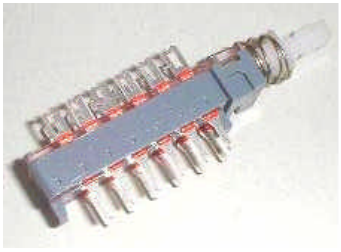
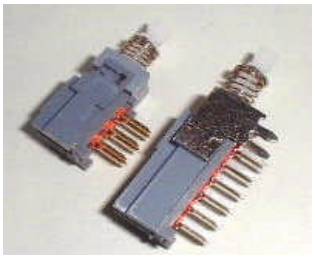
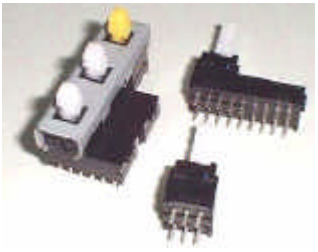
Toneluck Switches



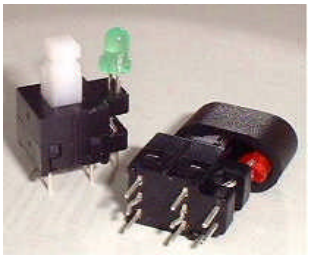
PBN



MPN



MPV



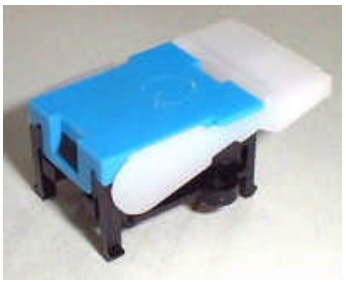
LTV

PWL

MQS-1

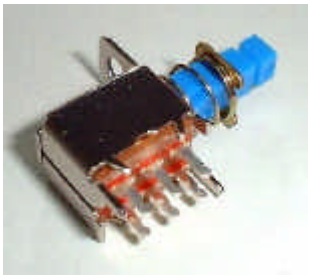
MQS-1s

MQS-2



THK-1

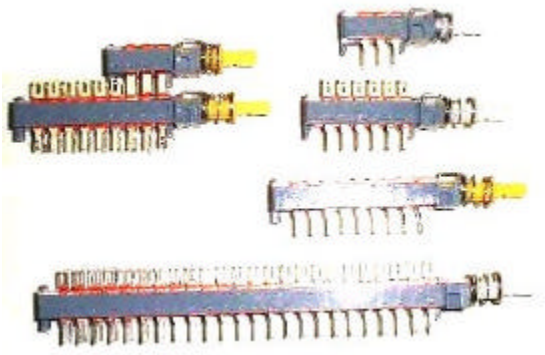
KEY



SP

DS

PB Push button switch

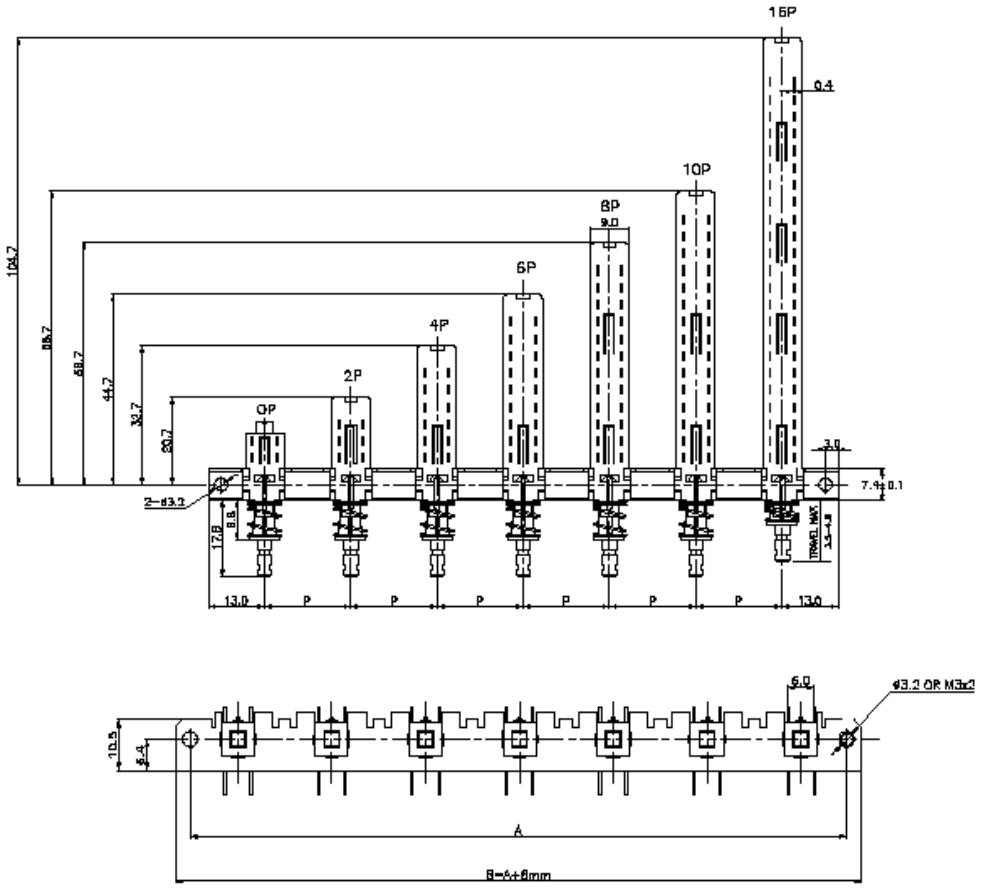


Characteristics

- Exclusive spring –loaded contacts with audio bridge "point" make the perfect mechanism for long electrical life
- Various stroke 3.5, 2.5 or 1.5mm
- A wide range of standard operating force available
- Handle current from 0.1A ~ 1.0A
- Single chassis and mounting frame are available
- Built-in LED version available
- Various pin configurations for different PCB
- Various house material: UL94V0, Nylon, PBT, etc.

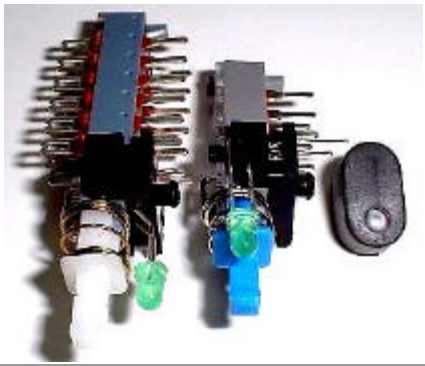
Electrical Data							
Electrical ratings & Operating life	0.10A/30V DC 80,000 cycles 0.20A/24V DC 50,000 cycles 0.50A/30 V DC 10,000 cycles 1.00A/25 V DC 10,000 cycles 0.20A/250V AC 5,000 cycles 0.50A/100V AC 5,000 cycles						
Dielectric strength	1500VAC, 50~60Hz, for 1min between current-carrying metal part and ground, and between each terminal and non-current carrying metal part.						
Contact resistance	20 mΩ (max)						
Insulation resistance	1000 MΩ (min)						
Mechanical Data							
Travel to lock distance	3.5, 2.5, 1.5 +/- 0.3mm						
Total travel distance	4.8, 3.5, 2.5 +/- 0.3mm						
Operating force(min)	No of Poles	2P	4P	6P	8P	10P	16P
		350gf	450gf	550gf	650gf	650gf	700gf
		210gf	400gf	400gf			
LED Data							
LED types	3 mm Round 5 mm Round 3.4 x 1.1 mm Rectangular 3.9 x 1.9 mm Rectangular 5.0 x 2.0 mm Rectangular 2.0 x 5.0 mm Triangular 3.0 x 4.5 mm Triangular 5.6 x 4.9 mm Triangular *Or customer specified specification						
Further Data							
Operating temperature	-20 ~ +85 C						
Contact arrangement	Total travel distance 4.8 mm: 2~16 poles Total travel distance 3.5 & 2.5mm: 2~4 poles						
Terminals	Standard PCB through hole terminal Crimped terminal Ag Plating (Au Plating is available upon request)						
Function	Momentary Self-lock Inter-lock						
Mounting	Hole Diameter: 2x3.2mm Hole Diameter: 2x2.4mm Thread Specification: 2x [M3 x 0.5mm] Mounting Ear Cut						
Chassis Pitch	10, 12.5, 15, 17.5 & 20mm						
Buttons	BF series all models BC & LED series caps (with windows) for illuminated version						
Actuator dimensions	3.3 x 3.3 mm						
Plastic material	UL94V-0, UL94V-2, UL94HB						
Max. soldering temperature	5 second at 260C						

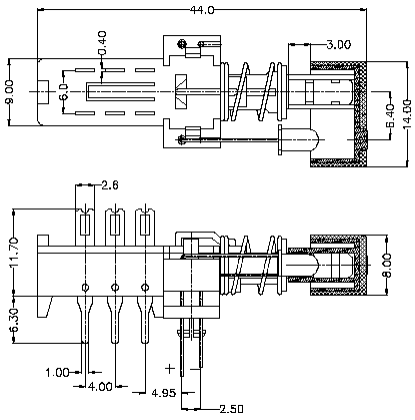
PB Push button switch



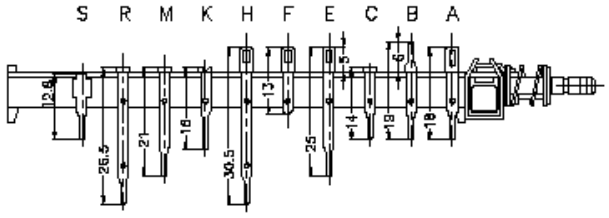
Gang switches

Push button switch with led





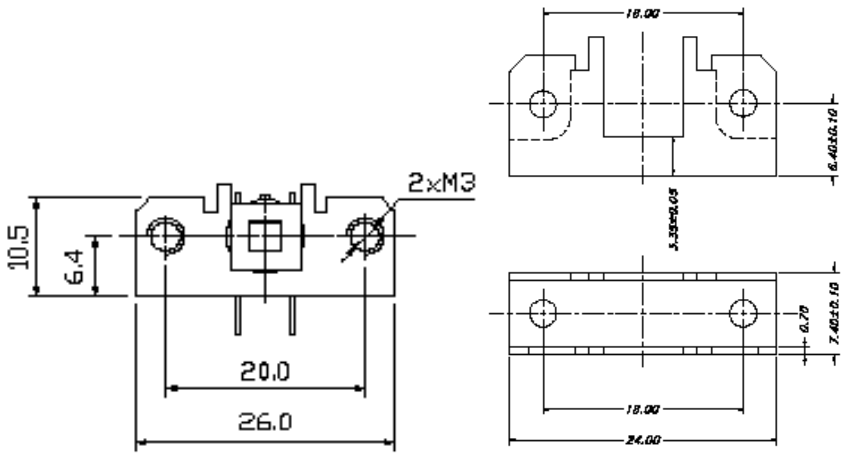
Terminal type Standard PCB Pins

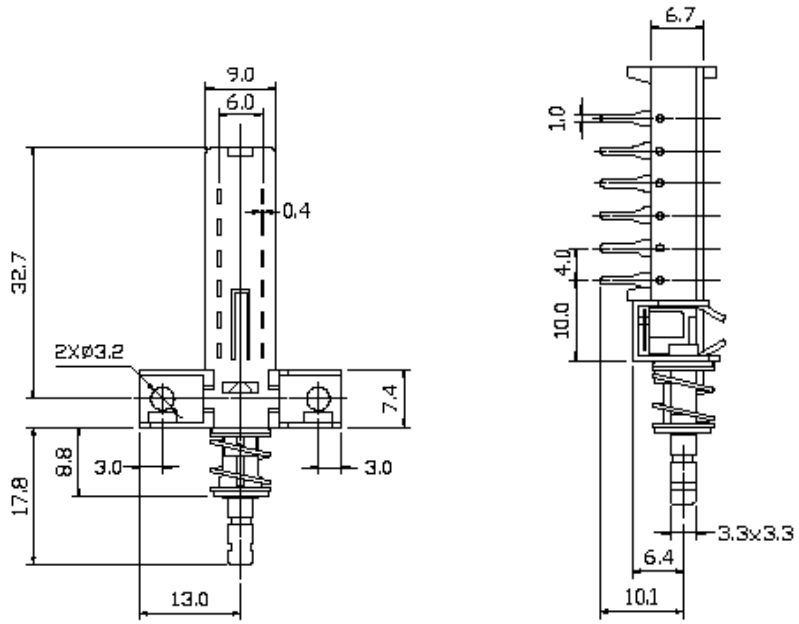


A	18.0 mm
B	19.0 mm
C	14.0 mm
E	25.0 mm
F	13.0 mm
H	30.5 mm
K	16.0 mm
M	21.0 mm
R	26.5 mm
S	12.8 mm only available for 1.5 & 2.5mm travel-to-lock version

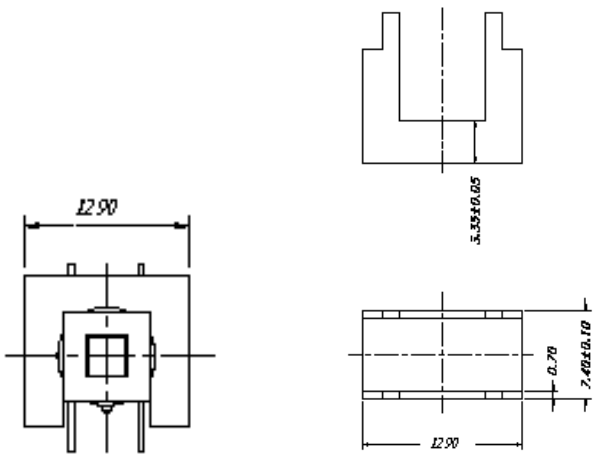
Chassis for Push Button: Standard single chassis

Mounting type **2x[M3 x 0.5mm], 2x 2.4mm or 2 x 3.2mm**

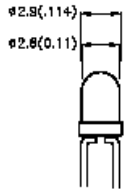
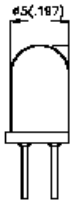
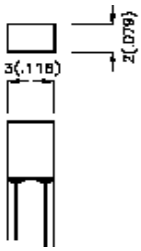
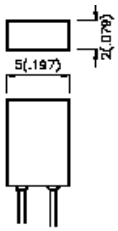
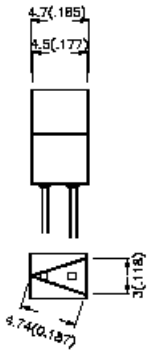
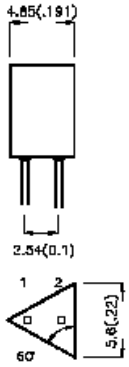




Mounting Ear cut



LED Specifications

3mm Round	5mm Round	3mm Rectangular	5mm Rectangular	3mm Triangular	5.6mm Triangular
 Pin pitch: 2.54mm Tolerance: +/- 0.25mm					

LED Type	Color	Wavelength	Intensity / Iv(mcd)		Size/shape	Remarks
R02	Red Diffused	700 nm	1.3 ~ 5.0	10mA	3mm Round	
R01	Red Diffused	625 nm	0.8 ~ 5.0	2mA	3mm Round	Low current
R03	Red Diffused	660 nm	8 ~ 20	2mA	3mm Round	Low current & super bright
G03	Green Diffused	565 nm	8 ~ 32	10mA	3mm Round	
G01	Green Diffused	565 nm	0.8 ~ 3.2	2mA	3mm Round	Low current & bright
Y03	Yellow Diffused	590 nm	8 ~ 32	10mA	3mm Round	
Y01	Yellow Diffused	590 nm	0.8 ~ 3.2	2mA	3mm Round	Low current & bright
R04	Red Diffused	700 nm	2 ~ 8	10mA	5mm Round	
R05	Red Diffused	625 nm	0.8 ~ 5	2mA	5mm Round	Low current
R06	Red Diffused	660 nm	8 ~ 20	2mA	5mm Round	Low current & super bright
G02	Green Diffused	565 nm	5 ~ 32	10mA	5mm Round	
G04	Green Diffused	565 nm	0.8 ~ 3.2	2mA	5mm Round	Low current
Y02	Yellow Diffused	590 nm	5 ~ 32	10mA	5mm Round	
Y04	Yellow Diffused	590 nm	0.8 ~ 32	2mA	5mm Round	Low current
R07	Red Diffused	700 nm	0.2 ~ 0.5	10mA	3mm Rectangular	
LED Type	**Color**	**Wavelength**	**Intensity / Iv(mcd)**		**Size/shape**	**Remarks**
R08	Red Diffused	625 nm	2 ~ 12.5	10mA	3mm Rectangular	High effective
G05	Green Diffused	565 nm	2 ~ 8	10mA	3mm Rectangular	
Y05	Yellow Diffused	590 nm	2 ~ 8	10mA	3mm Rectangular	
R09	Red Diffused	700 nm	0.5 ~ 2.0	10mA	5mm Rectangular	
R10	Red Diffused	625 nm	3.2 ~ 12.5	10mA	5mm Rectangular	High effective
R11	Red Diffused	660 nm	40 ~ 80	20mA	5mm Rectangular	Super bright
G06	Green Diffused	565 nm	2 ~ 8	10mA	5mm Rectangular	
Y06	Yellow Diffused	590 nm	2 ~ 8	10mA	5mm Rectangular	
R12	Red Diffused	700 nm	0.5 ~ 0.8	10mA	3mm Triangular	
R13	Red Diffused	625 nm	2 ~ 5	10mA	3mm Triangular	High effective
G07	Green Diffused	565 nm	1.25 ~ 3.2	10mA	3mm Triangular	
Y07	Yellow Diffused	590 nm	1.25 ~ 3.2	10mA	3mm Triangular	
R13	Red Diffused	700 nm	0.5 – 0.8	10mA	5.6mm Triangular	
R14	Red Diffused	625 nm	5 – 12.5	10mA	5.6mm Triangular	High effective
G08	Green Diffused	565 nm	2 – 8	10mA	5.6mm Triangular	
Y08	Yellow Diffused	590 nm	2 - 5	10mA	5.6mm Triangular	

Ordering Instructions

PBN- S 2 A – 1.5 H – R01 L - xxxx
1 2 3 4 5 6 7 8 9

1: PBN= Normal PBV= Valox material

2: Functions
S = Self lock
N= Non-lockp)

3: No. of poles – 2, 4, 6, 8, 10, 16
4: Terminal type –A, B, C, E, F, H, K, M, R, S
5: Travel to lock distance – 1.5, 2.5, 3.5 mm
6: Mounting Type

H: Hole Diameter: 2 x ö3.2mm
G: Hole Diameter: 2 x ö2.4mm
T: Thread Specification: 2x [M3 x 0.5mm]
C: Mounting Ear Cut
Nil: Without Mount

7: LED specification (ignored if no LED)

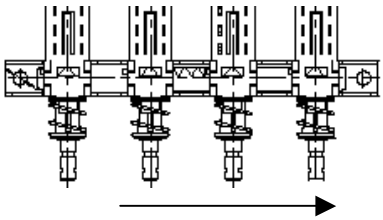
8: LED Position (relative to plunger, ignored if no LED)
L = Left (Plunger points inward, latch pin u
R = Right
U = Up
D = Down

9: Spec code
Specification code will be assigned by Toneluck to differentiate any minor changes from standard version.

