IQS680 Datasheet

Combination sensor with dual channel capacitive proximity/touch, Passive Infrared Radial sensor and metal detection capabilities

The IQS680 ProxFusion™ IC is a multifunctional Capacitance, Pyroelectric Infrared Radial (PIR) & Inductance sensor designed for applications such as domestic energy efficient lighting applications with movement detection. The IQS680 is an ultra-low power solution designed for short or long term activations through any of the sensing channels. The IQS680 operates standalone or via the I^2C protocol and custom configurations are stored in an on-chip EEPROM.

Features

- **Unique combination of Sensors:**
  - Capacitive Sensing
  - Inductive Sensing
  - PIR Sensing
- **Capacitive Sensing**
  - 2pF to 200pF external capacitive load capability
  - Fully adjustable sensing options
  - Mutual- or self-capacitance.
- **Inductive Sensing**
  - Distinguish between ferrous and non-ferrous metals
  - Only external sense coil required (PCB trace)
- **PIR Sensing:**
  - DSP algorithm for long range movement detection.
  - Automatic drift compensation.
- **Multiple integrated UI's**
- **Automatic Tuning Implementation** (ATI) – performance enhancement (10bit ATI)
- **EEPROM** included on-chip for calibration data and settings.
- Minimal external components
- Standard **I^2C** interface (polling with sub 1ms clock stretching)
- Optional RDY indication for event mode operation
- **Low Power Consumption:**
  - 300uA
  - (100 Hz response)
  - 10uA
  - (10 Hz response)
- **Supply Voltage:** 1.75V to 3.6V
- **Low Profile** DFN(3x3) – 10 pin package

DFN10
Representations only, not actual markings

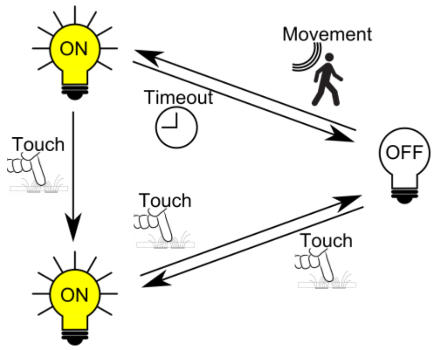


Figure 1: Under cabinet UI (PIR and Prox)

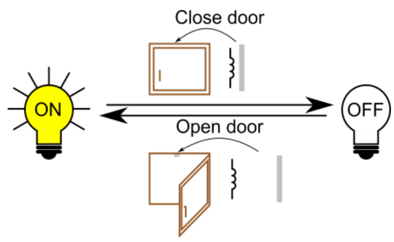


Figure 2: In cabinet UI (Inductive sensor)

Applications

- Under Cabinet Lighting (UCL)
- Standard PIR sensor cost reduction
- Smart Lights
- Night Lights
- Battery powered PIR sensors solutions
- Movement detection

Available Packages

T_A	DFN10
-40°C to 85°C	IQS680

Table of Contents

List of Abbreviations

ATI	Automatic Tuning Implementation
BOD	Brown Out Detection
FOV	Field Of View
GND	Ground
I^2C	Inter-Integrated Circuit
ICI	Internal Capacitor Implementation
LTA	Long Term Average
MSL	Moisture Sensitivity Level
OTP	One-Time Programmable
PIR	Pyroelectric Infrared Radial
POR	Power On Reset
PWM	Pulse Width Modulation
THR	Threshold
TO	Time-Out
UI	User Interface

List of symbols

C_{ATI}	ATI Compensation
CS_{PIR}	PIR sensor Current Samples
CS_{SS}	Steady-State CS_{PIR}
CS_{T}	Touch Current Samples
C_{S}	Internal Reference Capacitor
C_{X}	Sense electrode
D_{THR}	PIR Current Samples Deviation Threshold
f_{S}	Sampling frequency
M_{ATI}	ATI Multiplier
P_{THR}	Proximity event Threshold
R_{X}	Receiving electrode
T_{THR}	Touch event Threshold
T_{X}	Transmission electrode
V_{DD}	Supply voltage
V_{SS}	Ground

1 Introduction

1.1 ProxFusion™

The ProxFusion™ sensor series provide all of the proven ProxSense® engine capabilities with additional sensors types. A combined sensor solution is available within a single platform.
All specification as provided, except where specifically noted, are subject to the following conditions:

- **Temperature:-40°C to +85°C**
- **Supply voltage (V_{DD}): 1.8V to 3.6V**

1.2 Features

The IQS680 is a capacitive sensing controller designed for both integrated and standalone Pyroelectric Infrared Radial (PIR) sensing applications. The device offers highly dynamic and adjustable PIR sensing range, depending on the lens chosen (0 – 12m), as well as a high sensitivity proximity (Prox) and contact (Touch) detection through a dedicated sensor line (C_X).
The device includes advanced Digital Signal Processing (DSP) capabilities for on-chip PIR signal analysis. This, combined with the Automatic Tuning Implementation (ATI) algorithm which calibrates the device to the sense electrode, yields a highly stable, high sensitivity movement detection controller. Further features of the device include an internal voltage regulator and Internal Capacitor Implementation (ICI) to reduce external components. The analogue circuitry is also capable of Power On Reset (POR) detection as well as Brown Out Detection (BOD).
Furthermore, the device has an inductive sensing mode that allows for the detection of non-ferret metals in close proximity to the sensor.
The device can also be configured by means of an on-chip EEPROM, such as choosing the device output format, event durations, sensitivity and storing calibration data. The output options includes an open-drain or push-pull, active high or low output with Pulse Width Modulation (PWM) as well as the standard I^2C interface.

1.3 Operation

The device has been designed to be used in standalone battery operated automated lighting applications with on/off touch control capabilities. Furthermore, standard I^2C interface allows the device to be used in an integrated environment.
The capacitive sensing line of the device can reliably observe the measured results at various levels, which enables it to distinguish between a Prox or Touch event. This allows for a variety of User Interface (UI) responses. The ATI algorithm allows for the adaptation to a wide range of sensing pad sizes.

