

DIO1467

Data/Audio Low-Voltage Dual DPDT Analog Switch

Description

The DIO1467 is a dual Double-Pole, Double-Throw (DPDT) analog switch. The DIO1467 operates from a single 1.65 V to 4.5 V supply and features an ultra-low on resistance of 2.7 Ω on the data path. This device is fabricated with sub-micron CMOS technology to achieve fast switching speeds and is designed for break-before-make operation.

The DIO1467 features very low quiescent current even when the control voltage is lower than the V_{CC} supply. This feature allows mobile handset applications to directly interface with the baseband processor general-purpose I/Os.

The DIO1467 provides packages with Green QFN1.8*2.6-16, QFN3*3-16, and QFN2.5*2.5-16.

Features

- Switch type: DPDT (2X)
- Input type: Data/audio switch
- Voltage operation: 1.65 V to 4.5 V
- Low on resistance of data path: 2.7 Ω
- Bandwidth: 180 MHz
- 30 pF C_{on} at 1 MHz
- Excellent on resistance matching
- Low power consumption
- ESD CDM level = C3 at ± 2000 V
- ESD HBM level = 3B at ± 8000 V
- Green packaged: QFN1.8*2.6-16, QFN3*3-16, and QFN2.5*2.5-16

Applications

- Cell-phone/PDA
- MP3/MP4/PMP
- Portable instrumentation
- Battery-powered communications
- Computer peripherals

■ Ordering Information

Part Number	Top Marking	RoHS	T _A	Package	
DIO1467LN16	D17	Green	-40 to 105°C	QFN1.8*2.6-16	Tape & Reel, 3000
DIO1467CL16	D1467	Green	-40 to 105°C	QFN3*3-16	Tape & Reel, 5000
DIO1467QL16	D1467	Green	-40 to 105°C	QFN2.5*2.5-16	Tape & Reel, 3000

If you encounter any issue in the process of using the device, please contact our customer service at marketing@dioo.com or phone us at (+86)-21-62116882. If you have any improvement suggestions regarding the datasheet, we encourage you to contact our technical writing team at docs@dioo.com. Your feedback is invaluable for us to provide a better user experience.

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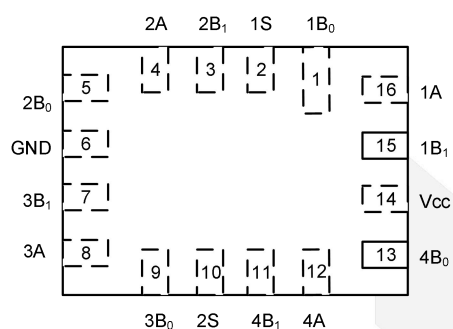
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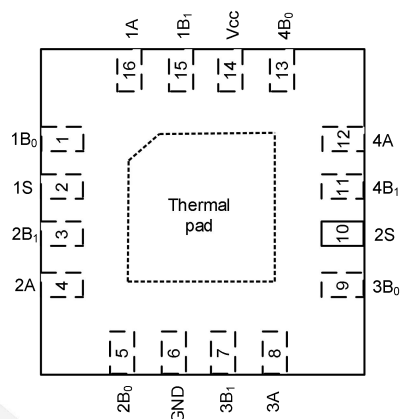
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1. Pin Assignment and Functions



QFN1.8*2.6-16
(Top view)



QFN3*3-16/QFN2.5*2.5-16
(Top view)

Table 1. Pin descriptions

Pin Name	Description
nB ₀ /nB ₁	Data/Audio Port
1S/2S	Switch Select
nA	Data/Audio Common Port
V _{CC} / GND	Power
Thermal pad	Recommend to connect to ground for improved thermal performance.

Table 2. Truth table

1S	2S	Function
L	-	1B ₀ = 1A & 2B ₀ = 2A
H	-	1B ₁ = 1A & 2B ₁ = 2A
-	L	3B ₀ = 3A & 4B ₀ = 4A
-	H	3B ₁ = 3A & 4B ₁ = 4A

2. Absolute Maximum Ratings

Exceeding the maximum ratings listed under Absolute Maximum Ratings when designing is likely to damage the device permanently. Do not design to the maximum limits because long-time exposure to them might impact the device's reliability. The ratings are obtained over an operating free-air temperature range unless otherwise specified.

