

Series 70

Flexible. Tactile and reliable.

<https://eao.com/70>



70 Information about the Series

Key advantages

- Full-face illumination
- Excellent tactile feedback
- Almost limitless design possibilities
- Easy-to-clean, UV-resistant films
- PCB mount switches

Typical application areas

- Machinery
- Public transportation
- Heavy duty and special vehicles
- Marine
- Telecommunications
- Medical technology
- Energy supply
- Automation
- Building infrastructure
- Food and beverage industry

Functions

- Pushbutton
- Illuminated pushbutton
- Indicator

Design

- Flush

IP front protection

- IP40

Rating

- 42 VAC (100 mA)

Terminal

- PCB

Lens Material

- Plastic

Markings

- Printed insert film legends

Conformities

- CE
- 2011/65/EU (RoHS)



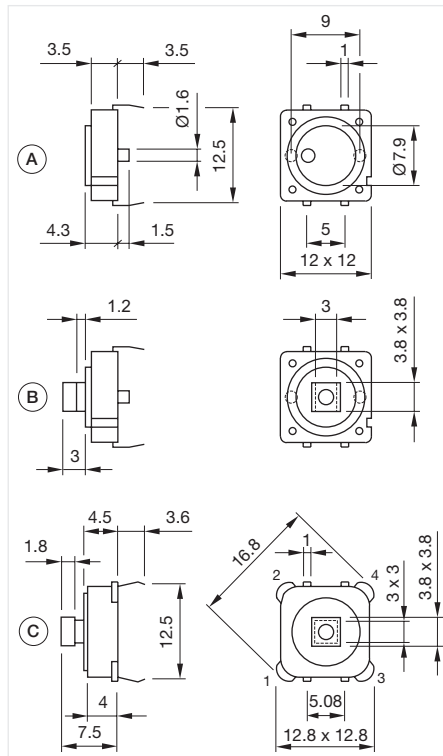
| | |
|--|------------|
| PCB | |
| Switching element without illumination | 802 |
| Switching element with illumination | 804 |
| Indicator element | 806 |
| Components | 808 |
| Accessories | 810 |
| Technical data | 811 |
| Application Guidelines | 813 |

- 01
- 02
- 03
- 04
- 09
- 14
- 17
- 18
- 19
- 22
- 31
- 41
- 45
- 51
- 56
- 57
- 61
- 70**
- 71
- 82
- 84
- 92
- 96

Switching element without illumination



Product can differ from the current configuration.



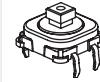
Dimensions [mm]
 A = For Part No. 70-100.0
 B = For Part No. 70-101.0
 C = For Part No. 70-201.0

Equipment consisting of (schematic overview)



Spacer cap

Page 810



Switching element

Each Part Number listed below includes all the black components shown in the 3D-drawing.

To obtain a complete unit, please select the red components from the pages shown.

General information

- Contact normally open
- Dimensions with fitted spacing cap see details Spacing cap



Switching element

| Product attributes | Contact material | Switching action | Terminal | Part No. | Wiring diagram | Component Layout |
|-------------------------------|------------------|------------------|--------------|----------|----------------|------------------|
| Operation without spacing cap | Silver | Momentary | PCB terminal | 70-100.0 | 331 | 80 |



Switching element

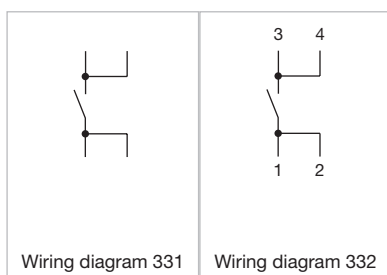
| Product attributes | Contact material | Switching action | Terminal | Part No. | Wiring diagram | Component Layout |
|----------------------------|------------------|------------------|--------------|----------|----------------|------------------|
| Operation with spacing cap | Silver | Momentary | PCB terminal | 70-101.0 | 331 | 80 |



