面向印刷基板设计工程师的解决方案：设计印刷基板要考虑的4个要求

欧姆龙提供精益求精的解决方案和服务，为您从产品设计到生产的各项业务提供支持。与制造业相关的环境正在发生显著变化。
贵公司的设计和生产部门必须应对各种管理难题，以适应快速变化的制造环境。
为了解决您的管理难题，我们的电子和机械部件在全球范围内提供精益求精的解决方案和支持服务。

01 节能电子部件

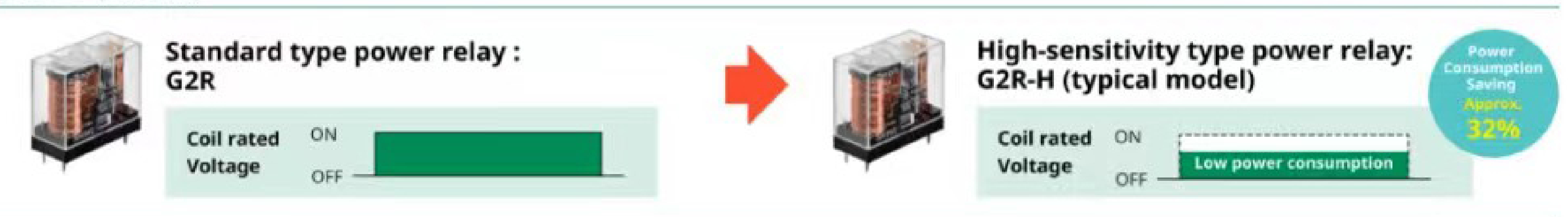
欧姆龙电子部件有助于节省能源和降低电路设计中的温升

我们有两种解决方案来让您的设备实现节能。一种是使用低功耗型继电器。
另一种是采用低功耗驱动设计并配备闭锁型和线圈电压保持型继电器。

01-1 低功耗设备

高灵敏度型（低功耗）

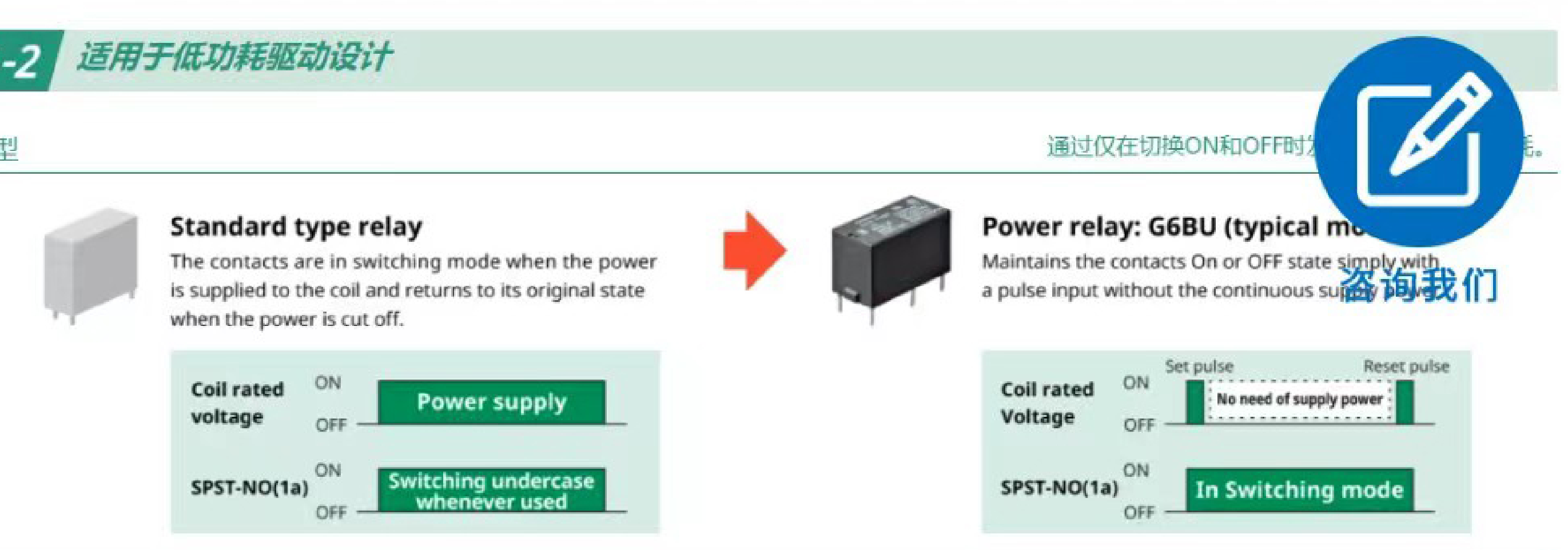
通过少量的施加电压在ON和OFF之间切换


Standard type power relay : G2R
Coil rated Voltage
ON
OFF
High-sensitivity type power relay: G2R-H (typical model)
Coil rated Voltage
ON
OFF
Low power consumption
Power Consumption Saving Approx. 32%

<其他高灵敏度型号>
微型继电器：G6A-2（高灵敏度型150 mW）
微型继电器：G5V-2（高灵敏度型150 mW；DC12V额定电压）

01-2 适用于低功耗驱动设计

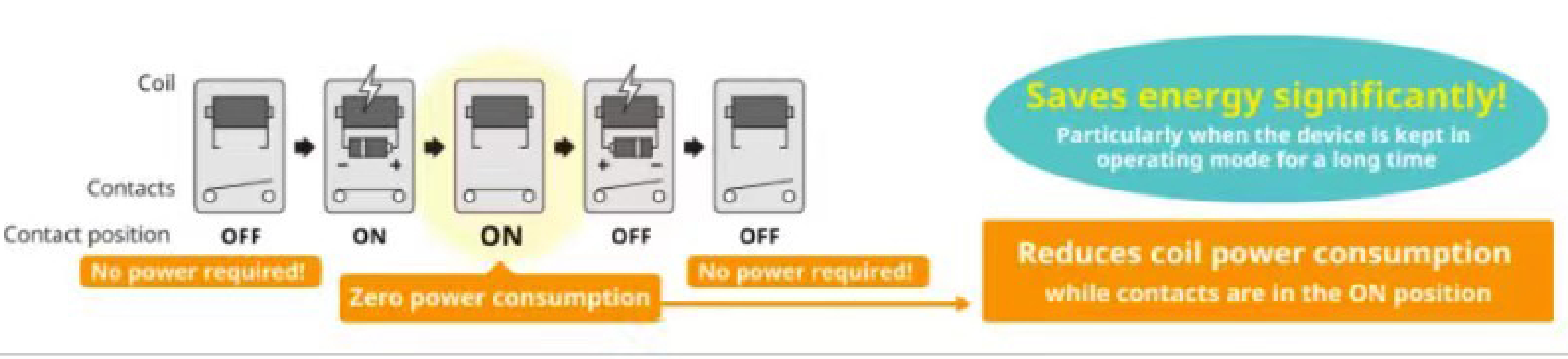
闭锁型


Standard type relay
The contacts are in switching mode when the power is supplied to the coil and returns to its original state when the power is cut off.
Coil rated voltage
ON
OFF
Power supply
SPST-NO(1a)
Switching undercase whenever used
Power relay: G6BU (typical mo
Maintains the contacts On or OFF state simply with a pulse input without the continuous su
Coil rated Voltage
Set pulse
Reset pulse
No need of supply power
SPST-NO(1a)
In Switching mode

