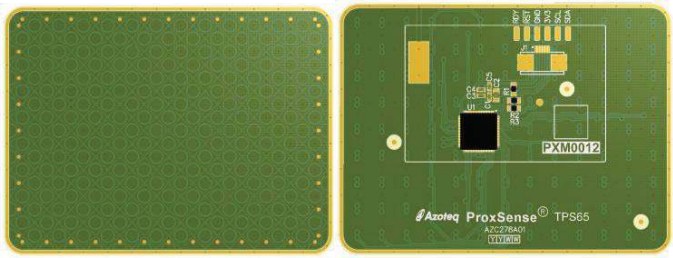
ProxSense® Standard Trackpad Module Datasheet

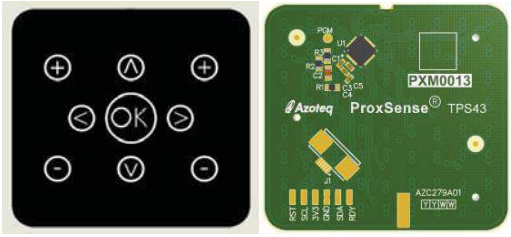
ProxSense® Capacitive Trackpads with XY Coordinate, Gesture Recognition & Patented Snap / Push Button Detection

The ProxSense® series of capacitive trackpads offer best in class sensitivity, signal to noise ratio and power consumption. Automatic tuning for sense electrodes guarantees optimal operation over production and environmental changes.

Main Features

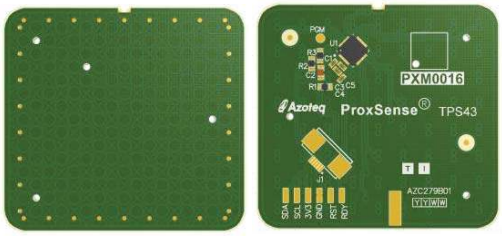
- Trackpad with on chip XY coordinate calculation
- 3072 x 2048 resolution (TPS65)
- 100Hz report rate
- Adjustable Sensitivity
- Proximity wake up from low power
- Automatic drift compensation
- 1 & 2 Finger Gesture Detection
  - Swipe
  - Tap
  - Pinch / Zoom
  - Gesture with Hold
- Fast I2C Interface
- Optional Snap Overlay
- Low Power, suitable for battery applications
- Supply voltage: 1.65V to 3.6V
- <40µA active sensing LP mode
- I^2C interface to BlueTooth SoC





Applications

- Micro Projectors
- Remote Controls
- Printers & White Goods
- Mechanical Push Button Replacement



RoHS2 Compliant

Contents

Datasheet Revision History

Version	Description	Date
1.00	First Release	June 2015
1.01	Updated Ordering Information	September 2015
1.02	Updated overlay thickness	September 2016

1 Hardware Description

The trackpad modules are constructed on RoHS2 and REACH compliant FR4 PCB material. The module PCBs are 1mm thick and have an ENIG finish with a hotbar footprint and FPC connector. The standard modules are not Halogen free.

Table 1.1 Summary of Trackpad Offerings

Module Name	Shape	Size	Touch IC	Resolution
TPS43	Rectangular	43mm x 40mm	IQS572	2048 x 1792
TPS65	Rectangular	65mmx 49mm	IQS550	3072 x 2048

Table 1.2 Summary of Trackpad Overlay Offerings

Module Name	Description	Stack-Up
Adhesive	3M Adhesive Supplied with Liner and Pull tab	A
Mylar Overlay	0.2mm Mylar adhere to module with 3M double sided adhesive	B
4mm Metal Dome for TPS43 only	Metal Dome sheet added on top of Isolation Film	C
Printed Rubber Overlay for TPS43 only	XXmm Black Overlay with Snap Keys	D

1.2 PCB Specification

All 6 modules offered adhere to the following PCB specifications:

- Material: 2-layer, FR4 PCB (non-HF material)
- Conductor: 35µm Copper (1oz. Cu)
- Finish: ENIG
- Size: Module Specific
- PCB Final Thickness = 1.0mm +/- 10%
- Outline: Precision DIE-CUT Profile

1.3 Adhesive Specification

The modules offered are supplied with double sided adhesive applied on the trackpad for ease of integration. The adhesive is kept with the liner in place, with a pull tab for easy removal without tearing:

- Type: 3M 468 200MP
- Thickness = 0.13mm
- Liner = Polycoated Kraft Paper
- Liner w/ Pull-Tab (No glue on Pull-Tab)
- Adhesive sized to fit entire tracking area (module specific)

1.4 Stack-Up A Thickness

The total thickness given in Figure 1.1 does not include the protective liner on the adhesive, as this liner needs to be removed when the module is assembled into the application. The highest

part (thickest part of the module) of the assembly is located at the 0603 capacitor – C2. Please refer to the module STEP file for a 3D drawing indicating component positions.