Symbol	Parameter	Min	Max	Unit
V_{CC}	Supply voltage	-0.5	5.25	V
V_S	Switch voltage	-0.5	$V_{CC} + 0.3$	V
V_{IN}	DC input I/O voltage	-0.5	V_{CC}	V
I_{IK}	DC input diode current	-50		mA
I_{OUT}	DC output current		50	mA
I_{Peak}	Peak current (pulsed at 1 ms, 10% duty cycle)		500	mA
P_D	Continuous power dissipation ($T_A = 105^{\circ}C$) (15.6 mW/ $^{\circ}C$ above 105 $^{\circ}C$)		1.25	W
T_{STG}	Storage temperature range	-65	150	$^{\circ}C$
T_J	Junction temperature		150	$^{\circ}C$

3. Recommended Operating Condition

Recommended operating conditions are specified to ensure optimal performance to the datasheet specifications. The ratings are obtained over an operating free-air temperature range unless otherwise specified.

Symbol	Parameter	Min	Max	Unit
V_{CC}	Supply voltage	1.65	4.5	V
V_{IN}	Control input voltage (1S, 2S)	0	V_{CC}	V
V_S	Switch I/O voltage	0	V_{CC}	V
T_A	Operating temperature	-40	105	$^{\circ}C$

4. ESD Ratings

When a statically-charged person or object touches an electrostatic discharge sensitive device, the electrostatic charge might be drained through sensitive circuitry in the device. If the electrostatic discharge possesses sufficient energy, damage might occur to the device due to localized overheating.

Model	Condition	Rating	Unit
HBM	ESDA/JEDEC JS-001	±8000	V
CDM	ESDA/JEDEC JS-002	±2000	V

5. Electrical Characteristics

All typical values are at $V_{CC} = 3.3\text{ V}$, $T_A = 25^\circ\text{C}$ unless otherwise specified.

Symbol	Parameter	Conditions	V_{CC} (V)	Temp	Min	Typ	Max	Unit
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DC electrical characteristics

V_{IH}	Input voltage high		1.65 to 4.5	-40 to 105°C	0.8			V
V_{IL}	Input voltage low		1.65 to 4.5	-40 to 105°C			0.4	V
I_{IN}	Control input leakage	$V_{SW} = 0$ to V_{CC}	4.5	25°C	-1		1	μA
$I_{NC(OFF)}$ $I_{NO(OFF)}$	Off leakage current	$nB_0, nB_1 = 0.3$ or 3.6 V	4.5	25°C	-1		1	μA
$I_{NC(ON)}$ $I_{NO(ON)}$	On leakage current	$nB_0, nB_1 = 0.3$ or 3.6 V	4.5	25°C	-1		1	μA
I_{CC}	Quiescent supply current	$V_{IN} = 0\text{ V}$ or V_{CC} , $I_{OUT} = 0\text{ V}$	4.5	25°C		1.2	2	μA
R_{OND}	1A, 2A, 3A, 4A, resistance	$I_{OUT} = -20\text{ mA}$, $V_{SW} = 2.3\text{ V}$	2.7	-40 to 105°C		2.7		Ω
I_{CCT}	Increase in I_{CC} current per control voltage and V_{CC}	$V_{IN} = 1.8\text{ V}$	4.5	25°C		1.1		μA
		$V_{IN} = 2.6\text{ V}$	4.5	25°C		1.2		μA

AC electrical characteristics

t_{OND}	Turn-on time (1A, 2A, 3A, 4A)	$R_L = 50\text{ Ω}$, $C_L = 35\text{ pF}$, $V_{SW} = 1.5\text{ V}$	2.7 to 3.6	-40 to 105°C		90		ns
t_{OFFD}	Turn-off time (1A, 2A, 3A, 4A)	$R_L = 50\text{ Ω}$, $C_L = 35\text{ pF}$, $V_{SW} = 1.5\text{ V}$	2.7 to 3.6	-40 to 105°C		60		ns
t_{BBMD}	Break-before-make	$R_L = 50\text{ Ω}$, $C_L = 35\text{ pF}$, $V_{SW} = 1.5\text{ V}$	2.7 to 3.6	25°C		50		ns
t_{PD}	Propagation delay (1A, 2A, 3A, 4A)	$R_L = 50\text{ Ω}$, $C_L = 35\text{ pF}$	3.3	25°C			0.5	ns