<其他闭锁型号>
功率继电器：G5RL-U/-K, G6BU/K, G6C
表面安装继电器：G6K, G6SU/K

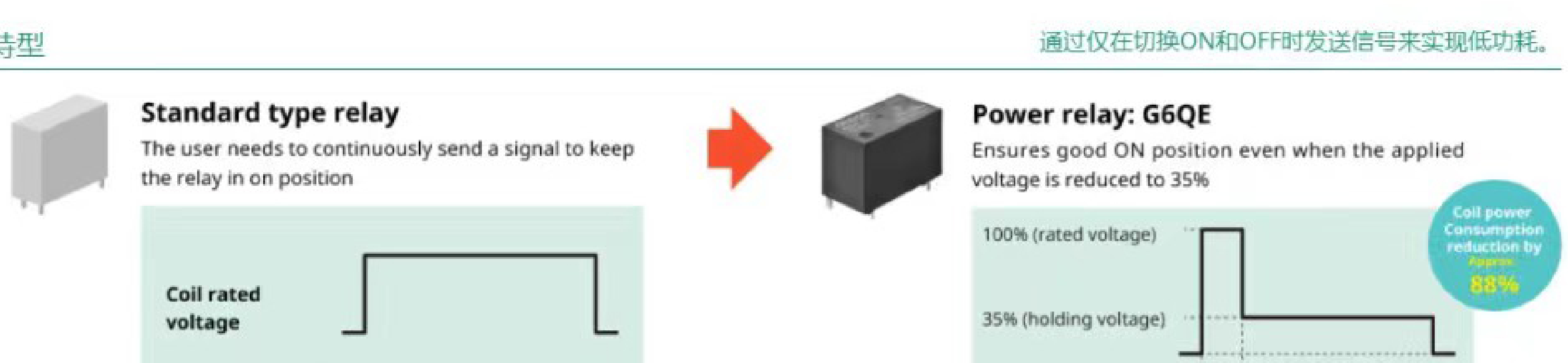
什么是闭锁功能?

当电压施加到线圈上时，触点打开和关闭。即使切断电压后，闭锁功能也能维持触点位置。当设备处于工作模式时，这会节省线圈功耗，最终有助于节能。


Coil
Contacts
Contact position
OFF
ON
ON
OFF
OFF
No power required!
Zero power consumption
No power required!
Saves energy significantly!
Particularly when the device is kept in operating mode for a long time
Reduces coil power consumption while contacts are in the ON position

电压保持型

通过仅在切换ON和OFF时发送信号来实现低功耗。

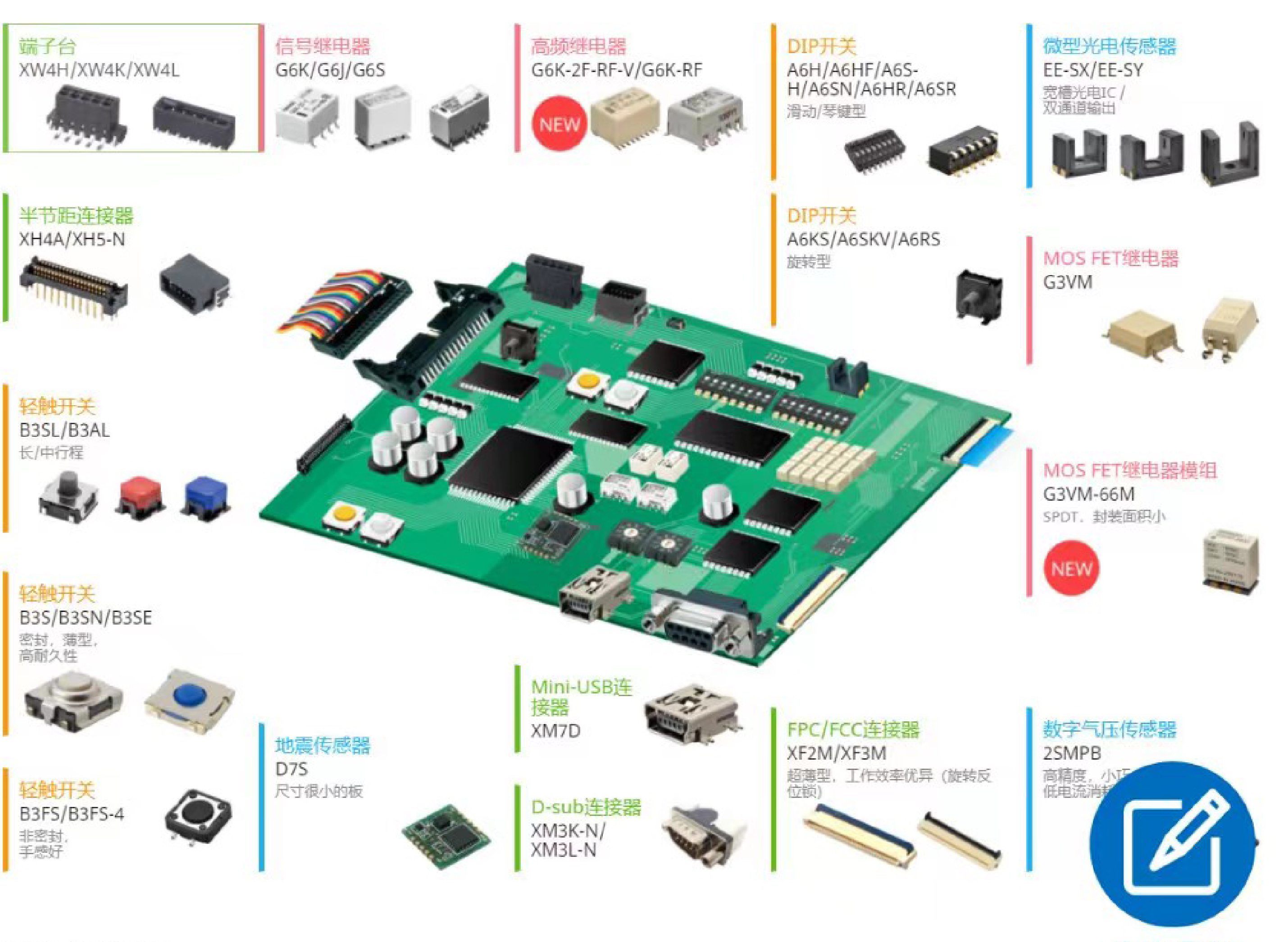

Standard type relay
The user needs to continuously send a signal to keep the relay in on position
Coil rated voltage
SPST-NO(1a)
ON
OFF
In Switching mode
Power relay: G6QE
Ensures good ON position even when the applied voltage is reduced to 35%
100% (rated voltage)
35% (holding voltage)
100 ms or more
SPST-NO(1a)
In Switching mode
Coil power Consumption reduction by Approx. 88%
Omron eval