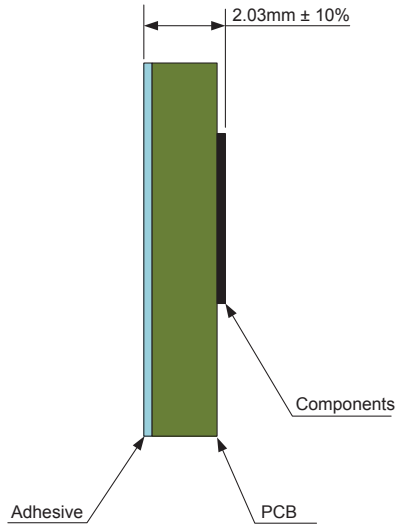


Figure 1.1 Stack-Up (A) - Thickness. PCB + 3M Double Sided Adhesive.

1.5 Stack-Up B Thickness

The total thickness given in Figure 1.2 includes the Mylar overlay, PCB and component heights. The highest part (thickest part of the module) of the assembly is located at the 0603 capacitor – C2. Please refer to the module STEP file for a 3D drawing indicating component positions.

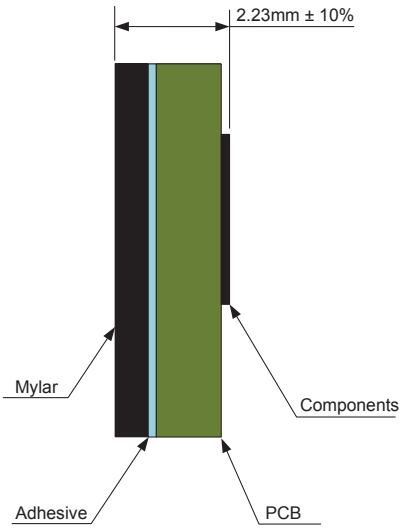


Figure 1.2 Maximum Module Thickness for Stack-Up B. PCB + 3M Double Sided Adhesive and Mylar Overlay

1.6 Stack-Up C Thickness

The total thickness given in Figure 1.3 indicates the height from the top of the metal domes, including PCB thickness and component heights. The highest part (thickest part of the module) of the assembly is located at the 0603 capacitor – C2.

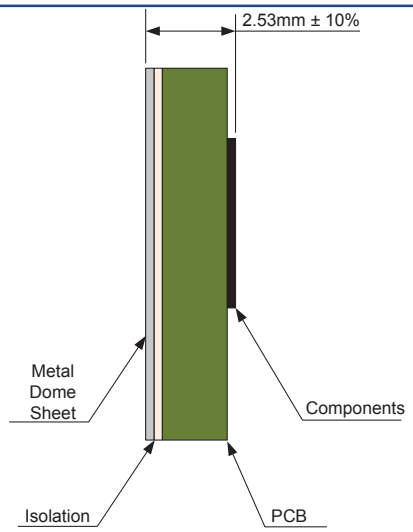


Figure 1.3 Maximum Module Thickness for Stack-Up C

1.7 Stack-Up D Thickness

The total thickness given in Figure 1.4 is the same as for stack-up C, with the addition of the 0.2mm printed rubber key mat. The highest part (thickest part of the module) of the assembly is located at the 0603 capacitor – C2.

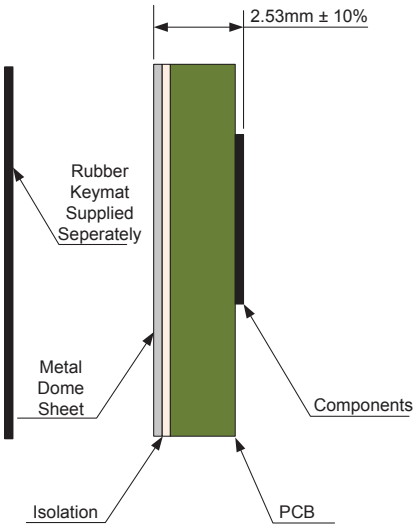


Figure 1.4 Maximum Module Thickness

1.8 Compatible Overlay Thickness

TPS65 and TPS43 are optimized for 0.2 – 1.2mm. For overlays up till 3mm please contact Azoteq for the firmware version or setting adjustments.