OIRR	Off isolation (2A, 3A, 4A)	$R_L = 50\ \Omega$, $f = 10\ \text{MHz}$,	2.7 to 3.6	25°C		-51		dB
X _{talk}	Non-adjacent channel crosstalk (2A, 3A, 4A)	$R_L = 50\ \Omega$, $f = 10\ \text{MHz}$	2.7 to 3.6	25°C		-64		dB
BW	-3 dB bandwidth (2A, 3A, 4A)	$R_L = 50\ \Omega$, $C_L = 5\ \text{pF}$,	2.7 to 3.6	25°C		180		MHz

Capacitance

C _{COND}	1A, 2A, 3A, 4A on capacitance	$f = 1\ \text{MHz}$		-40 to 105°C		30		pF
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Note: Specifications subject to change without notice.

6. Typical Performing Characteristics

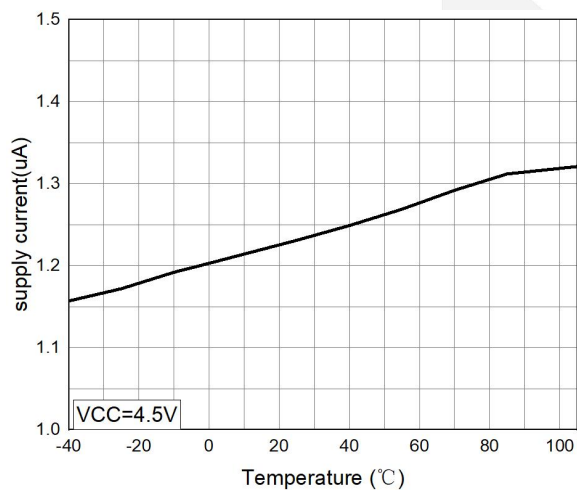


Figure 1. Supply vs. Temperature

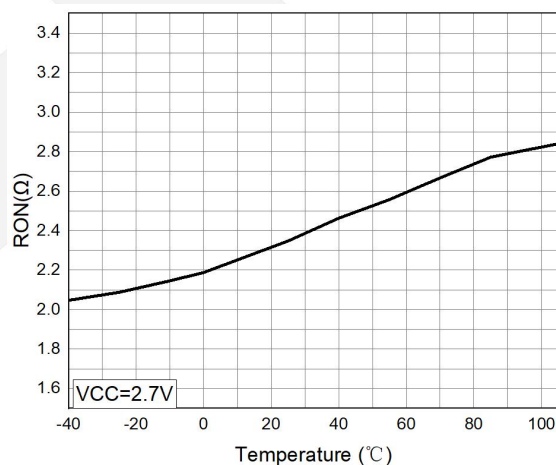