02 装配时间减少/自动化

有助于自动安装的部件产品的多样化阵容

欧姆龙的产品组合（传感器、连接器、开关和继电器）中有一系列适合自动印刷电路板用安装的表面安装部件。我们的部件有助于减小在印刷电路板用上的安装空间和减少装配工时。

02-1 PC板表面安装设备

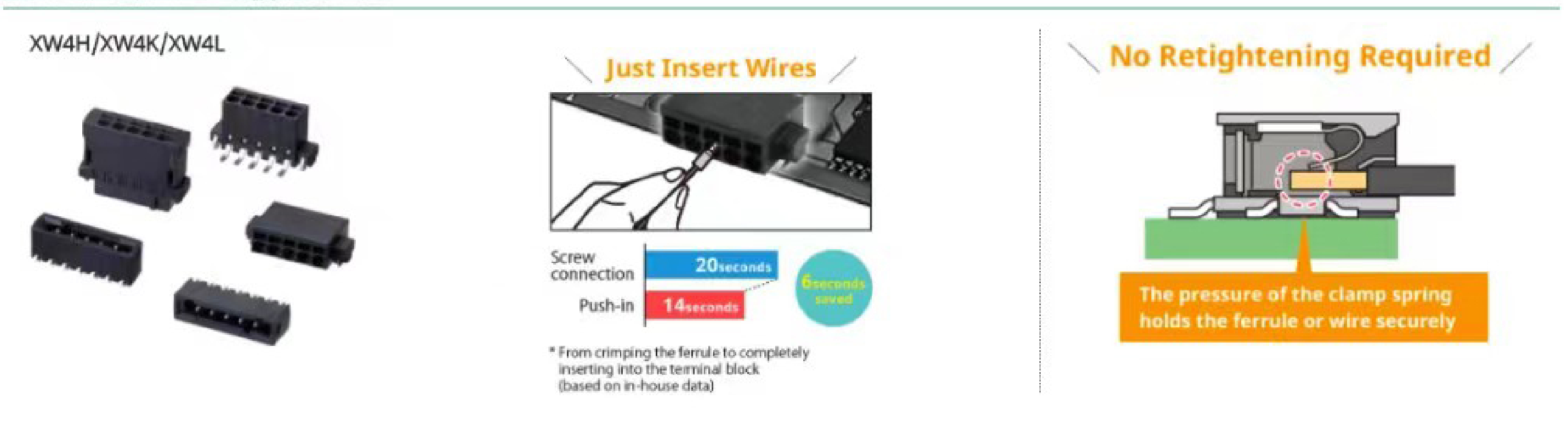

端子台
XW4H/XW4K/XW4L
信号继电器
G6K/G6J/G6S
高频继电器
G6K-2F-RF-V/G6K-RF
NEW
DIP开关
A6H/A6HF/A6S-H/A6SN/A6HR/A6SR
滑动/琴键型
微型光电传感器
EE-SX/EE-SY
宽槽光电IC / 双通道输出
半节距连接器
XH4A/XH5-N
DIP开关
A6KS/A6SKV/A6RS
旋转型
MOS FET继电器
G3VM
轻触开关
B3SL/B3AL
长/中行程
MOS FET继电器模组
G3VM-66M
SPDT、封装面积小
NEW
轻触开关
B3S/B3SN/B3SE
密封、薄型、高耐久性
Mini-USB连接器
XM7D
地震传感器
D7S
尺寸很小的板
FPC/FCC连接器
XF2M/XF3M
超薄型、工作效率优异（旋转反位锁）
数字气压传感器
2SMPB
高精度、小巧、低电流消耗
轻触开关
B3FS/B3FS-4
非密封、手感好
D-sub连接器
XM3K-N/XM3L-N

欧姆龙表面安装部件

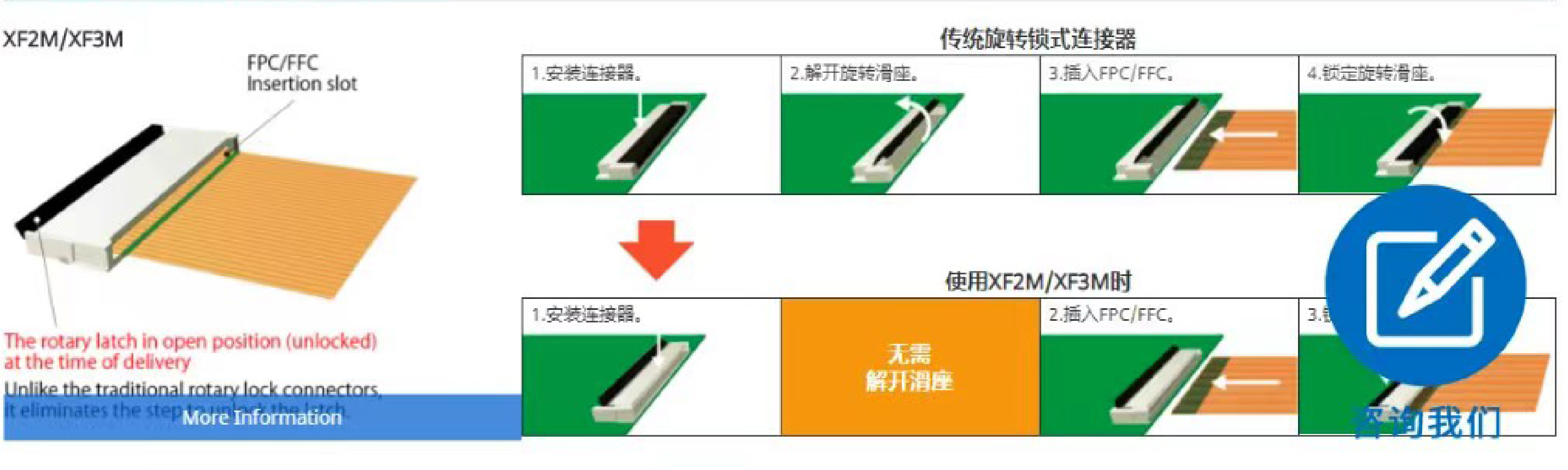
继电器	信号继电器	G6K/G6J/G6S
	高频继电器	G6K-2F-RF-V/G6K-RF
	MOS FET继电器	G3VM
	MOS FET继电器模组	G3VM-66M
开关	轻触开关	B3SL/B3AL B3S/B3SN/B3SE B3FS/B3FS-4
	DIP开关（滑动/琴键型）	A6H/A6HF/A6S-H/A6SN/A6HR/A6SR
	DIP开关（旋转型）	A6KS/A6SKV/A6RS
连接器	FPC/FCC连接器	XF2M/XF3M
	半节距连接器	XH4A/XH5-N
	D-sub连接器	XM3K-N/XM3L-N
	Mini-USB连接器	XM7D
	端子台	XW4H/XW4K/XW4L
传感器	微型光电传感器	EE-SX/EE-SY
	地震传感器	D7S
	数字气压传感器	2SMPB

02-2 易于安装的PC板部件

推入式连接印刷电路板用端子台


XW4H/XW4K/XW4L
Just Insert Wires
Screw connection
20seconds
Push-in
14seconds
6seconds saved
* From crimping the ferrule to completely inserting into the terminal block (based on in-house data)
No Retightening Required
The pressure of the clamp spring holds the ferrule or wire securely

旋转反位锁式FPC/FFC连接器


XF2M/XF3M
FPC/FFC Insertion slot
The rotary latch in open position (unlocked) at the time of delivery
Unlike the traditional rotary lock connectors, it eliminates the step to unlock the latch.
传统旋转锁式连接器
1.安装连接器。
2.解开旋转滑座。
3.插入FPC/FFC。
4.锁定旋转滑座。
使用XF2M/XF3M时
1.安装连接器。
无需解开滑座
2.插入FPC/FFC。
3.

