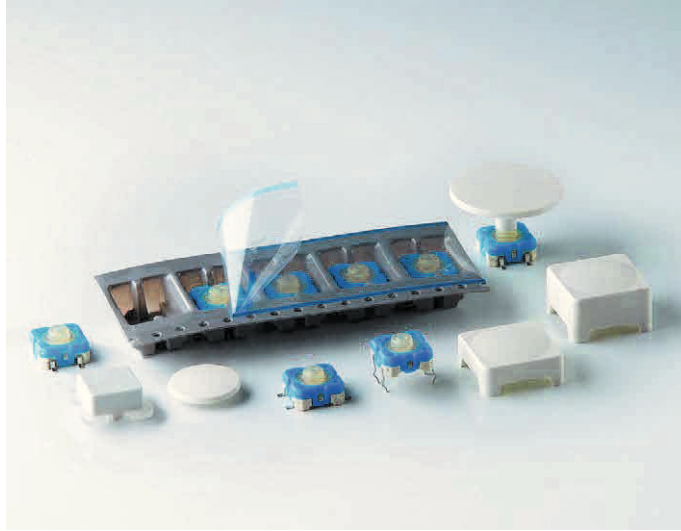


# PCB KEY SWITCHES

RACON - TACTILE SWITCHES



## RACON

Tactile switches

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RACON tactile switches distinct key click, excellent switching reliability. For use under an overlay or with RK 90 keycaps. Print and SMD versions available (suitable for automatic assembly). All products are RoHS compliant.

---

4

RACON

# PCB KEY SWITCHES

## RACON - TACTILE SWITCHES

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# RACON 8 Tactile switches

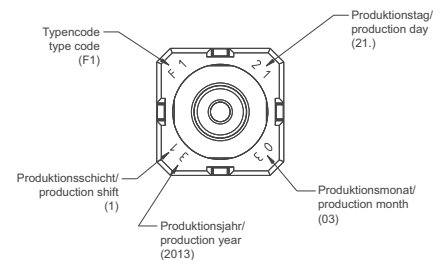
→ RACON 8 tactile switches offer an extremely high switching reliability while needing very little space. They can be arranged as single keys, in rows or key blocks.

When arranged under an overlay, RACON key switches should be combined with plungers.

The features at a glance:

- Suitable for the most common soldering methods
  - Wave soldering bath for THT versions
  - Reflow soldering for SMT version
  - Vapour phase soldering for SMT versions
  - Manual soldering
- SMT version suitable for processing with an automatic SMT assembly machine
- IMDS listed

You can download actual product information from our internet site [www.rafi.de](http://www.rafi.de) / Catalogues and Downloads






### Technical Data

<b>→ Dimensions</b>	
Length of housing	8.4 mm
Width of housing	8.4 mm
Height of housing	see order block
<b>→ Mechanical design</b>	
Mounting	soldering
Terminals	see order block
Contact system	snap-action contact
Contact arrangement	1 NO
Contact materials	Au
Illumination	no
<b>→ Mechanical characteristics</b>	
Switching travel	0.34 <sup>±0.1</sup> mm
<b>→ Electrical characteristics</b>	
Rated voltage min.	0.02 V
Rated voltage max.	35 V
Rated current min.	0.01 mA
Rated current max.	100 mA
Rated power max. (ohmic load)	1 W
Contact resistance when new max.	100 mΩ
Insulation resistance	10 <sup>9</sup> Ω
<b>→ Other specifications</b>	
Ambient temp. operating min.	-40 °C
Ambient temp. operating max.	+90 °C
Resistance to environment	DIN EN 60068-2 -14,-30,-33 and -78
Operating life	1,000,000
Solderability / Solder heat resistance	see order block
Flammability of materials	UL 94 HB
Packing	see order block
Produkt type	see order block
ROHS compliant	yes
REACH compliant	yes

# PCB KEY SWITCHES

## RACON 8 - TACTILE SWITCHES

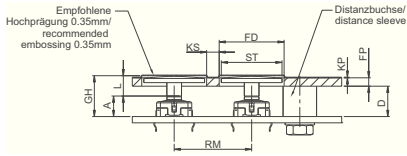
### Accessories RACON 8 - Tactile switch

→ Description	Photo	Order no.	Additional accessories see page
Spacer, round, length 6.25 mm, red		5.30.759.034/0000	2 - 265, 4 - 97, 5 - 32
Plunger round		5.46.167.311/0209	4 - 49
RK 90 - Keycap body, for lenses 9 x 9 mm		5.55.103.265/1013	4 - 110

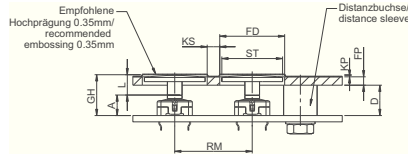
For other plungers, refer to the chapter „RACON special accessories“; for keycaps, refer to the chapter „RK 90“