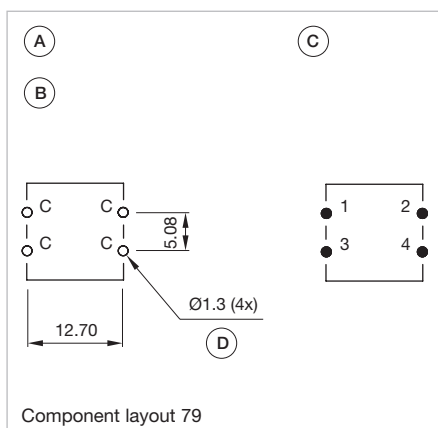
Switching element

| Product attributes | Contact material | Switching action | Terminal | Part No. | Wiring diagram | Component Layout |
|----------------------------|------------------|------------------|--------------|----------|----------------|------------------|
| Operation with spacing cap | Gold | Momentary | PCB terminal | 70-201.0 | 332 | 79 |

Wiring diagrams

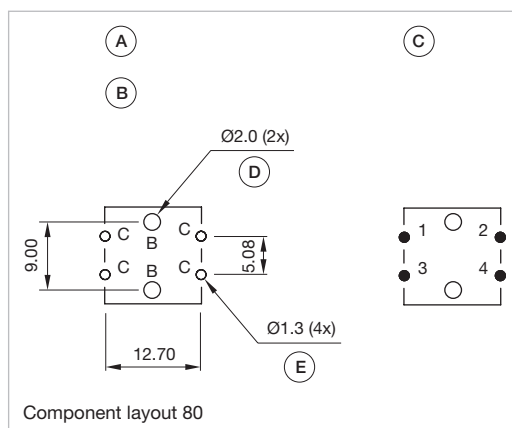


Component layouts



Dimensions [mm]

- A = Switching element without illumination
- B = Drilling plan (component side)
- C = Occupancy plan (component side)
- D = Hole for switching element



Dimensions [mm]

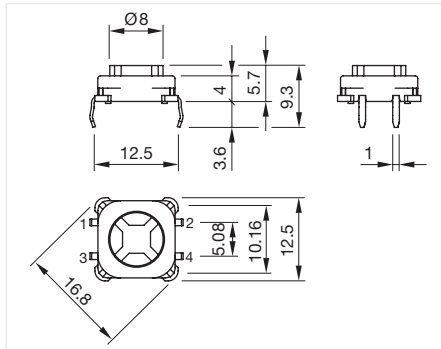
- A = Switching element without illumination with illumination
- B = Drilling plan (component side)
- C = Occupancy plan (component side)
- D = Hole for centering pins non-metallic
- E = Hole for switching element

- 01
- 02
- 03
- 04
- 09
- 14
- 17
- 18
- 19
- 22
- 31
- 41
- 45
- 51
- 56
- 57
- 61
- 70
- 71
- 82
- 84
- 92
- 96

Switching element with illumination



Product can differ from the current configuration.



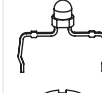
Dimensions [mm]

Equipment consisting of (schematic overview)

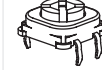


Lens

Page 808



Single-LED



Switching element

Each Part Number listed below includes all the black components shown in the 3D-drawing.

To obtain a complete unit, please select the red components from the pages shown.

General information

- The customer has to decide what series resistor shall be used to the LED
- Luminosity and wave length variations caused by LED manufacturing processes may cause slight differences regarding the illumination. The customer has to decide what resistor shall be used to the LED
- Dimensions with fitted spacing cap see details Spacing cap
- Contact normally open