Gang Switch

PBN – 5 –17.5 H – xxxx
1 2 3 4 5

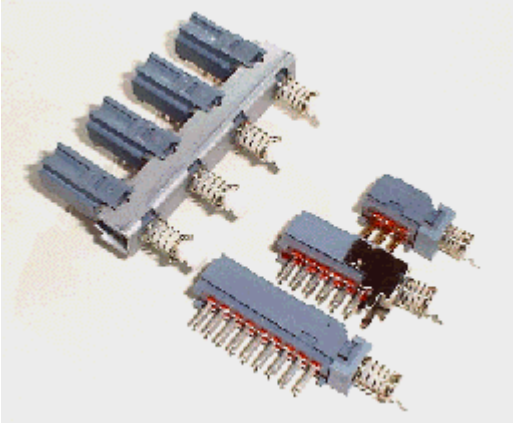
1 = Series code
2 = Total no. of keys
3 = Pitch distance of mounting
4 = Mounting type
H: Hole Diameter: 2xö 3.2mm
G: Hole Diameter: 2xö 2.4mm
T: Thread Specification: 2x [M3 x 0.5mm]
C: Mounting Ear Cut
5 = Specification code will be assigned by Toneluck to differentiate any minor changes from standard version



No of Keys

Key No.#	**Switch Part Number**	**Function** (select one only)				**Pitch** *(p)*	**Button P/N**
		Self Lock	Non-lock	Inter-lock	Reset		
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							

MPN Miniature Push Button Switch

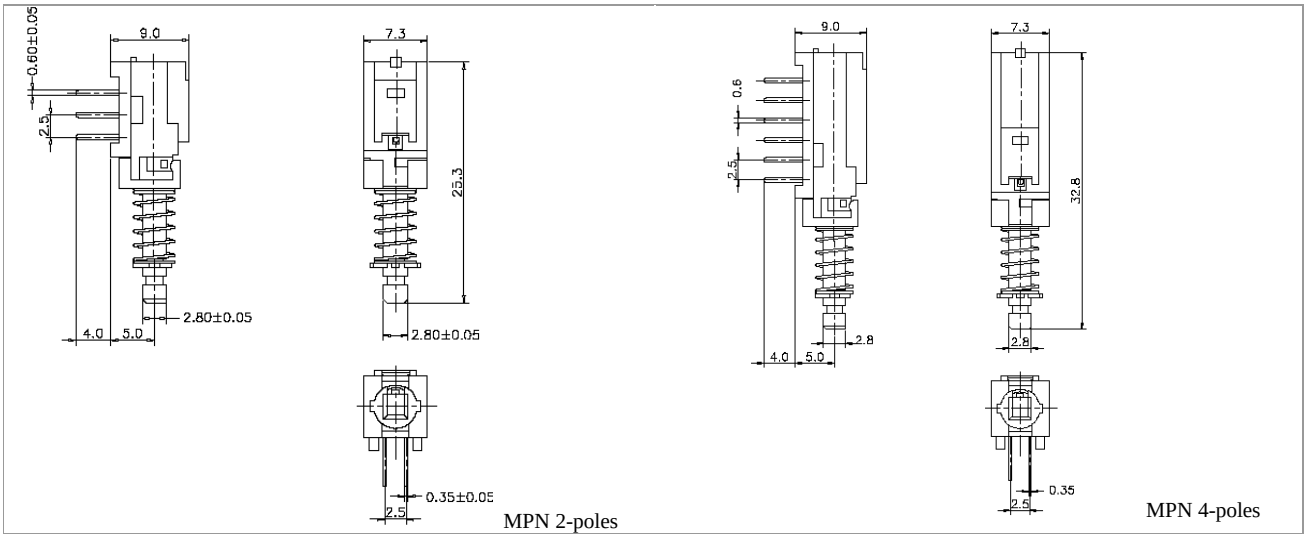


Characteristics

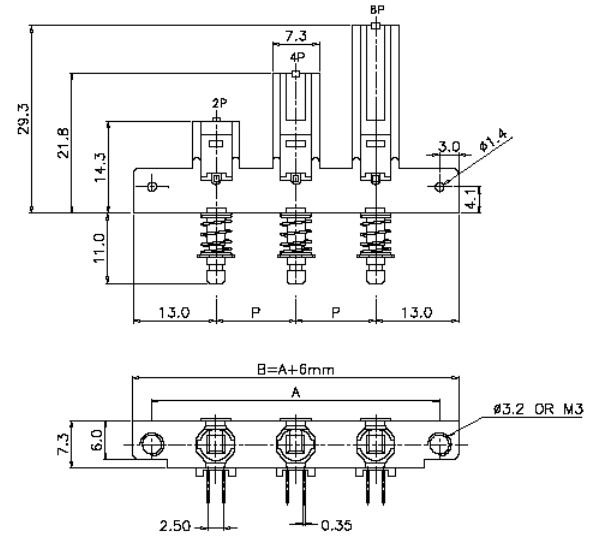
- Mini size and short stroke with good “hand-feel”
- Wiping & bifurcated contacts for smooth, silent actuation stroke and reliable contacts
- Snap-in mounting bracket available
- Gold plated terminals version for professional audio equipments
- Small contact resistance
- Handle current from 0.1A/30VDC ~ 1.0A/13VDC
- Wide operating temperature range: -25 ~ +125C
- Chassis mounting/Inter-lock available
- UL94V0 housing material

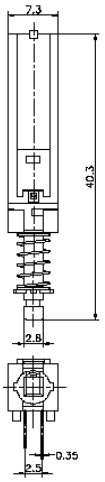
Electrical Data	
Electrical ratings & Operating life	0.10A/30V DC 20,000 cycles (min) 1.00A/13V DC 20,000 cycles(min)
Dielectric strength	500VAC, 50~60Hz, for 1min between current-carrying metal part and ground, and between each terminal and non-current carrying metal part.
Contact resistance	50 mΩ (max)
Insulation resistance	100 MΩ (min)
Mechanical Data	
Travel to lock distance	2.0 mm
Total travel distance	3.0 mm
Operating force	2 Pole: 160 +/- 50gf, 220+/-50gf 4 Pole: 280 +/- 50gf 6 Pole: 330 +/- 50gf
Further Data	
Operating temperature	-25 ~ +85 C -25 ~+125 C
Circuit configuration	2 Poles, 4 Poles, 6 Poles
Terminals	Straight PCB pins Snap in terminal
Function	Momentary Self-lock Inter-lock
Buttons	MF series all models
Actuator dimensions	2.8 x 2.8 mm
Plastic material	UL94HB UL94V-0
Max. soldering temperature	5 second at 260C

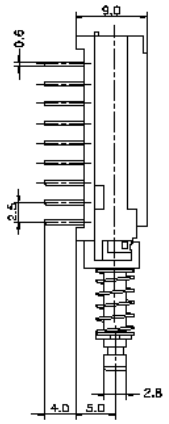
Miniature Push button switch



MPN gang switch



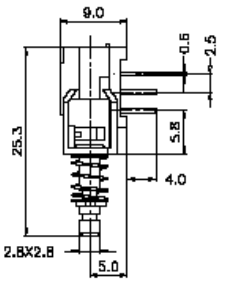


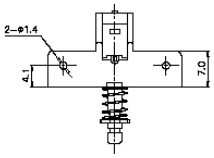


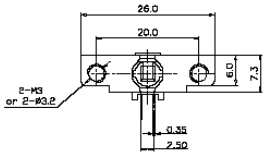
MPN 6-poles switch

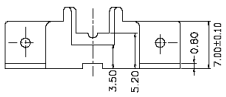
Chassis for Miniature Push Button Switch

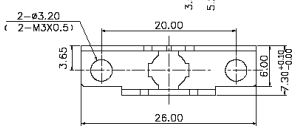
Standard single chassis



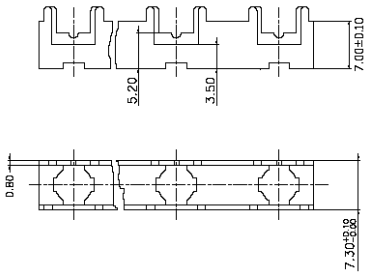




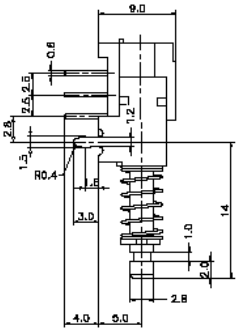


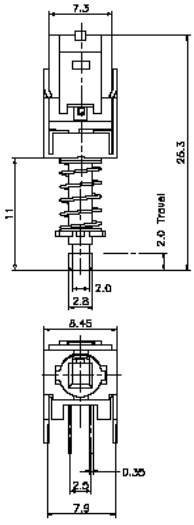


Mounting Ear Cut



PCB Metal Holder





Ordering Instructions

MPN – S 2 H –xxxx
1 2 3 4

1: Functions
S = Self Lock;
N = Non-lock

2: No. of poles : 2, 4, 6

3: Mounting Type
H: Hole Diameter: 2xö 3.2mm
G: Hole Diameter: 2xö 2.4mm
T: Thread Specification: 2x [M3 x 0.5mm]
C: Mounting Ear Cut
D: With PCB metal holder
Nil: Without Mount

4: Specification code
Specification code will be assigned by Toneluck to differentiate any minor changes from standard version.

Gang Switch

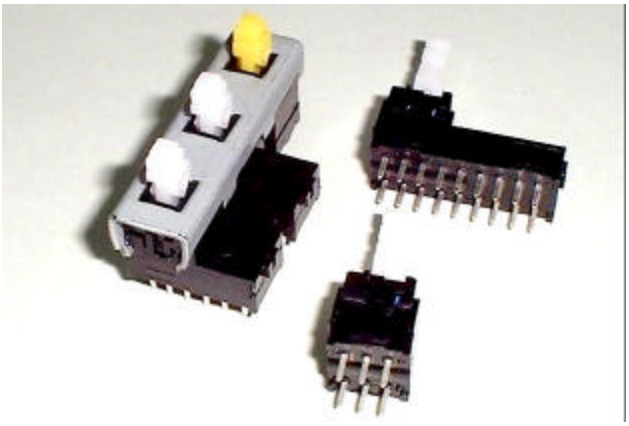
MPN – 5 –17.5 H – xxxx
1 2 3 4 5

1 = Series code
2 = Total no. of keys
3 = Pitch distance of mounting
4 = Mounting type
H: Hole Diameter: 2xö 3.2mm
G: Hole Diameter: 2xö 2.4mm
T: Thread Specification: 2x [M3 x 0.5mm]
C: Mounting Ear Cut

5 = Specification code will be assigned by Toneluck to differentiate any minor changes from standard version

HK/23 Dec,2000

MPV Vertical Push Button Switch

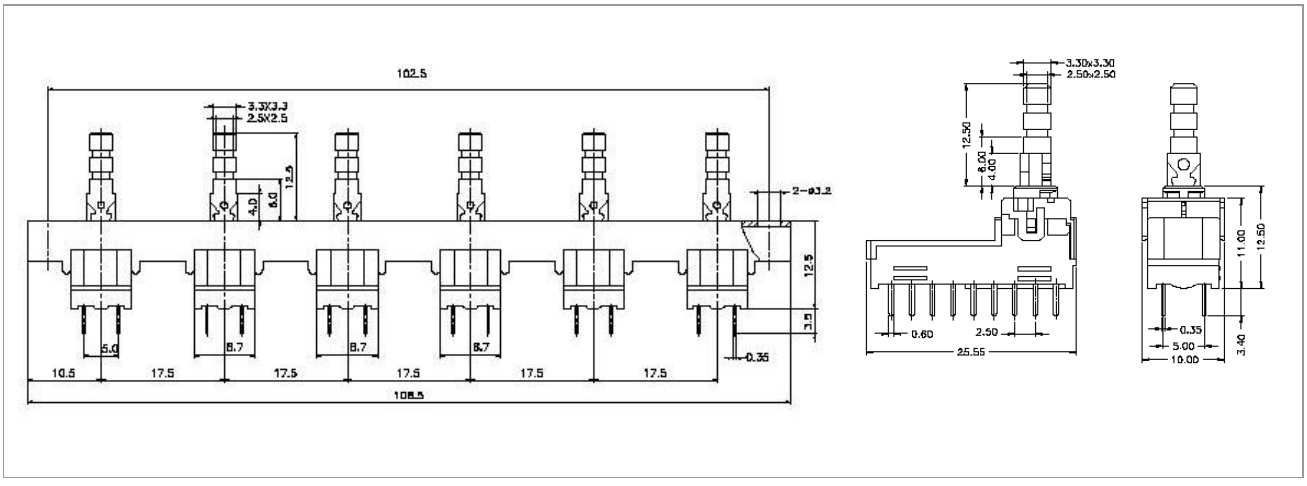


Characteristics

- Mini size and short stroke with good “hand-feel”
- Wiping & bifurcated contacts for smooth, silent actuation stroke and reliable contacts
- Snap-in mounting bracket available
- Various terminals version for professional audio equipments and telephones
- Small contact resistance
- Handle current 0.1A/30VDC, 0.1A/60VDC
- Operating temperature range: -20 ~ +85C
- Chassis mounting/Inter-lock available

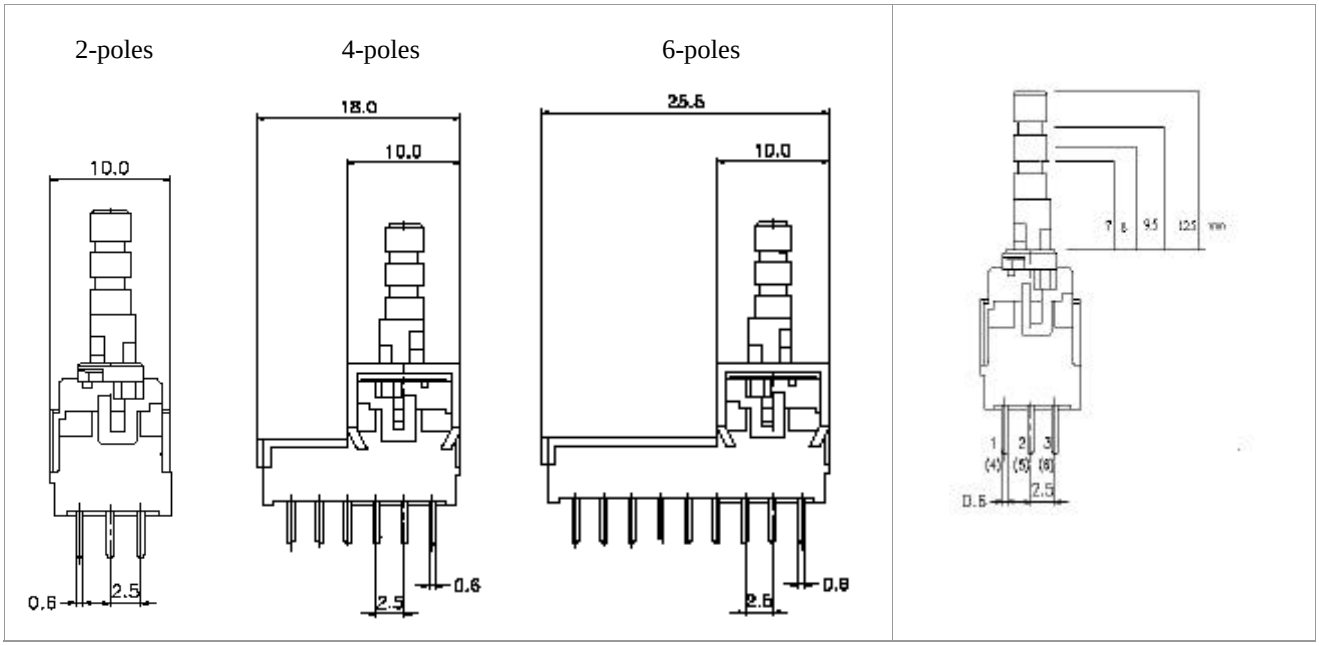
Electrical Data	
Electrical ratings Operating life	0.10A/30V DC 0.1A/60V DC 20,000 cycles (min) 20,000 cycles(min)
Dielectric strength	500VAC, 50~60Hz, for 1min between current-carrying metal part and ground, and between each terminal and non-current carrying metal part.
Contact resistance	30 mΩ (max)
Insulation resistance	100 MΩ (min)
Mechanical Data	
Travel to lock distance	2.0 mm
Total travel distance	3.0 mm
Operating force	2 Pole: 200 +/- 100gf, 4 Pole: 250 +/- 100gf 6 Pole: 330 +/- 100gf
Further Data	
Operating temperature	-25 ~ +65 C
Circuit configuration	2 Poles, 4 Poles, 6 Poles
Terminals	Straight PCB pins Crimped terminal
Function	Momentary Self-lock Inter-lock Reset
Buttons	BC, BF series all models
Actuator dimensions	3.3 x 3.3 mm
Plastic material	UL94V-0 UL94HB
Max. soldering temperature	5 second at 260C

Vertical Push-button switch



No of Poles

Plunger height



Ordering Instructions

MPV – S 2 – 8.0 H –xxxx
1 2 3 4 5

1: Functions
S = Self Lock;
N = Non-lock

2: No. of poles : 2, 4, 6

3: Plunger height : 7.0 / 8.0 / 9.5 / 12.5 mm

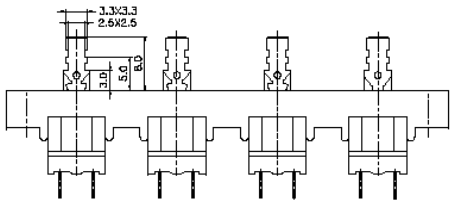
4: Mounting Type
H: Hole Diameter: 2xö 3.2mm
G: Hole Diameter: 2xö 2.4mm
T: Thread Specification: 2x [M3 x 0.5mm]
C: Mounting Ear Cut
Nil: Without Mount

5: Specification code
Specification code will be assigned by Toneluck to differentiate any minor changes from standard version.

