



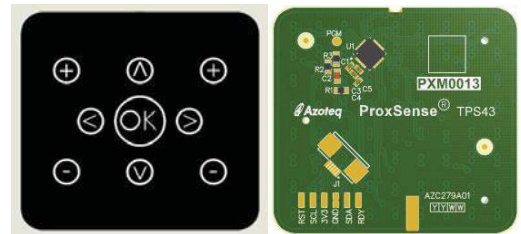
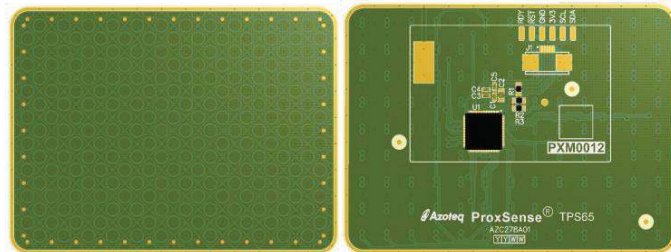
## **ProxSense<sup>®</sup> Standard Trackpad Module Datasheet**

### **ProxSense<sup>®</sup> Capacitive Trackpads with XY Coordinate, Gesture Recognition & Patented Snap / Push Button Detection**

The ProxSense<sup>®</sup> 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.

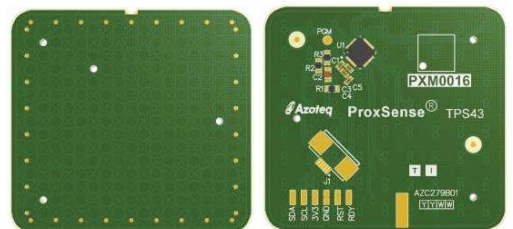
#### **Main Features**

- 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<sup>2</sup>C interface to BlueTooth SoC



#### **Applications**

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



**RoHS2  
Compliant**



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## 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
<a href="#">TPS43</a>	Rectangular	43mm x 40mm	IQS572	2048 x 1792
<a href="#">TPS65</a>	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 href="#">A</a>
Mylar Overlay	0.2mm Mylar adhere to module with 3M double sided adhesive	<a href="#">B</a>
4mm Metal Dome for TPS43 only	Metal Dome sheet added on top of Isolation Film	<a href="#">C</a>
Printed Rubber Overlay for TPS43 only	XXmm Black Overlay with Snap Keys	<a href="#">D</a>

### 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:

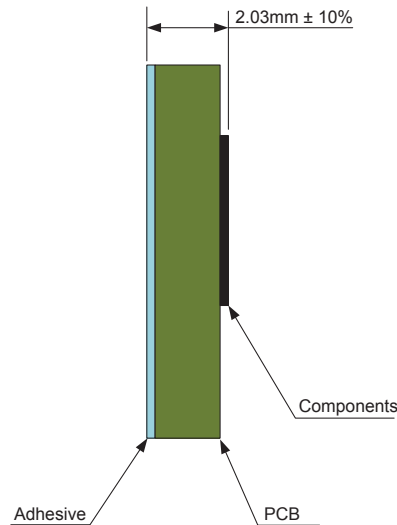
- Type: 3M 468 200MP
- Thickness = 0.13mm
- Liner = Polycoated Kraft Paper
- Liner w/ Pull-Tab (No glue on Pull-Tab)
- Adhesive sized to fit entire tracking area (module specific)

### 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



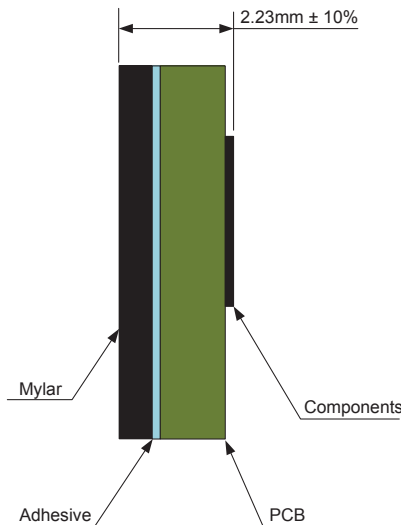
part (thickest part of the module) of the assembly is located at the 0603 capacitor – C2. Please refer to the module STEP file for a 3D drawing indicating component positions.