Switching element

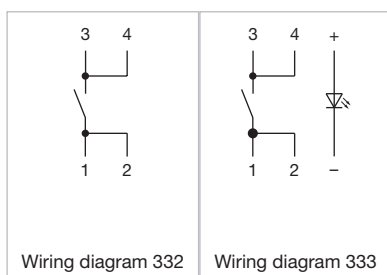
| Forward voltage | Contact material | Lumi. Intensity | Dom. Wavelength | Switching action | Terminal | Illumination colour | Part No. | Wiring diagram | Component Layout |
|-----------------|------------------|-----------------|----------------------|------------------|--------------|---------------------|-----------|----------------|------------------|
| 2.0 VDC @ 20 mA | Gold | 160 mcd | 625 nm | Momentary | PCB terminal | Red | 70-220.2S | 333 | 82 |
| 2.9 VDC @ 20 mA | Gold | 600 mcd | 580 nm | Momentary | PCB terminal | Yellow | 70-220.4S | 333 | 82 |
| 3.2 VDC @ 20 mA | Gold | 650 mcd | 525 nm | Momentary | PCB terminal | Green | 70-220.5S | 333 | 82 |
| 3.0 VDC @ 20 mA | Gold | 250 mcd | 467 nm | Momentary | PCB terminal | Blue | 70-220.6S | 333 | 82 |
| 3.2 VDC @ 20 mA | Gold | 500 mcd | x: 0.31 / y: 0.32 nm | Momentary | PCB terminal | White | 70-220.9S | 333 | 82 |



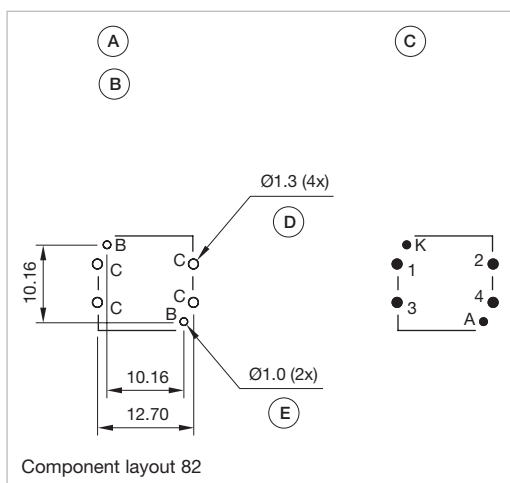
Switching element

| Contact material | Switching action | Terminal | Part No. | Wiring diagram | Component Layout |
|------------------|------------------|--------------|------------|----------------|------------------|
| Gold | Momentary | PCB terminal | 92-851.342 | 332 | 82 |

Wiring diagrams



Component layouts



Dimensions [mm]

A = Switching element with illumination

B = Single LED

C = Drilling plan (component side)

D = Hole for switching element, Pad max. Ø 2.5 mm

E = Hole for LED

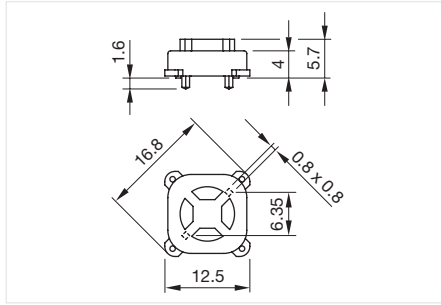
- 01
- 02
- 03
- 04
- 09
- 14
- 17
- 18
- 19
- 22
- 31
- 41
- 45
- 51
- 56
- 57
- 61
- 70
- 71
- 82
- 84
- 92
- 96

70 PCB

Indicator element



Product can differ from the current configuration.



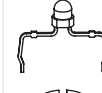
Dimensions [mm]

Equipment consisting of (schematic overview)



Lens

Page 808



Single-LED



Illumination element

Each Part Number listed below includes all the black components shown in the 3D-drawing.

To obtain a complete unit, please select the red components from the pages shown.