Gang Switch

MPV – 5 –17.5 H – xxxx
1 2 3 4 5

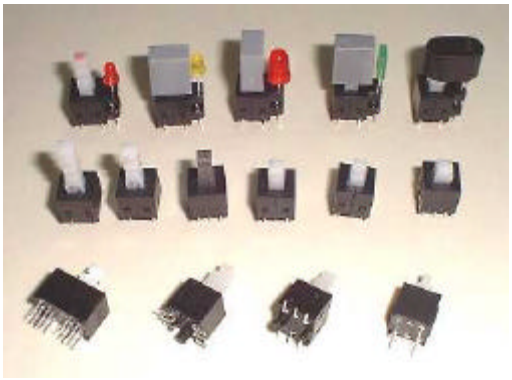
1 = Series code
2 = Total no. of keys
3 = Pitch distance of mounting (12.5 / 15 / 17.5 / 19 / 20 mm)
4 = Mounting type
H: Hole Diameter: 2xö 3.2mm
G: Hole Diameter: 2xö 2.4mm
T: Thread Specification: 2x [M3 x 0.5mm]
C: Mounting Ear Cut
5 = Specification code will be assigned by Toneluck to differentiate any minor changes from standard version



No of Keys

Key No.#	**Switch Part Number**	**Function** (select one only)				**Pitch** *(p)*	**Button P/N**
		Self Lock	Non-lock	Inter-lock	Reset		
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							

LTV vertical push switch



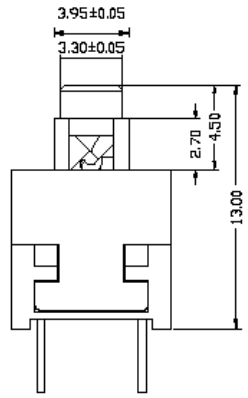
Characteristics

- Mini size and short stroke with good “hand-feel”
- Wiping & bifurcated contacts for smooth, silent actuation stroke and reliable contacts
- Handle current from 0.1A ~ 1.0A
- Long electrical life cycles
- LED available at different position from actuator
- Various caps for standard and illumated switches
- Various pin configurations for different PCB
- Various house material: UL94V0, Nylon, PBT, etc.
- Actuator length available from 5.7-16.5mm

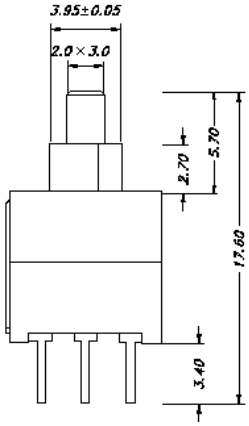
Electrical Data	
Electrical Ratings	0.10A/30V DC, 0.45A/30V DC, 1.00A/13V DC
Operating life	0.10A/30V DC 100,000 cycles (min) 2 poles version 0.45A/30V DC 30,000 cycles (min) 1.00A/13V DC 20,000 cycles (min) 1.00A/30V DC 10,000 cycles (min) 0.10A/30V DC 20,000 cycles (min) 4 poles version
Dielectric strength	500VAC, 50~60Hz, for 1min between current-carrying metal part and ground, and between each terminal and non-current carrying metal part.
Contact resistance	30 mΩ (max)
Insulation resistance	100 MΩ (min)
Mechanical Data	
Travel to lock distance	1.5 mm
Total travel distance	2.5 mm
Operating force	150 +/- 50 gf, 450 +/- 50 gf 240 +/- 50 gf, 550 +/- 50 gf 350 +/- 50 gf
LED Data	
LED types	3 mm Round 5 mm Round 3.4 x 1.1 mm Rectangular 3.9 x 1.9 mm Rectangular 5.0 x 2.0 mm Rectangular 2.0 x 5.0 mm Triangular 3.0 x 4.5 mm Triangular 5.6 x 4.9 mm Triangular *Or customer specified specification
LED specifications	Standard type: 10 mA Low current: 2 mA Supper bright: ~20mcd / 2mA *Or customer specified specification
Further Data	
Operating temperature	-20 ~ +65 C -20 ~ +85 C
Contact arrangement	2P2T, 2P1T (normal open), 4P2T
Terminals	Straight PCB pins Crimped terminal SMD bent terminal
Function	Momentary Self-lock
Buttons	BF series all models LED series caps (with windows) for illuminated version
Actuator heights (mm)	4.50 9.50 5.70 11.25 6.50 12.00 8.60 14.50 9.00 16.50
Plastic material options	UL94V-0 UL94V-2 UL94HB
Max. soldering temperature	5 second at 260C

Actuator Type: LTV-85 (2P2T) , LTV-86 (2P1T)

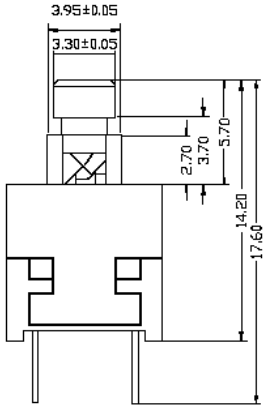
Actuator: 4.5



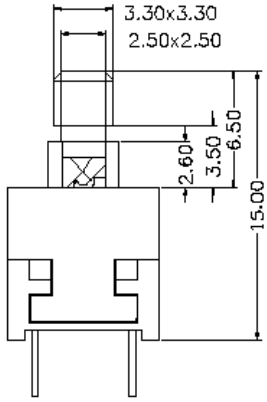
Actuator: 5.7



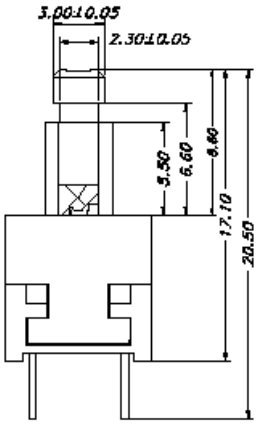
Actuator: 5.7B



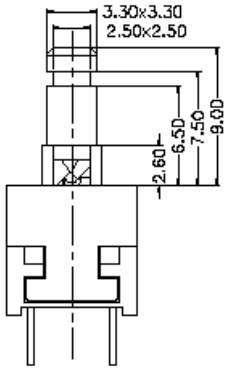
Actuator: 6.5



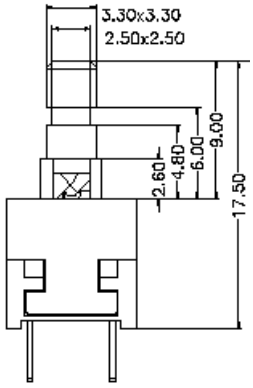
Actuator: 8.6



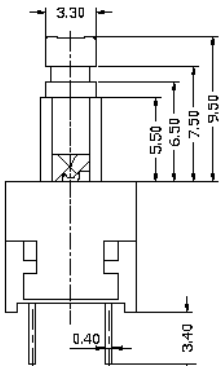
Actuator: 9.0



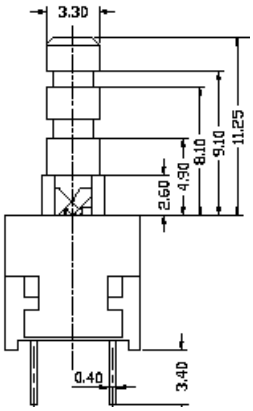
Actuator: 9.0B



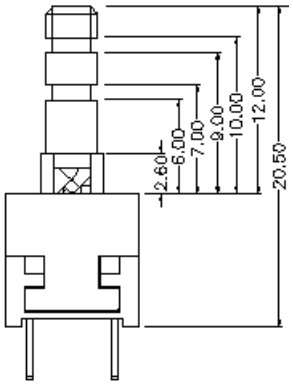
Actuator: 9.5



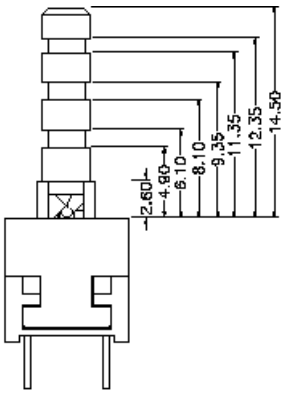
Actuator: 11.25



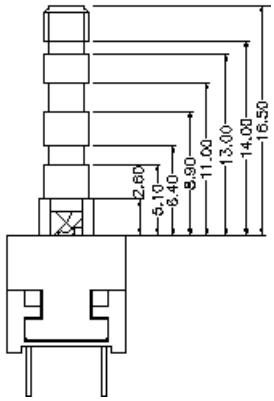
Actuator: 12.0



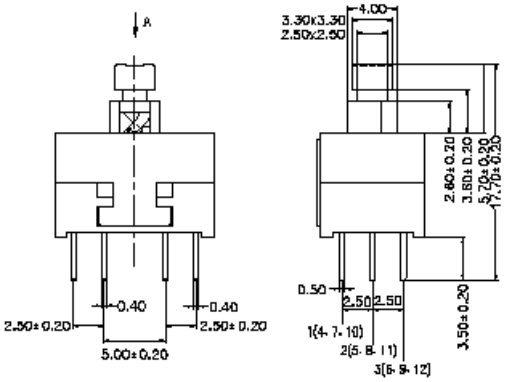
Actuator: 14.5



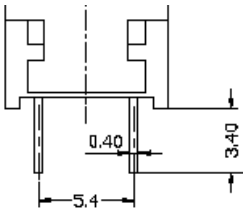
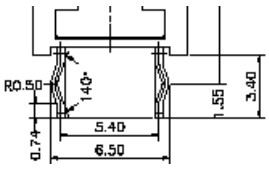
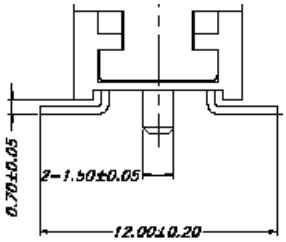
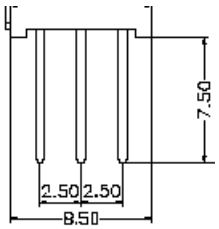
Actuator: 16.5



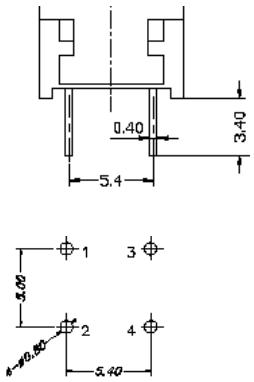
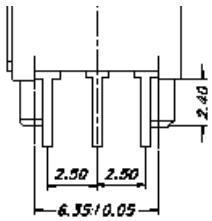
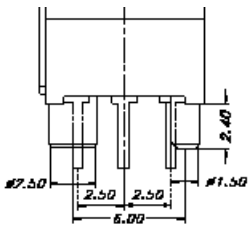
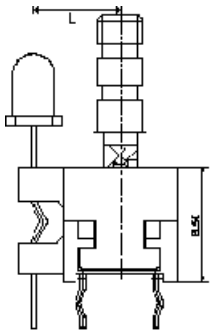
For LTV-87 (4P2T)



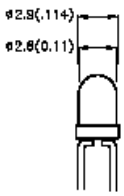
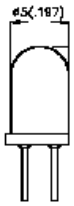
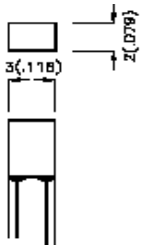
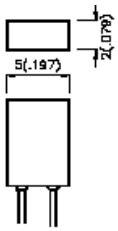
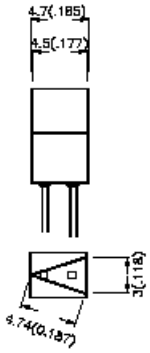
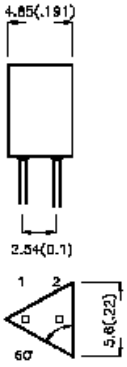
Terminal types: LTV-85, LTV-86

Standard PCB Pins	Crimped Terminals	SMT Bent Pins	7.5mm Terminals
			

Switch Base/Position Pins

2P1T Version (normal open)	**Position Pin Type #1** (same size)	**Position Pin Type #2** (Different size)	**Illuminated Switches**
			 L=6.4 or 8.4mm

LED Specifications

3mm Round	5mm Round	3mm Rectangular	5mm Rectangular	3mm Triangular	5.6mm Triangular
 Pin pitch: 2.54mm Tolerance: +/- 0.25mm					

LED Type	Color	Wavelength	Intensity / Iv(mcd)		Size/shape	Remarks
R02	Red Diffused	700 nm	1.3 ~ 5.0	10mA	3mm Round	
R01	Red Diffused	625 nm	0.8 ~ 5.0	2mA	3mm Round	Low current
R03	Red Diffused	660 nm	8 ~ 20	2mA	3mm Round	Low current & super bright
G03	Green Diffused	565 nm	8 ~ 32	10mA	3mm Round	
G01	Green Diffused	565 nm	0.8 ~ 3.2	2mA	3mm Round	Low current & bright
Y03	Yellow Diffused	590 nm	8 ~ 32	10mA	3mm Round	
Y01	Yellow Diffused	590 nm	0.8 ~ 3.2	2mA	3mm Round	Low current & bright
R04	Red Diffused	700 nm	2 ~ 8	10mA	5mm Round	
R05	Red Diffused	625 nm	0.8 ~ 5	2mA	5mm Round	Low current
R06	Red Diffused	660 nm	8 ~ 20	2mA	5mm Round	Low current & super bright
G02	Green Diffused	565 nm	5 ~ 32	10mA	5mm Round	
G04	Green Diffused	565 nm	0.8 ~ 3.2	2mA	5mm Round	Low current
Y02	Yellow Diffused	590 nm	5 ~ 32	10mA	5mm Round	
Y04	Yellow Diffused	590 nm	0.8 ~ 32	2mA	5mm Round	Low current
R07	Red Diffused	700 nm	0.2 ~ 0.5	10mA	3mm Rectangular	

LED Type	Color	Wavelength	Intensity / Iv(mcd)		Size/shape	Remarks
R08	Red Diffused	625 nm	2 ~ 12.5	10mA	3mm Rectangular	High effective
G05	Green Diffused	565 nm	2 ~ 8	10mA	3mm Rectangular	
`05	Yellow Diffused	590 nm	2 ~ 8	10mA	3mm Rectangular	
R09	Red Diffused	700 nm	0.5 ~ 2.0	10mA	5mm Rectangular	
R10	Red Diffused	625 nm	3.2 ~ 12.5	10mA	5mm Rectangular	High effective
R11	Red Diffused	660 nm	40 ~ 80	20mA	5mm Rectangular	Super bright
G06	Green Diffused	565 nm	2 ~ 8	10mA	5mm Rectangular	
Y06	Yellow Diffused	590 nm	2 ~ 8	10mA	5mm Rectangular	
R12	Red Diffused	700 nm	0.5 ~ 0.8	10mA	3mm Triangular	
R13	Red Diffused	625 nm	2 ~ 5	10mA	3mm Triangular	High effective
G07	Green Diffused	565 nm	1.25 ~ 3.2	10mA	3mm Triangular	
Y07	Yellow Diffused	590 nm	1.25 ~ 3.2	10mA	3mm Triangular	
R13	Red Diffused	700 nm	0.5 – 0.8	10mA	5.6mm Triangular	
R14	Red Diffused	625 nm	5 – 12.5	10mA	5.6mm Triangular	High effective
G08	Green Diffused	565 nm	2 – 8	10mA	5.6mm Triangular	
Y08	Yellow Diffused	590 nm	2 - 5	10mA	5.6mm Triangular	

Ordering Instructions

LTV – 85 S 0 N 5.7 – R01 A- xxxx **(2 Poles Versions)**
1 2 3 4 5 6 7 8

1: Series
- 85 = 2P2T
- 86 = 2P1T (normal open)

2: Functions
- S = Lock
- N = Non-lock

3: Base/Position Pin
- 0 = No position pin
- 1 = Two same size small position pins
- 2 = Two different size position pins

4: Terminal shape
- N = Standard 3.4mm long straight pcb pin
- D = Snap in pins/3.4mm
- Z = Pins bent out (SMT)
- L = 7.5mm long terminal

5: Actuator type

6: LED type *(ignored if no LED)*
- * Ref. to LED spec table for standard types
- * Contact Toneluck for custom-made items

7: LED positions relative to plunger *(ignored if no LED)*
- A = left hand side, 6.4mm from plunger
- B = left hand side, 8.4mm from plunger

Direction: Latching pin point inwards

8: Specification code
Specification code will be assigned by Toneluck to differentiate any minor changes from standard version.