More Information

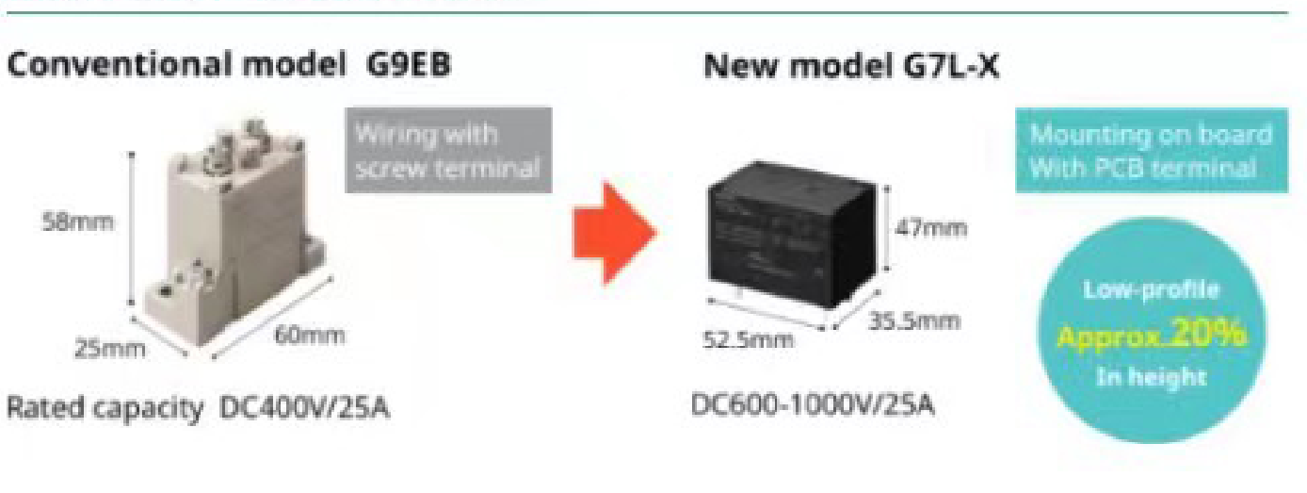
03 尺寸小型化/便携性

欧姆龙电子部件有助于实现产品小型化

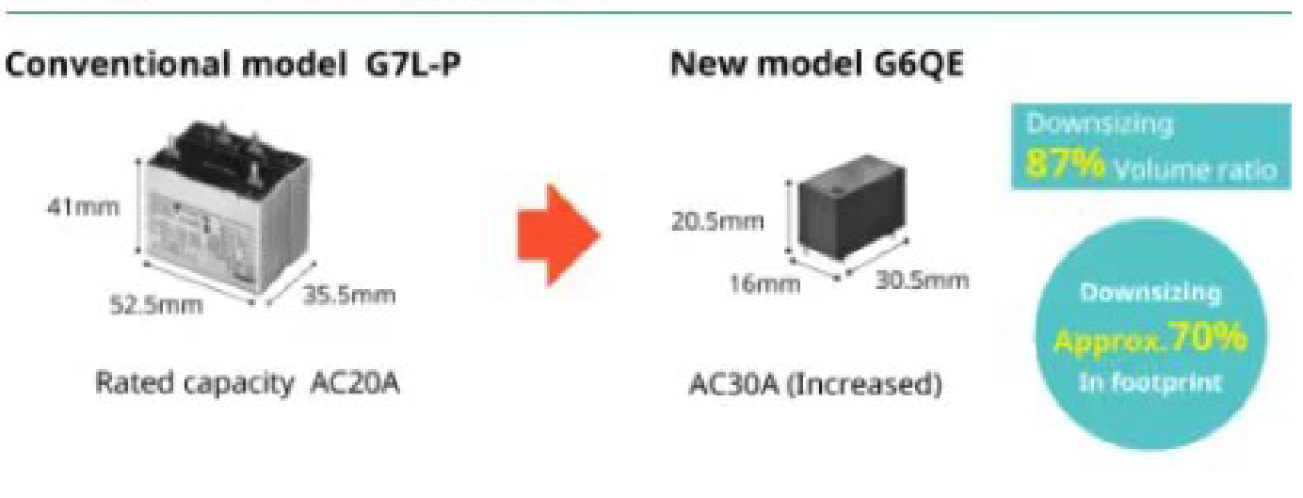
我们小巧纤薄的低背型部件有助于使您的产品实现尺寸小型化，并且不会牺牲高性能。
表面安装部件能够使产品进一步小型化。