### RACON 8, Typical system assembly with plunger under overlay

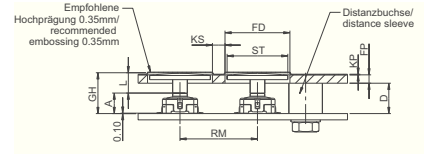
THT terminal outward



THT terminal inward



SMT gullwing terminal



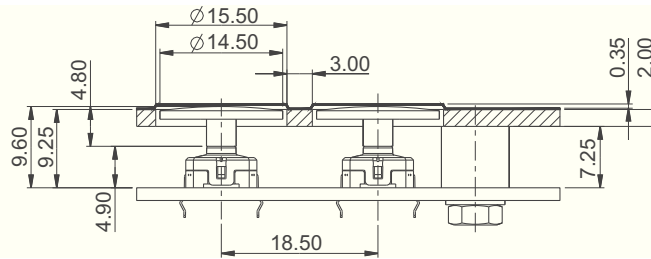
#### Variable Declaration

#### THT terminal inward and outward

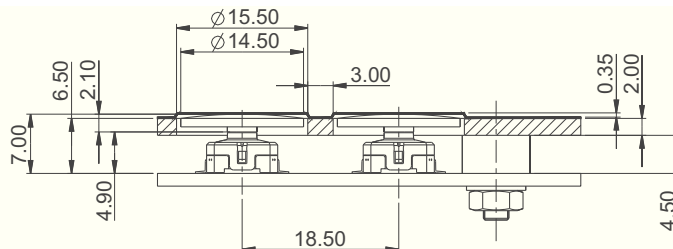
#### SMT terminal

A	Height of key switch	$A = 4.90 \pm 0.1 \text{ mm}$	
D	Length of spacer $D = GH - KP - FP$		
FD	Front panel cut-out $FD = ST + 1 \text{ mm}$		
FP	Front panel thickness		
GH	Overall height	$GH = A + L$	$GH = A + L + 0.1 \text{ mm}$
KP	Thickness of overlay + embossing		
KS	Glue webs for overlay, min. 3 mm		
L	Length of plunger	$L = GH - A$	$L = GH - A - 0.1 \text{ mm}$
RM	Key grid		
ST	Diameter of plunger		

### RACON 8, Standard system assembly



### RACON 8, Lowest system assembly

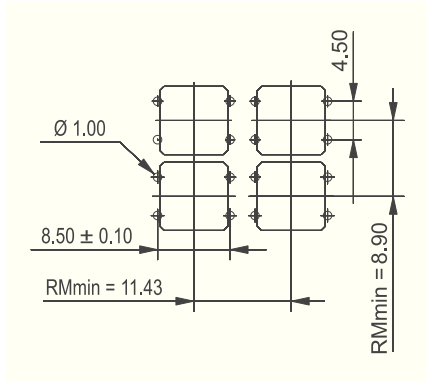


# PCB KEY SWITCHES

RACON 8 - TACTILE SWITCHES

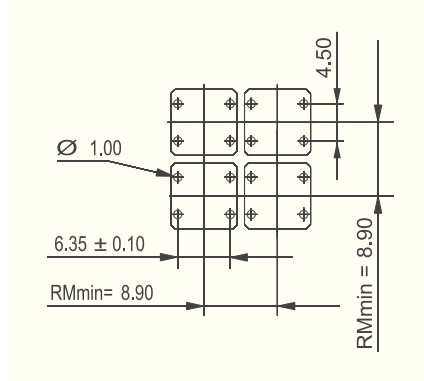
## RACON 8, PCB hole pattern, smallest grid

THT terminal outward



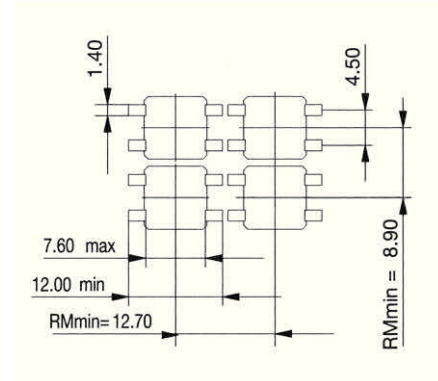
view on component side

THT terminal inward



view on component side

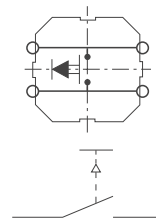
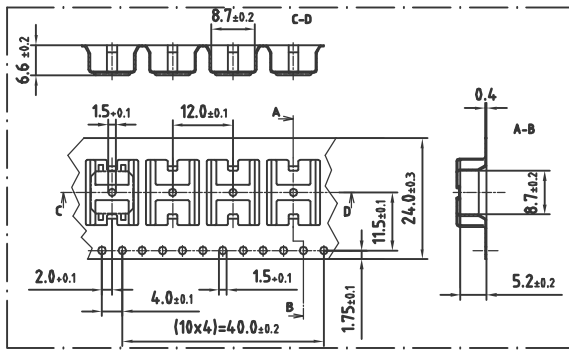
SMT gullwing terminal



view on component side

## RACON 8, SMT terminal, tape and reel

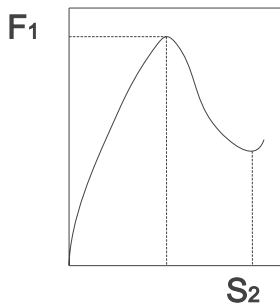
## Circuit diagram RACON 8



Switching symbols acc. to IEC 60 617 form X (twice interrupting)

