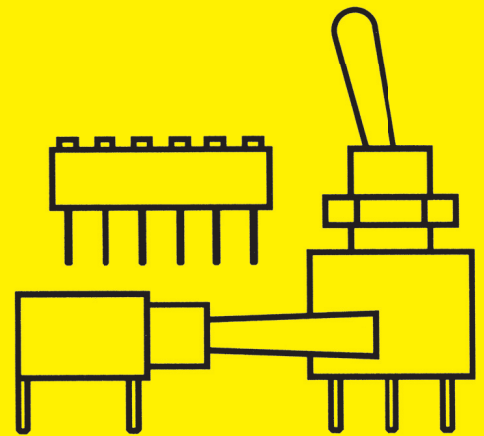
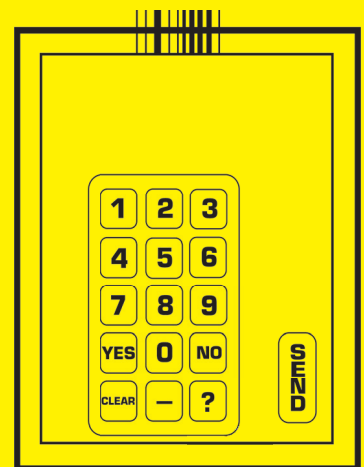


knitter switch

Professional Switches

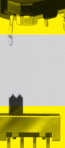


Input Systems



2023/ 2024

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	5. Tact Switches / Multi-Function	65
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General Information

The catalog details are without obligation and subject to modifications after print.

Current datasheets and product change notifications can be found on www.knitter-switch.com.

This catalogue is divided by switch types: toggle switches, pushbutton switches, slide switches, dual-in-line switches, rotary coded switches, rotary switches, encoder, LED's and membranes.

The chapters include professional, semi-professional and low-cost components.

The technical specification for each series is specifically stated. Unless otherwise specified, the figures for contact rating apply for the standard version.

For several series, especially MT... and MP..., the following is available:

Standard version:	silver or silver-plated contacts and terminals
Configuration B:	gold-plated (over Nickel) contacts and terminals
Configuration G:	gold-plated (over silver) contacts and terminals

All switches are sealed on the terminal side.

Switches for SMT as well as most series for PCB mounting are generally fully washable.

Unless otherwise specified, components for auto- (wave-) soldering are limited to pre-heat max. 60s, max. 100 °C, soldering max. 5s, max. 260 °C.

Signs and symbols:

ESD: component is ESD-resistant. Resistance is depending from switch size and is listed in the technical data

IP 67: component has an approved IP rating or is according to an IP rating

CE: our products meet all relevant regulations



all components in this catalogue are compliant with regulation 2011/65/EU



IR-reflow soldering according to JEDEC ST-020 D
(peak 260 °C, 10s max.)

Type naming/switching functions

A group of a maximum of 4 identification letters is followed by up to 4 digits (excepted membranes and some switches with specific features).

The letters are specific for the type of actuation, the digits describes certain technical features.

This is followed by the characteristic letters for the different switching functions (if there are):

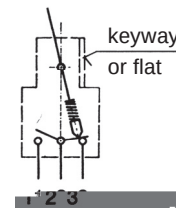
First column is used for 1/3 pole-, second column for 2/4 pole switches. For switches using same housing for 1 and 2 pole versions, only column 1 is used	A		off	–	on	
	B		on	–	(mom)	
	C		off	–	mom	
	D	N	on	–	on	
	E	P	on	off	on	
	F	R	mom	–	on	mom: momentary on
	G	S	mom	off	mom	(mom): momentary off
	H	T	mom	off	on	
	EA	PA	on	on	on	
		SA	mom	on	mom	
		TA	mom	on	on	

For all toggle switches, a dot on the top of the switching function table indicates the switching position with the lever in the direction of the keyway or the flattened thread. The closed contacts are always opposite to the position of the lever.

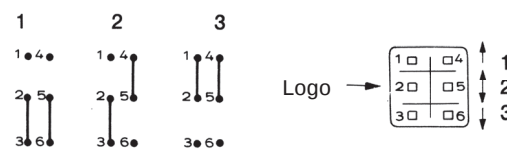
For PA, SA and TA types the poles are switched separately as shown in the diagram below:

Lever position:

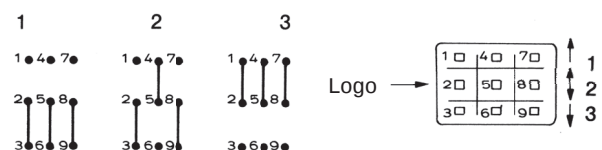
- 1 lever up
- 2 lever at middle
- 3 lever down



DPDT



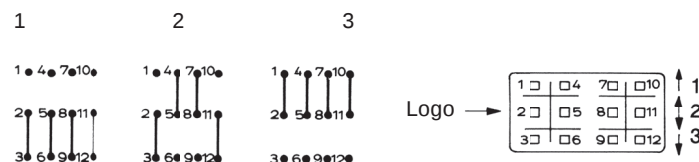
3PDT



A connection between terminals 3 and 5 forms a one-pole three-position switch.



4PDT



Connections between terminals 3 and 5 and 8 and 12 form a two-pole three-position switch.



2

Toggle Switches

2.1 Miniature Toggle Switches



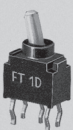
General		8– 9
Series MTA	standard	10–11
Series MTE	waterproof IP 67	12–13
Series MTL	with locking lever	14–15
Series MTG	mustang type	16–17
Series MTW	mustang type / waterproof IP 67	18
Series MZME	ESD proof, waterproof IP 67	19
Series STM	with short lever	20–21

2.2 Subminiature Toggle Switches



Series ATE	waterproof IP 67	22–24
Series SST	SMD / waterproof IP 67	25
Series TST	low-cost/ESD proof, waterproof IP 67	26–27

2.3 Microminiature Toggle Switches



Series FT	ESD proof	28–29
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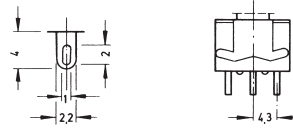
Miniature Toggle Switches

2

Available for miniature toggle switches series MT./ST.
and also for miniature pushbutton switches series MP.

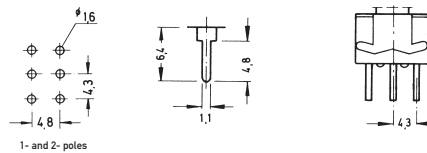
Solder tags:

Series MT./MP.



PC terminals:

- PC



horizontal actuation on PCB*

- RA



vertical actuation on PCB*

- VM



* Series ST./SP. only

Standard switches with RA and VM are without thread. Special versions upon request.

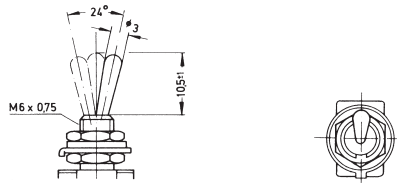
Partly non-stock items; minimum quantity and delivery time on request.

Miniature Toggle Switches

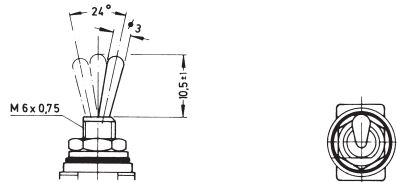
2

Standard levers:

Series MTA

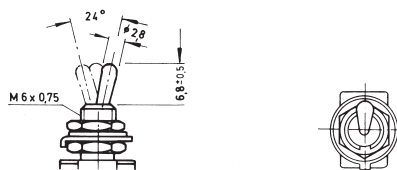


waterproof IP 67
Series MTE

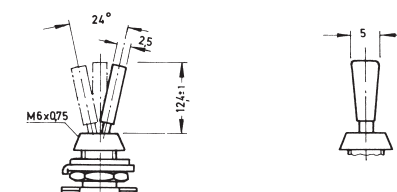


Special levers:

short
Series MTM

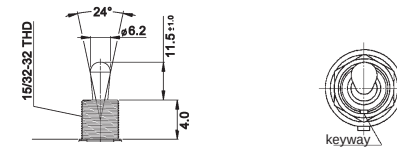


flat, with decorative nut
Series MTF

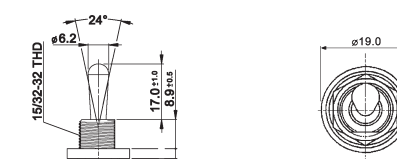


Mustang levers:

Series MTG

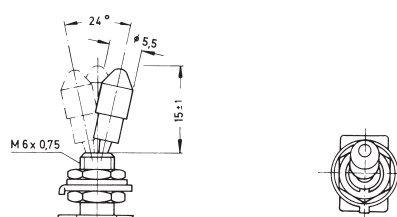


long, waterproof IP 67
Series MTW



Locking lever:

Series MTL



Miniature Toggle Switches

2

Specifications:

Contact rating:	250 V AC, 3 A / 125 V AC, 6 A 30 V DC, 4 A / 12 V DC, 5 A 6 V DC, 6 A
Contact resistance:	< 20 mΩ
Insulation resistance:	> 1000 MΩ at 500 V DC
Dielectric strength:	1500 V, 50 Hz for the duration of 1 minute
Operating temperature:	– 45 °C to +140 °C
Mechanical life:	minimum 300 000 operations
Contacts:	coin silver (common contact copper alloy, silver-plated) also available gold-plated, version B and G, see page 4
Terminals:	solder tags, copper alloy silver-plated further terminal versions see page 8
Material:	case: diallyle-phthalate, meets UL 94 V–0, black lever: chromium-plated, metal parts: nickel-plated
Mounting:	bushing M 6 x 0.75 with locking plate, key 9 mm
Soldering conditions:	hand-soldering – max.: 60 W, 3 sec, 420 °C wave-soldering – max.: 5 sec, 270 °C

Accessories:

Knurled nut, nickel-plated

M 6 x 0,75, Ø 8 mm R 675



Waterproof sealing caps (height 14.3 mm)

black ET 102
red ET 109



Waterproof sealing cap with mounting screw

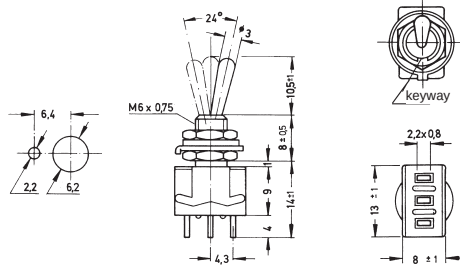
UL recognized components on request.

Models: Switching functions

SPDT



MTA 106 D	on	–	on
MTA 106 E	on	off	on
MTA 106 F	mom	–	on
MTA 106 G	mom	off	mom
MTA 106 H	mom	off	on



DPDT

MTA 206 N	on	–	on
MTA 206 P	on	off	on
MTA 206 R	mom	–	on
MTA 206 S	mom	off	mom
MTA 206 T	mom	off	on
MTA 206 PA	on	on	on
MTA 206 SA	mom	on	mom
MTA 206 TA	mom	on	on

measures: a = 9, b = 14 ± 1



3PDT

MTA 306 D	on	–	on
MTA 306 E	on	off	on
MTA 306 F	mom	–	on
MTA 306 G	mom	off	mom
MTA 306 H	mom	off	on
MTA 306 EA	on	on	on



4PDT

MTA 406 N	on	–	on
MTA 406 P	on	off	on
MTA 406 R	mom	–	on
MTA 406 S	mom	off	mom
MTA 406 T	mom	off	on
MTA 406 PA	on	on	on
MTA 406 SA	mom	on	mom
MTA 406 TA	mom	on	on



UL recognized components on request.



Miniature Toggle Switches waterproof

2

Specifications:

Contact rating:	250 V AC, 3 A / 125 V AC, 6 A 30 V DC, 4 A / 12 V DC, 5 A 6 V DC, 6 A
Contact resistance:	< 20 mΩ
Insulation resistance:	> 1000 MΩ at 500 V DC
Dielectric strength:	1500 V, 50 Hz for the duration of 1 minute
Operating temperature:	– 45 °C to +140 °C
Mechanical life:	minimum 100 000 operations
Contacts:	coin silver (common contact copper alloy, silver-plated) also available gold-plated, version B and G, see page 4
Terminals:	solder tags, copper alloy silver-plated further terminal versions see page 8
Protection:	30 minutes at 1 m water column; IP 67
Sealing:	neoprene O-rings between toggle/bushing and bushing/panel
Material:	case: diallyle-phthalate, meets UL 94 V–0, black lever: chromium-plated, metal parts: nickel-plated
Mounting:	bushing M 6 x 0,75 locking through flat bush, key 9 mm
Soldering conditions:	hand-soldering – max.: 60 W, 3 sec, 420 °C wave-soldering – max.: 5 sec, 270 °C

UL recognized components on request.



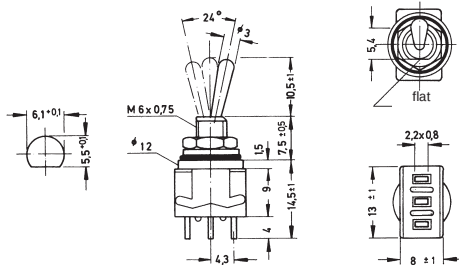
Miniature Toggle Switches waterproof

2

Models: Switching functions

SPDT

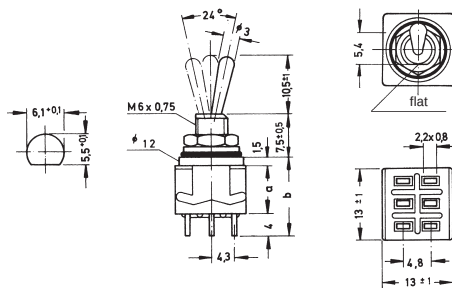
MTE 106 D	on	–	on
MTE 106 E	on	off	on
MTE 106 F	mom	–	on
MTE 106 G	mom	off	mom
MTE 106 H	mom	off	on



DPDT

MTE 206 N	on	–	on
MTE 206 P	on	off	on
MTE 206 R	mom	–	on
MTE 206 S	mom	off	mom
MTE 206 T	mom	off	on
MTE 206 PA	on	on	on
MTE 206 SA	mom	on	mom
MTE 206 TA	mom	on	on

measures: a = 9, b = 14,5±1



3PDT

MTE 306 D	on	–	on
MTE 306 E	on	off	on
MTE 306 F	mom	–	on
MTE 306 G	mom	off	mom
MTE 306 H	mom	off	on



4PDT

MTE 406 N	on	–	on
MTE 406 P	on	off	on
MTE 406 R	mom	–	on
MTE 406 S	mom	off	mom
MTE 406 T	mom	off	on
MTE 406 PA	on	on	on
MTE 406 SA	mom	on	mom
MTE 406 TA	mom	on	on



UL recognized components on request.