03-1 小巧/纤薄/低背型部件

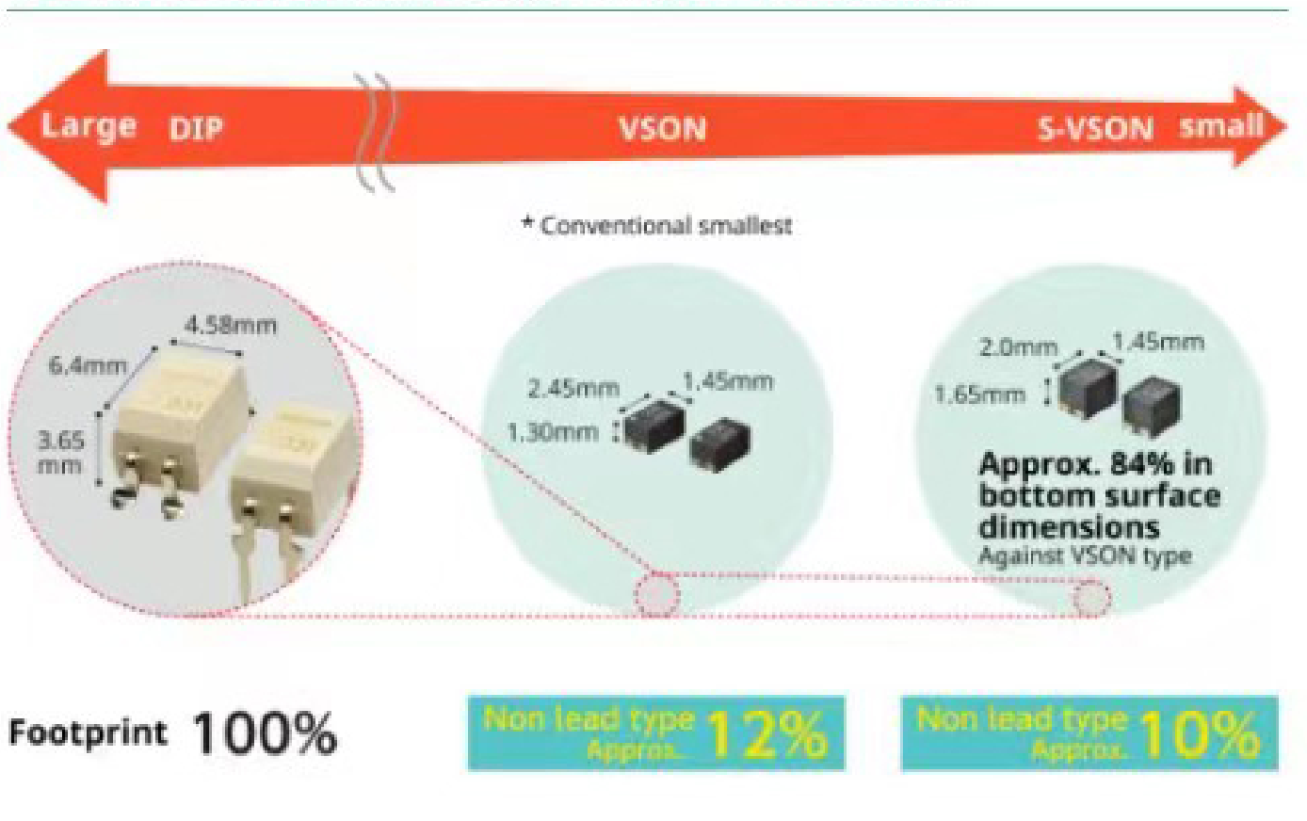
紧凑型功率继电器 G7L-X


Conventional model G9EB
Wiring with screw terminal
58mm
25mm
60mm
Rated capacity DC400V/25A
New model G7L-X
Mounting on board With PCB terminal
47mm
52.5mm
35.5mm
DC600-1000V/25A
Low-profile Approx.20% In height

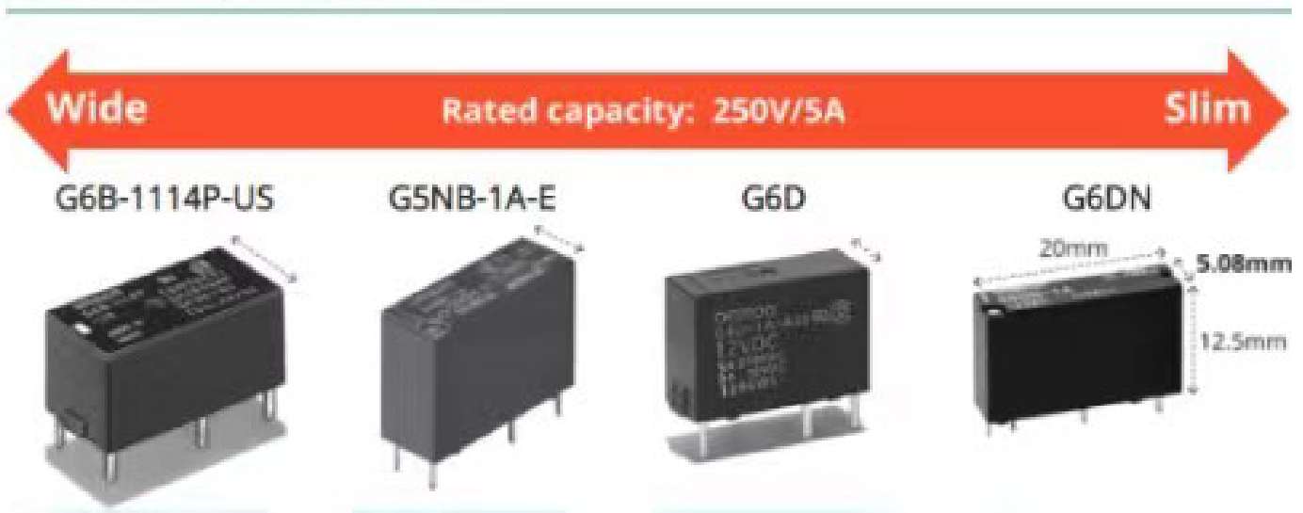
小型低背型功率继电器G6QE


Conventional model G7L-P
41mm
52.5mm
35.5mm
Rated capacity AC20A
New model G6QE
20.5mm
16mm
30.5mm
AC30A (Increased)
Downsizing 87% Volume ratio
Downsizing Approx.70% In footprint

小型MOS FET继电器G3VM-31QR S-VSON封装


Large DIP
VSON
S-VSON small
* Conventional smallest
4.58mm
6.4mm
3.65 mm
2.45mm
1.45mm
1.30mm
2.0mm
1.45mm
1.65mm
Approx. 84% in bottom surface dimensions Against VSON type
Footprint 100%
Non lead type Approx. 12%
Non lead type Approx. 10%

薄型功率继电器 G6DN


Wide
Rated capacity: 250V/5A
Slim
G6B-1114P-US
G5NB-1A-E
G6D
G6DN
20mm
5.08mm
12.5mm
10.0 mm max.
7.2 mm max.
6.5 mm max.
5.08 mm max.

超薄型密封轻触开关B3SE / B3U

Downsizing comparison (Omron products)
B3FS-4
4.3 mm
B3SL
3.4 mm
B3SE
2.0 mm
B3U
1.2 X 3 X 2.5 mm

