

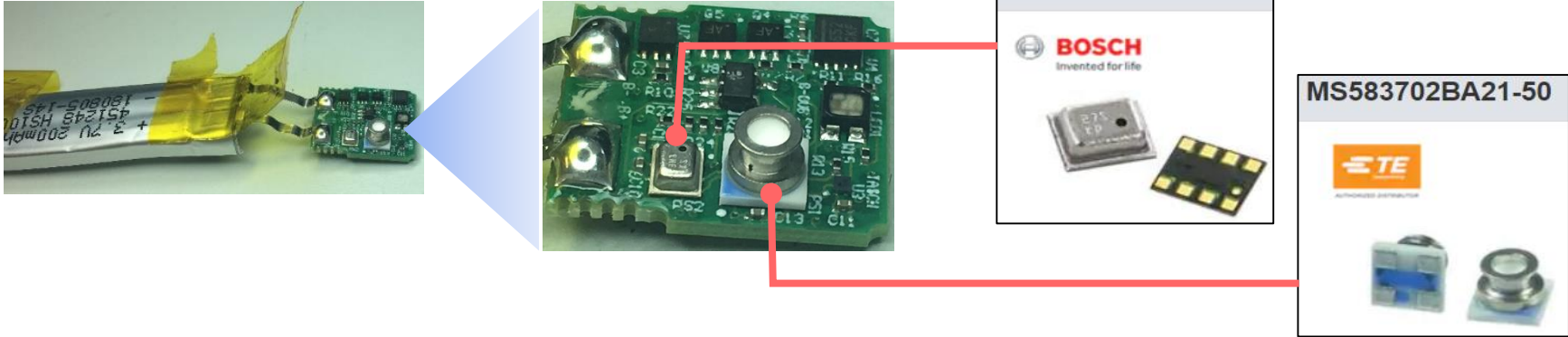
Proposal of pressure sensor for e-cigarette

ALPSALPINE

ALPS proposal for e-cigarette

Analysis of the e-cigarette

As an example of the pressure sensors with competitor



► ALPS proposal for the Pressure sensors

* Further low power setting available

Company P/N	BOSCH BMP280	ALPS HSPPAD042A	TE MS5837-02BA	ALPS HSPPAD143A
Photo				
Relative Accuracy	Typ. $\pm 0.12\text{hPa}$	Typ. $\pm 0.05\text{hPa}$	$\pm 0.5\text{hPa}$	Typ. $\pm 0.14\text{hPa}$
Current consumption	Typ. $2.8\mu\text{A}$	Typ. $1.8\mu\text{A}^*$	-	Typ. $1.8\mu\text{A}^*$

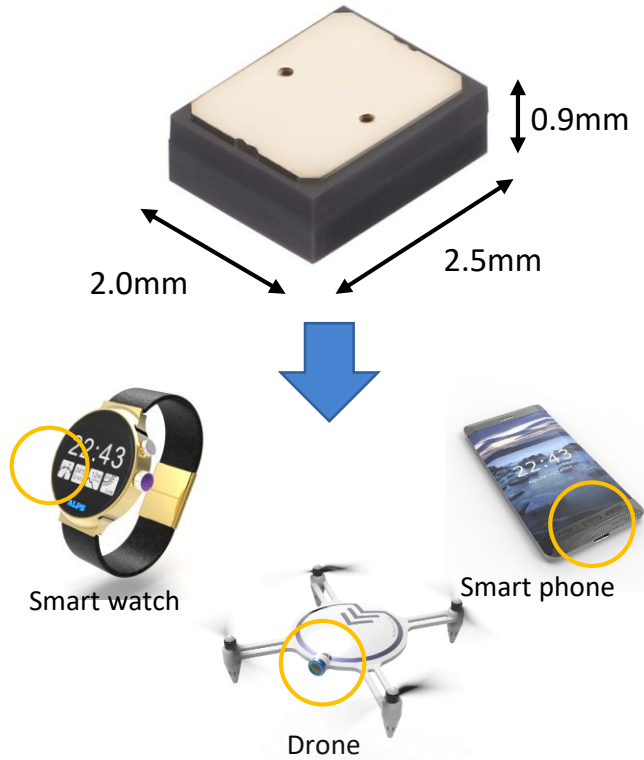
These products has high accuracy and low current consumption.

