



瑞澤電子在電子零件產業領域已有數十年經驗，坐落在桃園市中壢區，研發製造各項電子開關、連接器及其精密模具的開發、設計，為專業電子零組件的製造商及代理商。

瑞澤電子提供世界級的研發能力及製程技術給全球的客戶，我們將顧客滿意度為優先，以良好的服務、優良的品質、準確、快速的交貨時程及創新的研發能力滿足客戶需求，不斷強化專業的技術服務及提供優化的電子零組件方案，也代理各大廠牌電子零件產品，共同開發國際市場，提供客戶更多元的選擇。

瑞澤電子以永續經營為目標，並將企業經營成果回饋給社會，善盡企業應盡之社會責任。

Horustech Electronics Co.,Ltd. has the experience in the field of electronic components industry more than 10 years. Our parent company- Lizard Precision Industrial Co., Ltd was Founded in Apr. 2003 located in Bade district, Taoyuan City, Taiwan and specializes in research and development, manufacturing of precision tooling for various electronic components.

In order to offer further services to customers, global sales headquarter- Horustech Electronics Co., Ltd. was established in Feb. 2011 located in Zhongli, Taiwan which is a professional manufacturer and distributor of various electronic switches, connectors, variable potentiometer and related components can be widely applied to household, communication, automobile, electronic & medical equipment and other electronic applications.

Horustech Electronics Co., Ltd. is responsible to expand continuously our product lines to provide a complete solution and rapid delivery schedule, best quality and service, Innovative and technical capability for our customers to fulfill the fast changing market's demand, we also expect to be one of global and best suppliers for electric components.

Line Cards

EPSON

MinebeaMitsumi
Passion to Create Value through Difference

 **C.C.P.**

Firstohm®

Nidec **FORWARD**
FORWARD ELECTRONICS

PANJIT


Speed & Passion
DIPTRONICS

 德利威電子股份有限公司
Dailywell Electronics Co.,Ltd.

 神明電機株式会社
SHINMEI ELECTRIC CO., LTD.

Products



Switch, Encoder, Potentiometer



MCU, IC, Sensor, motor



Crystal, Oscillator, Coil, Solenoid



Diodes, Mosfet, MELF, Pogo pin

INDEX

MinebeaMitsumi	4
Switch	5
Connector	10
Power Inductor, Transformer, Coil	16
IC	18

EPSON	22
Crystal	24
Oscillator	26
Real Time Clock Module	31
IC/MCU	34

Nidec Components	46
Switch	47
Circuit protector	50
Trimmer potentiometer	51
Attenuators Mixed signal device	51
Sensor	51
Potentiometer	53
encoder	54
Motor	54
Micro blower	55
Brushless DC Fan	56
Polygon laser scanner	56

以上產品線請查閱目錄: 2020 Horustech_Agencies product catalog (part1)

SHINMEI	57
Switch	58
Relay	61
Solenoid	62
Automotive Application	62

FORWARD	64
Potentiometer	65
Encoder	69

Dailywell	71
Toggle switch	72
Rocker/Slide Switch	73
Pushbutton Switch	74
DC Power Jack Switch	78

DIPTRONICS	79
C.C.P.	92
Firstohm	98
PANJIT	111

SHINMEI PRODUCTS CATALOG

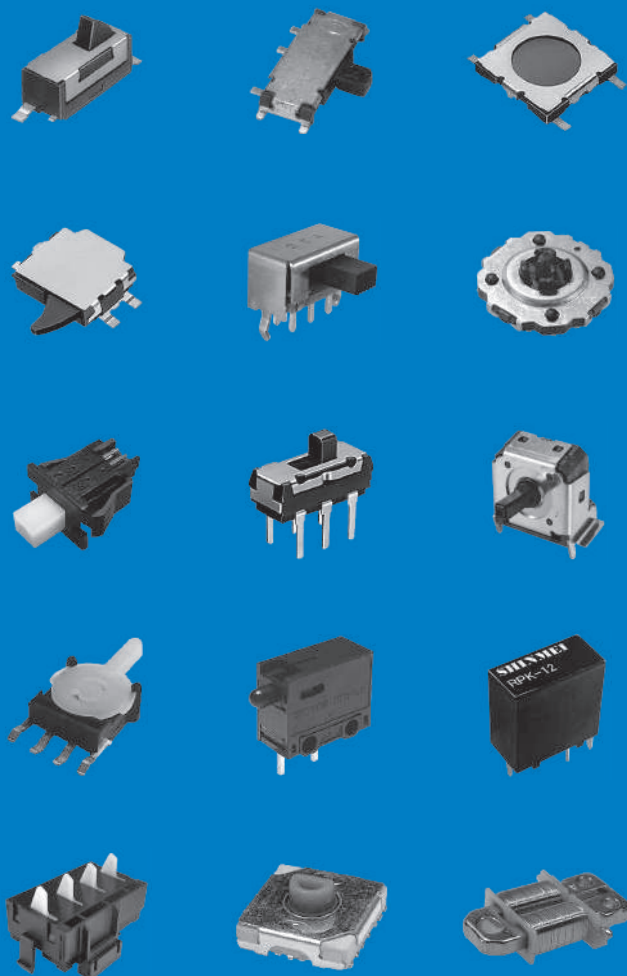
<http://www.shinmei-e.co.jp>

● SWITCH

● SOLENOID

● RELAY

● AUTOMOTIVE APPLICATIONS



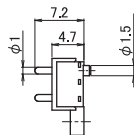
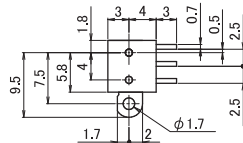
神明電機株式会社
SHINMEI ELECTRIC CO., LTD.

SHINMEI SWITCHES

検出スイッチ(小形プッシュタイプ)シリーズ / DETECTOR SWITCH (SMALL PUSH TYPE) SERIES

製品名 PART NO.	外形図 DIMENSIONS (mm)	特長・個別仕様 FEATURES・PERFORMANCE
-----------------	------------------------	---------------------------------

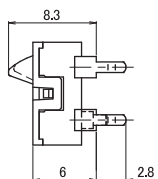
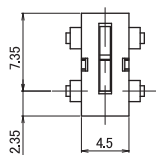
■ SW2AD-74-20



定格：1mA 5V DC～50mA 16V DC
回路：2C-1P ノーマルオープン
接触抵抗：1Ω MAX

Rating：1mA 5V DC～50mA 16V DC
Circuit-Position：2C-1P Normal Open
Contact Resistance：1Ω MAX

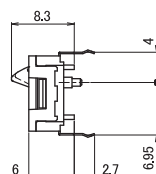
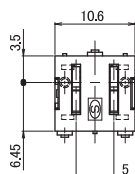
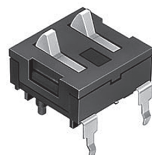
■ SW1AB-253-9



定格：0.5～10mA 5V DC
回路：1C-1P ノーマルオープン
接触抵抗：1Ω MAX

Rating：0.5～10mA 5V DC
Circuit-Position：1C-1P Normal Open
Contact Resistance：1Ω MAX

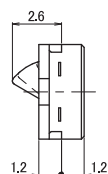
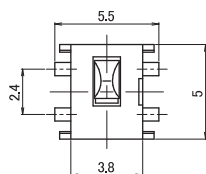
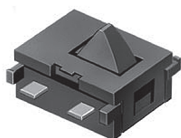
■ SW2AB-254-9A



定格：0.5～10mA 5V DC
回路：2C-1P ノーマルオープン
接触抵抗：1Ω MAX

Rating：0.5～10mA 5V DC
Circuit-Position：2C-1P Normal Open
Contact Resistance：1Ω MAX

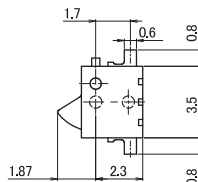
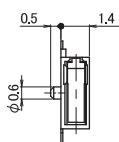
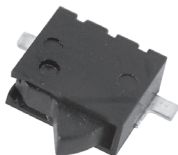
■ SW1AB-411-T28



定格：0.1～5mA 5V DC
回路：1C-1P ノーマルオープン
接触抵抗：500mΩ MAX

Rating：0.1～5mA 5V DC
Circuit-Position：1C-1P Normal Open
Contact Resistance：500mΩ MAX

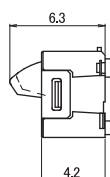
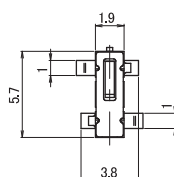
■ SW1AB-482-T50



定格：1mA 5V DC
回路：1C-1P ノーマルオープン
接触抵抗：1Ω MAX

Rating：1mA 5V DC
Circuit-Position：1C-1P Normal Open
Contact Resistance：1Ω MAX

■ SW1AB-500-T11



定格：50μA～10mA 3～5V DC
回路：1C-1P ノーマルオープン
接触抵抗：1Ω MAX

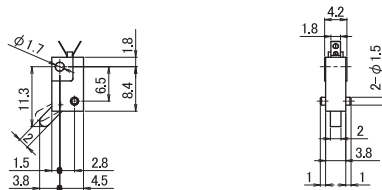
Rating：50μA～10mA 3～5V DC
Circuit-Position：1C-1P Normal Open
Contact Resistance：1Ω MAX

SHINMEI SWITCHES

検出スイッチ(レバータイプ)シリーズ / DETECTOR SWITCH (LEVER TYPE) SERIES

製品名 PART NO.	外形図 DIMENSIONS (mm)	特長・個別仕様 FEATURES・PERFORMANCE
-----------------	------------------------	---------------------------------

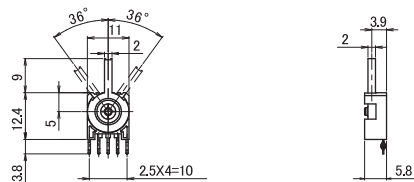
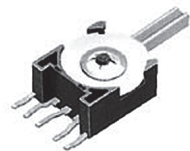
■MLS-29AU



定格: 20mA 16V DC
回路: 1C-1P ノーマルオープン
接触抵抗: 50mΩ MAX

Rating: 20mA 16V DC
Circuit-Position: 1C-1P Normal Open
Contact Resistance: 50mΩ MAX

■SSS-12



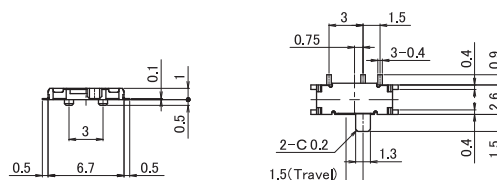
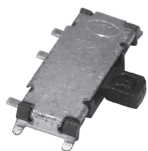
定格: 100mA 12V DC
動作力: 0.7N MAX
接触抵抗: 100mΩ MAX

Rating: 100mA 12V DC
Operation Force: 0.7N MAX
Contact Resistance: 100mΩ MAX

スライドスイッチシリーズ / PAPER SLIDE SWITCH SERIES

製品名 PART NO.	外形図 DIMENSIONS (mm)	特長・個別仕様 FEATURES・PERFORMANCE
-----------------	------------------------	---------------------------------

■SLM-12-741-1-T45



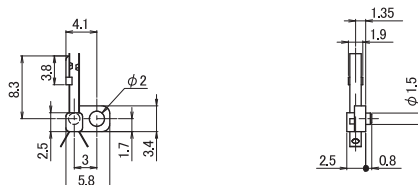
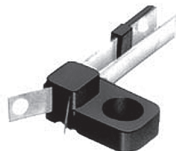
定格: 0.3A 4V DC
回路: 1C-2P
接触抵抗: 70mΩ MAX

Rating: 0.3A 4V DC
Circuit-Position: 1C-2P
Contact Resistance: 70mΩ MAX

リーフスイッチシリーズ / LEAF SWITCH SERIES

製品名 PART NO.	外形図 DIMENSIONS (mm)	特長・個別仕様 FEATURES・PERFORMANCE
-----------------	------------------------	---------------------------------

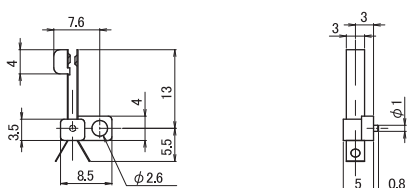
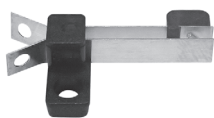
■LSA-1112J5



定格: 1A 16V DC
回路: 1C-1P ノーマルオープン
接触抵抗: 40mΩ MAX

Rating: 1A 16V DC
Circuit-Position: 1C-1P Normal Open
Contact Resistance: 40mΩ MAX

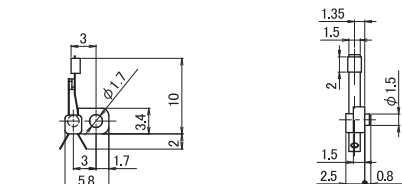
■LSA-1119F



定格: 1A 16V DC
回路: 1C-1P ノーマルオープン
接触抵抗: 40mΩ MAX

Rating: 1A 16V DC
Circuit-Position: 1C-1P Normal Open
Contact Resistance: 40mΩ MAX

■LSB-1112A



定格: 1A 16V DC
回路: 1C-1P ノーマルクローズ
接触抵抗: 200mΩ MAX

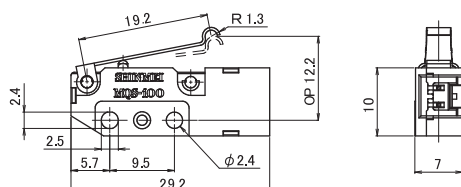
Rating: 1A 16V DC
Circuit-Position: 1C-1P Normal Close
Contact Resistance: 200mΩ MAX

マイクロスイッチ(小形マイクロスイッチ)シリーズ / MICRO SWITCH (SMALL MICRO SWITCH) SERIES

製品名 PART NO.	外形図 DIMENSIONS (mm)	特長・個別仕様 FEATURES・PERFORMANCE
-----------------	------------------------	---------------------------------

■MQS-100A-5D3PT

NEW コネクター接続タイプ



定格: 0.1A 30V DC
回路: 1C-1P
動作力: 0.20N MAX

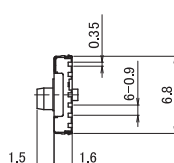
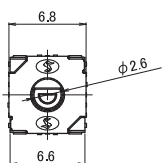
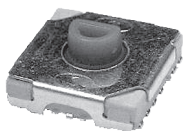
Rating: 0.1A 30V DC
Circuit-Position: 1C-1P
Operation Force: 0.20N MAX

SHINMEI SWITCHES

モードセレクトスイッチシリーズ / MODE SELECT SWITCH SERIES

製品名 PART NO.	外形図 DIMENSIONS (mm)	特長・個別仕様 FEATURES・PERFORMANCE
-----------------	------------------------	---------------------------------

■SSS-60MD-8/10/12



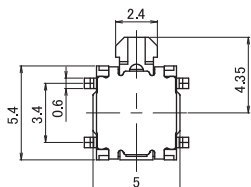
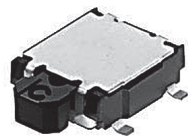
定格: 50mA 12V DC
回転トルク: 0.7N-cm
接触抵抗: 200mΩ MAX

Rating: 50mA 12V DC
Rotational torque: 0.7N-cm
Contact Resistance: 200mΩ MAX

タクティールスイッチシリーズ / TACTILE SWITCH SERIES

製品名 PART NO.	外形図 DIMENSIONS (mm)	特長・個別仕様 FEATURES・PERFORMANCE
-----------------	------------------------	---------------------------------

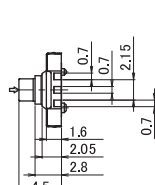
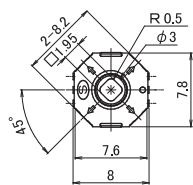
■TSW-1 シリーズ



定格: 50mA 12V DC
回路: 1C-1P ノーマルオープン
接触抵抗: 500mΩ MAX

Rating: 50mA 12V DC
Circuit-Position: 1C-1P Normal Open
Contact Resistance: 500mΩ MAX

■TSW-10 シリーズ



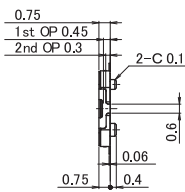
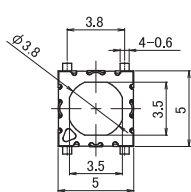
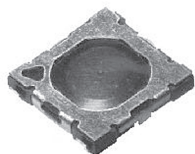
定格: 50mA 12V DC
回路: 1C-5P ノーマルオープン
接触抵抗: 100mΩ MAX

Rating: 50mA 12V DC
Circuit-Position: 1C-5P Normal Open
Contact Resistance: 100mΩ MAX

タクティールスイッチシリーズ / TACTILE SWITCH SERIES

製品名 PART NO.	外形図 DIMENSIONS (mm)	特長・個別仕様 FEATURES・PERFORMANCE
-----------------	------------------------	---------------------------------

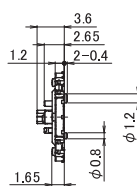
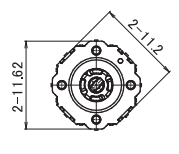
■TSW-15 シリーズ



定格: 50mA 12V DC
回路: 1C-2P ノーマルオープン 2段動作
接触抵抗: 100mΩ MAX

Rating: 50mA 12V DC
Circuit-Position: 1C-2P Normal Open Double action
Contact Resistance: 100mΩ MAX

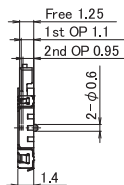
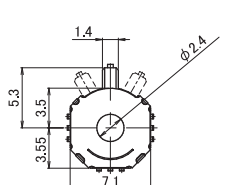
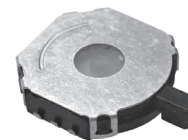
■TSW-26 シリーズ



定格: 10mA 5V DC
回転トルク: 0.2N-cm
接触抵抗: 1Ω MAX
パルス数: 12
ポジション数: 12

Rating: 10mA 5V DC
Rotational torque: 0.2N-cm
Contact Resistance: 1Ω MAX
Number of pulses: 12
Number of positions: 12

■TSW-27 シリーズ

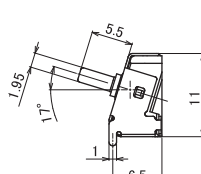
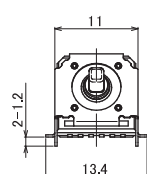


定格: 10mA 5V DC
回路: 2回路6接点 ノーマルオープン 2段動作
接触抵抗: 1Ω MAX

Rating: 10mA 5V DC
Circuit-Position: 2C-6P Normal Open Double action
Contact Resistance: 1Ω MAX

■TSW-41 シリーズ

NEW



定格: 50mA 12V DC
回路: 1回路5接点
接触抵抗: 100mΩ MAX

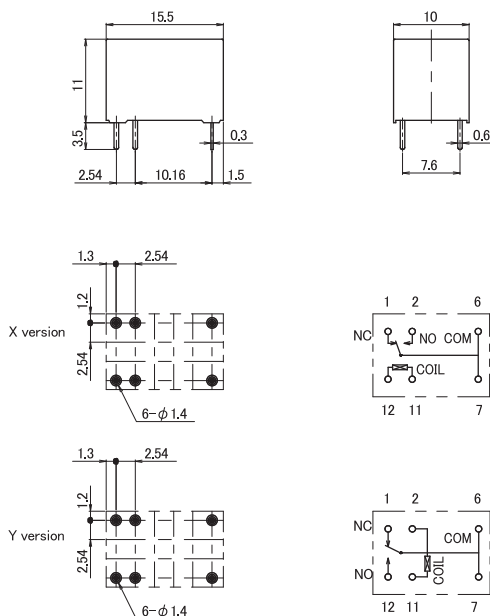
Rating: 50mA 12V DC
Circuit-Position: 1C-5P
Contact Resistance: 100mΩ MAX

SHINMEI SWITCHES

シグナルリレー / SIGNAL RELAYS

製品名 PART NO.	外形図 DIMENSIONS (mm)	個別仕様 PERFORMANCE
-----------------	------------------------	---------------------

■ A5 シリーズ



■ 特長

- サブミニチュア1極リレー
- 高感度型200mWと標準型450mW
X端子配列、Y端子配列、高容量型など多彩な品揃え
- 耐環境性に優れたシール構造
- UL File No. E128155

■ FEATURES

- Subminiature single pole relay.
- Standard (450mW) & High sensitive (200mW) type.
X and Y terminal arrangement standard (1A).
Heavy duty (2A) type are available.
- Sealed construction.
- UL File No. E128155

■ 性能概要 / SPECIFICATIONS

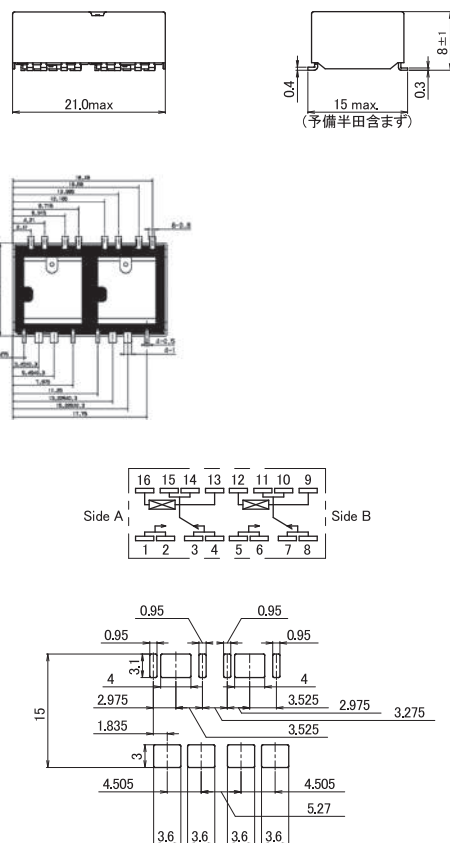
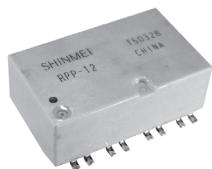
SPDT (1c)	1A 30V DC 0.5A 120V AC
最大開閉電圧 Max. switching voltage	120V AC 60V DC
最大開閉電力 Max. switching power	60VA, 30W
定格消費電力 Electric power consumption	450mW (Standard) 200mW (High sensitive)
耐電圧 Initial breakdown voltage	接点間 Between open contacts 500Vrms (1 minute)
	接点-コイル間 Between contacts and coil 1,000Vrms (1 minute)
機械的寿命 Mechanical Life	10,000,000 operations
電氣的寿命 Electrical Life	500,000 operations (1A 30V DC)