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

### 1.5 Stack-Up B Thickness

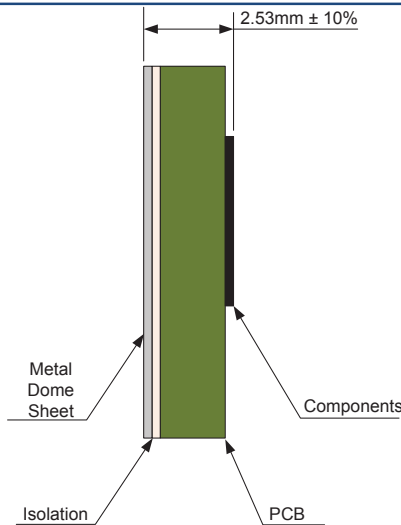
The total thickness given in Figure 1.2 includes the Mylar overlay, PCB and component heights. The highest part (thickest part of the module) of the assembly is located at the 0603 capacitor – C2. Please refer to the module STEP file for a 3D drawing indicating component positions.



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

### 1.6 Stack-Up C Thickness

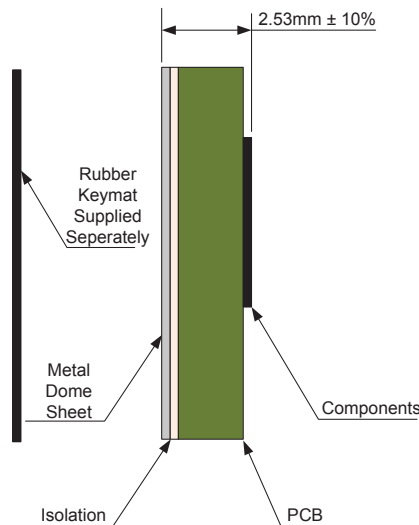
The total thickness given in Figure 1.3 indicates the height from the top of the metal domes, including PCB thickness and component heights. The highest part (thickest part of the module) of the assembly is located at the 0603 capacitor – C2.



**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.



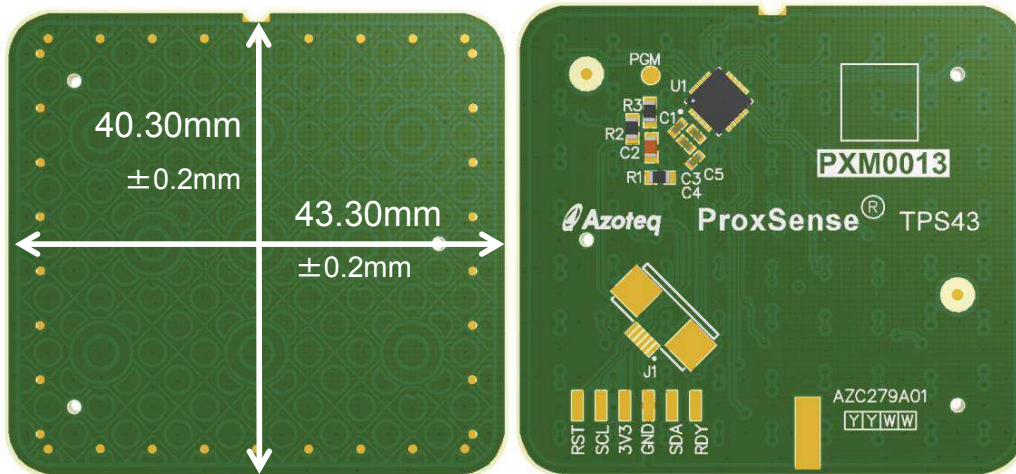
## 1.9 Finger Sizes

**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).

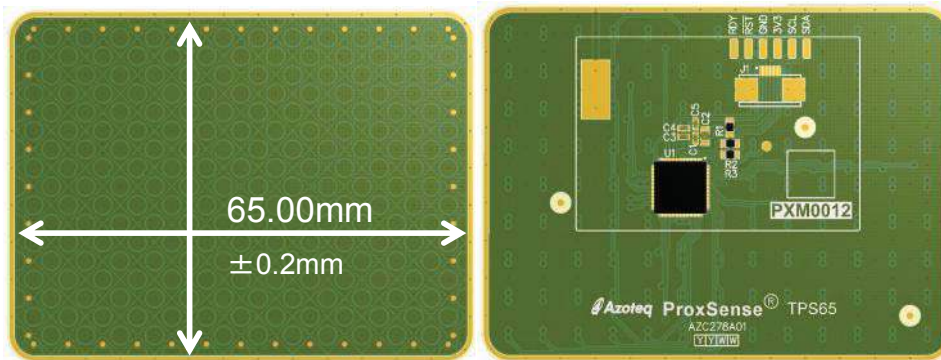
**Table 2.1 FPC connector pin out for TPS43.**

