

### RF 15 short-travel keyswitch



### **General data**

Low-profile keyboards with RF 15 components should be designed with a 19.05 mm grid. 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.

Rated power max. (ohmic

### **Technical data**

**General information** 

Colour of lens	see order block	load)	Au: 2 W, Ag: 12.5 W
Recommended key grid	19.05 mm	Contact resistance when	
		new max.	100 m $\Omega$
Dimensions		Contact resistance acc.	
Length	15 mm	to life max.	3 Ω
Width	15 mm	Insulation resistance	$10^9 \Omega$
Overall height	9.7 mm	ESD strength (underneath	
		overlay)	15 kV
Mechanical design		Bouncing time max.	5 ms
Mounting	soldering into PCB		
Terminals	contacts tin-plated, fix	Other specifications	
_	contact Ag plated	Ambient temp. operating	
Contact system	snap-action contact	min.	-25 °C
Contact arrangement	1 NO	Ambient temp. operating	
Contact materials	Au/Ag	max.	+70 °C
Illumination	spot-/fully illuminated	Storage temperature min.	-40 °C
LED colour	see order block	Storage temperature max.	_
LED type	see order block	(product)	+80 °C
		Storage temperature max.	
Mechanical characteristics		(in tube)	+50 °C
Operating force max.	2 3 N	Resistance to constant	
Operating travel	0.5 mm	environment	according to
Switching travel	0.5 mm		IEC 600 68-2-3 and 2-30
Robustness min.	with through-plated PCB	Resistance at variable	
	100 N	environment	according to
			IEC 600 68-2-14 and 2-33
Electrical characteristics		Operating life min.	1,000,000
Rated voltage min.	Au: 0.02 V, Ag: 3 V	Soldering time max.	2,5 sec.
Rated voltage max.	Au: 42 V, Ag: 50 V	Soldering temperature	050.00
Rated current min.	Au: 0,01 mA, Ag: 0,1 mA	max.	250 °C
Rated current max.	Au: 100 mA, Ag: 250 mA	Flammability of materials	UL 94 HB

4 - 26 PCB Keyswitches

# SOLUTIONS WITH PASSION

### Force/Travel Diagram – Keyswitch RF 15

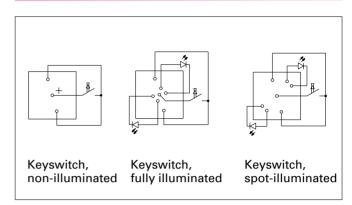
# Operation characteristic limits RF F1 F2 1 0 0 0,2 0,4 s (mm) F3 0,6 0,8 1

F 1 = Max. operating force

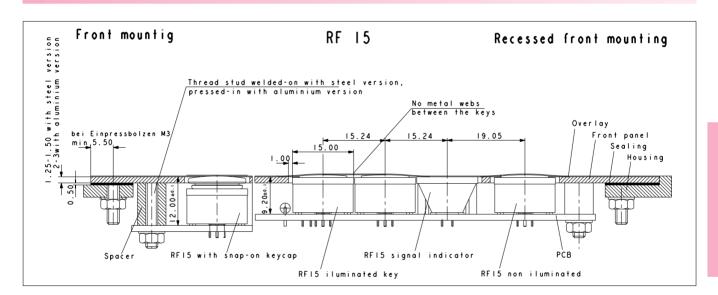
F 2 = Force at contact

F 2 is max. 55% of F 1

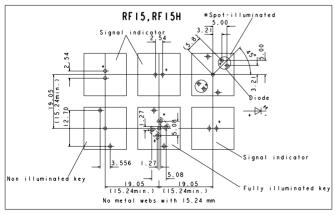
### Circuit Diagram - Keyswitch RF 15



### **Dimensional Drawing RF 15**

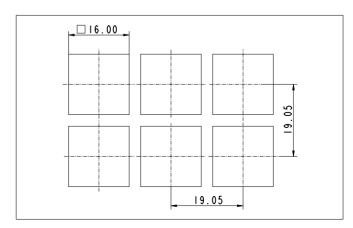


### **Hole Pattern RF 15**



View on component side, all hole diameters 1,1 +/- 0,1 mm

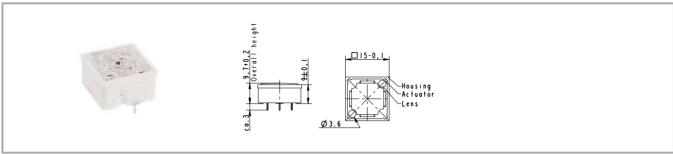
### **Hole Pattern – Front Panel**



RF

PCB Keyswitches 4 - 27

### RF 15 short-travel keyswitch, non-illuminated



Contact materials	Illumination	Colour of lens	LED colour	LED type	Order no.
Ag	not illuminated	transparent			3.14.100.006/0000
Au	not illuminated	transparent			3.14.100.001/0000

Technical data see page 4 - 26

### Accessories:

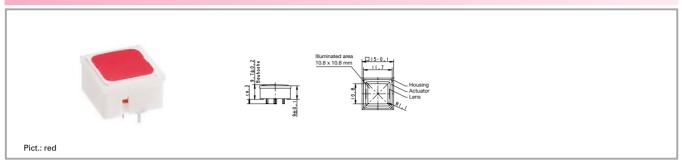
Keycap for RF 15, snap-on, for overall height 12.5 mm: 5.46.654.059/0227

For keycaps, refer to chapter accessories and system RK 90.

If exchangeable legends are required, or if an overall height of 12.5 mm is required, a keycap can be mounted on the non-illuminated keys. The keycap legend is visible through a window in the overlay. You can change the legend by replacing the keycap.



### RF 15 short-travel keyswitch, fully illuminated with 2 LEDs



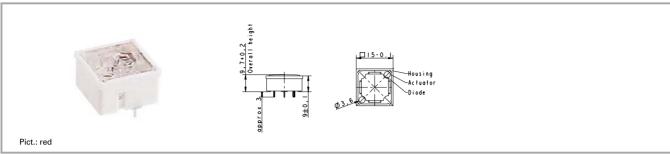
Contact materials	Illumination	Colour of lens	LED colour	LED type	Order no.
Ag	fully illuminated 2 LEDs	red	red	2 mm	3.14.200.021/0000
Ag	fully illuminated 2 LEDs	green	green	2 mm	3.14.200.022/0000
Ag	fully illuminated 2 LEDs	yellow	yellow	2 mm	3.14.200.023/0000
Ag	fully illuminated 2 LEDs	orange	yellow	2 mm	3.14.200.024/0000
Ag	fully illuminated 2 LEDs	blue	blue	2 mm	3.14.200.025/0000
Au	fully illuminated 2 LEDs	green	green	2 mm	3.14.200.012/0000
Au	fully illuminated 2 LEDs	yellow	yellow	2 mm	3.14.200.013/0000
Au	fully illuminated 2 LEDs	orange	yellow	2 mm	3.14.200.014/0000
Au	fully illuminated 2 LEDs	blue	blue	2 mm	3.14.200.015/0000

Technical data see page 4 - 26

For keycaps, refer to RK 90 system design. Technical data of LED see seperate page at the beginning of this chapter.



