engineering customers and users who design with Diodes products. Diodes products may be used to facilitate safety-related applications; however, in all instances customers and users are responsible for (a) selecting the appropriate Diodes products for their applications, (b) evaluating the suitability of the Diodes products for their intended applications, (c) ensuring their applications, which incorporate Diodes products, comply the applicable legal and regulatory requirements as well as safety and functional-safety related standards, and (d) ensuring they design with appropriate safeguards (including testing, validation, quality control techniques, redundancy, malfunction prevention, and appropriate treatment for aging degradation) to minimize the risks associated with their applications.
3. Diodes assumes no liability for any application-related information, support, assistance or feedback that may be provided by Diodes from time to time. Any customer or user of this document or products described herein will assume all risks and liabilities associated with such use, and will hold Diodes and all companies whose products are represented herein or on Diodes' websites, harmless against all damages and liabilities.
4. Products described herein may be covered by one or more United States, international or foreign patents and pending patent applications. Product names and markings noted herein may also be covered by one or more United States, international or foreign trademarks and trademark applications. Diodes does not convey any license under any of its intellectual property rights or the rights of any third parties (including third parties whose products and services may be described in this document or on Diodes' website) under this document.
5. Diodes products are provided subject to Diodes' Standard Terms and Conditions of Sale (<https://www.diodes.com/about/company/terms-and-conditions/terms-and-conditions-of-sales/>) or other applicable terms. This document does not alter or expand the applicable warranties provided by Diodes. Diodes does not warrant or accept any liability whatsoever in respect of any products purchased through unauthorized sales channel.
6. Diodes products and technology may not be used for or incorporated into any products or systems whose manufacture, use or sale is prohibited under any applicable laws and regulations. Should customers or users use Diodes products in contravention of any applicable laws or regulations, or for any unintended or unauthorized application, customers and users will (a) be solely responsible for any damages, losses or penalties arising in connection therewith or as a result thereof, and (b) indemnify and hold Diodes and its representatives and agents harmless against any and all claims, damages, expenses, and attorney fees arising out of, directly or indirectly, any claim relating to any noncompliance with the applicable laws and regulations, as well as any unintended or unauthorized application.
7. While efforts have been made to ensure the information contained in this document is accurate, complete and current, it may contain technical inaccuracies, omissions and typographical errors. Diodes does not warrant that information contained in this document is error-free and Diodes is under no obligation to update or otherwise correct this information. Notwithstanding the foregoing, Diodes reserves the right to make modifications, enhancements, improvements, corrections or other changes without further notice to this document and any product described herein. This document is written in English but may be translated into multiple languages for reference. Only the English version of this document is the final and determinative format released by Diodes.
8. Any unauthorized copying, modification, distribution, transmission, display or other use of this document (or any portion hereof) is prohibited. Diodes assumes no responsibility for any losses incurred by the customers or users or any third parties arising from any such unauthorized use.

Copyright © 2022 Diodes Incorporated

www.diodes.com