Miniature Toggle Switches with locking lever

2

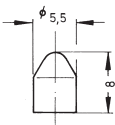
Specifications:

Contact rating:	250 V AC, 3 A / 125 V AC, 6 A 30 V DC, 4 A / 12 V DC, 5 A 6 V DC, 6 A
Contact resistance:	< 20 mΩ
Insulation resistance:	> 1000 MΩ at 500 V DC
Dielectric strength:	1500 V, 50 Hz for the duration of 1 minute
Operating temperature:	– 45 °C to +140 °C
Mechanical life:	minimum 300 000 operations
Contacts:	coin silver (common contact copper alloy, silver-plated) also available gold-plated, version B and G, see page 4
Terminals:	solder tags, copper alloy silver-plated
Material:	case: diallyle-phthalate, meets UL 94 V–0, black lever: chromium-plated, metal parts: nickel-plated
Mounting:	bushing M 6 x 0.75, with locking plate, key 9 mm, tightening torque 49 Ncm max.
Soldering conditions:	hand-soldering – max.: 60 W, 3 sec, 420 °C wave-soldering – max.: 5 sec, 270 °C

Accessories:

Aluminium marker caps:

black	KL 105
red	KL 109
silver	KL 110



UL recognized components on request.



Miniature Toggle Switches with locking lever

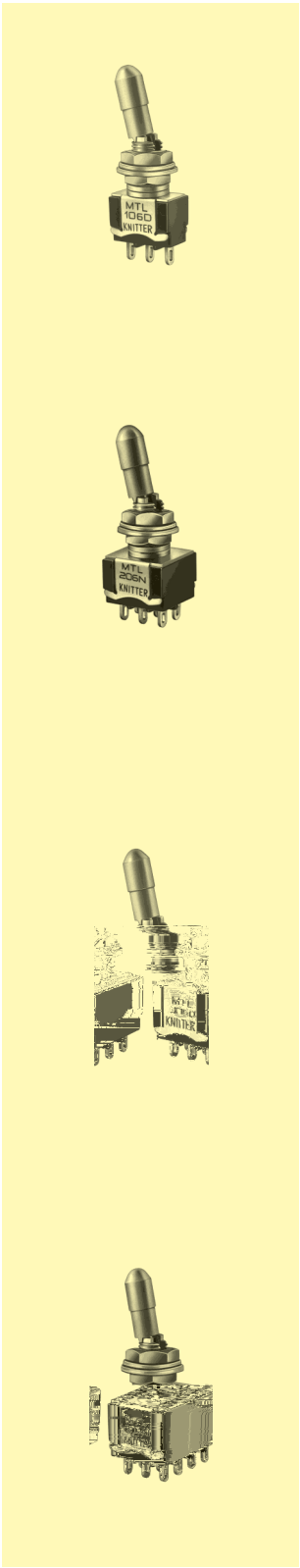
Models Switching functions

S P D T		●		
MTL 106 D	on	–	on	
MTL 106 E	on	off	on	

D P D T				
MTL 206 N	on	–	on	
MTL 206 P	on	off	on	
measures: a = 9, b = 15 ± 1				
MTL 206 PA	on	on	on	
measures: a = 11,5, b = 17,5 ± 1				

3 P D T				
MTL 306 D	on	–	on	

4 P D T				
MTL 406 N	on	–	on	
MTL 406 P	on	off	on	



UL recognized components on request.

Mustang Toggle Switches

2

Specifications:

Contact rating:	250 V AC, 3 A / 125 V AC, 6 A 30 V DC, 4 A / 12 V DC, 5 A 6 V DC, 6 A
Contact resistance:	< 20 mΩ
Insulation resistance:	> 1000 MΩ at 500 V DC
Dielectric strength:	1500 V, 50 Hz for the duration of 1 minute
Operating temperature:	– 45 °C to +140 °C
Mechanical life:	minimum 200 000 operations (100 000 cycles for SA and TA)
Contacts:	coin silver (common contact copper alloy, silver-plated) also available gold-plated version B and G, see page 4
Terminals:	solder tags, copper alloy silver-plated further terminal versions see page 8
Material:	case: diallyle-phthalate, meets UL 94 V–0, green lever: chromium-plated, metal parts: nickel-plated
Mounting:	bushing 15/32-32 THD with locking plate (M 12 x 0.75), key 14 mm
Soldering conditions:	hand-soldering – max.: 60 W, 3 sec, 420 °C wave-soldering – max.: 5 sec, 270 °C

Accessories:

Waterproof sealing cap (height 21.4 mm)

grey

ET 307



Waterproof sealing cap (height 11 mm)

grey

ET 507 Z





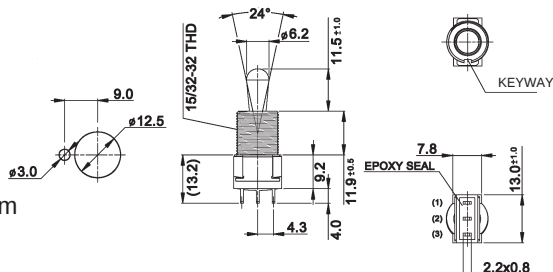
Mustang Toggle Switches

2

Models: Switching functions

S P D T

MTG 106 D	on	–	on
MTG 106 E	on	off	on
MTG 106 F	mom	–	on
MTG 106 G	mom	off	mom
MTG 106 H	mom	off	on

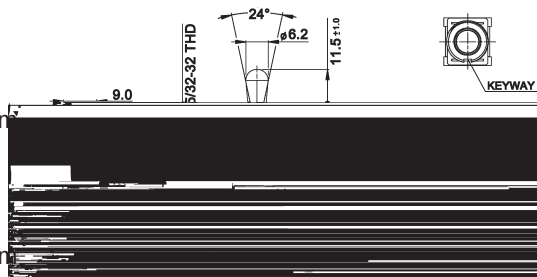


D P D T

MTG 206 N	on	–	on
MTG 206 P	on	off	on
MTG 206 R	mom	–	on
MTG 206 S	mom	off	mom
MTG 206 T	mom	off	on
MTG 206 PA	on	on	on
MTG 206 SA	mom	on	mom
MTG 206 TA	mom	on	on

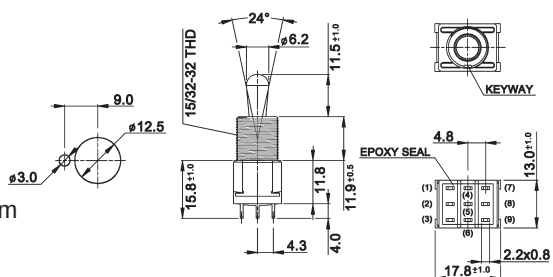
measures: a = 9, b = 13 ± 1

measures: a = 11,5, b = 15,5 ± 1



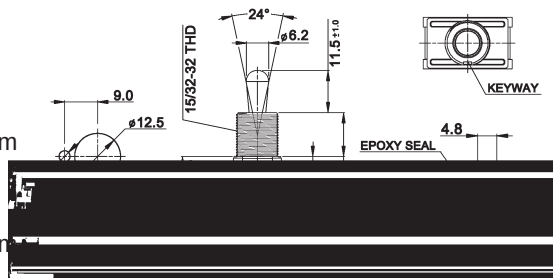
3 P D T

MTG 306 D	on	–	on
MTG 306 E	on	off	on
MTG 306 F	mom	–	on
MTG 306 G	mom	off	mom
MTG 306 H	mom	off	on



4 P D T

MTG 406 N	on	–	on
MTG 406 P	on	off	on
MTG 406 R	mom	–	on
MTG 406 S	mom	off	mom
MTG 406 T	mom	off	on
MTG 406 PA	on	on	on
MTG 406 SA	mom	on	mom
MTG 406 TA	mom	on	on



UL recognized components on request.

Mustang Toggle Switches waterproof

2

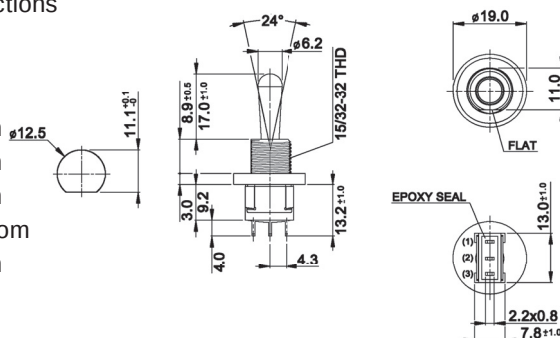
Specifications:

Contact rating:	250 V AC, 3 A / 125 V AC, 6 A 30 V DC, 4 A / 12 V DC, 5 A 6 V DC, 6 A
Contact resistance:	< 20 mΩ
Insulation resistance:	> 1000 MΩ at 500 V DC
Dielectric strength:	1500 V, 50 Hz for the duration of 1 minute
Operating temperature:	– 45 °C to +140 °C
Mechanical life:	minimum 100 000 operations
Contacts:	coin silver (common contact copper alloy, silver-plated) also available gold-plated version B and G, see page 4
Terminals:	solder tags, copper alloy silver-plated
Protection:	IP 67
Sealing:	neoprene O-rings between toggle/bushing and bushing/panel
Material:	case: diallyle-phthalate, meets UL 94 V-0, green lever: chromium-plated, metal parts: nickel-plated
Mounting:	bushing 15/32-32 THD locking through flat bush, key 14 mm
Soldering conditions:	hand-soldering – max.: 60 W, 3 sec, 420 °C wave-soldering – max.: 5 sec, 270 °C

Models: Switching functions

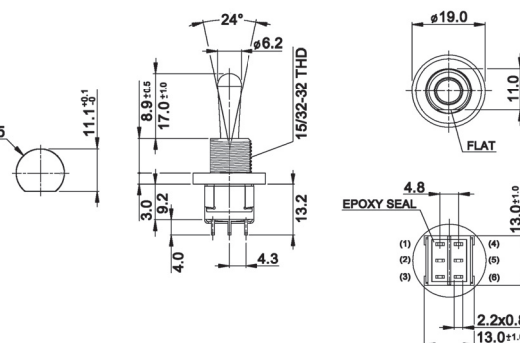
SPDT

MTW 106 D	on	–	on
MTW 106 E	on	off	on
MTW 106 F	mom	–	on
MTW 106 G	mom	off	mom
MTW 106 H	mom	off	on



DPDT

MTW 206 N	on	–	on
MTW 206 P	on	off	on
MTW 206 R	mom	–	on
MTW 206 S	mom	off	mom
MTW 206 T	mom	off	on
MTW 206 PA	on	on	on



Accessories:

Waterproof sealing cap (height 11 mm)
grey ET 507 Z





Miniature Toggle Switches for horizontal mounting, without thread



2

Specifications:

Contact rating:	250 V AC, 3 A / 125 V AC, 6 A 30 V DC, 4 A / 12 V DC, 5 A 6 V DC, 6 A
Contact resistance:	< 10 mΩ
Insulation resistance:	> 1000 MΩ at 500 V DC
Dielectric strength:	1500 V, 50 Hz for the duration of 1 minute
Operating temperature:	– 20 °C to + 80 °C
Mechanical life:	minimum 100 000 operations
Contacts:	coin silver (common contact copper alloy, silver-plated)
Terminals:	PC terminals, copper alloy silver-plated
Material:	case: diallyle-phthalate, meets UL 94 V–0, black lever: chromium-plated, metal parts: nickel-plated
Mounting:	on pc-board, horizontal mounting
Soldering conditions:	wave-soldering – max.: 5 sec, 270 °C

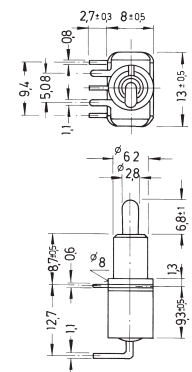
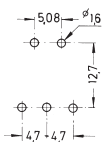
Models:

Switching functions

SPDT

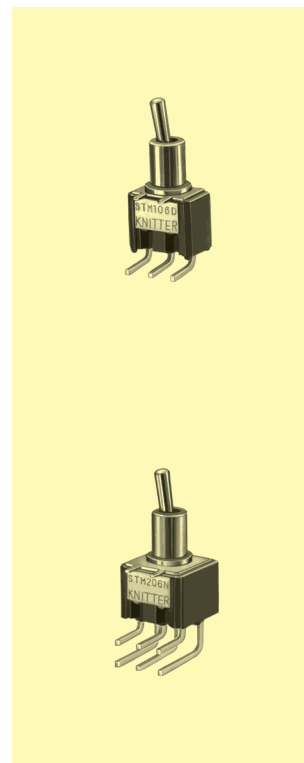
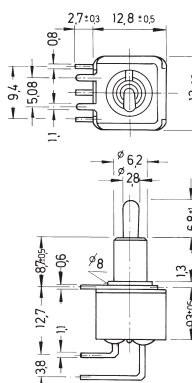
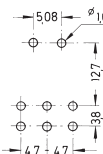


STM 106 D – RA	on	–	on
STM 106 E – RA	on	off	on
STM 106 F – RA	mom	–	on
STM 106 G – RA	mom	off	mom
STM 106 H – RA	mom	off	on