### RF 15 short-travel keyswitch, 1 LED spot-illumination



Contact materials	Illumination	Colour of lens	LED colour	LED type	Order no.
Ag	spot illumination 1 LED	opaque white	blue	3 mm	3.14.100.040/0000
Ag	spot illumination 1 LED	transparent	red	3 mm	3.14.100.041/0000
Ag	spot illumination 1 LED	transparent	green	3 mm	3.14.100.042/0000
Ag	spot illumination 1 LED	transparent	yellow	3 mm	3.14.100.043/0000
Au	spot illumination 1 LED	opaque white	blue	3 mm	3.14.100.030/0000
Au	spot illumination 1 LED	transparent	red	3 mm	3.14.100.031/0000
Au	spot illumination 1 LED	transparent	green	3 mm	3.14.100.032/0000
Au	spot illumination 1 LED	transparent	yellow	3 mm	3.14.100.033/0000

Technical data see page 4 - 26

Double-spot LED illumination available on request Technical data of LED see seperate page at the beginning of this chapter.



### RF 15 N short-travel keyswitch





### **General data**

The RF 15N keyswitch provides a minimum overall height of 6.2 mm. The overall height can be varied by extension plungers which are inserted into the cross-like notches on the actuator tops.

LEDs can only be arranged separately next to the keyswitches up to an overall height of 10 mm (i.e. without plunger or with small plunger).

Keyswitches with overall heights of 12 mm or more can be provided with a maximum of 2 LEDs which are inserted into the recesses of the keyswitch housing. LEDs of keyswitches with overall heights of 12.5 mm or more should be placed onto LED spacers in order to obtain satisfactory illumination.

### **Technical data**

**General information** 

Colour of lens	see order block
Recommended key grid	19.05 mm
Dimensions Length	15 mm

Length15 mmWidth15 mmOverall height6.2 mm

Mechanical design Mounting

Terminals

contacts tin-plated, fix
contact Ag plated

Snap-action contact

1 NO

Contact materials

Illumination

contacts tin-plated, fix
contact Ag plated

Snap-action contact

1 NO

Au/Ag
external 3 mm LED
possible if height < 12 mm

soldering into PCB

**Mechanical characteristics** 

Operating force max.
Operating travel
Switching travel
Robustness min.

2 ... 3 N
0.5 mm
0.5 mm
with through-plated PCB

Robustness min. with through-plated PC 100 N

**Electrical characteristics** 

Rated voltage min.

Rated voltage max.

Rated current min.

Rated current max.

Rated power max.

Au: 0.02 V, Ag: 3 V

Au: 42 V, Ag: 50 V

Au: 0,01 mA, Ag: 0,1 mA

Au: 100 mA, Ag: 250 mA

(ohmic load) Au: 2 W, Ag: 12.5 W

Other specifications

Ambient temp. operating min. -25 °C

Ambient temp. operating max. +70 °C

Storage temperature min. Storage temperature max. (product) +80 °C

Storage temperature max. (in tube) +50 °C

Resistance to constant

environment according to IEC 600 68-2-3

Resistance at variable environment acc

Operating life min. Soldering time max. Soldering temperature

max. Flammability of materials +70 °C
-40 °C
+80 °C
+50 °C

according to
IEC 600 68-2-3 and 2-30

according to
IEC 600 68-2-14 and 2-33
1,000,000
2,5 sec.

250 °C

UL 94 HB

# SOLUTIONS WITH PASSION

### Force/Travel Diagram – Keyswitch RF 15 N

# 

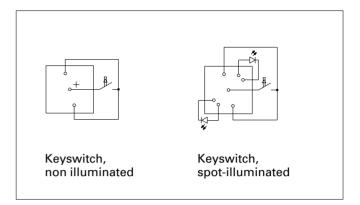
0,4 0,6 s (mm)

### F 1 = Max. operating force F 2 = Force at contact

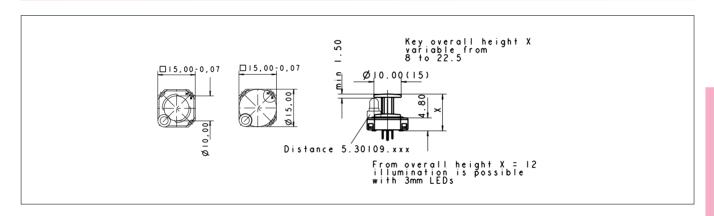
F 2 is max. 55% of F 1

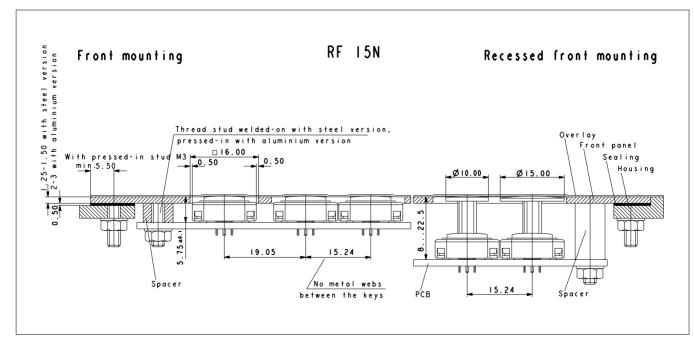
0.2

### Circuit Diagram - Keyswitch RF 15 N



### **Dimensional Drawings RF 15 N**





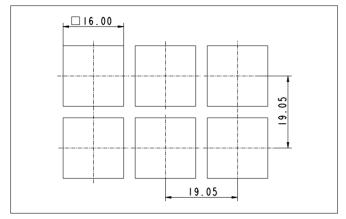
4

RF

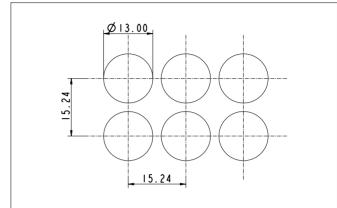
PCB Keyswitches 4 - 33

### **Hole Patterns – Front Panel RF 15 N**

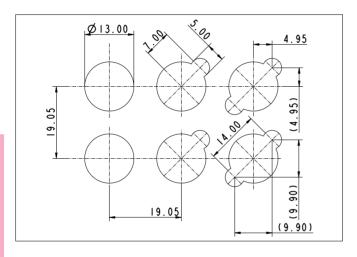
### RF 15 N without plunger



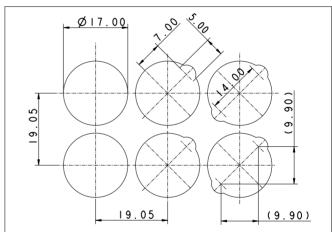
RF 15 N with plunger ø 10 mm, non-illuminated