車載用パワーリレー / RELAYS FOR AUTOMOTIVE

製品名 PART NO.	外形図 DIMENSIONS (mm)	個別仕様 PERFORMANCE
-----------------	------------------------	---------------------

■ RPP シリーズ

NEW



■ 特長

- 小形ツインタイプ
- 表面実装タイプ
- 低背タイプ

■ FEATURES

- Small type twin relay
- SMT Type
- Low height type

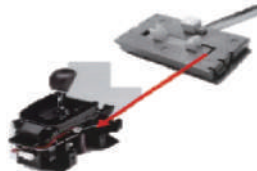
■ 性能概要 / SPECIFICATIONS

SPDT (1c) X 2	25A, 16V, DC
最大開閉電圧 Max. switching voltage	DC 14V
最大開閉電力 Max. switching power	420W
定格消費電力 Electric power consumption	0.96W
耐電圧 Initial breakdown voltage	接点間 Between open contacts AC 500V
	接点-コイル間 Between contacts and coil AC 500V
機械的寿命 Mechanical Life	1,000,000 operation
電氣的寿命 Electrical Life	100,000 operation

應用：停車檔位檢測開關

應用：檔位位置檢測開關

應用：檔位位置檢測開關



應用：排檔手動模式轉換開關

應用：排檔手動模式轉換開關

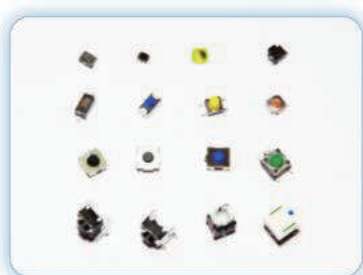
應用：檔位位置檢測開關



以上為客制化商品，僅供參考，若有需要請向業務諮詢。

福華電子

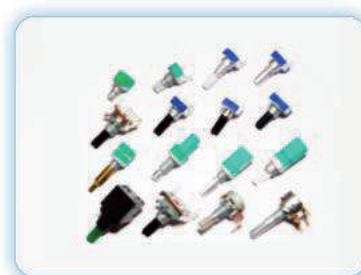
FORWARD
FORWARD ELECTRONICS



按鍵開關

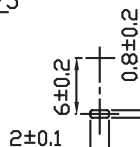
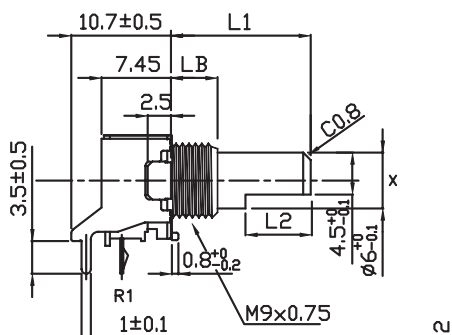


編碼器/感測器

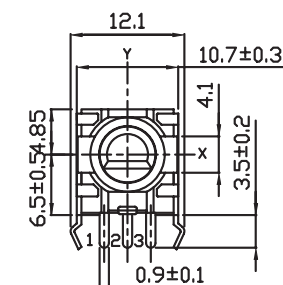
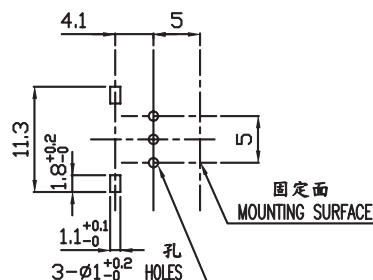


可變電阻器

Max operating Voltage	50V A.C/10V D.C
Total resistance tolerance	±20%
Total rotational angle	300±10°
Rotational torque	30~200gf-cm
Rotational Life	15,000 cycles

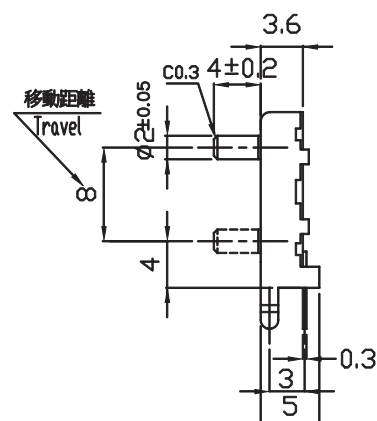
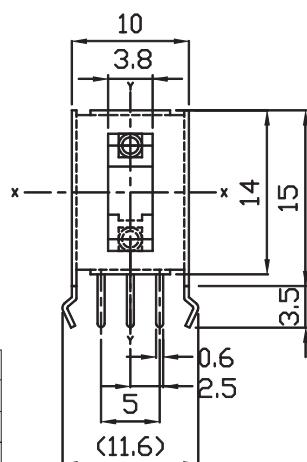


固定孔尺寸圖容許差 ± 0.1
P.W.B. MOUNTING DETAIL
TOLERANCES ± 0.1
VIEWED FROM MOUNTING SIDE

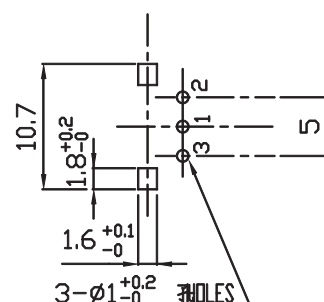


上圖軸以反時鐘方向
迴轉示於切斷之狀態
SHAFT SHOWN IN FULL
C.C.W POSITION

Insulation resistance	100M Ω min. 250V DC
Voltage proof	10 sec 250V A.C
Total resistance tolerance	$\pm 20\%$ (Linear)
Operating force	120gf MAX
Travel	8mm
Sliding Life	100,000 cycles



固定孔尺寸圖 容許差±0.1
P.W.B. MOUNTING DETAIL
VIEWED FROM MOUNTING SIDE
(TOLERANCE±0.1)

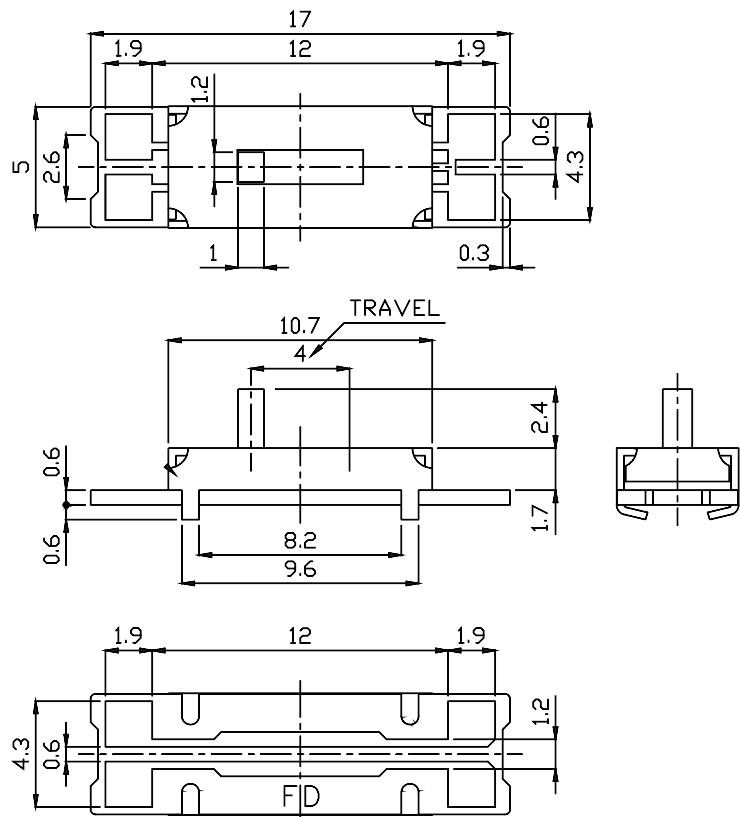


RS04P



SPECIFICATION

Insulation resistance	5M Ω min. 25V DC
Voltage proof	10 sec 25V A.C
Total resistance tolerance	$\pm 35\%$
Operating force	30~180gf
Travel	4mm
Sliding Life	5,000 cycles

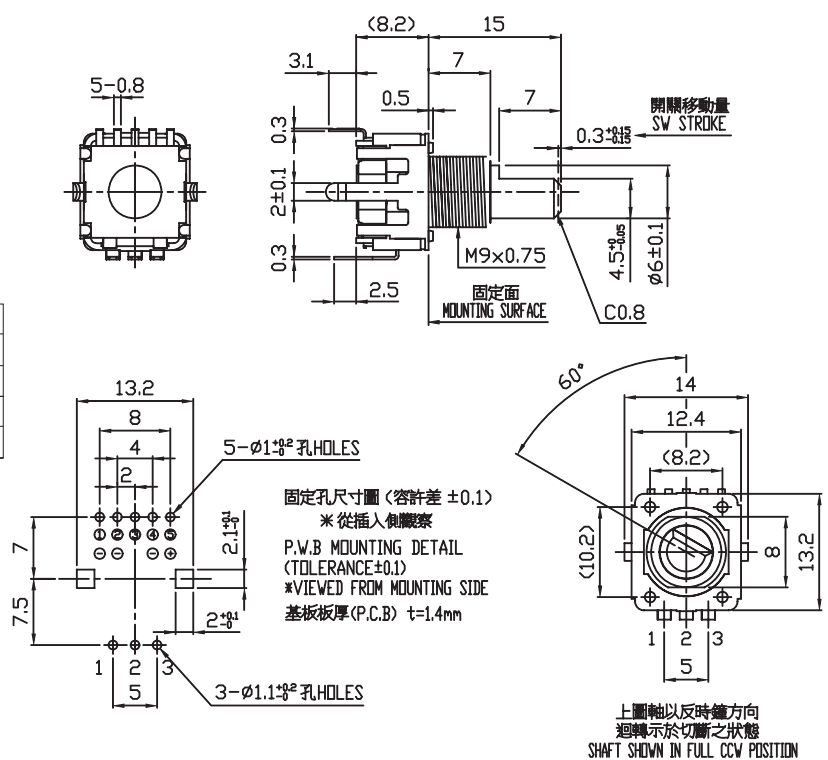
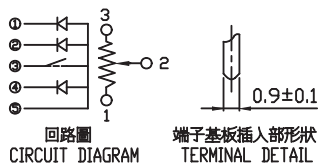


RD12S



SPECIFICATION

Voltage proof	300V A.C
Insulation resistance	100M Ω min. 250V D.C
Total rotational angle	300 $\pm$ 5 $^{\circ}$
Rotational torque	10~80gf.cm
Rotational life	15,000 cycles

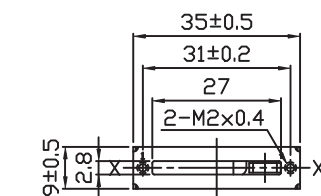


RF202



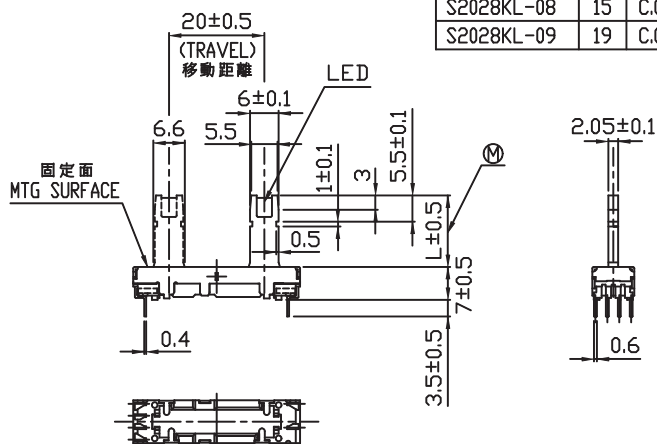
SPECIFICATION

Operating Force	30 ~ 250 gf
Total Resistance	5 KΩ, 10KΩ, 20KΩ, 50KΩ, 100 KΩ.....
Total Resistance Tolerance	±20%
Sliding Service Life	15,000 cycles
Operating Temperature Range	-10°C to +70°C

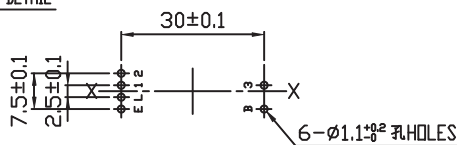


④ 部長度如下圖 LEVER LENGTH

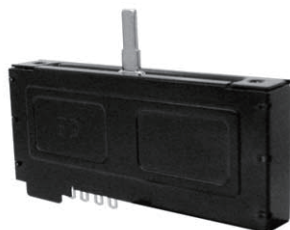
組立圖 NO. DRAW NO.	L LENGTH	端子 C.C	指示 INSTRUCTION
S2028GL-01	10	—	
S2028GL-02	15	—	
S2028GL-03	19	—	
S2028KL-07	10	C.C	
S2028KL-08	15	C.C	
S2028KL-09	19	C.C	



固定孔尺寸圖
MOUNTING HOLE DETAIL

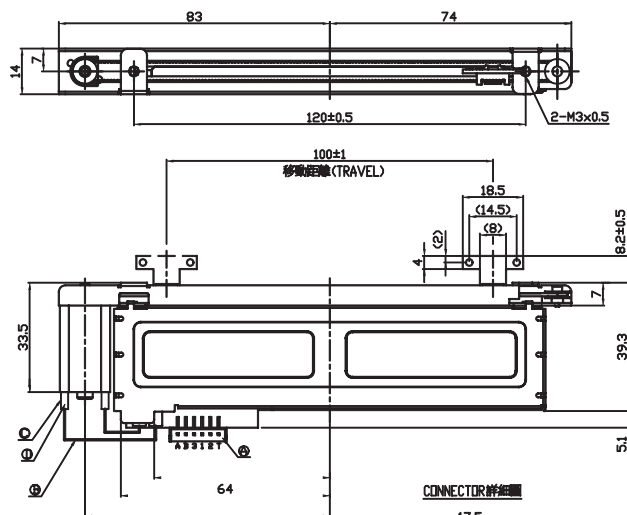


RFA0Z

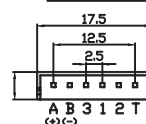


SPECIFICATION

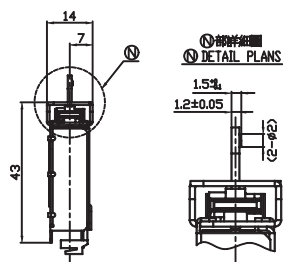
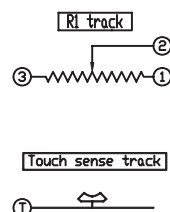
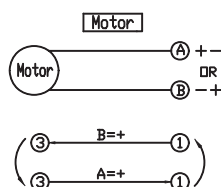
Operating Force	50 gf max
Operating voltage	350V A.C / 50V D.C
Total Resistance Tolerance	±20%
Sliding Service Life	1,000,000 cycles
Operating Temperature Range	-10°C to +70°C



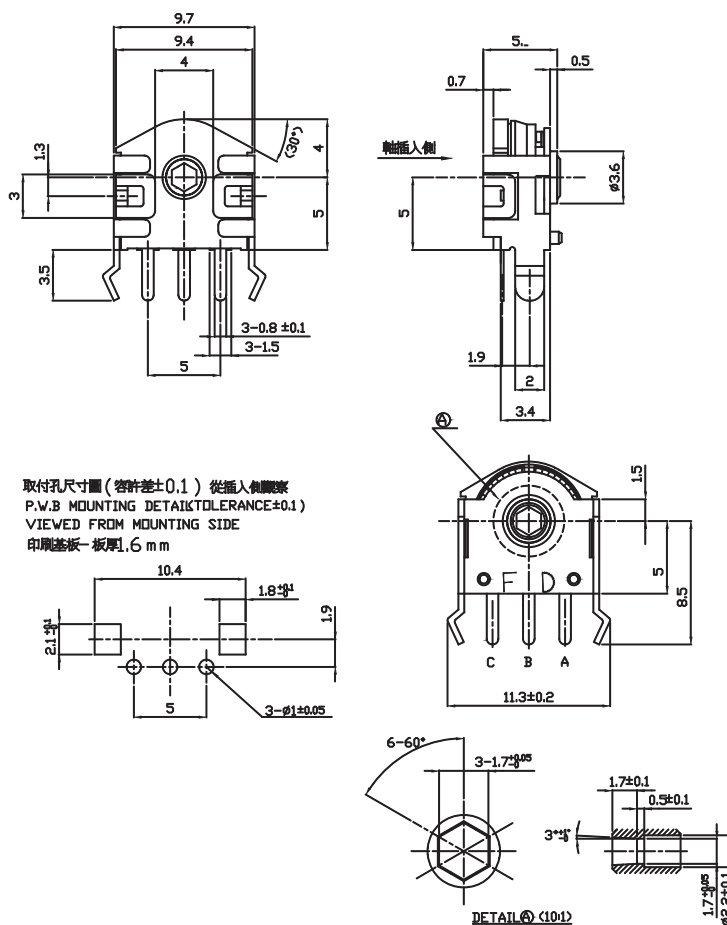
CONNECTOR 詳細圖



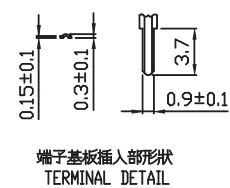
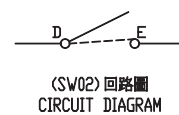
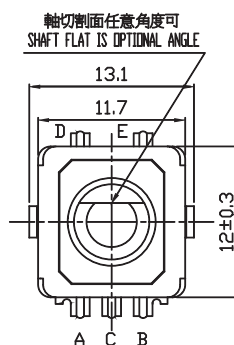
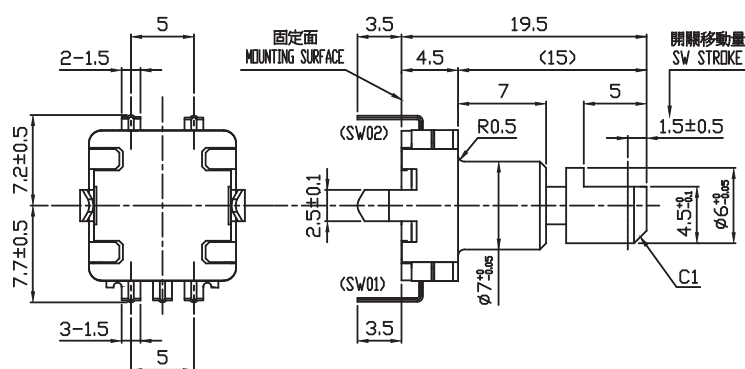
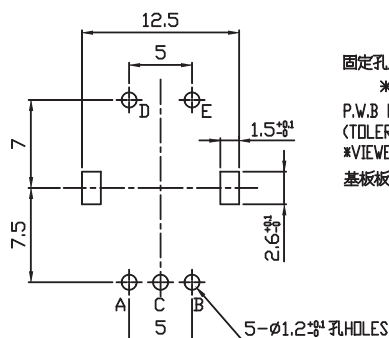
回路圖
CIRCUIT DIAGRAM



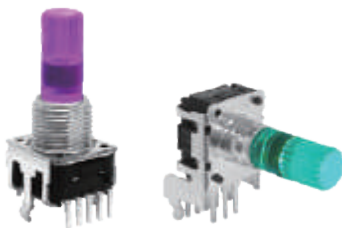
Rating	D.C 5V 0.5mA
Dielectric Strength	50VAC, 1 min
Detent Torque	10~50 gf·cm
Rotational life	100,000 cycles



Contact Resistance	100 mΩ
Insulation Resistance	100 MΩ MIN, 250VDC
Operating Force	350±100gf/400±200gf
Travel	0.5mm/1.5mm
Operating Life	20,000 cycles

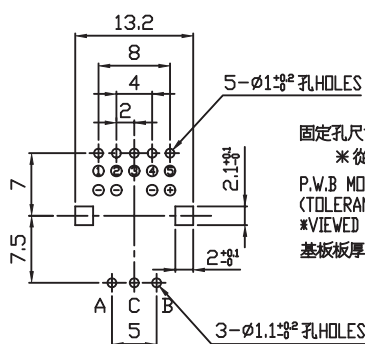
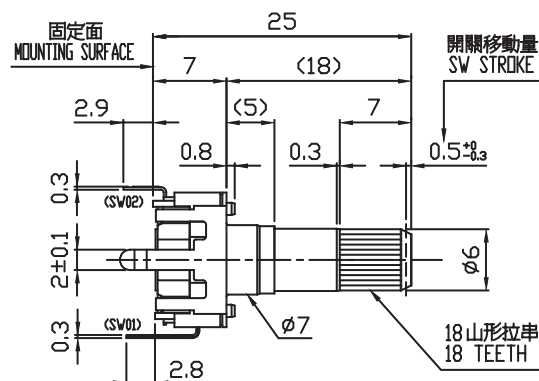
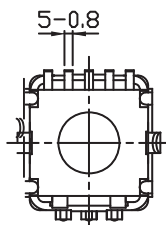


DC12S

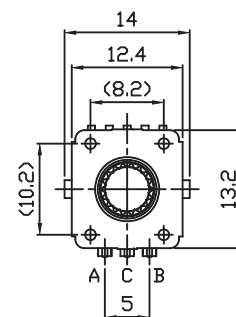
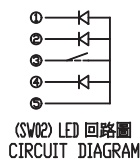


SPECIFICATION

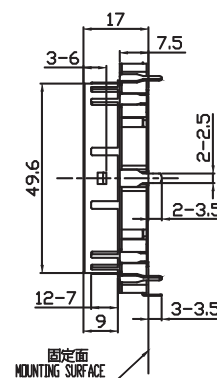
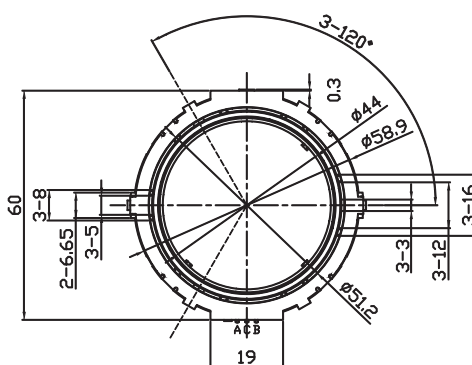
Contact Resistance	100 mΩ
Insulation Resistance	100 MΩ MIN, 250VDC
Operating Force	450±200gf
Travel	0.5 +0/-0.3mm
Operating Life	20,000 cycles



固定孔尺寸圖(容許差 ± 0.1)
 *從插入側觀察
 P.W.B MOUNTING DETAIL
 (TOLERANCE ± 0.1)
 *VIEWED FROM MOUNTING SIDE
 基板板厚(P.C.B) $t=1.5\text{mm}$

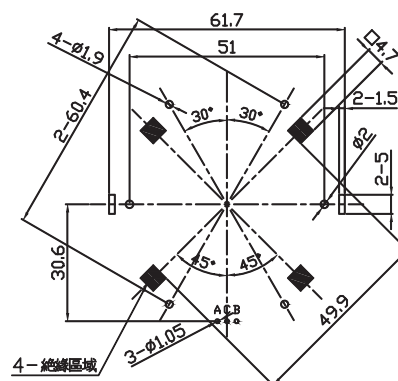
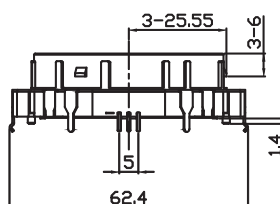


DC60H



SPECIFICATION

Rating	D.C 5V 10mA
Dielectric Strength	100 VAC
Insulation Resistance	100 MΩ MIN
Total Rotational Angle	360°
Rotational Torque	40~100gf. cm
Rotational Life	40,000 cycles





SWITCH PRODUCTS

Quality & Technology electronic switch
manufacturer



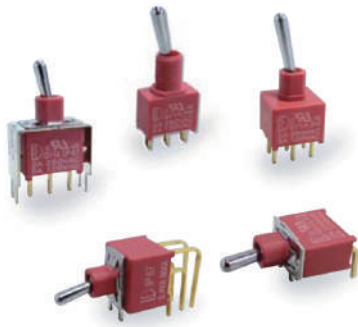
SW1

SWITCHES

◆Toggle Switches

1A Series

Sealed Miniature Toggle Switches



SPECIFICATIONS

CONTACT RATING: Dependent upon contact material See page 17.