Figure 2. R_{ON} vs. Temperature

7. Test Diagrams

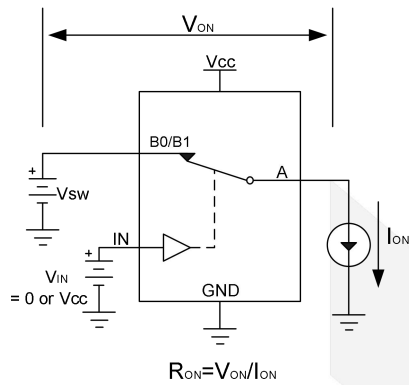


Figure 3. Switch on resistor

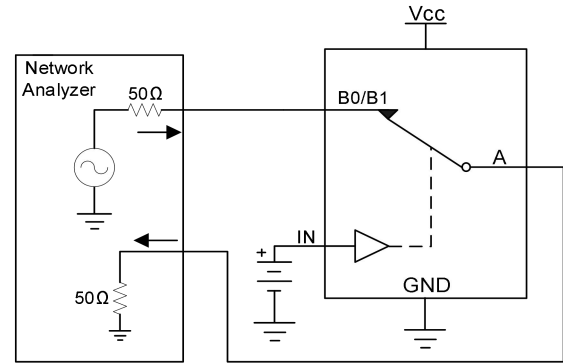


Figure 4. Bandwidth

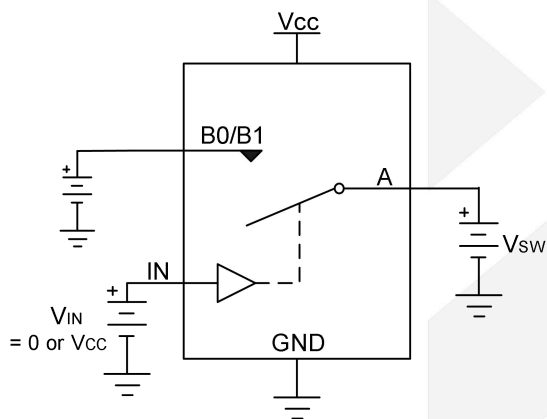


Figure 5. Switch off leakage

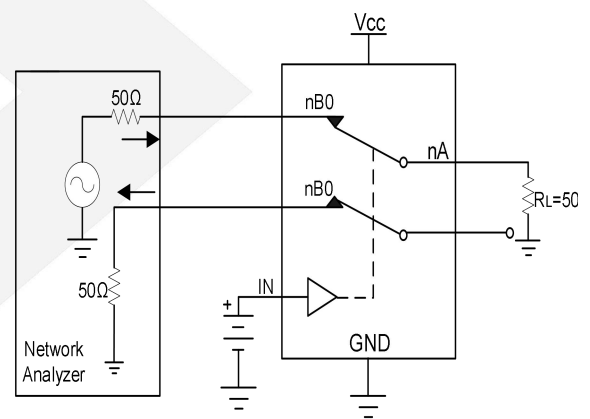