RF 15 N with plunger ø 10 mm, illuminated

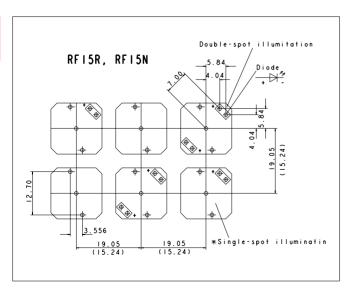


RF 15 N with plunger ø 15 mm, illuminated



### Hole Pattern RF 15 N

RF



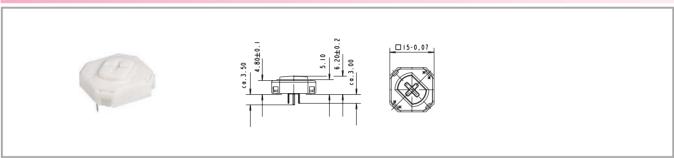
View on component side All hole diameters 1,1 +/-0,1 mm PCB layout Keyswitch 1/400" grid



### **Accessories RF 15 N short-travel keyswitch**

Description	Photo	Order no.	Page
LED yellow, 3mm	1111	1.90.690.103/0000	5 - 20
LED spacer for RF 15 N, $\emptyset$ 5 mm, spacing length 2.2 mm, light grey, for use with overall height of 12.5 mm		5.30.109.010/0756	
Extension plunger for RF 15 N, Ø 10 mm, overall height 22.5 mm	T	5.46.011.028/0710	
Extension plunger for RF 15 N, $\emptyset$ 15 mm, overall height 22.5 mm	T	5.46.017.028/0710	

### RF 15 N short-travel keyswitch, non-illuminated



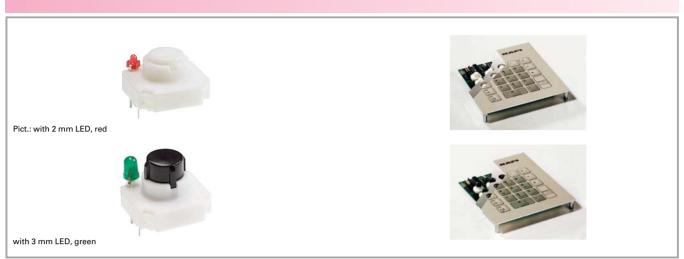
Contact materials	Illumination	Recommended key grid	Overall height	Order no.
Au	external 3 mm LED possible if height < 12 mm	19.05 mm	6.2 mm	3.14.100.601/0000
Ag	external 3 mm LED possible if height < 12 mm	19.05 mm	6.2 mm	3.14.100.606/0000

Technical data see page 4 - 32

For keycaps, refer to RK 90 system design. Double-spot LED illumination available on request.



### RF 15 R short-travel keyswitch



### **General data**

The round actuator of the RF 15 R keyswitch requires round front panel cut-outs. These make it possible to use a narrow keyboard grid of only 15.24 mm with sufficiently large frame webs between the individual keys. We recommend area embossing over the actuators for the overlay.

### **Technical data**

Rated current max. Rated power max.

(ohmic load)

General information		Contact resistance when	
Recommended key grid	15.24 mm	new max.	100 m $\Omega$
		Contact resistance acc.	
Dimensions		to life max.	3 Ω
Length	15 mm	Insulation resistance	$10^9 \Omega$
Width	15 mm	ESD strength (underneath	
Overall height	9,7/12,5 mm	overlay)	15 kV
		Bouncing time max.	5 ms
Mechanical design			
Mounting	soldering into PCB	Other specifications	
Terminals	contacts tin-plated, fix	Ambient temp. operating	
	contact Ag plated	min.	-25 °C
Contact system	snap-action contact	Ambient temp. operating	
Contact arrangement	1 NO	max.	+70 °C
Contact materials	Au/Ag	Storage temperature min.	-40 °C
Illumination	spot illumination	Storage temperature max.	
LED colour	see order block	(product)	+80 °C
LED type	see order block	Storage temperature max.	
		(in tube)	+50 °C
Mechanical characteristics		Resistance to constant	
Operating force max.	2 3 N	environment	according to
Operating travel	0.5 mm		IEC 600 68-2-3 and 2-30
Switching travel	0.5 mm	Resistance at variable	
Robustness min.	with through-plated PCB	environment	according to
	100 N		IEC 600 68-2-14 and 2-33
		Operating life min.	1,000,000
Electrical characteristics		Soldering time max.	2,5 sec.
Rated voltage min.	Au: 0.02 V, Ag: 3 V	Soldering temperature	•
Rated voltage max.	Au: 42 V, Ag: 50 V	max.	250 °C
Rated current min.	Au: 0,01 mA, Ag: 0,1 mA	Flammability of materials	UL 94 HB
Rated current max.	Au: 100 mA, Ag: 250 mA		
Bated nower may			

4 - 36 **PCB** Keyswitches

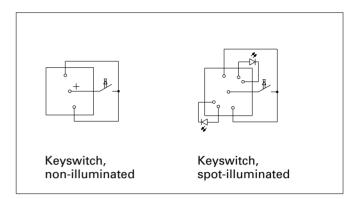
Au: 2 W, Ag: 12.5 W

# SOLUTIONS WITH PASSION

### Force/Travel Diagram – Keyswitch RF 15 R

# Operation characteristic limits RF 4 F (N) F1 F2

### Circuit Diagram - Keyswitch RF 15 R

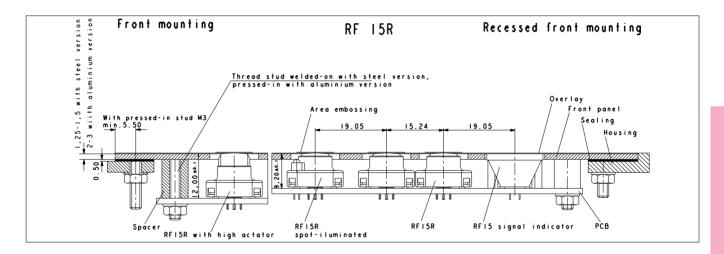


F 1 = Max. operating force

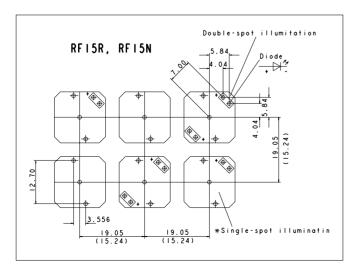
F 2 = Force at contact

F 2 is max. 55% of F 1

### **Dimensional Drawing RF 15 R**



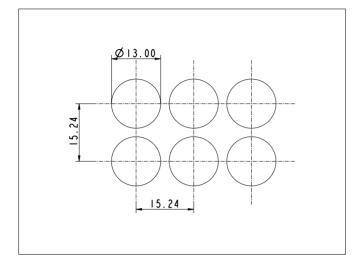
### **Hole Pattern RF 15 R**



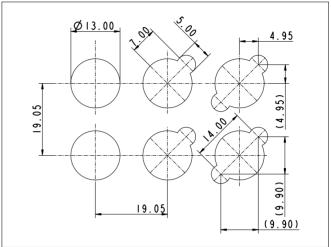
View on component side All hole diameters 1,1 +/- 0.1 mm PCB layout Keyswitch 1/400" grid 4