2 Hardware

2.1 Packaging and Pin-out

The IQS680 is available in the DFN10 packaging. The pin-outs and functionality is given below.

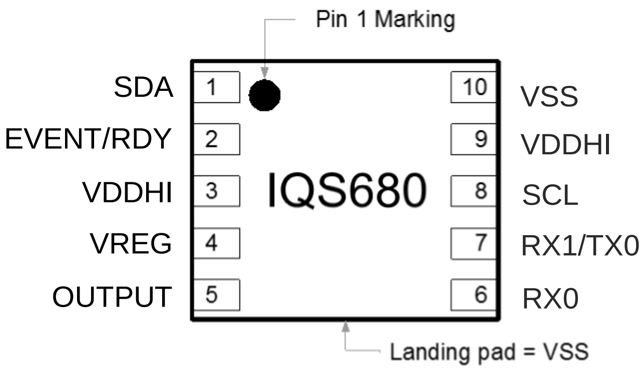


Figure 2.1: IQS680 pin-out (DFN10 package; device markings may differ)

Table 2.1: Pin-out descriptions

Pin	Name	Type	Function
1	SDA	I^2C	I^2C Data bus
2	EVENT	Digital Out	Active output on movement and when PIR is blocked
2	RDY	I^2C	I^2C Ready indication bus
3	VDDHI	Supply Input	Supply: 1.75V – 3.6V
4	VREG	Regulator output	Requires external capacitors
5	OUTPUT	Digital Out	Active high/low open-drain/push-pull output with PWM
6	Rx0	Analogue	Charge Receive electrode for sensors
7	Rx1	Analogue	Charge Receive electrode for sensors
7	Tx0	Analogue	Charge Transfer electrode for sensors
8	SCL	I^2C	I^2C Clock bus
9	VDDHI	Supply Input	Supply: 1.75V – 3.6V
10	VSS	Voltage reference	Ground connection

2.2 Reference schematic

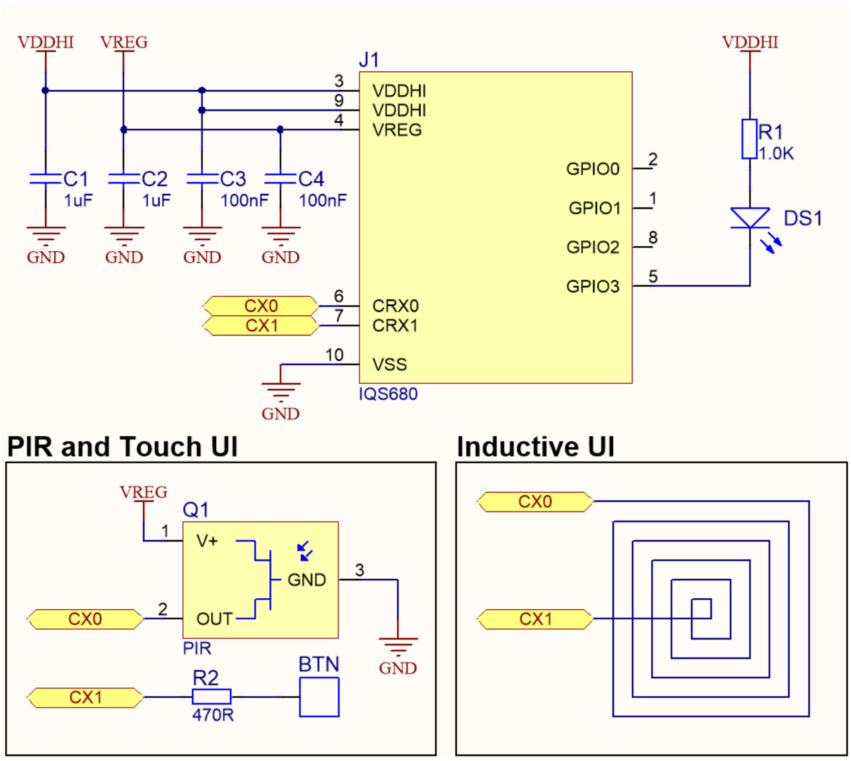


Figure 2.2: IQS680 reference schematic

2.3 Sensor channel combinations

The table below summarizes the IQS680's sensor and channel associations.

Table 2.2: Sensor - channel allocation

	Sensor / UI type	CH0	CH1	CH2
Capacitive	Movement detection	○Touch	• PIR	
Inductive	Metal detection	○Touch rejection		• Inductive

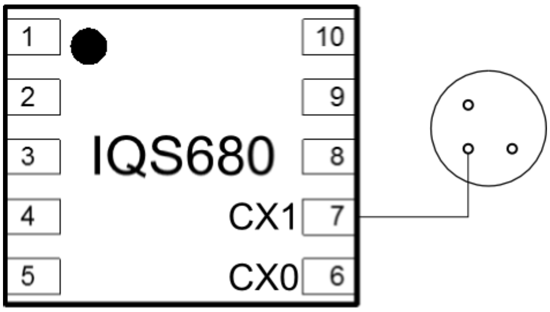
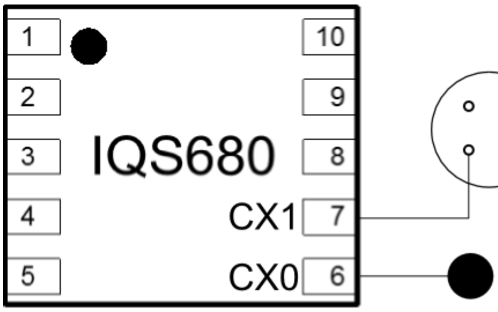
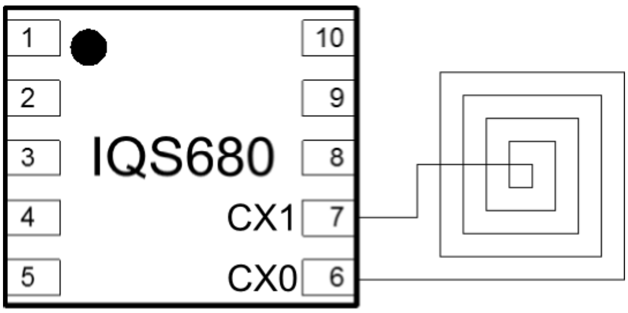
Key:

- • - Optional implementation
- ○ - Fixed use for UI

2.4 Hardware configuration

In the table below are multiple options of configuring sensing (Rx) and transmitting (Tx) electrodes to realize different implementations.

