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 mlm/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	

Calculating the series resistor:

$$R_V = \frac{U_B - U_F}{I_F}$$

Rated power of series:

$$P_V = I_F^2 \times R_V$$

Example for 5 Volt:

$$R_V = \frac{5V - 2{,}0\,V}{0{,}02\,A} = 150\ \Omega \text{ (= standard value)}$$

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.

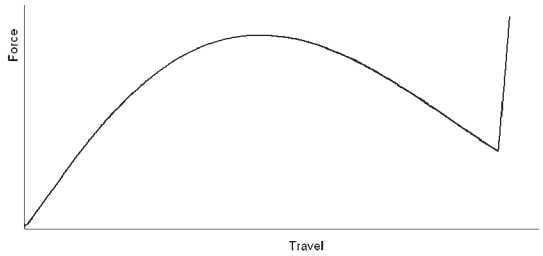
Technical Data

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.	$2.9^{\pm 0.6}$ N
Switching travel	$0.5^{+0.2}$ mm
Robustness min.	with through-plated PCB 100 N

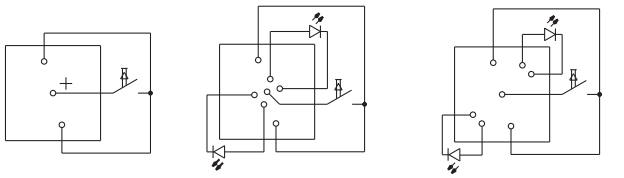
Electrical characteristics	
Rated voltage min.	Au: 0.02 V, Ag: 3 V
Rated voltage max.	Au: 35 V, Ag: 50 V
Rated current min.	Au: 0.01 mA, Ag: 0.1 mA
Rated current max.	Au: 100 mA, Ag: 250 mA
Rated power max. (ohmic load)	Au: 2 W, Ag: 12.5 W
Contact resistance when new max.	100 mΩ
Insulation resistance	10^9 Ω
Other specifications	
Ambient temp. operating min.	-25 °C
Ambient temp. operating max.	+70 °C
Environmental restistance	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