### **Hole Pattern – Front Panel RF 15 R**

### RF 15 R, non-illuminated

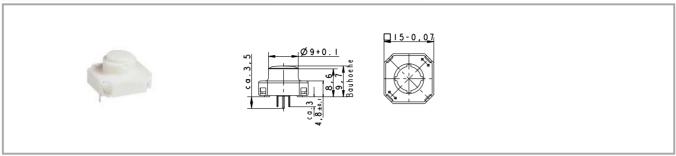


RF 15 R, illuminated



1

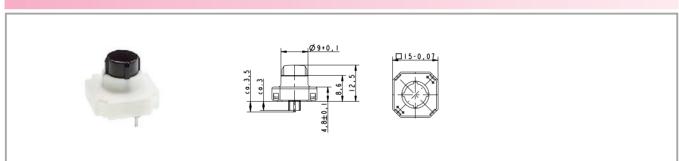
### RF 15 R low short-travel keyswitch, non-illuminated



Contact materials	Overall height	Illumination	LED type	LED colour	Order no.
Au	9.7 mm	not illuminated			3.14.100.501/0000
Ag	9.7 mm	not illuminated			3.14.100.506/0000

Technical data see page 4 - 36

### RF 15 R high short-travel keyswitch, non-illuminated

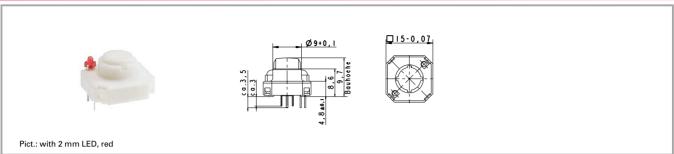


Contact materials	Overall height	Illumination	LED type	LED colour	Order no.
Au	12.5 mm	not illuminated			3.14.100.801/0000
Ag	12.5 mm	not illuminated			3.14.100.806/0000

Technical data see page 4 - 36

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### RF 15 R low short-travel keyswitch, 1 LED spot-illumination



Contact materials	Overall height	Illumination	LED type	LED colour	Order no.
Au	9.7 mm	spot illumination 1 LED	2 mm	red	3.14.100.531/0000
Au	9.7 mm	spot illumination 1 LED	2 mm	green	3.14.100.532/0000
Au	9.7 mm	spot illumination 1 LED	2 mm	yellow	3.14.100.533/0000
Ag	9.7 mm	spot illumination 1 LED	2 mm	red	3.14.100.541/0000
Ag	9.7 mm	spot illumination 1 LED	2 mm	green	3.14.100.542/0000
Ag	9.7 mm	spot illumination 1 LED	2 mm	yellow	3.14.100.543/0000

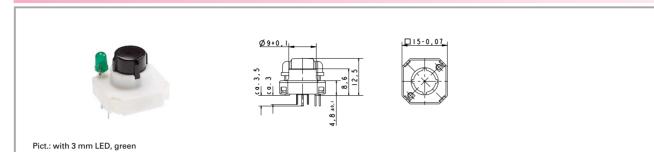
Technical data see page 4 - 36

Versions with 2 LEDs available on request.

Technical data of LED see seperate page at the beginning of this chapter.



### RF 15 R high short-travel keyswitch, 1 LED spot-illumination



Contact materials	Overall height	Illumination	LED type	LED colour	Order no.
Au	12.5 mm	spot illumination 1 LED	3 mm	blue	3.14.100.830/0000
Au	12.5 mm	spot illumination 1 LED	3 mm	red	3.14.100.831/0000
Au	12.5 mm	spot illumination 1 LED	3 mm	green	3.14.100.832/0000
Au	12.5 mm	spot illumination 1 LED	3 mm	yellow	3.14.100.833/0000
Ag	12.5 mm	spot illumination 1 LED	3 mm	blue	3.14.100.840/0000
Ag	12.5 mm	spot illumination 1 LED	3 mm	red	3.14.100.841/0000
Ag	12.5 mm	spot illumination 1 LED	3 mm	green	3.14.100.842/0000
Ag	12.5 mm	spot illumination 1 LED	3 mm	yellow	3.14.100.843/0000

Technical data see page 4 - 36

Versions with 2 LEDs available on request.

Technical data of LED see seperate page at the beginning of the chapter.

### RF 15 H short-travel keyswitch



### **General data**

### Application notes:

The RF 15 H key has an overall height of 12.5 mm and can be fully illuminated. When designing membrane keyboards, we recommend using a key grid of at least 19.05 mm and a 0.13 mm overlay with area embossing over the keys. You can use the O-ring (accessory) to block the key and use it as an indicator field or blank spaceholder.

### **Technical data**

Rated current max.

General information		Rated power max.	
Colour of lens	see order block	(ohmic load)	Au: 2 W, Ag: 12.5 W
Recommended key grid	20 mm	Contact resistance when	-
, -		new max.	100 m $\Omega$
Dimensions		Contact resistance acc.	
Length	15 mm	to life max.	$3\Omega$
Width	15 mm	Insulation resistance	$10^9 \Omega$
Overall height	12.5 mm	ESD strength (underneath	
_		overlay)	15 kV
Mechanical design		Bouncing time max.	5 ms
Mounting	soldering into PCB		
Terminals	see order block	Other specifications	
Contact system	snap-action contact	Ambient temp. operating	
Contact arrangement	1 NO	min.	-25 °C
Contact materials	Au/Ag	Ambient temp. operating	
Illumination	not illuminated / fully illu-	max.	+70 °C
	minated	Storage temperature min.	-40 °C
LED colour	see order block	Storage temperature max.	
LED type	see order block	(product)	+80 °C
		Storage temperature max.	
Mechanical characteristics		(in tube)	+50 °C
Operating force max.	2 3 N	Resistance to constant	
Operating travel	0.5 mm	environment	according to
Switching travel	0.5 mm		IEC 600 68-2-3 and 2-30
Robustness min.	with through-plated PCB	Resistance at variable	
	100 N	environment	according to
			IEC 600 68-2-14 and 2-33
Electrical characteristics		Operating life min.	1,000,000
Rated voltage min.	Au: 0.02 V, Ag: 3 V	Soldering time max.	2,5 sec.
Rated voltage max.	Au: 42 V, Ag: 50 V	Soldering temperature	_
Rated current min.	Au: 0,01 mA, Ag: 0,1 mA	max.	250 °C

4 - 42 PCB Keyswitches

Flammability of materials

UL 94 HB

Au: 100 mA, Ag: 250 mA

# SOLUTIONS WITH PASSION

### Force/Travel Diagram - Keyswitch RF 15 H

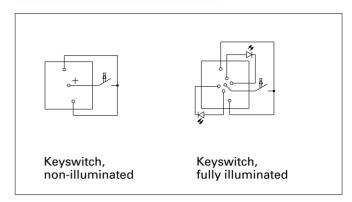
# Operation characteristic limits RF F1 F2 1 0 0,2 0,4 8 (mm) 0,6 0,8 1

