

Specifications LED

3 mm LED

(valid for 25 °C)	Red LED	Green LED	Yellow LED
Max. forward current I _F :	30 mA	30 mA	20 mA
Current reduction from: T ₀ = 50 °C:	approx 0.5 mA/°C	approx 0.5 mA/°C	approx 0.2 mA/°C
Wavelength typ:	635 nm	565 nm	586 nm
Forward voltage U _F /I _F typ:	2 V/10 mA	2 V/10 mA	2 V/10 mA
Reverse voltage U _R /I _F typ:	5 V/100 µA min.	5 V/100 µA min.	5 V/100 µA min.
Ambient temperature, operating:	- 20 °C ... + 80 °C	- 20 °C ... + 80 °C	- 20 °C ... + 80 °C
	Blue LED	White LED	Green LED superbright
Max. forward current I _F :	20 mA	25 mA	30 mA
Current reduction from: T ₀ = 50 °C:	approx 0.6 mA/°C	-	-
Wavelength typ:	470 nm	-	510-545 nm
Forward voltage U _F /I _F typ:	2.7 V/10 mA	3.6 V/20 mA	3.5 V/20 mA
Reverse voltage U _R /I _F typ:	5V/100 µA min.	-	-
Ambient temperature, operating:	- 20 °C ... + 80 °C	- 20 °C ... + 80 °C	-30 °C ... + 100 °C

2 mm LED (full illumination of RF 15/19)

(valid for 25 °C)	Red LED	Green LED	Yellow LED
Max. forward current I _F :	30 mA	30 mA	50 mA
Current reduction from: T ₀ = 50 °C:	0.5 mA/°C	0.5 mA/°C	0.8 mA/°C
Light current f _v /I _F typ:	-	-	250 mIm/20 mA
Wavelength typ:	637 nm	569 nm	590 nm
Forward voltage U _F /I _F typ:	1.8 V/20 mA	2.1 V/10 mA	1.9 V/20 mA
Reverse voltage U _R /I _F typ:	5 V/100 µA min.	5 V/100 µA min.	5 V/100 µA min.
Ambient temperature, operating:	- 55 °C ... + 100 °C	- 40 °C ... + 100 °C	-40 °C ... + 100 °C
	Blue LED	Multi-colour LED	
Max. forward current I _F :	30 mA	30 mA	
Current reduction from: T ₀ = 50 °C:	-	approx 0.6 mA/°C	
Light current f _v /I _F typ:	-	-	
Wavelength typ:	464-485 nm	635/565 nm	
Forward voltage U _F /I _F typ:	3.6 V/20 mA	2 V/10 mA	
Reverse voltage U _R /I _F typ:	-	-	
Ambient temperature, operating:	- 20 °C ... + 80 °C	- 20 °C ... + 80 °C	

4

Calculating the series resistor:	Rated power of series:	Example for 5 Volt:
$R_V = \frac{U_B - U_F}{I_F}$	$P_V = I_F^2 \times R_V$	$R_V = \frac{5V - 2,0V}{0,02 A} = 150 \Omega (= \text{standard value})$

RF

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

Technical Data

General information

Colour of lens see order block
Recommended key grid 23 mm

Dimensions

Length 19.05 mm
Width 19.05 mm
Overall height 9.7 mm

Mechanical design

Mounting soldering in PCB
Terminals THT
Contact system snap-action contact
Contact arrangement 1 NO
Contact materials see order block
Illumination see order block
LED colour see order block
LED type see order block

Mechanical characteristics

Operating force max. 2.9 ± 0.6 N
Switching travel $0.5^{+0.2}$ mm
Robustness min. with through-plated PCB 100 N

Electrical characteristics

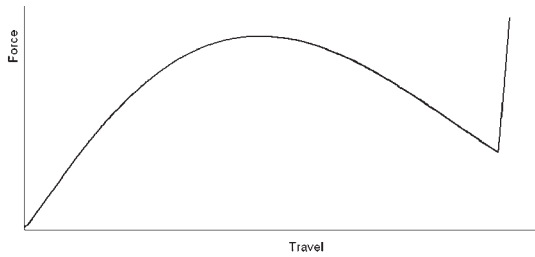
Rated voltage min. Au: 0.02 V, Ag: 3 V
Rated voltage max. Au: 35 V, Ag: 50 V
Rated current min. Au: 0.01 mA, Ag: 0.1 mA
Rated current max. Au: 100 mA, Ag: 250 mA
Rated power max. (ohmic load) Au: 2 W, Ag: 12.5 W
Contact resistance when new max. 100 m Ω
Insulation resistance $10^9 \Omega$

Other specifications

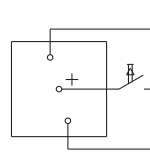
Ambient temp. operating min. -25 °C
Ambient temp. operating max. +70 °C
Environmental resistance acc. to IEC 60068-2 -14, -30, -33 and -78
Operating life min. (operations) 1,000,000
Solderability / solder heat resistance according to E DIN IEC 600 28-2-20
Wave soldering 260 °C max.
Manual soldering 350 °C / 5 sec. max.