General information

- The customer has to decide what series resistor shall be used to the LED
- Contact normally open
- Luminosity and wave length variations caused by LED manufacturing processes may cause slight differences regarding the illumination. The customer has to decide what resistor shall be used to the LED



Indicator element

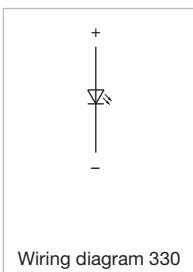
| Illumination colour | Forward voltage | Lumi. Intensity | Dom. Wavelength | Terminal | Part No. | Wiring diagram | Component Layout |
|---------------------|-----------------|-----------------|-----------------|--------------|-----------|----------------|------------------|
| Red | 2.0 VDC @ 20 mA | 160 mcd | 625 nm | PCB terminal | 70-820.2S | 330 | 81 |
| Green | 3.2 VDC @ 20 mA | 650 mcd | 525 nm | PCB terminal | 70-820.5S | 330 | 81 |



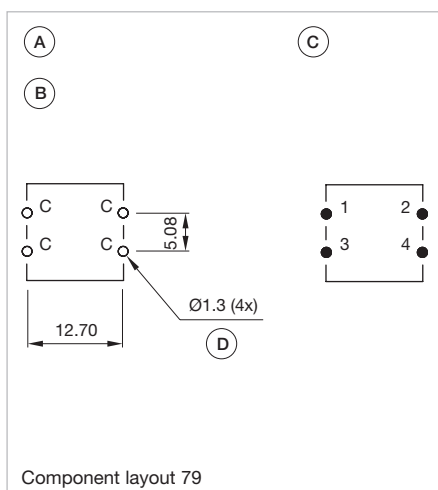
Indicator element

| Terminal | Part No. | Wiring diagram | Component Layout |
|--------------|------------|----------------|------------------|
| PCB terminal | 92-800.042 | 330 | 79 |

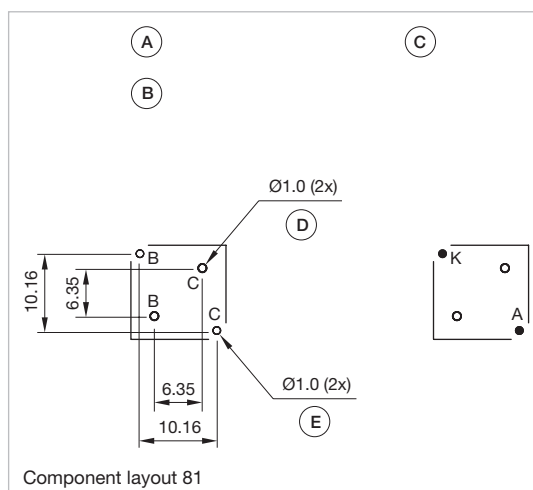
Wiring diagrams



Component layouts



Dimensions [mm]
 A = Switching element without illumination
 B = Drilling plan (component side)
 C = Occupancy plan (component side)
 D = Hole for switching element



Dimensions [mm]
 A = Illumination element
 B = Single LED
 C = Drilling plan (component side)
 D = Hole for centering pins non-metallic
 E = Hole for LED



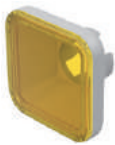
Flexible. Tactile and reliable. EAO Series 70.

Proven in customer-specific membrane applications – thanks to almost limitless design possibilities.

- Long-standing HMI System competence
- Homogeneous illumination
- Excellent tactile feedback
- Almost limitless design possibilities
- Easy-to-clean, UV-resistant films

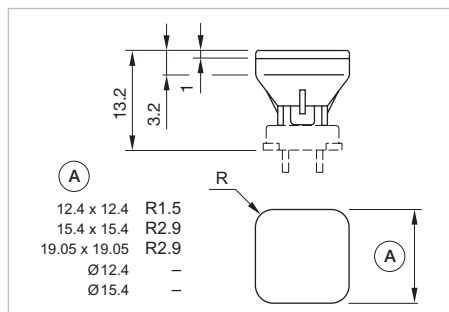
01
02
03
04
09
14
17
18
19
22
31
41
45
51
56
57
61
70
71
82
84
92
96