F 1 = Max. operating force

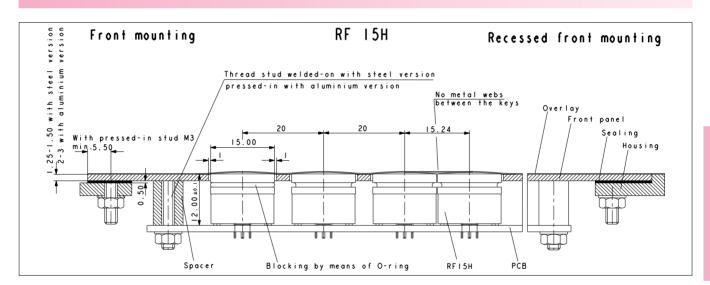
F 2 = Force at contact

F 2 is max. 55% of F 1

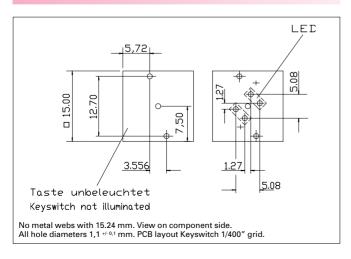
### Circuit Diagram - Keyswitch RF 15 H



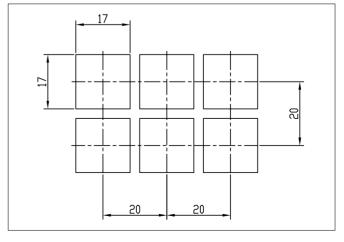
### **Dimensional Drawing**



### **Hole Pattern**



### **Hole Pattern – Front Panel**



4

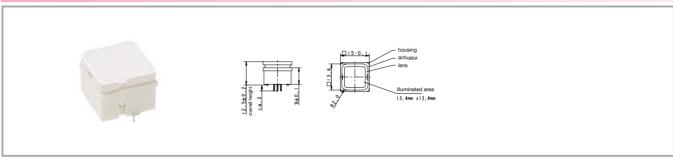
RF

PCB Keyswitches

### **Accessories RF 15 H short-travel keyswitch**

Description	Photo	Order no.	Page
O-ring, black, for blocking the operating stroke		5.30.120.009/0100	5 - 27

### RF 15 H short-travel keyswitch, non-illuminated

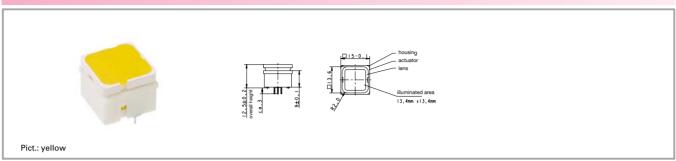


Contact materials	Illumination	Colour of lens	LED colour	LED type	Order no.
Au	not illuminated	white			3.14.100.702/0000
Ag	not illuminated	white			3.14.100.707/0000

Technical data see page 4 - 42

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### RF 15 H short-travel keyswitch, fully illuminated



Illumination	Colour of lens	LED colour	LED type	Order no.
fully illuminated 2 LEDs	red	red	2 mm	3.14.200.731/0000
fully illuminated 2 LEDs	green	green	2 mm	3.14.200.732/0000
fully illuminated 1 LED	green	green super bright	3 mm	3.14.200.736/0000
fully illuminated 2 LEDs	yellow	yellow	2 mm	3.14.200.733/0000
fully illuminated 1 LED	white	white	3 mm	3.14.200.735/0000
fully illuminated 2 LEDs	orange	yellow	2 mm	3.14.200.738/0000
fully illuminated 1 LED	blue	blue	3 mm	3.14.200.739/0000
fully illuminated 2 LEDs	white	multi colour	3 mm	3.14.100.734/0000
fully illuminated 2 LEDs	red	red	2 mm	3.14.200.741/0000
fully illuminated 2 LEDs	green	green	2 mm	3.14.200.742/0000
fully illuminated 1 LED	green	green super bright	3 mm	3.14.200.746/0000
fully illuminated 2 LEDs	yellow	yellow	2 mm	3.14.200.743/0000
fully illuminated 1 LED	white	white	3 mm	3.14.200.745/0000
fully illuminated 2 LEDs	orange	yellow	2 mm	3.14.200.748/0000
fully illuminated 1 LED	blue	blue	3 mm	3.14.200.749/0000
fully illuminated 2 LEDs	white	multi colour	3 mm	3.14.100.744/0000
	fully illuminated 2 LEDs fully illuminated 2 LEDs fully illuminated 1 LED fully illuminated 2 LEDs fully illuminated 1 LED fully illuminated 1 LED fully illuminated 2 LEDs fully illuminated 1 LED fully illuminated 1 LED fully illuminated 2 LEDs fully illuminated 1 LED	fully illuminated 2 LEDs fully illuminated 2 LEDs fully illuminated 3 green 2 LEDs fully illuminated 4 yellow 2 LEDs fully illuminated 5 white 1 LED fully illuminated 6 orange 2 LEDs fully illuminated 6 blue 1 LED fully illuminated 7 red 2 LEDs fully illuminated 8 green fully illuminated 9 green 2 LEDs fully illuminated 9 green 2 LEDs fully illuminated 9 green 1 LED fully illuminated 9 green 1 LED fully illuminated 9 yellow 2 LEDs fully illuminated 1 blue 1 LED fully illuminated white	fully illuminated 2 LEDs fully illuminated 2 LEDs fully illuminated 3 green 3 green 3 green 4 green 4 green 5 green 5 green 5 green 6 green 7 green 8 green 9	fully illuminated 2 LEDs fully illuminated 2 LEDs fully illuminated 3 green 3 green 2 mm 2 LEDs fully illuminated 4 green 3 green super bright 3 mm 1 LED fully illuminated 4 yellow 4 yellow 2 mm 2 LEDs fully illuminated 5 orange 7 yellow 2 mm 2 LEDs fully illuminated 6 blue 6 blue 7 mm 2 LEDs fully illuminated 7 red 8 mm 2 LEDs fully illuminated 8 plue 8 multi colour 9 mm 2 LEDs fully illuminated 9 red 9 green 9 green 9 mm 2 LEDs fully illuminated 9 green 9 green 9 green 9 mm 2 LEDs fully illuminated 9 green 9 green 9 green 9 mm 2 LEDs fully illuminated 9 green 9 green 9 green 9 mm 2 LEDs fully illuminated 9 yellow 9 yellow 9 mm 2 LEDs fully illuminated 1 yellow 9 yellow 9 mm 2 LEDs fully illuminated 1 yellow 9 yellow 9 mm 2 LEDs fully illuminated 1 orange 9 yellow 9 mm 2 LEDs fully illuminated 1 blue 1 blue 1 mm 1 LED fully illuminated 1 blue 1 multi colour 3 mm 1 LED fully illuminated 1 blue 1 multi colour 3 mm 1 LED fully illuminated 1 blue 1 multi colour 3 mm

Technical data see page 4 - 42

When using the keyswitches with multicolour LEDs the illumination colour can be varied from red to green by change of polarity. Due to the frequency of the polarity-changes the colours red, green, yellow as well as all secondary colours from these are possible. Technical data of LED see seperate page of the beginning of this chapter.