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.**

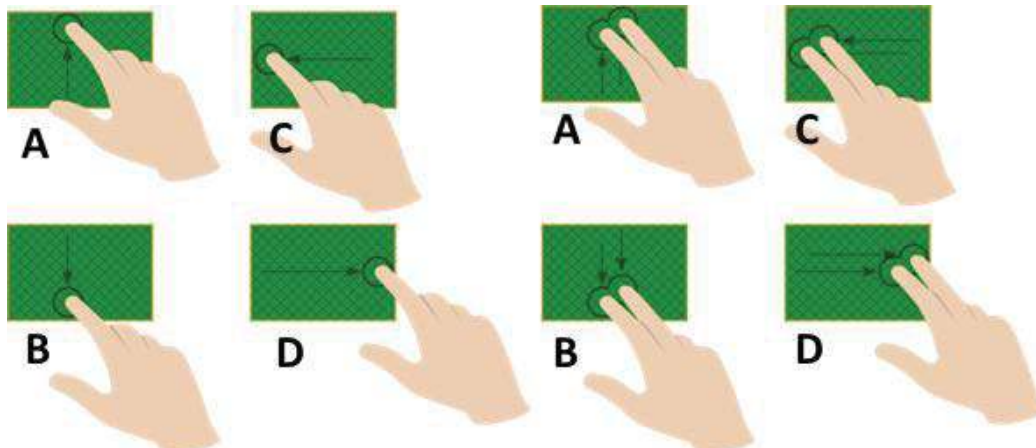
J1	Connection
1	RDY
2	NRST
3	GND
4	VDDHI
5	SCL
6	SDA

## 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](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.



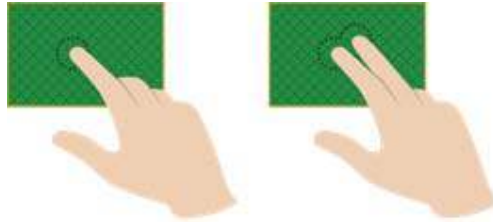
**Figure 4.1 Swipe Gestures**





## 4.2 Tap Gesture

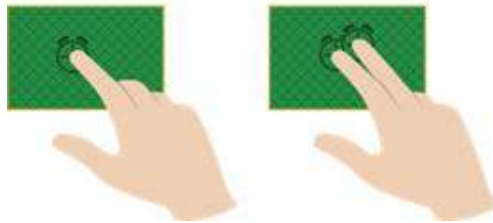
The trackpad module can recognize a tap gesture, from a single finger or two fingers, at any point on the trackpad surface. A valid tap generates an interrupt event.



**Figure 4.2** Illustration of Tap Gesture

## 4.3 Tap and Hold Gesture

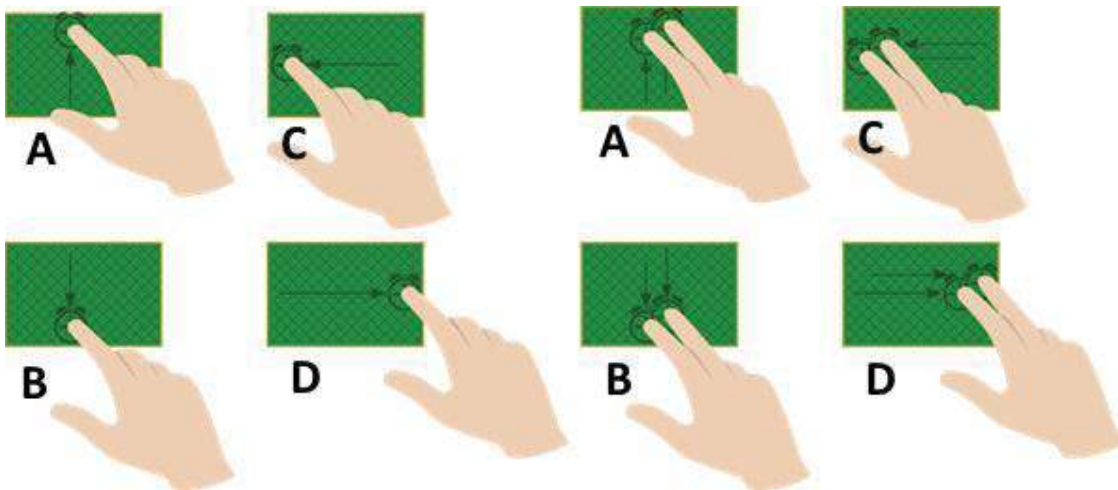
The trackpad module can recognize a tap & hold gesture, from a single finger or two fingers, at any point on the trackpad surface. A valid tap & hold generates an interrupt event.