DPDT

STM 206 N – RA	on	–	on
STM 206 P – RA	on	off	on
STM 206 R – RA	mom	–	on
STM 206 S – RA	mom	off	mom
STM 206 T – RA	mom	off	on





Miniature Toggle Switches for vertical mounting, without thread

2

Specifications:

Contact rating:	250 V AC, 3 A / 125 V AC, 6 A 30 V DC, 4 A / 12 V DC, 5 A 6 V DC, 6 A
Contact resistance:	< 10 mΩ
Insulation resistance:	> 1000 MΩ at 500 V DC
Dielectric strength:	1500 V, 50 Hz for the duration of 1 minute
Operating temperature:	– 20 °C to + 80 °C
Mechanical life:	minimum 100 000 operations
Contacts:	coin silver (common contact copper alloy, silver-plated)
Terminals:	PC terminals, copper alloy silver-plated
Material:	case: diallyle-phthalate, meets UL 94 V–0, black lever: chromium-plated, metal parts: nickel-plated
Mounting:	on pc-board, vertical mounting
Soldering conditions:	wave-soldering – max.: 5 sec, 270 °C

Models:

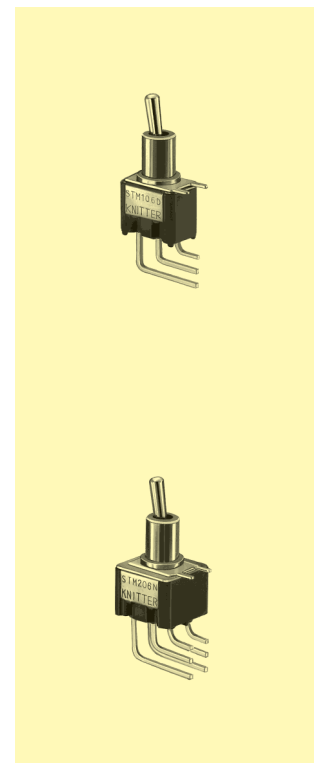
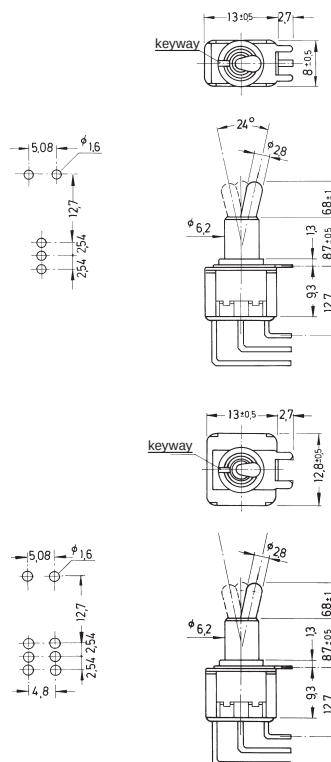
Switching functions

S P D T

STM 106 D – VM	on	–	on
STM 106 E – VM	on	off	on
STM 106 F – VM	mom	–	on
STM 106 G – VM	mom	off	mom
STM 106 H – VM	mom	off	on

D P D T

STM 206 N – VM	on	–	on
STM 206 P – VM	on	off	on
STM 206 R – VM	mom	–	on
STM 206 S – VM	mom	off	mom
STM 206 T – VM	mom	off	on



Subminiature Toggle Switches

2**Specifications:**

Contact rating:	max. 48 V AC/DC, 0.4 VA / max. 50 mA min. 20 mV AC/DC, 1 μ A
Contact resistance:	< 50 m Ω
Insulation resistance:	> 1000 M Ω
Dielectric strength:	500 V, 50 Hz for the duration of 1 minute
Operating temperature:	–40 °C to +85 °C
Electrical life:	minimum 40 000 operations
Contacts:	phosphor-bronze, gold-plated over nickel barrier
Terminals:	phosphor-bronze, gold-plated over nickel barrier
Protection:	IP 67
Material:	case: PBT meets UL 94 V-0, washable bushing/frame: stainless steel switch-support: brass, tin-plated actuator: brass, chromium-plated
Mounting:	on pc-board
Soldering conditions:	wave-soldering – max.: 5 $\pm$ 1 sec, 260 °C $\pm$ 5 °C

UL recognized components on request.



Subminiature Toggle Switches

2

Models:

Switching functions:

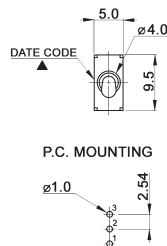
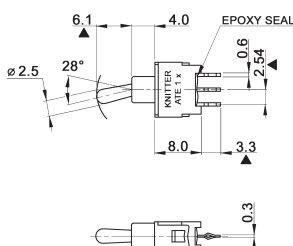
Switching functions F / H:

the closed contacts are opposite to the lever position;
when looking at the brand name on the right hand side

washable

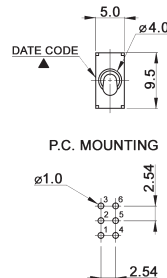
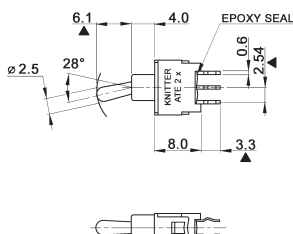
SPDT

ATE 1 D	on	–	on
ATE 1 E	on	off	on
ATE 1 F	mom	–	on
ATE 1 G	mom	off	mom
ATE 1 H	mom	off	on



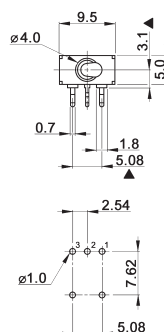
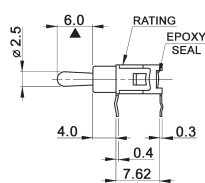
DPDT

ATE 2 D	on	–	on
ATE 2 E	on	off	on
ATE 2 F	mom	–	on
ATE 2 G	mom	off	mom
ATE 2 H	mom	off	on



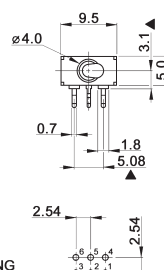
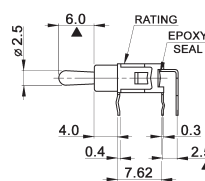
SPDT

ATE 1 D – RA	on	–	on
ATE 1 E – RA	on	off	on
ATE 1 F – RA	mom	–	on
ATE 1 G – RA	mom	off	mom
ATE 1 H – RA	mom	off	on



DPDT

ATE 2 D – RA	on	–	on
ATE 2 E – RA	on	off	on
ATE 2 F – RA	mom	–	on
ATE 2 G – RA	mom	off	mom
ATE 2 H – RA	mom	off	on



UL recognized components on request.



Subminiature Toggle Switches waterproof



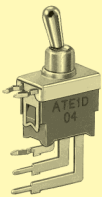
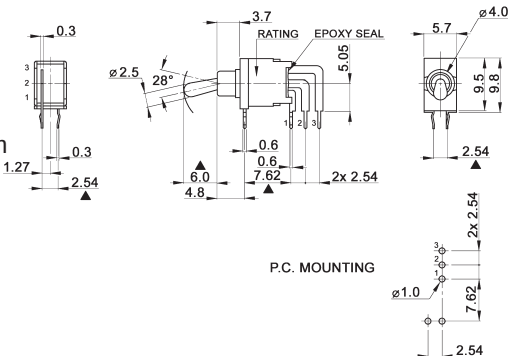
Specifications: see page 22

Models: Switching functions the closed contacts are opposite to the lever position;
Switching functions F/H: when looking at the brand name on the right hand side.

washable

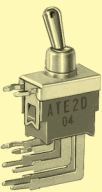
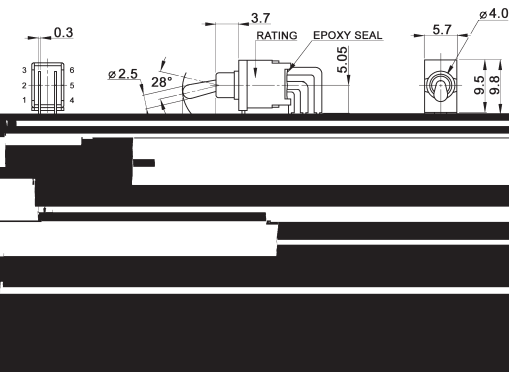
SPDT

ATE 1 D – VM	on	–	on
ATE 1 E – VM	on	off	on
ATE 1 F – VM	mom	–	on
ATE 1 G – VM	mom	off	mom
ATE 1 H – VM	mom	off	on



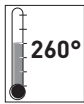
DPDT

ATE 2 D – VM	on	–	on
ATE 2 E – VM	on	off	on
ATE 2 F – VM	mom	–	on
ATE 2 G – VM	mom	off	mom
ATE 2 H – VM	mom	off	on



Accessories: see page 22.

UL recognized components on request.



Subminiature Toggle Switches for SMT, waterproof

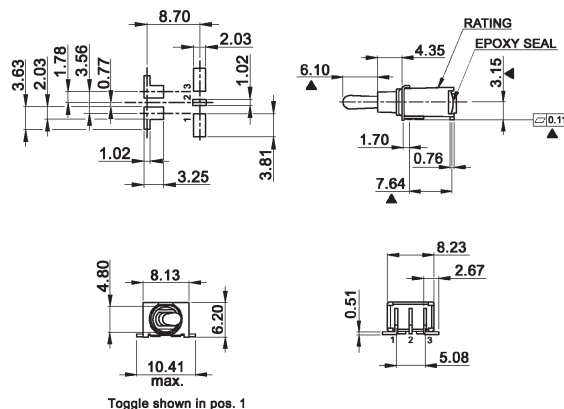
2

Specifications:

Contact rating:	max. 20 V AC/DC, 0.4 VA
Contact resistance:	< 20 mΩ
Insulation resistance:	> 1000 MΩ
Dielectric strength:	1000 V RMS at sea level
Operating temperature:	-30 °C to +85 °C
Electrical life:	30000 operations at full load
Contacts:	copper alloy, with gold plate over nickel plate
Terminals:	copper alloy, with gold plate over nickel plate
Protection:	IP 67
Material:	case and bushing: glass filled nylon 6/6 (UL 94 V-0) actuator: brass, chromium-plated switch support: brass, tin-plated
Mounting:	on pc-board – SMD

Model: Switching function

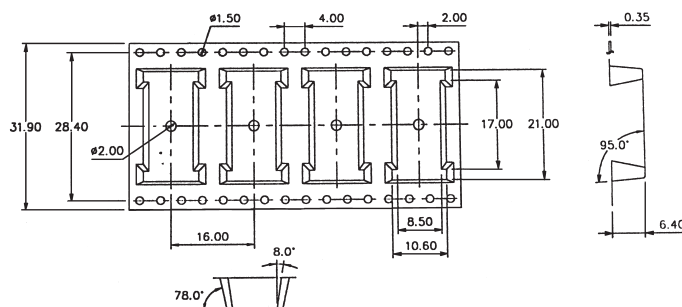
SST 1 DB-R on – on



washable



Packing:
500 pcs/reel



Subminiature Toggle Switches ESD proof, waterproof



2

Specifications:

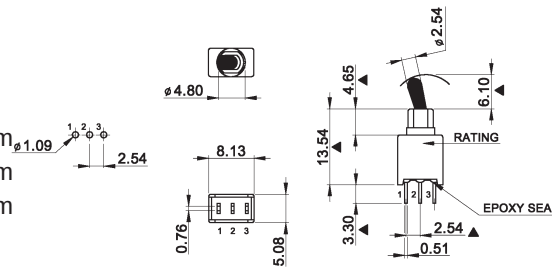
Contact rating:	max. 20 V AC / DC, 0.4 VA
Contact resistance:	< 20 mΩ
Insulation resistance:	> 1000 MΩ
Dielectric strength:	1000 V, 50 Hz for the duration of 1 minute
Operating temperature:	– 30 °C to + 85 °C
Mechanical life:	minimum 30 000 operations
Contacts/Terminals:	copper alloy
Material:	case: nylon with glass fibre, meets UL 94 V–0, washable support: brass, tin-plated lever: brass, chromium-plated (...-ESD: PA, ESD resistance 6 kV)
Protection:	IP 67
Mounting:	on pc-board

Models: Switching functions: the closed contacts are opposite to the lever position.

washable

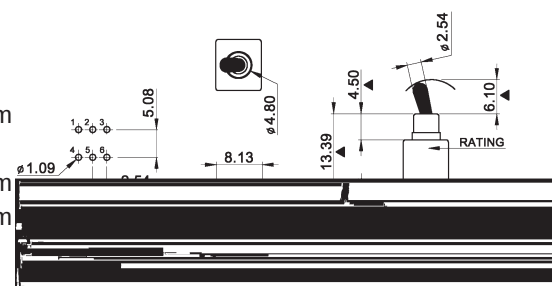
S P D T

TST 1 D (-ESD)	on	–	on
TST 1 E (-ESD)	on	off	on
TST 1 F (-ESD)	on	–	mom
TST 1 G (-ESD)	mom	off	mom
TST 1 H (-ESD)	on	off	mom



D P D T

TST 2 N (-ESD)	on	–	on
TST 2 R (-ESD)	on	–	mom
TST 2 P (-ESD)	on	off	on
TST 2 S (-ESD)	mom	off	mom
TST 2 T (-ESD)	on	off	mom
TST 2 PA (-ESD)	on	on	on





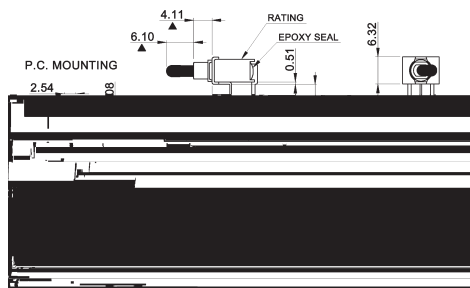
Subminiature Toggle Switches ESD proof, waterproof

2

Models: Switching functions: the closed contacts are opposite to the lever position.