### RF 15 signal indicator



Pict.: green

### **Technical data**

General	intorm	ıati∩n

Colour of lens Recommended key grid

**Dimensions** 

Length Width Overall height

Mechanical design

Mounting Illumination LED colour LED type

Other specifications

Ambient temp. operating

min.

see order block 19.05 mm

15 mm 15 mm 9.7 mm

soldering into PCB fully illuminated 1 LED see order block 2 mm

-25 °C

Ambient temp. operating max.

Storage temperature min. Storage temperature max. (product)

Storage temperature max. (in tube)

Resistance to constant environment

Resistance at variable environment

Soldering time max. Soldering temperature max.

Flammability of materials

+70 °C -40 °C

+80 °C

+50 °C

according to

IEC 600 68-2-3 and 2-30

according to

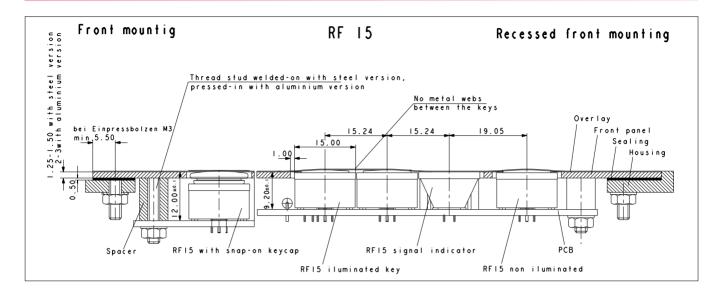
IEC 600 68-2-14 and 2-33

2,5 sec.

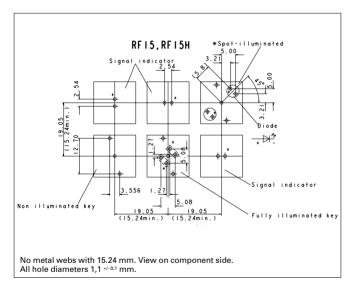
250 °C UL 94 HB

4 - 46 **PCB** Keyswitches

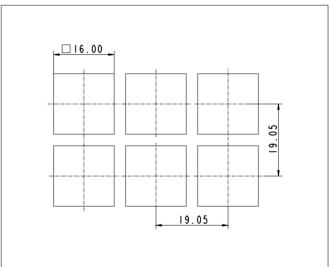
### **Dimensional Drawing Signal Indicator RF 15**



### **Hole Pattern**



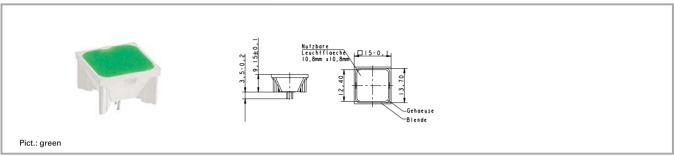
### **Hole Pattern – Front Panel**



RF

PCB Keyswitches 4 - 47

### RF 15 signal indicator, fully illuminated, 1 LED



Overall height	Illumination	Colour of lens	LED colour	LED type	Order no.
9.7 mm	fully illuminated 1 LED	red	red	2 mm	3.14.200.051/0000
9.7 mm	fully illuminated 1 LED	green	green	2 mm	3.14.200.052/0000
9.7 mm	fully illuminated 1 LED	yellow	yellow	2 mm	3.14.200.053/0000
9.7 mm	fully illuminated 1 LED	orange	yellow	2 mm	3.14.200.054/0000
9.7 mm	fully illuminated 1 LED	blue	blue	2 mm	3.14.200.055/0000

Technical data see page 4 - 46

For more information, see LEDs.

Technical data of LED see seperate page of the beginning of this chapter.

4

### RF 19 short-travel keyswitch



### **General data**

### **Application notes:**

RF 19 keys offer a large actuation area. When designing low-profile keyboards with a grid of >= 23 mm, frame webs remain free between the individual keys.

Rated power max.

The overlay can be glued onto these frame webs; we recommend area embossing over the keys for the overlay.

### **Technical data**

**General information** 

Rated current max.

Colour of lens	see order block	(ohmic load)	Au: 2 W, Ag: 12.5 W
Recommended key grid	23 mm	Contact resistance when	
<b>.</b> .		new max.	100 m $\Omega$
Dimensions		Contact resistance acc.	•
Length	19.05 mm	to life max.	<b>3</b> Ω
Width	19.05 mm	Insulation resistance	$10^9 \Omega$
Overall height	9.7 mm	ESD strength (underneath	
		overlay)	15 kV
Mechanical design		Bouncing time max.	5 ms
Mounting	soldering into PCB		
Terminals	contacts tin-plated, fix	Other specifications	
	contact Ag plated	Ambient temp. operating	
Contact system	snap-action contact	min.	-25 °C
Contact arrangement	1 NO	Ambient temp. operating	
Contact materials	Au/Ag	max.	+70 °C
Illumination	spot-/fully illuminated	Storage temperature min.	-40 °C
LED colour	see order block	Storage temperature max.	
LED type	see order block	(product)	+80 °C
		Storage temperature max.	
Mechanical characteristics		(in tube)	+50 °C
Operating force max.	2 3 N	Resistance to constant	
Operating travel	0.5 mm	environment	according to
Switching travel	0.5 mm		IEC 600 68-2-3 and 2-30
Robustness min.	with through-plated PCB	Resistance at variable	
	100 N	environment	according to
			IEC 600 68-2-14 and 2-33
Electrical characteristics		Operating life min.	1,000,000
Rated voltage min.	Au: 0.02 V, Ag: 3 V	Soldering time max.	2,5 sec.
Rated voltage max.	Au: 42 V, Ag: 50 V	Soldering temperature	
Rated current min.	Au: 0,01 mÅ, Ag: 0,1 mA	max.	250 °C

4 - 50 PCB Keyswitches

Flammability of materials

UL 94 HB

Au: 100 mA, Ag: 250 mA

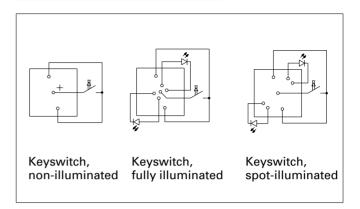
# SOLUTIONS WITH PASSION

### Force/Travel Diagram - Keyswitch RF 19

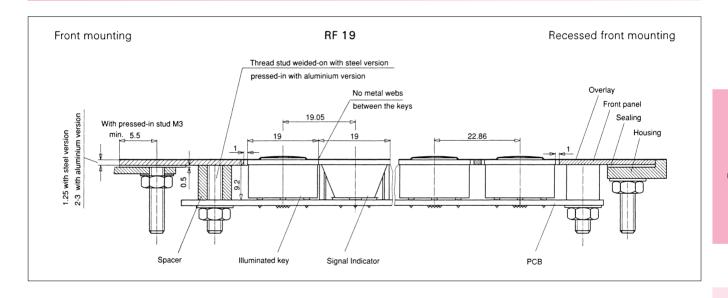
# Operation characteristic limits RF F1 F2 1 0 0 0,2 0,4 8 (mm) 0,6 0,8 1