LTV – 87 S 0 N 5.7 - xxxx **(4P2T version)**
1 2 3 4

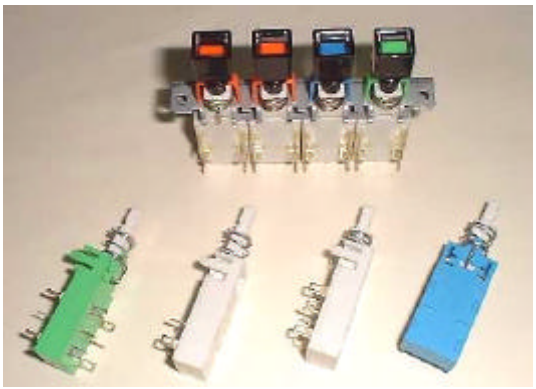
1: Functions
- S = Lock
- N= Non-lock

2: Base type
- 0 = No position pin

3: Terminal type
- N = standard through hole pcb
- D = RDI/Snap in pins

4: Actuator height: 5.7mm

PWL Power Switch



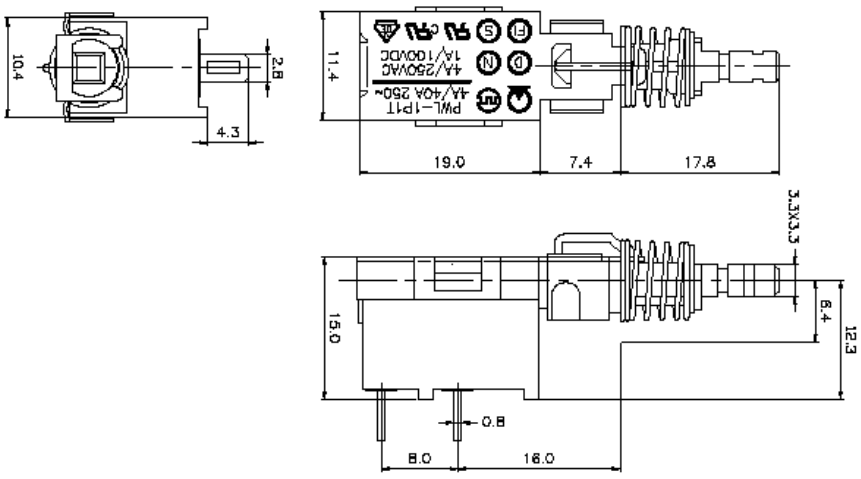
Characteristics

- Snap-in mounting bracket available
- Individual/ chassis/inter-lock modules available
- Different travel distances
- Wide operating temperature range: -40 ~ +85C
- High tracking resistance version available
- UL94V0 housing material available
- Snap-on caps in a variety of shapes & colors
- Compliant to major safety standards

Electrical Data				
Electrical Ratings & Operating life	6A	250VAC	10,000 cycles	(2 Poles)
	4A 10A 1A	250VAC 250VAC 100VDC	10,000 cycles 10,000 cycles 10,000 cycles	(1 Pole)
Dielectric strength	1,500VAC, 50~60Hz, for 1min between current-carrying metal part and ground, and between each terminal and non-current carrying metal part.			
Contact resistance	50 mΩ (max)			
Insulation resistance	100 mΩ (min)			
Mechanical Data				
Travel to lock/Total Travel distance	2 Poles series: 3.0/4.5 mm 1Poles series: 2.5/3.5 mm or 1.5/2.5 mm			
Operating force *	450 +/- 30 gf 650 +/- 100 gf			
Further Data				
Operating temperature	-25 ~ +85C (2 poles) -40 ~+ 85C (1 pole)			
Circuit configurations	2P2T 2P1T 1P2T 1P1T			
Terminals	Solder terminals PCB terminals			
Function	Momentary With Lock Inter-lock modules			
Actuator dimensions	3.3 x 3.3 mm			
Plastic material	UL 94V0			
Proof Tracking Resistance (CTI/PTI)	175V or 250V			

**Please contact Toneluck for specifications other than the above standard options.*

Dimensions: PWL-1P1T

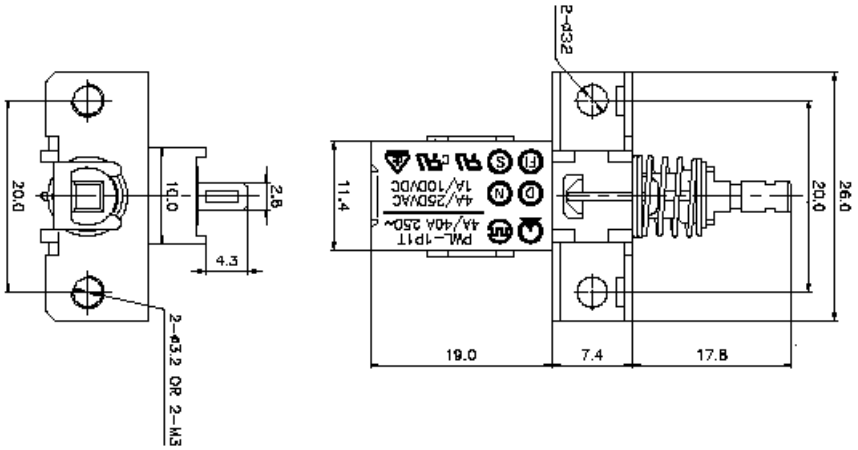


Mounting Types: PWL-1P1T

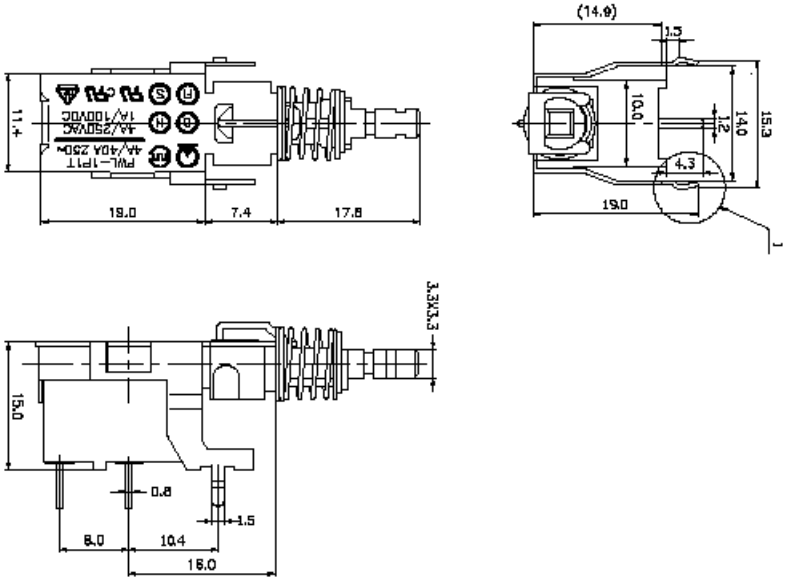
H: Hole Diameter: 2xö 3.2mm

G: Hole Diameter: 2xö 2.4mm

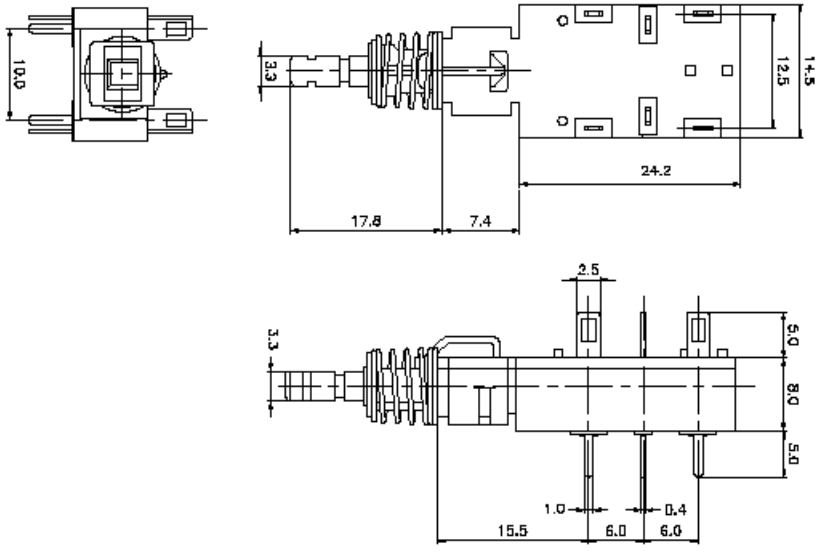
T :Thread Specification: 2x [M3 x 0.5mm]



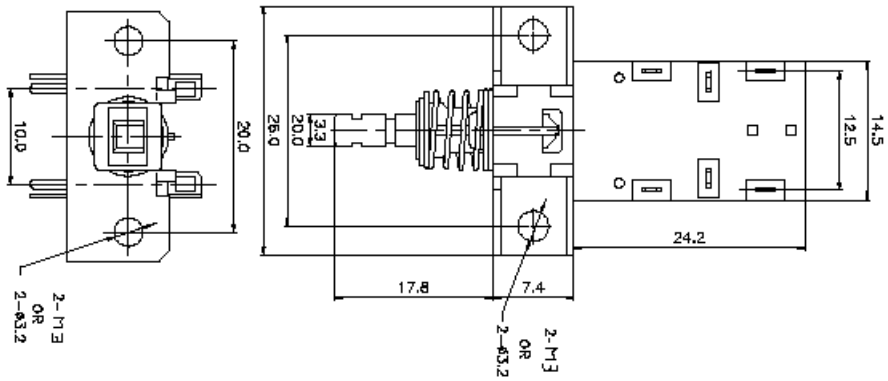
D: with PCB metal holder



Dimensions: PWL-2P



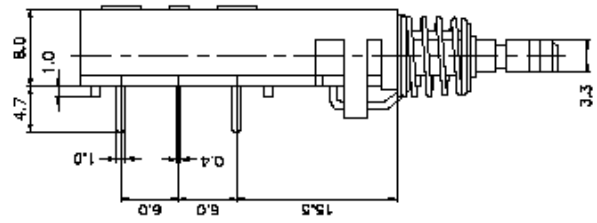
Mounting Types: PWL-2P

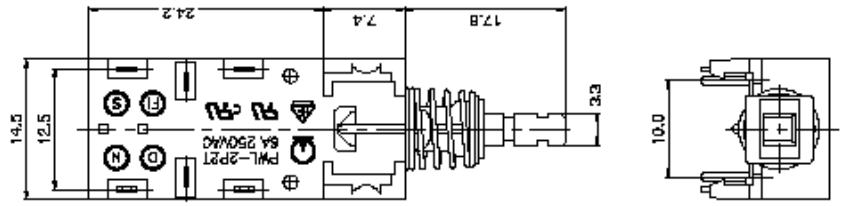


Cases Type: PWL-2P

 **P: with 2 plastic supports base**	 **K: with 2 plastic pcb holder & position pin**	 **F: PCB pins in opposite direction** **Ref to drawing below**

Case Type F: PWL-2P





Ordering Information

PWL- 2P1TL – 6 S A K H – xxxx
1 2 3 4 5 6

1: Circuit configurations
- 2P2T : Normal 2P2T circuit
- 2P1TR : 2P1T / normal closed circuit
- 2P1TL : 2P1T / normal opened circuit
- 1P2TL : 1P2T / using left hand side circuit
- 1P2TR : 1P2T/ using right hand side circuit

** Direction: Latch pin up, plunger point inward*

2: Current Rating:
- 6 = 6A/250VAC

3: Lock function
- S = Lock
- N= non-lock

4: Terminal Configuration
- A: with both PCB pins & Solder Lugs
- B: PCB only
- C: Solder lugs only

5: Case Types
- S: Standard type
- P: With two plastic supports base
- K: with plastic pcb holders & position pin
- F: PCB pin in opposite direction

6: Mounting type
- H: Hole Diameter: 2xö 3.2mm
- G: Hole Diameter: 2xö 2.4mm
- T: Thread Specification: 2x [M3 x 0.5mm]
- C: Mounting Ear Cut
- Nil: Without Mount

PWL – 1P1T – 4 S P 1.5 H – xxxx
1 2 3 4 5

1: Current Rating :
- 4 = 4A/250V AC
- 10 = 10A/250V AC

2: Lock Function
- S=Self-lock
- N= Non-lock

3: Terminal type
- A = Solder lugs terminal
- P = PCB pin

4: Travel to lock distance
- 1.5 = 1.5 mm
- 2.5= 2.5 mm

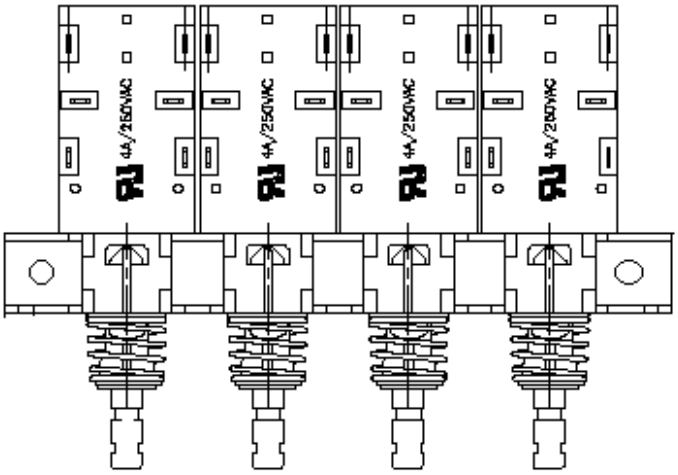
5: Mounting type
- H: Hole Diameter: 2xö 3.2mm
- G: Hole Diameter: 2xö 2.4mm
- T :Thread Specification: 2x [M3 x 0.5mm]
- C: Mounting Ear Cut at both ends
- D: With PCB Holder
- Nil: Without Mount

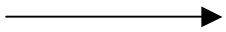
Notes:
1. Please contact Toneluck or her representatives for details on switch modules
2. The "****" is a 4 digits specification code assigned by Toneluck for individual customer specification

Gang Switch

PWL – 5 –17.5 H – xxxx
1 2 3 4 5

1 = Series code
2 = Total no. of keys
3 = Pitch distance of mounting
4 = Mounting type
H: Hole Diameter: 2xö 3.2mm
G: Hole Diameter: 2xö 2.4mm
T: Thread Specification: 2x [M3 x 0.5mm]
C: Mounting Ear Cut
5 = Specification code will be assigned by Toneluck to differentiate any minor changes from standard version

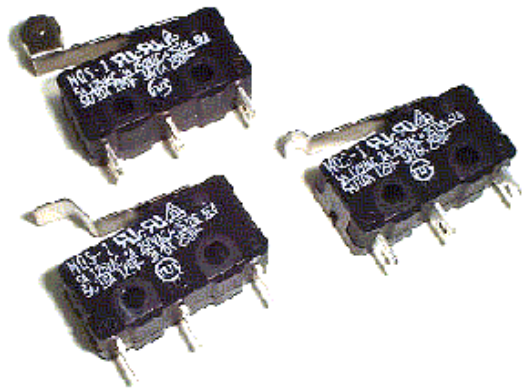




No of Keys

Key No.#	**Switch Part Number**	**Function** (select one only)				**Pitch** *(p)*	**Button P/N**
		Self Lock	Non-lock	Inter-lock	Reset		
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							

MQS-1 Subminiature Snap Action Switch



Characteristics

- Mini size high performance snap action switches
- Wide switching capacity from 0.1A ~ 10A/250VAC
- Optional gold contacts for low energy applications
- Wide operating temperature range: -25 ~ +85C
- Reduced contact gap distance version available
- Custom made levers & different operating force
- Compliant to major safety standards
- Optional movement differential travel distance for different applications

Electrical Data			
Electrical Ratings & Operating life cycles	0.2A/ 48VDC	25T85	1,000,000 cycles
	3A 125/250VAC	25T85	50,000 cycles
	5A 125/250VAC	25T85	50,000 cycles
	10A 125/250VAC	25T85	10,000 cycles
Dielectric strength	1,000VAC, 50~60Hz, for 1min between current-carrying metal part and ground, and between each terminal and non-current carrying metal part.		
Contact resistance	30 mΩ (max, silver contacts)		
Insulation resistance	100 MΩ (min)		
Mechanical Data			
Movement Differential Travel *Note 1*	Standard type: 0.2mm (max) Shorter type : 0.1mm (max)		
Operating force (pin plunger/no lever type)	80 ± 20 gf 130 ± 20 gf 160 ± 30gf 230 ± 40 gf		
Further Data			
Operating temperature	-25 ~ +85C		
Circuit configuration	SPDT SPST-NO SPST-NC		
Terminals	Quick Connect Terminal Solder Terminal PCB Terminal PCB Right Angle Terminal		
Housing material	Thermoplastic		
Flammability Rating	UL94V-0		
Proof Tracking Index (PTI/CTI)	175V 250V		

Ordering Information

MQS- 1 1 A 80NP - xxxx
1 2 3 4 5 6

1: Ratings/Series
- 1 = 0.2A /48V DC
- 2 = 3A/250V AC
- 3 = 5A/250V AC
- 4 = 10A/250V AC

2: Lever Type
- A, B, C, D, ….Z
- N = No Lever

3: Operating force
- Operating force measured at the tip of the actuator
- Refer to following table for the operating force of individual lever type

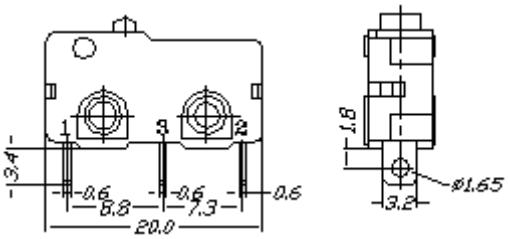
4: Contact Gap: N= Normal type(Movement differential travel:0.2mm max)
R = Quick Return(Movement differential travel: 0.1mm mas)

5: Terminal type
- P=PCB terminal
- A=Solder Lugs
- B=Right Angle
- D=Quick connect Terminal

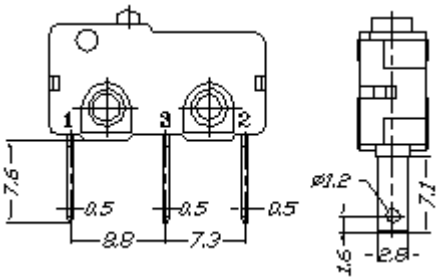
6: Spec code which to be assigned by Toneluck for individual customer specification

Terminal Type

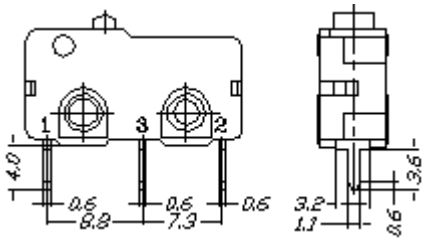
Type A: Solder Terminal



Type D: Quick Connect Terminal

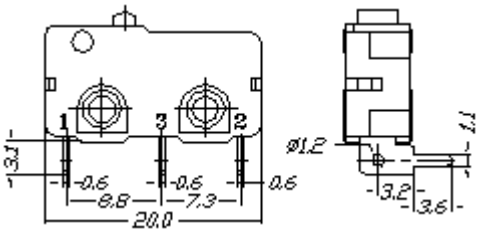


Type P: PCB Terminal



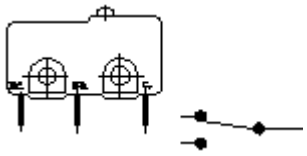
1=COM
2=NC
3=NO

Type B: Right Angle PCB Terminal

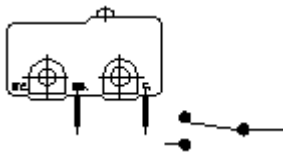


Circuit Configurations

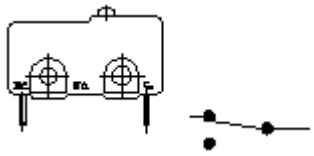
SPDT



SPST-NO

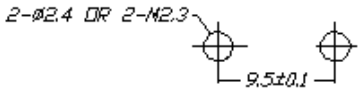


SPST-NC

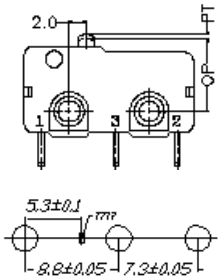


Installation

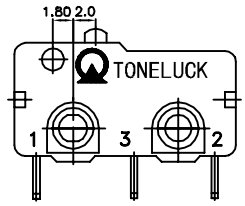
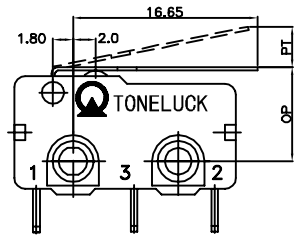
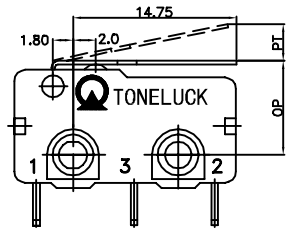
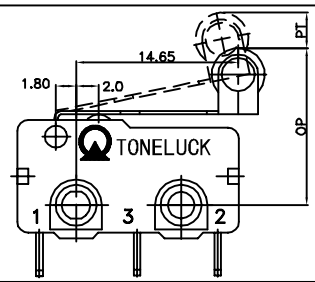
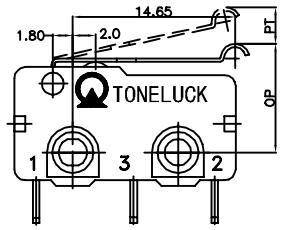
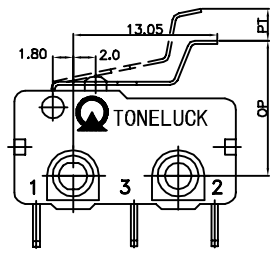
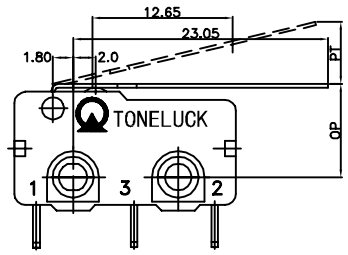
Mounting Holes