Table 2.3: hardware description per UI

	Self capacitive configuration
PIR only	
PIR and button	
Inductive coil	

3 User Interface

Although standard I^2C interface is available, the IQS680 is designed as a standalone device with a single logic output. There are three User Interfaces (UI's) on the device, namely Movement detection, Touch detection and Metal detection. The first make use of a PIR sensor to detect movement over a distance and the second senses touch by means of a capacitive sensing electrode (C_X). The latter operates with a single copper coil to detect non-ferrite metals in close proximity. Flow-diagrams of the three UI's are given in Figure 3.1 below. Note that when the output is in PWM mode, it is not considered to be in an active state. More detail is provided on this in the subsections that follow.

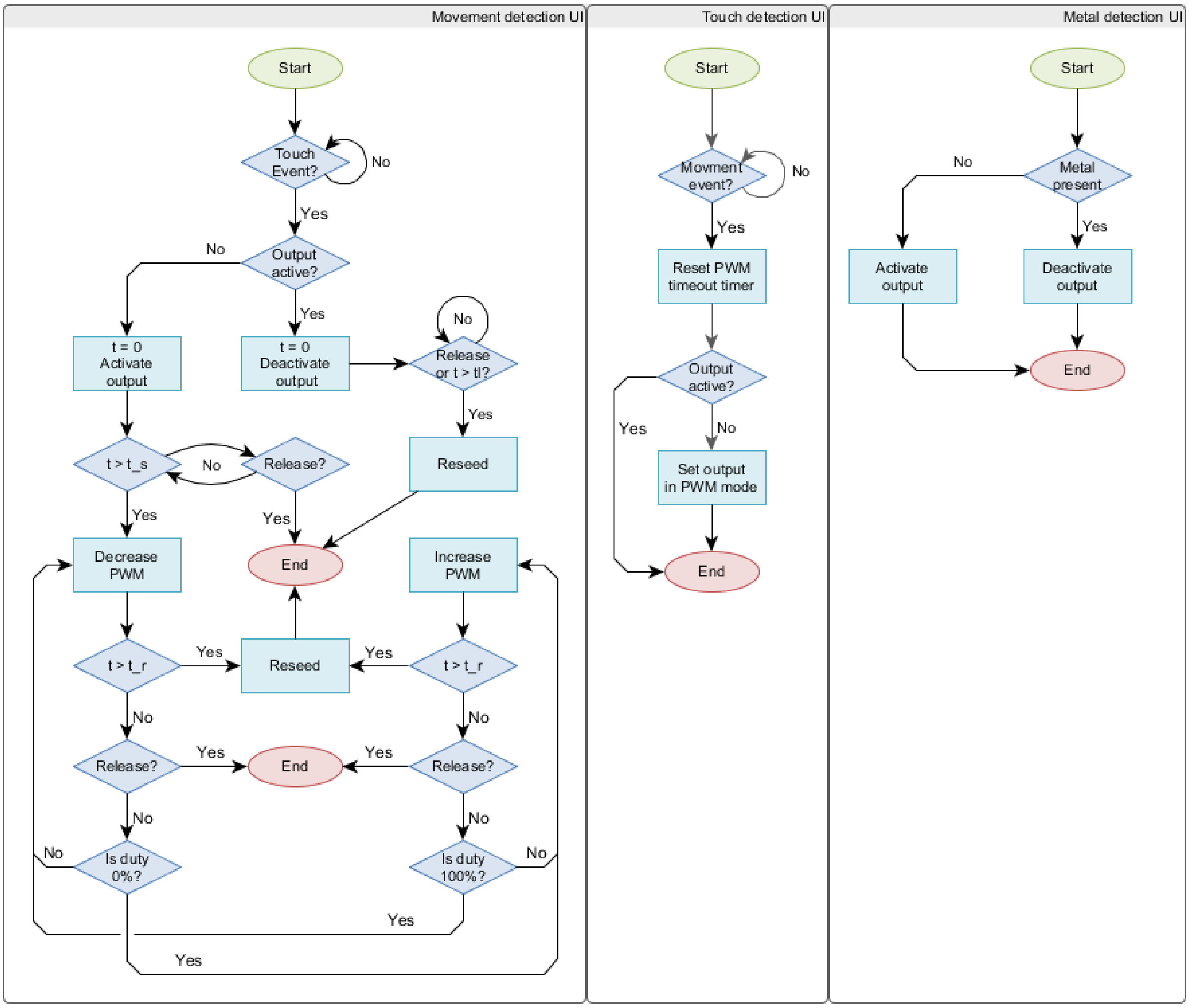


Figure 3.1: UI flow-diagrams

3.1 Movement detection UI

3.1.1 PIR sensor

The PIR sensor functions as the movement over a distance interface. Typical PIR sensors have a sensing range of up to 12m, with a radial FOV of 120°. Care should be taken when designing the housing of the PIR sensor as well as the choice of lens, as this plays a pivotal role in sensitivity, range and FOV of the PIR sensor.

Given that the output is in an inactivate state, the IQS680 will switch the output into PWM mode if any movement is detected within the PIR's FOV. The output will exit PWM mode after a predefined time period, upon which the output will return to an idle state.