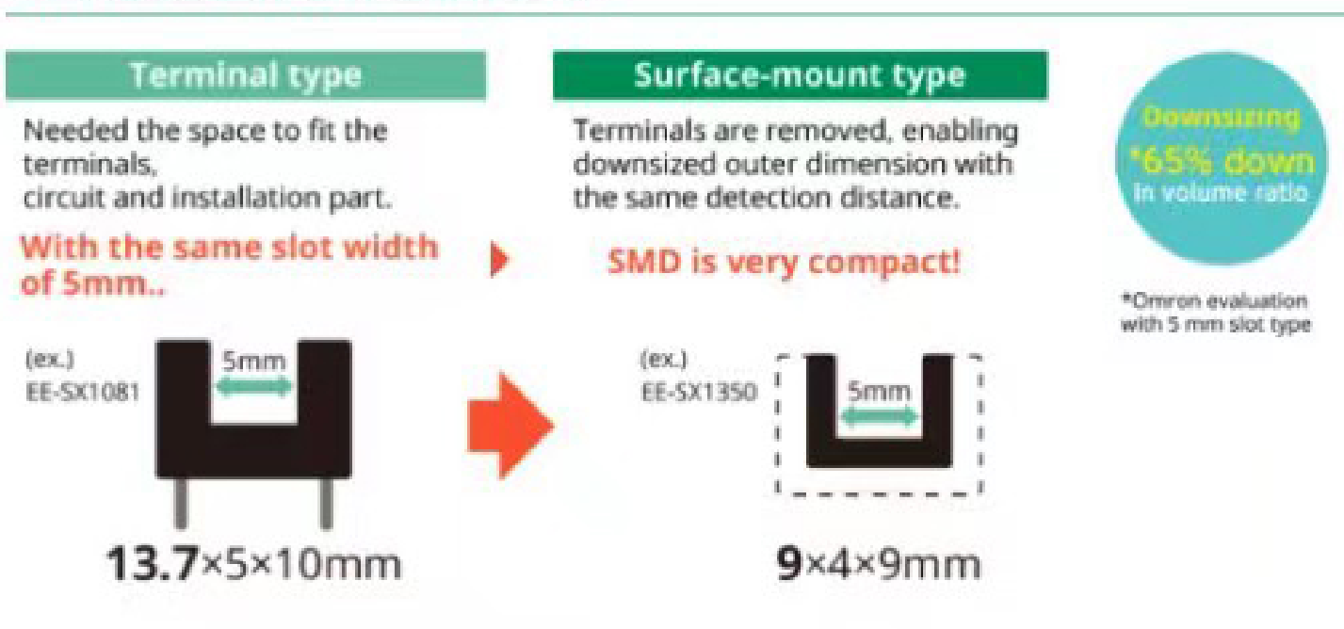
超小型检测开关D3SK / D3SH

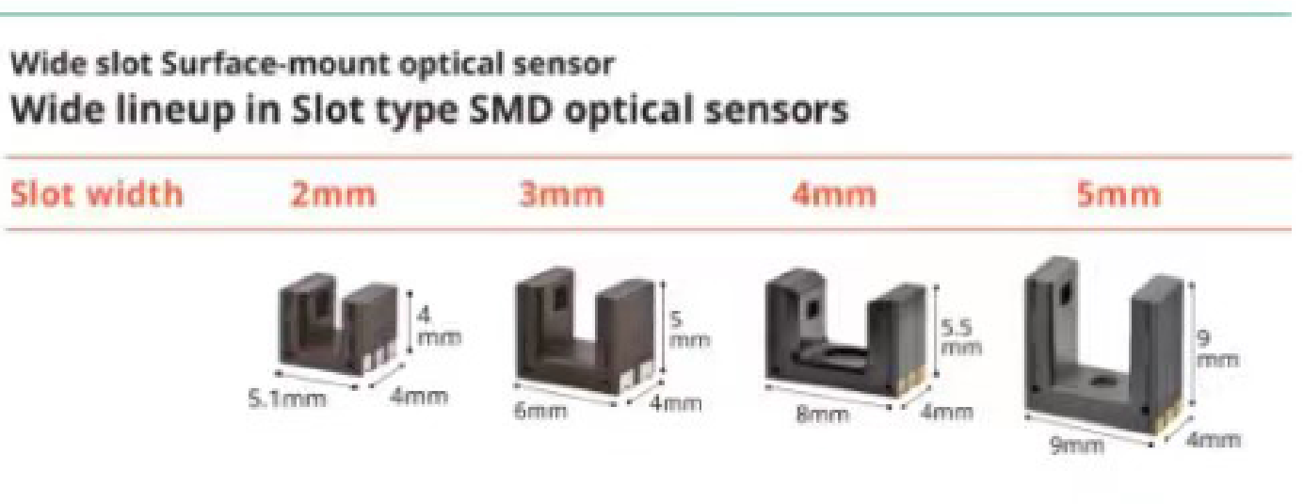
独特的机制可实现高接触可靠性和高精度操作。

D3SK
W3×D3.5×H0.9
D3SH
W3×D3.4×H0.9

03-2 封装面积小的表面安装型部件

SMD型微型光电传感器EE-SX


Terminal type
Needed the space to fit the terminals, circuit and installation part.
With the same slot width of 5mm..
(ex.) EE-SX1081
5mm
13.7×5×10mm
Surface-mount type
Terminals are removed, enabling downsized outer dimension with the same detection distance.
SMD is very compact!
(ex.) EE-SX1350
5mm
9×4×9mm
Downsizing *65% down in volume ratio
*Omron evaluation with 5 mm slot type

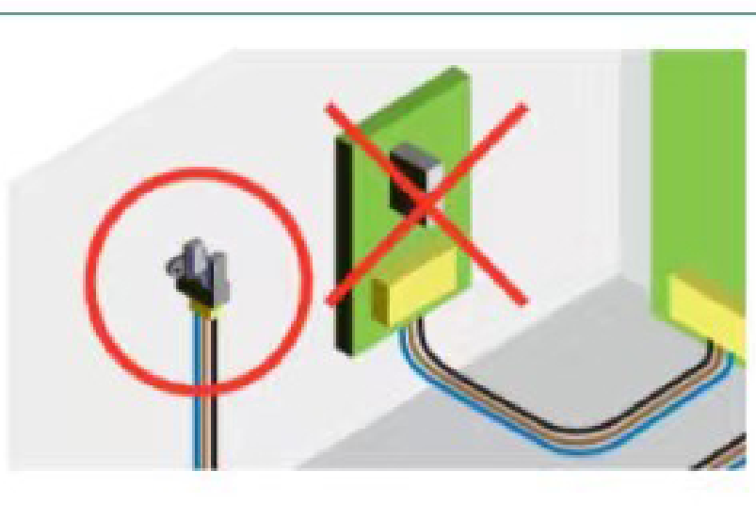

Wide slot Surface-mount optical sensor
Wide lineup in Slot type SMD optical sensors
Slot width
2mm
3mm
4mm
5mm
4 mm
5.1mm
4mm
5 mm
6mm
4mm
5.5 mm
8mm
4mm
9 mm
9mm
4mm

03-3 组合部件/模组

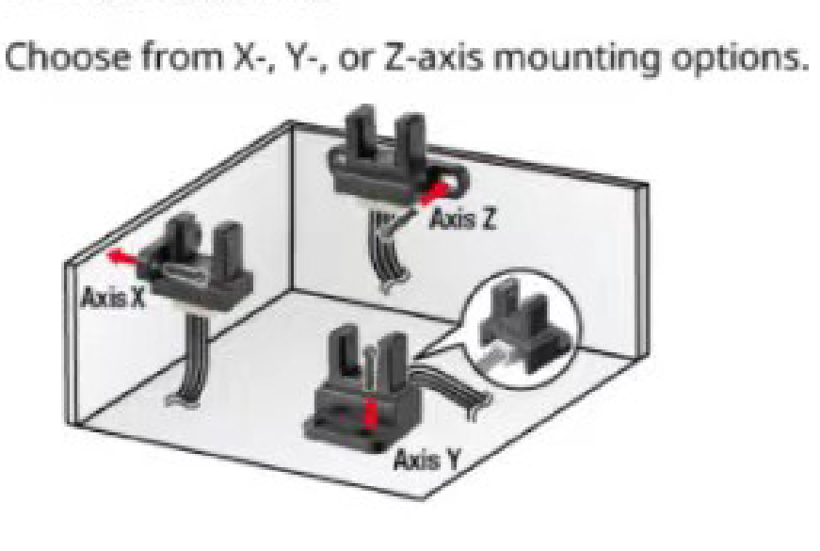
接插件型微型光电传感器

多功能一体化（传感器+PC板+连接器）

EE-SX(-P)

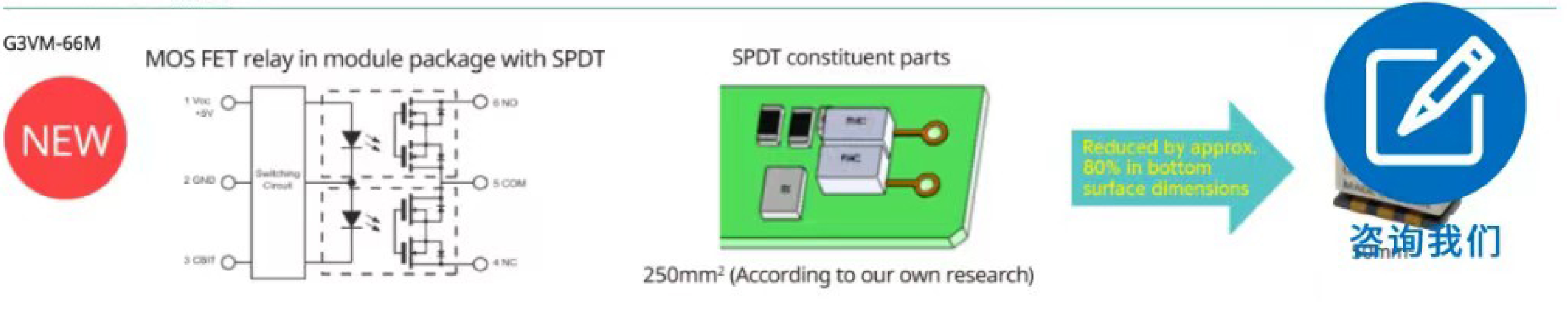


更大的设备设计灵活性！
Choose from X-, Y-, or Z-axis mounting options.