SPDT

TST 1 D – RA (-ESD)	on	–	on
TST 1 E – RA (-ESD)	on	off	on
TST 1 F – RA (-ESD)	on	–	mom
TST 1 G – RA (-ESD)	mom	off	mom
TST 1 H – RA (-ESD)	on	off	mom

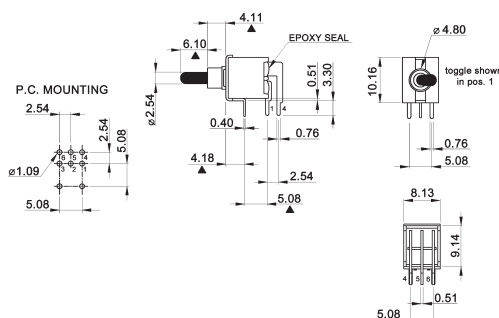


washable



DPDT

TST 2 N – RA (-ESD)	on	–	on
TST 2 R – RA (-ESD)	on	–	mom
TST 2 P – RA (-ESD)	on	off	on
TST 2 S – RA (-ESD)	mom	off	mom
TST 2 T – RA (-ESD)	on	off	mom
TST 2 PA – RA (-ESD)	on	on	on



Specifications:

Contact rating:	max. 28 V DC, 0.4 VA min. 20 mV DC, 1 μ A
Contact resistance:	< 100 m Ω
Insulation resistance:	> 500 M Ω at 250 V DC
Dielectric strength:	250 V, 50 Hz for the duration of 1 minute
Operating temperature:	–40 °C to +85 °C
Mechanical life:	minimum 30 000 operations
Contacts:	phosphor bronze, gold-plated
Terminals:	PC terminals, crimped, phosphor bronze, gold-plated
Material:	case and lever: PES, meets UL 94 V–0, washable
Mounting:	on pc-board
Soldering conditions:	wave-soldering – max.: 7 sec, 250 °C $\pm$ 5 °C – max.: 5 sec, 270 °C $\pm$ 5 °C
ESD resistance:	> 8 kV (between lever and terminals)



Microminiature Toggle Switches ESD proof

2

Models:

Switching functions:

the closed contacts are opposite to the lever position;

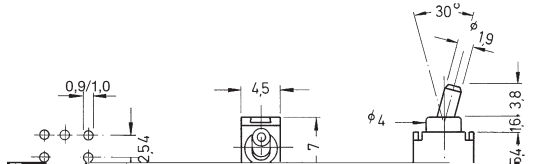
Switching functions F/H:

when looking at the brand name on the left hand side.

washable

SPDT

FT 1 D	on	–	on
FT 1 E	on	off	on
FT 1 F	mom	–	on
FT 1 G	mom	off	mom
FT 1 H	mom	off	on



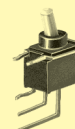
DPDT

FT 2 D	on	–	on
FT 2 E	on	off	on
FT 2 F	mom	–	on
FT 2 G	mom	off	mom
FT 2 H	mom	off	on



SPDT

FT 1 D – VM	on	–	on
FT 1 E – VM	on	off	on
FT 1 F – VM	mom	–	on
FT 1 G – VM	mom	off	mom
FT 1 H – VM	mom	off	on



DPDT

FT 2 D – VM	on	–	on
FT 2 E – VM	on	off	on
FT 2 F – VM	mom	–	on
FT 2 G – VM	mom	off	mom
FT 2 H – VM	mom	off	on



3

Pushbutton Switches

3.1 Miniature Pushbutton Switches



Series MPA	standard	32–33
Series MPE	waterproof IP 67	34–35
Series MPG	heavy duty	36–37
Series MPS	snap action	38
Series MPM		39
Series MPS		40
Series MPBS	2–6 poles	41
Series MPSA	0.6 N – 3.5 N operating force	42

3.2 Subminiature Pushbutton Switches



Series APE	standard	43
Series MZP	low cost	44
Series TSP	waterproof IP 67	45
Series SSP	for SMT/waterproof IP 67	45

3.3 Microminiature Pushbutton Switches



Series FP	ESD proof	46–47
Series SSP	for SMT	48

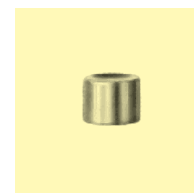
Miniature Pushbutton Switches

Specifications:

Contact rating:	250 V AC, 3 A / 125 V AC, 6 A 30 V DC, 4 A / 12 V DC, 5 A 6 V DC, 6 A
Contact resistance:	< 20 mΩ
Insulation resistance:	> 1000 MΩ at 500 V DC
Dielectric strength:	1500 V, 50 Hz for the duration of 1 minute
Operating temperature:	– 45 °C to +140 °C
Mechanical life:	minimum 30 000 operations
Contacts:	coin silver (common contact copper alloy, silver-plated) also available gold-plated, version B and G, see page 4
Terminals:	solder tags, copper alloy silver-plated further terminal versions see page 8
Material:	case: diallyl-phthalate meets UL 94 V–0, black metal parts: nickel-plated
Mounting:	bushing M 6 x 0,75 with locking plate, key 9 mm
Soldering conditions:	hand-soldering – max.: 60 W, 3 sec, 420 °C wave-soldering – max.: 5 sec, 270 °C

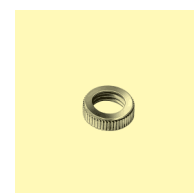
Accessories:

Buttons	Ø (height 8 mm)		Ø (height 10 mm)	
orange	10 mm	KM 403		
blue	10 mm	KM 404		
black	10 mm	KM 405	15 mm	KM 605
green	10 mm	KM 406		
grey	10 mm	KM 407	15 mm	KM 607
yellow	10 mm	KM 408		
red	10 mm	KM 409	15 mm	KM 609
white	10 mm	KM 410	15 mm	KM 610



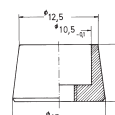
Knurled nut, nickel-plated

M 6 x 0,75	8 mm	R 675
------------	------	-------



Covers

M 6 x 0,75	
Brass chromium-plated	CO 106
Brass black, matt finish	CO 106 S



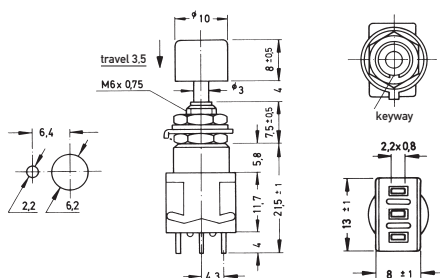
Models:

Switching functions

SPDT

MPA 106 F
MPA 106 D

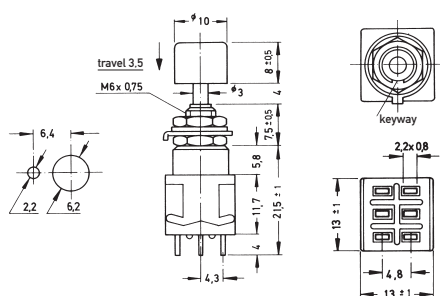
* on - mom
on - on



DPDT

MPA 206 R
MPA 206 N

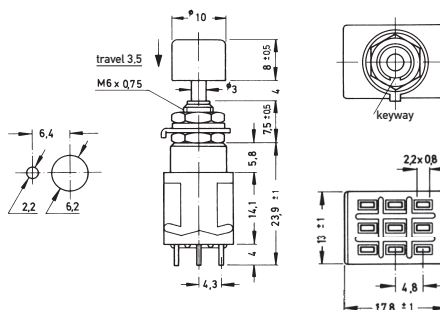
* on - mom
on - on



3PDT

MPA 306 F
MPA 306 D

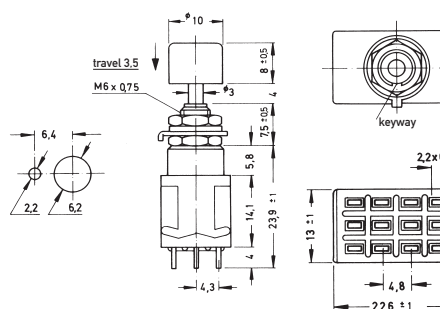
* on - mom
on - on



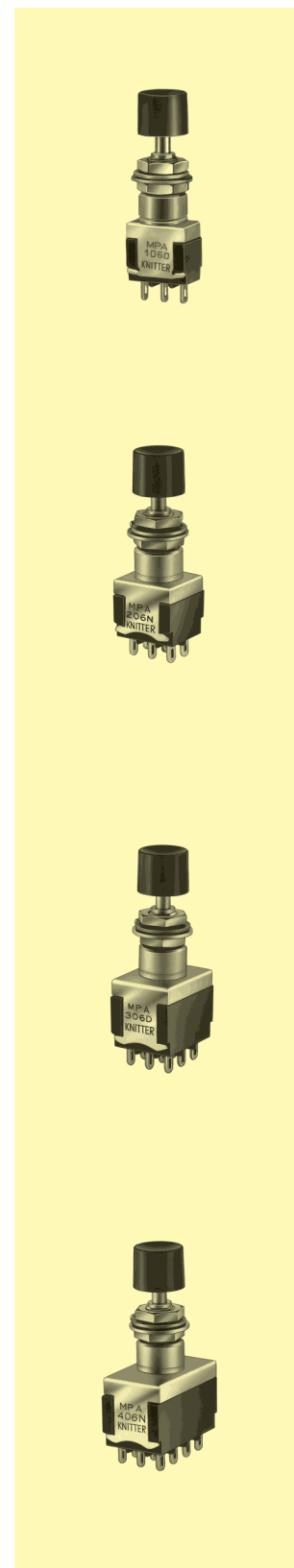
4PDT

MPA 406 R
MPA 406 N

* on - mom
on - on



* When looking at the brand name the normally closed contact is on the right-hand side.



Miniature Pushbutton Switches waterproof

Specifications:

Contact rating:	250 V AC, 3 A / 125 V AC, 6 A 30 V DC, 4 A / 12 V DC, 5 A / 6 V DC, 6 A
Contact resistance:	< 20 mΩ
Insulation resistance:	> 1000 MΩ at 500 V DC
Dielectric strength:	1500 V, 50 Hz for the duration of 1 minute
Operating temperature:	–45 °C to +140 °C
Mechanical life:	minimum 30000 operations
Contacts:	coin silver (common contact copper alloy, silver-plated) also available gold-plated, version B and G, see page 4
Terminals:	solder tags, copper alloy silver-plated further terminal versions see page 8
Case material:	diallyl-phthalate, black metal parts: nickel-plated
Protection:	30 minutes at 1 m water column; IP 67
Sealing:	neoprene O-rings between toggle/bushing and bushing/panel
Mounting:	bushing M 6 x 0.75, key 9 mm
Soldering conditions:	hand-soldering – max.: 60 W, 3 sec, 420 °C wave-soldering – max.: 5 sec, 270 °C

Accessories:

Buttons	Ø (height 8 mm)		Ø (height 10 mm)	
orange	10 mm	KM 403		
blue	10 mm	KM 404		
black	10 mm	KM 405	15 mm	KM 605
green	10 mm	KM 406		
grey	10 mm	KM 407	15 mm	KM 607
yellow	10 mm	KM 408		
red	10 mm	KM 409	15 mm	KM 609
white	10 mm	KM 410	15 mm	KM 610



Covers

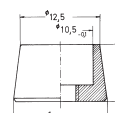
M 6 x 0.75

Brass, chromium-plated

Brass, black, matt finish

CO 106

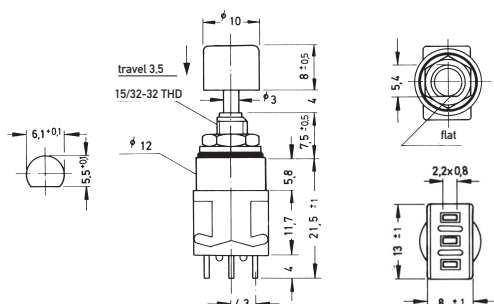
CO 106 S



Models: Switching functions

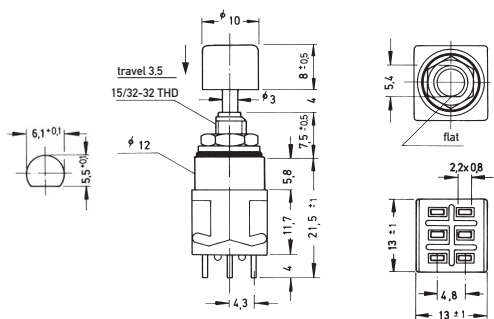
SPDT

MPE 106 F	* on	—	mom
MPE 106 D	on	—	on



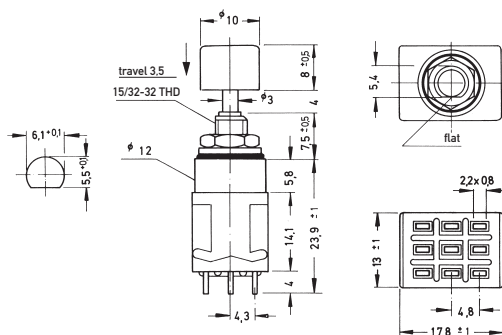
DPDT

MPE 206 R	* on	—	mom
MPE 206 N	on	—	on



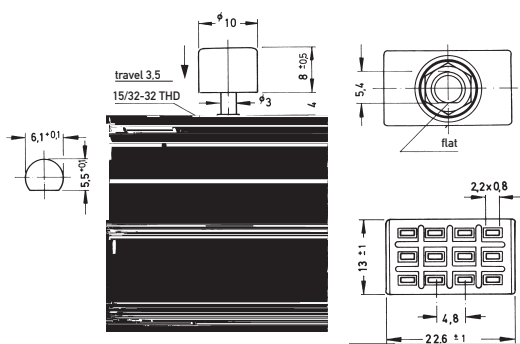
3PDT

MPE 306 F	* on	—	mom
MPE 306 D	on	—	on

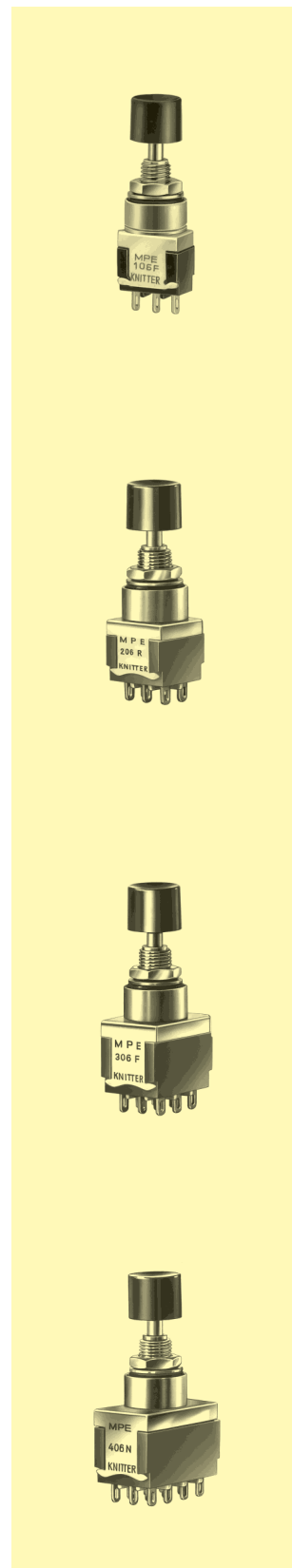


4PDT

MPE 406 R	* on	—	mom
MPE 406 N	on	—	on



* When looking at the brand name the normally closed contact is on the right-hand side.