4

## Typical force travel diagram

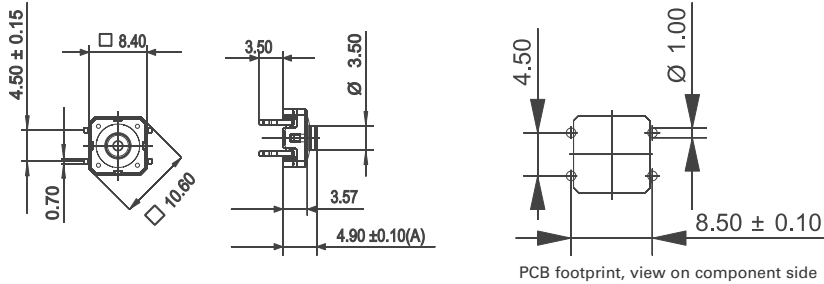


Operating force F1 and switching travel S2 see order block

RACON

### RACON 8 Tactile switch, THT outward

Technical data see page 4 - 33

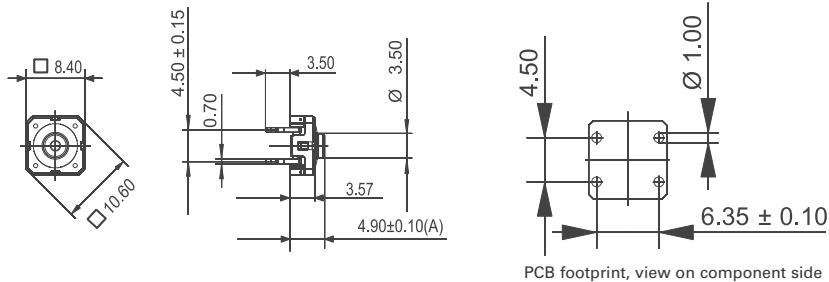


→ Produkt type	Terminals	Operating force	Solderability / Solder heat resistance	Packing	Order no.
A1	THT outward	3.3 <sup>±0.6</sup> N	DIN EN 60068-2-20	tubes à 60 pieces	1.14.100.501/0000

For keycaps refer to chapter „RK 90“; plungers see „RACON special accessories“

### RACON 8 Tactile switch, THT inward

Technical data see page 4 - 33



→ Produkt type	Terminals	Operating force	Solderability / Solder heat resistance	Packing	Order no.
B1	THT inward	3.3 <sup>±0.6</sup> N	DIN EN 60068-2-20	tubes à 60 pieces	1.14.100.502/0000

For keycaps refer to chapter „RK 90“; plungers see „RACON special accessories“

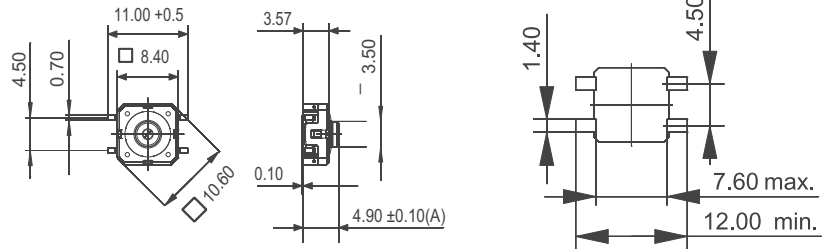
# PCB KEY SWITCHES

RACON 8 - TACTILE SWITCHES



## RACON 8 Tactile switch, SMT gullwing (Z) terminals

Technical data see page 4 - 33



PCB footprint, view on component side

→ Produkt type	Operating force	Switching travel	Operating life	Packing	Solderability / Solder heat resistance	Order no.
C1	3.3 <sup>±0.6</sup> N	0.34 <sup>±0.1</sup> mm	1,000,000	tape and reel à 1000 pieces	DIN EN 60068-2-58	1.14.100.503/0000
C2	4.8 <sup>±0.8</sup> N	0.42 <sup>±0.1</sup> mm	1,000,000	tape and reel à 1000 pieces	DIN EN 60068-2-58	1.14.100.603/0000
C4	6.0 <sup>±1.0</sup> N	0.47 <sup>±0.1</sup> mm	50,000	tape and reel à 1000 pieces	DIN EN 60068-2-58	1.14.100.803/0000

For keycaps refer to chapter „RK 90“; plungers see „RACON special accessories“



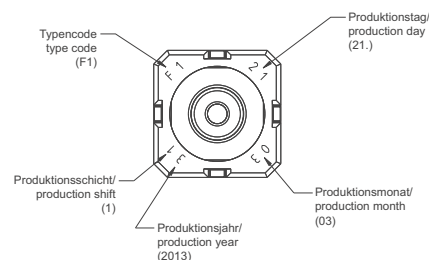
# RACON 12 Tactile switches

→ RACON 12 tactile switches offer an extremely high switching reliability while needing very little space. They can be arranged as single keys, in rows or key blocks.

When arranged under an overlay, RACON key switches should be combined with plungers.

The features at a glance:

- Suitable for the most common soldering methods
  - Wave soldering bath for THT versions
  - Reflow soldering for SMT versions
  - Vapour phase soldering for SMT versions
  - Manual soldering
- SMT version suitable for processing with an automatic SMT assembly machine
- IMDS listed



### Technical Data

#### → Dimensions

Length of housing	12 mm
Width of housing	12 mm
Overall height	see order block

#### → Mechanical design

Mounting	soldering
Terminals	see order block
Contact system	snap-action contact
Contact arrangement	1 NO
Contact materials	Au
Illumination	no

#### → Mechanical characteristics

Operating force	see order block
Switching travel	see order block

#### → Electrical characteristics

Rated voltage min.	0.02 V
Rated voltage max.	35 V
Rated current min.	0.01 mA
Rated current max.	100 mA
Rated power max. (ohmic load)	1 W
Contact resistance when new max.	100 mΩ
Insulation resistance	10 <sup>9</sup> Ω





#### → Other specifications

Ambient temp. operating min.	-40 °C
Ambient temp. operating max.	+90 °C
Resistance to environment	DIN EN 60068-2 -14,-30,-33 and -78
Operating life	see order block
Solderability / Solder heat resistance	see order block
Flammability of materials	UL 94 HB
Packing	see order block
Produkt code	see order block
ROHS compliant	yes
REACH compliant	yes

# PCB KEY SWITCHES

## RACON 12 - TACTILE SWITCHES

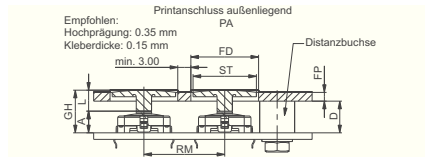
### Accessories RACON 12 - Tactile switch