Force/Travel Diagram – Keyswitch RF 19

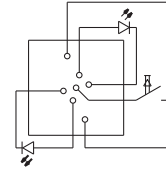
Operation characteristic limits RF



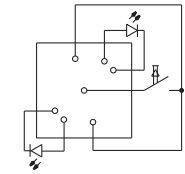
Circuit Diagram – Keyswitch RF 19



Keyswitch, non-illuminated

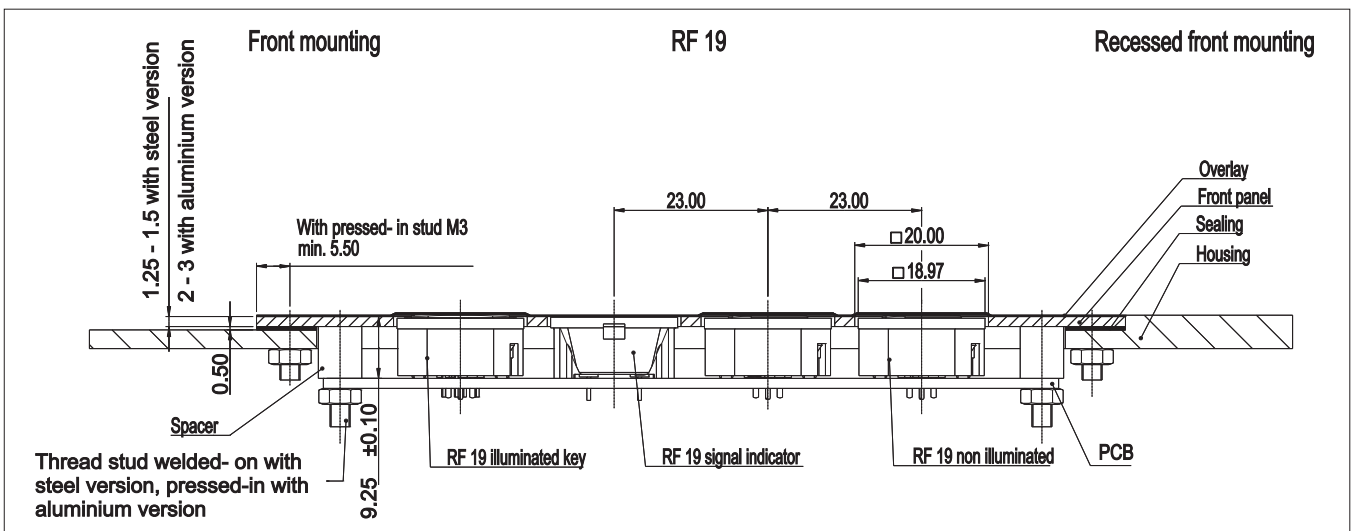


Keyswitch, fully illuminated

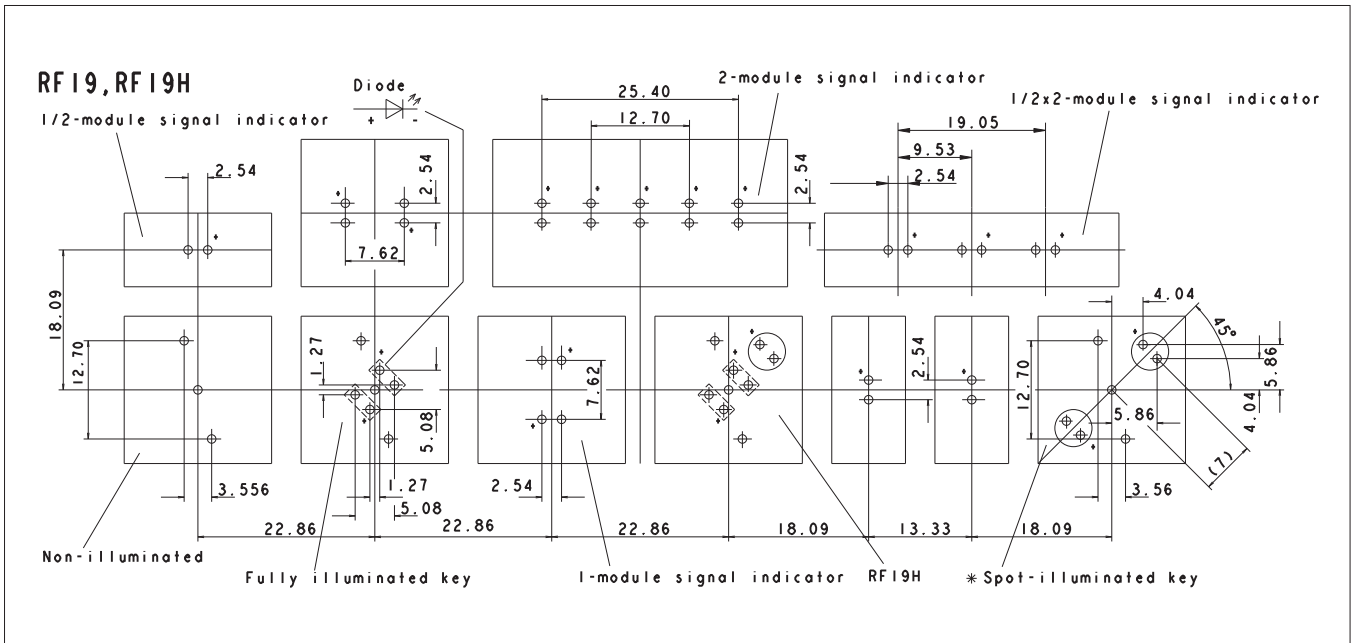


Keyswitch, spot-illuminated

Dimensional Drawing

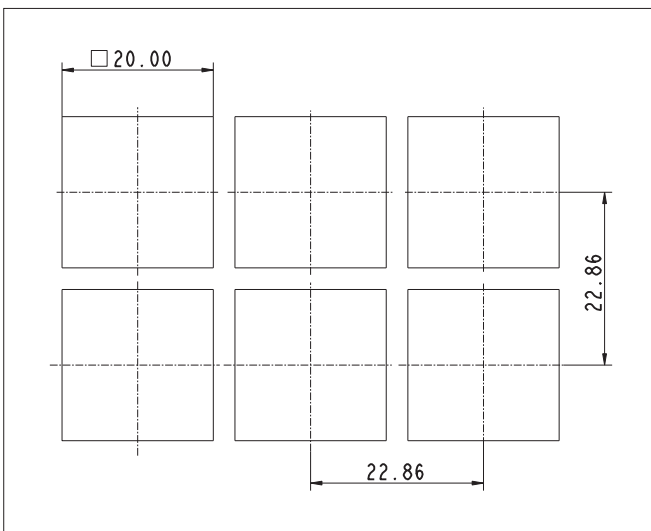


Hole Patterns RF 19



* 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

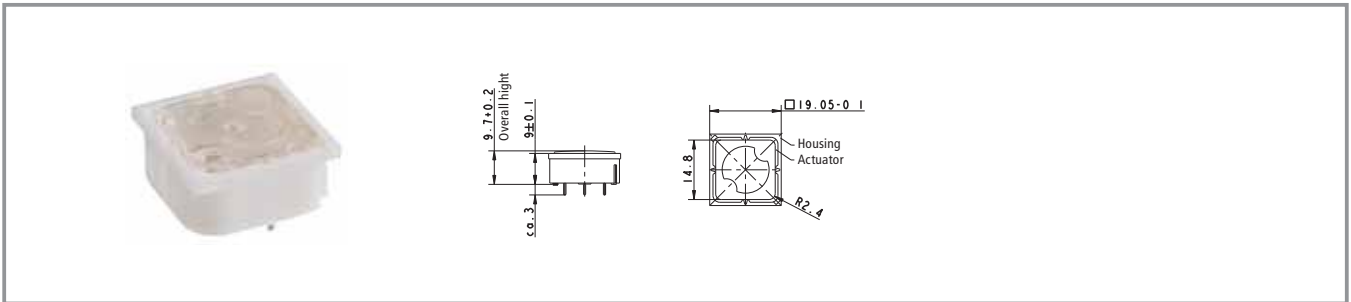
Hole Patterns – Front Panel RF 19



4

RF

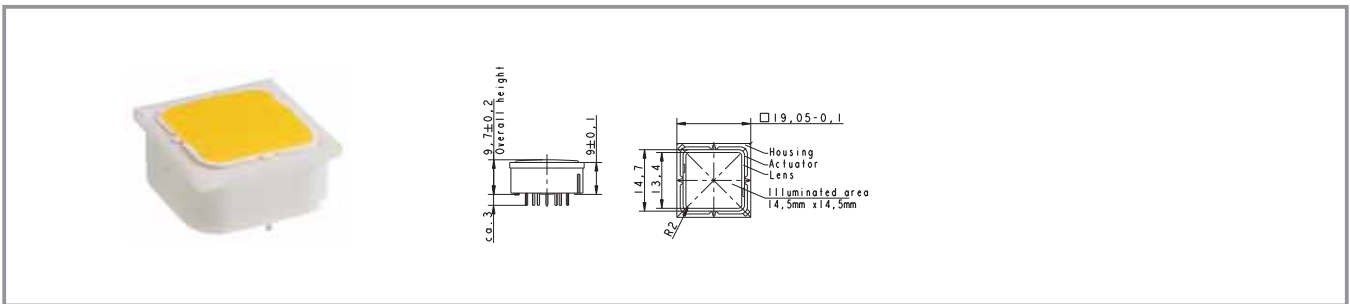
RF 19 - Short-travel keyswitch, non-illuminated



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 - 66

RF 19 - Short-travel keyswitch, fully illuminated with 2 LED