Digital Pressure Sensor

Confidential

Standard Product

HSPPAD042A



Applications

- Indoor navigation.
- Calorie calculation.
- Flying height.
- Weather forecast & information.

Features

- Low current consumption (55% lower than competitor)
- Self temperature compensation
- Better relative accuracy (41% better than competitor)

Parameter	HSPPAD042A	Competitor BMP280
Pressure range	300 – 1100hPa	300 – 1100hPa
Pressure RMS noise	0.013hPa	0.013hPa
Pressure absolute accuracy	±0.7hPa	±1hPa
Pressure relative accuracy	±0.05hPa	±0.12hPa
Current consumption @Low power mode	1.8uA	2.74uA
Current consumption @High resolution mode	11.2uA	24.8uA
Sleep current	0.1uA	0.1uA
Supply voltage	1.7 – 3.6V	1.71 – 3.6V
Maximum measurement rate	200Hz	182Hz
Package type / pin no.	LGA / 10-pin	LGA / 8-pin
Package dimensions	2.0 x 2.5 x 0.9	2.0 x 2.5 x 0.95

Waterproof Type Pressure Sensor

New Product

HSPPAD143A



SMD cylinder type



Fitness Tracker



Smart watch



Smart phone

Features

- Waterproof pressure sensor
- SMD type
- 17 bit Digital Output (with 16 data FIFO)
- Supply voltage 1.7 to 3.6 V
- 300 to 2100 hPa
(+9000m in Altitude and 10m in Depth)

Specifications

Size	3.1 x 3.1 x 2.6mm
Current Consumption	1.8uA @ Low power setting
RMS noise	2.6Pa (0.22m) @ High resolution setting
Pressure Range	300 ~ 2100hPa
Pressure Resolution	2Pa/LSB
Accuracy	+/- 2hPa