→ Description	Photo	Order no.	Additional accessories see page
Spacer, round, length 6.25 mm, red		5.30.759.034/0000	2 - 265, 4 - 97, 5 - 32
Square plunger for membrane data entry system		5.46.001.057/0209	4 - 51
Plunger round		5.46.168.050/0209	4 - 50
RK 90 - Keycap body, for lens 1 -module		5.55.103.030/1013	4 - 112

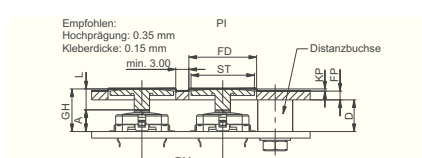
For other plungers, refer to the chapter „RACON special accessories“; for keycaps, refer to the chapter „RK 90“

## RACON 12, Typical system assembly with plunger under overlay

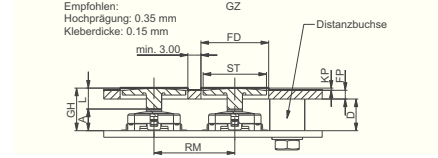
THT terminal outward



THT terminal inward



SMT gullwing terminal



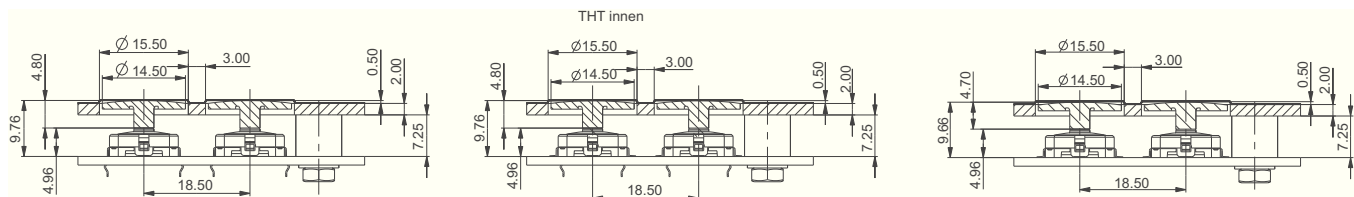
### Variable Declaration

### THT terminal inward and outward

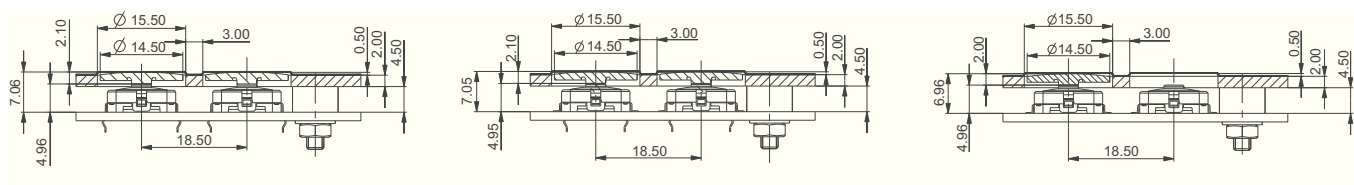
### SMT terminal

A	Height of key switch		$A = 4.90 \pm 0.1 \text{ mm}$
D	Length of spacer		$D = GH - KP - FP$
FD	Front panel cut-out		$FD = ST + 1 \text{ mm}$
FP	Front panel thickness		
GH	Overall height	$GH = A + L$	$GH = A + L + 0.1 \text{ mm}$
KP	Thickness of overlay + embossing		
L	Length of plunger	$L = GH - A$	$L = GH - A - 0.1 \text{ mm}$
RM	Key grid		
ST	Diameter of plunger		

## RACON 12, Standard system assembly



## RACON 12, Lowest system assembly

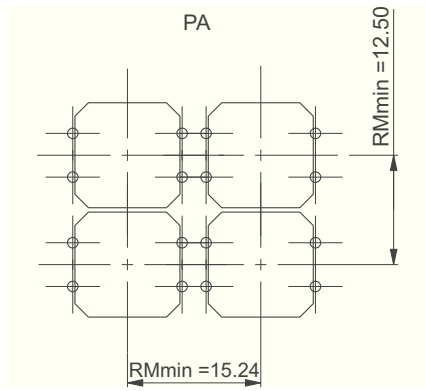


# PCB KEY SWITCHES

RACON 12 - TACTILE SWITCHES

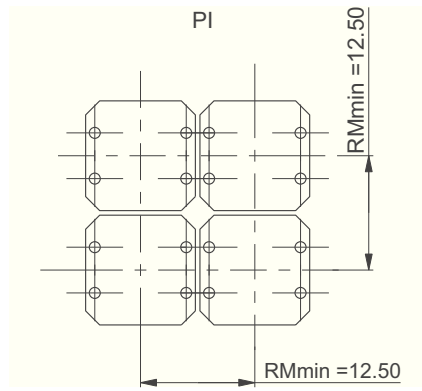
## RACON 12, PCB hole pattern, smallest grid