F 1 = Max. operating force F 2 = Force at contact F 2 is max. 55% of F 1

### Circuit Diagram - Keyswitch RF 19



### **Dimensional Drawing**

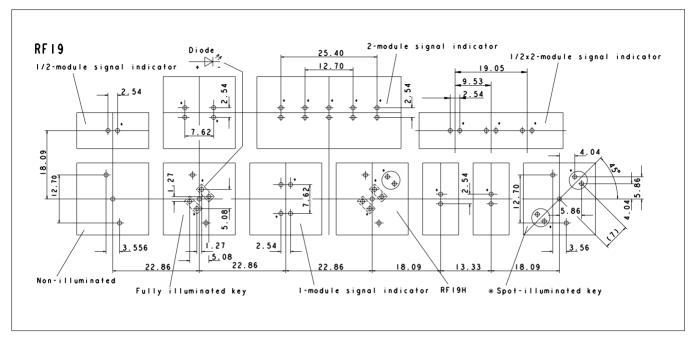


RF

PCB Keyswitches 4 - 51



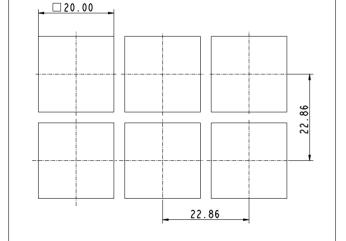
### **Hole Patterns RF 19**



\* The LED may be positioned either on the left-hand or right-hand side. Standard version: LED on left-hand side View on component side, all hole diameters 1,1 +/- 0,1 mm

### **Hole Patterns – Front Panel RF 19**

4



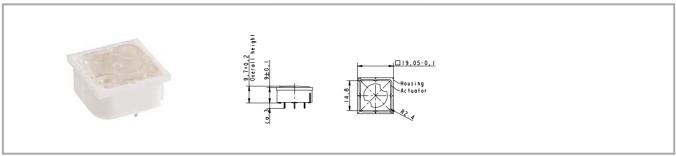
RF

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### RF 19 short-travel keyswitch, non-illuminated

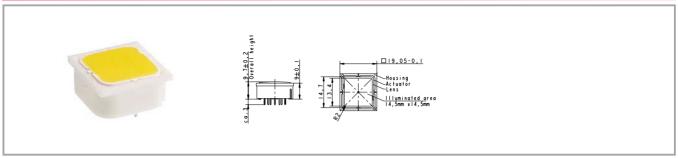


Contact materials	Illumination	Colour of lens	LED colour	LED type	Order no.
Au	not illuminated	transparent			3.14.001.001/0000
Ag	not illuminated	transparent			3.14.001.006/0000

Technical data see page 4 - 50



### RF 19 short-travel keyswitch, fully illuminated with 2 LEDs



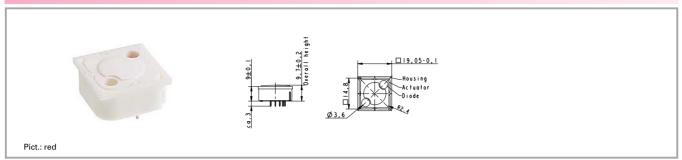
Contact materials	Illumination	Colour of lens	LED colour	LED type	Order no.
Au	fully illuminated 2 LEDs	red	red	2 mm	3.14.002.011/0000
Au	fully illuminated 2 LEDs	green	green	2 mm	3.14.002.012/0000
Au	fully illuminated 2 LEDs	yellow	yellow	2 mm	3.14.002.013/0000
Au	fully illuminated 2 LEDs	orange	yellow	2 mm	3.14.002.014/0000
Au	fully illuminated 2 LEDs	blue	blue	2 mm	3.14.002.015/0000
Ag	fully illuminated 2 LEDs	red	red	2 mm	3.14.002.021/0000
Ag	fully illuminated 2 LEDs	green	green	2 mm	3.14.002.022/0000
Ag	fully illuminated 2 LEDs	yellow	yellow	2 mm	3.14.002.023/0000
Ag	fully illuminated 2 LEDs	orange	yellow	2 mm	3.14.002.024/0000
Ag	fully illuminated 2 LEDs	blue	blue	2 mm	3.14.002.025/0000

Technical data see page 4 - 50

Technical data of LED see seperate page of the beginning of this chapter.



### RF 19 short-travel keyswitch, 1 LED spot-illumination



Contact materials	Illumination	Colour of lens	LED colour	LED type	Order no.
Au	spot illumination 1 LED	opaque white	blue	3 mm	3.14.001.030/0000
Au	spot illumination 1 LED	transparent	red	3 mm	3.14.001.031/0000
Au	spot illumination 1 LED	transparent	green	3 mm	3.14.001.032/0000
Au	spot illumination 1 LED	transparent	yellow	3 mm	3.14.001.033/0000
Ag	spot illumination 1 LED	opaque white	blue	3 mm	3.14.001.040/0000
Ag	spot illumination 1 LED	transparent	red	3 mm	3.14.001.041/0000
Ag	spot illumination 1 LED	transparent	green	3 mm	3.14.001.042/0000
Ag	spot illumination 1 LED	transparent	yellow	3 mm	3.14.001.043/0000

Technical data see page 4 - 50

Versions with 2 LEDs available on request.

Technical data of LED see seperate page of the beginning of this chapter.

nг



### RF 19 short-travel keyswitch, 1 NC + 1 NO



### **Technical data**

General information	
Recommended key grid	23 mm

**Dimensions** Lenath 19.05 mm Width 19.05 mm Overall height 9.7 mm

Mechanical design Mounting

**Terminals** Contact system Contact arrangement

Contact materials Illumination

**Mechanical characteristics** 

Operating force max. Operating travel Switching travel Robustness min.

100 N

**Electrical characteristics** Rated voltage min. Rated voltage max. Rated current min.

Rated current max.

Rated power max. (ohmic load)

For keycaps, refer to RK 90.

soldering into PCB contacts tin-plated, fix

contact Ag plated bridge contact 1 NC + 1 NO Au/Ag none

2 ... 3 N 0.5 mm 0.5 mm with through-plated PCB

Au: 0,02 V, Ag: 3 V V Au: 42 V, Ag: 50 V V Au: 0,01 mA, Ag: 0,1 mA

Au: 100 mA, Ag: 250 mA mA

Au: 2 W, Ag: 12.5 W

Contact resistance when new max.