1.9 Finger Sizes

Table 1.3 Module Compatible Finger Sizes.

Module	Min Finger	Min Finger Separation
TPS43	6.5 mm	12 mm
TPS65	7.0 mm	12.9 mm

2 TPS43

The TPS43 is a 43mm x 40mm rectangular trackpad with rounded corners. A representation of the module can be found in Figure 2.1.

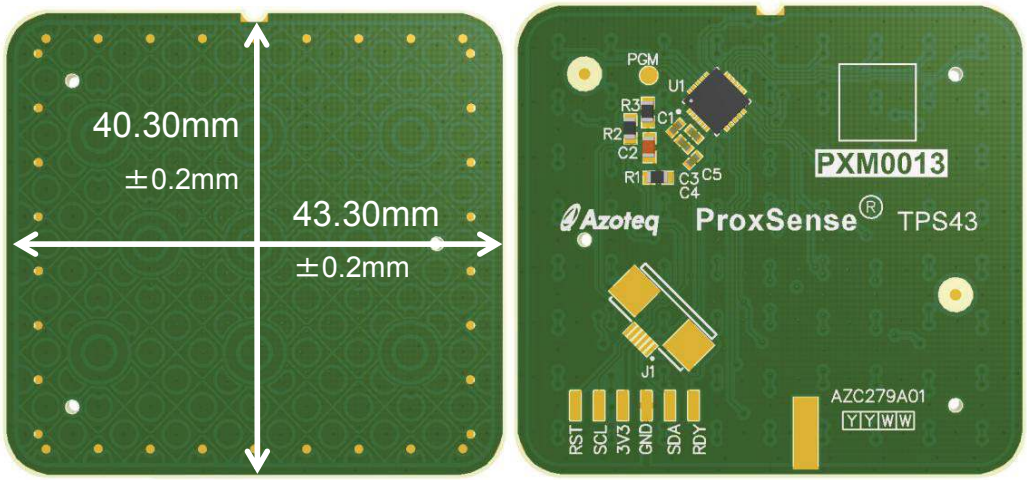


Figure 2.1 TPS43 – Module Representation

Please note: A different PCB is used for the standard trackpad options (AZC279B01) compared to that used with metal dome buttons (AZC279A01).

Table 2.1 FPC connector pin out for TPS43.

J1	Connection
1	RDY
2	SDA
3	GND
4	VDDHI
5	SCL
6	NRST

3 TPS65

The TPS65 is a 65mm x 49mm rectangular trackpad with rounded corners. A representation of the module is shown in Figure 3.1.

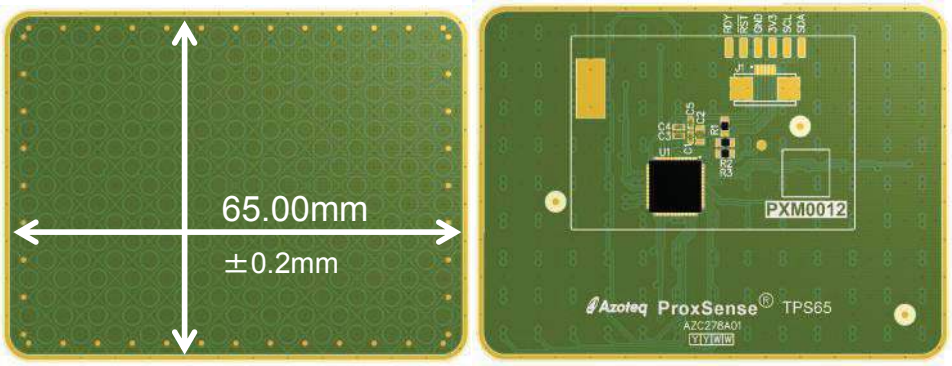


Figure 3.1 TPS48 – Module Representation

Table 3.1 FPC connector pin out for TPS65.

J1	Connection
1	RDY
2	NRST
3	GND
4	VDDHI
5	SCL
6	SDA

4 Gestures and Implementation

The TPS65 and TPS43 provides filtered XY coordinates for up to 5 fingers, which makes it ideal to be used for mouse pointer applications. It also supports gesture recognition, as shown below. For more information about the gestures, see the IQS5xx-B000 datasheet: http://www.azoteq.com/images/stories/pdf/iqs5xx-b000_trackpad_datasheet.pdf

4.1 Swipe Gestures

The trackpad modules can recognize 1 and 2 finger gestures. A valid gesture generates an interrupt event.