MECHANICAL LIFE: 30,000 make-and-break cycles.

CONTACT RESISTANCE: 10 m Ω max. initial @ 2-4VDC

100mA for both silver and gold plated contacts.

INSULATION RESISTANCE: 1,000 M Ω min.

DIELECTRIC STRENGTH: 1,000 Vrms min.@sea level.

OPERATING TEMPERATURE: -40°C to 85°C.

MATERIALS

CASE & BUSHING: Glass filled nylon 6/6, flame retardant, heat stabilized (UL94v-0).

ACTUATOR: Brass, chrome plated with internal, O-ring seal standard.

SWITCH SUPPORT: Brass or steel, tin plated.

SWITCH SUPPORT RETAINER: Stainless steel.

CONTACT / TERMINALS: Copper alloy, with Silver or gold plated.
(See Page 17)

2B Series

Sealed Sub-Miniature Toggle Switches(SMT)



SPECIFICATIONS

CONTACT RATING: Dependent upon contact material See Page 37.

MECHANICAL LIFE: 30,000 make-and-break cycles.

CONTACT RESISTANCE: 20 m Ω max. initial @ 2-4VDC

100mA for both silver and gold plated contacts.

INSULATION RESISTANCE: 1,000 M Ω min.

DIELECTRIC STRENGTH: 1,000 Vrms min.@sea level.

OPERATING TEMPERATURE: -30°C to 85°C.

MATERIALS

CASE & BUSHING: Glass filled nylon 6/6, flame retardant, heat stabilized (UL94v-0).

ACTUATOR: Brass, chrome plated, internal O-ring seal.
Standard for all actuators.

SWITCH SUPPORT: Brass, tin plated.

CONTACT / TERMINALS: Copper alloy, with Silver or gold plated.
(See Page 37)

SWITCHES

◆Rocker Switches

3M Series

Miniature Rocker & Paddle Switches



SPECIFICATIONS

CONTACT RATING: Dependent upon contact material See Page 56.

MECHANICAL LIFE: 40,000 make-and-break cycles.

CONTACT RESISTANCE: 10 mΩ max. initial @ 2-4VDC

100mA for both silver and gold plated contacts.

INSULATION RESISTANCE: 1,000 MΩ min.

DIELECTRIC STRENGTH: 1,000 Vrms min.@sea level.

OPERATING TEMPERATURE: -40°C to 85°C.

MATERIALS

CASE: Diallyl phthalate (DAP) (UL94v-0).

ACTUATOR: Nylon,black std.

BUSHING: Brass or Zinc,nickel plated.

HOUSING: Stainless Steel.

SWITCH SUPPORT: Brass,tin plated or stainless steel.

TERMINAL/CONTACT: Copper alloy,with silver or gold plated.

(See Page 56)

4B Series

Sealed Sub-Miniature Rocker Switches(SMT)



IP 67
ACCORDING TO
EN 60529:1981+A1:2001
IEC 60529:2001



SPECIFICATIONS

CONTACT RATING: Dependent upon contact material See Page 77.

MECHANICAL LIFE: 50,000 make-and-break cycles.

CONTACT RESISTANCE: 20 mΩ max. initial @ 2-4VDC

100mA for both silver and gold plated contacts.

INSULATION RESISTANCE: 1,000 MΩ min.

DIELECTRIC STRENGTH: 1,000 Vrms min.@sea level.

OPERATING TEMPERATURE: -30°C to 85°C.

MATERIALS

CASE & BUSHING: Glass filled nylon 6/6,flame retardant,
heat stabilized (UL94v-0).

ACTUATOR: Nylon black std,internal O-ring seal standard witch
all actuators.

SWITCH SUPPORT: Brass,tin plated.

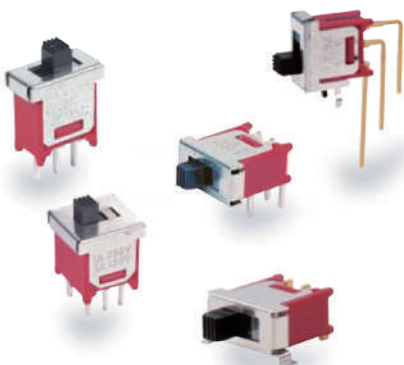
CONTACT / TERMINALS: Copper alloy,with Silver or gold plated.

(See Page 77)

◆Slide Switches

5F Series

Sub-Miniature Slide Switches



SPECIFICATIONS

CONTACT RATING: Dependent upon contact material See Page 89.

MECHANICAL LIFE: 30,000 make-and-break cycles.

CONTACT RESISTANCE: 20 mΩ max. initial @ 2-4VDC

100mA for both silver and gold plated contacts.

INSULATION RESISTANCE: 1,000 MΩ min.

DIELECTRIC STRENGTH: 1,000 Vrms min.@sea level.

OPERATING TEMPERATURE: -40°C to 85°C.(std)

-30°C to 85°C.(SMT)

MATERIALS

CASE: Diallyl phthalate (DAP) (UL94v-0).

HOUSING: Stainless steel or phosphor bronze,tin plated.

ACTUATOR: Nylon,black std.

CONTACT: Brass or copper alloy,with silver or gold plated.

TERMINALS: Copper alloy,with silver and gold plated.

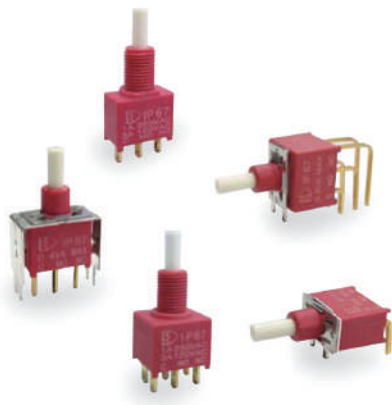
(See Page 89)

SWITCHES

◆Pushbutton Switches

7A Series

Sealed Snap-Acting Pushbutton Switches



IP 67
ACCORDING TO
EN 60528:1991+A1:2001
IEC 60529:2001



SPECIFICATIONS

CONTACT RATING: Dependent upon contact material see page 111.

MECHANICAL LIFE: 50,000 make-and-break cycles.

CONTACT RESISTANCE: 20 m Ω max. initial @ 2-4VDC
100mA for both silver and gold plated contacts.

INSULATION RESISTANCE: 1,000 M Ω min.

DIELECTRIC STRENGTH: 1,000 Vrms min. @sea level.

OPERATING TEMPERATURE: -40°C to 85°C.

CAP INSTALLATION FORCE: 10 lbs,max.permmissible.

MATERIALS

CASE & BUSHING : Glass filled Nylon 6/6, flame retardant, heat stabilized (UL 94v-0).

PLUNGER: Glass filled Nylon or Glass fille polyester (UL 94v-0).

SWITCH SUPPORT: Brass or steel, tin plate.

SWITCH SUPPORT RETAINER: Stainless steel.

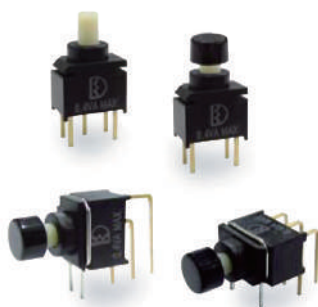
CONTACTS : Phosphor bronze with silver coin.

ALL TERMINALS : Brass,with silver or gold plated. (See Page 111)

TERMINAL SEAL : Epoxy.

8U Series

Sealed Ultraminiature Pushbutton Switches



IP 67
ACCORDING TO
EN 60528:1991+A1:2001
IEC 60529:2001



SPECIFICATIONS

CONTACT RATING: 0.4 VA max. @ 20 V AC or DC max.

MECHANICAL LIFE: 40,000 make-and-break cycles.

CONTACT RESISTANCE: Below 100 m Ω typ. initial @ 2-4VDC,
100mA.

INSULATION RESISTANCE: 500 M Ω min.

DIELECTRIC STRENGTH: 500 Vrms min.@sea level.

OPERATING TEMPERATURE: -40°C to 85°C.

MATERIALS

HOUSING AND BASE:Glass filled nylon 6/6 or 4/6 , flame retardant
,heat stabilized(UL94V-0)

ACTUATOR:Glass filled nylon 6/6 , flame retardant, heat stabilized
(UL94V-0), with standard internal o-ring seal.

SWITCH SUPPORT: Steel,with Sn plate.

CONTACT: Phosphor bronze,Gold plated.

TERMINALS: Brass,Gold plated.

PSD Series

Pushbutton Switches



SPECIFICATIONS

CIRCUIT : DPDT

RATING : 0.1A, DC30V MAX/100mA, DC1.5V MIN

CONTACT RESISTANCE : 50 m Ω MAX.

INSULATION RESISTANCE : 100 M Ω MIN.

ELECTRICAL LIFE : 50,000 cycles

ACTUATION FORCE : 250 $\pm$ 100g

TRAVEL:

1. Full Travel : 1.5 $\pm$ 0.4mm

2. Contact Travel : 1.0 $\pm$ 0.4mm

OPERATING TEMPERATURE RANGE : -20°C to 70°C

MATERIALS

CASE : Glass filled Nylon 6/6, black.

HOUSING : Glass filled Nylon 6/6, black.

ACTUATOR : Glass filled Nylon 6/6, black.

CONTACT : Phosphor bronze,silver plated.

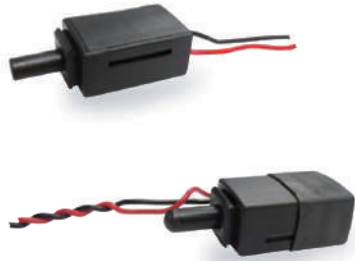
TERMINALS : LCP, Black & Brass, silver plated.

SWITCHES

◆Pushbutton Switches

PS9 Series

Intrusion Switches



SPECIFICATIONS

CONTACT RATING: 0.4 VA max. @ 20 V AC or DC.

MECHANICAL & ELECTRICAL LIFE:

100,000 actuations min. at full load.

CONTACT RESISTANCE: 200 mΩ max. initial @ 2-4VDC, 100mA .

INSULATION RESISTANCE: 100 MΩ min.

DIELECTRIC STRENGTH: 500 Vrms min. @sea level.

OPERATING TEMPERATURE: -30°C to 85°C.

MATERIALS

HOUSING: Nylon 6/6 (UL 94V-0)

ACTUATOR: Nylon 6/6 (UL 94V-0)

MOVABLE CONTACT: Copper alloy, gold plate over nickel plate.

FIXED CONTACT: Brass, gold plate over nickel plate.

WIRE: UL 3385-24 AWG.

MPB16L Series

16mm Metal Pushbutton Switches(LOCK)



IP 67
ACCORDING TO
EN 60529-1991 IEC 60529-2001



SPECIFICATIONS

RATING : 2A/36VDC.

ELECTRICAL LIFE : 100,000 Make-And-Break cycles at full load.

INSULATION RESISTANCE : 1,000MΩ Min. at 500VDC.

DIELECTRIC STRENGTH : 2,000V RMS@sea level.

CONTACT RESISTANCE : 50mΩ Max. @1A/12VDC(Initial value)

OPERATION TEMPERATURE : -20°C~+70°C

TRAVEL: About 2.3mm.

OPERATION PRESSURE : 4.5N±1.5N

INGRESS PROTECTION : IP67

TORQUE : 11.5 kgf · cm

THICKNESS : 6.0mm (Max.)

CAP Keeps same high.

Current limiting resistor is required to limit LED forward current to 20mA.

MATERIALS

BUSHING : Aluminum alloy, Anodized.

BASE : Nylon 6/6.

ACTUATOR : POM.

CAP : PC, Aluminum alloy, Anodized.

SPRING : Steel.

SEALING : Silicone.

O-Ring : Silicone.

TERMINAL : Brass, Coin silver, Gold flash plated.

CONTACT : Brass, Coin silver, Gold flash plated.

NUT : Brass(Nickel Plated).

SWITCHES

◆Pushbutton Switches

MPB19 Series

19mm Metal Pushbutton Switches



SPECIFICATIONS

RATING : 1th 5A/250VAC resistive load 3A/250VAC
CONTACT RESISTANCE : 50 mΩ max. @ 1A 12VDC (initial value)
INSULATION RESISTANCE : 1,000 MΩ min. at 500VDC
DIELECTRIC STRENGTH : 2,000V RMS @ sea level
OPERATION TEMPERATURE : -20°C to 55°C
MECHANICAL LIFE : Momentary 1,000,000 cycles
Self-lock 500,000 cycles
ELECTRICAL LIFE : 50,000 make-and-break cycles at full load
TORQUE : 5~14Nm
PANEL THICKNESS : 10mm (Ø19.20mm)
OPERATION PRESSURE : 1Pole 2.5±1N / 2Poles 3.5±1N
TRAVEL : About 3.2mm
INGRESS PROTECTION : IP67, IK10(Stainless)

MATERIALS

BUSHING : Stainless Steel / Nickel plated brass
/ Aluminum alloy
BASE : PBT(UL 94-V0) , PC(UL 94-V2)
ACTUATOR : PC(UL 94-V2) ; Stainless Steel
/ Nickel plated brass / Aluminum alloy
INNER ASSEMBLY : POM / PA66.
SPRING : Spring steel.
SEALING : Silicone.
O-Ring : Silicone.
TERMINAL : Brass,with silver or gold plated.
CONTACT : Brass,coin silver,with silver or gold plated.
HEX NUT : Nickel plated brass.

MPF16 Series

16mm Metal Pushbutton Switches



SPECIFICATIONS

RATING : 50mA 12VDC.
OPERATION LIFE : 500,000 Cycles.
INSULATION RESISTANCE : 100 MΩ Min. at 500VDC.
DIELECTRIC STRENGTH : 500V RMS@sea level.
CONTACT RESISTANCE : 100mΩ Max.@1A/12VDC(Initial value)
OPERATION TEMPERATURE : -40°C~+85°C
TRAVEL: About 3.0±0.3mm.
OPERATION PRESSURE : 300gf±150gf.
INGRESS PROTECTION : IP67
TORQUE : 11.5 kgf · cm

MATERIALS

BUSHING : Aluminum alloy,Black.
BASE : PA66.
ACTUATOR : PC.
CAP : PA66,Black.
SPRING : Steel.
O-Ring : NBR(Black).
TERMINAL : Brass,Gold flash plated.
CONTACT : Brass,Gold flash plated.
NUT : SPCC(Nickel Plated).

SWITCHES

◆Pushbutton Switches / Hall-effect Joystick / 2-in-1 Switches

MPS25 Series

25mm Short Metal Pushbutton Switches



IP 67
ACCORDING TO
EN 60529:1991+A1:2001
IEC 60529:2001



SPECIFICATIONS

RATING : 2A/36VDC

ELECTRICAL LIFE: 200,000 make-and-break cycles at full load.

MECHANICAL LIFE: 1,000,000. Cycles

DIELECTRIC STRENGTH: 2,000V RMS@sea level

CONTACT RESISTANCE: 50mΩ MAX.@1A 12VDC(initial value)

OPERATING TEMPERATURE: -20°C to 70°C

TRAVEL: ABOUT 1.8mm

OPERATION PRESSURE: 4.5±1.5N

INGRESS PROTECTION: IP67,IK10(Stainless)

TORQUE: 1~3Nm

Current limiting resistor is required to limit led forward current to 20mA

MATERIALS

BUSHING : Stainless Steel

BASE : PA66,White UL-94V0

ACTUATOR : PC,Translucent UL-94V2
Stainless Steel

INNER ASSEMBLY : PC,Transparent UL-94V2

SPRING : Spring steel

SEALING : Silicone,Translucent

O-Ring : Silicone

TERMINAL : Brass ,Gold flash plated

CONTACT : Brass,Sliver alloy

HEX NUT : Brass,Nickel plated

HJB Series

Hall-effect Joystick



SPECIFICATIONS

POWER INPUT: DC 5V +/- 0.5V.

TYPE: 3 AXES, X/Y and Z(ROTARY).

OUTPUT: ANALOG DC 0-5V.

OPERATING LIFE: X/Y AXES 5 MILLION CYCLES MIN.
Z AXE 1 MILLION CYCLES MIN.

OPERATING TEMPERATURE: -20°C to 65°C.

MTP Series

2-in-1 Switches (Push & Rotary switch)



SPECIFICATIONS

CONTACT MATERIAL : Copper over Silver.

RATING : 50mA/DC12V.(max.) (Resistive load)

OPERATING LIFE : Push:30,000 Rotary : 10,000

INSULATION RESISTANCE : 1,00MΩ

CONTACT RESISTANCE : 200mΩ MAX.

WITHSTANDING VOLTAGE: 100V AC for 1min.

OPERATING TEMPERATURE: -20°C to 70°C.

TRAVEL : ABOUT 0.55mm.(push)

OPERATION PRESSURE :

S1 / S3 = Push : 3N+/-1N ; Rotary : 3N+/-1.5N

S2 = Push : 3N+/-1N ; Rotary : 1N+/-0.5N

S4 = Push : 3N+/-1N ; Rotary : 0.8N+/-0.5N(MOM)

S5 = Push : 3N+/-1N ; Rotary : 3N+/-1.5N(ON) ; 0.8N+/-0.5N(MOM)

MATERIALS

CASE&TERMINAL: LCP&Brass,Sliver plated.

CONTACT : Stanless,Sliver plated.

ACTUATOR : LCP.

HOUSING : Stanless.

SPRING : Stanless.

SWITCHES

◆DC Power Jack Switches

RJ Series

DC Power Jack With Rocker Switches



SPECIFICATIONS

ELECTRICAL RATING : DC 15V 5A

DC 15V 2.5A for 1.65mm pin

CONTACT RESISTANCE : 20 mΩ (initial)

INSULATION RESISTANCE : > 1000 MΩ

(500VDC between open contacts)

DIELECTRIC STRENGTH : > 1500V@ 1 minute

ELECTRICAL LIFE : 6,000 cycles

TEMPERATURE RISE AT THE TERMINAL : Max.30°C

SOLDER ABILITY OF TERMINAL : Max 350°C,3S (no pressure may be placed in the terminals when soldering by hand)

Any Cd Pb Hg etc and it's compounds is not include in this product

MATERIALS

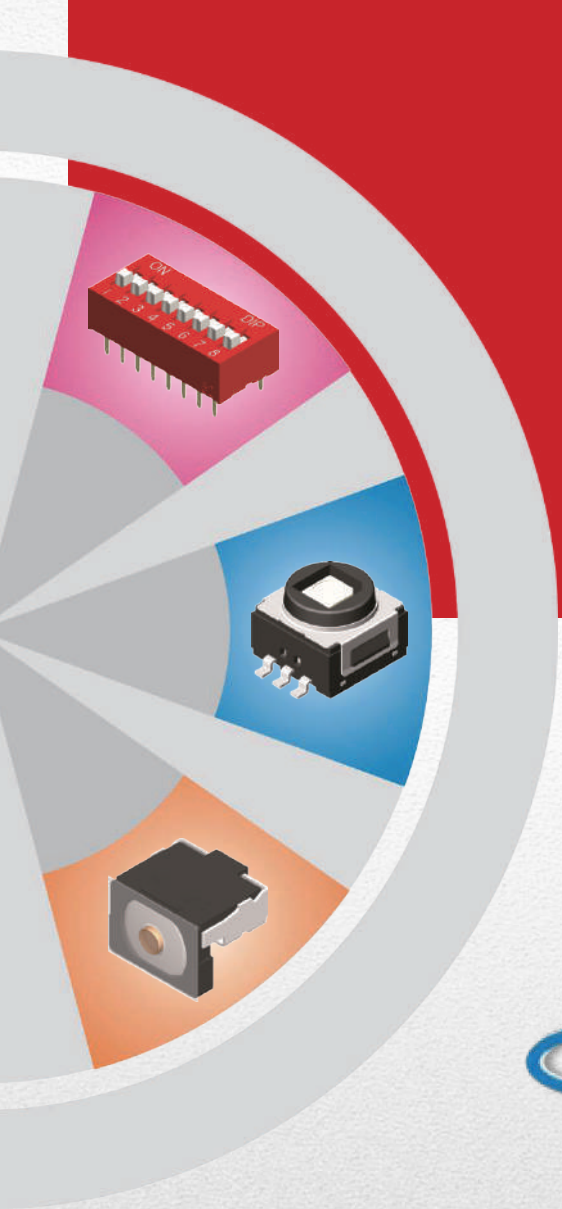
CASE&HOUSING: Glass filled Nylon 6/6,black.

ACTUATOR : Glass filled Nylon 6/6,Black.

CONTACT : Copper alloy,silver plated.

TERMINALS : Copper alloy,silver plated.

PIN : Brass,nickel plated.



