

## Description

The smart power relay ESR10 Micro (Electronic Standard Relay) is a solid state relay which can replace electro-mechanical relays.

The ESR10 is a plus switching (high side switch) closing relay (NO) in an ISO Micro automotive relay enclosure.

It allows bipolar control by a positive voltage. This space-saving relay is available in three power classes:

- 10 A for max. 85° C / (12 and 24) Vdc
- 17 A for max. 105° C / (12 and 24) Vdc
- 30 A for max. 85° C / 12 Vdc

## Applications

The ESR10 helps to switch loads whose current demand is too high to be connected directly to the controlgear. The switching function of the ESR10 is completely noiseless. This allows installation in the vehicle's interior.

The ESR10 Micro is suitable for all applications in DC 12 V or 24 V electrical systems where valves, motors, lamps etc. have to be switched:

- Road vehicles (passenger cars, bicycles, trucks, buses, working vehicles and emergency cars, special vehicles)
- Construction vehicles and agricultural vehicles
- Watercraft (ships, sailing boats, motor yachts etc.)

## Benefits

- The low current consumption, particularly in the ON condition, helps to reduce gas consumption as well as CO<sub>2</sub> emissions.
- The solid state relay switches silently and features wear-free operation of all loads with an extremely long life span.

## Order numbering code

| Type No.                                 |                                              |
|------------------------------------------|----------------------------------------------|
| ESR10                                    | electronic standard relay                    |
| <b>Protection (characteristic curve)</b> |                                              |
| N                                        | not protected, only short circuit protection |
| <b>Type of enclosure</b>                 |                                              |
| C2                                       | Micro enclosure with hexagonal latching lugs |
| <b>Terminals (pins)</b>                  |                                              |
| A4                                       | standard automotive, 4-pole (ISO)            |
| <b>Load and control</b>                  |                                              |
| HB                                       | high-side-switch (HSS), bipolar control      |
| <b>Sub type</b>                          |                                              |
| 00                                       | standard                                     |
| <b>System voltage</b>                    |                                              |
| D1                                       | DC 12 V                                      |
| D2                                       | DC 24 V                                      |
| <b>Current rating (at 25°C)</b>          |                                              |
| 10 A                                     |                                              |
| 17 A                                     |                                              |
| 30 A *                                   | (12 V only)                                  |
| ESR10 - N C2 A4 HB - 00 - D1 - 10A       | ordering example                             |

\* The 30A version of the ESR10 Micro will only be available upon request and for high volume projects (> 5000 pcs). Small quantities cannot be ordered.



**ESR10 Micro**

## Technical data (25 °C) – ESR10 Micro 10 A

### Voltage supply LINE+

|                              |                |                      |
|------------------------------|----------------|----------------------|
| System voltage               | U <sub>B</sub> | DC 12 V / DC 24 V    |
| Operating voltage            |                | 6...16 V / 10...32 V |
| Closed current <sup>1)</sup> | OFF            | 8 µA                 |

### Load circuit LOAD

|                            |                 |                                                          |
|----------------------------|-----------------|----------------------------------------------------------|
| Load output                |                 | MOSFET, high side switching (HSS)                        |
| Load types                 |                 | resistive, inductive and capacitive                      |
| Protective function        |                 | short circuit proof, temperature disconnection (pulsing) |
| Current rating             | I <sub>N</sub>  | 10 A                                                     |
| Voltage drop <sup>1)</sup> | U <sub>ON</sub> | 75 mV                                                    |
| Max. short circuit current |                 | 60 A (L/R = 3 ms)                                        |

### Control input IN+

|                                  |      |                                                          |
|----------------------------------|------|----------------------------------------------------------|
| Control voltage                  | ON   | 12 V: ±6...16 V; 24 V: ±10...32 V                        |
|                                  | OFF  | 12 V: ±0...2 V; 24 V: ±0...4 V                           |
| Control current <sup>1) 2)</sup> |      | 10 mA (at 13.5 V respectively 27 V) (derating see chart) |
| Switching frequency              | max. | see chart                                                |
| Rising edge                      |      | < 5 ms                                                   |

### General data

|                                                   |                                     |                                                 |
|---------------------------------------------------|-------------------------------------|-------------------------------------------------|
| Reverse polarity protection circuit, load circuit | load                                | yes (reverse polarity conductive) <sup>3)</sup> |
| Cycle times <sup>1)</sup>                         | t <sub>ON</sub><br>t <sub>OFF</sub> | 0.5 ms<br>0.5 ms                                |
| Temperature range                                 |                                     | -40 °C...85 °C                                  |
| Dimensions                                        |                                     | ISO Standard Micro (with retaining lugs)        |
|                                                   | plugged in                          | 26 x 15.5 x 26 mm                               |
|                                                   | including contacts                  | 26 x 15.5 x 37 mm                               |
| Mass <sup>1)</sup>                                |                                     | 15 g                                            |

<sup>1)</sup> typically

<sup>2)</sup> The upstream controlgear may misconstrue the situation as "wire break" due to the extremely low control current. In this case the trigger threshold should be adjusted.