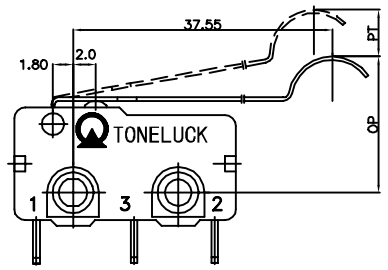
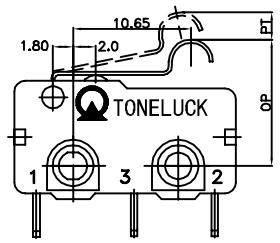
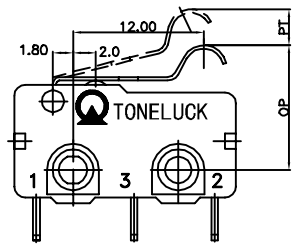
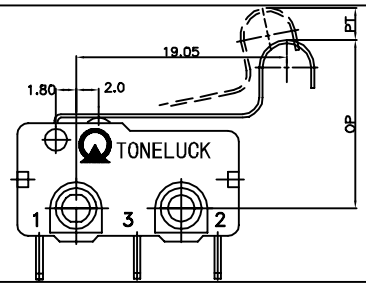
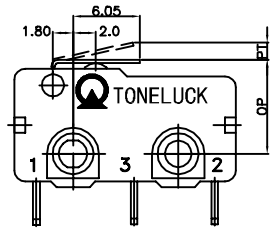
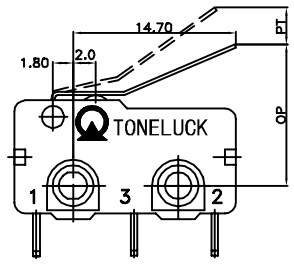
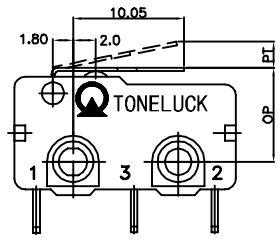


PCB holes



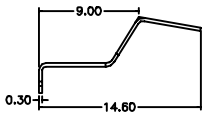
1=COM 2=NC 3=NO

Lever Type	Dimensions	Operating Force (gf)	RF (gf min.)	OP (mm)	PT (mm max.)	OT (mm min.)	MD (mm max.)	FP (mm max.)
N		80±20	10	8.4±0.5	0.6	0.5	0.2	——
		130±20	25	8.4±0.5	0.6			
		160±30	35	8.4±0.5	0.8			
		230±40	55	8.4±0.5	0.8			
A		20±10	5	9.7±1.0	2.8	1.0	1.0	12.5
		30±10	5	9.4±1.0	3.0			
		40±15	8	9.0±1.0	3.5			
		50±20	10	9.0±1.0	3.5			
B		25±10	5	9.7±1.0	2.8	1.0	1.0	12.5
		35±15	5	9.4±1.0	3.0			
		45±15	8	9.0±1.0	3.5			
		65±20	15	9.0±1.0	3.5			
C		15±10	5	15.4±0.8	2.0	1.0	1.0	17.5
		30±10	5	15.0±0.8	2.5			
		40±15	8	14.5±0.8	3.0			
		55±20	15	14.5±0.8	3.0			
D		20±10	5	11.4±0.8	2.2	1.0	1.0	13.6
		35±15	5	11.0±0.8	2.6			
		45±15	10	10.6±0.8	3.0			
		65±20	15	10.5±0.8	3.0			
E		20±10	5	13.5±0.8	2.3	1.0	1.0	15.3
		40±15	8	13.2±0.8	2.5			
		50±20	10	12.7±0.8	3.0			
		65±20	15	12.7±0.8	3.0			
H		10±5	2	10.7±1.5	3.0	1.5	2.0	13.7
		20±10	5	10.0±1.5	3.7			
		25±10	5	9.2±1.5	4.5			
		35±10	5	9.2±1.5	4.5			

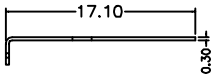
Lever Type	Dimensions	Operating Force (gf)	RF (gf min.)	OP (mm)	PT (mm max.)	OT (mm min.)	MD (mm max.)	FP (mm max.)
K		12 max.	3	15.5±2.0	5.5	2.0	2.5	22.0
P		30±15	5	12.5±1.0	2.0	0.8	0.8	14.5
		45±15	8	12.0±1.0	3.0			
		60±20	15	12.0±1.0	3.0			
		75±20	20	12.0±1.0	3.0			
Q		25±10	5	13.0±0.8	2.2	0.6	0.8	15.2
		40±15	8	12.7±0.8	2.5			
		60±20	15	12.5±0.8	2.7			
		75±20	20	12.5±0.8	2.7			
R		15±10	5	16.7±1.2	2.5	1.5	1.5	19.5
		25±10	8	16.3±1.2	2.9			
		35±15	10	15.6±1.2	3.5			
		45±20	15	15.6±1.2	3.5			
T		40±15	8	9.2±0.8	1.6	0.5	0.8	10.8
		65±20	15	9.0±0.8	1.8			
		100±30	25	8.9±0.8	2.0			
		120±30	30	8.9±0.8	2.0			
W		20±10	5	14.3±1.0	2.2	0.8	1.0	16.4
		40±15	8	14.0±1.0	2.5			
		50±20	10	13.4±1.0	3.0			
		65±20	15	13.4±1.0	3.0			
Z		30±10	8	9.5±0.8	2.5	0.5	0.8	11.3
		40±20	10	9.2±0.8	2.8			
		60±20	15	8.9±0.8	3.0			
		75±25	25	8.9±0.8	3.0			

Oher Available Levers:

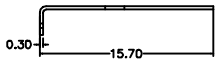
Type : F



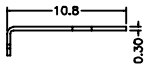
Type : L

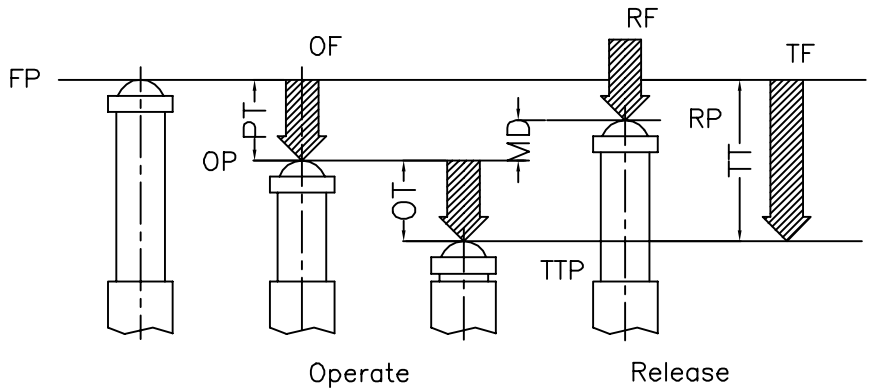


Type : G



Type : M





OF: Operating Force

RF: Release Force

TF: Total Travel Force

FP: Free Position

OP: Operating Position

TTP: Total Travel Position

RP: Release Position

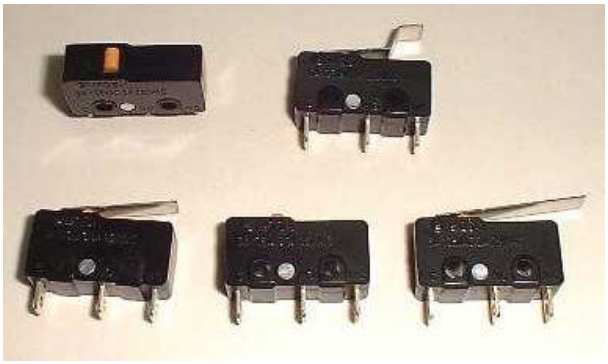
PT: Pre Travel

OT: Over Travel

MD: Movement Differential Travel

TT: Total Travel

MQS-1s Subminiature Snap Action Switch



Characteristics

- Mini size high performance snap action switches
- Wide switching capacity from 0.2A ~ 10A/250VAC
- Optional gold contacts for low energy applications
- Wide operating temperature range: -25 ~ +85C
- Reduced contact gap distance version available
- Custom made levers & different operating force
- Compliant to major safety standards
- Optional movement differential travel distance for different applications

Electrical Data			
Electrical Ratings & Operating life cycles	0.2A/48VDC	25T85	1,000,000 cycles
	3A 125/250VAC	25T85	50,000 cycles
	5A 125/250VAC	25T85	50,000 cycles
	10A 125/250VAC	25T85	10,000 cycles
Dielectric strength	1,000VAC, 50~60Hz, for 1min between current-carrying metal part and ground, and between each terminal and non-current carrying metal part.		
Contact resistance	30 mΩ (max, silver contacts)		
Insulation resistance	100 MΩ (min)		
Mechanical Data			
Movement Differential Travel	0.1mm (max)		
Operating force	50 ± 10 gf (for pin plunger/no lever type only, refer to attached table for operating force with lever)		
Further Data			
Operating temperature	-25 ~ +85C		
Circuit configuration	SPDT SPST-NO SPST-NC		
Terminals	Quick Connect Terminal Solder Terminal Bent Terminal		
Housing material	Thermosetting Plastic		
Flammability Rating	UL94V-0		
Proof Tracking Index (PTI/CTI)	175V		

Ordering Information

MQS- 1s 1 A 80N P - xxxx
1 2 3 4 5 6

1: Ratings/Series
- 1 = 0.2A /48V DC
- 2 = 3A/250V AC
- 3 = 5A/250V AC
- 4 = 10A/250V AC

2: Lever Type
- A, B, C, D, ….Z
- N = No Lever

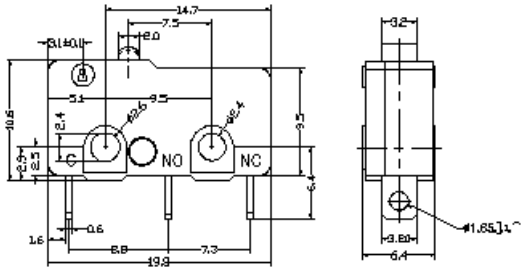
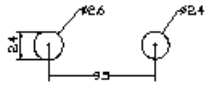
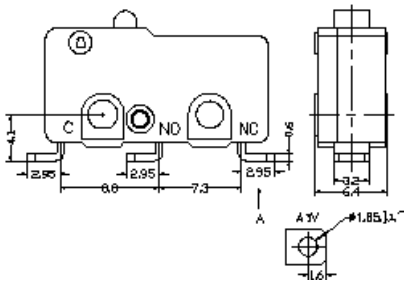
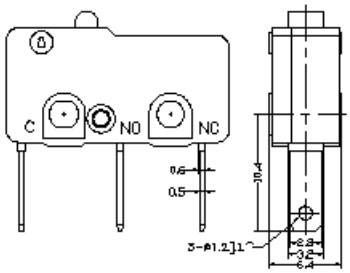
3: Operating force
- Operating force measured at the tip of the actuator
- Refer to following table for the operating force of individual lever type

4: Contact Gap
- N= Normal type(Movement differential travel: 0.1mm max)
- R= Quick Return Type (under development)

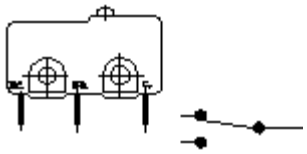
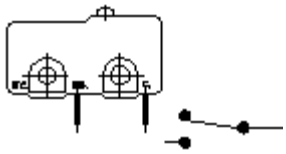
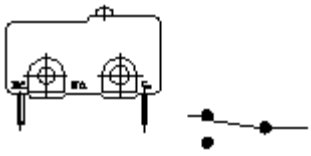
5: Terminal type
- A=Solder Lugs
- B=Bent Terminal
- D=Quick Connect Terminal

6: Spec code which to be assigned by Toneluck for individual customer specification

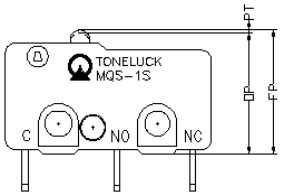
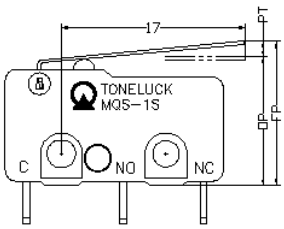
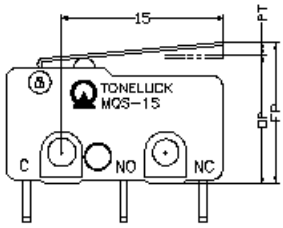
Terminal Type

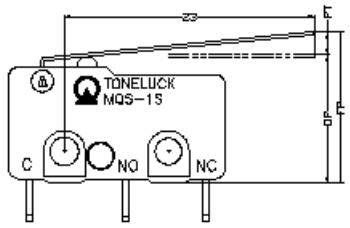
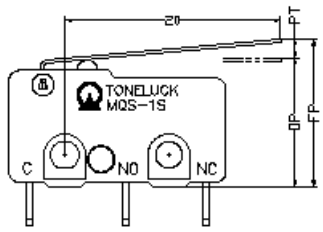
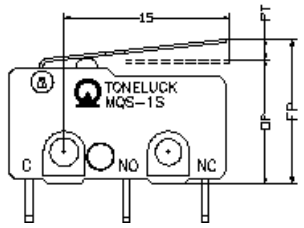
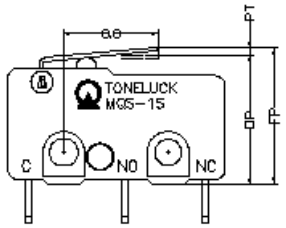
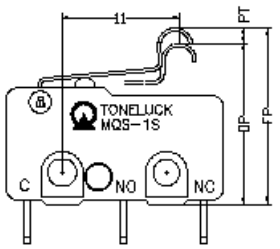
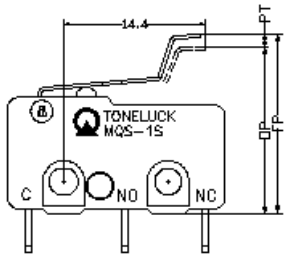
Type A: Solder Terminal	Mounting Holes
	
Type C: Bent Terminal	**Type D: Quick Connect Terminal**
	

Circuit Configurations

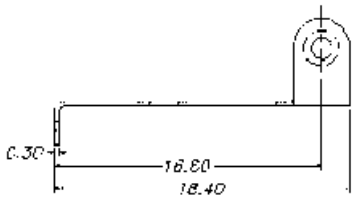
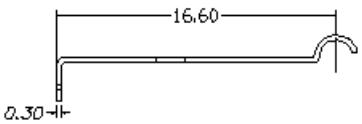
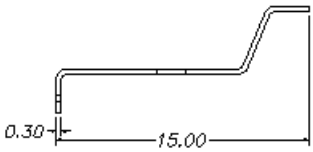
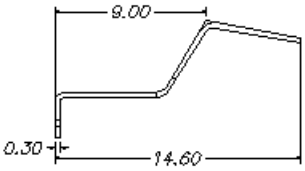
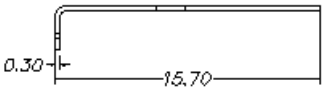
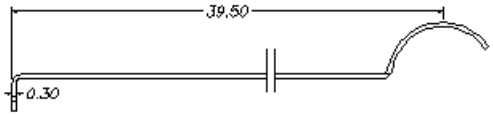
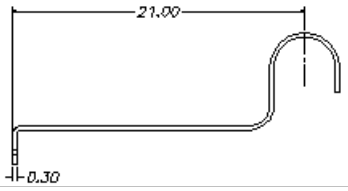
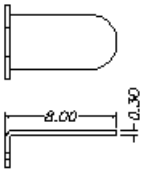
SPDT	SPST-NO	SPST-NC
		

Lever Type

Lever Type	Dimensions	Standard Operating Force Releasing Force (gf)	OP (mm)	PT (mm)	OT (mm)	MD (mm, max)
N		50 (± 10) 20	11 ± 0.5	0.5 max	0.8 ± 0.5	0.1
A		10 (± 5) 3	11 ± 2	1.2 ± 0.5	2.5 ± 0.5	0.4
B		12 (± 5) 5	13 ± 1	0.8 ± 0.5	2.5 ± 0.5	0.3

Lever Type	Dimensions	Standard Operating Force Releasing Force (gf)	OP (mm)	PT (mm)	OT (mm)	MD (mm, max)
H		8 (± 5) 3	13 ± 0.5	1.7 ± 0.5	3.1 ± 0.5	0.4
J		10 (± 5) 3	12.5 ± 0.5	1.2 ± 0.5	3.0 ± 0.5	0.4
L		15 (± 5) 8	13 ± 0.5	0.8 ± 0.5	2.6 ± 0.5	0.4
M		25 (± 10) 8	12 ± 0.5	0.65 ± 0.5	1.5 ± 0.5	0.2
P		10 (± 5) 3	17 ± 2	0.6 ± 0.3	2.2 ± 0.5	0.3
S		15 (± 5) 8	16.5 ± 0.5	0.5 ± 0.3	2.8 ± 0.5	0.3

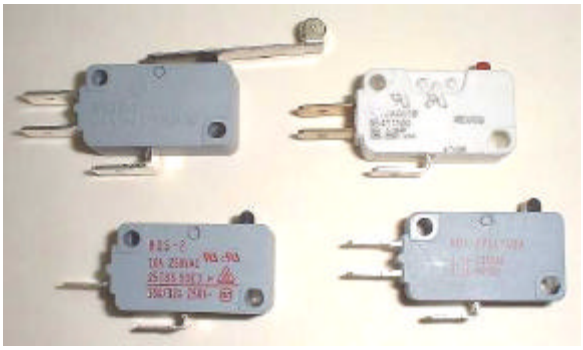
Other Available Lever Types

Type: C 	***Type: D*** 	***Type: E*** 
Type: F 	***Type: G*** 	***Type: K*** 
Type: R 	***Type: T*** 	

Note 1:

Movement Differential Travel(MD) Distance is the distance of the actuator from the operating position to the releasing position. The shorter the DT distance, the quicker the moving contact returns back to NC contact from the NO contact. This feature is especially useful when the NO contact is connected to an inductive load or motor load such as a coil, during the OFF->ON->OFF switching cycle, a very strong back EMF is generated which can be as high as hundred volts. In this case, the shorter the switching cycle (thus shorter DT distance), the less damage of the EMF to the contacts which leads to longer operating life cycles of the devices.