Miniature Pushbutton Switches

heavy duty series



Specifications:

Contact rating:	250 V AC, 3 A / 125 V AC, 6 A 30 V DC, 4 A / 12 V DC, 5 A 6 V DC, 6 A
Contact resistance:	< 20 mΩ
Insulation resistance:	> 1000 MΩ at 500 V DC
Dielectric strength:	1500 V, 50 Hz for the duration of 1 minute
Operating temperature:	– 45 °C to +140 °C
Mechanical life:	minimum 30 000 operations
Contacts:	coin silver (common contact copper alloy, silver-plated) also available gold-plated, version B and G, see page 4
Terminals:	solder tags, copper alloy silver-plated further terminal versions see page 8
Material:	case: diallyl-phthalate meets UL 94 V–0, black metal parts: nickel-plated
Mounting:	bushing 15/32-32 THD (M 12 x 0.75), key 14 mm
Soldering conditions:	hand-soldering – max.: 60 W, 3 sec, 420 °C wave-soldering – max.: 5 sec, 270 °C

Accessories:

Waterproof sealing caps (height 14.8 mm)

grey	ET 207
red	ET 209

also available in fluoro silicone material





Miniature Pushbutton Switches snap action



Specifications:

Contact rating:	125 V AC, 3 A 30 V DC, 1 A / 12 V DC, 2 A / 6 V DC, 3 A
Contact resistance:	< 10 mΩ
Insulation resistance:	> 1000 MΩ at 500 V DC
Dielectric strength:	1000 V, 50 Hz for the duration of 1 minute
Operating temperature:	–20 °C to +80 °C
Mechanical life:	minimum 100000 operations
Contacts:	coin silver (common contact copper alloy, silver-plated) also available gold-plated version B, see page 4
Terminals:	solder tags, copper alloy silver-plated
Case material:	phenol resin, black
Mounting:	bushing M 6 x 0.75 with locking plate, key 9 mm
Soldering conditions:	hand-soldering – max.: 60 W, 3 sec, 420 °C

Models: Switching functions

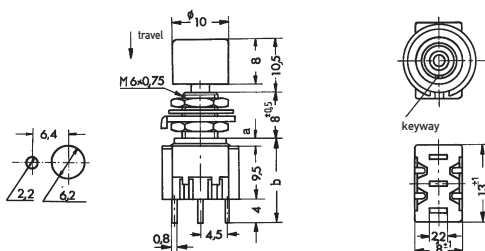
S P D T

MPS 103 F on – mom

measures: a = 1.5, b = 15^{±1}
travel 1.0

MPS 103 D on – on

measures: a = 2.5, b = 16^{±1}
travel 2.5



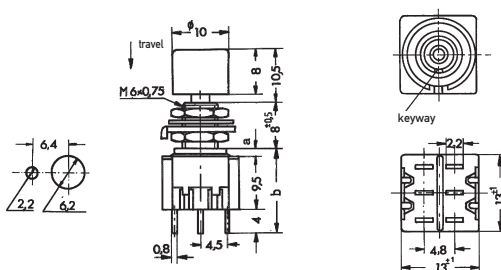
D P D T

MPS 203 R on – mom

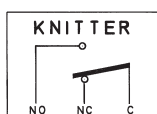
measures: a = 1.5, b = 15^{±1}
travel 1.0

MPS 203 N on – on

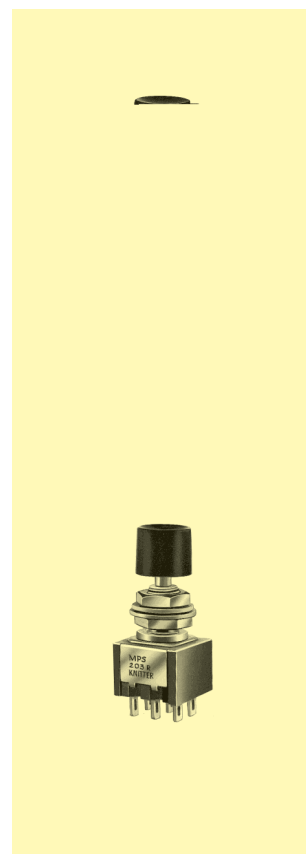
measures: a = 2.5, b = 16^{±1}
travel 2.5



Circuit diagram:



Accessories see page 34.





Miniature Pushbutton Switches snap action

3

Specifications:

Contact rating:	250 V AC, 1 A / 120 V AC, 3 A / 28 V DC, 3 A
Contact resistance:	< 20 mΩ
Insulation resistance:	> 1000 MΩ
Dielectric strength:	1000 V, 50 Hz for the duration of 1 minute
Operating temperature:	– 30 °C to + 85 °C
Mechanical life:	minimum 50 000 operations
Contacts, terminals:	silver plated copper alloy, solder lugs
Material:	Case: Diallyl-Phtalate meets UL 94 V-0, red Bushing: nickel-plated brass Housing: stainless steel Plunger: PA
Mounting:	bushing thread 1/4-40 UNS-2A, key 8 mm
Soldering conditions:	hand soldering, max. 5 s, 350 °C

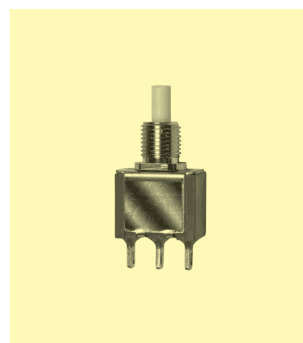
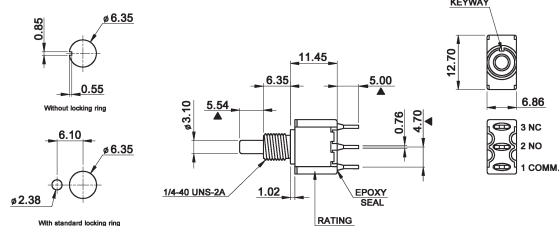
Models:

Switching functions

S P D T

M P M 1 F

on – mom



Miniature Pushbutton Switches

Specifications:

Contact rating:	30 V DC, 650 mA
Contact resistance:	< 20 mΩ
Insulation resistance:	> 500 MΩ at 500 V DC
Dielectric strength:	500 V, 50 Hz for the duration of 1 minute
Operating temperature:	– 20 °C to + 60 °C
Mechanical life:	minimum 20 000 operations
Contacts:	brass, silver-plated
Terminals:	solder tags
Material:	phenolformaldehyde, black
Mounting:	single-hole
Soldering conditions:	hand-soldering – max.: 3 sec, 260 °C ± 5 °C

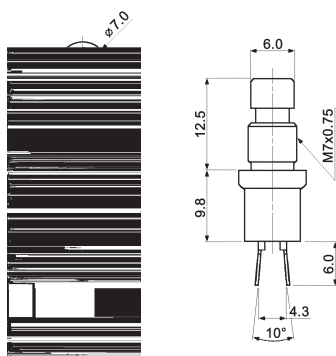
Models:

Contact arrangement

MPS 29 B

button colour: black
red

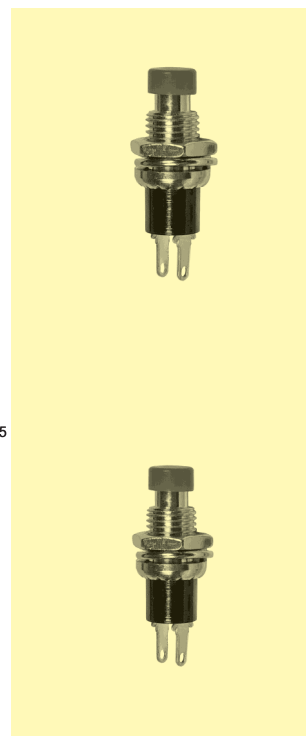
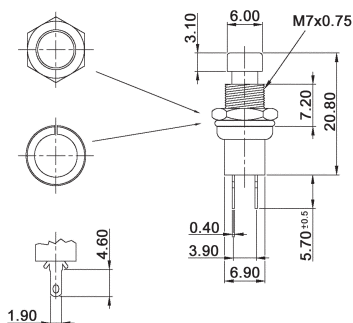
on – (mom)



MPS 29 C

button colour: black
red

off – mom



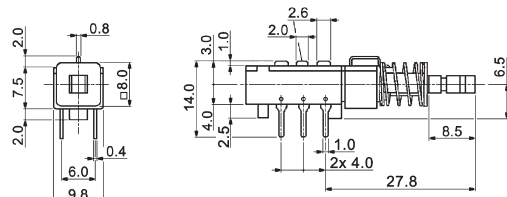


3

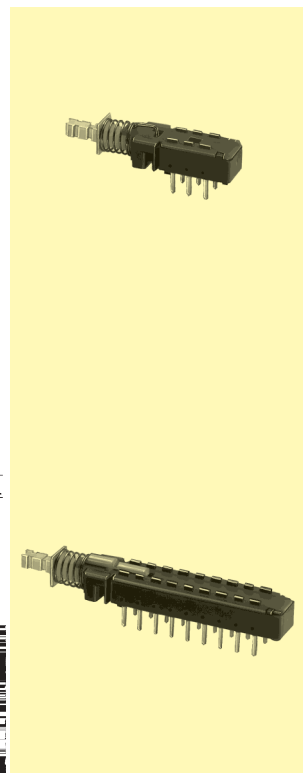
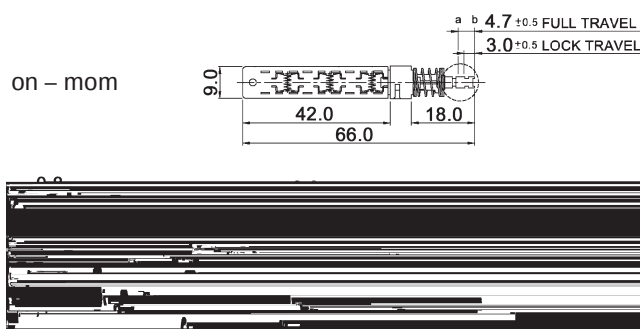
Mounting: on pc-board
Timing: non-shorting
Travel: 4.7 mm, locking travel: 3.0 mm
Soldering conditions: wave-soldering – max. 5 s, 260 °C

Switching function:

on – on



on – mom

MPBS - ☐ 2H01 ☐ - F14

Switching mode:

- ☐ on – mom
- ☒ on – on

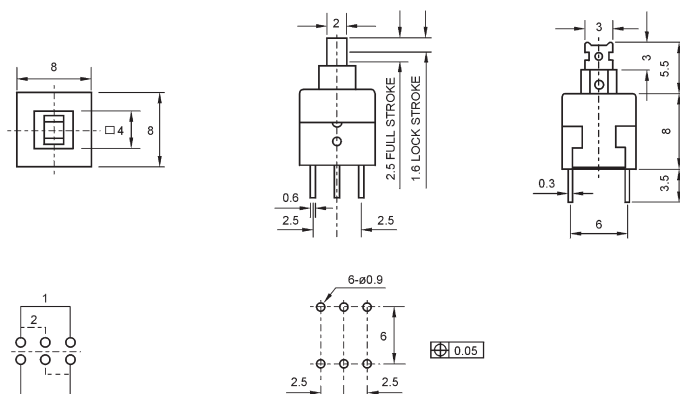
Miniature Pushbutton Switches

Specifications:

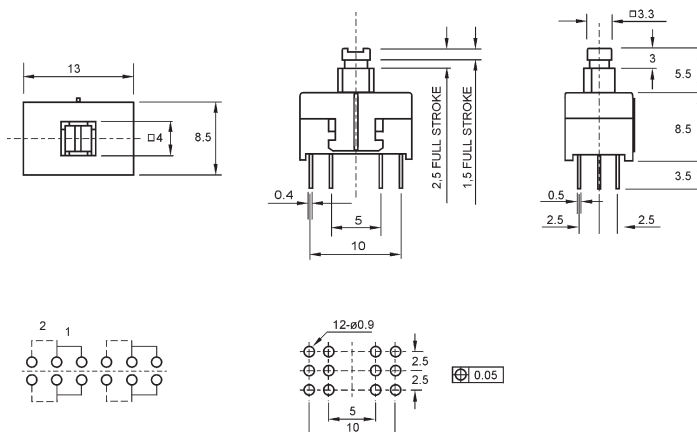
Contact rating:	30 V DC, 100 mA
Contact resistance:	< 20 mΩ
Insulation resistance:	> 100 MΩ
Dielectric strength:	500 V, 50 Hz for the duration of 1 minute
Operating temperature:	-10 °C to +60 °C
Electrical life:	minimum 10 000 operations
Contacts:	beryllium-copper, silver-plated
Terminals:	brass, silver-plated
Case:	base: PBT, cover: POM, actuator: POM
Mounting:	on pc-board
Timing:	non-shorting
Soldering conditions:	wave-soldering – max. 5 sec, 260 °C ± 5 °C