However, if movement is detected whilst the output is already in PWM mode, the deactivation timers will be reset. This implies that the device will only return to an idle state once no movement was detected of the given time period. As long as the output is active, any movement detection will be ignored.

3.1.2 Touch button

There are 2 trigger levels to which the capacitive electrode will respond.

The first of these is a Prox event. This event should trigger once the user comes within a small distance to the C_X (in the order of 5cm). This trigger level will not result in an active output, but instead the device will enter Zoom mode. In this mode the device will sample C_X at 60Hz rather than the selected frequency (f_S) chosen by the designer. This mode switching feature increases the responsiveness of the touch functionality of the device whilst maintaining low power consumption during idle operation.

The second trigger level is a Touch event. This is triggered when the user physically touches the device surface directly above the C_X pad.

In the case that the output is inactive during the touch event, the output will be activated. If the touch remains for longer than 500ms the output will start to dim. If a PWM duty of 0% is reached, the duty will start to increase. This process will continue until the touch is released.

If the output is active when a touch event is registered, the output will be deactivated.

3.2 Metal detection UI

3.2.1 Inductive coil

With a coil connected between the C_{X0} and C_{X1} pins, the IQS680 passes a current though the coil and detects any deviations in the current. The IQS680 interpret these fluctuations in current as the presence or absence of metals, such as copper, in the E-field generated by the current passed through the coil.

If the IQS680 detect metal in close proximity to the coil, the output is deactivated and inversely, if no metal is detected the output is activated.

A second optional capacity measurement is also done on the coil to detect and compensate for any capacitive effect that may be exerted on the coil. This allows the IQS680 to refrain from responding to any touches made on the coil.

3.3 Event output responses

The following figure depicts the responses of the device for all the possible user inputs, given all the possible states of the output.

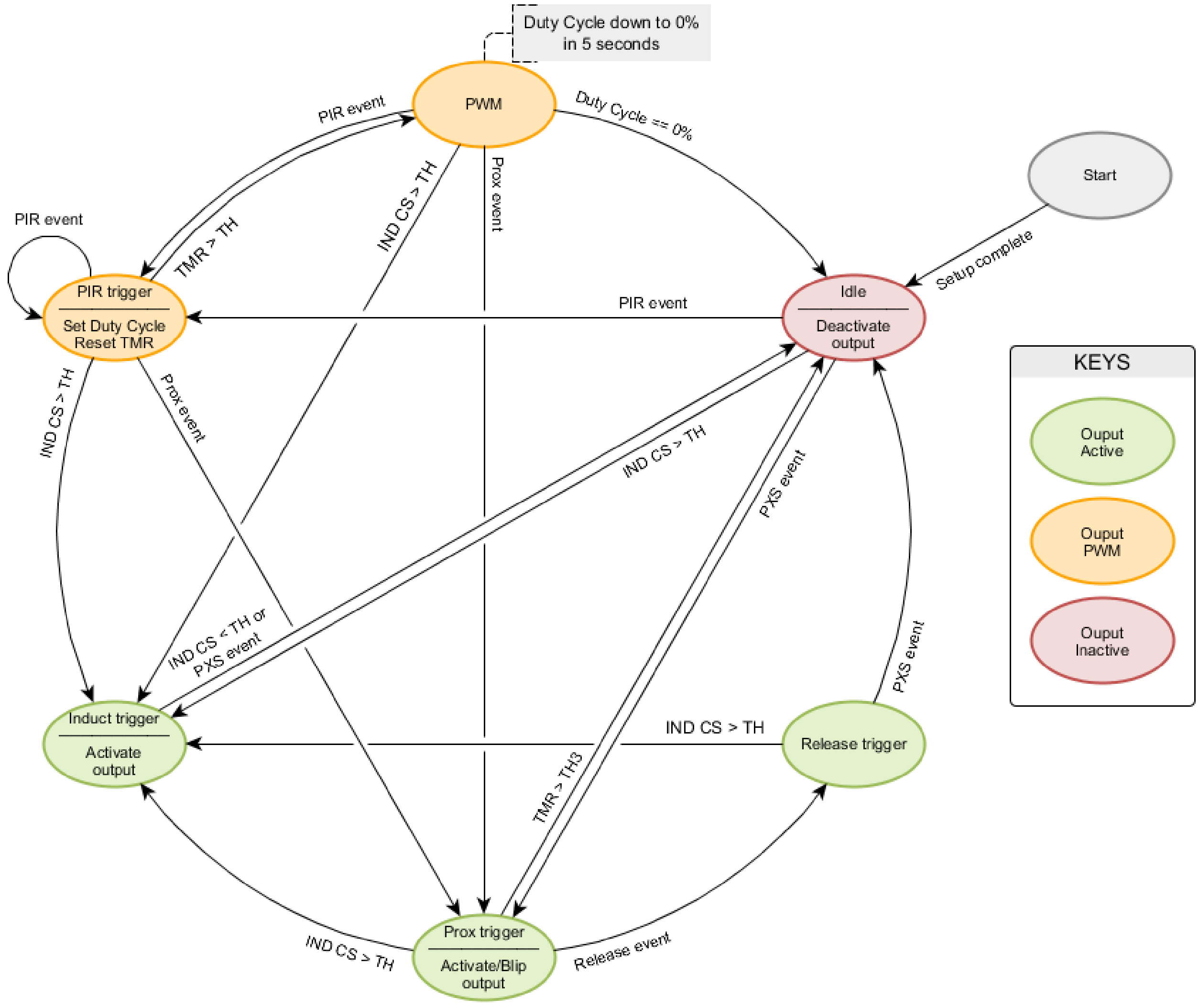


Figure 3.2: State diagram of the IQS680 output

4 Measuring capacitance using the *Charge Transfer* method

The *charge transfer* method of capacitive sensing is employed on the IQS680. The charge transfer principle is thoroughly described in the application note: “AZD004 - Azoteq Capacitive Sensing”.