MQS-2 Miniature Snap Action Switch



Characteristics

- Wide switching capacity from 0.1A ~ 16A/250VAC
- Optional gold contacts for low energy applications
- Wide operating temperature range: -25 ~ +125C
- Custom made levers & different operating force
- Compliant to major safety standards (UL/VDE)
- High tracking resistance (PTI 250V)

Electrical Data			
Electrical Ratings Operating life cycles	0.1A/30VDC 5 A/40VDC 0.1A/250VAC 3A 125/250VAC 6A 125/250VAC 10A 125/250VAC 16A 125/250VAC 0.1A/30VDC 0.1A/250VAC 3A 125/250VAC 6A 125/250VAC 10A 125/250VAC 16A 125/250VAC	25T85 25T85 25T85 25T85 25T85 25T85 25T85 25T125 25T125 25T125 25T125 25T125 25T125	1,000,000 cycles 6,000 cycles 50,000 cycles 50,000 cycles 50,000 cycles 50,000 / 100,000 cycles 50,000 cycles 1,000,000 cycles 50,000 cycles 50,000 cycles 50,000 cycles 50,000 cycles 50,000 cycles
Dielectric strength	1,000VAC, 50~60Hz, for 1min between current-carrying metal part and ground, and between each terminal and non-current carrying metal part.		
Contact resistance	30 mΩ (max, silver contacts)		
Insulation resistance	100 MΩ (min)		
Mechanical Data			
Operating force (pin plunger/no lever type)	20 ± 5 gf 160 ± 20 gf 200 ± 20gf		
Further Data			
Operating temperature	-25 ~ +85C -25 ~ +125C		
Circuit configuration	SPDT SPST-NO SPST-NC		
Terminals	Quick Connect Terminal Solder Terminal Screw Terminal PCB Right Angle Terminal		
Housing material	Thermoplastic		
Flammability Rating	UL94V-0		
Proof Tracking Index (PTI/CTI)	175V 250V		

Remarks:

1. OP= Operating position (mm)
2. PT= Pre-travel distance (mm, max)
3. OT= Over-travel distance (mm, min)
4. MD=Movement differential distance (mm, max)
5. The "xxxx" suffix code (in part-number) is assigned by Toneluck for individual customer specification.
6. Please consult Toneluck or her representatives for other custom-made specifications.

Toneluck UL ISO-9001 Tel: (852)- 2553 6874 Fax: (852)- 2873 5541 ***www.toneluck.com*** switch@toneluck.com

MQS-2 Ordering Information

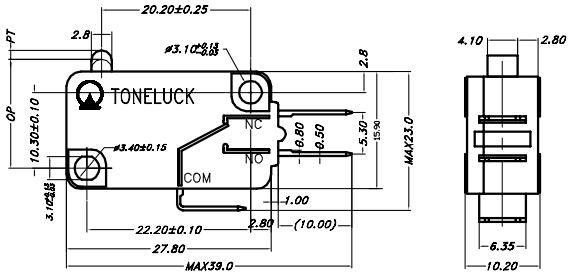
Ordering Code

MQS-2 10 S A 1 A A -xxxx
1 2 3 4 5 6

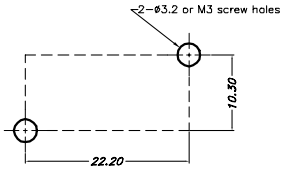
1.Ratings
P1=0.1A/250VAC,0.1A/30VDC
03=3A/250VAC
06=6A/250VAC
10=10A/250VAC
15=15.1A/250VAC
16=16A/250VAC
21=21A/250VAC

2.Operating Temperature: S=-25°C~+85°C; T=-25°C~+125°C
3.Lever Position: A or B, Nil=no lever installed
4.Lever Type: 1,2,3...n, 0=No lever installed
5.Terminal type
6.Circuit: A=SPDT,B=SPST-NC,C=SPST-NO

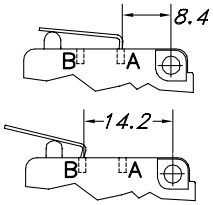
Basic Dimension



Mounting holes



Lever Positions

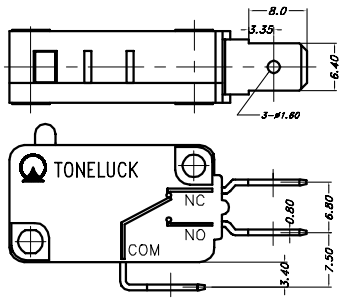


Lever Type: 1,2,3,4.....

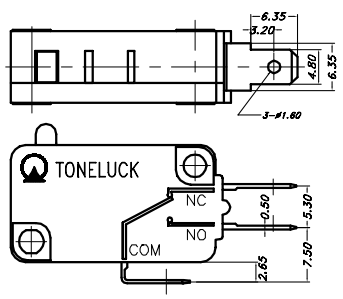
1. For lever installed in position A: MQS-210SA1xxxx; MQS-210SA2xxxx; MQS-210SA3xxxx.....
1. For lever installed in position B: MQS-210SB1xxxx; MQS-210SB2xxxx; MQS-210SB3xxxx.....

Terminal Type

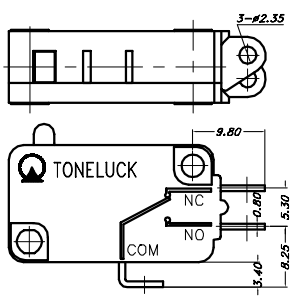
A:250# Terminal



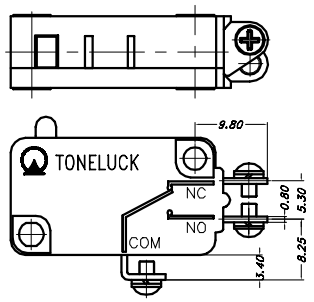
B:187# Terminal



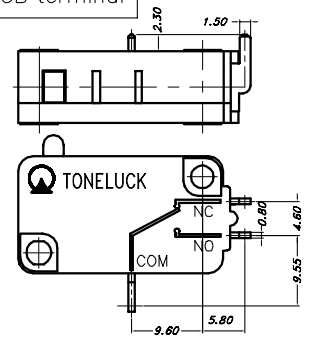
C:Solder Terminal



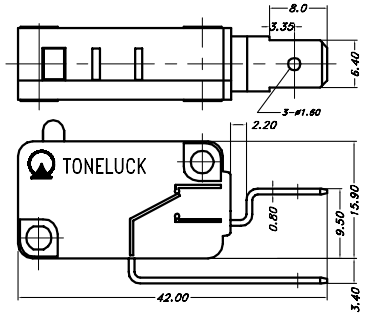
D:Screw Terminal



P:PCB terminal

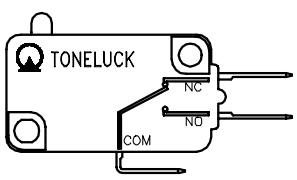


G:250# Extended Terminal

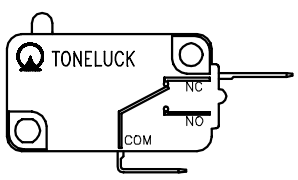


Circuit Configuration

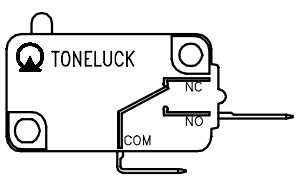
A: SPDT



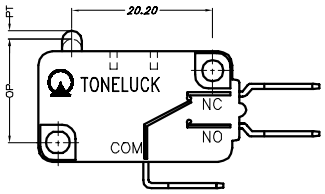
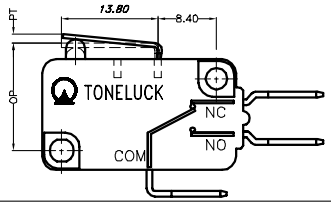
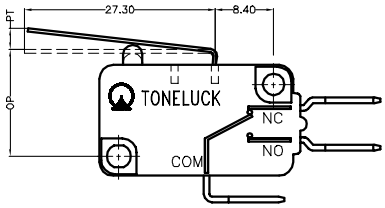
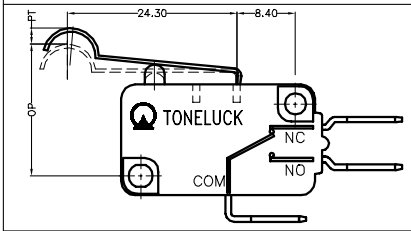
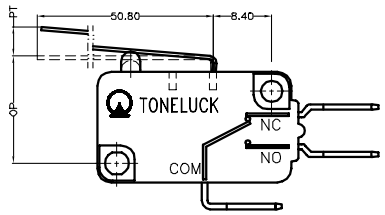
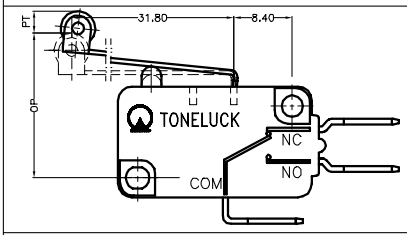
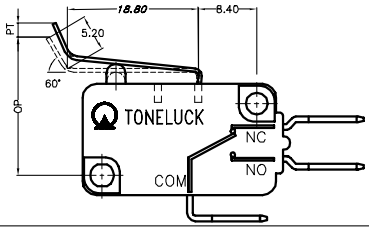
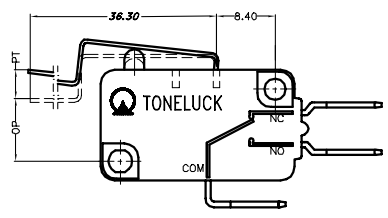
B: SPST-NC

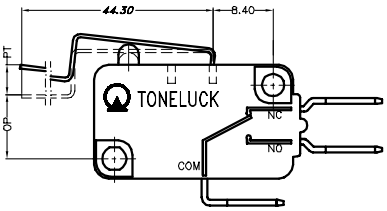
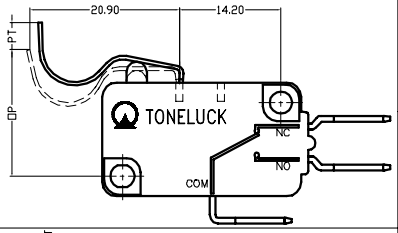
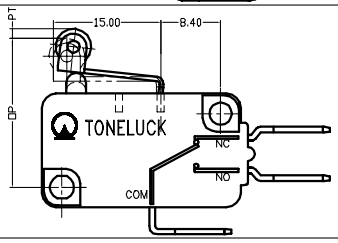


C: SPST-NO

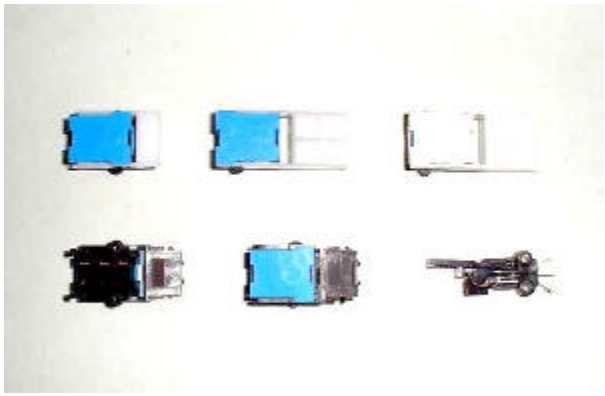


Parameter

Lever Type	Part No.	Operating Force (gf)					OP(mm)	PT(mm) max	OT(mm) min	MD (mm) max
		Release Force (gf) min								
	MQS-2□□□0□□	20±5	160±20	200±20			14.7±0.5	1.2	1.25	0.40
		10	50	55						
	————	——	——	——			——	——	——	——
	MQS-2□□□A1□□	——	160±20	200±20			15.3±0.5	1.6	1.5	0.5
			50	55						
	MQS-2□□□B1□□	——	80±15	100±15			15.3±1.1	3.0	2.4	0.75
			30	40						
	MQS-2□□□A2□□	——	75±15	95±15			15.3±1.5	3.3	2.5	1.2
			30	40						
	MQS-2□□□B2□□	——	40±8	50±10			15.3±2.3	6.0	4.8	1.6
			15	20						
	MQS-2□□□A3□□	——	85±15	105±15			18.7±1.5	2.8	2.4	1.1
			30	40						
	MQS-2□□□B3□□	——	45±9	55±10			18.7±2.1	5.5	4.1	1.65
			15	40						
	MQS-2□□□A4□□	——	40±8	50±10			15.3±2.5	6.5	4.4	2.2
			15	20						
	MQS-2□□□B4□□	——	20±5	25±5			15.3±4.3	11.5	8.3	3.5
			8	12						
	MQS-2□□□A5□□	——	60±12	75±14			20.7±1.5	3.7	3.3	1.3
			25	30						
	MQS-2□□□B5□□	——	35±8	40±8			20.7±2.2	7.5	5.5	2.4
			12	15						
	MQS-2□□□A6□□	——	95±15	120±17			19.7±1.2	2.5	2.0	0.9
			40	45						
	MQS-2□□□B6□□	——	50±10	65±12			19.7±2.0	4.7	3.8	1.5
			20	30						
	MQS-2□□□A7□□	——	55±12	70±13			8.9±1.8	4.2	3.6	1.6
			20	30						
	MQS-2□□□B7□□	——	30±7	37±8			8.9±2.7	8.5	5.75	2.75
			10	15						

Lever Type	Part No.	Operating Force (gf)					OP(mm)	PT(mm) max	OT(mm) min	MD (mm) max
		Release Force (gf) min								
	MQS-2□□□A8□□	——	45±9	55±10			8.9±2.2	5.0	4.5	1.85
			15	20						
	MQS-2□□□B8□□	——	25±6	30±7			8.9±3.6	10.2	7.3	3.1
			10	10						
	————	——	——	——			——	——	——	——
	MQS-2□□□B9□□	——	60±12	75±14			17.7±2.2	4.2	3.6	1.5
			20	30						
	MQS-2□□□A12□□	——	160±20	200±20			20.7±0.5	1.6	1.5	0.5
			50	55						
	MQS-2□□□B12□□	——	80±15	100±15			20.7±1.1	3.0	2.4	0.75
			30	40						

THK Telephone-hook switch



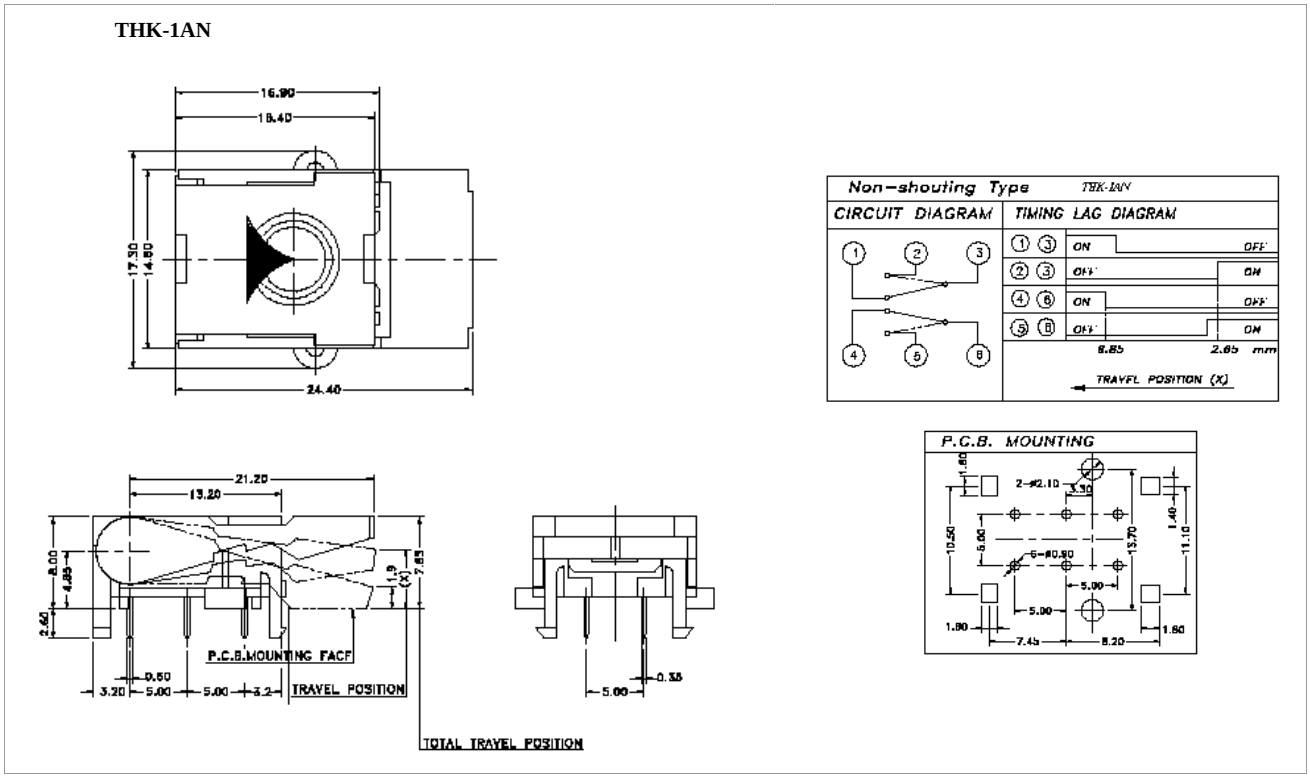
Characteristics

- Applicable in micro-current and high-load versions.
- Changeover timing available in wide variety
- Various type of levers available
- Long electronic life cycles
- High temperature Nylon material available
- Smooth light hand feel

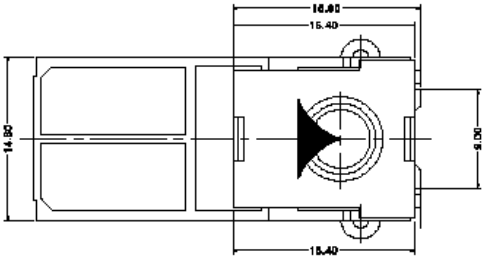
Electrical Data	
Electrical Ratings	0.2A/48V DC
Operating life	300,000 cycles min.
Dielectric strength	500VDC, 50~60Hz, for 1min between current-carrying metal part and ground, and between each terminal and non-current carrying metal part.
Contact resistance	50 mΩ (max)
Insulation resistance	100 MΩ (min)
Mechanical Data	
Operating force	50+/-10gf
Further Data	
Operating temperature	THK-1 -10 ~ +80 C THK-2 -10 ~ +60 C
Contact arrangement	1P2T 2P2T
Terminals	PC pins
Function	Momentary
Plastic material	UL94V-0, UL94V-2, UL94HB
Max. soldering temperature	5 second at 225