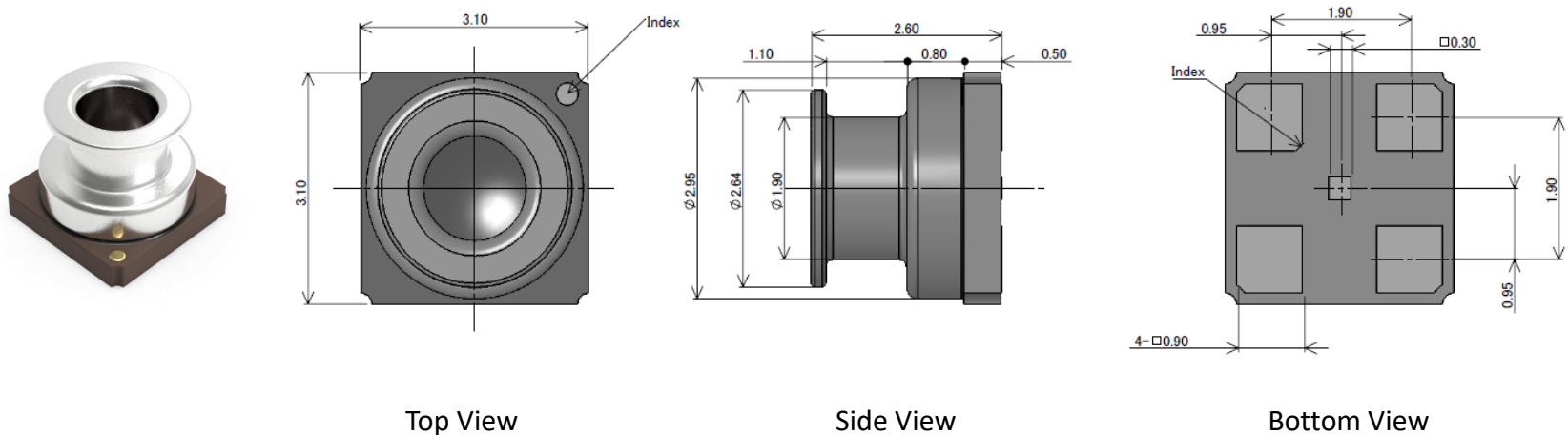
Applications

- Watch
- Wearable device

HSPPAD143A information

Confidential

■ Package dimensions



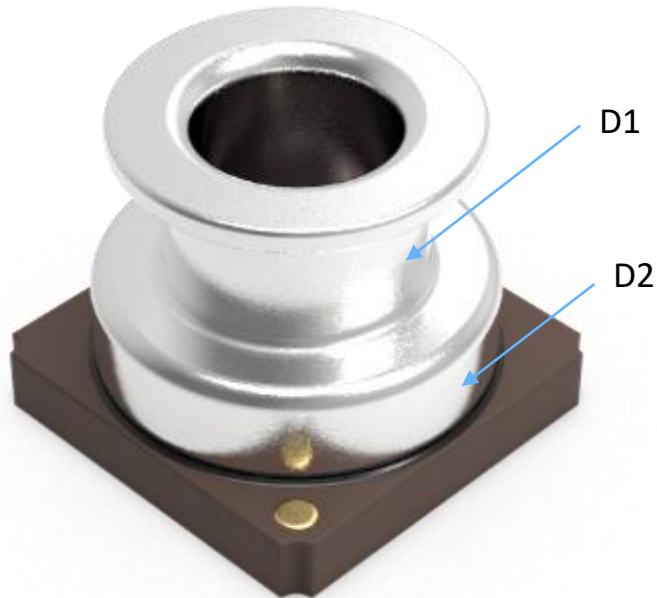
■ Features

- Waterproof pressure sensor
- Barometric and Water depth (10m in depth) sensing
- 5-Pin LGA package
- Pressure measurement range from 300 hPa to 2100 hPa (max output value : 2620 hPa)
- I2C interface

HSPPAD143A O-ring example

Confidential

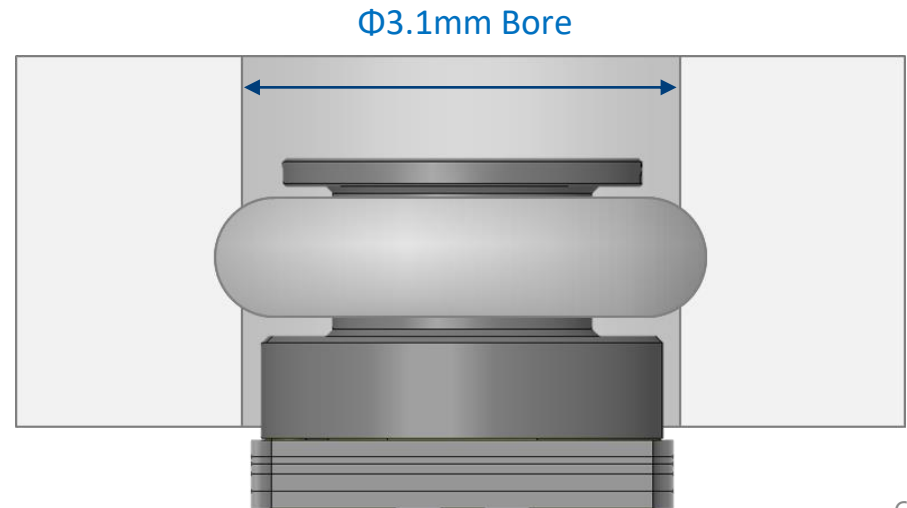
■ Cylinder dimensions



- ✓ Package size
3.1 x 3.1 x 2.6mm
- ✓ Cylinder diameter
D1 : 1.90mm
D2 : 2.95mm

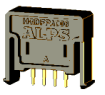




■ Recommended dimensions

- ✓ O-ring
Inner diameter : 1.8mm
Cross section diameter : 0.8mm
- ✓ Housing
Housing inner diameter : 3.1mm







Component Products for Home Appliance

Sensor ; Position Sensor and Detective Switch

HGDFP HGDFPA006A  High Sensitivity Switching, Magnetic Sensor	SPVQ3  SOP23 Water-proof Option : w/ Actuator, w/ Lead Wire	SPVQ8  Compact Water-proof	RDC50  Rotary Sensor	RDC80  For 360 degree w/ 2-phase
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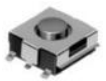

Sensor ; Environment Sensor

HSPPA  Analog / Digital Pressure Sensor	HSHCA  Analog / Digital Humidity Sensor	HSHCAA106E  Humidity and Temp. Sensor Vdd 5V module with connector	HSVDDD  NEW Light Sensor Selectable light wavelength x 2 slot.
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Current Sensor