A charge cycle is used to take a measurement of the capacitance of the C_X relative to ground. It consists of a series of pulses charging C_X and discharging C_X to C_S, at the charge transfer frequency:

$$f_{CT} = \frac{1}{t_{CT}} = 1\text{MHz}$$

The number of the pulses required to reach a trip voltage on the reference capacitor is referred to as the Count value (CS) which is the instantaneous capacitive measurement. The CS is used to determine if either a physical contact or proximity event occurred, based on the change in CS detected. The typical values of CS, without a touch or proximity condition range between 512 and 1280 counts, although other counts can be used based on the application requirements.

The IQS680 schedules a charge cycle every t_S seconds to ensure regular samples for processing of results. The duration of the charge cycle is defined as t_C and varies according to the counts required to reach the trip voltage. Following the charge cycles other activities such as data streaming is completed (if in streaming mode), before the next charge cycle is initiated.

Please note: Attaching a probe to the Cx pin will increase the capacitance of the sense plate and therefore CS. This may have an immediate influence on the Counts value (decrease t_C) and cause a proximity or touch event. After a period of t_{HALT} seconds has passed since the probe was attached, the system will adjust to accommodate for this change. If the total load on C_X, with the probe attached, is still lower than the maximum CS the system will continue to function normally after t_{HALT} seconds with the probe attached.

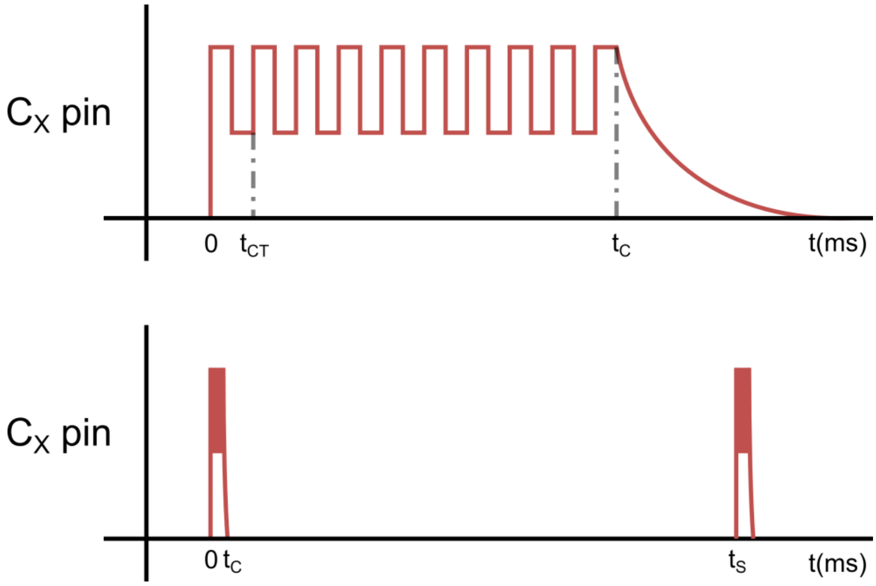


Figure 4.1: Charge cycles as can be seen on C_X.

5 User Configurable Settings (UCS)

This section describes the user configurable options of the IQS680 in detail. User options are selected though the Azoteq GUI, which is used to write it in the device's EEPROM.

5.1 Sampling frequency

The frequency at which the device samples the sensors directly relates to its power consumption, where a higher sample rate requires a more power. The designer may select 1 of 4 possible sample frequencies as shown in the table below.

Table 5.1: Sample frequency options

FREQ: Device sampling frequency select	
10 Hz	50 Hz
20 Hz	100 Hz

5.2 Input options

The IQS680 includes 3 input modes, which defines what sensors are attached to the device. These options are given in the Table 5.2: Table 5.2.

Table 5.2: User Input options

INPUT: Input type select
PIR sensor only
PIR and capacitive sensors
Coil (metal detect) sensor

5.3 Output format options

The IQS680 includes 4 output formats. These options, given in Table 5.3, allow the designer to operate the load in the best configuration for the given application.

Table 5.3: Output formats

$OUTPUT_F$: Output format select
Active High & Push-pull
Active Low & Push-pull
Active High & Open-drain
Active Low & Open-drain

5.4 Output modes

The IQS680 includes 3 output modes. These options, given in Table 5.4Table 5.3, allow the designer to operate the load in the best configuration for the given application.

Table 5.4: Output modes

$OUTPUT_T$: Output mode select
On/Off
Varied PWM
Pulse

In the "On/Off" output mode, the IQS680 will always activate the output on any event with a 100% PWM duty. In the "Varied PWM" mode, the IQS680 will cycle through a 0 – 100% PWM duty when a prolonged touch event is detected (longer than 1s), given that the touch event has activated the load. The "Pulse" mode will only generate a short pulse (10us - 250us, selectable) for any event.

5.5 Auto-off

By default the device's output will remain in an active state perpetually, given that the output is in a load driven mode. However, if the auto-off feature is selected, the output will be deactivated after a period of 1 hour.

5.6 Proximity threshold

The Proximity Threshold (P_{THR}) defines the minimum required diverges of the Touch CS (CS_T) below the Long Term Average (LTA) for more than 4 consecutive cycles to trigger a proximity event. The IQS680 proximity threshold options range is 0 - 255, where typical values are approximately 8, enabling the designer to obtain the desired sensitivity and noise immunity for the touch electrode.

5.7 Touch threshold

Similar to the proximity threshold, the Touch Threshold (T_{THR}) defines the minimum required diverges of the CS_T below the LTA for more than 2 consecutive cycles to trigger a touch event. The following equation illustrates how it is determined whether a touch event has occurred:

$$LTA \times \frac{CS_T}{256} > T_{THR}.$$

The IQS680 proximity threshold options range is 0 - 255. The touch threshold is selected by the designer to obtain the desired touch sensitivity.