THT terminal outward



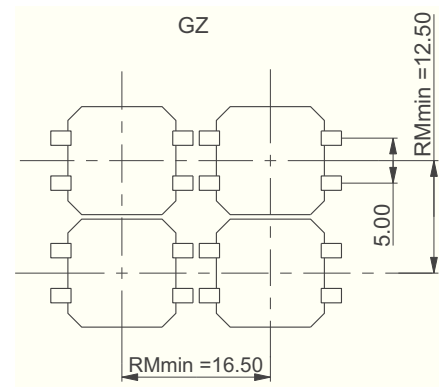
view on component side

THT terminal inward



view on component side

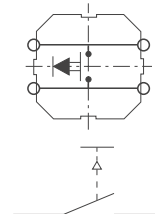
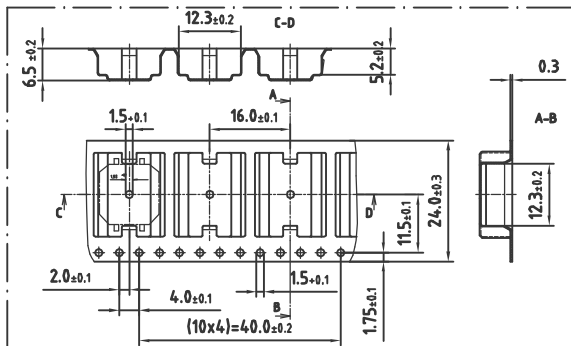
SMT gullwing terminal



view on component side

## RACON 12, SMT terminal, tape and reel

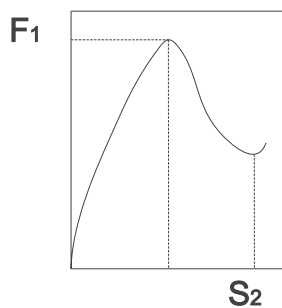
## Circuit diagram RACON 12



Switching symbols acc. to IEC 60 617 form X (twice interrupting)

4

## Typical force travel diagram

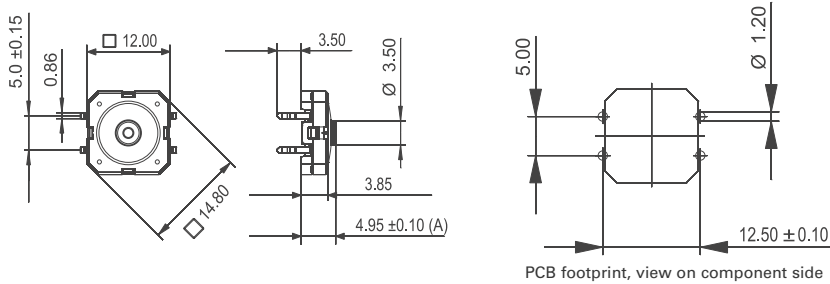


Operating force F1 and switching travel S2 see order block

RACON

## RACON 12 Tactile switch solder terminals for PCB, outward

Technical data see page 4 - 39

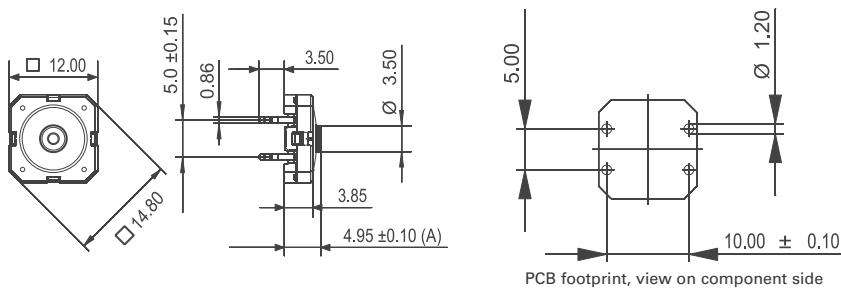


→ Produkt code	Operating force	Switching travel	Operating life	Solderability / Solder heat resistance	Packing	Order no.
A1	3.6 <sup>±0.7</sup> N	0.61 <sup>±0.1</sup> mm	1,000,000	DIN EN 60068-2-20	tubes à 45 pieces	1.14.001.501/0000

For keycaps refer to chapter „RK 90“, plungers see „RACON special accessories“

## RACON 12 Tactile switch solder terminals for PCB, inward

Technical data see page 4 - 39



→ Produkt code	Operating force	Switching travel	Operating life	Solderability / Solder heat resistance	Packing	Order no.
B1	3.6 <sup>±0.7</sup> N	0.61 <sup>±0.1</sup> mm	1,000,000	DIN EN 60068-2-20	tubes à 45 pieces	1.14.001.502/0000

For keycaps refer to chapter „RK 90“, plungers see „RACON special accessories“

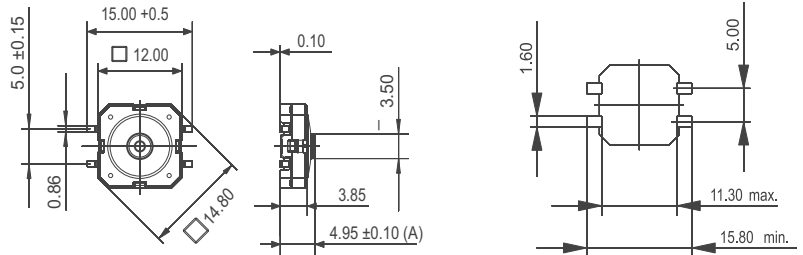
# PCB KEY SWITCHES

RACON 12 - TACTILE SWITCHES



## RACON 12 Tactile switch SMT gullwing (Z) terminals

Technical data see page 4 - 39



PCB footprint, view on component side

→ Produkt code	Operating force	Switching travel	Operating life	Solderability / Solder heat resistance	Packing	Order no.
C2	2.5 <sup>±0.6</sup> N	0.55 mm	1,000,000	DIN EN 60068-2-58	tape and reel à 750 pieces	1.14.001.603/0000
C1	3.6 <sup>±0.7</sup> N	0.61 <sup>±0.1</sup> mm	1,000,000	DIN EN 60068-2-58	tape and reel à 750 pieces	1.14.001.503/0000
C4	4.7 <sup>±0.8</sup> N	0.66 mm	1,000,000	DIN EN 60068-2-58	tape and reel à 750 pieces	1.14.001.803/0000
ZD	6.8 <sup>±1.6</sup> N	0.7 <sup>±0.1</sup> mm	1,000,000	DIN EN 60068-2-58	tape and reel à 750 pieces	1.14.001.916/0000
ZE	9.7 <sup>±2.5</sup> N	0.73 <sup>±0.1</sup> mm	65.000	DIN EN 60068-2-58	tape and reel à 750 pieces	1.14.001.920/0000