GCBC


TACT Switch™; For HMI

SKRC  Water-proof	SKQB  Water-proof	SKST  Middle Stroke Silent Type	SKSU  Water-proof Middle Stroke Silent Type	SKRA  Middle Stroke
SKRG 	SKHH 	SKHW  Dust-proof	SKRP  2.5N 4N	SKHM  Dust-proof
			SKHU  Dust-proof	

Bluetooth®SMART UGM22A


NEW
w/o Antenna

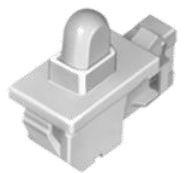
DIP Switch SSGM

 
2CH 4CH

Power Switch SDKR



Water-proof
AC&DC SW combined
w/o Lever

SDKN


Compact & Low Profile, w/o Lever



Rotary Operation Device ; Menu and Mode Select

RK09D  Wide Variety	RK09K  Wide Variety	EC12D  with Push Switch w/o Shaft	EC12E  Shaft Type	EC18AG  Water-proof Heavy Torque	EC21A  Ring Type	EC28A  Ring Type	SDDE  Encoder + Power Switch. Achieve Auto Off Function	SDKZ  Absolute Encoder +Power Switch
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Alps Component Products for Drone and Robot

Control Sensor

Geomagnetic Sensor



HSCDTD



□1.6,h=0.7mm
Low current Consumption
(1/12 competitor)