 **DIPTRONICS**

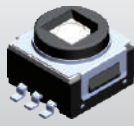
Switch Solution

ILLUMINATED SWITCH ML9 SERIES

Tact Switch Illuminated



NEW



ML9

FEATURES

- ※ Various LED options
- ※ 300,000 operation life cycles

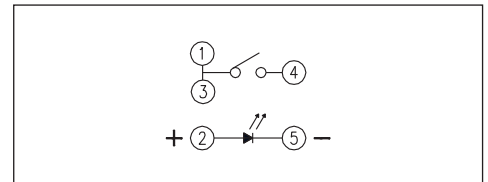
APPLICATION

- ※ Automotive
- ※ Network equipment
- ※ Telecommunications
- ※ Medical equipment
- ※ Industrial controls

SPECIFICATION

Contact Rating	50mA, 32V DC
Contact Resistance	100mΩ max.
Insulation Resistance	100MΩ min. 100V DC
Dielectric Strength	250V AC/1 minute
Operating Force	400±100gf
Travel	0.45mm
Operating Life	300, 000 cycles
Operating Temp.	-40°C ~ +85°C
Storage Temp.	-55°C ~ +85°C

CIRCUIT



PACKAGE

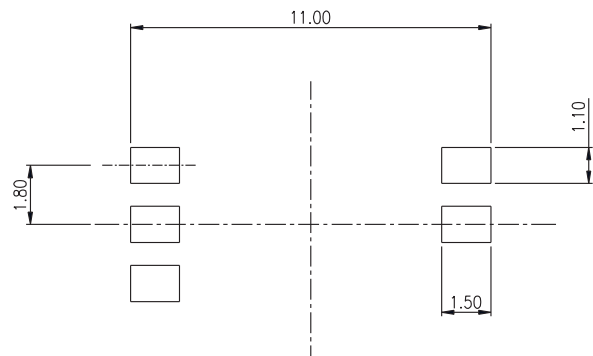
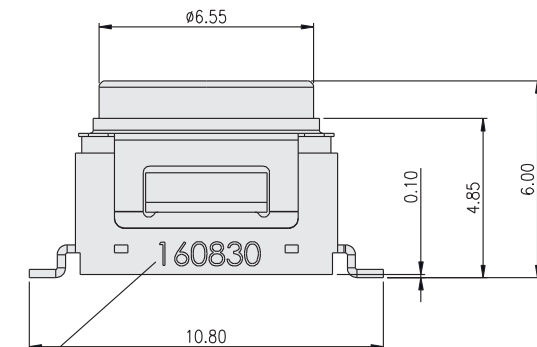
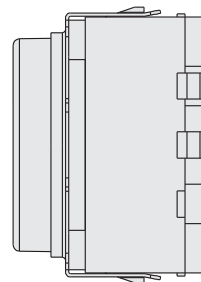
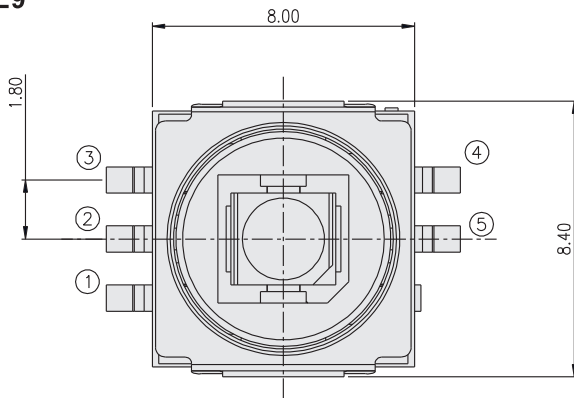
<Tape & Reel>
650 pcs.

HOW TO ORDER

ML9 - M ☐ ☐ ☐ **QR**

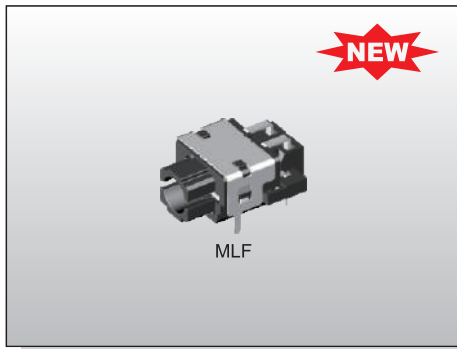
- S.M.T.
- ☐=Without Post
- P=With Post
- Operation Force: 4=400gf
- Package: Tape & Reel
- Halogen Free
- LED Color:
 - ☐=Without LED
 - B=Blue
 - G=Green
 - R=Red
 - W=White
 - O=Orange

ML9



P.C.B. LAYOUT

Date code: YYMMDD



FEATURES

- ※Horizontal operation
- ※Various LED colors
- ※Mid-mount type

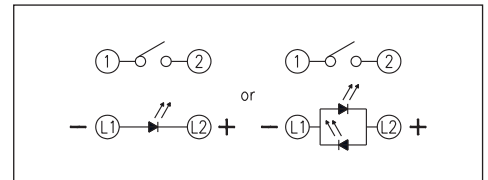
APPLICATION

- ※Server, desktop
- ※Communication apparatus
- ※IPC

SPECIFICATION

Contact Rating	50mA, 12V DC
Contact Resistance	100mΩ max.
Insulation Resistance	10MΩ min. 100V DC
Dielectric Strength	250V AC/1 minute
Operating Force	200±70gf
Travel	1.5mm
Operating Life	100, 000 cycles
Operating Temp.	-40°C ~ +85°C
Storage Temp.	-40°C ~ +85°C

CIRCUIT



PACKAGE

<Tape & Reel>
570 pcs.

HOW TO ORDER

MLF - 3 **Q R**

Operation Force:
200gf

Package:
Tape & Reel

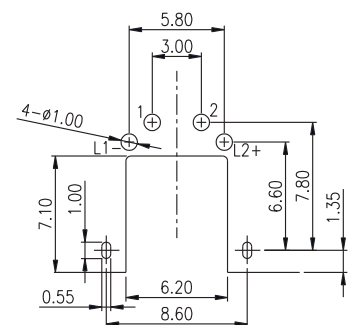
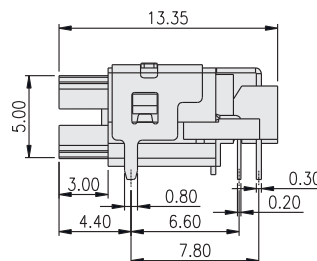
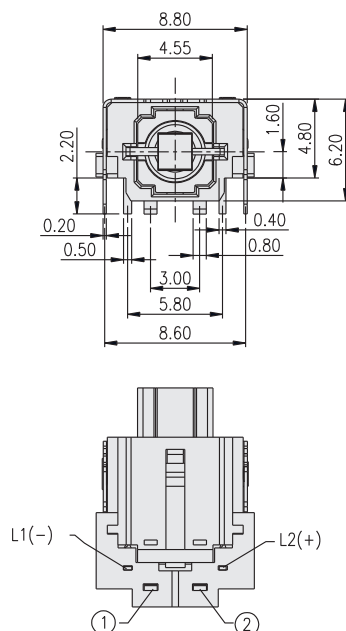
Halogen Free

LED Color:
□=Without LED
AW=Amber/White

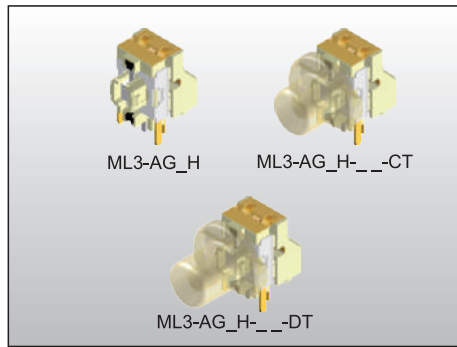
MLF

LED Color Options:

Part No.	Color	Dominant Wavelength λ_p Typ.(nm)	Luminous Intensity I_v (mcd)	Forward Voltage V_F (V)		View Angle $2\theta_{1/2}$ (Degree)
			Typ.	Typ.	Max.	
B	Blue	470	70	3.0	3.6	140°
PG	Pure Gree	520	160	3.2	3.6	
G	Yellow Green	570	30	2.0	2.3	
Y	Yellow	590	60	2.0	2.3	
A	Soft Orange	605	50	2.0	2.3	
R	Deep Red	640	25	2.0	2.3	
W	Cold White	X:0.30 / Y:0.30	350	3.0	3.6	



P.C.B. LAYOUT

**FEATURES**

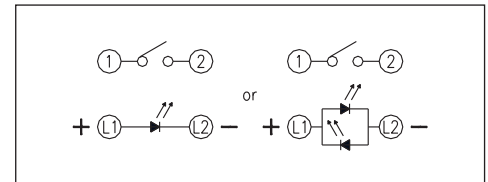
- ※ Compact size, extra thin
- ※ Dual LEDs
- ※ Focused light

APPLICATION

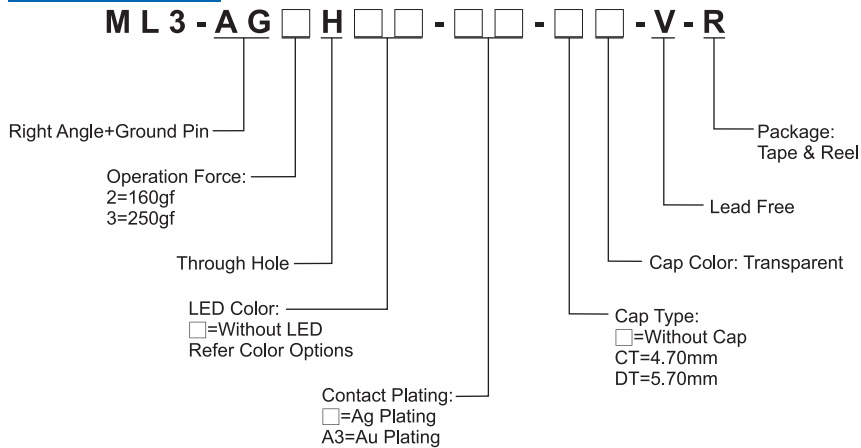
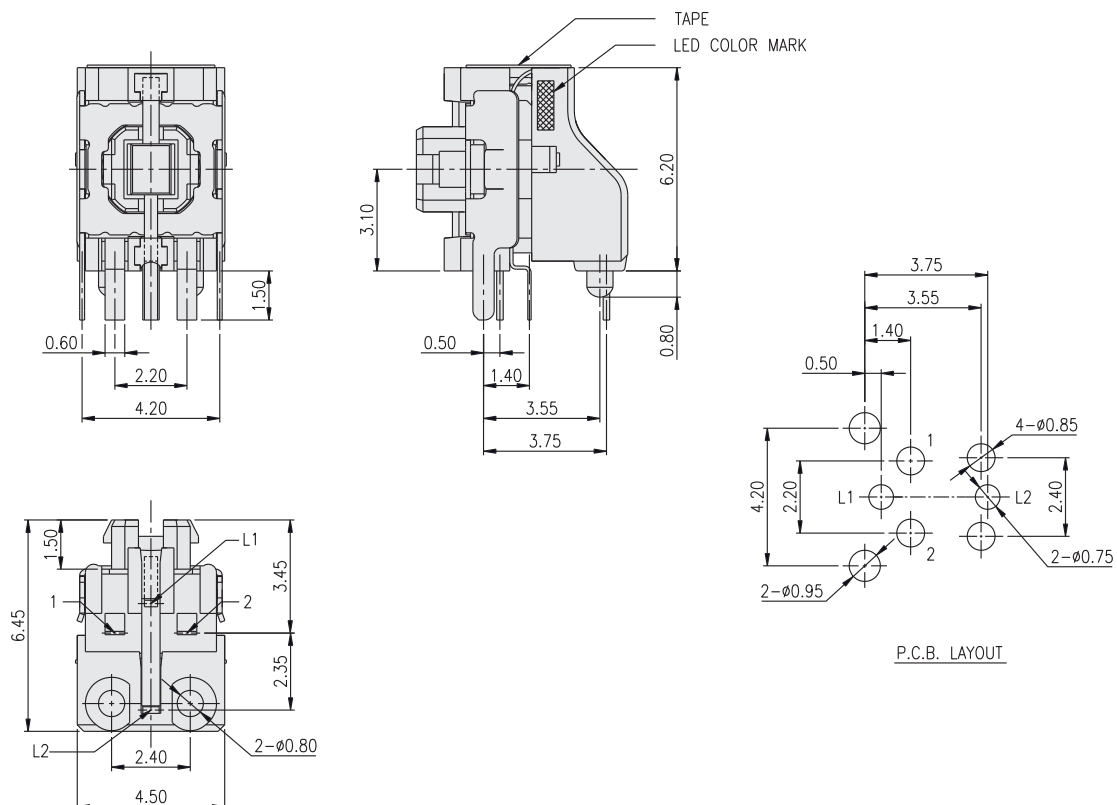
- ※ Server
- ※ Testing Instrument
- ※ Telecommunication

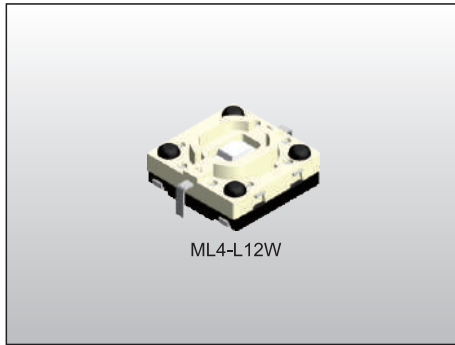
SPECIFICATION

Contact Rating	50mA, 12V DC
Contact Resistance	500mΩ max.
Insulation Resistance	100MΩ min. 100V DC
Dielectric Strength	250V AC/1 minute
Operating Force	160±50gf, 250±100gf
Travel	0.2mm
Operating Life	100, 000 cycles
Operating Temp.	-40°C ~ +85°C
Storage Temp.	-40°C ~ +85°C

CIRCUIT**PACKAGE**

Without Cap: 600 pcs/reel
With Cap: 300 pcs/reel

HOW TO ORDER**ML3**



FEATURES

- ※ Compact size 4.9x4.9 with LED
- ※ Ultra-thin: a height of 2.0mm

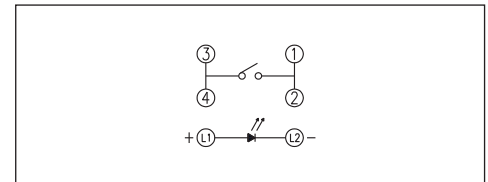
APPLICATION

- ※ NB, Monitor
- ※ Portable device
- ※ Tablet

SPECIFICATION

Contact Rating	50mA, 12V DC
Contact Resistance	100mΩ max.
Insulation Resistance	100MΩ min. 500V DC
Dielectric Strength	250V AC/1 minute
Operating Force	160±50gf
Travel	0.25mm
Operating Life	1,000, 000 cycles
Operating Temp.	-40°C ~ +85°C
Storage Temp.	-40°C ~ +85°C

CIRCUIT



PACKAGE

<Tape & Reel>
2500 pcs.

HOW TO ORDER

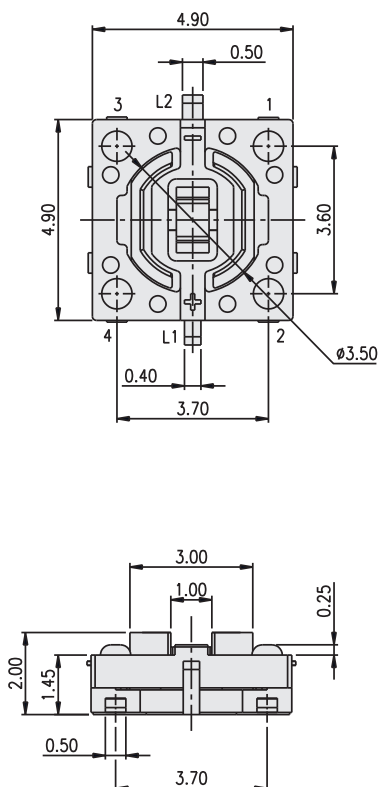
ML4-L **QR**

S.M.T. Package:
Tape & Reel

Height:
1=2.00mm Halogen Free

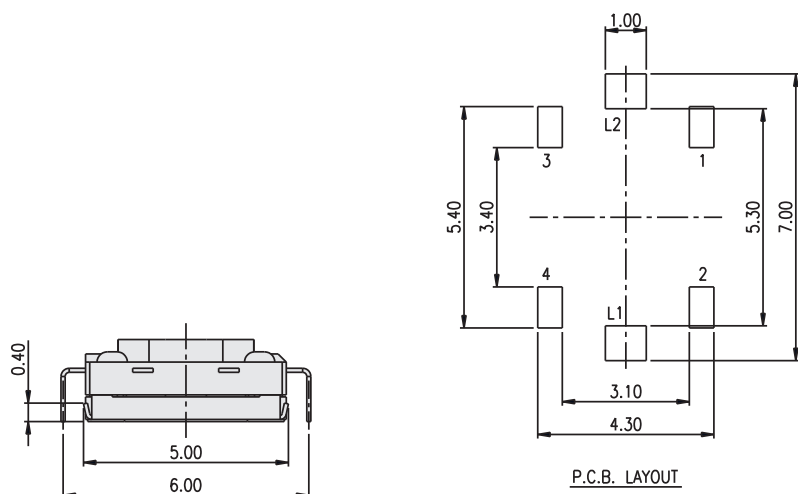
Operating Force:
2=160gf LED Color:
Refer Color Options

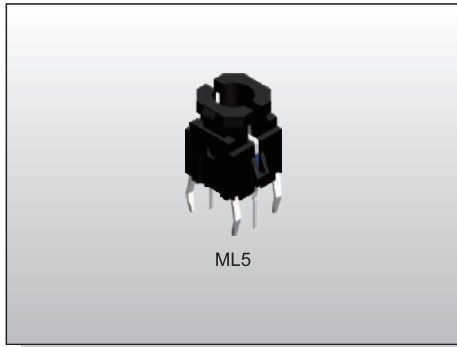
ML4



LED Color Options:

Part No.	Color	Dominant Wavelength λ_p Typ.(nm)	Luminous Intensity I_v (mcd)	Forward Voltage V_F (V)		View Angle $2\theta_{1/2}$ (Degree)
			Typ.	Typ.	Max.	
B	Blue	470	100	3.0	3.6	120°
G	Green	570	30	2.05	2.4	
R	Red	630	50	1.9	2.4	
W	Cold White	X:0.30 / Y:0.30	150	3.0	3.6	





ML5

FEATURES

- ※Silicone structure for low noise
- ※Long travel
- ※Options of differen LED color

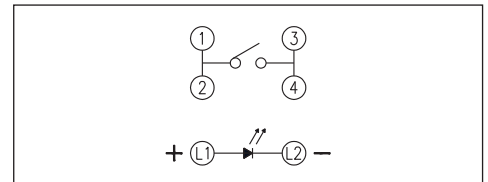
APPLICATION

- ※Audio device
- ※Office equipment
- ※Communication apparatus

SPECIFICATION

Contact Rating	50mA, 12V DC
Contact Resistance	100mΩ max.
Insulation Resistance	100MΩ min. 500V DC
Dielectric Strength	250V AC/1 minute
Operating Force	200±70gf
Travel	1.2mm
Operating Life	50,000 cycles
Operating Temp.	-40°C ~ +85°C
Storage Temp.	-40°C ~ +85°C

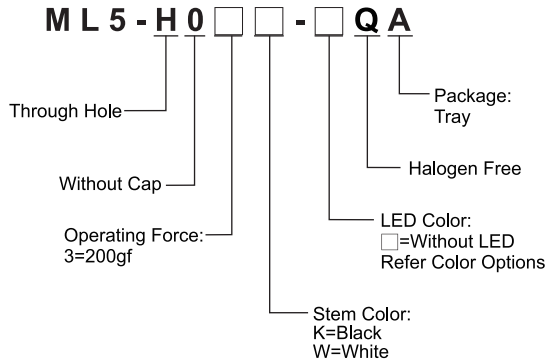
CIRCUIT



PACKAGE

<Tray>
140 pcs.

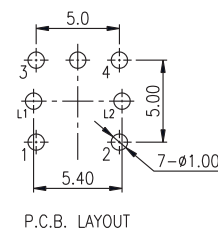
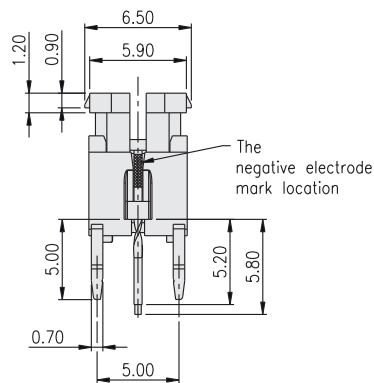
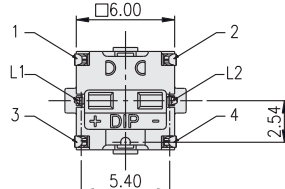
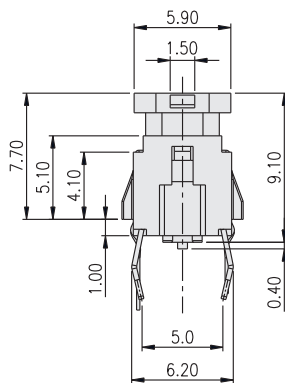
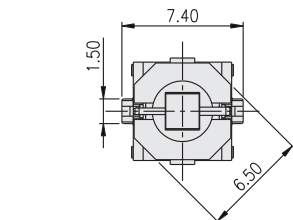
HOW TO ORDER



ML5

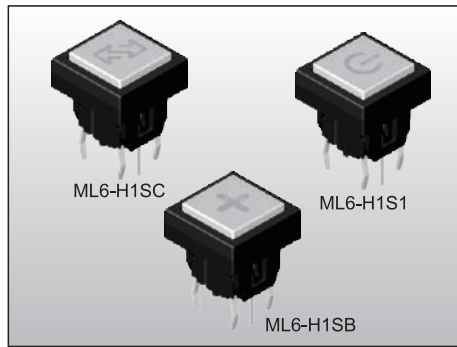
LED Color Options:

Part No.	Color	Dominant Wavelength λ_p Typ.(nm)	Luminous Intensity I_v (mcd)	Forward Voltage V_F (V)		View Angle $2\theta_{1/2}$ (Degree)
			Typ.	Typ.	Max.	
B	Blue	470	80	3.0	3.6	140°
PG	Pure Gree	520	160	3.2	3.6	
G	Yellow Green	570	30	2.0	2.3	
Y	Yellow	590	60	2.0	2.3	
A	Soft Orange	605	50	2.0	2.3	
R	Deep Red	640	25	2.0	2.3	
W	Cold White	X:0.30 / Y:0.30	350	3.0	3.6	



ILLUMINATED SWITCH ML6-H1 SERIES

Tact Switch Illuminated



FEATURES

- ※ Customized cap options
- ※ Bi-color LED available
- ※ Long operating life

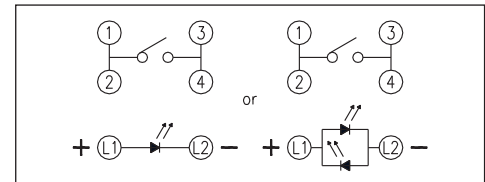
APPLICATION

- ※ Sever, modem, data storage
- ※ Audio module
- ※ Office equipment

SPECIFICATION

Contact Rating	50mA, 12V DC
Contact Resistance	100mΩ max.
Insulation Resistance	100MΩ min. 100V DC
Dielectric Strength	250V AC/1 minute
Operating Force	160±50gf
Travel	0.25mm
Operating Life	300,000 cycles
Operating Temp.	-40°C ~ +85°C
Storage Temp.	-40°C ~ +85°C

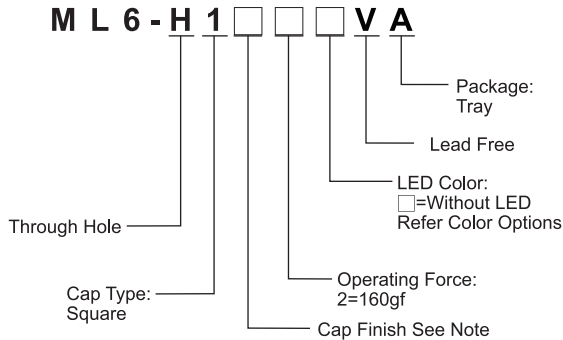
CIRCUIT



PACKAGE

<Tray>
100 pcs.