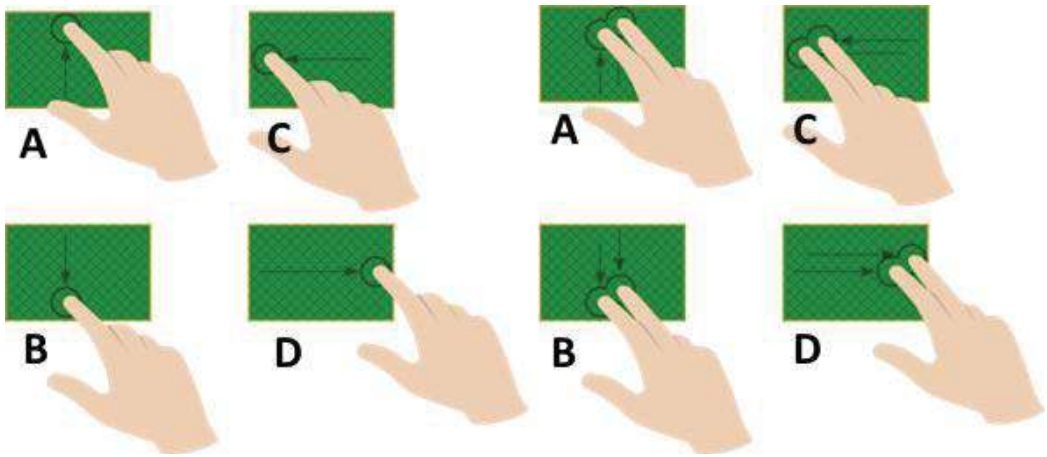


Figure 4.1 Swipe Gestures

4.2 Tap Gesture

The trackpad module can recognize a tap gesture, from a single finger or two fingers, at any point on the trackpad surface. A valid tap generates an interrupt event.

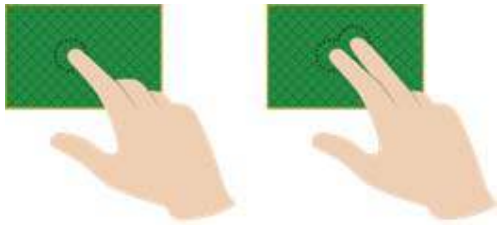


Figure 4.2 Illustration of Tap Gesture

4.3 Tap and Hold Gesture

The trackpad module can recognize a tap & hold gesture, from a single finger or two fingers, at any point on the trackpad surface. A valid tap & hold generates an interrupt event.

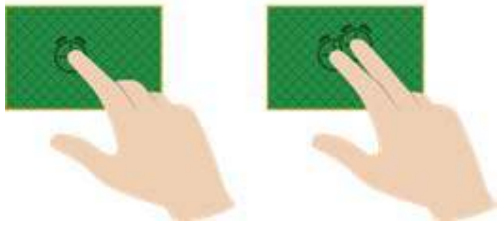


Figure 4.3 Tap & Hold Gesture

4.4 Swipe and Hold Gestures

The trackpad module recognizes four 1 and 2 finger swipe & hold gestures.