Pressure Sensor



HSPPAD



2.0×2.5,h=0.9mm
Low Noise

Force Sensor

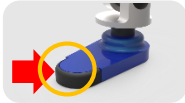


HSFPAR



2×1.6,h=0.65mm
2.6×4,h=2mm

Mechanical Detection

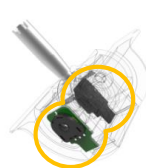


SPVQ8



Position Sensor

Stick Controller

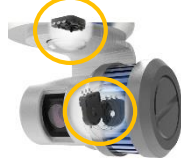


RDC503



linearity (±2%)
h=2.75mm
Life=1,000K

Gimbal Control



RDC506 / 508



linearity (±2 %) : RDC506
(±1 %) : RDC508
h=2.2mm,Life=1,000K

Arm Angle



RDC502



linearity (±2 %)
DIP Type
Life=1,000K
Vertical Mount

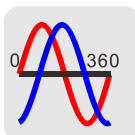
RDC1010



Slide Sensor
Linearity ±0.5%
Life=50K

Magnetic Sensor

Analog

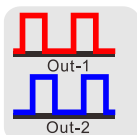


HGARAP001A



4.0×2.95mm
h=1.3mm

Encode

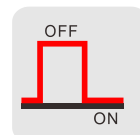


HGPRDT005A



2.9×2.8mm
h=1.1mm
Encoder Pitch Free

Switching



HGDF



2.9×2.8mm
h=1.1mm

RK09Y11L



Ele.Angle :60°
Life 1,000K

RDC90



Long Life 10,000K
h=3.2mm

For Digital Input

TACT Switch™

SKSV



2.8×1.9mm
h=0.5mm
1.6N, Life 300K
2.2N, Life 100K

SKSW



3.0×2.0mm
h=0.6mm
1.8N, Life 300K
2.4N, Life 500K
3.3N, Life 300K

SKRP



4.2×3.2mm
h=2.5mm
1.57N, Life 100K
2.55N, Life 50K
4.0N, Life 100K

SKTD



Sidepush™
3.9×2.9mm
h=1.55mm
1.6N, Life 200K

SKRW



□3.7mm
h= 0.35 mm
1.57N, Life 500k
2.35N, Life 50k

SKTH



3.5×3.2mm
h=1.8/2.5mm
1.4N, Life 100K
3.0N, Life 200K

SKRR



7.5×7mm
h= 0.6 mm
1N, 1.6N,2N
Life 5M

SKRH



7.35 x 7.5mm
h=5mm
Life 1M

Detector Switch

SPVR



Power Switch

SPPH2



Contactsheet™

SK5AS



φ6mm
h= 0.45 mm
1.6N, Life 3M

SK5AM



φ7mm
h= 0.57mm
1.6N, Life 3M

Encoder

EC05E



h=3mm
Life 100K

EC10E



h=7/9/11mm
Life 100K

Slide Switch

SSSS7



Travel=2.0mm
Life 10K

SSSS8



Travel=1.5
/2.0mm
Life 10K

For Analog Input



RKJXV



17.8×21.3×11.2mm
98N Robustness

RKJXY



18.1×19.6×4.91mm
100N Robustness

RS08U

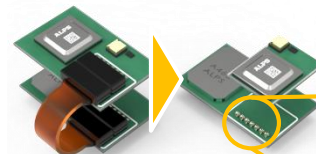


Travel=8.0mm
Life 10K

Connector

Spring Contact

SCTA Series



Space saving
Connector less
Easy Assembly



1.4×1.4mm
h=1.2, 1.4, 1.6, 1.8, 2.0mm

1. The smallest in the industry (half size from competitors),
2. Rating: 0 ~ 3A
3. For internal connection of signal and ground pins. Alternative to cables and connectors.

NEW

Alps Products for VR, AR Devices

ALPS

2017

Analog Input Devices

RKJXU



Operating Travel ± 2 mm
100N Robustness
Life 2Mil

RDC10



Position Sensor
Linearity $\pm 0.5\%$

RDC1010



Position Sensor
Linearity $\pm 0.5\%$

RKJXV



Operating Angle $\pm 23^\circ$
98N Robustness
Life 2Mil

RS08U



Travel 8.0mm
SMD Type

RK14J



With knob type

RKJXY



Operating Angle $\pm 15.5^\circ$
100N Robustness
Life 1Mil

RK08H



Without knob type

Input / Feedback devices

HAPTIC™ Reactor



10×22.6×mm
h=9mm

HAPTIC™ Trigger

Under Development



Input Devices

SRBE



Encoder & Push
Life 100 k

SKRR



TACT Switch™
Travel 0.25mm
Life 5Mil

RKJXS



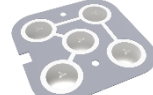
Center
& 8-direction
Life 500k

SKSW



TACT Switch™
Travel 0.13mm
1.8N/2.4N/3.3N
Life 300k/500k/300k

Custom Model



Contactsheet™

SK5AS



Contactsheet™
 $\phi 6$ mm h= 0.45 mm
1.6N
Life 3Mil

EC05E



Hollow Shaft Encoder
12-pulse/12-detents

SPVS



Standard Long
Detector Switch
Normal Open / Close
Life 50k

SSAJ



Slide Switch
5.5×2.5,h=0.7mm
Travel 1.4mm
Life 10k

SSAL



Slide Switch
Recoil: Left / Right
7.6×2.6,h=1.2mm
Travel 2.0mm
Life 100k

Power Inductor

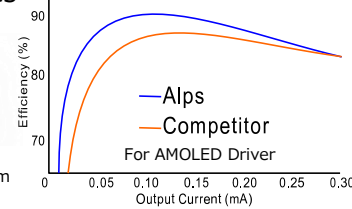
GLU series

NEW



2.5×2.0mm,
h=1mm/1.2mm

Efficiency vs Output Current



For AMOLED Driver



Camera Actuator

For 16M
ATMC1Z961B

NEW



9.0×8.0,h=2.9mm
Lens barrel size: $\phi 6.5$
Conventional Type

For 13M
ATMC1Z901A



$\phi 8.5$,h=2.8mm
Lens barrel size:M6.5 P0.25

Connector

Spring Contact

SCTA



1.4×1.4mm
h= 1.2 mm (WH=0.7~1.0mm)
1.4 mm (WH=0.8~1.2mm)
1.6 mm (WH=1.0~1.4mm)
1.8 mm (WH=1.2~1.6mm)
2.0 mm (WH=1.4~1.8mm)
WH: Working height



For Media Card

SCHA4B



For microSD Card
Push-push Type
Life 10k

Geomagnetic



Electronic Compass

HSCD TD008A

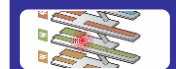


$\square 1.6$,h=0.7mm

Low current
Consumption
(1/12 competitor)

Sensor

Pressure



Indoor Navigation

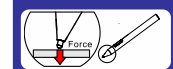
HSP PAD042A



2×2.5,h=0.9mm

Low current
Consumption
(45% competitor)