**Figure 4.3** Tap & Hold Gesture

## 4.4 Swipe and Hold Gestures

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

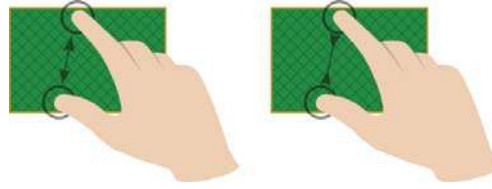


**Figure 4.4** Swipe & Hold Gestures

## 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

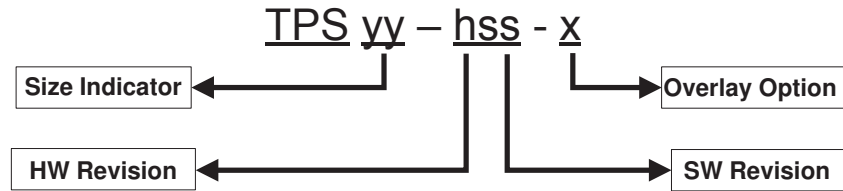
**Table 5.2** Start-up and shut-down slope Characteristics

DESCRIPTION	Conditions	PARAMETER	MIN	MAX	UNIT
Power On Reset	V <sub>DDHI</sub> Slope ≥ 100V/s @25°C	V <sub>POR</sub>	1.44	1.65	V
Power Down Reset	V <sub>DDHI</sub> Slope ≥ 100V/s @25°C	V <sub>PDR</sub>	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](http://www.azoteq.com).



<b>Trackpad Module</b>	TPS	=	Trackpad
<b>Size Indicator (yy)</b>	43	=	43mm
	65	=	65mm
<b>Hardware Revision (h)</b>	1	=	Standard Module With Hot Bar Connection
	2	=	Standard Module with Ziff Connector
<b>Software Revision (ss)</b>	01	=	Standard Gestures
<b>Overlay Options (x)</b>	A	=	No overlay, Adhesive only
	B	=	0.2mm Black Mylar
	C	=	Metal Dome Layer (4mm Domes)
	D	=	Metal Dome Layer with Rubber Mat
<b>Overlay options C and D are only available for TPS43</b>			

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




## Appendix A. Contact Information

	USA	Asia	South Africa
<b>Physical Address</b>	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
<b>Postal Address</b>	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
<b>Tel</b>	+1 512 538 1995	+86 755 8303 5294 ext 808	+27 21 863 0033
<b>Fax</b>	+1 512 672 8442		+27 21 863 1512
<b>Email</b>	kobusm@azoteq.com	linayu@azoteq.com.cn	info@azoteq.com

Please visit [www.azoteq.com](http://www.azoteq.com) for a list of distributors and worldwide representation.

The following patents relate to the device or usage of the device: US 6,249,089 B1; US 6,621,225 B2; US 6,650,066 B2; US 6,952,084 B2; US 6,984,900 B1; US 7,084,526 B2; US 7,084,531 B2; US 7,265,494 B2; US 7,291,940 B2; US 7,329,970 B2; US 7,336,037 B2; US 7,443,101 B2; US 7,466,040 B2 ; US 7,498,749 B2; US 7,528,508 B2; US 7,755,219 B2; US 7,772,781 B2; US 7,781,980 B2; US 7,915,765 B2; US 7,994,726 B2; US 8,035,623 B2; US RE43,606 E; US 8,288,952 B2; US 8,395,395 B2; US 8,531,120 B2; US 8,659,306 B2; US 8,823,273 B2; EP 1 120 018 B2; EP 1 206 168 B1; EP 1 308 913 B1; EP 1 530 178 A1; EP 2 351 220 B1; EP 2 559 164 B1; CN 1330853; CN 1783573; AUS 761094; HK 104 1401

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