Contact materials	Illumination	Colour of lens	LED colour	LED type	Order no.
Au	fully illuminated 2 LED	red	red	2 mm	3.14.002.011/0000
Au	fully illuminated 2 LED	green	green	2 mm	3.14.002.012/0000
Au	fully illuminated 2 LED	opaque white	green	2 mm	3.14.002.901/0000
Au	fully illuminated 2 LED	yellow	yellow	2 mm	3.14.002.013/0000
Au	fully illuminated 2 LED	orange	yellow	2 mm	3.14.002.014/0000
Au	fully illuminated 2 LED	blue	blue	2 mm	3.14.002.015/0000
Ag	fully illuminated 2 LED	red	red	2 mm	3.14.002.021/0000
Ag	fully illuminated 2 LED	green	green	2 mm	3.14.002.022/0000
Ag	fully illuminated 2 LED	yellow	yellow	2 mm	3.14.002.023/0000
Ag	fully illuminated 2 LED	orange	yellow	2 mm	3.14.002.024/0000
Ag	fully illuminated 2 LED	blue	blue	2 mm	3.14.002.025/0000
Ag	fully illuminated 2 LED	opaque white	green	2 mm	3.14.002.944/0000
Ag	fully illuminated 2 LED	white	green	2 mm	3.14.002.026/0000
Ag	fully illuminated 2 LED	white	yellow	2 mm	3.14.002.027/0000

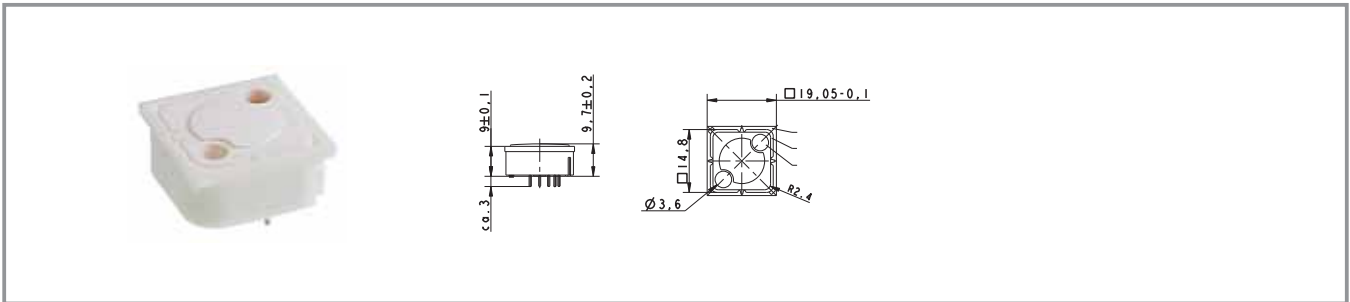
Technical data see page 4 - 66

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

4

RF

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	opaque white	red	3 mm	3.14.001.031/0000
Au	spot illumination 1 LED	opaque white	green	3 mm	3.14.001.032/0000
Au	spot illumination 1 LED	opaque white	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	opaque white	red	3 mm	3.14.001.041/0000
Ag	spot illumination 1 LED	opaque white	green	3 mm	3.14.001.042/0000
Ag	spot illumination 1 LED	opaque white	yellow	3 mm	3.14.001.043/0000

Technical data see page 4 - 66

Versions with 2 LEDs available on request.

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