70 Components



Lens plastic square

| Lens material | Lens colour | Lens optics | Lens shape | Lens illumination | Dimensions | Part No. |
|---------------|-------------|-------------|------------|-------------------|---------------------|----------|
| Plastic | White | translucent | flush | illuminative | 19.05 mm x 19.05 mm | 70-920.9 |
| | Red | translucent | flush | illuminative | 15,4 mm x 15,4 mm | 70-921.2 |
| | Orange | translucent | flush | illuminative | 15,4 mm x 15,4 mm | 70-921.3 |
| | Yellow | translucent | flush | illuminative | 15,4 mm x 15,4 mm | 70-921.4 |
| | Green | translucent | flush | illuminative | 15,4 mm x 15,4 mm | 70-921.5 |
| | Blue | translucent | flush | illuminative | 15,4 mm x 15,4 mm | 70-921.6 |
| | White | translucent | flush | illuminative | 15,4 mm x 15,4 mm | 70-921.9 |
| | Red | translucent | flush | illuminative | 12,4 mm x 12,4 mm | 70-922.2 |
| | Orange | translucent | flush | illuminative | 12,4 mm x 12,4 mm | 70-922.3 |
| | Yellow | translucent | flush | illuminative | 12,4 mm x 12,4 mm | 70-922.4 |
| | Green | translucent | flush | illuminative | 12,4 mm x 12,4 mm | 70-922.5 |
| | Blue | translucent | flush | illuminative | 12,4 mm x 12,4 mm | 70-922.6 |
| | White | translucent | flush | illuminative | 12,4 mm x 12,4 mm | 70-922.9 |

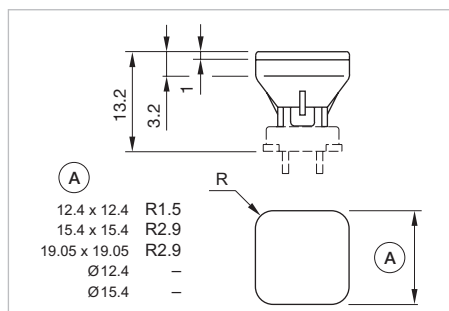


Dimensions [mm]
A = Front dimension



Lens round

| Lens material | Lens colour | Lens optics | Lens shape | Lens illumination | Dimensions | Part No. |
|---------------|-------------|-------------|------------|-------------------|------------|----------|
| Plastic | Red | translucent | flush | illuminative | Ø 15,4 mm | 70-911.2 |
| | Orange | translucent | flush | illuminative | Ø 15,4 mm | 70-911.3 |
| | Yellow | translucent | flush | illuminative | Ø 15,4 mm | 70-911.4 |
| | Green | translucent | flush | illuminative | Ø 15,4 mm | 70-911.5 |
| | White | translucent | flush | illuminative | Ø 15,4 mm | 70-911.9 |
| | Red | translucent | flush | illuminative | Ø 12,4 mm | 70-912.2 |
| | Orange | translucent | flush | illuminative | Ø 12,4 mm | 70-912.3 |
| | Yellow | translucent | flush | illuminative | Ø 12,4 mm | 70-912.4 |
| | Green | translucent | flush | illuminative | Ø 12,4 mm | 70-912.5 |
| | White | translucent | flush | illuminative | Ø 12,4 mm | 70-912.9 |



Dimensions [mm]
A = Front dimension



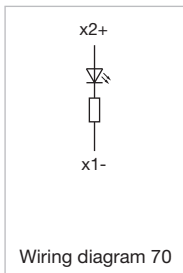
Single-LED, T1 3/4 MG

| Illumination colour | Lumi. Intensity | Dom. Wavelength | Forward voltage | Part No. | Wiring diagram |
|---------------------|-----------------|----------------------|-----------------|---------------|----------------|
| Red | 160 mcd | 625 nm | 2.0 VDC @ 20 mA | 10-2601.3172S | 70 |
| Amber | 165 mcd | 605 nm | 2.0 VDC @ 20 mA | 10-2601.3173S | 70 |
| Yellow | 600 mcd | 580 nm | 2.9 VDC @ 20 mA | 10-2603.3174S | 70 |
| Green | 650 mcd | 525 nm | 3.2 VDC @ 20 mA | 10-2603.3175S | 70 |
| Blue | 250 mcd | 467 nm | 3.0 VDC @ 20 mA | 10-2603.3176S | 70 |
| White | 500 mcd | x: 0.31 / y: 0.32 nm | 3.2 VDC @ 20 mA | 10-2603.3178S | 70 |