<sup>3)</sup> In the event of reverse polarity connection, the MOSFET will switch through automatically for self-protection.

## Technical data (25 °C) – ESR10 Micro 17 A

|                                                   |                                     |                                                                     |
|---------------------------------------------------|-------------------------------------|---------------------------------------------------------------------|
| <b>Voltage supply LINE+</b>                       |                                     |                                                                     |
| System voltage                                    | U <sub>B</sub>                      | DC 12 V / DC 24 V                                                   |
| Operating voltage                                 |                                     | 6...16 V / 10...32 V                                                |
| Closed current <sup>1)</sup>                      | OFF                                 | 8 µA                                                                |
| <b>Load circuit LOAD</b>                          |                                     |                                                                     |
| Load output                                       |                                     | MOSFET, high side switching (HSS)                                   |
| Load types                                        |                                     | resistive, inductive and capacitive                                 |
| Protective function                               |                                     | short circuit proof, temperature disconnection (pulsing)            |
| Current rating                                    | I <sub>N</sub>                      | 17 A                                                                |
| Voltage drop <sup>1)</sup>                        | U <sub>ON</sub>                     | 75 mV                                                               |
| Max. short circuit current                        |                                     | 100 A (L/R = 3 ms)                                                  |
| <b>Control input IN+</b>                          |                                     |                                                                     |
| Control voltage                                   | ON<br>OFF                           | 12 V: ±6...16 V; 24 V: ±10...32 V<br>12 V: ±0...2 V; 24 V: ±0...4 V |
| Control current <sup>1) 2)</sup>                  |                                     | 10 mA (at 13.5 V respectively 27 V)<br>(derating see chart)         |
| Switching frequency                               | max.                                | see chart                                                           |
| Rising edge                                       |                                     | < 5 ms                                                              |
| <b>General data</b>                               |                                     |                                                                     |
| Reverse polarity protection circuit, load circuit | load                                | yes (reverse polarity conductive) <sup>3)</sup>                     |
| Cycle times <sup>1)</sup>                         | t <sub>ON</sub><br>t <sub>OFF</sub> | 0.5 ms<br>0.5 ms                                                    |
| Temperature range                                 |                                     | -40 °C...105 °C                                                     |
| Dimensions                                        |                                     | ISO Standard Micro (with retaining lugs)                            |
| plugged in                                        |                                     | 26 x 15.5 x 26 mm                                                   |
| including contacts                                |                                     | 26 x 15.5 x 37 mm                                                   |
| Mass <sup>1)</sup>                                |                                     | 15 g                                                                |

## Approvals

| Authority | Approval mark | Regulation |
|-----------|---------------|------------|
| KBA       | E1            | ECE R 10   |

## Technical data (25 °C) – ESR10 Micro 30 A

|                                                   |                                     |                                                             |
|---------------------------------------------------|-------------------------------------|-------------------------------------------------------------|
| <b>Voltage supply LINE+</b>                       |                                     |                                                             |
| System voltage                                    | U <sub>B</sub>                      | DC 12 V                                                     |
| Operating voltage                                 |                                     | 6...16 V                                                    |
| Closed current <sup>1)</sup>                      | OFF                                 | 5 µA                                                        |
| <b>Load circuit LOAD</b>                          |                                     |                                                             |
| Load output                                       |                                     | MOSFET, high side switching (HSS)                           |
| Load types                                        |                                     | resistive, inductive and capacitive                         |
| Protective function                               |                                     | short circuit proof, temperature disconnection (pulsing)    |
| Current rating                                    | I <sub>N</sub>                      | 30 A                                                        |
| Voltage drop <sup>1)</sup>                        | U <sub>ON</sub>                     | 50 mV                                                       |
| Max. short circuit current                        |                                     | 100 A (L/R = 3 ms)                                          |
| <b>Control input IN+</b>                          |                                     |                                                             |
| Control voltage                                   | ON<br>OFF                           | 12 V: ±6...16 V<br>12 V: ±0...2 V                           |
| Control current <sup>1) 2)</sup>                  |                                     | 10 mA (at 13.5 V respectively 27 V)<br>(derating see chart) |
| Switching frequency                               | max.                                | see chart                                                   |
| Rising edge                                       |                                     | < 5 ms                                                      |
| <b>General data</b>                               |                                     |                                                             |
| Reverse polarity protection circuit, load circuit | load                                | yes (reverse polarity conductive) <sup>3)</sup>             |
| Cycle times <sup>1)</sup>                         | t <sub>ON</sub><br>t <sub>OFF</sub> | 0.5 ms<br>3.5 ms                                            |
| Temperature range                                 |                                     | -40 °C...85 °C                                              |
| Dimensions                                        |                                     | ISO Standard Micro (with retaining lugs)                    |
| plugged in                                        |                                     | 26 x 15.5 x 26 mm                                           |
| including contacts                                |                                     | 26 x 15.5 x 37 mm                                           |
| Mass <sup>1)</sup>                                |                                     | 15 g                                                        |