Force



Touch Pen Input

HSF PAR

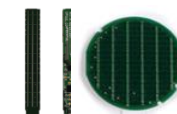


HSF PAR003A HSF PAR303A

2×1.6,h=0.66mm
2.7×4,h=2.06mm

High sensitivity
Long life cycle
PKG/Unit:1000k

Capacitive Touch Solution



CIRQUE

40mm Round Trackpad and Custom Touch Input Solutions

Alps Products for VR, AR Devices

Analog Input Devices

RKJXU

RDC10

Position Sensor
Linearity $\pm 0.5\%$

RDC1010

Position Sensor
Linearity $\pm 0.5\%$

RS08U

Travel 8.0mm
SMD Type

RK14J

With knob type

RK08H

Without knob type

Operating
Travel
 $\pm 2\text{mm}$
100N
Robustness
Life 2Mil

RKJXV

Operating Angle $\pm 23^\circ$
98N Robustness
Life 2Mil

RKJXY

Operating Angle $\pm 15.5^\circ$
100N Robustness
Life 1Mil

Input Devices

SRBE

Encoder & Push
Life 100 k

SKRR

TACT Switch™
Travel 0.25mm
Life 5Mil

RKJXS

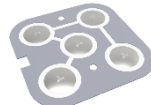


Center
& 8-direction
Life 500k

SKSW

TACT Switch™
Travel 0.13mm
1.8N/2.4N/3.3N
Life 300k/500k/300k

Custom Model



Contactsheet™

SK5AS

Contactsheet™
 $\Phi 6, h=0.45\text{mm}$
1.6N
Life 3Mil

EC05E

Hollow Shaft Encoder
12-pulse/12-detents

SPVS

Standard Long
Detector Switch
Normal Open / Close
Life 50k

SSAJ

Slide Switch
5.5x2.5, h=0.7mm
Travel 1.4mm
Life 10k

SSAL

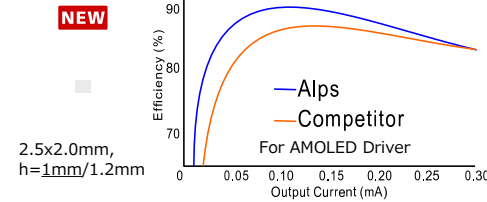
Slide Switch
Recoil: Left / Right
7.6x2.6, h=1.2mm
Travel 2.0mm
Life 100k

Power Inductor

GLU series

NEW

Efficiency vs Output Current



Camera Actuator

For 16M
ATMC1Z961B

NEW

9.0x8.0, h=2.9mm
Lens barrel size: $\Phi 6.5$
Conventional Type

For 13M
ATMC1Z901A

8.5, h=2.8mm
Lens barrel size: M6.5 P0.25

Connector

Spring Contact

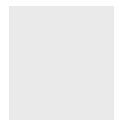
SCTA



1.4x1.4mm
h= 1.2 mm (WH=0.7~1.0mm)
1.4 mm (WH=0.8~1.2mm)
1.6 mm (WH=1.0~1.4mm)
1.8 mm (WH=1.2~1.6mm)
2.0 mm (WH=1.4~1.8mm)
WH: Working height

For Media Card

SCHA4B



For microSD Card
Push-push Type
Life 10k



Input / Feedback devices

HAPTIC™ Reactor

HAPTIC™ Trigger

Under Development

10x22.6xmm
h=9mm



Geomagnetic



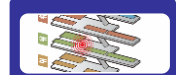
Electronic Compass

HSCDTD008A

1.6, h=0.7mm

Low current
Consumption
(1/12 competitor)

Sensor
Pressure



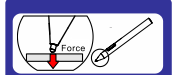
Indoor Navigation

HSPPAD042A

2x2.5, h=0.9mm

Low current
Consumption
(45% competitor)

Force



Touch Pen Input

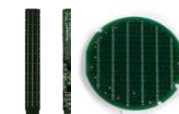
HSFPAR

HSFPAR003A HSFPAR303A

2x1.6, h=0.65mm
2.7x4, h=2.06mm

High sensitivity
Long life cycle
PKG/Unit: 1000k

Capacitive Touch Solution



CIRQUE

40mm Round Trackpad and Custom Touch Input Solutions

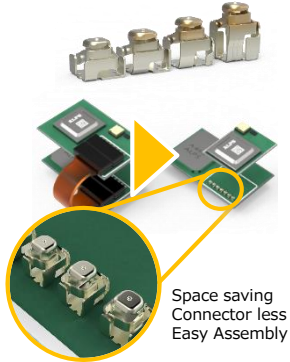
Alps Products for Headset and Hearing Aid