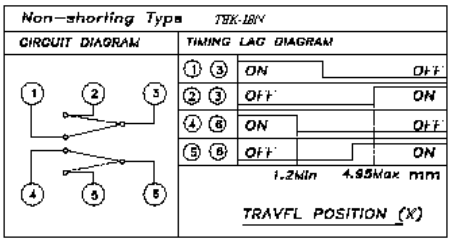
Dimensional drawings

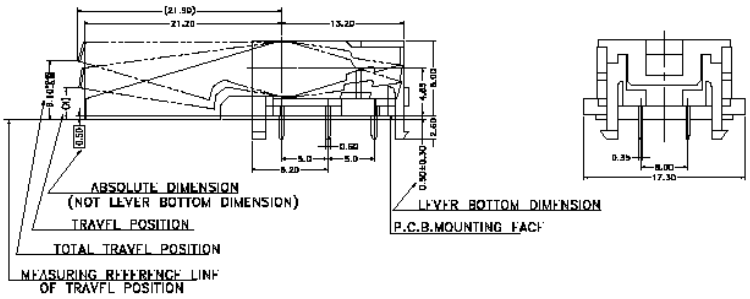
THK-1AN

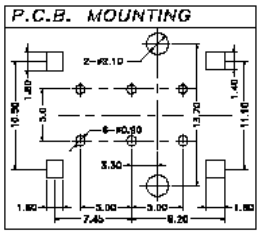


THK-1BN

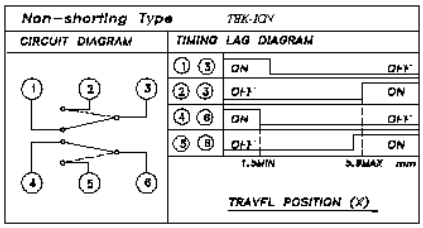


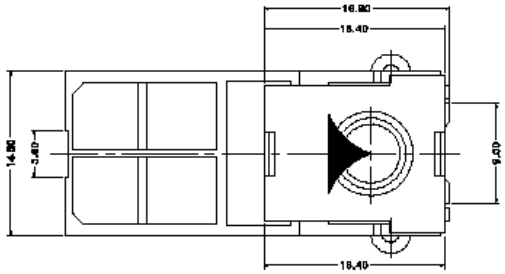


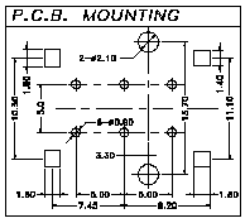


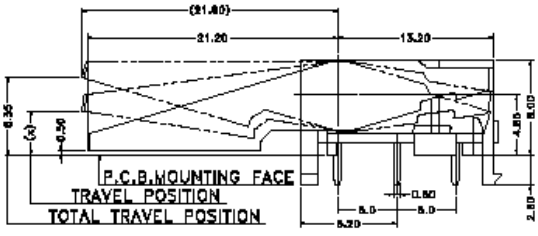


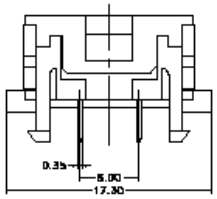
THK-1CN



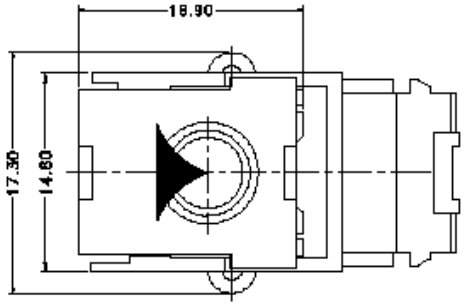


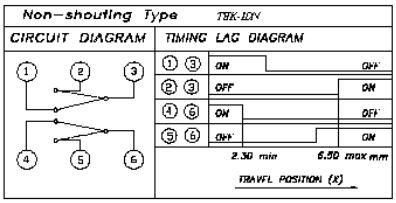


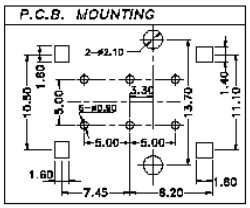


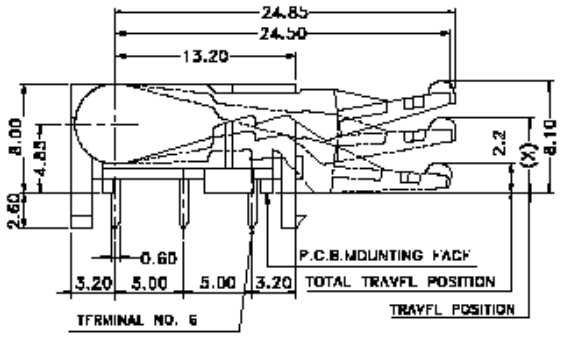


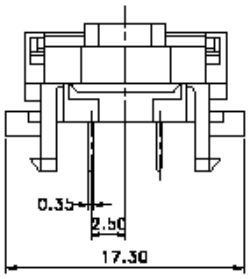
THK-1DN



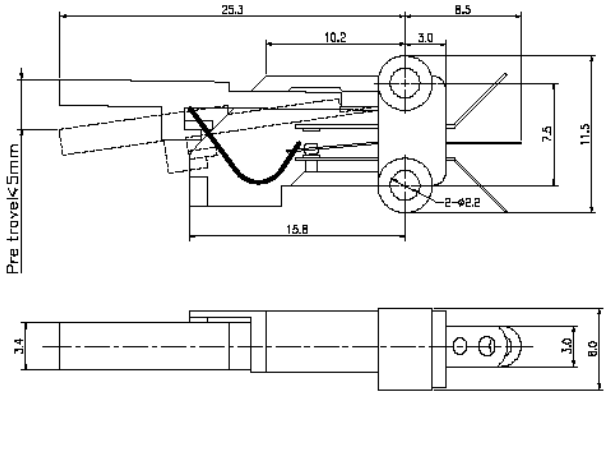




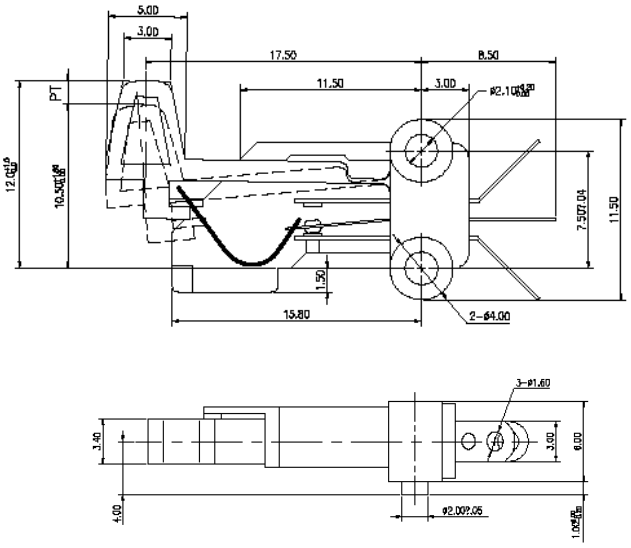




THK-2B



THK –2C



Ordering Instruction

THK-1 A N _–xxxx
1 2 3

1: Lever Type: A, B, C, D
2: N= Non-shorting S= Shorting type
3: Housing material
F = high temperature
Nil = standard material

THK-2 C – xxxx

Lever shape: ref. to drawings

Notes:

1. Please contact Toneluck or her representatives for details on switch modules
2. The "****" is a 4 digits specification code assigned by Toneluck for individual customer specification

KEY switch

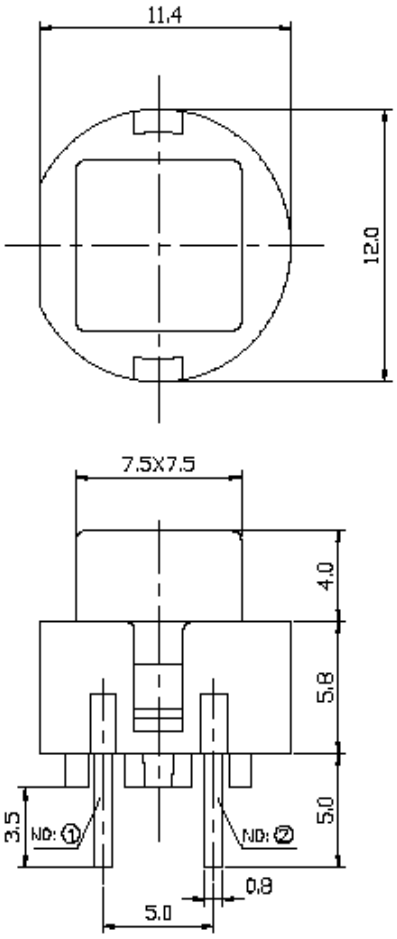
Characteristics

- Single pole, momentary
- Short stroke of 0.8mm
- Light touch feeling
- Long electronic life cycles
- With standard plunger size 3.3 x 3.3 mm
- Various plunger height available
- Several colors and shapes available

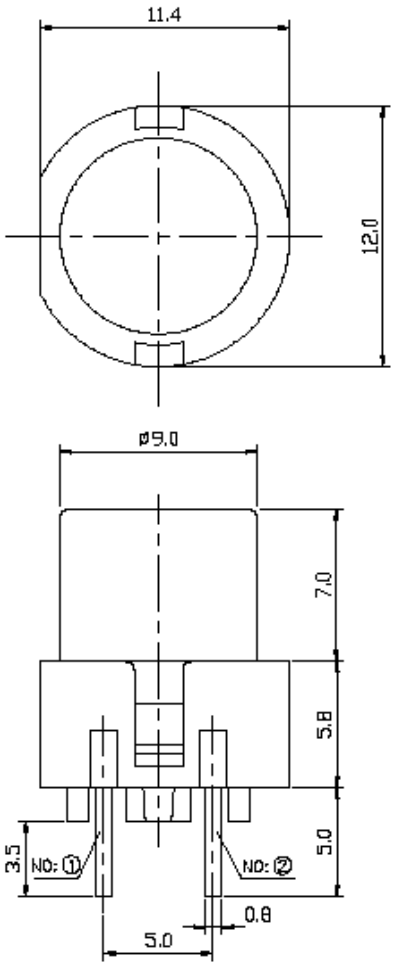
Electrical Data		
Electrical Ratings	0.01A/35V DC	
Operating life	500,000 cycles min.	
Dielectric strength	500V AC, 50~60Hz, for 1min between current-carrying metal part and ground, and between each terminal and non-current carrying metal part.	
Contact resistance	20 mΩ (max)	
Insulation resistance	100 MΩ (min)	
Mechanical Data		
Travel to lock distance	/	
Total travel distance	0.8mm	
Operating force	130 +/- 50g 180 +/- 50g 330 +/- 50g	
Cap Data		
Cap types	**Key Code**	**Cap shape**
	KEY-R	Round cap with height 12.8mm
	KEY-Rs	Round curved top with height 13.9mm
	KEY-R2	Round curved top with height 13.7mm
	KEY-R3	Round curved top with height 14.6mm
	KEY-S	Square cap
	KEY-L	Flat cap
	KEY-P	3.3 x 3.3 x5.5 mm plunger cap
	KEY-K	Square cap (button)
Cap colors	**Color**	**Pantone code**
	Red	187C
	Green	355C
	Light Grey	5425C
	Dark Grey	11C
	Yellow	115C
	Black	3C 2X
	Blue	2925C
	White	
Further Data		
Operating temperature	-20 ~ +65 C	
Contact arrangement	SPST NO	
Terminals	PC pins	
Function	Momentary	
Button	KEY-K	
Actuator dimensions	3.3 x 3.3 mm	
Plastic material	UL94V-0, UL94V-2, UL94HB	
Max. soldering temperature	5 second at 225	

Dimensional drawings

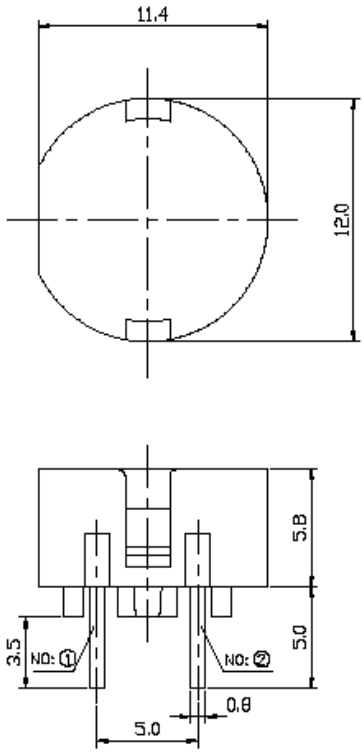
KEY-S



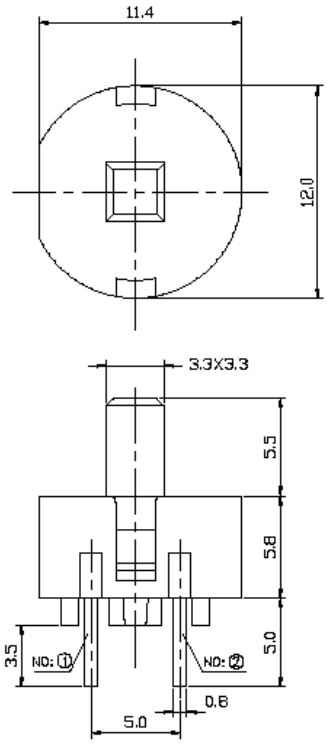
KEY-R



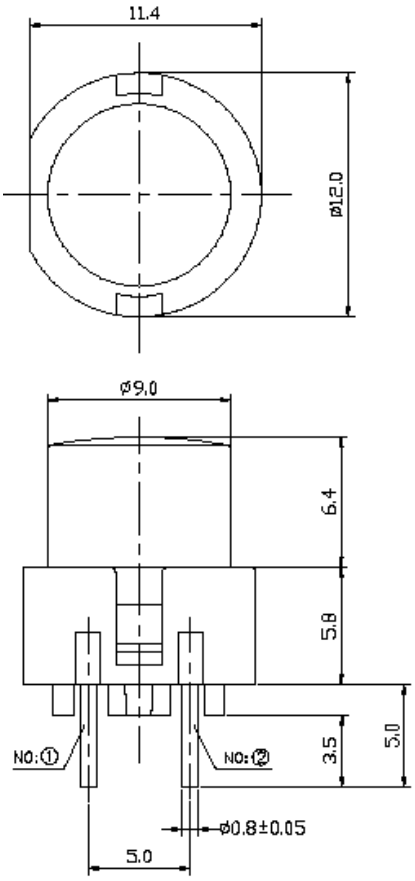
KEY-L



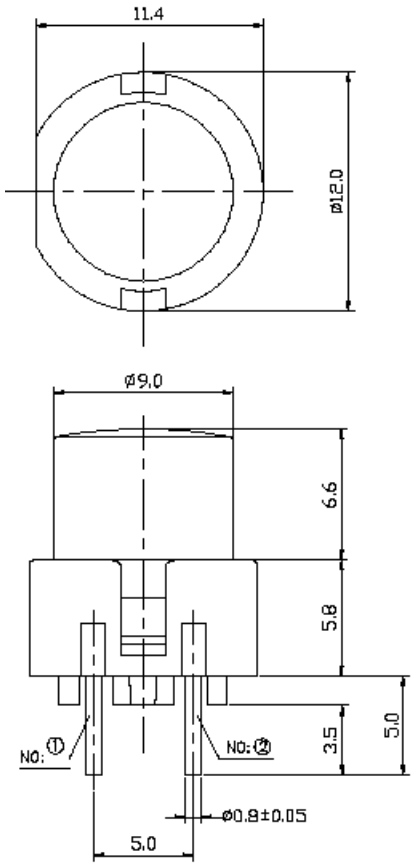
KEY-P



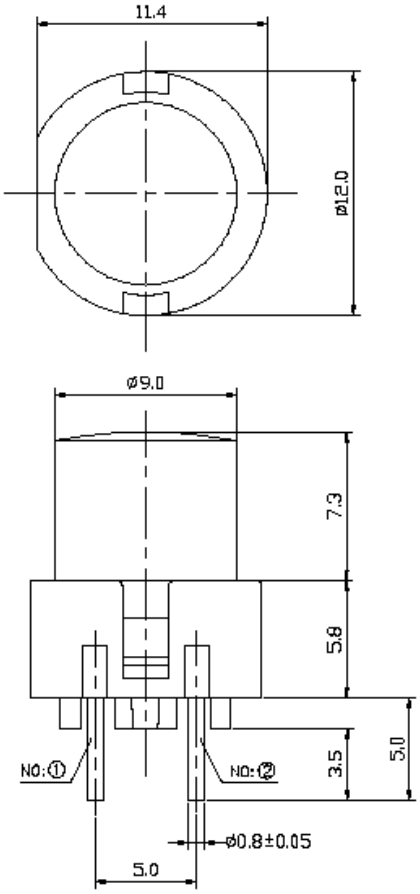
KEY-R2



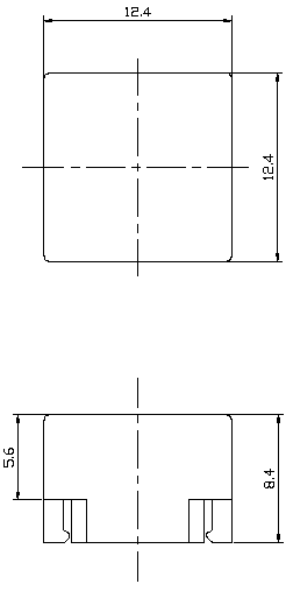
KEY-Rs

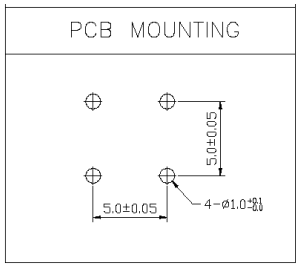


KEY-R3



KEY-K





Ordering Instruction

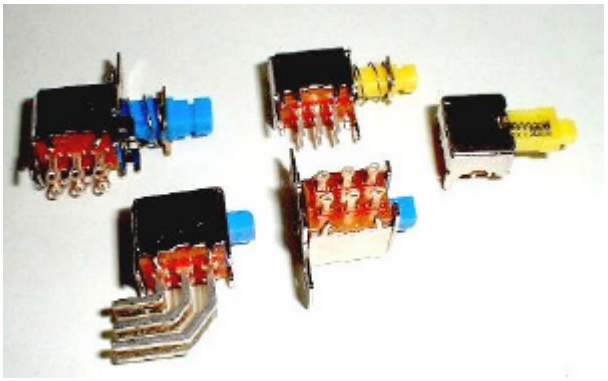
KEY – R2 – R – xxxx
1 2 3

1: Cap shape
R: Round top with height12.8mm
Rs: Round curved top with height 13.9mm
R2: Round curved top with height 13.7mm
R3: Round curved top with height 14.6mm
S: Square
P: 3.3(W) x 3.3(d) x 5.5(h) plunger cap
K: Square cap (button) for KEY-S and KEY L

2: Cap color
R: Red
Y: Yellow
G: Green
B: Black
W: White
L: Blue
DGY: Dark Grey
LGY: Light Grey

3 : It is a four digit specification code assigned by Toneluck for different specification.