Additional information

- The customer has to decide what series resistor shall be used to the LED
- Luminosity and wave length variations caused by LED manufacturing processes may cause slight differences regarding the illumination. The customer has to decide what resistor shall be used to the LED

Wiring diagrams



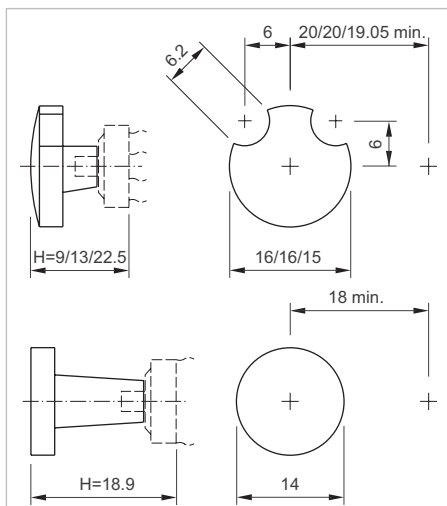
70 Accessories

Front side



Spacing cap

| Product attributes | Dimensions | Part No. |
|--------------------------|------------|----------|
| Without recesses for LED | 18.9 mm | 70-901.0 |
| 2 recesses for LED | 9 mm | 70-910.0 |
| | 13 mm | 70-911.0 |
| | 22.5 mm | 70-912.0 |



Dimensions [mm]

Switching element illuminated Part No. 92-851.342

Switching system

Short-travel switching system with two independent contact points and tactile operation. Guarantees reliable switching even of very light loads 1 normally open contact

Material

Material of contact
Gold-plated silver

Switching element
Plastic

Mechanical characteristics

Actuating force
With overlay foil 4 N \pm 1.5 N
Max. actuating force >50 N, as per DIN 42115

Actuating travel
Approx. 0.4 mm

Resistance to heat of soldering
250 °C, 3 s (PCB assembly)
320 °C, 3 s (when using a soldering iron)

Mechanical lifetime
 \geq 5 Mio. operations (switching element without overlay)
 \geq 1 Mio. operations (switching element under overlay)

Protection
IP40 (only switching element)
IP65 front side with overlay foil

Electrical characteristics

Electrical life
 \geq 500 000 cycles of operation at 42 VDC, 50 mA, as per IEC 60512-5-9c
When attention is paid to the direction of current flow from terminal 3/4 to 1/2 the electrical life can be prolonged.

Switching voltage and switching current
Switching voltage min. 50 mV AC/DC
max. 42 V AC/DC
Switching current min. 10 μ A AC/DC
max. 100 mA AC/DC
Power rating max. 2 W

Electric strength
500 VAC, 50 Hz, 1 minute, as per IEC 60512-2-4a

Ambient conditions

Storage temperature
-40 °C ... +85 °C

Operating temperature
-25 °C ... +70 °C

Approvals

Conformities
CE
2011/65/EC (RoHS)

Switching element non-illuminated Part No. 70-100.0 and 70-101.0

Switching system

Short-travel switching system with two independent contact points and tactile operation. Guarantees reliable switching even of very light loads 1 normally open contact

Material

Mechanical characteristics

Actuating force
With overlay foil 5 N \pm 2 N
Max. actuating force >50 N, as per DIN 42115

Actuating travel
0.3 mm

70 Technical data

Electrical characteristics

Electrical life

at 5 VDC, 1 mA 500 000 cycles of operation

Switching voltage and switching current

Max. 12 VDC, 50 mA

Min. 1 VDC, 10 mA

Electric strength

250 VAC for 1 minute

Ambient conditions

Storage temperature

-30 °C ... +85 °C

Operating temperature

-20 °C ... +70 °C

Approvals

Conformities

CE

2011/65/EC (RoHS)