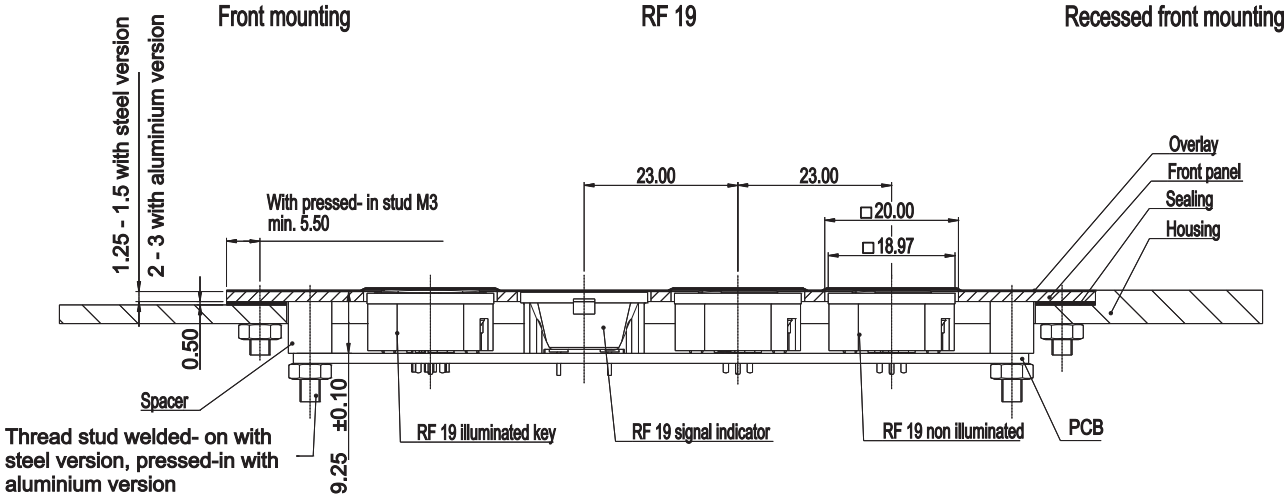


Circuit Diagram – Keyswitch RF 19

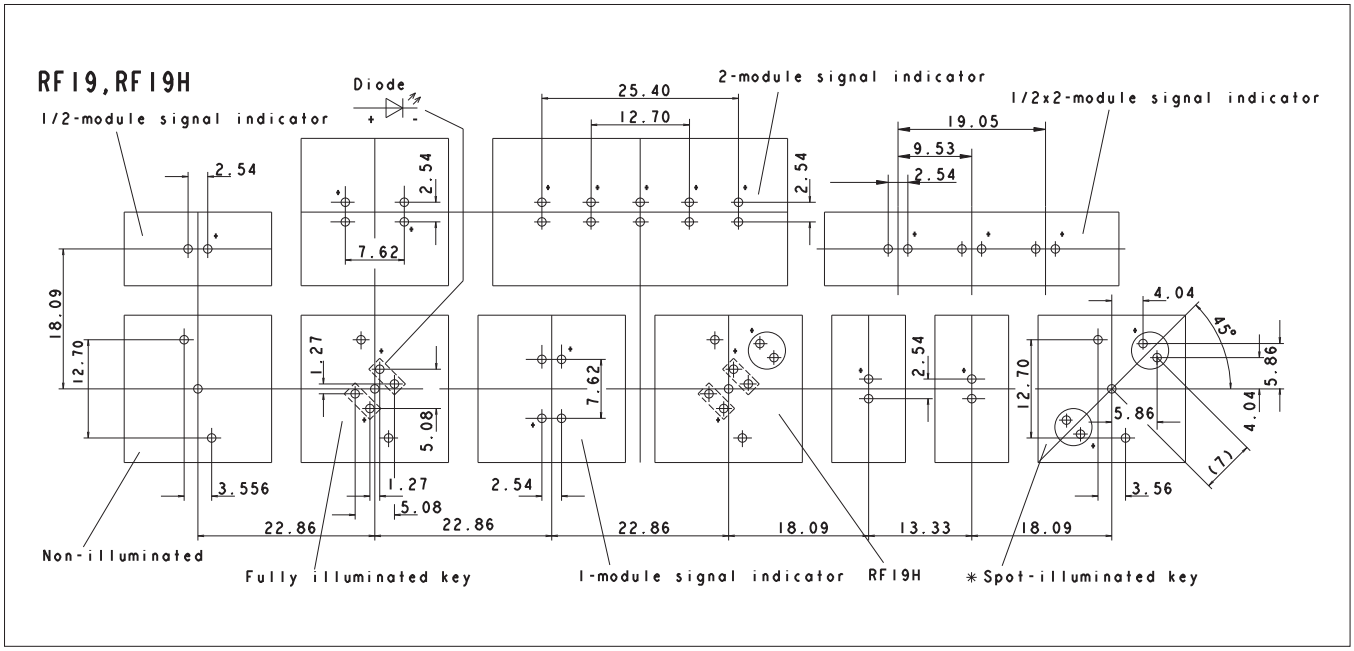


Keyswitch, non-illuminated | Keyswitch, fully illuminated | Keyswitch, spot-illuminated

Dimensional Drawing

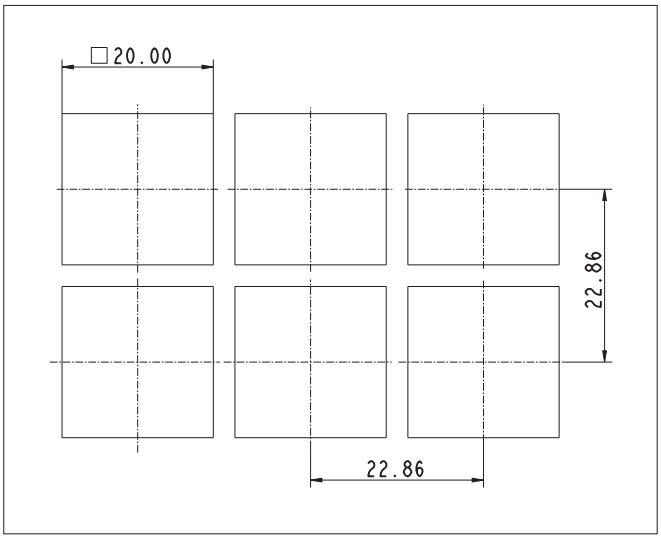


Hole Patterns RF 19

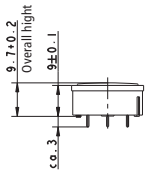


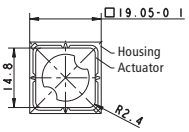
*The LED may be positioned either on the left-hand or right-hand side.
Standard version: LED on left-hand side
View on component side, all hole diameters 1.1 +/- 0.1 mm

Hole Patterns – Front Panel RF 19



RF 19 - Short-travel keyswitch, non-illuminated

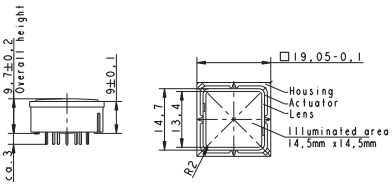




Contact materials	Illumination	Colour of lens	LED colour	LED type	Order no.
Au	not illuminated	transparent	-	-	**3.14.001.001/0000**
Ag	not illuminated	transparent	-	-	**3.14.001.006/0000**

Technical data see page 4 - 66

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



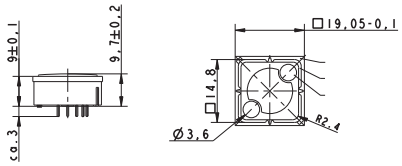
Contact materials	Illumination	Colour of lens	LED colour	LED type	Order no.
Au	fully illuminated 2 LED	red	red	2 mm	**3.14.002.011/0000**
Au	fully illuminated 2 LED	green	green	2 mm	**3.14.002.012/0000**
Au	fully illuminated 2 LED	opaque white	green	2 mm	3.14.002.901/0000
Au	fully illuminated 2 LED	yellow	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.

Stock items are marked by **bold printed order numbers.**

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.

Stock items are marked by **bold printed order numbers.**