SPN Selector push switches



Characteristics

1.5mm or 2.5mm -travel distance
Long electronic life cycles
Various case and mounting available
PCB terminals and lead wiring terminals available

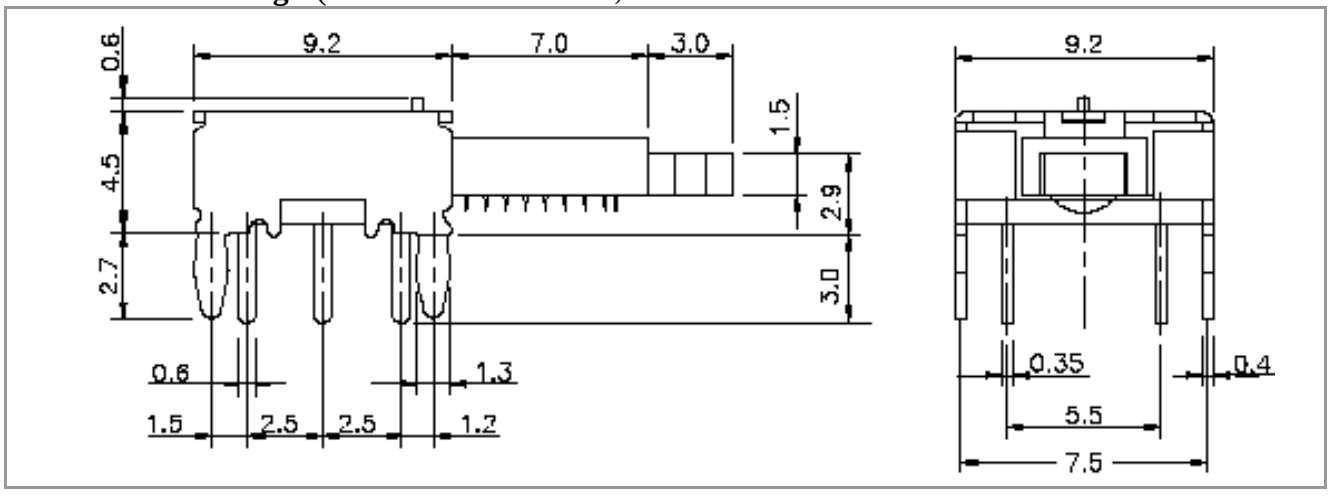
Application

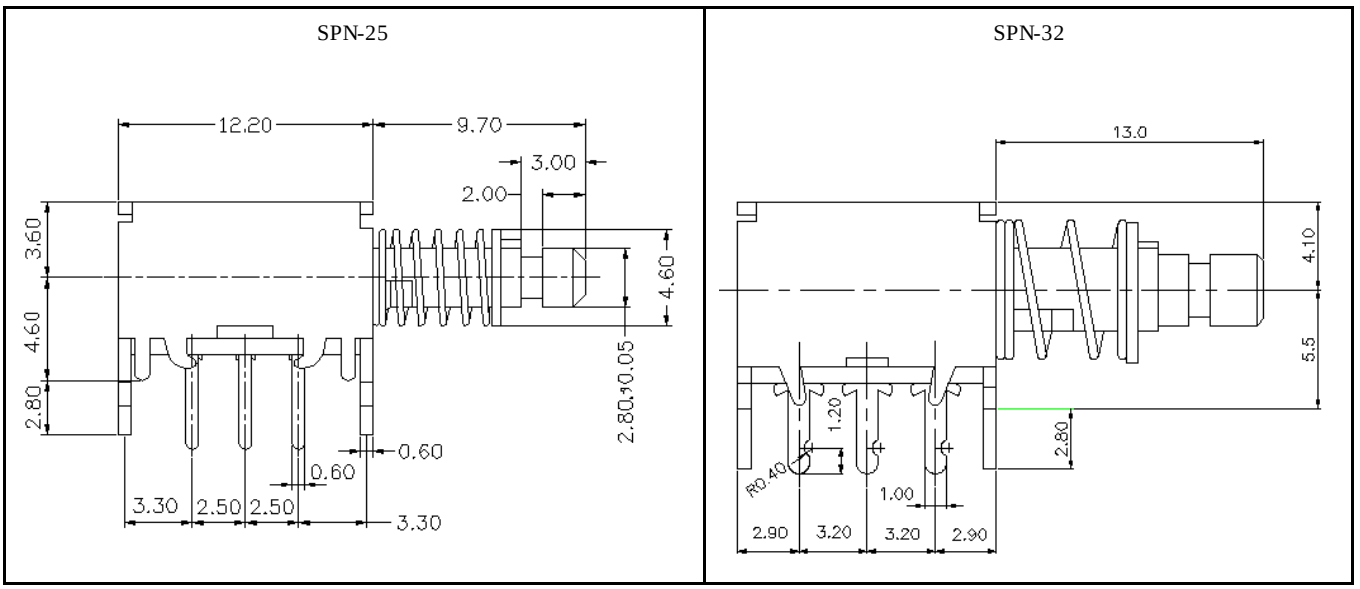
suitable for audio systems, telephones, instruments,etc.

Technical specifications

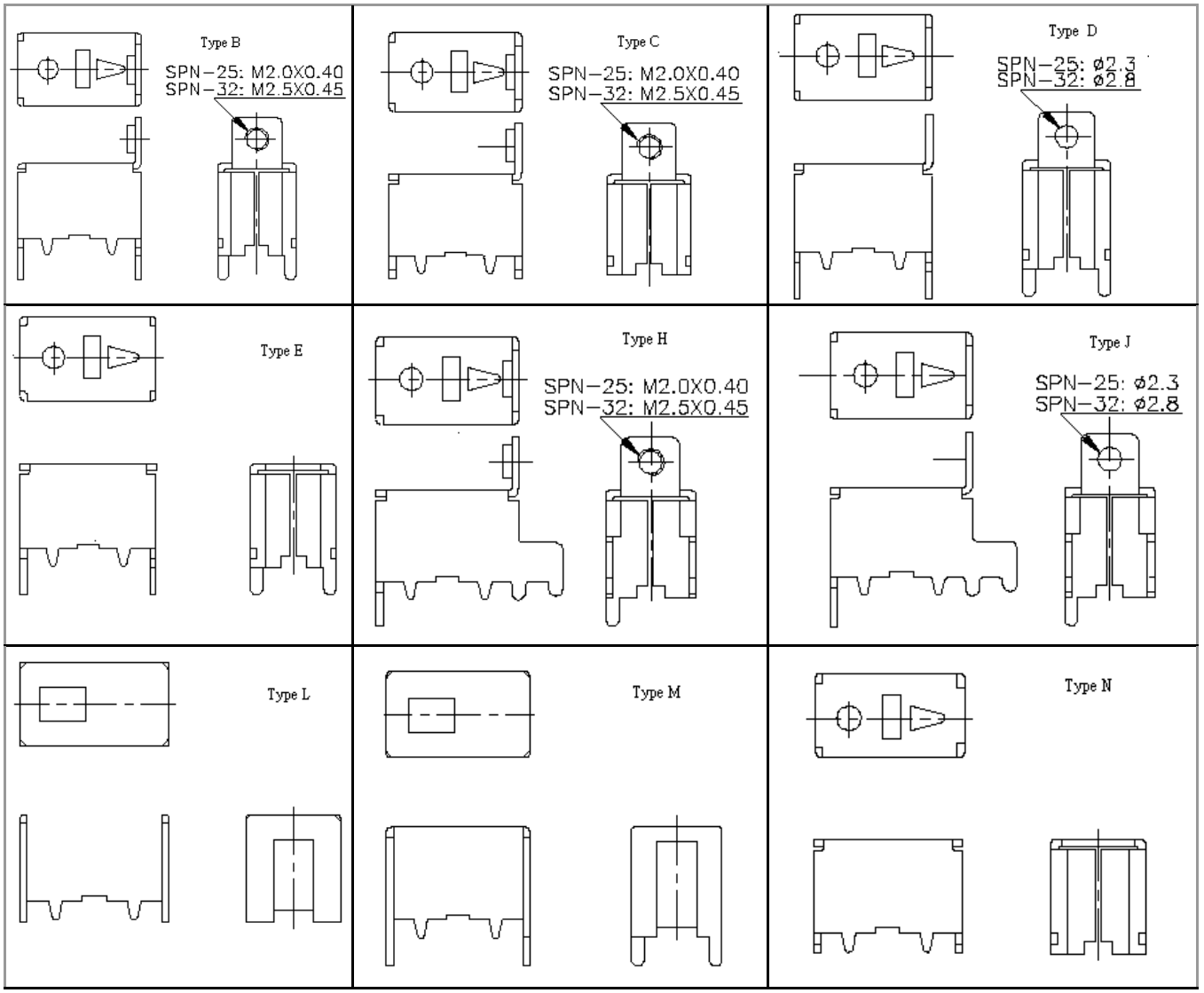
Electrical Data	
Electrical Ratings	0.20A/30VDC
Operating life	General : 20,000 cycles (min) Case type L, Z & T: 100,000 cycles (min)
Dielectric strength	500VAC (50~60Hz,cut-off current 2mA) is applied between non-connected terminals and between terminals and frame for 60 +/- 5s. No dielectric breakdown shall occur.
Contact resistance	20 mΩ (max)
Insulation resistance	100 MΩ (min)
Change over time	Non-shorting
Mechanical Data	
Travel to lock distance	SPN-32: 2.5mm SPN-25: 1.5-2.5mm
Total travel distance	SPN-32: 3.5mm SPN-25: 2.5-3.5mm
Operating force	SPN-32: 300 +/- 100g SPN-32 (Case type L, T & Z): 80 +/- 20g SPN-25: 330 +/- 100g SPN-25S-TT: 200 +/- 100g SPN-25N-TT: 200 +/- 100g
Further Data	
Operating temperature	-10 ~ +60C
Circuit configuration	2 poles
Terminals	PCB terminals Lead wiring terminals
Function	Momentary Self-lock
Button	SPN-32: button BC, BF series SPN-25: button BC, BF & MF Series
Plastic material	UL94HB
Solder heat resistance	260C/ 5 seconds max

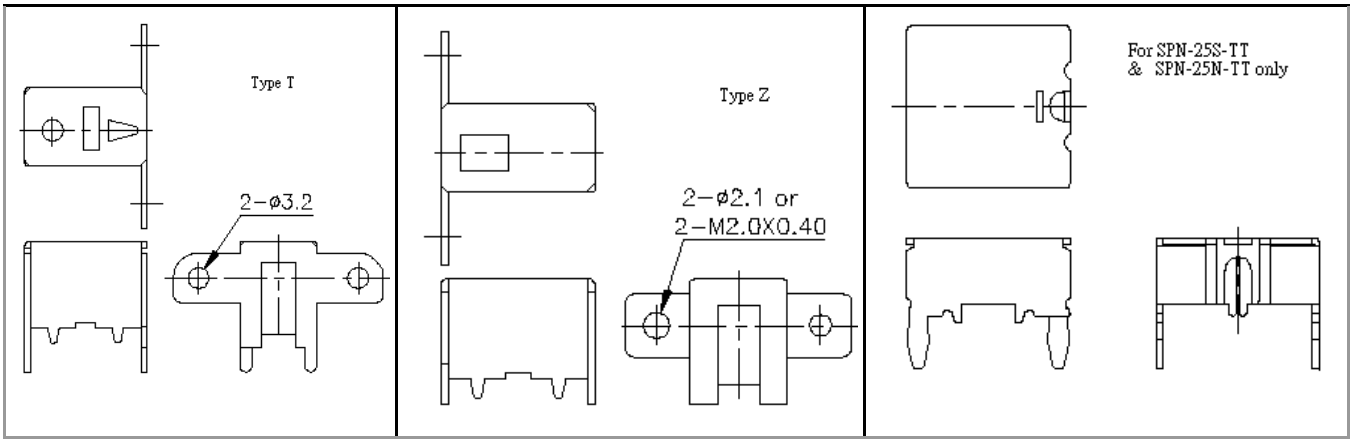
Dimensional drawings: (SPN-25S-TT / SPN-25N-TT)



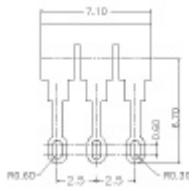
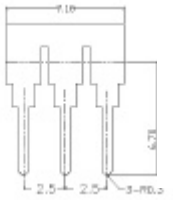
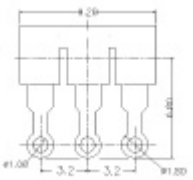
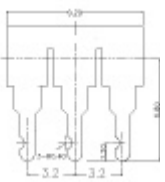
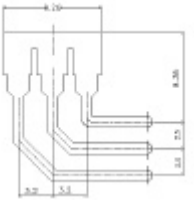


Case & mounting



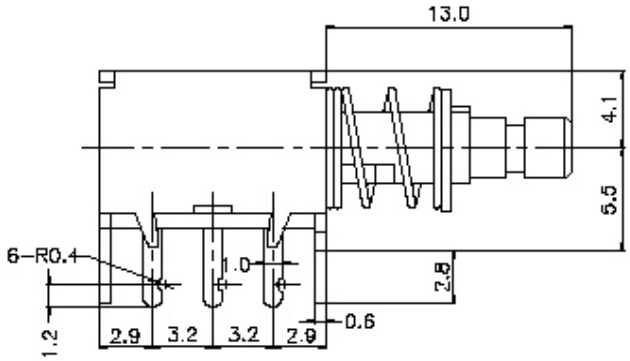


Terminal Type

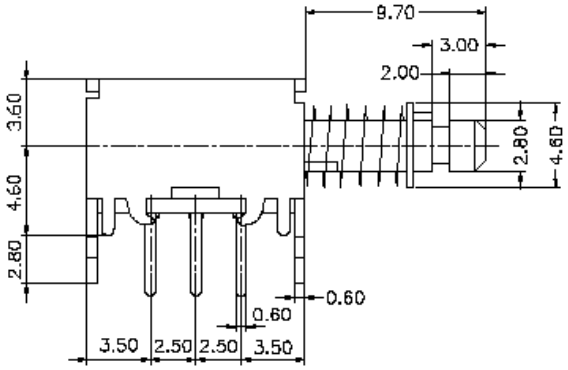
SPN-25		SPN-32		
Type:G	Type:H	Type:G	Type:H	Type:J
				

SPN series combination

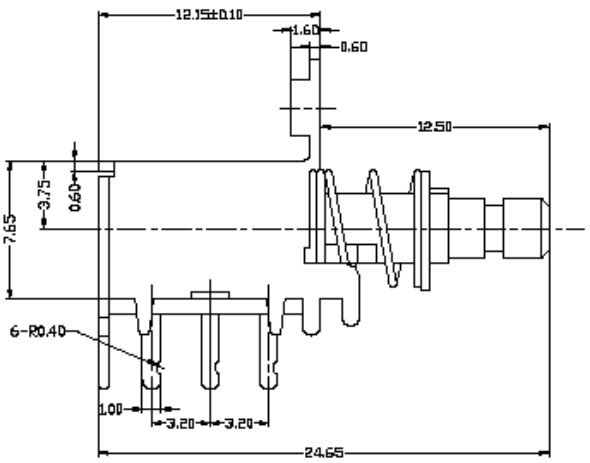
SPN-32S-EH



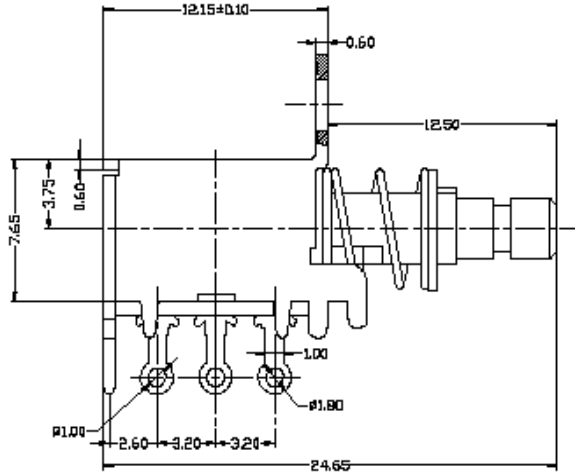
SPN-25S-EH



SPN-32S-HH



SPN-32S-JG



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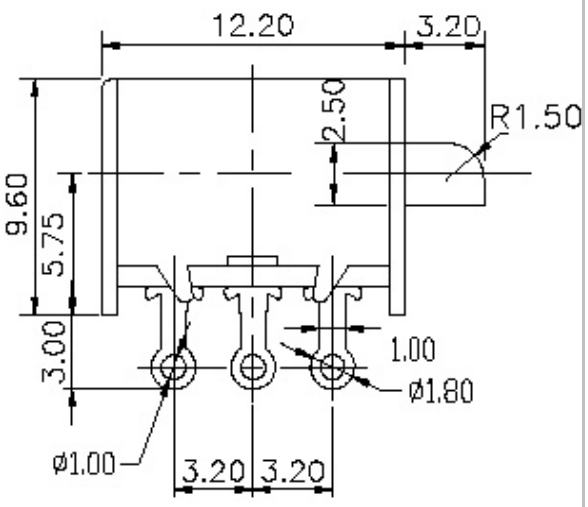
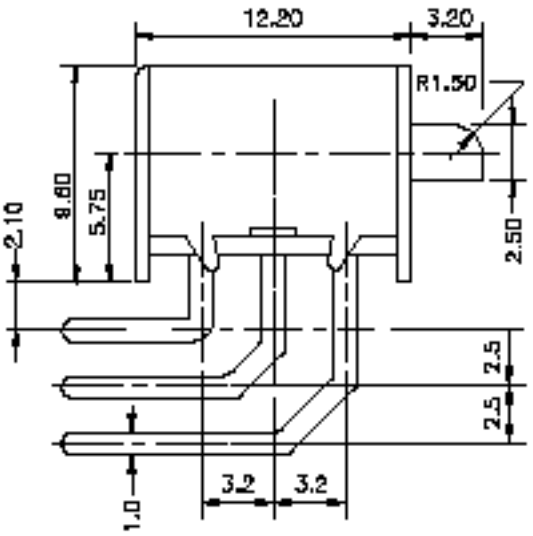


SPN-32N-ZJ



Ordering Instruction

SPN – 32 S – L J -xxxx
1 2 3 4 5

1: Terminal pitch
32 = 3.2mm
25 = 2.5mm

2: Function
S = Self lock
N = Non-lock

3: Case & mounting
Ref. to the above case and mounting.

4: Terminal type
Ref. to terminal type.

5: It is a four digital specification code assigned by Toneluck for different specification.