5.8 PIR event threshold

Unlike the touch events, which are based on the absolute CS_T measurement, PIR events are based on the differential measurement of the PIR sensor CS (CS_{PIR}). Thus, a PIR Event Threshold (E_{THR}) defines the minimum required *rate* of diverges of CS_{PIR} from its Steady-State CS (CS_{SS}) to trigger a PIR event.
The IQS680 PIR events threshold options range is 0 - 255, which is chosen to obtain the desired sensitivity and noise immunity for the PIR sensor.

5.9 PIR deviation threshold

The PIR sensor is susceptible to ambient noise such as fluctuation in temperature over the course of 24hrs. These changes directly impact the sensitivity of the sensor.
In order to maintain a non-variant sensitivity, the IQS680 will monitor the difference of the CS_{SS} value from the selected ATI target value and compare it to the PIR Deviation Threshold (D_{THR}). If

$$|CS_{SS} \div ATI\ target| \geq \mathrm{D}_{\mathrm{THR}}\ , \qquad (5.1)$$

the device will recalibrate the PIR sensor.
There are 3 possible values for D_{THR}, given in the table below.

Table 5.5: PIR deviation thresholds

D_{THR}: PIR CS deviation THR select	
1/16	Most conservative
1/12	
1/8	Least conservative

5.10 Number of PIR events

In order to improve the IQS680's resilience against false triggers (important for security applications), the device can be setup to prevent the output from activating until a given number of PIR event has occurred in short succession. The number of event may range from 1 to 4.

5.11 PIR event Timeout

If a PIR event occurred, given that the output is in a load driven mode, the device's output will go in an active or PWM state for a selected period. This period can be selected in steps of 4 seconds, ranging from 4 to 1024 seconds.
Should a consecutive PIR event triggered before the selected period has elapsed, the internal timer will be reset and the output will remain active. This implies that the PIR event timeout defines the time the output will remain active after the last PIR event has occurred.

5.12 Minimum PIR Stabilization Time

Due to the unknown nature of the state in which a PIR at the moment the power is applied to the device, it is necessary for the IQS680 to suppress all PIR events at start-up. The IQS680 automatically monitors the PIR sensor and continue to suppress all PIR event until the sensor has stabilized. This can take up to 30 seconds.
The Minimum PIR stabilization time define the period in seconds (0 - 255) which the PIR must be stable before the IQS680 will stop suppressing PIR events.

6 Auto Tuning Implementation (ATI)

ATI is a sophisticated technology implemented in the latest generation ProxSense® devices that optimises the performance of the sensor in a wide range of applications and environmental conditions (refer to application note AZD0027 - Auto Tuning Implementation).
ATI makes adjustments through external reference capacitors unnecessary (as required by most other solutions) to obtain optimum performance.
The device automatically adjusts the ATI parameters to optimise the sensing electrodes connection to the device. The ATI algorithm execute whenever the device starts-up and or when the counts are not within a predetermined range.
ATI adjusts internal circuitry according to two parameters, the *ATI multiplier* (M_{ATI}) and the *ATI compensation* (C_{ATI}).

6.1 The ATI base

The M_{ATI} can be viewed as a course adjustment of the CS, used to achieve the ATI base value. The ATI base value is important, as this determines the sensitivity of the device at a given ATI target. The sensitivity can be defined as:

$$Sensitivity = \frac{ATI_{target}}{ATI_{base}}.$$

The designer may chose separate ATI base for the 2 sensors of the device, i.e., the PIR and electrode, from the options given in Table 6.1.

Table 6.1: Error! Reference source not found. **bits 7-6**

PIR$_{BASE}$: PIR base value	
T$_{BASE}$: Touch base value	
100	Default
75	Most sensitive
150	
200	Least sensitive

6.2 The ATI target

The C_{ATI} is a fine adjustment used to reach the ATI target value. The ATI target gives the necessary resolution for measuring small changes in the measured signal. The designer may define distinct ATI targets for the 2 sensors of the device, i.e., the PIR and electrode, from the options given in Table 6.2.

Table 6.2: Error! Reference source not found. **bits 5-4**

PIR$_{ATI}$: PIR ATI target	
T$_{ATI}$: Touch ATI target	
1024	Default
512	Least resolution
768	
1280	Most resolution

6.3 Sensitivity due to ATI

The adjustment of the ATI parameters will result in variations in the count and sensitivity. Sensitivity can be observed as the change in count as the result of a *fixed* change in sensed capacitance. The ATI parameters have been chosen to provide significant overlap. It may therefore be possible to select various combinations of ATI multiplier and ATI compensation settings to obtain the same count. The sensitivity of the various options may however be different for the same count.

7 Electrical characteristics

7.1 Absolute Maximum Specifications

The following absolute maximum parameters are specified for the device:
Exceeding these maximum specifications may cause damage to the device.

Absolute maximum specification

Parameter	3.3V solution absolute maximum	5V solution absolute maximum
Operating temperature	-40°C to 85°C	
Supply Voltage (VDDHI – GND)	3.6V	5.5V
Maximum pin voltage	VDDHI + 0.5V (may not exceed VDDHI max)	
Maximum continuous current (for specific Pins)	10mA	
Minimum pin voltage	GND - 0.5V	
Minimum power-on slope	100V/s	
ESD protection	±4kV (Human body model)	

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7.2 Power On-reset/Brown out

Power on-reset and brown out detection specifications

DESCRIPTION	CONDITIONS	PARAMETER	MIN	MAX	UNIT
Power On Reset	V_{DDHI} Slope ≥ 100V/s @25°C	POR	TBC	TBC	V
Brown Out Detect	V_{DDHI} Slope ≥ 100V/s @25°C	BOD	TBC	TBC	V