Figure 6. Channel-to-channel crosstalk

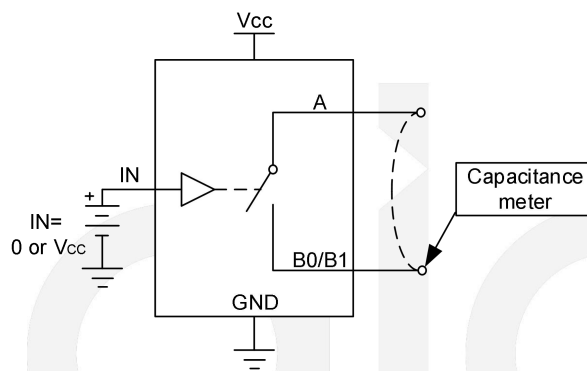


Figure 7. On/off capacitance test

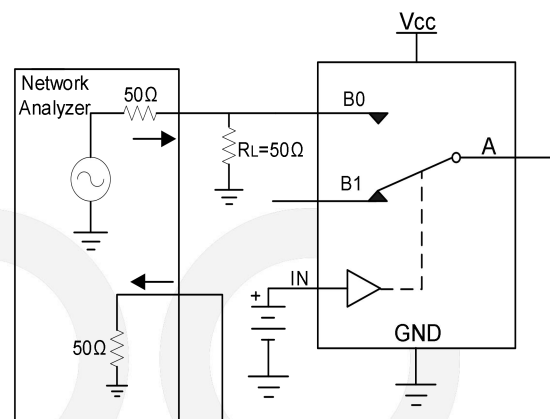


Figure 8. Off-isolation

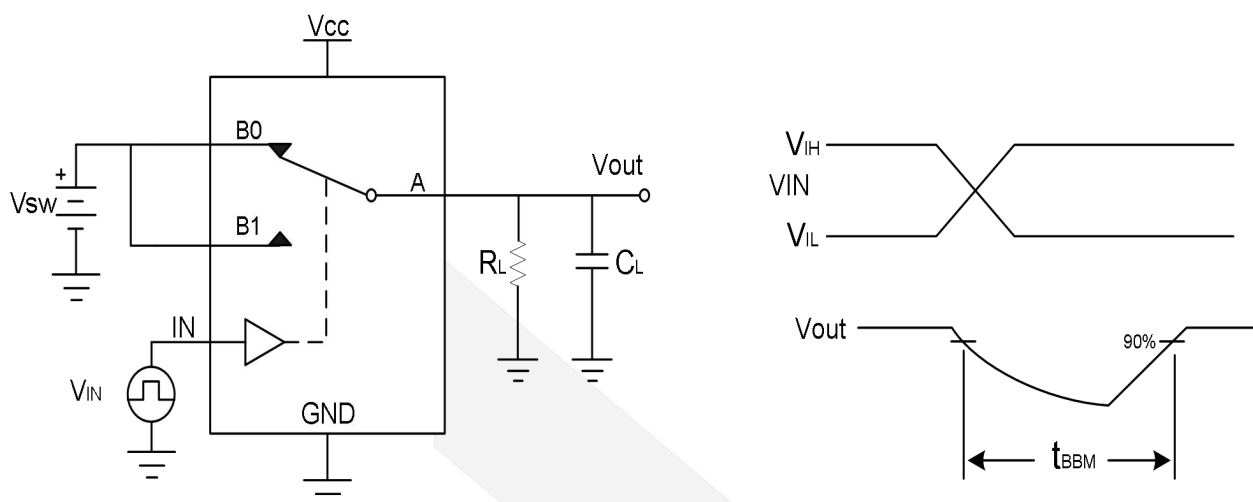


Figure 9. Break-before-make

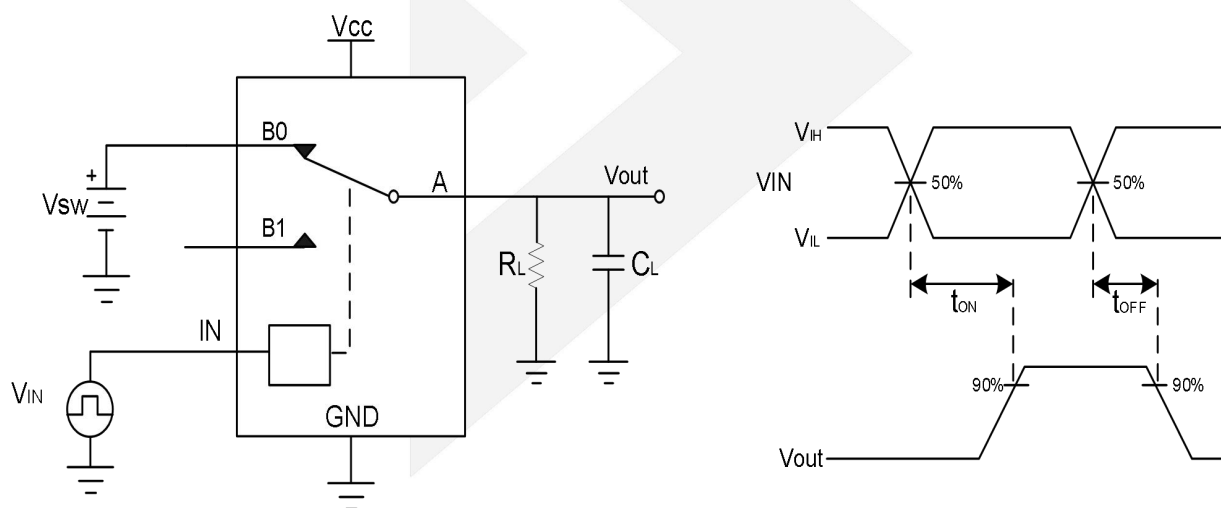
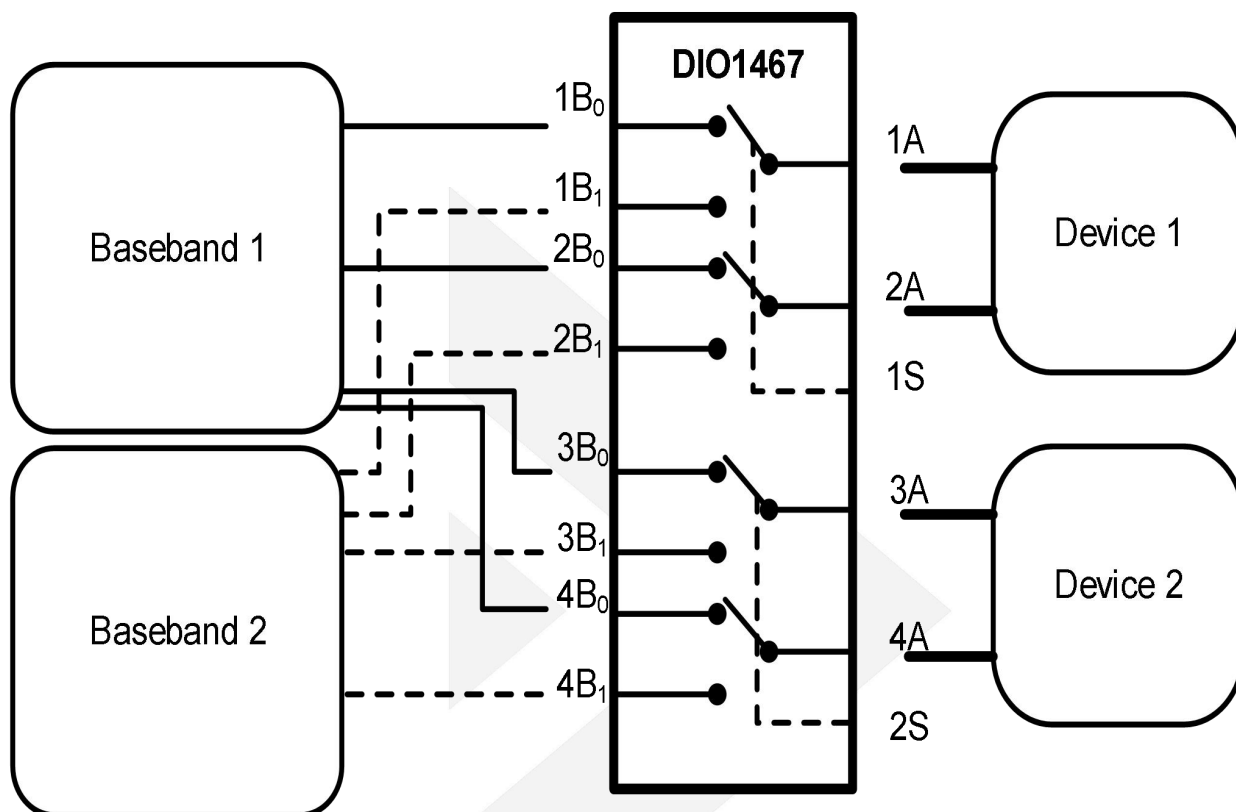