Switching element non-illuminated Part No. 70-201.0

Switching system

Short-travel switching system with two independent contact points and tactile operation. Guarantees reliable switching even of very light loads 1 normally open contact

Material

Material of contact

Gold-plated silver

Switching element

Plastic

Mechanical characteristics

Actuating force

With overlay foil 2.1 N ± 0.2 N

Max. actuating force > 50 N, as per DIN 42115

Actuating travel

Approx. 0.5 mm

Resistance to heat of soldering

260 °C, 3 s, as per IEC 60068-2-20

Mechanical lifetime

≥ 5 Mio. cycles of operation (switching element without overlay)

≥ 1 Mio. cycles of operation (switching element under overlay)

Protection

IP40 (only switching element)

IP65 front side with overlay foil

Electrical characteristics

Electrical life

≥ 500 000 cycles of operation at 42 VDC, 50 mA, as per IEC 60512-5-9c

When attention is paid to the direction of current flow from terminal ¼ to ½ the electrical life can be prolonged.

Switching voltage and switching current

Switching voltage min. 50 mVAC/DC

max. 42 VAC/DC

Switching current min. 10 µA AC/DC

max. 100 mA AC/DC

Power rating max. 2 W

Electric strength

500 VAC, 50 Hz, 1 minute, as per IEC 60512-2-4a

Ambient conditions

Storage temperature

-40 °C ... +85 °C

Operating temperature

-25 °C ... +70 °C

Approvals

Conformities

CE

2011/65/EC (RoHS)

EAO reserves the right to alter specifications without further notice.

Suppressor circuits

When switching inductive loads such as relays, DC motors, and DC solenoids, it is always important to absorb surges (e.g. with a diode) to protect the contacts. When these inductive loads are switched off, a counter emf can severely damage switch contacts and greatly shorten lifetime.

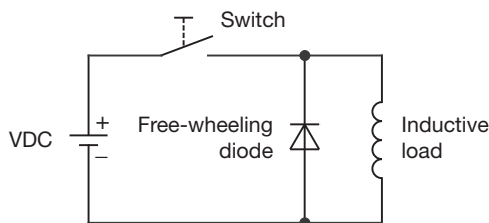
Fig. 1 shows an inductive load with a free-wheeling diode connected in parallel. This free-wheeling diode provides a path for the inductor current to flow when the current is interrupted by the switch. Without this free-wheeling diode, the voltage across the coil will be limited only by dielectric breakdown voltages of the circuit or parasitic elements of the coil. This voltage can be kilo-

volts in amplitude even when nominal circuit voltages are low (e.g. 12 VDC) see Fig. 2.

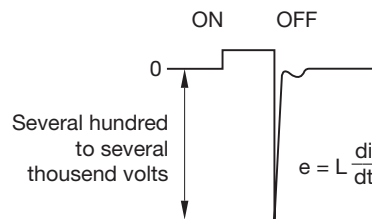
The free-wheeling diode should be chosen so that the reverse breakdown voltage is greater than the voltage driving the inductive load. The DC blocking voltage (V_R) of the free-wheeling diode can be found in the datasheet of a diode. The forward current should be equal or greater than the maximum current flowing through the load.

To get an efficient protection, the free-wheeling diode must be connected as close as possible to the inductive load!

Switching with inductive load
Fig. 1



Counter EMF
over load without free-wheeling diode
Fig. 2



Note for soldering

Process parameter for wave soldering

Basic specification for wave soldering J-STD 75 W4C.