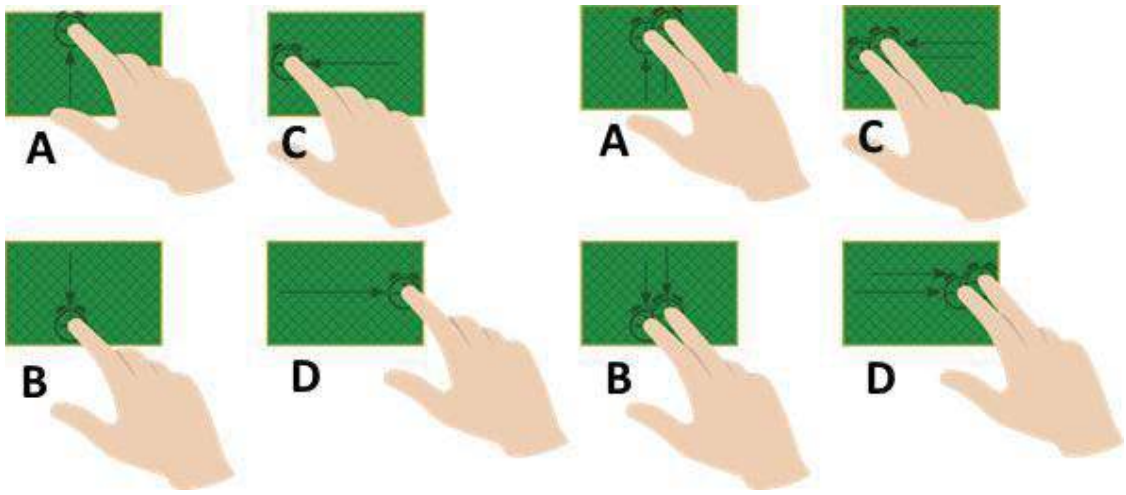


Figure 4.4 Swipe & Hold Gestures

4.5 Pinch & Zoom

A pinch gesture is reported when two touches move closer together, and a zoom gesture is reported when they move apart.

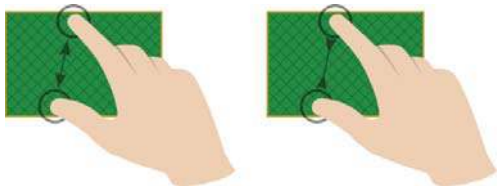


Figure 4.5 Illustration of Pinch and Zoom Gesture

5 Specifications

5.1 Absolute Maximum Specifications

The following absolute maximum parameters are specified for the device:

Exceeding these maximum specifications may cause damage to the device.

- Operating temperature -40°C to 85°C
- Supply Voltage (VDDHI – GND) 3.6V
- Minimum power-on slope 100V/s
- ESD protection ±2kV (Human body model)

5.2 Application Level Tests

According to the module design, with proper application system design implementation a 16kV IEC air discharge and 1Vp-p Conducted Immunity level should be possible to achieve.

5.3 Power Consumption

Table 5.1 Trackpad Module General Operating Conditions

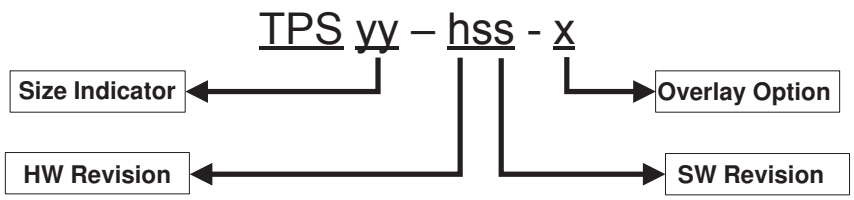
DESCRIPTION	MIN	TYP	MAX	UNIT
Supply voltage	1.65	3.3V	3.6	V
Tracking Mode Current	-	TBD		mA
Low Power Current	-	TBD	TBD	µA

Table 5.2 Start-up and shut-down slope Characteristics

DESCRIPTION	Conditions	PARAMETER	MIN	MAX	UNIT
Power On Reset	V_{DDHI} Slope ≥ 100V/s @25°C	V_{POR}	1.44	1.65	V
Power Down Reset	V_{DDHI} Slope ≥ 100V/s @25°C	V_{PDR}	1.30	1.60	V

6 Ordering Information

Order quantities will be subject to MOQ of 5k pcs. Contact the official distributor for sample quantities. A list of the distributors can be found under the “Distributors” section of www.azoteq.com.



Trackpad Module	TPS	=	Trackpad
Size Indicator (yy)	43	=	43mm
	65	=	65mm
Hardware Revision (h)	1	=	Standard Module With Hot Bar Connection
	2	=	Standard Module with Ziff Connector
Software Revision (ss)	01	=	Standard Gestures
Overlay Options (x)	A	=	No overlay, Adhesive only
	B	=	0.2mm Black Mylar
	C	=	Metal Dome Layer (4mm Domes)
	D	=	Metal Dome Layer with Rubber Mat

Overlay options C and D are only available for TPS43

Note: For non-standard versions please contact Azoteq direct.

Appendix A. Contact Information

	USA	Asia	South Africa
Physical Address	6507 Jester Blvd Bldg 5, suite 510G Austin TX 78750 USA	Rm2125, Glittery City Shennan Rd Futian District Shenzhen, 518033 China	109 Main Street Paarl 7646 South Africa
Postal Address	6507 Jester Blvd Bldg 5, suite 510G Austin TX 78750 USA	Rm2125, Glittery City Shennan Rd Futian District Shenzhen, 518033 China	PO Box 3534 Paarl 7620 South Africa
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Please visit www.azoteq.com for a list of distributors and worldwide representation.