7.3 Digital input/output trigger levels

Digital input/output trigger level specifications

DESCRIPTION	CONDITIONS	PARAMETER	MIN	TYPICAL	MAX	UNIT
All digital inputs	VDD = 1.8V	Input low level voltage	TBC	TBC	TBC	V
All digital inputs	VDD = 1.8V	Input high level voltage	TBC	TBC	TBC	V
All digital inputs	VDD = 3.3V	Input low level voltage	TBC	TBC	TBC	V
All digital inputs	VDD = 3.3V	Input high level voltage	TBC	TBC	TBC	V

7.4 Current consumptions

7.4.1 Capacitive sensing alone

Capacitive sensing current consumption

Solution	Power mode	Conditions	Report rate	MIN	TYPICAL	MAX	UNIT
3.3V	NP mode	VDD = 1.8V		TBC	TBC	TBC	mA
3.3V	NP mode	VDD = 3.3V		TBC	TBC	TBC	mA
3.3V	LP mode	VDD = 1.8V		TBC	TBC	TBC	mA
3.3V	LP mode	VDD = 3.3V		TBC	TBC	TBC	mA
3.3V	ULP mode	VDD = 1.8V		TBC	TBC	TBC	mA
3.3V	ULP mode	VDD = 3.3V		TBC	TBC	TBC	mA
3.3V	Halt mode	VDD = 1.8V		TBC	TBC	TBC	mA
3.3V	Halt mode	VDD = 3.3V		TBC	TBC	TBC	mA
5V	NP mode	VDD = 2.5V		TBC	TBC	TBC	mA
5V	NP mode	VDD = 5.5V		TBC	TBC	TBC	mA
5V	LP mode	VDD = 2.5V		TBC	TBC	TBC	mA
5V	LP mode	VDD = 5.5V		TBC	TBC	TBC	mA
5V	ULP mode	VDD = 2.5V		TBC	TBC	TBC	mA
5V	ULP mode	VDD = 5.5V		TBC	TBC	TBC	mA
5V	Halt mode	VDD = 2.5V		TBC	TBC	TBC	mA
5V	Halt mode	VDD = 5.5V		TBC	TBC	TBC	mA

7.4.2 Hall-effect sensing alone

Hall-effect current consumption

Solution	Power mode	Conditions	Report rate	MIN	TYPICAL	MAX	UNIT
3.3V	NP mode	VDD = 1.8V		TBC	TBC	TBC	mA
3.3V	NP mode	VDD = 3.3V		TBC	TBC	TBC	mA
3.3V	LP mode	VDD = 1.8V		TBC	TBC	TBC	mA
3.3V	LP mode	VDD = 3.3V		TBC	TBC	TBC	mA
3.3V	ULP mode	VDD = 1.8V		TBC	TBC	TBC	mA
3.3V	ULP mode	VDD = 3.3V		TBC	TBC	TBC	mA
3.3V	Halt mode	VDD = 1.8V		TBC	TBC	TBC	mA
3.3V	Halt mode	VDD = 3.3V		TBC	TBC	TBC	mA
5V	NP mode	VDD = 2.5V		TBC	TBC	TBC	mA
5V	NP mode	VDD = 5.5V		TBC	TBC	TBC	mA
5V	LP mode	VDD = 2.5V		TBC	TBC	TBC	mA
5V	LP mode	VDD = 5.5V		TBC	TBC	TBC	mA
5V	ULP mode	VDD = 2.5V		TBC	TBC	TBC	mA
5V	ULP mode	VDD = 5.5V		TBC	TBC	TBC	mA
5V	Halt mode	VDD = 2.5V		TBC	TBC	TBC	mA
5V	Halt mode	VDD = 5.5V		TBC	TBC	TBC	mA

7.5 Capacitive loading limits

To be completed.

7.6 Hall-effect measurement limits

To be completed.

8 Package information

8.1 DFN10 package and footprint specifications

Table 8.1: DFN-10 Package dimensions (bottom)

Dimension	[mm]
A	3 ±0.1
B	0.5
C	0.25
D	n/a
F	3 ±0.1
L	0.4
P	2.4
Q	1.65

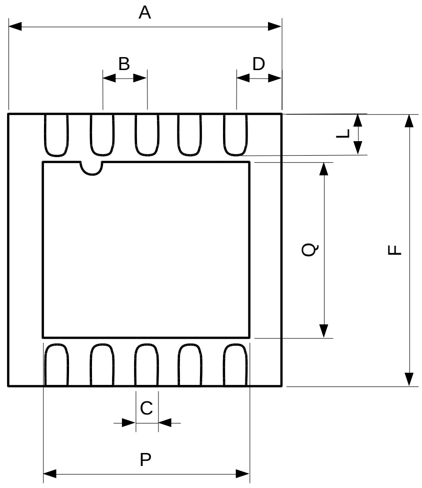


Figure 8.2: DFN-10 Package dimensions (bottom). Note that the saddle needs to be connected to GND on the PCB.

Table 8.2: DFN-10 Package dimensions (side)

Dimension	[mm]
G	0.05
H	0.65
I	0.7-0.8

Table 8.3: DFN-10 Landing dimensions

Dimension	[mm]
A	2.4
B	1.65
C	0.8
D	0.5
E	0.3
F	3.2

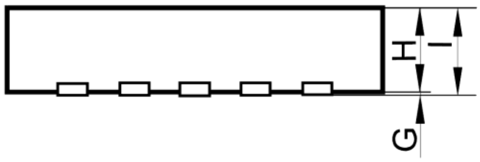


Figure 8.1: DFN-10 Package dimensions (side)