Spring Contact

SCTA Series

1.4×1.4mm
h=1.2, 1.4, 1.6, 1.8, 2.0mm

NEW



Space saving
Connector less
Easy Assembly

Potentiometer

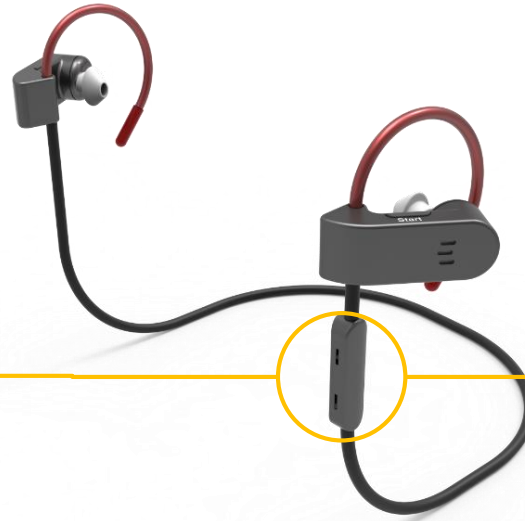
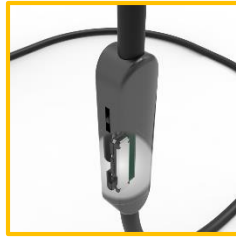
RS08U

Travel=8.0 mm



Horizontal Vertical

Life 10K



Slide Switch

SSAJ

5.5×2.5, t=0.7mm
Travel= 1.4mm

Thinnest



Life 10K

SSAH

9.5×3.0, t=0.9mm
Travel= 1.5mm



Life 10K

SSAG

9.05×3.0, t=1.15mm
Travel=1.5mm
Life 100K(Recoil)



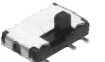
Left side Recoil Right side Recoil

SSSS8

6.7 / 9.7×2.6 / 4.1, t=1.4mm
Travel=1.5mm, Life 10K
Rich Variety



Horizontal



Vertical

TACT Switch™

Low Profile

SKQG

5.2×5.2, h=1.5mm
Travel=0.25mm

0.98 N Life 500K 1.57 N Life 500K



2.55 N Life 100K 3.43 N Life 100K

SKRB

4.8×4.8, h=0.55 mm
Travel=0.15 ~0.2 mm

1.1N Life 2000K 1.57N Life 1000K



2.55N Life 500K 3.5N Life 200K

SKRM

4.5×4.5, h=0.4 mm
Travel=0.15 ~0.2 mm

1.57N Life 500K



2.55n Life 100K

SKRW

3.7×3.7, h=0.35 mm
Travel=0.15 mm

1.57 N Life 500K



2.35 N Life 50K

SKSH

3.3×2.9, h=0.35 mm
Travel=0.15 mm

1.6 N Life 200K



2.35 N Life 50K

Stem Type

SKRK

3.9×2.9, h=2.0mm
Travel=0.13mm

0.98 N Life 200K



1.57 N Life 200K

SKSG

3.0×2.7, h=1.4mm
Travel=0.12mm

1.6 N Life 200K



4 N Life 200K

With Projection

SKSW

3.0×2.0, h=0.6 mm
Travel=0.13 mm



1.8 N Life 300K 2.4 N Life 500K

SKSV

2.8×1.9, h=0.55 mm
Travel=0.12 mm



1.6 N Life 300K 2.2 N Life 100K

SKSM

3.4×2.9, h=0.7 mm
Travel=0.1 mm



1.6 N Life 500K

SKSF

2.8×2.4, h=0.65mm
Travel=0.1mm



1.6 N Life 100K

SKTA

2.6×1.6, h=0.53mm
Travel=0.11mm



NEW 1N / 1.6 N Life 300K (Target)

Sidepush™

SKTD

3.9×2.9, h=1.55mm
Travel=0.15mm



h=1.55mm

1.6N Life 200k

SKTG

3.7×3.5, h=1.55mm
Travel=0.15mm



h=0.85mm

1.6N Life 200k

SKSC

3.5×3.55, h=1.25mm
Travel=0.2mm

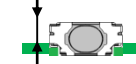


h=1.25mm

1.6 / 2.2N Life 100k

SKSL

4.5×2.6, h=2.2mm
Travel=0.15



h=1.6mm

1.6 / 2.2N Life 600k