Models:

MPSA-22E08L-O
MPSA-22E08-O



MPSA-42E06L-O
MPSA-42E06-O



Minimum order quantity 1.000 pcs

Ordering Code:

MPSA - O - -

Number of poles:

22E08 2 poles
 42E06 4 poles

Switching function:

on – mom
 L on – on

Operating force:

for MPSA 42E06 only:

350 3.5 N ±1.0 N

for MPSA 22E08 only:

060 0.6 N ±0.25 N – for on-mom only
 150 1.5 N ±0.5 N – for on-mom only
 350 3.5 N ±1.0 N – for on-on only
 500 5.0 N ±1.0 N – for on-mom only

Contact / terminal surface:

for MPSA 42E06 only:

silver

for MPSA 22E08 only:

silver
 AU3 0.075 μm gold



Subminiature Pushbutton Switches

3

Specifications:

Contact rating:	max. 48 V AC/DC, 0.4 VA / max. 50 mA min. 20 mV AC/DC, 1 μ A
Contact resistance:	< 50 m Ω
Insulation resistance:	> 500 M Ω at 250 V DC
Dielectric strength:	500 V, 50 Hz for the duration of 1 minute
Operating temperature:	-20 °C to +85 °C
Mechanical life:	minimum 60000 operations
Contacts:	phosphor bronze, gold-plated over nickel barrier
Terminals:	APE – PC terminals, crimped, phosphor bronze, gold-plated over nickel barrier
Material:	case: PBT, meets UL 94 V-0, washable metal parts: brass, nickel-plated
Mounting:	on pc-board
Soldering conditions:	wave-soldering – max. 5 sec, 260 °C $\pm$ 5 °C

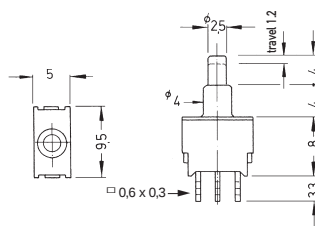
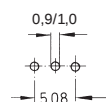
Models: Switching functions: when looking at the brand name,
the normally closed contact is on the right-hand side

washable

S P D T

APE 1 F

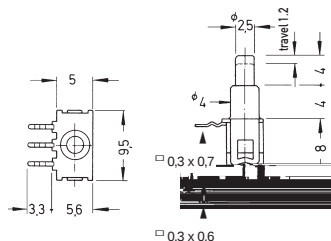
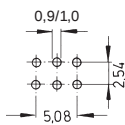
on – mom



D P D T

APE 2 F

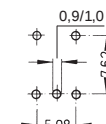
on – mom



S P D T

APE 1 F – RA

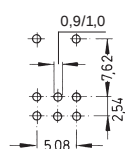
on – mom



D P D T

APE 2 F – RA

on – mom



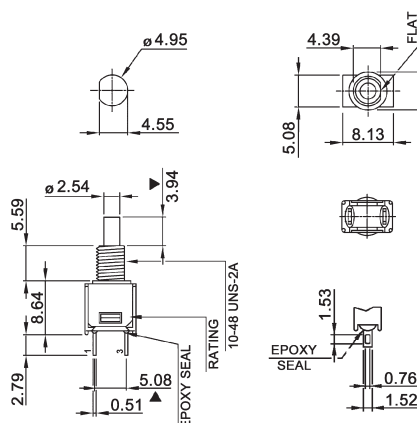
Subminiature Pushbutton Switches

Specifications:

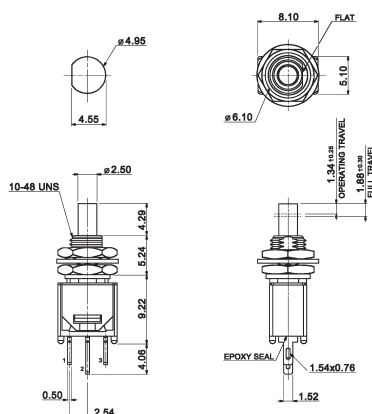
Contact rating:	250 V AC, 1 A / 120 V AC, 3 A / 28 V DC, 3 A
Contact resistance:	< 20 mΩ
Insulation resistance:	> 1000 MΩ
Dielectric strength:	1000 V, 50 Hz for the duration of 1 minute
Operating temperature:	-30 °C to +85 °C
Mechanical life:	minimum 50 000 operations
Contacts:	brass, silver-plated
Terminals:	brass, silver-plated
Case:	base: PA, cover: stainless steel, actuator: PA
Mounting:	single-hole
Timing:	non-shorting
Soldering conditions:	wave-soldering – max. 10 sec, max. 260 °C (pre-heat: max. 120 sec, max. 150 °C) manual soldering – max. 5 sec, max 350 °C

Models: Switching functions

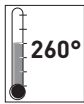
MZP 1 C off – mom



MZP 1 D on – on



Packing: 100 pcs/bag



Subminiature Pushbutton Switches waterproof

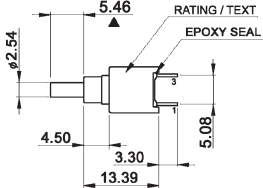
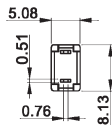
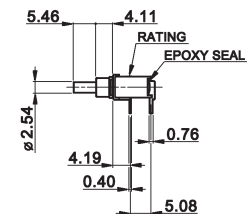
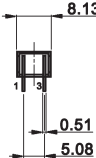
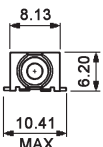
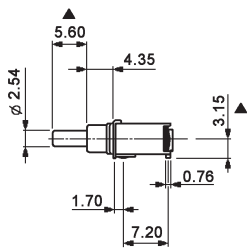
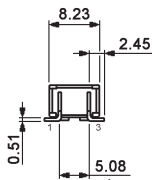
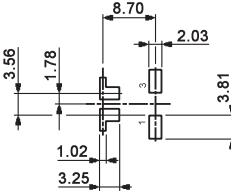
3

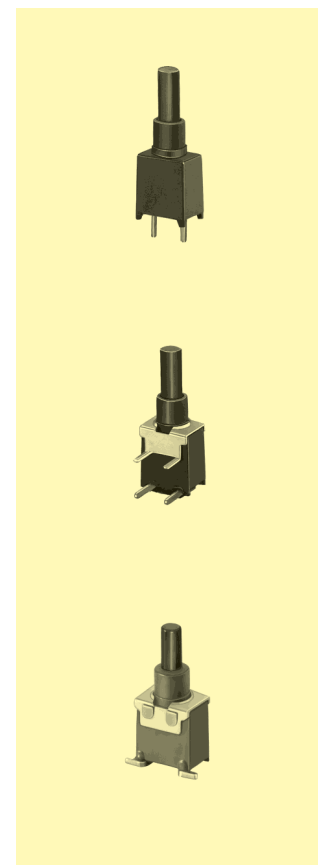
Specifications:

Contact rating:	20 V AC/DC, 0.4 VA
Contact resistance:	< 20 mΩ
Insulation resistance:	> 1000 MΩ
Dielectric strength:	1000 V, 50 Hz for the duration of 1 minute
Operating temperature:	-30 °C to +85 °C
Mechanical life:	minimum 50 000 operations
Contacts:	copper-alloy, gold-plate over nickel plate
Terminals:	copper-alloy, gold-plate over nickel plate
Case:	PA, support: brass, tin-plated, actuator: PA
Protection:	IP 67
Mounting:	TSP: on pc-board, holes Ø 1.09 mm, SSP: SMD
Travel:	0.9 mm
Soldering conditions:	TSP: wave-soldering – max. 10 sec, max. 260 °C (pre-heat max. 120 sec, max. 150 °C), SSP: see reflow-profile manual soldering – max. 5 sec, max 350 °C

Models: Switching functions

washable

TSP 1 C	off – mom			
TSP 1 C – RA	off – mom			
SSP 1 CB-R	off – mom			
Packing:				



Microminiature Pushbutton Switches ESD proof



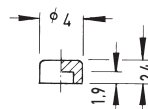
Specifications:

Contact rating:	max. 28 V DC, 0.4 VA min. 20 mV DC, 1 μ A
Contact resistance:	< 100 m Ω
Insulation resistance:	> 500 M Ω at 250 V DC
Dielectric strength:	250 V, 50 Hz for the duration of 1 minute
Operating temperature:	- 40 °C to + 85 °C
Mechanical life:	minimum 30 000 operations
Contacts:	phosphor bronze, gold-plated
Terminals:	PC terminals, crimped, phosphor bronze gold-plated
Material:	case and button: PES, meets UL 94 V-0, washable
Mounting:	on pc-board
Soldering conditions:	wave-soldering – max.: 7 sec, 250 °C $\pm$ 5 °C max.: 5 sec, 270 °C $\pm$ 5 °C
ESD resistance:	> 8 kV (between button and terminals)

Accessories:

Plastic caps

black	KF 4105
grey	KF 4107
red	KF 4109
white	KF 4110



Models:

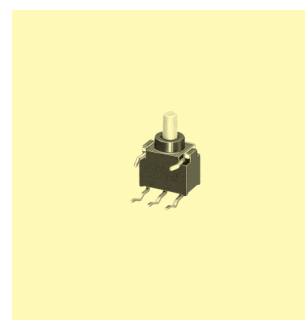
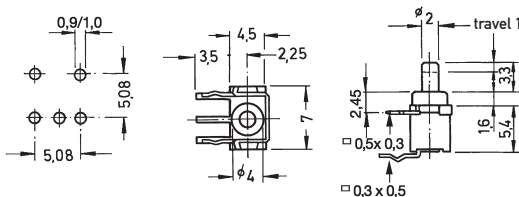
Switching functions: when looking at the brand name,
the normally closed contact is on the right hand side.

washable

S P D T

FP 1 F – RA

mom – on



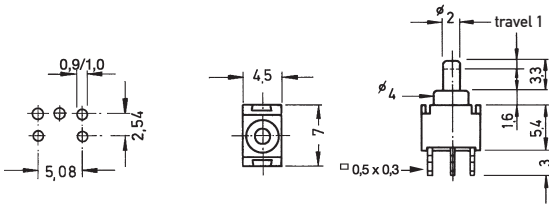


Microminiature Pushbutton Switches ESD proof

Models: Switching functions: when looking at the brand name,
the normally closed contact is on the left hand side.

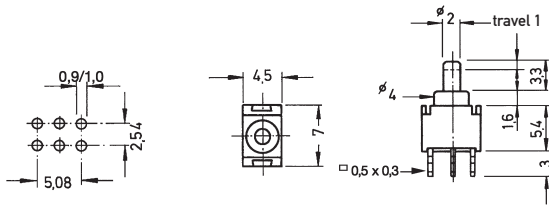
SPDT
FP 1F

on – mom

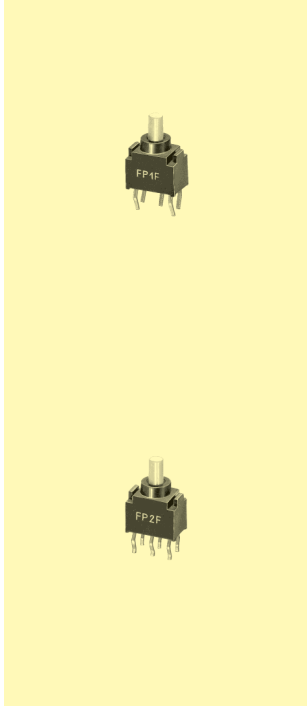


DPDT
FP 2F

on – mom

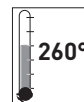


washable



3

Microminiature Pushbutton Switches for SMT

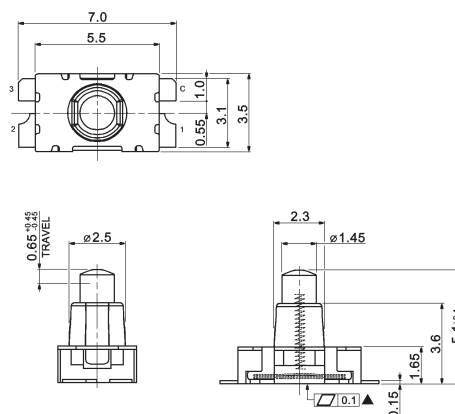


Specifications:

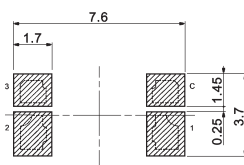
Contact rating:	50 V DC, 10 mA
Contact resistance:	< 100 mΩ
Insulation resistance:	>1000 MΩ
Dielectric strength:	100V, 50 Hz for the duration of 1 minute
Operating temperature:	-10 °C to +60 °C
Operating force:	1.1 ± 0.8 N
Mechanical life:	minimum 100 000 operations
Material:	Contacts, Terminals: phosphor-bronze, gold-plated Stem: brass, nickel-plated Case: HTN, black Cover: stainless steel
Travel:	0.65 ± 0.45 mm

Models: Switching function

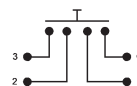
SSP 129 T off – mom



PCB Layout



Circuit diagram

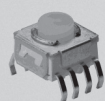
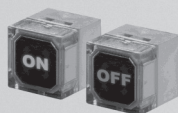


Packing:
1000 pcs/reel



4

Illuminated Pushbutton Switches



Type	latching	momentary	form		also non illuminated	number of colours / combinations	special feature	Page
			round	square				
DPL 1		•	•			6		52
DPW 1	•	•	•	•	•		waterproof IP 67	53
DPWL	•	•	•	•		11	waterproof IP 67	54-56
LP 10		•		•		2	Legend change at colour change	57
LP 14		•		•	•	6	Combination of up to 4 LEDs	58
MPLS 12	•	•	•			7	Operating at the side SMT	59
TM 81		•	•		•	8	Operating at the side	60
TSLE/TSSLE		•		•	•	64	waterproof IP 67	61-62
TSSL		•		•		25	8x4.3 mm, 2 mm flat SMT	63