Maximum temperature on the component side (Temp 2):
(Temperature must not exceed during the entire processing)

120 °C

Preheating phase (t1 ... t2):

70 ... 120 sec

Ramp up:

typ. +1 °C/sec

Ramp up to maximum temperature (t2 ... t3):

not defined

Maximum temperature on the soldering side (Temp 3):

250 °C

Maximum time of soldering process (t3 ... t4):

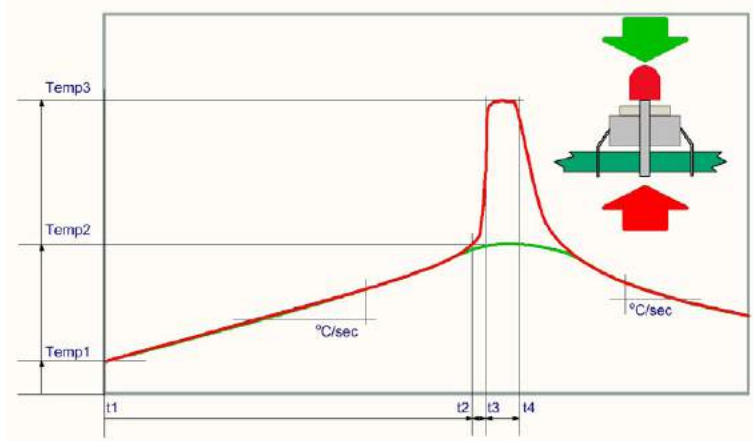
3 sec

Ramp down at 170 °C:

typ. -2 °C/sec

70 Application Guidelines

Temperature curve wave soldering



Green curve: Temperature on the component side of the pcb
 Red curve: Temperature on the soldering side of the pcb

Room temperature: Temp 1

Preheating: Temperature process = Temp 1 ... Temp 2
 Process time = t1 ... t2

Ramp up to soldering temperature: Process time = t2 ... t3

Soldering phase: Temperature process = Temp 3
 Process time = t3 ... t4

Iron soldering

Basic specification for iron soldering IEC 60068-2-20

Maximum temperature at tip of iron: 320 °C
 Maximum soldering time: 3 sec

Cleaning/Lacquering

The switching elements are not sealed. Cleaning up the PCB may damage the contacts in the switching elements. For this reason, the following points should be noted:

- When soldering make sure that the flux does not pass on the upper side of the PCB.
- When cleaning the PCB with detergents ensure that no dust or other debris may get inside of the switching elements.
- Ensure that no lacquer penetrates into the interior of the switching element when lacquering the PCB.

Storage of components

To obtain the optimum solderability of the components, the following points should be noted during storage:

- Do not store components in locations with high temperature or humidity.
- Do not expose components to corrosive gases.
- Avoid direct sunlight for a long period.

X-ON Electronics

Largest Supplier of Electrical and Electronic Components

Click to view similar products for [Industrial Panel Mount Indicators / Switch Indicators](#) category:

Click to view products by [EAO](#) manufacturer:

Other Similar products are found below :

[LW1A-P1-GD](#) [LW1A-P1-W](#) [01-931.3](#) [01-152.025](#) [73.362.4028.0](#) [750-1520](#) [9001OA120](#) [A0142N5](#) [A3DT-500Y](#) [AL6M-LK3-R](#) [AL6M-P7P-A](#) [AOLQW-2B0600](#) [AP1M255-A](#) [APD106LN-G](#) [APD106LN-S](#) [APN1126-G](#) [APS122DN-W](#) [ASLWLD-G](#) [ASLWLD-R](#) [ATN2100](#) [AYLW4L-A](#) [18-237.035](#) [18-945](#) [HW1A-L1-GD](#) [HW1A-P2-GL](#) [HW1X-BM411-R](#) [HW2A-L1-GL](#) [HWAZ1N-OB](#) [PA2100/2](#) [PA2200/1](#) [PA2SHIELD](#) [PAMR25](#) [LA3P-1C03V-Y](#) [96-923.5](#) [A0244J2](#) [LSPD-120A](#) [LSPD-1Y](#) [LSPD-6A](#) [LSPD-6DA](#) [LSPD-6DW](#) [LSPD-6DY](#) [LSPD-6R](#) [LSPD-6W](#) [18-946](#) [AL6H-LK3-A](#) [AL6H-P4-JW](#) [AL6M-LK1-MG](#) [AP8M155-G](#) [APD106LN-W](#) [APN106L-O](#)