For keycaps refer to chapter „RK 90“, plungers see „RACON special accessories“

# RACON 12 V Tactile switches with vertical adapter



- The RACON 12 V version can be used, for example, for PC plug-in boards and for measurement and control engineering applications. The vertical mounting adapter (support element) absorbs the operating force so that the pressure on the soldered terminals is reduced. For this mounting arrangement, the key switch is provided with two horizontal terminals on one side.

### Technical Data

#### → Dimensions

Length	14.5 mm
Width	13.6 mm
Overall height	4.95 mm

#### → Mechanical design

Mounting	soldering
Terminals	THT
Contact system	snap-action contact
Contact arrangement	1 NO
Contact materials	Au
Illumination	no

#### → Mechanical characteristics

Operating force	3.6 <sup>±0.7</sup> N
Switching travel	0.61 <sup>±0.1</sup> mm

#### → Electrical characteristics

Rated voltage min.	0.02 V
Rated voltage max.	35 V
Rated current min.	0.01 mA
Rated current max.	100 mA
Rated power max. (ohmic load)	1 W
Contact resistance when new max.	100 mΩ
Insulation resistance	10 <sup>9</sup> Ω

#### → Other specifications

Ambient temp. operating min.	-40 °C
Ambient temp. operating max.	+80 °C
Storage temperature min.	-50 °C
Storage temperature max. (product)	+85 °C
Storage temperature max. (in tube)	+85 °C
Environmental resistance	acc. to IEC 60068-2-14, -30, -33 and -78
Operating life	1,000,000
Solderability / solder heat resistance	DIN EN 60068-2-20
Flammability of materials	UL 94 HB
Packing	in boxes à 100 pieces
Produkt code	F 1
ROHS compliant	yes
REACH compliant	yes

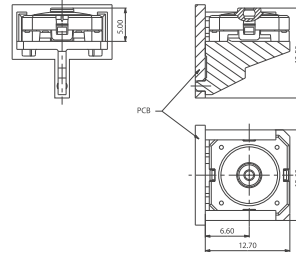
# PCB KEY SWITCHES

RACON 12 V - TACTILE SWITCHES



## RACON 12 V Tactile switch with vertical adapter

Technical data see page 4 - 45



→ Produkt code	Terminals	Contact arrangement	Packing	Order no.
F 1	THT	1 NO	in boxes à 100 pieces	1.14.001.505/0000

Plungers for overall height of 6.5 mm may not be used.



# RACON 12 I Tactile switches



### → Application note

Low-profile keyboards with RACON 12 i components should be designed with a grid spacing of 15.24 mm. With this grid, frame webs remain free between the individual keys. The overlay can be glued onto these frame webs; we recommend area embossing over the keys for the overlays. If our RK 90 system design is used, we recommend the 9 x 9 mm keycaps.

### Technical Data

#### → General information

Color of lens	see order block
Recommended key grid	15.24 x 15.24 mm
Key grid min.	12.5 x 12.5 mm

#### → Dimensions

Length	11.35 mm
Width	11.35 mm
Overall height	9.7 mm

#### → Mechanical design

Mounting	soldering
Terminals	THT
Contact system	snap-action contact
Contact arrangement	1 NO
Contact materials	Au
Illumination	fully illuminated 2 LED
LED color	see order block
LED type	standard 2 mm

#### → Mechanical characteristics

Operating force	3.3 <sup>±0.6</sup> N
Switching travel	0.34 <sup>±0.1</sup> mm

#### → Electrical characteristics

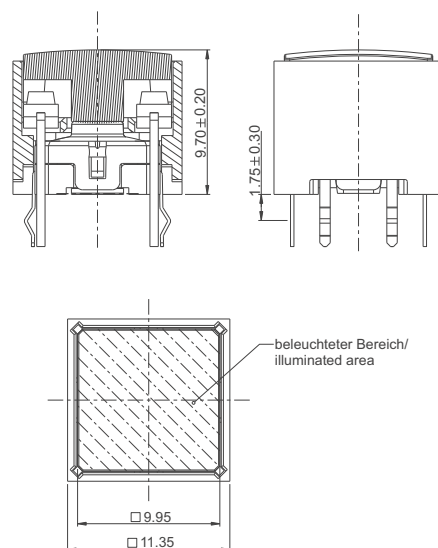
Rated voltage min.	0.02 V
Rated voltage max.	35 V
Rated current min.	0.01 mA
Rated current max.	100 mA
Rated power max. (ohmic load)	1 W
Contact resistance when new max.	100 mΩ
Dielectric strength AC min.	750 V
Insulation resistance	10 <sup>9</sup> Ω

#### → Electrical characteristics of LED

LED rated current max. I <sub>F</sub> at 25 °C	red/green: 30, yellow: 50 mA
LED current reduction beginning with 50 degree C	red: 0.5 mA/degree C, yellow 0.8 mA/degree C
LED wavelength typ.	red 639, green 510-535, yellow 590
LED forward voltage U <sub>F</sub> at 20 mA	red: 1.8 V/20 mA, yellow: 1.9 V/20 mA
LED breakdown voltage U <sub>R</sub> at 25 °C	min. 5 V/0.1 mA