Illuminated Pushbutton Switches waterproof



Specifications:

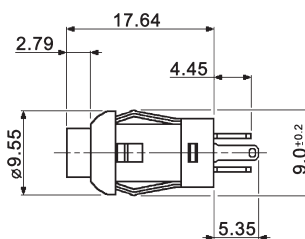
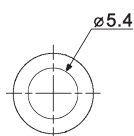
Contact rating:	30 V DC, 100 mA
Contact resistance:	<50 mΩ
Insulation resistance:	>100 MΩ
Dielectric strength:	500 V, 50 Hz for the duration of 1 minute
Operating temperature:	-40 °C to +85 °C
Operating force:	2.5 N ± 1 N
Mechanical life:	minimum 50 000 operations
Material:	Surface of contacts, terminals: gold over nickel plated Case: PA 66 Cap: PC
Mounting:	snap-in, mounting-hole diameter 8 mm, panel thickness 0.8...1.2 mm
Soldering conditions:	hand-soldering – max. 3 sec, 300 °C
Travel:	1.2 mm

Models:

Switching function

DPL 1 CB x

off – mom



Ordering Code:

DPL 1 CB

LEDs:

- white
- red
- yellow
- green
- blue
- blue/green



Illuminated Pushbutton Switches waterproof

4

Specifications:

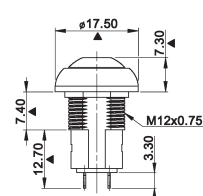
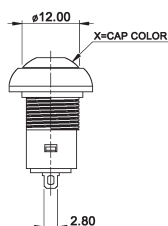
Contact rating:	momentary: 125 V AC, 125 mA	32 V AC, 400 mA	50 V DC, 100 mA
	latching: 125 V AC, 2 A	24 V DC, 100 mA	
Contact resistance:	<50 mΩ		
Insulation resistance:	>1000 MΩ		
Dielectric strength:	1000V, 50 Hz for the duration of 1 minute		
Operating temperature:	-30 °C to +85 °C		
Operating force:	3.5 N ± 1.5 N		
Mechanical life:	minimum 1 000 000 operations		
Material:	Surface of contacts, terminals: gold over silver plated		
	Base: DAP, UL 94 V-0		
	Case, Cap: PA 66		
Ingress Protection:	IP 67		
Mounting:	snap-in or bushing M12x0.75, key 14 mm		
Soldering conditions:	hand-soldering – max. 5 sec, 350 °C		
Travel:	momentary: 1.5 mm; latching: 2.5 mm		

Models:

Switching functions

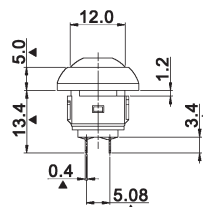
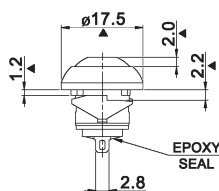
DPW 1 AG-K

off – on



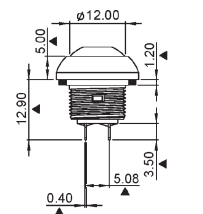
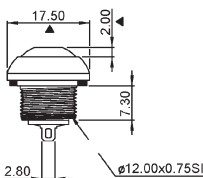
DPW 1 BG S-K

on – (off)



DPW 1 CG-B

off – mom



Ordering Code:

DPW 1 ☐ G ☐ ☐ - ☐

Switching function:

- ☐ A off – on
- ☐ B on – (off)
- ☐ C off – mom

Style:

☐ Thread

not for switching-function A:

☐ S Snap-in

Actuator:

- ☐ W white
- ☐ K black
- ☐ R red
- ☐ O orange
- ☐ Y yellow
- ☐ G green
- ☐ B blue

Terminals of switching contacts:

- ☐ Solder-lugs
- ☐ FO Fast-on

Illuminated Pushbutton Switches waterproof

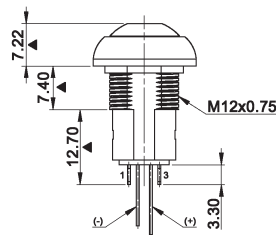
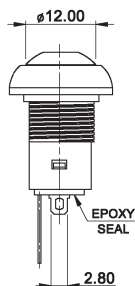


Specifications:

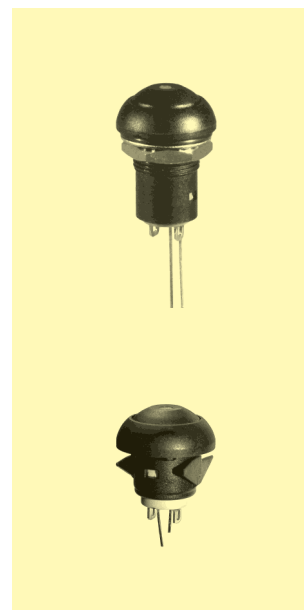
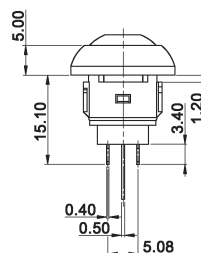
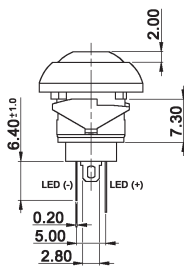
Contact rating:	125 V AC, 125 mA / 50 V DC, 100 mA / 32 V AC, 400 mA
Contact resistance:	<50 mΩ
Insulation resistance:	>1000 MΩ at 500 V DC
Dielectric strength:	1000 V, 50 Hz for the duration of 1 minute
Operating temperature:	-30 °C to +85 °C
Mechanical life:	minimum 1000 000 operations
Contacts:	gold-plated over silver
Terminals:	gold-plated
Travel:	1.5 mm
Material:	case: thermoplastic meets UL 94 V-0; button: PA
Protection:	IP 67
Soldering conditions:	hand-soldering – max.: 3 sec, 300 °C

Models: Switching functions

DPWL 1 AG KG off – on



DPWL 1 CG S-KY off – mom



Ordering Code:

DPWL 1 ☐ G ☐ ☐ - ☐				
Switching function:	Style:	Actuator:	LEDs:	Terminals or switching contacts:
☐ A off – on	☐ Thread	☐ W white	☐ W white	☐ Solder-lugs
☐ B on – (off)	not for switching-function A:	☐ K black	☐ R red	☐ FO Fast-on
☐ C off – mom	☐ S Snap-in	☐ R red	☐ Y yellow	
		☐ O orange	☐ G green	
		☐ Y yellow	☐ B blue	
		☐ G green	☐ YG yellow/green	
		☐ B blue	☐ YB yellow/blue	
			☐ YR yellow/red	
			☐ RG red/green	
			☐ RB red/blue	
			☐ GB green/blue	



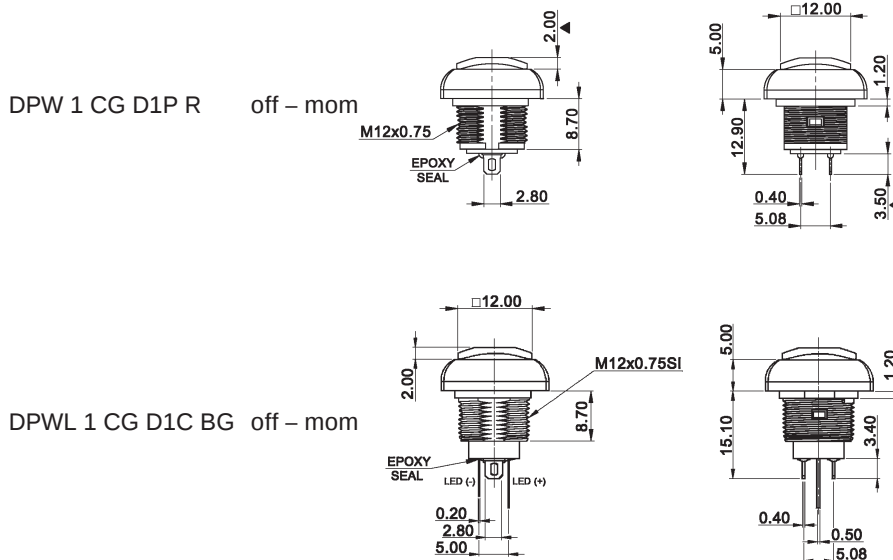
Illuminated Pushbutton Switches waterproof

4

Specifications:

Contact rating:	250 V AC, 200 mA 48 V AC, 500 mA 50 V DC, 200 mA
Contact resistance:	<50 mΩ
Insulation resistance:	>1000 MΩ
Dielectric strength:	1000 V, 50 Hz for the duration of 1 minute
Operating temperature:	-30 °C to +85 °C
Operating force:	3.5 N ± 1.5 N
Mechanical life:	minimum 1 000 000 operations
Material:	Surface of contacts, terminals: gold over silver plated Base: DAP, UL 94 V-0 Case: Zinc alloy Cap: PA 66
Ingress Protection:	IP 67
Mounting:	bushing M 12 x 0.75, key 14 mm
Soldering conditions:	hand-soldering – max. 5 sec, 350 °C
Travel:	1.5 mm

Models: Switching functions



Ordering Code:

DPW ☐ 1 ☐ G D1 ☐ ☐ ☐ - ☐					
Lighting:	Switching function:	Housing surface:	Actuator:	LEDs:	Terminals of switching contacts:
☐ without	☐ on – (off)	☐ P black ED-coated	☐ W white	☐ W white	☐ Solder-lugs
☐ L light	☐ C off – mom	☐ A Chromium-plated	☐ K black	☐ R red	☐ FO Fast-on
		☐ C Chromium matte	☐ R red	☐ Y yellow	
		☐ D Nickel matte	☐ O orange	☐ G green	
			☐ Y yellow	☐ B blue	
			☐ G green	☐ YG yellow/green	
			☐ B blue	☐ YB yellow/blue	
				☐ YR yellow/red	
				☐ RG red/green	
				☐ RB red/blue	
				☐ GB green/blue	

Illuminated Pushbutton Switches waterproof



Specifications:

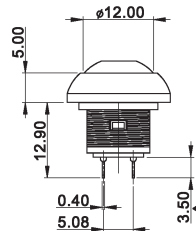
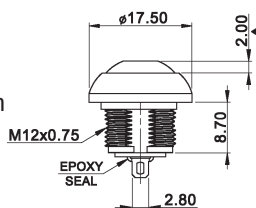
Contact rating:	250 V AC, 200 mA 48 V AC, 500 mA 50 V DC, 200 mA
Contact resistance:	<50 mΩ
Insulation resistance:	>1000 MΩ
Dielectric strength:	1000 V, 50 Hz for the duration of 1 minute
Operating temperature:	-30 °C to +85 °C
Operating force:	3.5 N ± 1.5 N
Mechanical life:	minimum 1 000 000 operations
Material:	Surface of contacts, terminals: gold over silver plated Base: DAP, UL 94 V-0 Case: Zinc alloy Cap: PA 66
Ingress Protection:	IP 67
Mounting:	bushing M 12 x 0.75, key 14 mm
Soldering conditions:	hand-soldering – max. 5 sec, 350 °C
Travel:	1.5 mm

Models:

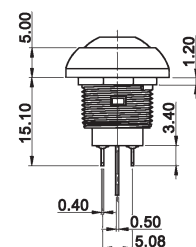
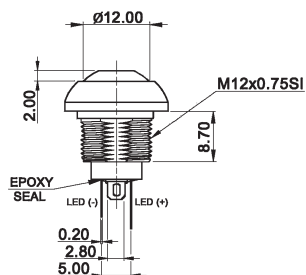
Switching functions

DPW 1 CG D2P R

off – mom



DPWL 1 CG D2C KG off – mom



Ordering Code:

DPW ☐ 1 ☐ G D2 ☐ ☐ ☐ - ☐

Lighting:

- ☐ without
☐ L light

Switching function:

- ☐ B on – (off)
☐ C off – mom

Housing surface:

- ☐ P black ED-coated
☐ A Chromium-plated
☐ C Chromium matte
☐ D Nickel matte

Actuator:

- ☐ W white
☐ K black
☐ R red
☐ O orange
☐ Y yellow
☐ G green
☐ B blue

LEDs:

- ☐ W white
☐ R red
☐ Y yellow
☐ G green
☐ B blue
☐ YG yellow/green
☐ YB yellow/blue
☐ YR yellow/red
☐ RG red/green
☐ RB red/blue
☐ GB green/blue

Terminals of switching contacts:

- ☐ Solder-lugs
☐ FO Fast-on



Illuminated Pushbutton Switches

Specifications:

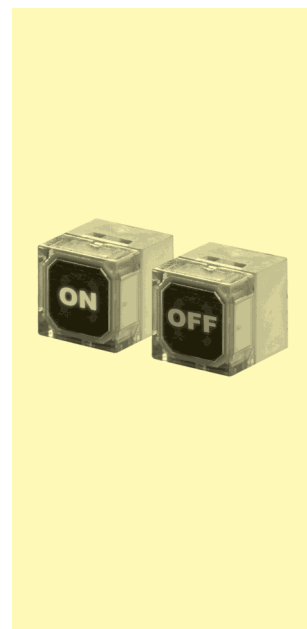
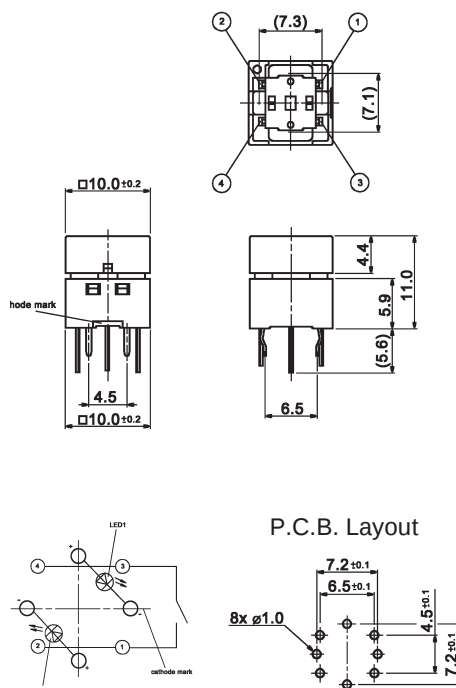
Contact rating:	24 V DC, 50 mA
Contact resistance:	<100 mΩ
Insulation resistance:	>100 MΩ
Dielectric strength:	500 V, 50 Hz for the duration of 1 minute
Operating temperature:	-25 °C to +70 °C
Operating force:	1.6 N ± 0.2 N
Mechanical life:	minimum 500 000 operations
Material:	Contacts: stainless steel, silver plated Terminals: brass, silver plated Case: PBT, UL 94 V-0, white Actuator: PC
Mounting:	on pc-board
Soldering conditions:	wave-soldering: max. 5 sec, max. 260 °C; pre-heat; max. 60 sec, max. 100 °C
Travel:	0.25 mm +0.2/-0.1 mm

4

Models:

Switching
functions

LP 10 02GA11 off - mom



Ordering Code:

LP 10 ☐ 2 ☐ A1 ☐		
Actuator:	LEDs:	Inlay:
☐ 0 clear	☐ B red/blue	☐ 0 without inscription
☐ 1 white transparent	☐ G red/green	☐ 1 OFF (red) and ON (second colour)
		☐ 2 切 (rot) und 入 (second colour)
		☐ 3 X (red) and O (second colour)

Illuminated Pushbutton Switches

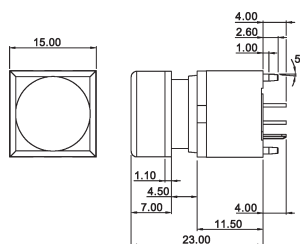
Specifications:

Contact rating:	12 V DC, 100 mA
Contact resistance:	< 20 mΩ
Insulation resistance:	> 100 MΩ
Dielectric strength:	600 V, 50 Hz for the duration of 1 minute
Operating temperature:	-40 °C to +85 °C
Operating force:	180 gf ± 50 gf
Mechanical life:	minimum 500 000 operations
Material:	Contacts: Brass, Gold-plated over nickel Terminals: Phosphor-Bronze, Tin-plated over nickel Case: PA66 Cap, diffusor: PC
Mounting:	on pc-board
Soldering conditions:	LP 14...: IR-reflow-soldering, LP 14...-PC: wave-soldering: max. 5 sec, max. 260 °C, pre-heat: max. 60 sec, max. 100 °C
Travel:	Operating point 2.9 mm, total travel 4.3 mm
Individual Marking:	possible by polyester-film inlay, recommended size 12.8 mm x 12.8 mm x 0.1 mm

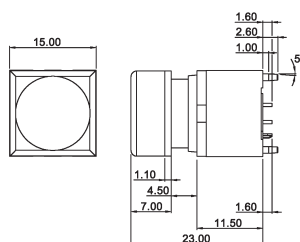
Models: Switching functions

D P D T

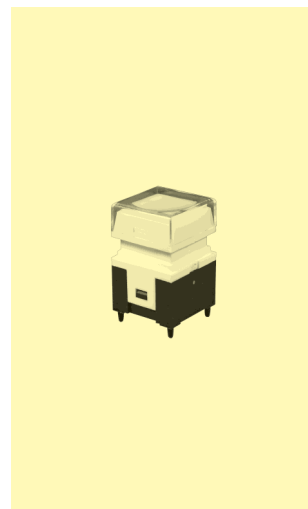
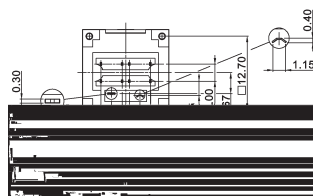
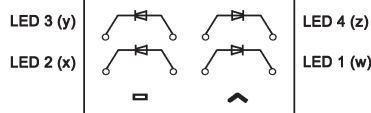
LP 14 CG RGBW-PC off – mom



LP 14 CG RGBW off – mom



pin-assignment



Ordering code:

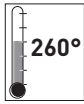
LP 14 CG ☐ ☐ ☐ ☐ - ☐

LED colour:

- ☐ N without LED
- ☐ W white
- ☐ Y yellow
- ☐ R red
- ☐ G green
- ☐ B blue

Terminals:

- ☐ -PC on pc-board (for wave-soldering)
- ☐ short terminals (THR)



Illuminated Pushbutton Switches for SMT

4

Specifications:

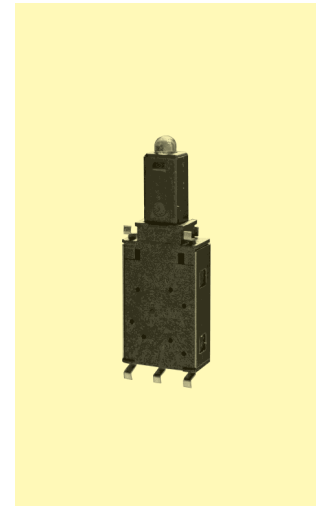
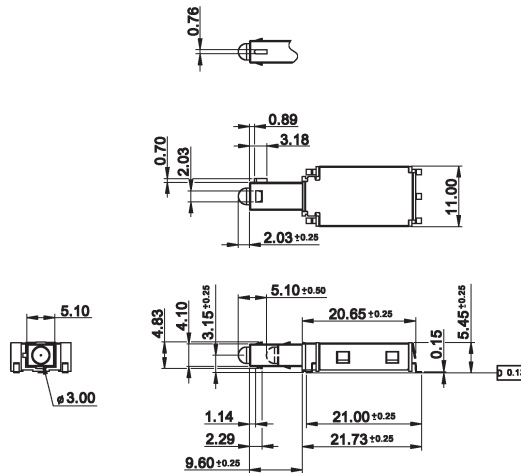
Contact rating:	50 V DC, 250 mA; max. 3,5 VA
Contact resistance:	<50 mΩ at 2–4 V DC, 100 mA
Insulation resistance:	>1000 MΩ
Dielectric strength:	250 V AC (50–60 Hz) for 1 minute
Operating temperature:	–30 °C to +85 °C
Mechanical life:	minimum 30 000 operations
Material:	case and actuator: glass filled LCP, UL 94 V–0, grey Housing: stainless steel Contact and terminal: copper alloy, silver plated with gold flash
Operating force:	250 ± 100 gf
Mounting:	on pc-board – SMD

Models: Switching functions

S P D T

MPLS 12 F ☐ on – mom

MPLS 12 D ☐ on – on



Ordering Code:

MPLS 12 F ☐

MPLS 12 D ☐

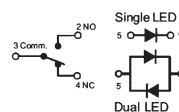
LED colour:

- ☐ W white
- ☐ Y yellow
- ☐ R red
- ☐ G green
- ☐ B blue
- ☐ AG amber/green
- ☐ RG red/green

P.C.B. Layout



Circuit diagram



Packing: 450 pcs/reel

Illuminated Pushbutton Switches

Specifications:

Contact rating:	32 V DC, 100 mA, 1 VA
Contact resistance:	<150 mΩ
Insulation resistance:	>100 MΩ
Dielectric strength:	250 V, 50 Hz for the duration of 1 minute
Operating temperature:	-40 °C to +85 °C
Operating force:	4 N ± 1.2 N
Mechanical life:	minimum 25 000 operations
Material:	Contacts: stainless steel, silver plated Terminals: brass, gold plated Case: LCP, UL 94 V-0 Actuator: PC
Mounting:	on pc-board
Soldering conditions:	wave-soldering: max. 5 sec, max. 260 °C; pre-heat: max. 60 sec, max. 100 °C
Travel:	2.4 mm ± 0.3 mm

Models:

	Switching function		
TM 81 FW-RA	mom - on		
TM 81 FRG-RA-THR	mom - on		
TMS 81 F-RA	mom - on		

Ordering Code:

Technology:	Switching Function:	LED Colors:	Construction:	Terminals:
☐ THT, THR ☒ SMT	☒ on - mom	☐ no LED ☐ A amber ☐ W white ☐ R red ☐ Y yellow ☐ G green ☐ B blue ☐ YB green/yellow ☐ RG green/red ☐ RA amber/blue	☒ RA right-angled	☐ THT, SMT ☒ THR THR



Illuminated Pushbutton Switches waterproof

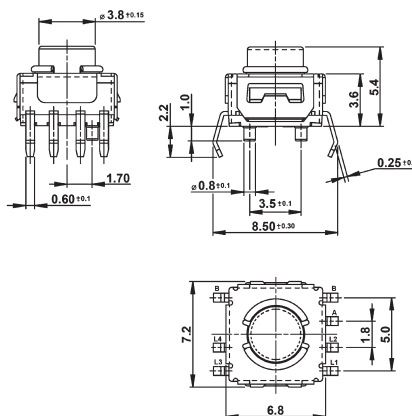
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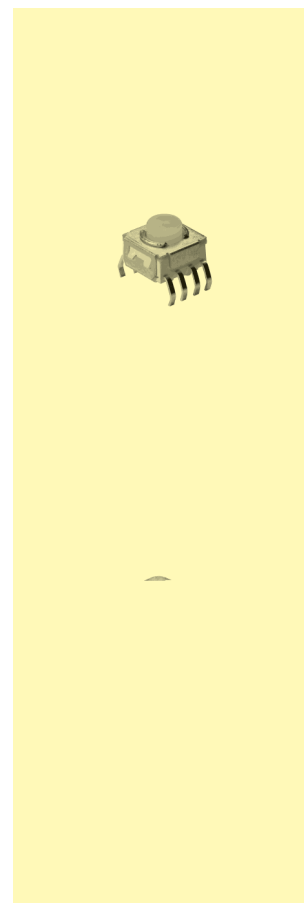
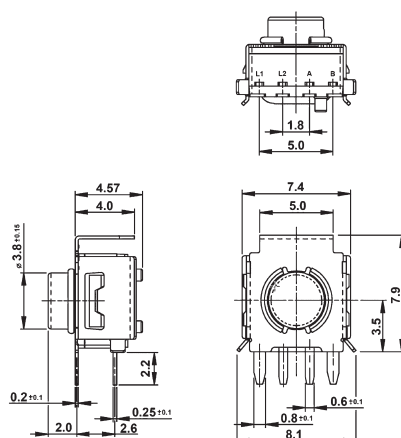
Contact rating:	12 V DC, 50 mA
Contact resistance:	<100 mΩ
Insulation resistance:	>100 MΩ
Dielectric strength:	250 V, 50 Hz for the duration of 1 minute
Operating temperature:	-40°C to +85°C
Operating force:	2 N ± 0.5 N
Mechanical life:	minimum 300 000 operations
Material:	Contacts: stainless steel, silver-plated, optionally gold-plated Terminals: Brass, silver plated, optionally gold-plated Case: PPA, white Actuator: silicone rubber
Protection:	IP 67
Mounting:	on pc-board

Models: Switching functions

TSLE 6868 R WNN off – mom



TSLE 6868 R RA WA off – mom



Ordering Code:

TSLE 6868 R ☐ ☐ ☐

Contact:

- ☐ silver
☐ gold

Operation:

- ☐ top
☐ side

LED:

Operation from top

- ☐ NNN no LED
☐ RGB RGB
☐ xyN two LEDs
☐ xNN one LED

Side-Operation

- ☐ NN no LED
☐ xy two LEDs
☐ xN one LED

x, y	Color
R	red
Y	yellow
G	green
B	blue
P	pure-green
A	amber
W	white



Illuminated Pushbutton Switches for SMT

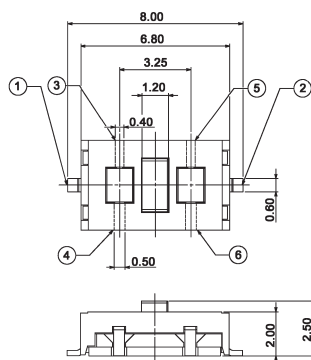
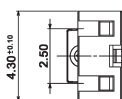
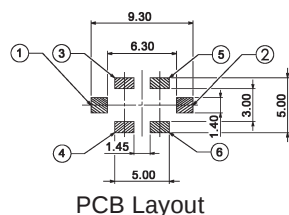
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Specifications:

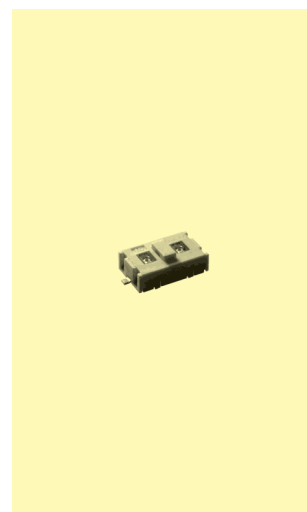
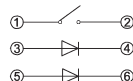
Contact rating:	12 V DC, 50 mA
Contact resistance:	<100 mΩ
Insulation resistance:	>100 MΩ
Dielectric strength:	250 V AC (50–60 Hz) for 1 minute
Operating temperature:	–20 °C to +70 °C
Operating force:	1.6 N +0.8 / –0.3 N
Mechanical life:	minimum 50 000 operations
Stem/cover:	high-temp. PA 9T UL 94 V–0, white
Terminal:	brass, silver-plated
Contact:	stainless steel, silver-plated
Base:	high-temp. PA 9T UL 94 V–0, molded black
Mounting:	on pc-board – SMT

Models:

TSSL 3W □ □



Circuit diagram



Ordering Code:

TSSL 3W □ □

Left LED:

- R red
- G green
- O soft orange
- W white
- B blue

Right LED:

- R red
- G green
- O soft orange
- W white
- B blue

Soldering conditions (reflow-soldering)