Contact resistance acc.  $3 \Omega$ to life max.  $2 \times 10^6 \Omega$ Insulation resistance

ESD strength (underneath overlay)

15 kV Bouncing time max. 5 ms

Other specifications Ambient temp. operating min.

Ambient temp. operating

Storage temperature min. Storage temperature max.

(product) Storage temperature max.

(in tube) Resistance to constant environment

Resistance at variable environment

Operating life min. Soldering time max. Soldering temperature

Flammability of materials

100 m $\Omega$ 

-25 °C

+70 °C -40 °C

+80 °C

+50 °C

according to IEC 600 68-2-3 and 2-30

according to

IEC 600 68-2-14 and 2-33

100000 5 sec.

265 °C UL 94 HB

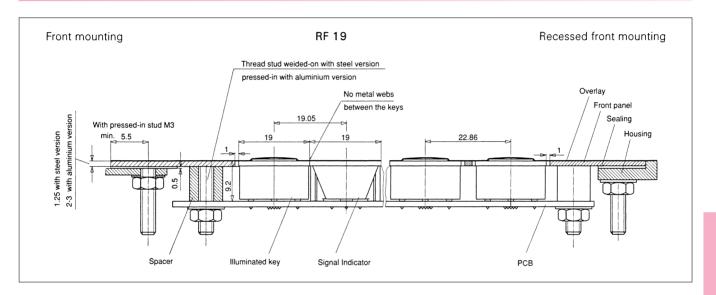
RF

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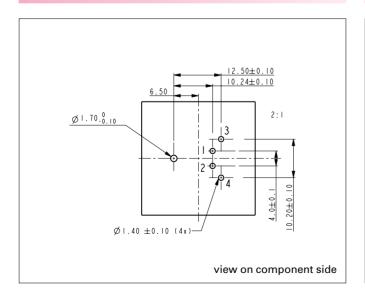
### **Circuit Diagram**

$$S \mid F - \begin{cases} 1 \\ - - - \end{cases}$$

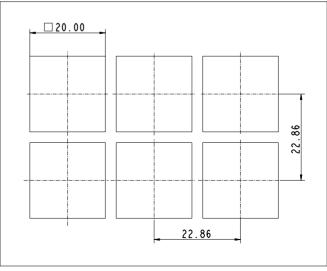
### **Dimensional Drawing**



### **Hole Pattern**



### **Hole Pattern – Front Panel**

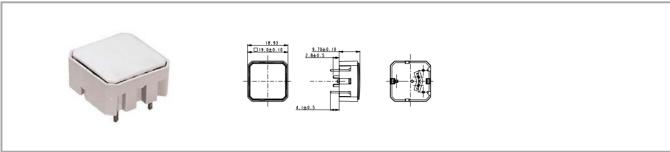


4

RF

PCB Keyswitches

### RF 19 short-travel keyswitch, non-illuminated



Contact materials	Contact arrangement	Illumination	Colour of lens	Order no.
Au	1 NC + 1 NO	not illuminated	opaque white	1.16.000.991/0000
Ag	1 NC + 1 NO	not illuminated	opaque white	1.16.000.990/0000

Technical data see page 4 - 56

4

### RF 19 H short-travel keyswitch



100 N

Au: 0.02 V, Ag: 3 V

Au: 42 V, Ag: 50 V

Au: 0,01 mA, Ag: 0,1 mA

Au: 100 mA, Ag: 250 mA

### **General data**

### **Application notes:**

The RF 19H key has an overall height of 12.5 mm and can be fully illuminated. When designing membrane keyboards, we recommend using a key grid of at least 23 mm and a 0.13 mm overlay with area embossing over the keys. You can use the O-ring (accessory) to block the key and use it as an indicator field or blank spaceholder.

Rated power max.

### **Technical data**

**General information** 

**Electrical characteristics** 

Rated voltage min.

Rated voltage max.

Rated current min.

Rated current max.

Colour of lens	see order block	(ohmic load)	Au: 2 W, Ag: 12.5 W
Recommended key grid	24 mm	Contact resistance when	
		new max.	100 m $\Omega$
Dimensions		Contact resistance acc.	
Length	19.05 mm	to life max.	$3\Omega$
Width	19.05 mm	Insulation resistance	10 <sup>9</sup> Ω
Overall height	12.5 mm	ESD strength (underneath	
		overlay)	15 kV
Mechanical design		Bouncing time max.	5 ms
Mounting	soldering into PCB		
Terminals	contacts tin-plated, fix	Other specifications	
	contact Ag plated	Ambient temp. operating	
Contact system	snap-action contact	min.	-25 °C
Contact arrangement	1 NO	Ambient temp. operating	
Contact materials	Au/Ag	max.	+70 °C
Illumination	spot-/fully illuminated	Storage temperature min.	-40 °C
LED colour	see order block	Storage temperature max.	
LED type	see order block	(product)	+80 °C
,,		Storage temperature max.	
Mechanical characteristics		(in tube)	+50 °C
Operating force max.	2 3 N	Resistance to constant	
Operating travel	0.5 mm	environment	according to
Switching travel	0.5 mm		IEC 600 68-2-3 and 2-30
Robustness min.	with through-plated PCB	Resistance at variable	
	400 N		

4 - 60 PCB Keyswitches

environment

Operating life min.

Soldering time max.

Soldering temperature

Flammability of materials

according to

1,000,000

2,5 sec.

250 °C

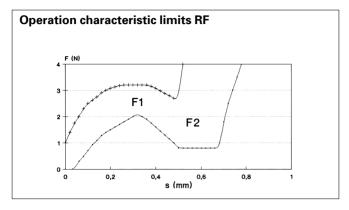
UL 94 HB

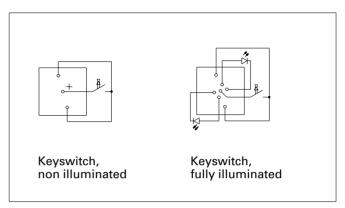
IEC 600 68-2-14 and 2-33

## RAFI

### Force/Travel Diagram - Keyswitch RF 19 H

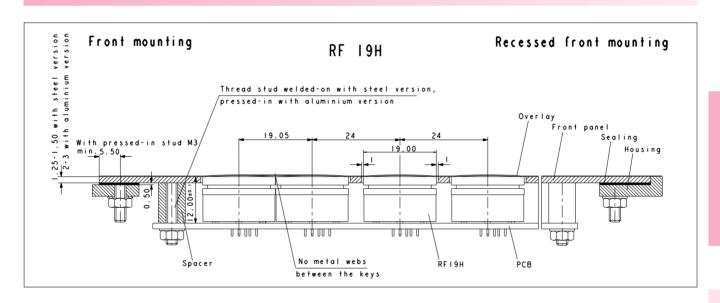
### Circuit Diagram - Keyswitch RF 19 H





- $F_1 = Max.$  operating force
- F 2 = Force at contact
- F 2 is max. 55% of F 1

### **Dimensional Drawing**



RF

PCB Keyswitches 4 - 61

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