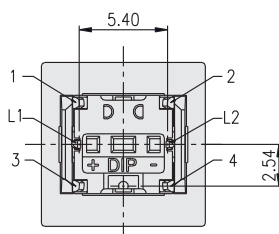
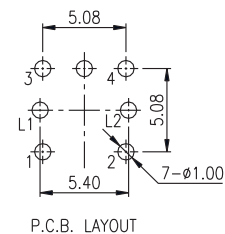
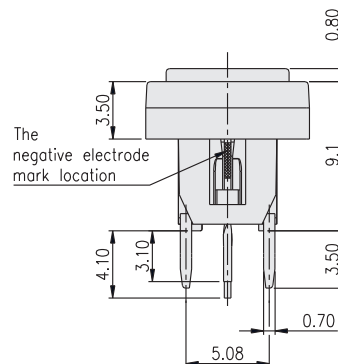
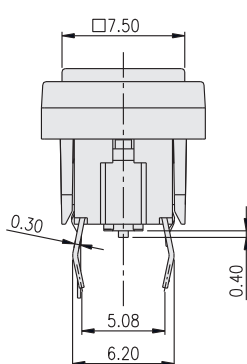
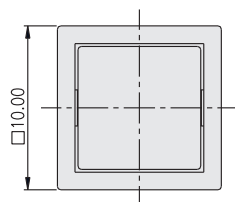
HOW TO ORDER



ML6-H1

LED Color Options:

Part No.	Color	Dominant Wavelength λ_p Typ.(nm)	Luminous Intensity I_v (mcd)	Forward Voltage V_F (V)		View Angle $2\theta_{1/2}$ (Degree)
			Typ.	Typ.	Max.	
B	Blue	470	70	3.0	3.6	140°
PG	Pure Gree	520	160	3.2	3.6	
G	Yellow Green	570	30	2.0	2.3	
Y	Yellow	590	60	2.0	2.3	
A	Soft Orange	605	50	2.0	2.3	
R	Red	630	60	2.0	2.3	
W	Cold White	X:0.30 / Y:0.30	350	3.0	3.6	

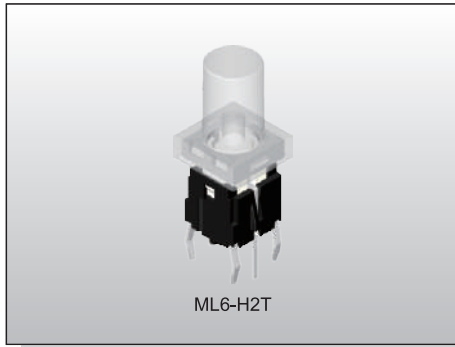


Note :

	CAP	
	Mark	Color
S1		Silver
S2	Reset	Silver
SA		Silver
SB		Silver

ILLUMINATED SWITCH ML6-H2 SERIES

Tact Switch Illuminated



FEATURES

- ✧ Customized cap options
- ✧ Bi-color LED available
- ✧ Long operating life

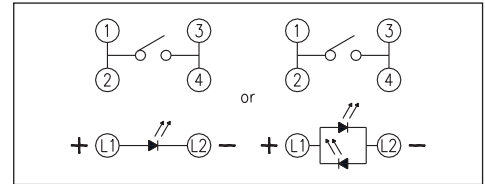
APPLICATION

- ✧ Sever, modem, data storage
- ✧ Audio module
- ✧ Office equipment

SPECIFICATION

Contact Rating	50mA, 12V DC
Contact Resistance	100mΩ max.
Insulation Resistance	100MΩ min. 100V DC
Dielectric Strength	250V AC/1 minute
Operating Force	160±50gf
Travel	0.25mm
Operating Life	300, 000 cycles
Operating Temp.	-40°C ~ +85°C
Storage Temp.	-40°C ~ +85°C

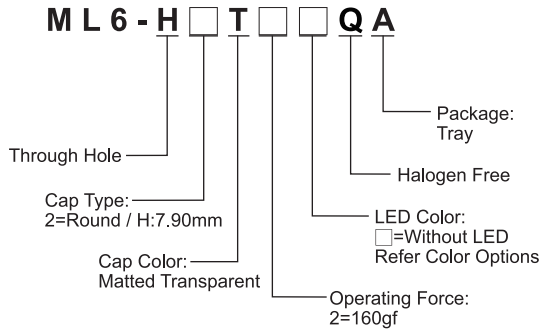
CIRCUIT



PACKAGE

<Tray>
100 pcs.

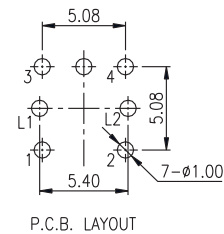
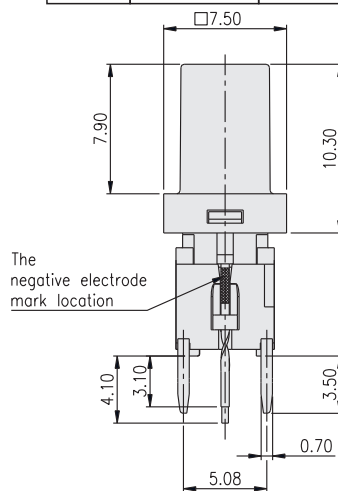
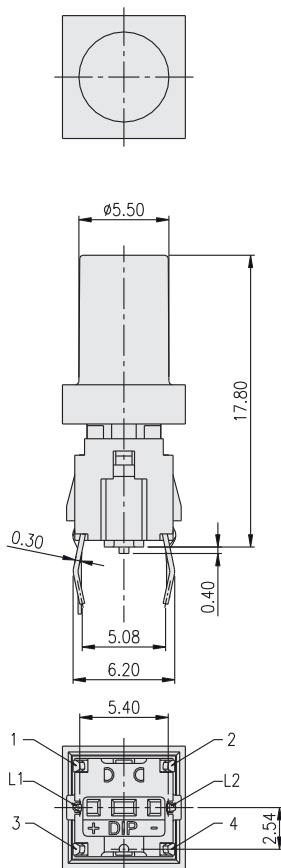
HOW TO ORDER

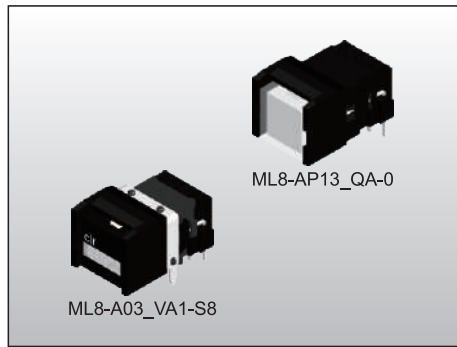


ML6-H2

LED Color Options:

Part No.	Color	Dominant Wavelength λ_p Typ.(nm)	Luminous Intensity I_v (mcd)	Forward Voltage V_F (V)		View Angle $2\theta_{1/2}$ (Degree)
			Typ.	Typ.	Max.	
B	Blue	470	70	3.0	3.6	140°
PG	Pure Gree	520	160	3.2	3.6	
G	Yellow Green	570	30	2.0	2.3	
Y	Yellow	590	60	2.0	2.3	
A	Soft Orange	605	50	2.0	2.3	
R	Red	630	60	2.0	2.3	
W	Cold White	X:0.30 / Y:0.30	350	3.0	3.6	





FEATURES

- ※Push to lock option
- ※Long stroke
- ※Options of different cap color & mark

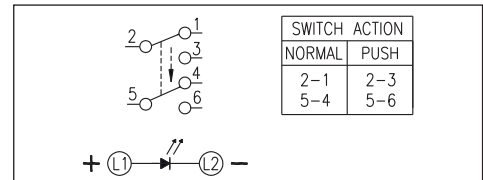
APPLICATION

- ※Audio device
- ※Office equipment
- ※Communication apparatus

SPECIFICATION

Contact Rating	0.1A, 30V DC
Contact Resistance	50mΩ max.
Insulation Resistance	100MΩ min. 500V DC
Dielectric Strength	500V AC/1 minute
Operating Force	250±100gf
Travel	1.5mm
Operating Life	10, 000 cycles
Operating Temp.	-40°C ~ +85°C
Storage Temp.	-40°C ~ +85°C

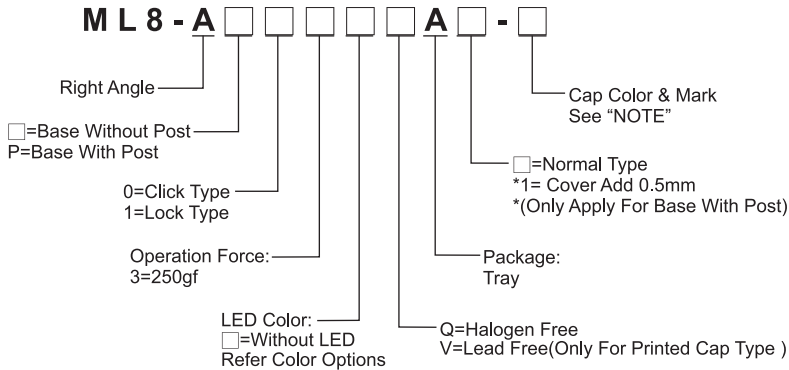
CIRCUIT



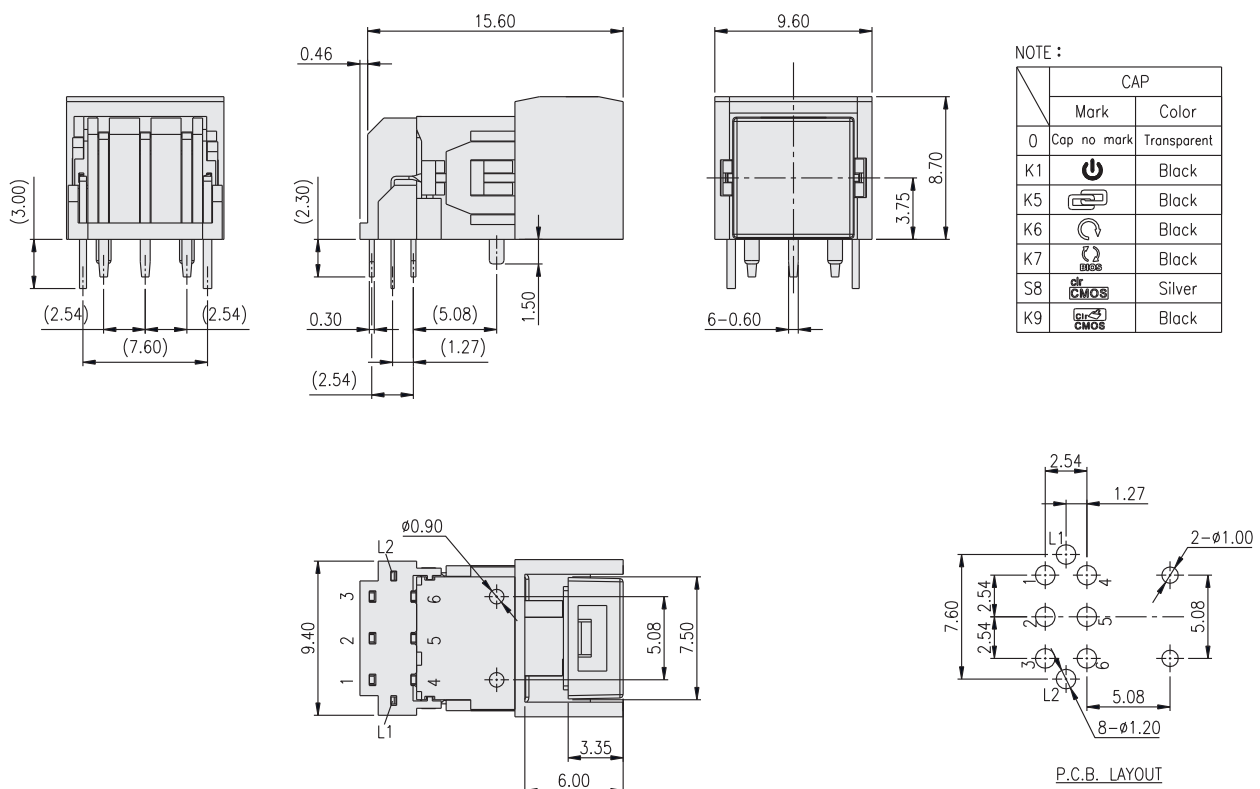
PACKAGE

<Tray>
120 pcs.

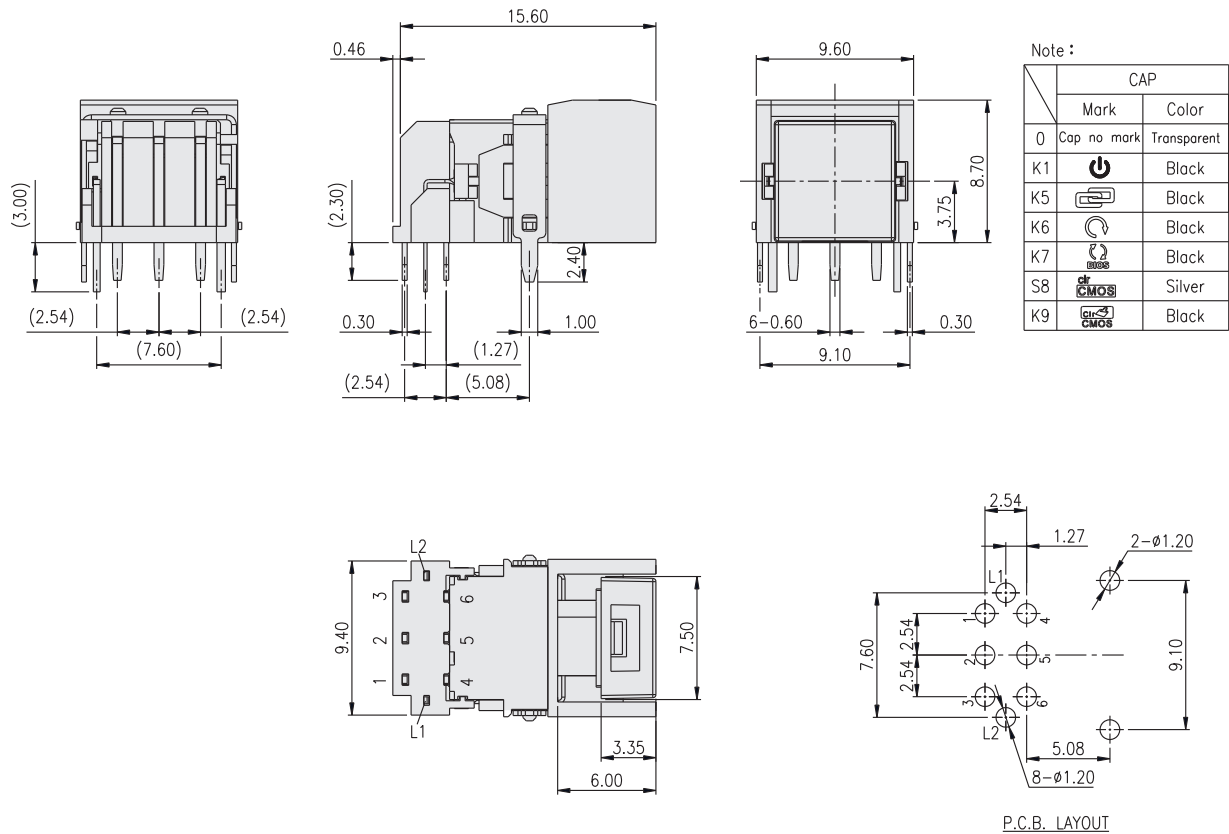
HOW TO ORDER



ML8-AP13



ML8-A03

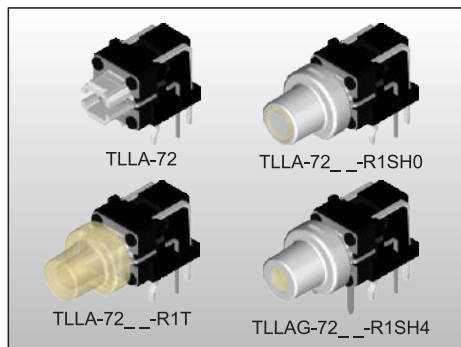


LED Color Options:

Part No.	Color	Dominant Wavelength λ_p Typ.(nm)	Luminous Intensity I_v (mcd)	Forward Voltage V_F (V)		View Angle $2\theta_{1/2}$ (Degree)
			Typ.	Typ.	Max.	
B	Blue	470	70	3.0	3.6	140°
PG	Pure Gree	520	160	3.2	3.6	
G	Yellow Green	570	30	2.0	2.3	
Y	Yellow	590	60	2.0	2.3	
A	Soft Orange	605	50	2.0	2.3	
R	Deep Red	640	25	2.0	2.3	
W	Cold White	X:0.30 / Y:0.30	350	3.0	3.6	

ILLUMINATED SWITCH TL(L)A(G)-7 SERIES

Tact Switch Illuminated



FEATURES

- ※Horizontal operation
- ※Various LED colors
- ※Options of different cap color & mark

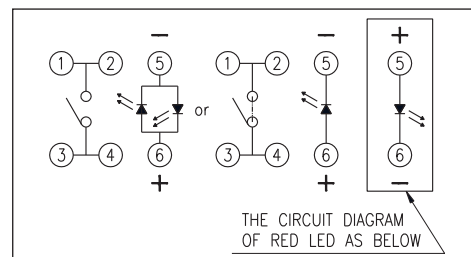
APPLICATION

- ※Automotive
- ※Server
- ※Laptop, IPC

SPECIFICATION

Contact Rating	50mA, 12V DC
Contact Resistance	100mΩ max.
Insulation Resistance	100MΩ min. 500V DC
Dielectric Strength	250V AC/1 minute
Operating Force	160±50gf / 260±50gf
Travel	0.2mm
Operating Life	500, 000 cycles
Operating Temp.	-40°C ~ +85°C
Storage Temp.	-40°C ~ +85°C

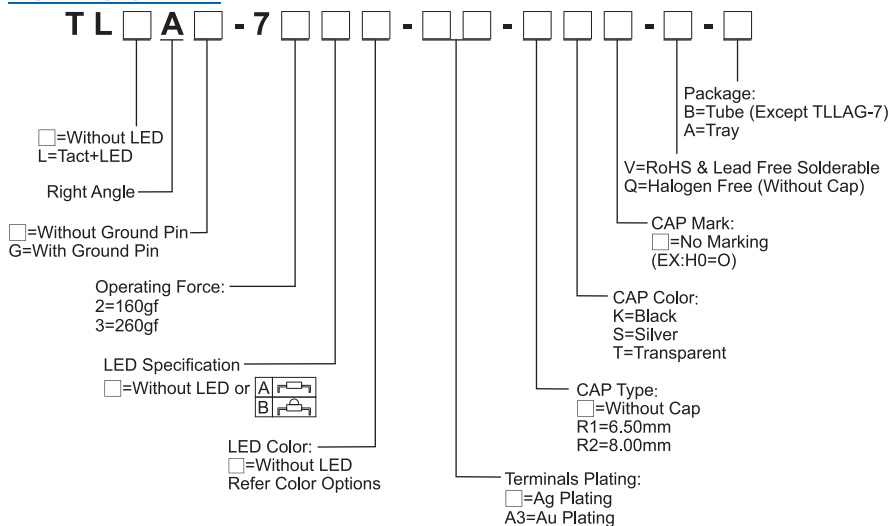
CIRCUIT



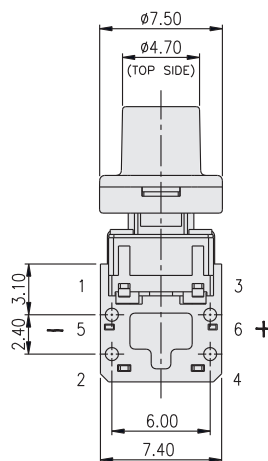
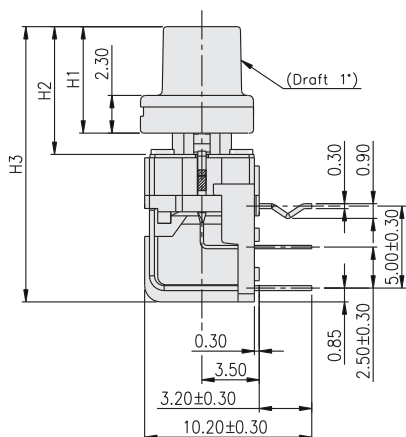
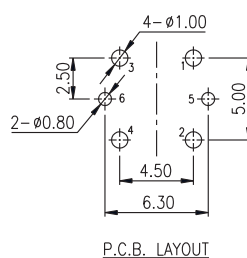
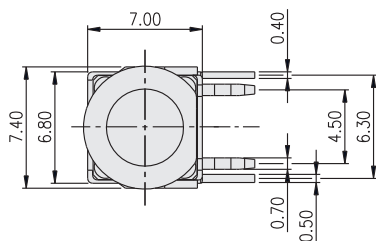
PACKAGE

- <Tray>
TLLA-7□-A: 100 pcs.
- <Tube>
TLLA-7□-B: 64 pcs.