#### → Other specifications

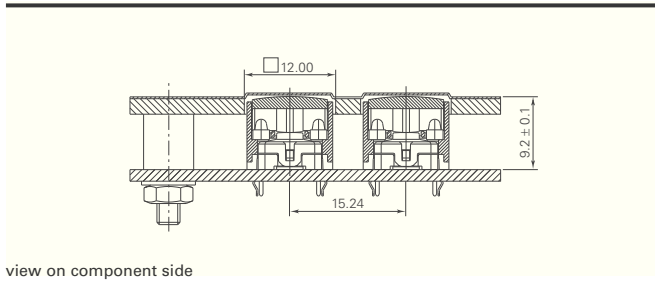
Ambient temp. operating min.	-40 °C
Ambient temp. operating max.	+80 °C
Storage temperature min.	see order block
Storage temperature max. (product)	see order block
Storage temperature max. (in tube)	see order block
Environmental resistance	acc. to IEC 60068-2-14, -30, -33 and -78
Operating life	1,000,000
Solderability / solder heat resistance	DIN EN 60068-2-20
Flammability of materials	UL 94 HB
Packing	tubes à 45 pieces
ROHS compliant	yes
REACH compliant	yes



# PCB KEY SWITCHES

RACON 12 I - TACTILE SWITCHES

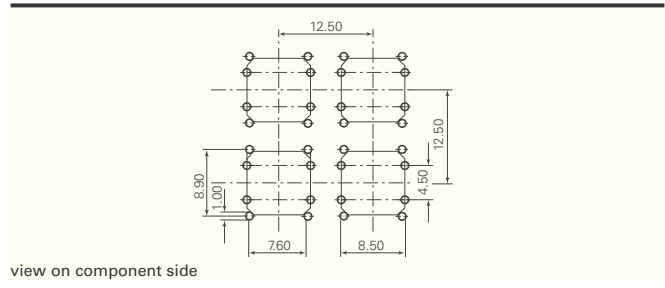
## RACON 12i Typical system assembly



view on component side

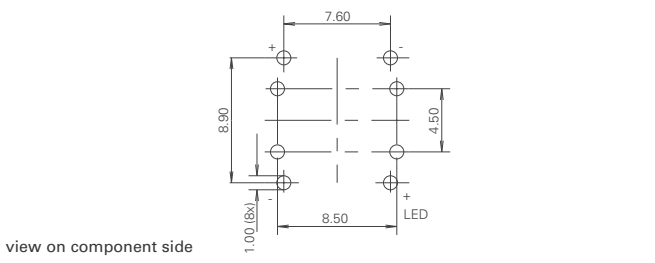
Recommended area embossing:  
0.35 mm at glue spacer thickness of 0.15 mm

## RACON 12i PCB smallest grid



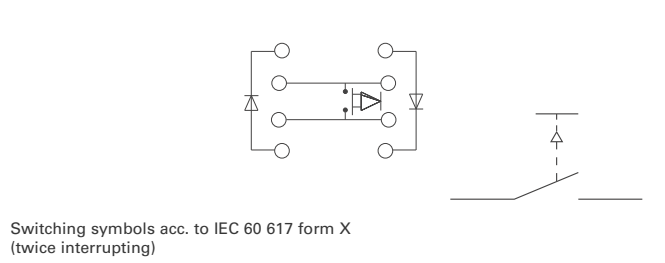
view on component side

## LED hole patterns



view on component side

## RACON 12i Circuit diagram



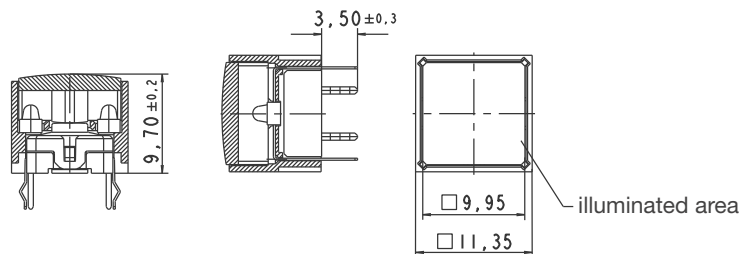
Switching symbols acc. to IEC 60 617 form X  
(twice interrupting)

4



## RACON 12 i Tactile switch

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→ Terminals	Contact arrangement	Illumination	Color of lens	LED color	Order no.
THT	1 NO	fully illuminated 2 LED	red	red	1.14.001.551/0000
THT	1 NO	fully illuminated 2 LED	yellow	yellow	1.14.001.553/0000
THT	1 NO	fully illuminated 2 LED	orange	yellow	1.14.001.554/0000
THT	1 NO	fully illuminated 2 LED	green	green	1.14.001.552/0000

If keycaps are used we recommend RK 90 keycaps 9 x 9 mm.