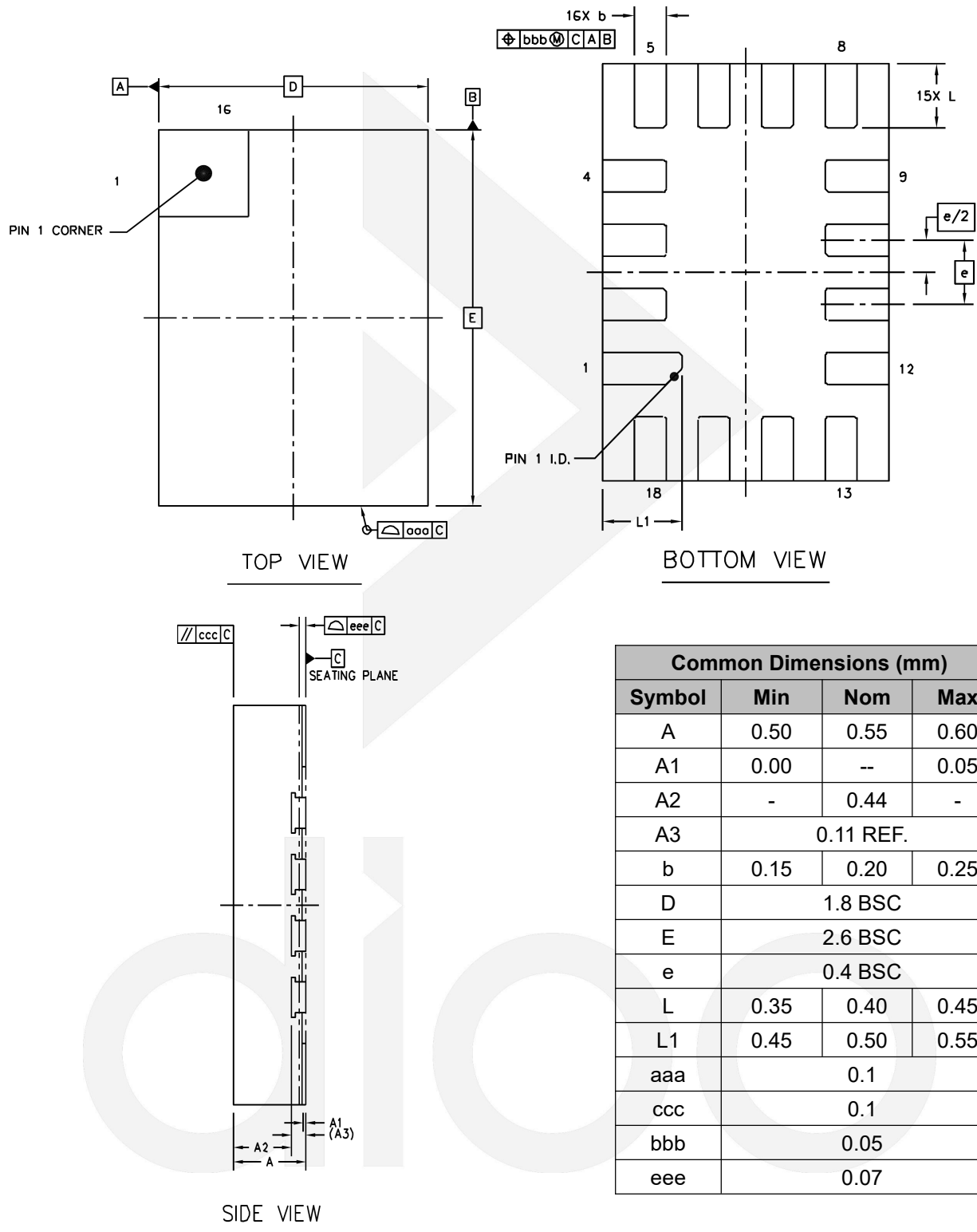
Figure 10. Turn-on/Turn-off

8. Block Diagram

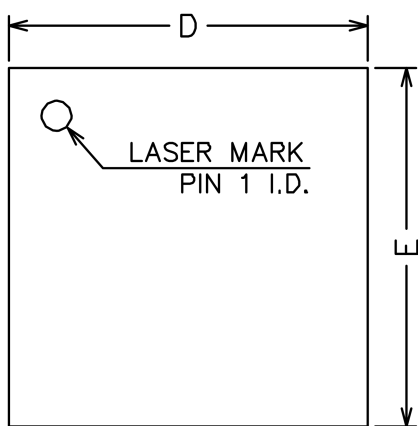


9. Physical Dimension

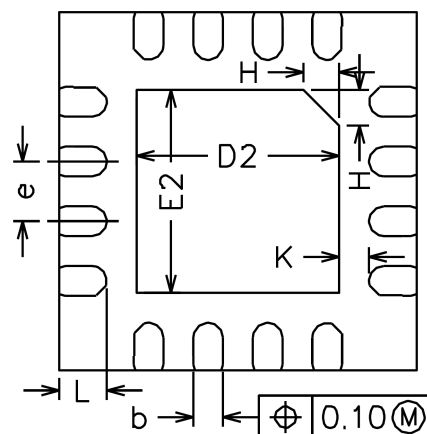
9.1. QFN1.8*2.6-16



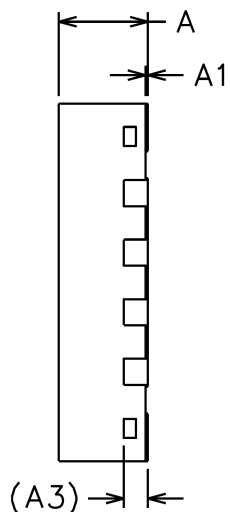
9.2. QFN3*3-16



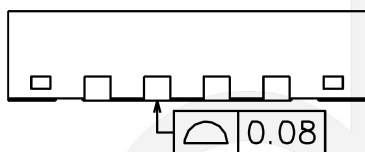
TOP VIEW



BOTTOM VIEW



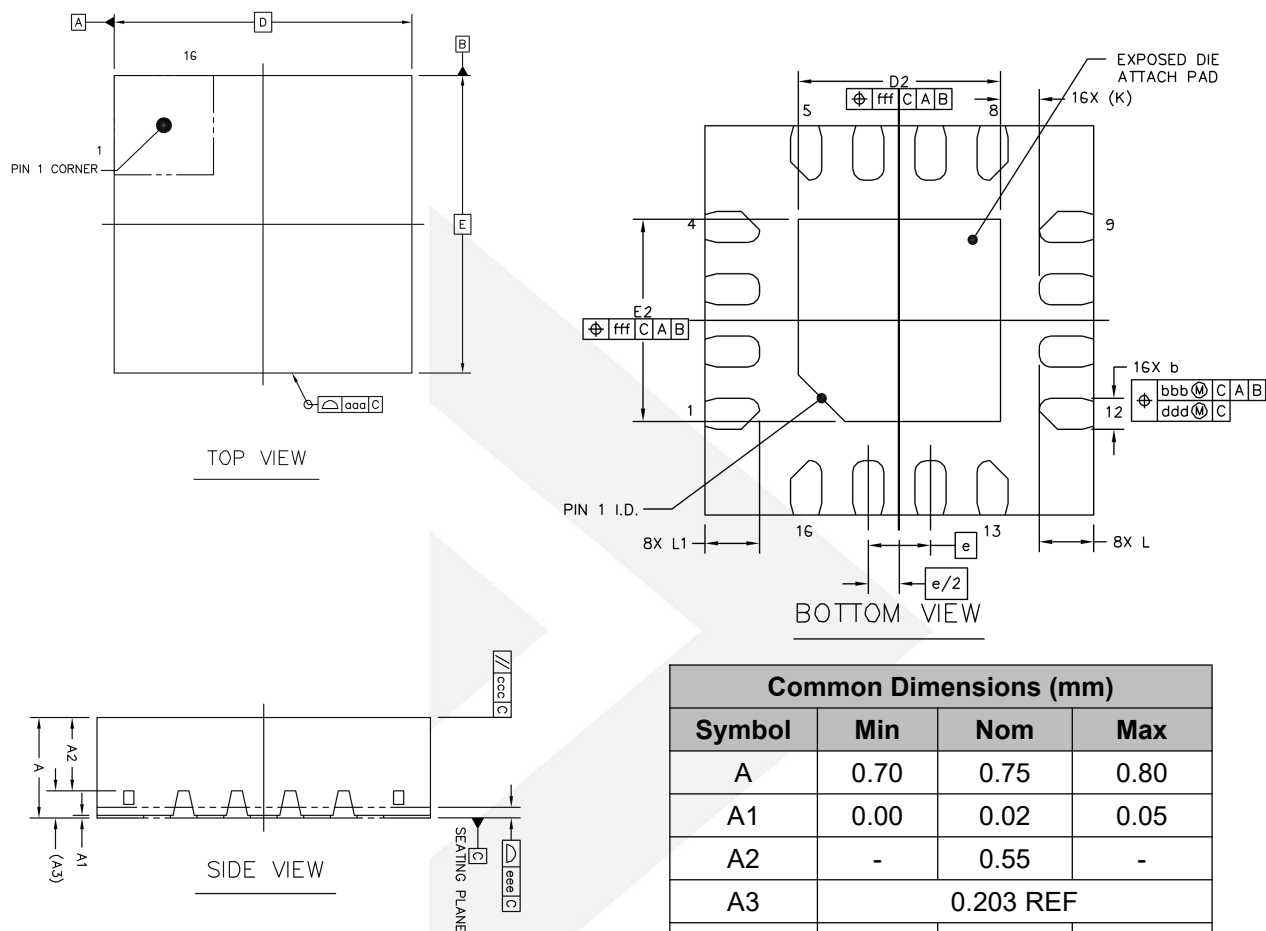
SIDE VIEW



SIDE VIEW

Common Dimensions (mm)			
Symbol	Min	Nom	Max
A	0.70	0.75	0.80
A1	0.00	0.02	0.05
A3	0.20 REF		
b	0.20	0.25	0.30
D	2.95	3.00	3.05
E	2.95	3.00	3.05
D2	1.60	1.70	1.75
E2	1.60	1.70	1.75
e	0.40	1.50	0.60
H	0.30 REF		
K	0.15	-	-
L	0.35	0.40	0.45

9.3. QFN2.5*2.5-16



Disclaimer

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