HOW TO ORDER



TLLA-72□□-R□



PART NO.	H1	H2	H3
TLLA-7□□□-□-R1□	6.50	7.80	16.80
TLLA-7□□□-□-R2□	8.00	9.30	18.30

NOTE :

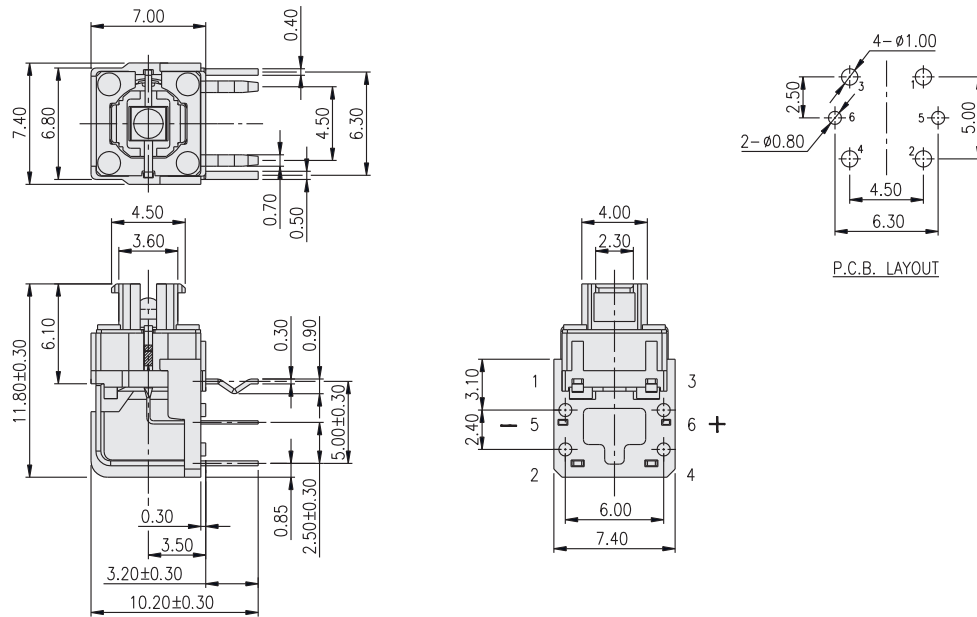
	CAP	
	MARK	COLOR
SH0	○	SILVER
KH0	○	BLACK
SH1	⊖	SILVER
KH1	⊖	BLACK
SH2	⊖	SILVER
KH2	⊖	BLACK
SH3	⊖	SILVER
KH3	⊖	BLACK
SH4	●	SILVER
KH4	●	BLACK
SH7	⊖	SILVER
KH7	⊖	BLACK
SH9	⊖	SILVER
KH9	⊖	BLACK
SHA	⊖	SILVER
KHA	⊖	BLACK
SHB	⊖	SILVER
KHB	⊖	BLACK

ILLUMINATED SWITCH TL(L)A(G)-7 SERIES

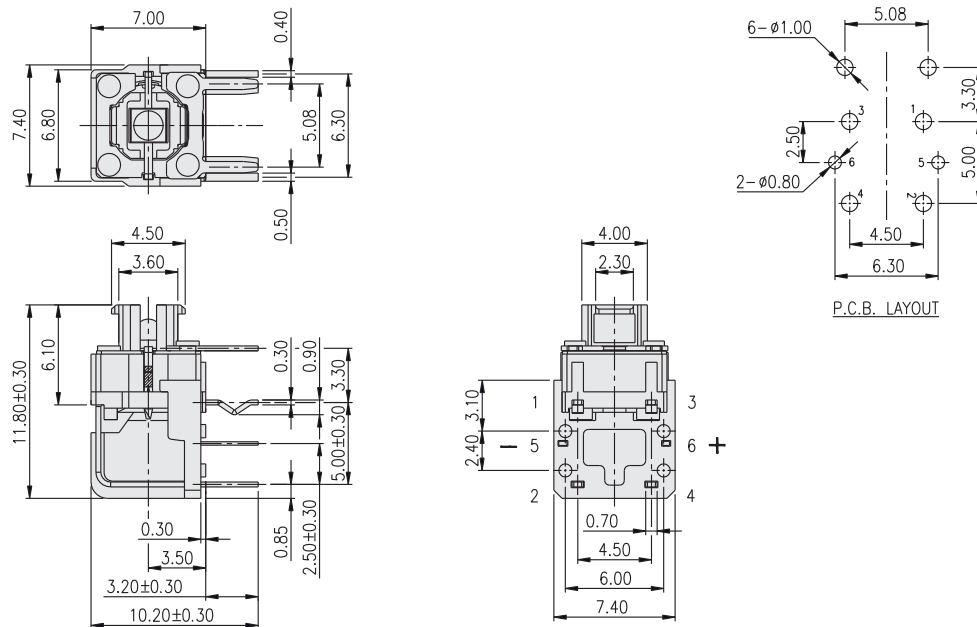
Tact Switch
Illuminated



TLLA-72

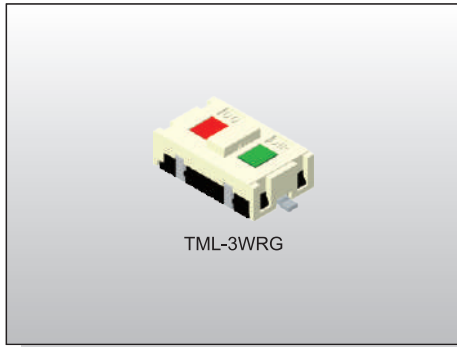


TLLAG-7



LED Color Options:

Part No.	Color	Dominant Wavelength λ_p Typ.(nm)	Luminous Intensity I_v (mcd)		Forward Voltage V_f (V)		View Angle $2\theta_{1/2}$ (Degree)	
			Typ.		Typ.	Max.	A	B
B	Blue	470	70	1100	3.0	3.6	140°	30°
PG	Pure Gree	520	160	2500	3.2	3.6		
G	Yellow Green	570	30	550	2.0	2.3		
Y	Yellow	590	60	1500	2.0	2.3		
A	Soft Orange	605	50	1500	2.0	2.3		
R	Deep Red	640	25	800	2.0	2.3		
W	Cold White	X:0.30 / Y:0.30	350	550	3.0	3.6		



TML-3WRG

FEATURES

- ※ Compact size
- ※ Bi-color LED light
- ※ Sharp click feeling

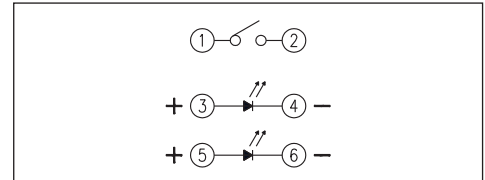
APPLICATION

- ※ Testing equipment
- ※ Industrial device
- ※ Automation

SPECIFICATION

Contact Rating	50mA, 12V DC
Contact Resistance	100mΩ max.
Insulation Resistance	100MΩ min. 500V DC
Dielectric Strength	250V AC/1 minute
Operating Force	160+80/-30gf
Travel	0.2mm
Operating Life	50,000 cycles
Operating Temp.	-20°C ~ +70°C
Storage Temp.	-30°C ~ +80°C

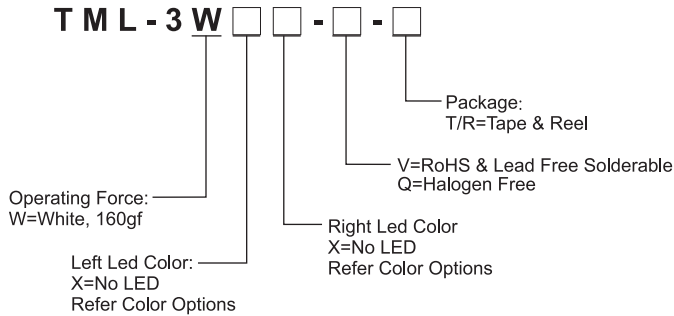
CIRCUIT



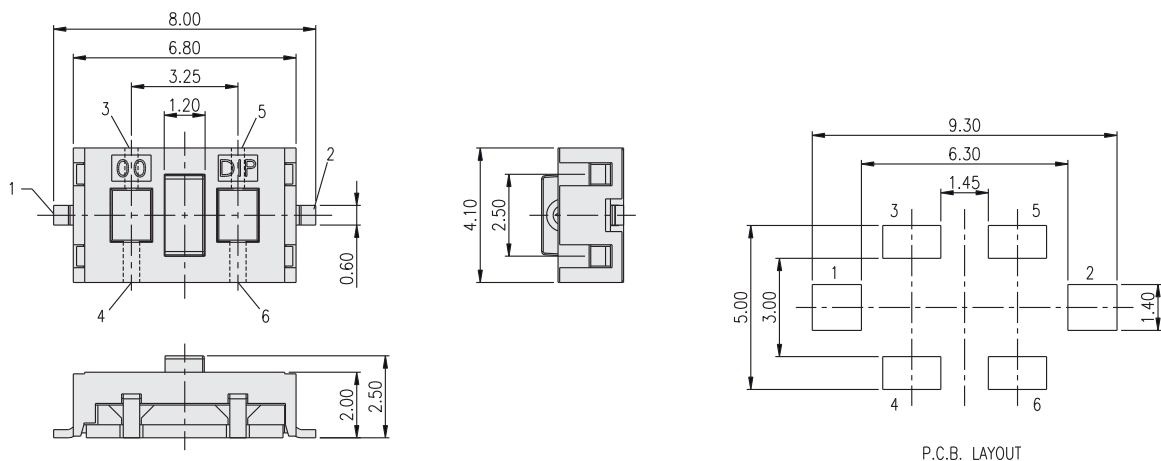
PACKAGE

<Tape & Reel>
3000 pcs.

HOW TO ORDER

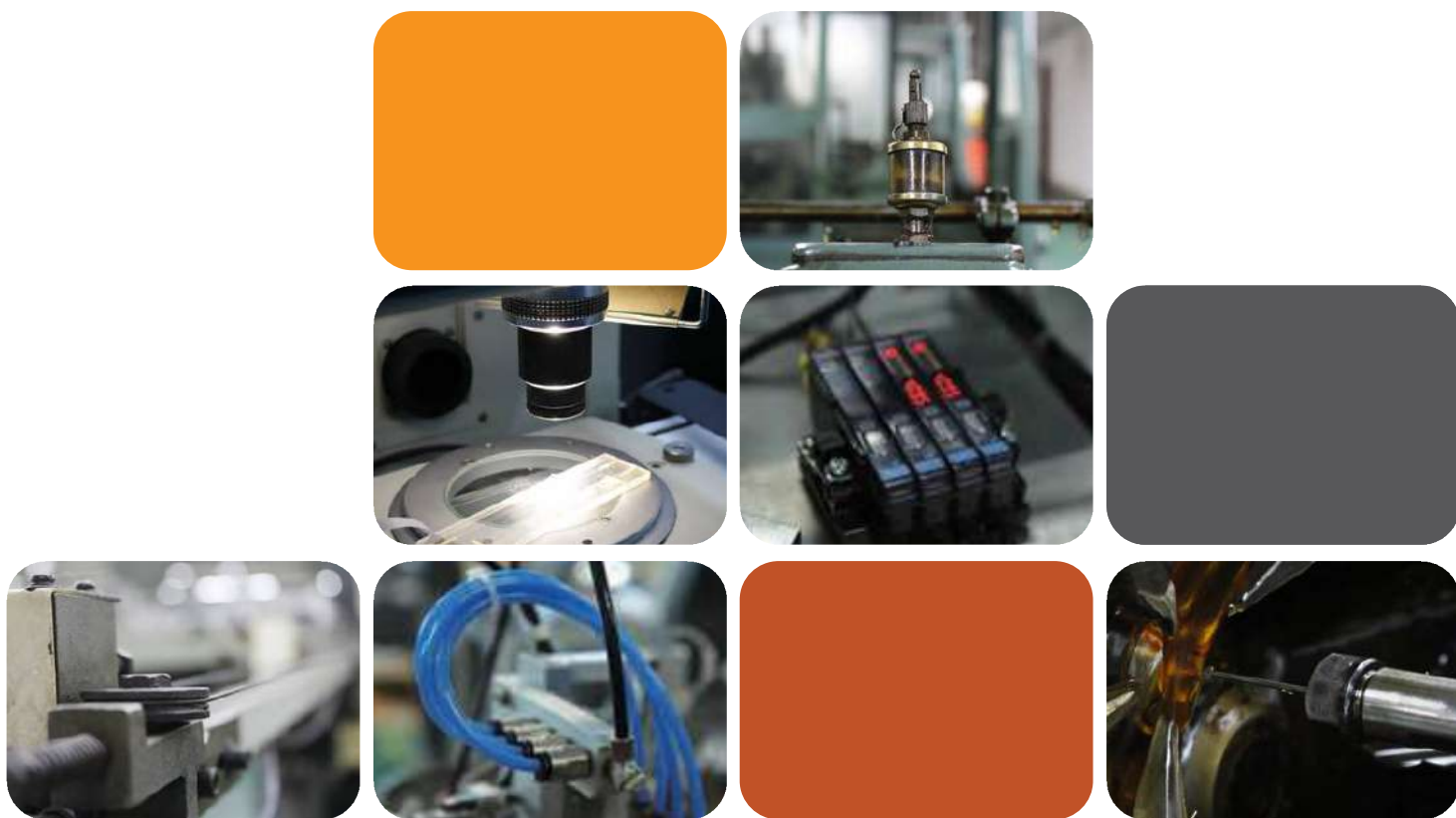


TML-3



LED Color Options:

Part No.	Color	Dominant Wavelength λ_p Typ.(nm)	Luminous Intensity I_v (mcd)	Forward Voltage V_F (V)		View Angle $2\theta_{1/2}$ (Degree)
			Typ.	Typ.	Max.	
B	Blue	470	70	3.0	3.6	140°
G	Yellow Green	570	30	2.0	2.3	
O	Yellow	590	60	2.0	2.3	
A	Soft Orange	605	50	2.0	2.3	
R	Red	630	60	2.0	2.3	
W	Cold White	X:0.30 / Y:0.30	350	3.0	3.6	



CONNECTOR 連接器

中國探針股份有限公司
C.C.P. Contact Probes Co.,Ltd

針管 (Barrel)

關於針管的設計，配合你的結構空間和產品功能的需求，以及壽命的保證，我們提交我們的產品目錄冊供你選擇。在針管的端部，因考慮到產品在PCB上固定的方便和焊接深度的問題，我們有一個凸緣的設計加以保證。

根據針管設計的不同，我們把pogo pin分為以下幾種型式：

About our barrel design, to fit your design space and functional requirement, and keep guaranteed life-cycle at the same time, we offer many choices for the outside diameter of barrels in our product catalog. On the end of barrel, we also can design a flange for your convenience to fit tight and control the depth of soldering with printed circuit board. Besides, with rectangular shape and bent-metal type.

As the difference in barrel design, we divided pogo pin into the following types:

F

平底式 Flat Type

穩定性好，針管底部為平底設計，易于與PCB板焊接
stable quality. The bottom of barrel is designed as flat shape, easy to be mounted on PCB.



P

插件式 Plug-in Type

針軸尾部帶有定位針。與PCB板焊接時，定位效果佳
With positioning pin on the bottom of barrel. Hard to shift after mounted on PCB. Good performance on positioning.



R

側放式 Right-Angle Type

側放式的設計大大減少產品的厚度
Right-angle design helps designers to narrow the space.



M

複合式 Multiple Type

結合彈片及探針的設計，提供設計人員更有彈性的空間設計
“Bent metal plus pogo pin” offers engineers more flexible design on space adjustment.



B

折彎式 Bending Type

針軸尾部折彎，提供設計人員在空間的利用上更多選擇
“Bending tail of barrel” offers engineers more choices on space adjustment.



S

特殊規格 Special Spec

可根據客戶的需求定制特殊規格的產品
We can provide the customization service for customers special needs in pogo pin connector field.



材料選擇 Material Selection

Pogo pin的材料組成成分 Material Composition

零件/Parts	材質/Material			
 針管/Barrel	黃銅 Brass	鈹銅 Beryllium Copper	磷青銅 Phosphor Bronze	鎳黃銅 Nickel Silver
 針軸/Plunger	黃銅 Brass	鈹銅 Beryllium Copper	磷青銅 Phosphor Bronze	高碳鋼 Tool Steel [SK4]
 彈簧/Spring	不鏽鋼線 Stainless Steel	琴鋼線 [鍍金] Music Wire with gold plated	鈹銅 Beryllium Copper	
 鋼珠 Ball Bearing	不鏽鋼線 Stainless Steel			
 膠芯 Housing & Cap	HTN	LCP	PBT	PA10T
 包材/Reel	PET	PS		

電鍍 Plating

我們擁有功能完善的實驗室和核心電鍍技術，如：鍍厚金處理(超過100u")；盲孔電鍍(Aspect Ratio>6.1)；貴重金屬處理(PdNi)等。目前電鍍廠基本產能可達 80KK pins /月。

电镀可以使产品美观，延长寿命期限，及得到良好的导电性能。我們的技術已經在跨國客戶的產品上得到實際應用,可以很好的幫助客戶解決大電流高頻連接問題。我們將秉持可信賴的質量、準確的交期、良好的信譽、客制化的服務與國內外客戶攜手共進，同獲發展。

产品对于电镀之要求/Electroplating Requirements

- 1 電流傳輸能力要好
good current transmission capacity
- 2 抗氧化及腐蝕能力並能保護底材
the good ability on oxidation and corrosion as well as the substrate protection
- 3 可以焊接或焊料易附著於表面上
can be welding or adhered easily on the surface
- 4 高耐磨性極高硬度
high wear resistance and high hardness



We have a fully functional laboratory and a core-plating technology, such as, a thick-layer Au-plating (over 100u "), a blind-hole plating (Aspect Ratio >6.1), precious metals-processing (PdNi), etc. At present, the basic capacity is 80 million pins per month.

We plate our products to make our products beautiful, extend the life span and achieve favorable electrical conductivity. Our technology has been applied for various well-known world-class brand electronic products. We insist on reliable quality, timely delivery, good reputation, customized service, and are eager to grow with domestic and foreign customers.

Water Proof Connector 防水式連接器

隨著電子行業的發展，電子產品的普及程度越來越高，並不斷地改善著我們的生活。與此同時，人們對電子產品的要求也不斷地提高，電子產品的防水性能開始受到人們的普遍重視。CCP 適勢推出了防水連接解決方案，提供客制化設計，實現防水，防塵，防震要求，使得產品能夠適用更惡劣的環境，帶給客戶更加安全、可靠優質的體驗。

With the rapid development of electronic industry, electronic products become more and more popular. It continuously improves the quality of our life. At the same time, people's demand for electronic products are increasing and the waterproof performance becomes valued. Therefore, CCP launches a water-proof connection solution. Our products are resistant to water, dust and shock, which can adapt to a more brutal environment, bringing safe and reliable quality to our customers.



產品優勢 Advantages

- IPX7級別防水設計 IPX7 waterproof design
- 外形小 Small shape
- 高耐溫性 High temperature resistance
- 抗腐蝕性 Corrosion resistance
- 提供客制化設計 Customerized design



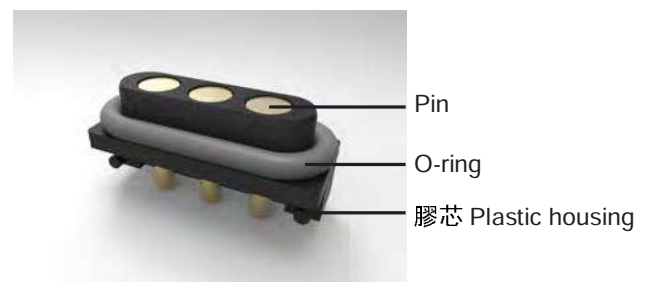
結構設計 Structure Design

1 打膠式 Waterproof Glue



打膠式設計能達到IPX6/IPX7的防護等級
The waterproof design approves IPX6/IPX7

2 O-ring



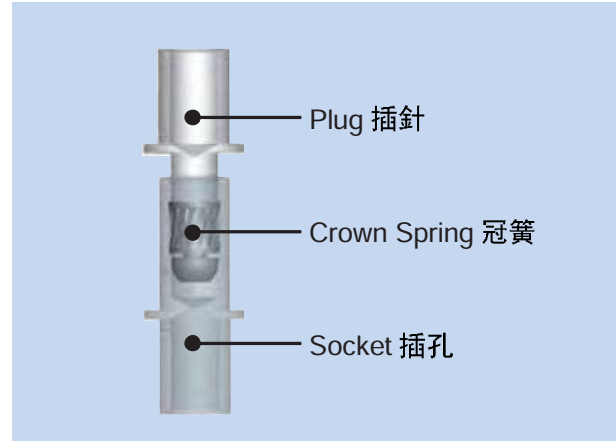
O-ring設計能達到IPX7的防護等級
The o-ring design approves IPX7

Crown Spring Connector

冠簧連接器

隨著電動汽車行業的飛速發展，CCP也同步推出了大電流端子的解決方案，旨在以可靠的連接、適當的插拔力以及更高的載流能力滿足市場以及客戶的快速充電需求。CCP擁有自主設計的冠簧彈片，擁有自主知識產權，並能夠根據不同的客戶需求調整不同的插拔力、阻抗及載流能力。CCP以連接端子為核心（IEC/GB/SAE端子），同時正將產品線拓寬至整組連接器，並輻射到電動汽車、軌道交通、工業及機器人等領域。

With the rapid development of automobile industry, CCP releases a solution of large current terminal, which aims at satisfying the needs of customers and market with our reliable connection, proper insertion force and higher quick charge of current-carrying capacity. CCP has crown spring shrapnel of our independent design and independent intellectual property rights. What's more, we can adjust to different insertion force, resistance and current carrying capacity according to different needs of customers. CCP focuses on the connection terminal (IEC/GB/SAE terminal) and widening our product lines to the whole connector. Besides, we also radiate to fields of electric cars, rail transportation, industrial and robot etc.