RACON

## RACON Special accessories

- $GH = „L“ \text{ length of plunger} + „A“ \text{ height of key switch} (+ 0.1 \text{ mm for SMT versions})$   
 Front panel cut-out = size of plunger + 1 mm



### Technical Data

→ **Dimensions**

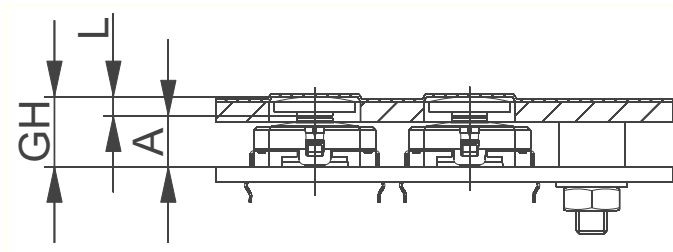
Length of plunger L	see order block
RACON version	see order block
Plunger diameter/size	see order block

→ **Other specifications**

ROHS compliant	yes
REACH compliant	yes

## Plunger round

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→ Plunger diameter/size	RACON version	Length of plunger L	Order no.
8 mm	RACON 8	1.4 mm	5.46.167.301/0209
8 mm	RACON 8	1.5 mm	5.46.167.102/0209
8 mm	RACON 8	1.6 mm	5.46.167.101/0209
8 mm	RACON 8/12	1.9 mm	5.46.167.090/0209
8 mm	RACON 8/12	2 mm	5.46.167.106/0209
8 mm	RACON 8/12	2.1 mm	5.46.167.107/0209
8 mm	RACON 8/12	4.6 mm	5.46.167.091/0209
8 mm	RACON 8/12	4.7 mm	5.46.167.311/0209
8 mm	RACON 8/12	4.8 mm	5.46.167.094/0209
8 mm	RACON 8/12	7.4 mm	5.46.167.092/0209
8 mm	RACON 8/12	7.5 mm	5.46.167.099/0209
8 mm	RACON 8/12	7.6 mm	5.46.167.096/0209

# PCB KEY SWITCHES

RACON 8/12 - SPECIAL ACCESSORIES

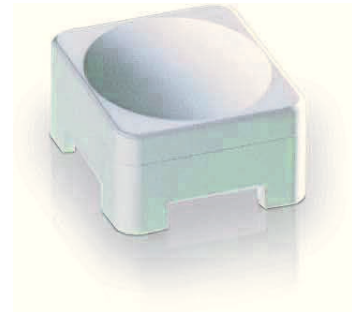
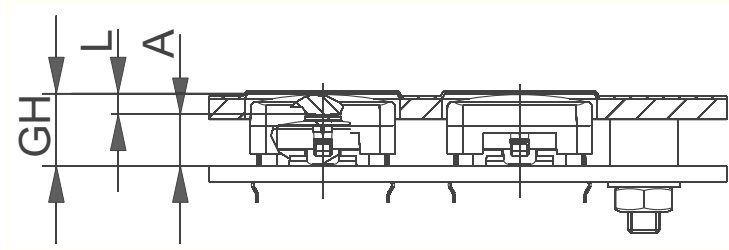
– Table (continued) –  
Plunger round

→ Plunger diameter/size	RACON version	Length of plunger L	Order no.
11.5 mm	RACON 8	1.4 mm	5.46.167.227/0209
11.5 mm	RACON 8	1.5 mm	5.46.167.061/0209
11.5 mm	RACON 8	1.6 mm	5.46.167.060/0209
11.5 mm	RACON 8/12	2 mm	5.46.167.067/0209
11.5 mm	RACON 8/12	2.1 mm	5.46.167.064/0209
11.5 mm	RACON 8/12	4.6 mm	5.46.167.043/0209
11.5 mm	RACON 8/12	4.7 mm	5.46.167.050/0209
11.5 mm	RACON 8/12	4.8 mm	5.46.167.047/0209
11.5 mm	RACON 8/12	7.5 mm	5.46.167.059/0209
11.5 mm	RACON 8/12	7.6 mm	5.46.167.058/0209
14.5 mm	RACON 8	1.4 mm	5.46.168.227/0209
14.5 mm	RACON 8	1.5 mm	5.46.168.061/0209
14.5 mm	RACON 8	1.6 mm	5.46.168.060/0209
14.5 mm	RACON 8/12	2 mm	5.46.168.067/0209
14.5 mm	RACON 8/12	2.1 mm	5.46.168.064/0209
14.5 mm	RACON 8/12	4.6 mm	5.46.168.043/0209
14.5 mm	RACON 8/12	4.7 mm	5.46.168.050/0209
14.5 mm	RACON 8/12	4.8 mm	5.46.168.047/0209
14.5 mm	RACON 8/12	7.4 mm	5.46.168.044/0209
14.5 mm	RACON 8/12	7.5 mm	5.46.168.059/0209
14.5 mm	RACON 8/12	7.6 mm	5.46.168.058/0209
19 mm	RACON 8	1.5 mm	5.46.169.061/0209
19 mm	RACON 8	1.6 mm	5.46.169.060/0209
19 mm	RACON 8/12	2 mm	5.46.169.067/0209
19 mm	RACON 8/12	2.1 mm	5.46.169.064/0209
19 mm	RACON 8/12	4.7 mm	5.46.169.050/0209
19 mm	RACON 8/12	4.8 mm	5.46.169.047/0209
19 mm	RACON 8/12	7.5 mm	5.46.169.059/0209
19 mm	RACON 8/12	7.6 mm	5.46.169.058/0209

Front panel cut-out = Plunger diameter + 1 mm.

## Square plunger for membrane data entry system

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→ Plunger diameter/size	RACON version	Length of plunger L	Order no.
14 x 14 mm	RACON 12 SMT	2 mm	5.46.001.057/0209
14 x 14 mm	RACON 12 SMT	4.7 mm	5.46.001.058/0209
14 x 14 mm	RACON 12 SMT	7.5 mm	5.46.001.059/0209
14 x 14 mm	RACON 12 THT	2.1 mm	5.46.001.064/0209
14 x 14 mm	RACON 12 THT	4.8 mm	5.46.001.060/0209
14 x 14 mm	RACON 12 THT	7.6 mm	5.46.001.063/0209

Front panel cut-out = 15 x 15 mm.

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