Axis Z
Axis X
Axis Y

MOS FET继电器模组

封装面积小的SPDT继电器模组


G3VM-66M
NEW
MOS FET relay in module package with SPDT
1 Vcc +5V
2 GND
3 CBIT
Switching Circuit
6 NO
5 COM
4 NC
SPDT constituent parts
250mm² (According to our own research)
Reduced by approx. 80% in bottom surface dimensions

04 高功能性/高性能

欧姆龙电子部件可使安全电路设计具有充足的余量

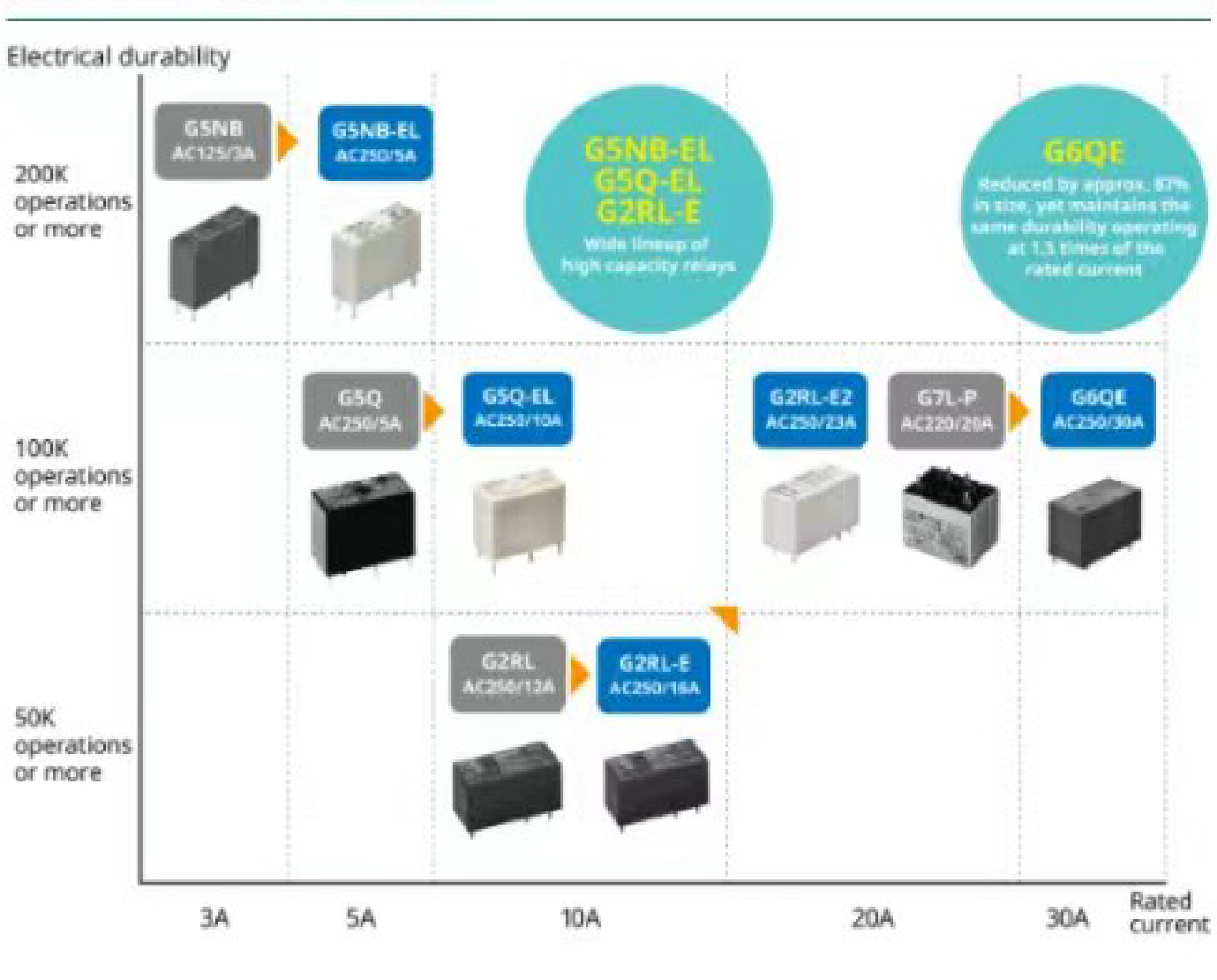
我们拥有各种大容量长寿命耐热部件，能够满足各种产品的要求，并且使用寿命更长。

04-1 大容量长寿命开关

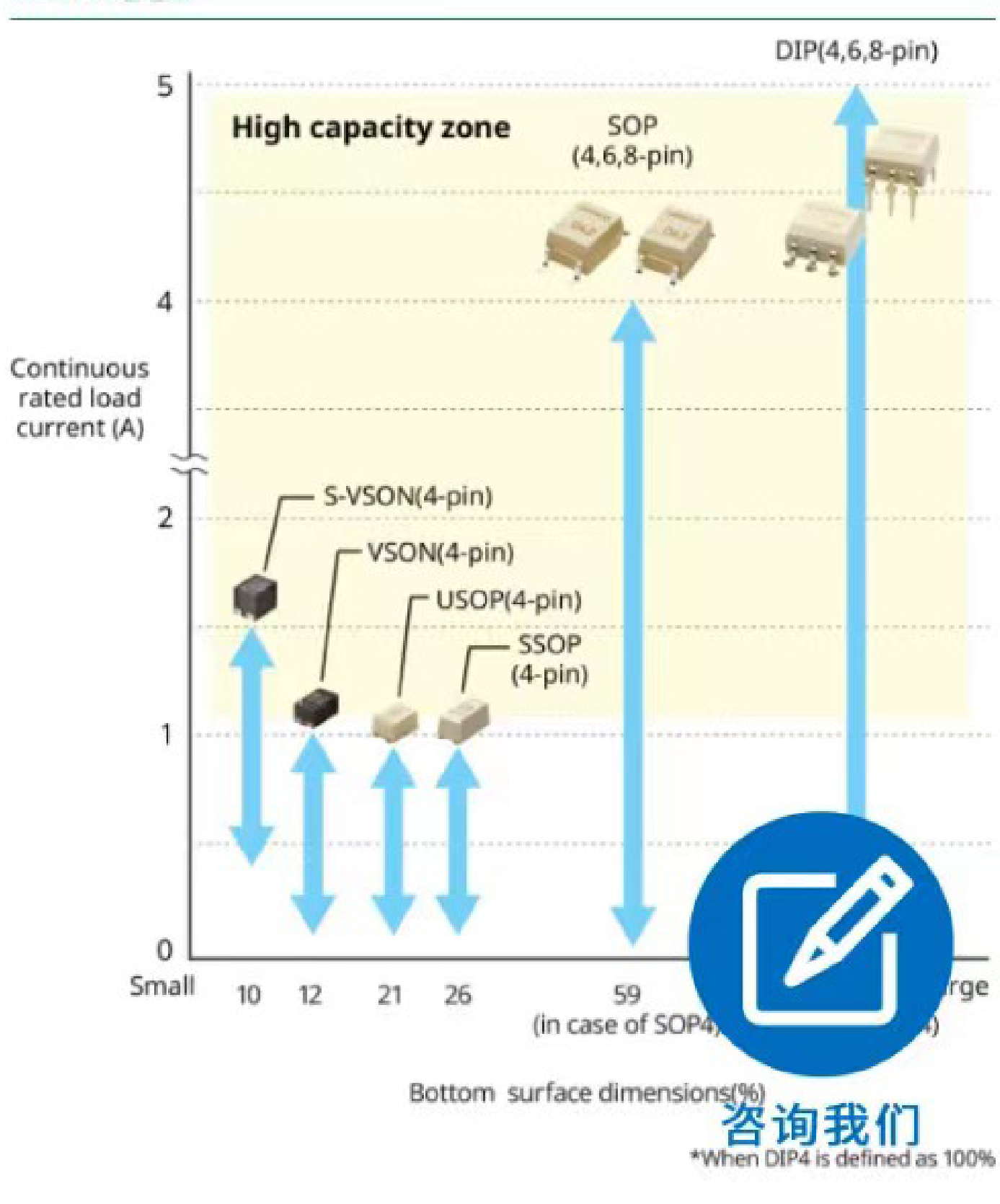
大容量继电器

大容量继电器的新增产品阵容通过材料精密加工和各种加工方法实现

AC功率继电器（与SPST-NO型对比）



MOS FET继电器



DC功率继电器

G7L-2A-X

DC600V/25A
电气寿命：6,000次或以上
DC1,000V/25A
电气寿命：100次或以上

High capacity switching DC1000V

DC负载型号用基本开关

通过钢触点实现。

V-21-1C6 (IN)

DC开关用基本开关

额定值	电气寿命
12A 30VDC 0.6A 125VDC 0.3A 250VDC	100,000次或以上

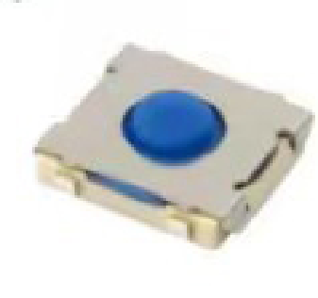
More Information

04-2 高耐久性/长寿命

长寿命开关

通过采用不锈钢弹簧实现

超薄型密封表面安装轻触开关
B3SE



Durability 1 million operations

表面安装轻触开关
B3FS-4

Durability 3 million operations