Advantages

1. 最小電壓降 Minimal voltage drop
2. 高電流承載量大 High current-carrying capacity
3. 外觀小 Small in size
4. 最小的接觸電阻值 Minimal contact resistance
5. 高耐用性可重複一萬次以上的插拔使用
High durability contacts withstand up to 10 thousand mating cycles
6. 優良抵抗震動和外力衝擊
High resistance to vibration and mechanical shock
7. 低維護費 Low maintenance costs
8. 抗腐蝕性佳 Very good corrosion resistance
9. 提供客製化設計
This structure also supports customize design
10. 專利設計: 双凹槽接觸式
CCP have an important patent for this crown springs - Double dimple contact CCP

Industrial Contact Pin

工業連接器

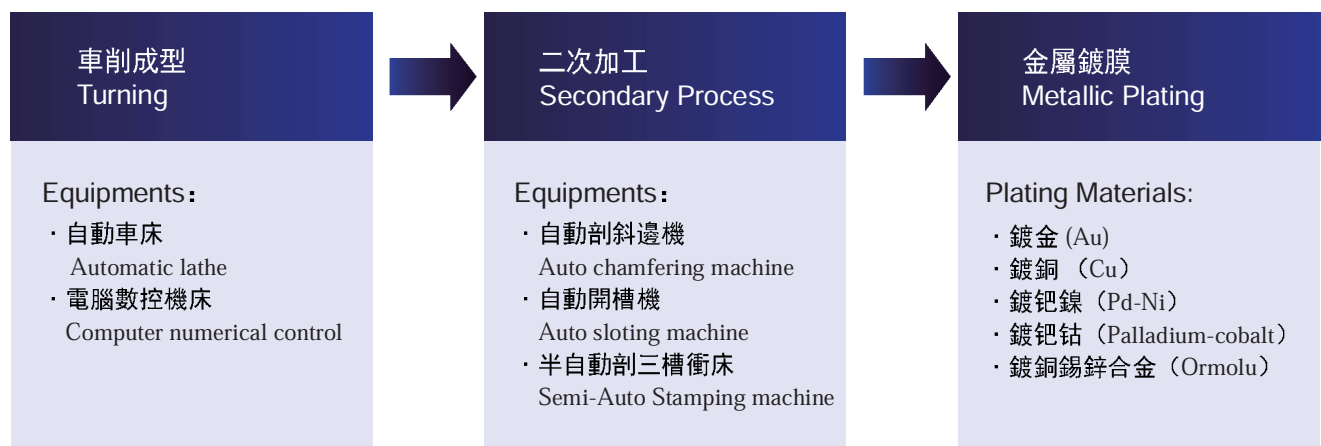
在工業產品領域，CCP推出了航天航空方面的軍用產品，通過在制程設計與原料等方面的差異化創新，以成本優勢與創新的科技幫助客戶增加市場份額，成為客戶最有價值的合作夥伴，為客戶提供安全、可靠優質的服務。

In the industrial field, CCP launches military products in aerospace aspects .By providing the advantages in design process and materials,we help customers increase the market share with cost advantage and technological innovation.We try to become the most valuable partners and we provide safe, reliable, high quality service to our customers.

產品優勢 Advantages

- 獨特的材質（可伐、錫青銅）Special materials（KOVAR、QSN4-3Y&QSN6.5-0.1Y）
- 專業的車削技術（車削孔深比可達9.0）Professional turning technology（turning hole to depth ratio up to 9.0）
- 盲孔電鍍技術 Blind hole plating technology

生產流程 Manufacturing Process

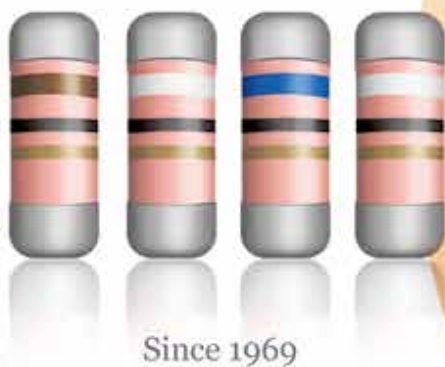


產品展示 Display





Building Life-time Partnership



*Quality, Reliability,
Cost-Down via Innovation*

第一電阻電容器股份有限公司

FIRST RESISTOR & CONDENSER CO., LTD.



公司簡介

Quality • Reliability
Cost-Down via Innovation

第一電阻電容器股份有限公司(FIRSTOHM) 成立於1969年，專營生產製造薄膜電阻器。成立之初，本公司即由美國及日本取得包括芯片電阻在內多項電阻器之製造技術。而後，自行成功研發抗浪湧(Anti-surge)電阻、色環貼片電阻(MELF)並量產，成為全球少數有技術能力製造色環貼片(MELF)電阻的廠商，充分掌握市場發展先機，產品獲得多家公司採用。秉持一貫「永續經營、不斷創新、追求卓越、終生學習」的企業文化，專精敬業之理念及穩健經營原則，第一電阻電容器股份有限公司已在被動元器件產業深耕五十年，締造良好口碑。



經營理念

科技日新又新，元器件制造商不斷追求創新以因應市場需求變遷的能力已成為電子產品及設備生產供應過程中不可或缺的要件。第一電阻電容器股份有限公司目前生產與銷售的產品為電子電路中必要的基本元器件。多年來公司即致力於生產自動化並改善制程、生產效率及產品質量，同時確保價格具競爭力且符合客戶需求。

核心競爭優勢

- **產品多樣化** - 包含色環貼片電阻，抗浪湧電阻，高壓電阻，精密電阻及電流感測電阻等特殊電阻。製程能力強，生產線高度自動化。
- **研發專職化** - 本公司自設研發部門且技術人員大多有多年基層產製經驗，在提高效率、精確度及減少耗損等能力上都十分優異。
- **解析全面化** - 從初期的技術諮詢到後期電阻產品選擇之過程中，本公司與客戶緊密合作、不斷溝通。
- **服務客制化** - 可依客戶需求提供規格不同之產品及交運方式以配合客戶產品的生命週期。

主要產品類型

應用業別 產品類型	電源供應	通訊	儀表	醫療	汽車	LED照明
MELF色環貼片電阻	★	★	★	★	★	★
抗浪湧電阻	★	★	★	★	★	★
高壓電阻	★		★	★		★
精密電阻			★	★	★	
電流感測電阻	★	★	★	★	★	★
可熔斷電	★		★		★	★

成功開發圓柱型貼片電阻

成立於台灣·台北

1986

1987

1989

自日本取得芯片電阻技術

1991

成功開發抗浪湧電阻

成功研發50KV高壓電阻

1998

自日本取得精密金屬皮膜電阻技術



產品應用分類參考

Quality • Reliability
Cost-Down via Innovation

■ 電路安全保護/抗浪湧

- Anti-Surge Wirewound Resistor—SWA
- Composite Film-Type Ceramic Composition Resistor—C3
- Fusible Resistor—FGE
- Fusible MELF Resistor—FM
- Pulse Safety Resistor—MSD
- Pulse Protective Resistor—PPR
- Short Circuit Protection Resistor—SCP
- Surge Resistant MELF Resistor—SRM (VDE0860 Certified)
- Surge Safety Resistor—SSR
- Anti-Surge Wirewound Fast-Fuse MELF Resistor—SWMT

■ AEC-Q200 (車規)

- Metal Film MELF Resistor—MM(V)
- Metal Film MELF Precision Resistor—MMP(V)
- Stabilized Film Power MELF Resistor—SFP(V)
- Surge Resistant MELF Resistor—SRM (VDE0860 Certified)

■ 電流偵測電路

- Current Sense Resistor—CSR
- Current Sense MELF Resistor—CSM

■ 照明/引擎點火電路

- Ignition Fixed Resistor—IG
- Ignition Noise Suppression Resistor (Wirewound Type)—ISW
- Ignition Noise Suppression Resistor—ISC (Film/Ceramic Composite Type)
- Medium Voltage Resistor—MVR
- Slug Resistor Center Coated—SLC
- Surge Safety Resistor—SSR

■ 精密/高穩定電路路

- Enhanced Film Fixed Resistor—EFR
- Enhanced Film Power MELF Resistor—EFP
- Metal Film MELF Precision Resistor—MMP
- Metal Film Precision Resistor—MP
- Stabilized Film Power MELF High Power—SFP
- Stabilized Metal Film MELF Resistor—SM
- Professional Metal Film Axial Resistor—PMA

■ 高功率電路 (>3W)

- Enhanced Film Power MELF Resistor—EFP
- High Voltage Resistor—HVR (VDE0860 Certified)
- Metal Oxide Film Fixed Resistor—MO
- Wirewound Resistors—WA
- Anti-Surge Wirewound MELF Resistor—SWM
- Anti-Surge Wirewound Fast-Fuse MELF Resistor—SWM

■ 高壓電路

- Enhanced Film Fixed Resistor—EFR
- High Voltage MELF Resistor—HVM
- High Voltage Resistor—HVR (VDE0860 Certified)
- Medium Voltage Resistor—MVR
- Medium Voltage MELF Resistor—MVM
- Spark-Gap Surge Absorber—SGS

■ 高頻電路

- High Frequency Terminator Resistor—HFT
- Surge Resistant MELF Resistor—SRM (VDE0860 Certified)

建立ISO14001
管理制度

建立ISO9000
管理制度

成功研發電流感測電阻

成功研發抗浪湧
繞線電阻器

成功研發抗浪湧
快速熔斷繞線電阻器

1999

2001

2008

2014

2015

2018

成功研發0102 MELF
金屬膜電阻

第一電阻擁有30年以上高質量MELF電阻的設計與生產經驗圓柱型貼片電



圓柱型貼片電阻 (MELF RESISTOR) 的優勢

- 強化機械結構、抗震、耐熱衝擊
- 優良的散熱性能(尤其適合氣流散熱)
- 耐高壓能力優於片式電阻(Surge Proof)
- 穩定性高，適合長時間使用
- 電阻低溫飄，高精密度

比一般貼片電阻更優異的性能

下圖使用第一電阻的MELF resistor 與V 廠牌Chip resistor 的電阻各一顆，兩者互相串聯並於電路兩端施加交流12.25 瓦的功率：

第一電阻抗浪湧圓柱型貼片電阻
SRM204T,100Ω, 5%



阻值平均變化率：小於 0.1%

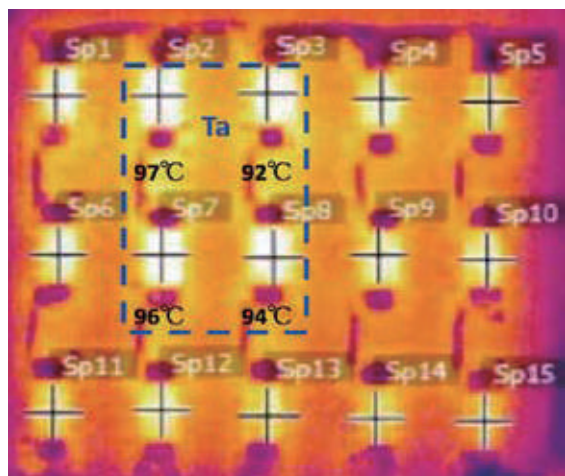
V廠牌抗浪湧貼片電阻
(1206封裝) 100Ω, 5%



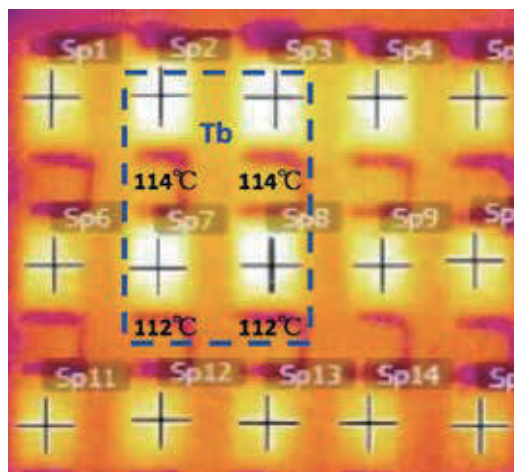
約0.1 秒 ~ 0.2 秒電阻形成開路

電阻散熱性能比較 (Rthi) : $\Delta T = T_b - T_a : 17^{\circ}\text{C} \sim 20^{\circ}\text{C}$

第一 電阻優勢：MELF 電阻散熱能力明顯優於Chip 電阻



• 第一電阻SFP101V (MELF resistor)



• V 廠牌1206 (Chip resistor)



最新產品

抗浪湧繞線快速熔斷電阻(SWAT/SWMT)

- 繞線接點強化專利 (台灣專利編號：I637420、美國專利編號：10170266)
- 單顆電阻結合抗浪湧與快速熔斷功能，降低成本
- 適合LED 照明、汽車電機、點火電路、汽車充放電電容洩放電阻、移動電話充電器

國際標準認證



No. FM 577844

證書號: FM 577844

維持內部工作流程的效率,質量及彈性以能有效率地對客戶的要求做出適當的應對。



No. EMS 594693

證書號: EMS 594693

生產過程中廢棄物減量以及減少環境污染符合國際標準化組織(ISO)的標準,並透過資源回收機制,使資源利用更有效率。



證書號: 40011593 & 40043961

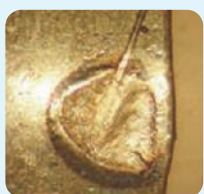
高壓電阻HVR & 抗浪湧電阻SRM通過規範: DIN EN 60065 (VDE 0860): 2015-11 clause 14.2 a)

高可靠度焊點之抗突波繞線電阻

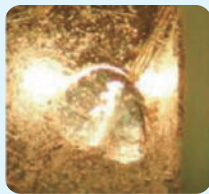
Anti-Surge Wire Wound Resistors

抗浪湧線繞電阻 (SWA/SWM)

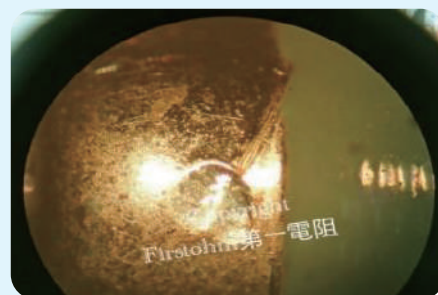
- 第一電阻專利改良繞線焊點。
- 應用範圍將由以高功率電路為主，提升至要求高壓突波保護的環境。



改善前:
電阻線明顯
外露



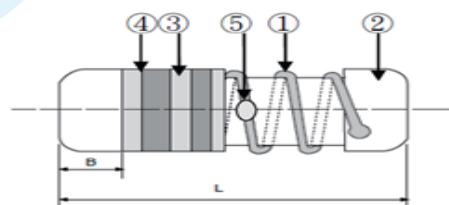
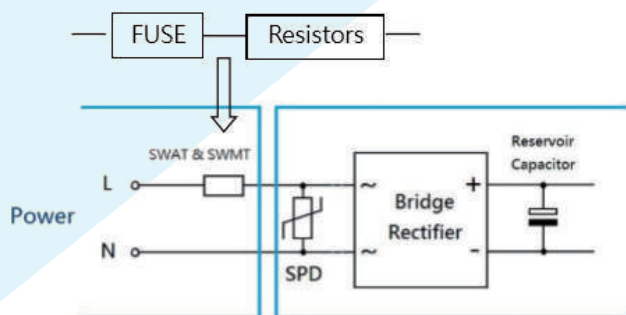
改善前:
電阻線比較
不明



Anti-Surge Wire Wound Fast-Fuse Resistors

抗浪湧線繞電阻 (SWAT/SWMT)

- 已通過台灣與美國專利申請。
- 具有**抗突波能力**與**快速熔斷**兩大功能。
- 可應用於電子產品交流轉直流的電源輸入端，可做為突波保護電路，可免於電路因為突波而損壞。
- 當異常電流或短路時，可在短時間內快速熔斷，避免持續高溫燒毀機殼引起安全事故。



NO	部位	材質
1	電阻合金線	鎳鉻合金
2	金屬帽	鐵、銅、錫
3	保護漆	不燃漆
4	色環	樹脂
5	可熔斷接點	Thermal Fuse

Feature Comparison

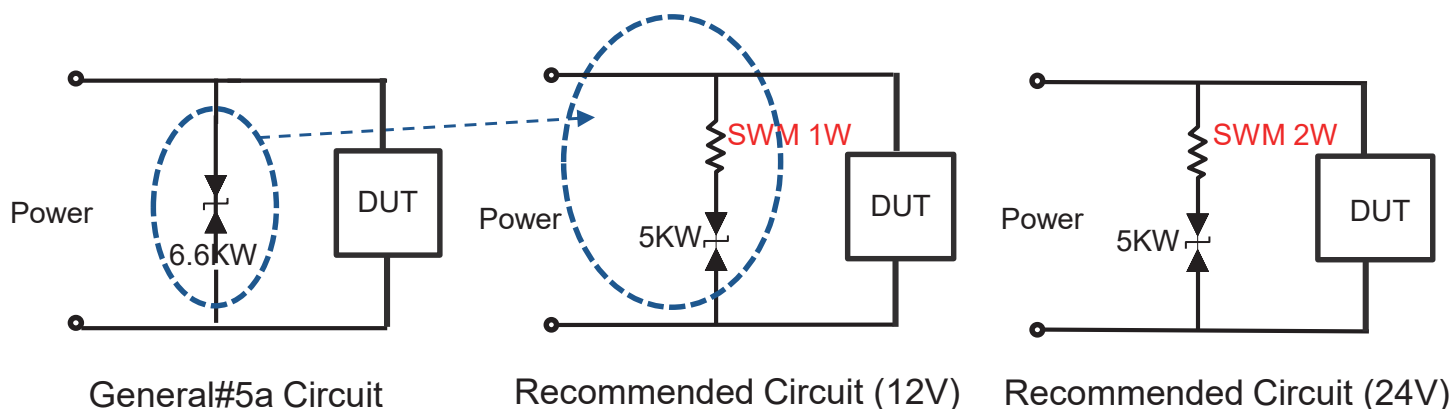
機械特性	Mini MELF 0204	CHIP 1206
外型	圓柱型	平板型
用於SMT 制程	可	可
尺寸	1.35 x 3.52 mm	1.6 x 3.2 mm
機械強度—震動、變形	較優	普通
機械強度—熱衝擊	較優	普通
熱阻	低	高
抗暫態突波能力	較優	普通
長時間操作穩定性	較優	普通
功率密度	優 (小尺寸高功率)	普通 (一般功率)
電流噪音(低阻值)	低	高

SWM在車規抗突波應用方法

在車用系統中，電子產品必須通過ISO7637的EMC傳導暫態測試，以確認車用電子元件不會遭受突波的影響而失效。針對ISO7637#5a所要求浪湧脈衝的耐受性，通常必須選擇功能比#5b更高一級的TVS才能通過測試。第一電阻對於通過#5a的測試標準提出最佳車規解決方案，建議使用抗突波電阻來降低突波對電路的衝擊，因此，可以使用#5b的TVS來通過#5a的測試，效益說明如下表。

ISO7637	規格	安全性	電路總成本
一般#5a電路	6.6KWTVS (Ex.: ASTV66SM824A)	普通	高
建議#5a電路	5KW TVS + SWM100,1Ω/2Ω(Ex.:TV50C110-441)	優	低

※依被保護電路電流大小分為Model(A)和Model(B)兩種方式，(A) 12V系統，(B) 24V系統



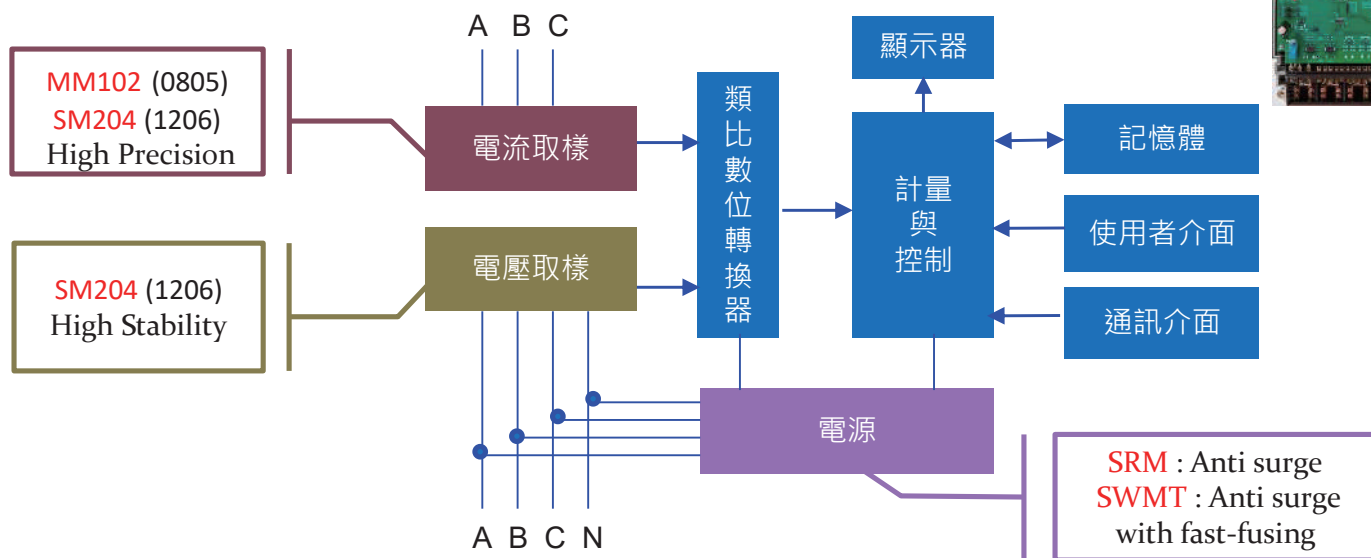
※ 使用SWM系列電阻于汽車應用之優勢:

1. 同時具有電阻與抗突波功能
2. 圓柱型繞線電阻使用MELF包裝，可用SMT打件
3. 電阻本體外部使用UL 94V-0防火不燃漆
4. 晶圓電阻(MELF)特性優於晶片電阻(Chip)，具抗震、不易扭曲變形，熱阻低、散熱快，耐熱衝擊等等優點