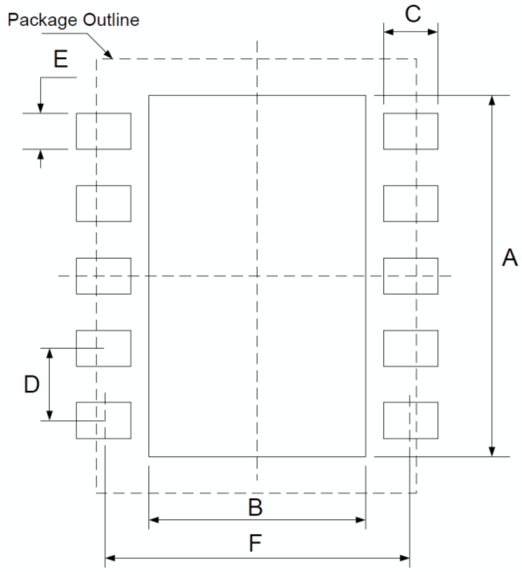
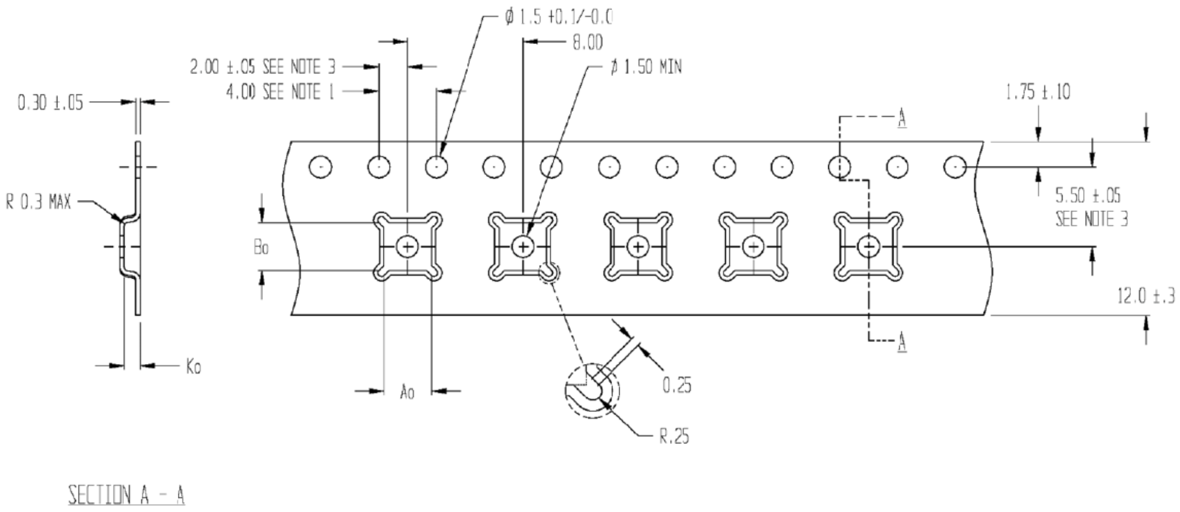


Figure 8.3: DFN-10 Landing dimensions

8.2 Device Marking and ordering information

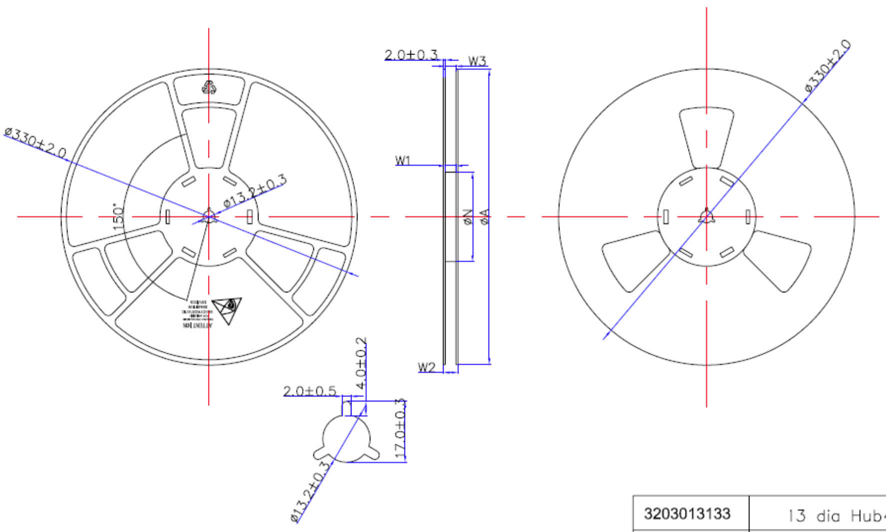
Not available to date

8.3 Tape Specification



A0=3.30
B0=3.30
K0=1.10

NOTES:
1、10 SPROCKET HOLE PITCH CUMULATIVE TOLERANCE ±0.2
2、CAMBER IN COMPLIANCE WITH EIA 481
3、POCKET POSITION RELATIVE TO SPROCKET HOLE
MEASURED AS TRUE POSITION OF POCKET, NOT POCKET HOLE



3203013133	13 dia Hub4 12mm width PS B
3203013213	13 dia Hub4 16mm width PS B
3203013253	13 dia Hub4 24mm width PS B

PRODUCT SPECIFICATIONS					
TYPE WIDTH	ϕA	ϕN	W1(Min)	W2(Max)	W3(Max)
12MM	330±2.0	100±1.0	12.4	18.4	15.4
16mm	330±2.0	100±1.0	16.4	22.4	19.4
24MM	330±2.0	100±1.0	24.4	30.4	27.4

8.4 MSL Level

Moisture Sensitivity Level (MSL) relates to the packaging and handling precautions for some semiconductors. The MSL is an electronic standard for the time period in which a moisture sensitive device can be exposed to ambient room conditions (approximately 30°C/85%RH see J-STD033C for more info) before reflow occur.

Package	Level (duration)
DFN10	MSL 1 (Unlimited at ≤30 °C/85% RH) Reflow profile peak temperature < 260 °C for < 30 seconds

9 Datasheet revisions

9.1 Revision history

V0.1 – Preliminary structure
V1.0 – Preliminary datasheet
V1.01 – Corrected contact information

9.2 Errata

1 Contact Information

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