*OF: for 1.47N type

微型光电传感器

非接触式传感器可形成更长寿命的设计

SMD型微型光电传感器

EE-SX

*Photo-IC output types are available for high-speed applications.

接插件型微型光电传感器

EE-SX(-P)

*The lineup of X, Y, Z-axis mounting helps your designing flexibility.

04-3 耐热继电器和开关

低信号继电器

G5V-1-T90

标准型	耐高温型
70°C 以下。	90°C 以下。

印刷电路板用功率继电器

G2RL-1A-E2-CV-HA

标准型	耐高温型
85°C 以下。	105°C 以下。

MOS FET继电器

G3VM

标准型	耐高温型
85°C 以下。	105°C 以下。

微动开关

V-10□-T
V-15□-T

标准型	耐高温型
105°C 以下。	150°C 以下。

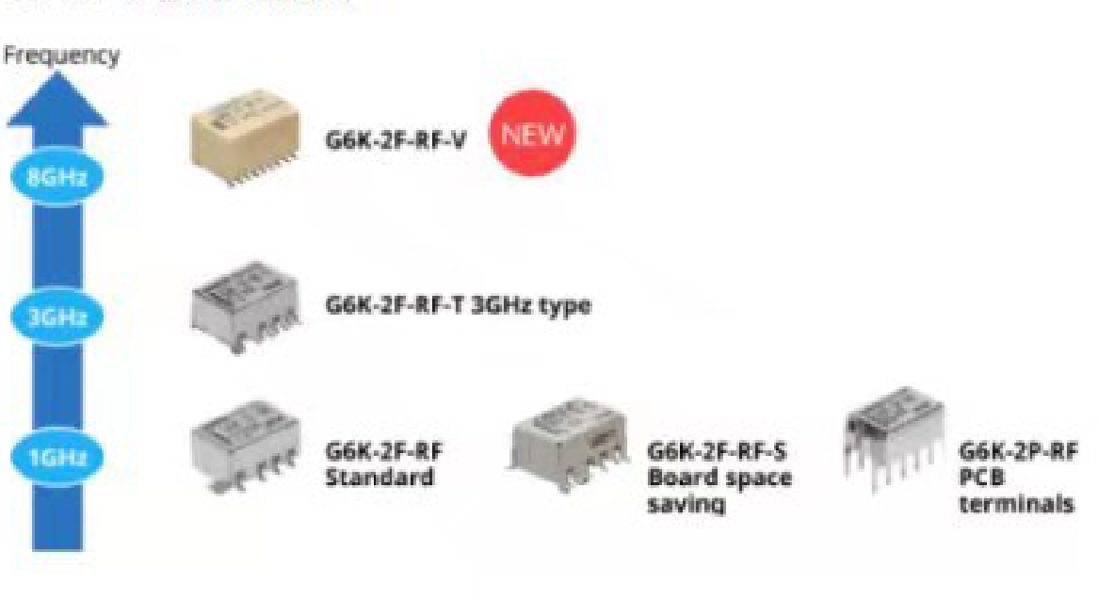
04-4 高频/低漏电流

8-GHz带宽的微型DPDT继电器

高频特性（插入损耗为3 dB以下）

G6K-RF

G6K-2F-RF系列产品阵容

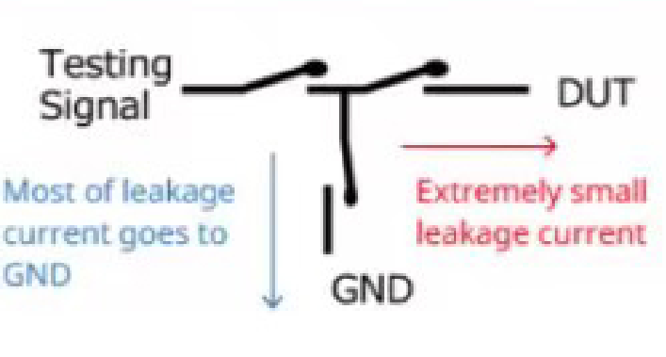

Frequency
8GHz
3GHz
1GHz
G6K-2F-RF-V
NEW
G6K-2F-RF-T 3GHz type
G6K-2F-RF Standard
G6K-2F-RF-S Board space saving
G6K-2P-RF PCB terminals

MOS FET继电器模组

独特的3-FET结构可形成极小的漏电流。

G3VM-MT

Coming soon


Testing Signal
DUT
Most of leakage current goes to GND
Extremely small leakage current
GND

-特性
1) 漏电流：1 p A或以下
2) 通过小模组封装实现尺寸小型化
(5X3.75X2.7mm)