電阻系列	功率	阻值範圍	誤差	工作電壓	過載電壓	抗突波電壓
SWM100	1W	0.1Ω~ 1.5KΩ	±5%	350V	700V	Max. 7.5KV
SWM200	2W	0.1Ω~ 1.5KΩ	±5%	400V	800V	Max. 8.5KV
SWM300	3W	0.1Ω~ 1.5KΩ	±5%	400V	800V	Max. 9KV

★電錶架構圖與電阻的應用部位:



★第一電阻晶圓電阻(MELF Resistor)優勢

電網環境複雜多變，拉合閘產生的脈衝群、間接雷等環境下對採樣電阻產生了較大的衝擊。為了提升表計的抗衝擊能力，建議選用柱狀貼片電阻，又稱晶圓電阻，與片狀電阻相比，柱狀貼片電阻由於有更大的表面面積使之耐電流，耐高壓的性能大大提升，不論在功能上，機械結構上，電氣特性上，或安全性上，都明顯優於片狀貼片電阻。

SM204系列-精確的電流/電壓量測(低溫漂,穩定性佳和承受脈衝能力好)

★SRM (Surge Resistant MELF Resistor)抗突波電阻

SRM抗突波膜層晶圓電阻，通過德國VDE0860安規認證，可提升電子產品的安全等級並可承受高達10千瓦單脈衝能力(防浪湧及抗電磁脈衝性能佳)

★SWMT (Anti-Surge Wire Wound Fast-Fusing MELF Resistor)

抗突波電阻+低溫快速融斷功能(專利申請中)

系列	功率(W)	阻值範圍(Ω)	誤差	TCR(PPM)	Max. Overload Voltage
MM102	0.2W	0.22Ω~2.2MΩ	±0.5%~±5%	±25, ±50, ±100	300V
SM204	0.25W	0.51Ω~10MΩ	±1%~±5%	±25, ±50, ±100	400V
SRM	1/4W~3W	1Ω~2M2Ω	±1%~±5%	±100, ±200	10KV
SWMT	1W~3W	0.1Ω~330Ω	±5%	±100, ±300	800V



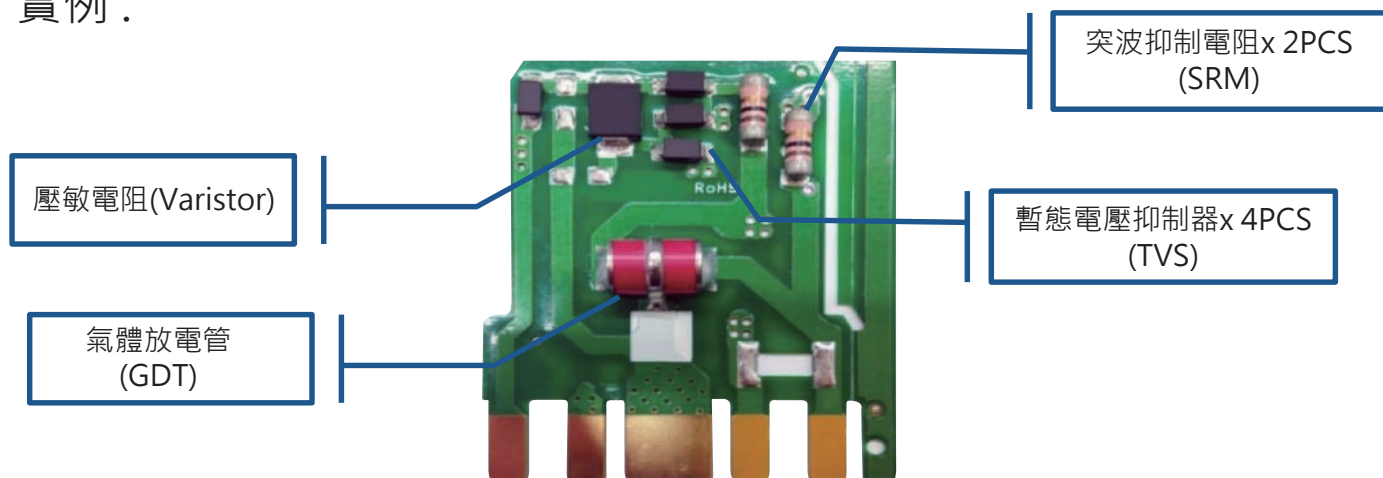
電子產品在實際應用時，電路經常面臨各種異常電壓(例如:雷擊過電壓，靜電等異常突波電壓)竄入，而使得電路功能異常或損壞，若於保護電路中能適當地搭配氣體放電管(GDT)、電壓抑制器(TVS)和壓敏電阻(Varistor)，則對於竄入電路中之異常過電流或過電壓之保護能力將更佳。

SRM Resistor(Surge Resistant MELF Resistor)可有效地抵抗瞬間高突波能量之衝擊，圓柱型SRM電阻器與其他表面黏著零件一起搭配使用，所有零件全部可以一起使用Reflow或Wave soldering 製程進行焊接，可以達到產品體積小型化與大量生產的要求。除此之外，可以改善以往使用繞線電阻之缺點，換言之，可以改善訊號接收器之訊號頻率響應，有效地降低高頻訊號損失，產品可靠度有效地提升。

應用：

- 電源防雷器(單相三線、三相三線、三相四線...)
- 影音信號防雷器(安防系統、Cable TV...)
- 通訊信號防雷器(Telephone、FAX、Modem...)

實例：



※此系列電阻產品，已通過德國VDE測試



Resistor	Key Features	Power Rating	Ohm Range	Tolerance
	MM Metal Film MELF Resistor • SMD enabled structure • Excellent solderability termination • Typical 10μs maximum pulse load: 32W ~ 70W • Typical temperature coefficient: 25ppm ~ 100ppm	1/6W ~ 1/2W	0, 0R51 ~ 10M	± 1%, ± 2%, ± 5%
	MM(V) Metal Film MELF Resistor, Vehicle Grade • AEC-Q200 compliant • Excellent solderability termination • Typical 10μs maximum pulse load: 35W ~ 80W • Typical temperature coefficient: 25ppm ~ 100ppm	1/4W ~ 1/2W	0R47 ~ 10M	± 1%, ± 2%, ± 5%
	MM102 Metal Film MELF Resistor • SMD-enabled structure • Excellent solderability termination • Typical temperature coefficient: 25ppm ~ 100ppm	0.2W	0, 0.22R ~ 2.2M	±0.5% ~ 5%

* All products are RoHS/REACH compliant unless otherwise specified.

1999

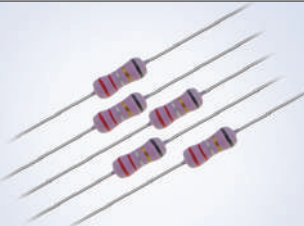
Established management system according to ISO14000 standards

Resistor	Key Features	Power Rating	Ohm Range	Tolerance
	MM(P) Metal Film MELF Resistor (Pulse Withstanding) • SMD enabled structure • Excellent solderability termination • Enhanced pulse withstanding capability • Typical temperature coefficient: 50ppm, 100ppm • Typical 1.2/50μs maximum pulse voltage: 4000V	1/6W ~ 1/2W	0R1 ~ 330K	± 1%, ± 2%, ± 5%
	MMP Metal Film MELF Precision Resistor • SMD enabled structure • Excellent solderability termination • Typical 10μs maximum pulse load: 32W ~ 70W • Typical temperature coefficient: 5ppm ~ 50ppm	1/6W ~ 1W	10R ~ 1M	± 0.1%, ± 0.25%, ± 0.5%
	MMP(V) Metal Film MELF Precision Resistor, Vehicle Grade • AEC-Q200 Compliant • Excellent solderability termination • Typical 10μs maximum pulse load: 35W ~ 80W • Typical temperature coefficient: 15ppm ~ 50ppm	1/4W ~ 1/2W	10R ~ 1M	±0.1% ~ 0.5%

* All products are RoHS/REACH compliant unless otherwise specified.

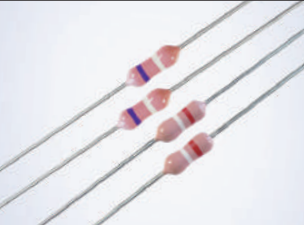
2001

ISO 9001 certified

Resistor	Key Features	Power Rating	Ohm Range	Tolerance
	SCP Short Circuit Protection Resistor - Advanced multi-functional design - Cut-off on overload or accidental short circuit - Transient withstanding for power-line coupling - Flameproof multi-layer coating equivalent to UL 94 V-0 - Flameproof feature equivalent to overload test UL 1412 - Possible alternative to wire-wound resistors - Maximum overload voltage: 600V ~ 700V - Fuses within 60 sec. at 12W ~ 30W	1/2W ~ 3W	2R2 ~ 10K	± 5%
	SFP Stabilized Film Power MELF Resistor - Low temperature coefficient and tolerances - Excellent stability - Superior power handling - Typical temperature coefficient: 50ppm ~ 200ppm	1/2W ~ 3W	0R5 ~ 10M	± 0.5% ~ 5%
	SFP(V) Stabilized Film Power MELF Resistor, Vehicle Grade - AEC-Q200 Complicant - Low temperature coefficient and tolerance - Superior power handling - Typical temperature coefficient: 25ppm ~ 50ppm	1/2W ~ 3W	0R22 ~ 1M	±1% ~ 5 %

* All products are RoHS/REACH compliant unless otherwise specified.

2011 SGS patent granted by European Patent Office

Resistor	Key Features	Power Rating	Ohm Range	Tolerance
	SGS Spark-Gap Surge Absorber - Low-cost patented construction (EP 09000962.2) - No light-dark effect - Low capacitance / short response time / fast ignition - Response time: ≤1ns	$\left[\begin{array}{l} 80A @ 2/10\mu s \\ 60A @ 8/20\mu s \end{array} \right]$ $\left[\begin{array}{l} \text{Surge} \\ \text{Current} \\ \text{Capacity} \end{array} \right]$	1550V ~ 3300V DC $\left[\begin{array}{l} \text{Spark-Over} \\ \text{Voltage} \end{array} \right]$	± 30%
	SL Slug Resistor - Specially treated metal caps withstand abrasions, impacts, and corrosions, so as to reduce contact resistance during operation. conductive film is enhanced to withstand abrasions, impacts, and corrosions as well. Suitable for clip-in (embedded) application like switches with neon indicators, neon/LED modules, LED display array, etc. - Protective coating is optional	1/6W ~ 1/2W	1R ~ 9M1	± 5% ~ 10%
	SLC Slug Resistor Center Coated Specially treated metal caps withstand abrasions, impacts, and corrosions, so as to reduce contact resistance during operation. conductive film is enhanced to withstand abrasions, impacts, and corrosions as well. Suitable for clip-in (embedded) application like switches with neon indicators, neon/LED modules, LED display array, etc.	1/6W ~ 1/2W	1R ~ 9M1	± 5% ~ 10%

* All products are RoHS/REACH compliant unless otherwise specified.

** estimated

SGS patent granted in Japan, China, and Korea 2012

Resistor	Key Features	Power Rating	Ohm Range	Tolerance
	SM Stabilized Metal Film MELF Resistor - Conformal coating against humidity - Excellent solderability termination - Typical 10μs maximum pulse load: 32W ~ 70W - Typical temperature coefficient: 25ppm ~ 100ppm	1/6W ~ 1/2W	0R51 ~ 10M	± 1% ~ 5%
	SRM Surge Resistant MELF Resistor - IEC60065 & UL1676 Compliant - Miniaturized MELF design handles high power - Special conductive film enhances anti-surge capability - Absorbs harmful surge which damages precious devices or components - SMD-enabled alternative to carbon composition resistors - Maximum permissible surge voltage: 2KV ~ 10KV - Typical 10μs maximum pulse load: 70W ~ 8000W - Approved to the safety requirement of VDE0860 under license number 40043961	1/4W ~ 3W	0R1 ~ 2M2	± 1% ~ 5%
	SSR Surge Safety Resistor - Designed to replace carbon or ceramic composition resistor - Absorbs harmful surge energy, so to prevent hazard of fire and circuit damage caused by surge energy with a flame proof coating - High-surge applications: fuel ignition systems, power charging/discharging circuits, electrocardiograph cables, etc. - Maximum permissible surge voltage: 10KV ~ 35KV - Typical 10μs maximum pulse load: 1400W ~ 25000W - Conforms to ANSI/AAMI norm EC53: 1995/(R)2008 5.5.3	1/4W ~ 5W	10R ~ 330K	± 5%

* All products are RoHS/REACH compliant unless otherwise specified.

Introduced C3 – Composite Film - Type Ceramic Composition Resistor 2012

Resistor	Key Features	Power Rating	Ohm Range	Tolerance
	SWA Anti-Surge Wirewound Resistor - Flameproof multi-layer coating equivalent to UL 94 V-0 - Flameproof feature equivalent to overload test UL 1412 - SWA series can be adopted for high surge applications such as high rush current protection for power capacitor, motor start-up protection, car & motorcycle engine ignition, etc. to absorb harmful surge energy and prevent hazard of circuit damage caused by surge impact. - Enhanced weld spot is reliable against surge impact - Special tin-plated electrolytic copper lead wire - Maximum permissible surge voltage: 12KV	1W ~3W	0R1 ~ 1K2	± 5%
	SWAT Anti-Surge Wire Wound Fast-Fuse Resistors - Worldwide patent pending - Enhanced welded spot is reliable against surge - Fast-acting fuse device for high-power applications - Advanced combined anti- surge & fast-fuse structure - Flameproof multi-layer coating equivalent to UL 94 V-0 - Flameproof feature equivalent to overload test UL 1412	1W ~ 3W	1R ~470R	± 5%
	SWM Anti-Surge Wirewound MELF Resistor - SMD enabled structure - Flameproof multi-layer coating equivalent to UL 94 V-0 - Flameproof feature equivalent to overload test UL 1412 - SWM series can be adopted for high surge applications such as high rush current protection for power capacitor, motor start-up protection, car & motorcycle engine ignition, etc. to absorb harmful surge energy and prevent hazard of circuit damage caused by surge impact. - Enhanced weld spot is reliable against surge impact - Maximum permissible surge voltage: 11KV	1W ~4W	0R1 ~ 1K2	± 5%

* All products are RoHS/REACH compliant unless otherwise specified.

Anti-Surge Wirewound Resistor 2014

Resistor	Key Features	Power Rating	Ohm Range	Tolerance
	SWMT Anti-Surge Wire Wound Fast-Fuse MELF Resistors - Worldwide patent pending - Enhanced welded spot is reliable against surge - Fast-acting fuse device for high-power applications - Advanced combined anti- surge & fast-fuse structure - Flameproof multi-layer coating equivalent to UL 94 V-0 - Flameproof feature equivalent to overload test UL 1412 - SMD enabled structure	1W ~ 4W	1R ~470R	± 5%
	WA Wirewound Resistors - Flameproof multi-layer coating mequivalent to UL 94 V-0 - Flameproof feature equivalent to overload test UL 1412 - Color code per MIL & EIA standards - Special tin-plated electrolytic copper lead wire	1/2W ~ 8W	0R1 ~ 3K3	± 2% ± 5%
	ZMM Zero Ohm Metal Film MELF Resistor - SMD enable structure - Excellent solderability termination - Stable metal film construction	2A ~ 4A [Maximum Current]	< 20mR	N/A

* All products are RoHS/REACH compliant unless otherwise specified.

Developed 0102 MELF Resistor 2015

Technology

Innovation

Global
Services

Quality



PRODUCT

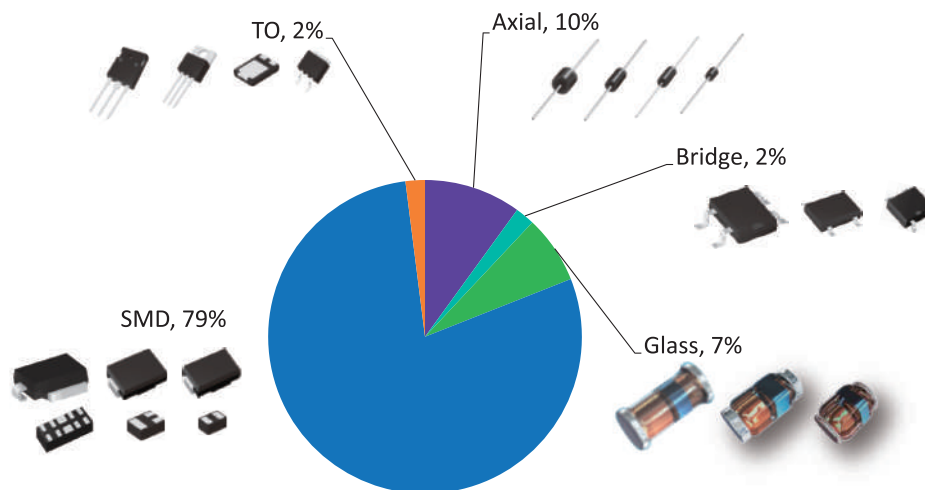


CATALOG

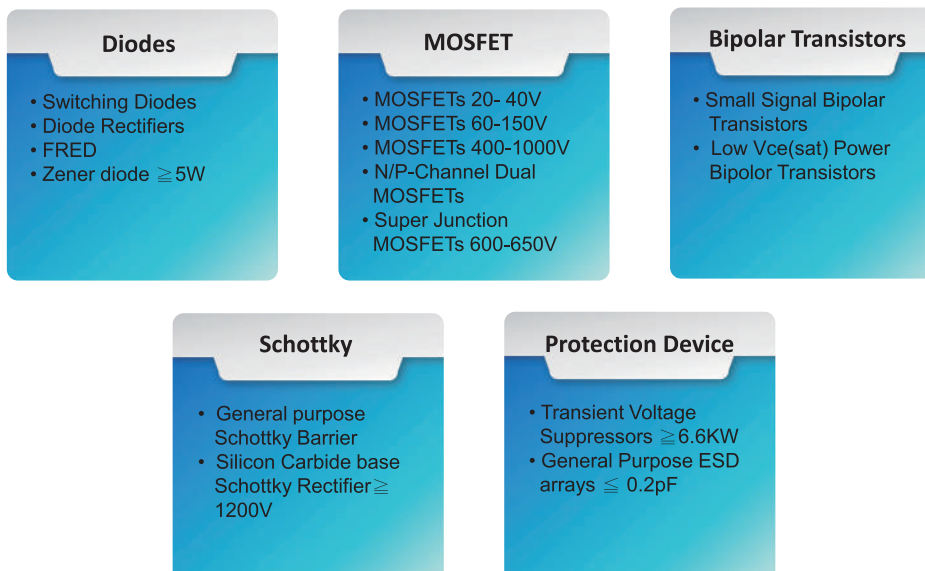
PAN JIT
SEMI
CONDUCTOR



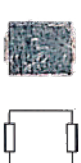
封裝產品線

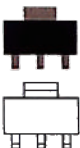
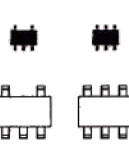
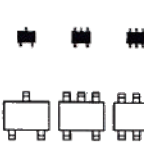
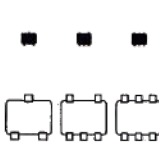


產品線



Surface Mount Type Package Outline

DO-218AC	SMEF	SMC	SMB	SMBF	SMA	SMAS	SMAF
15.5x 10.0x 4.9	9.0x 7.0x 1.9	7.9x5.9x 2.3	5.3x 3.6x 2.3	5.3x 3.6x 1.0	5.0x 2.7x 2.2	5.0x 2.5x 1.7	4.7x 2.5x 1.0
							

SOT-223	SOT-89	SOT-23 5L/6L	SC-59	SOT-23	SOT-323 / 353 / 363	SOT-523 / 553 / 563	SOT-723
6.5x 7.0x 1.6	4.5x 4.3x 1.5	2.9x 2.8x 1.5	2.9x 2.7x 1.0	2.9x 2.4x 1.0	2.0x 2.1x1.0	1.6x 1.6 x 0.6	1.2x 1.2x 0.5
							

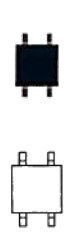
SOD-123	SOD-123FL	SOD-123HE	SOD-323	SOD-323HE	SOD-523	SOD-923
3.8x 1.6x 1.2	3.6x 1.8x 1.0	3.7x 1.8x 0.9	2.5x 1.3x 0.8	2.5x 1.3x 0.7	1.6x 0-.8x 0.6	1.0x 0.6x 0.4
						

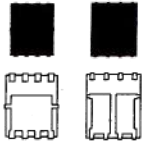
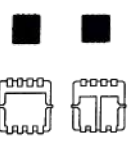
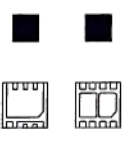
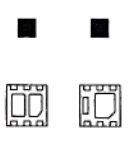
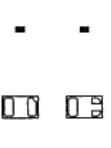
Unit:mm

www.panjit.com

Surface Mount Type Package Outline

TO-263	TO-252AA	TO-277B
10.1x 15.6x 4.6	6.5x 9.9x 2.3	4.3x 7.0x 1.1
		

SDIP	MDI	MBF	TDI
8.3x 9.9x 2.4	4.7x 7.0x 2.5	4.7x 7.0x 1.2	5.0x 6.5x 1.3
			

SOP-8	DFN5060-8L / DFN5060B-8L	DFN3333-8L / DFN3333B-8L	DFN3030-8L / DFN3030B-8L	DFN2020-6L / DFN2020B-6L	DFN1010-6L	DFN2L / 3L	DFN0603
4.9x 6.0x 1.7	5.0x 6.0x 1.0	3.3x 3.3 x 0.8	3.0x 3.0 x 0.8	2.0x 2.0 x 0.8	1.0x 1.0 x 0.5	1.0x 0.6x 0.5	0.6x 0.3x 0.3
							

DFN5515-14L / 18L	DFN4120-10L	DFN3810-9L	DFN2510-10L
5.5x 1.5x 0.5	4.1x 2.0x 0.5	3.8x 1.0x 0.5	2.5x 1.0x 0.5
			

Unit:mm

www.panjit.com



瑞澤電子股份有限公司
Horustech Electronics Co., Ltd

TEL : +886-3-426-6335 || FAX : +886-3-426-6303

地址：32041桃園市中壢區中央東路88號18樓

ADD. : Rm. 2, 19F., No.88, Zhongyang E. Rd., Zhongli Dist., Taoyuan City 32041, Taiwan

台灣
業務總部



onlinemarketing@horustech.com.tw