**Important:** The 30A version of the ESR10 Micro will only be available upon request and for high volume projects (> 5000 pcs). Small quantities cannot be ordered.

## Qualifications

### ESR10 Micro 10 A/12 V variant, VW

VW80000:2013-06 (LV124)  
TL81000:2013-02

### ESR10 Micro 10 A/12 V variant, GM

GMW 15267  
GMW 3097

### ESR10 Micro 10 A, 17 A, 30 A / 24 V

Environmental tests to LV124  
(Specification and severity to VW80000: 2013-06)

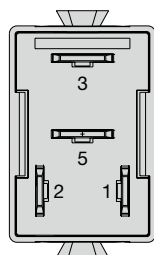
Electrical tests to ISO 16750-2

## Pin assignment

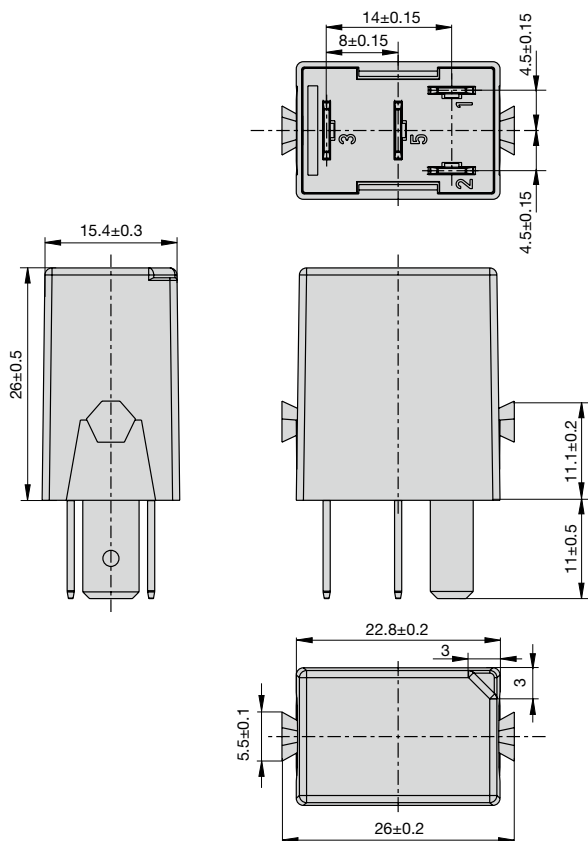
### ESR10 Micro

|        |   |         |               |
|--------|---|---------|---------------|
| LINE + | 3 | (30)    | $U_B$         |
| $IN_a$ | 1 | (86/31) | control input |
| $IN_b$ | 2 | (31/86) | ground        |
| LOAD   | 5 | (88a)   | load output   |

( )  $\hat{=}$  Automotive terminal designation



## Dimensions



Pin assignment is in accordance with ISO 7588

3 and 5 – blade terminals 6.3 x 0.8 [mm]

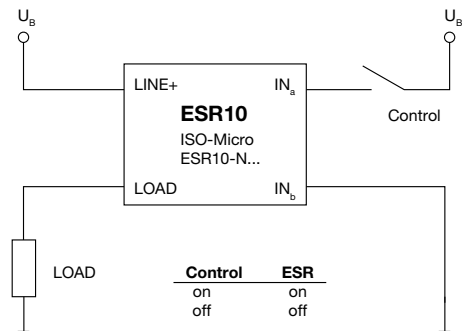
1 and 2 – blade terminals 4.8 x 0.8 [mm]

## Schematic diagram

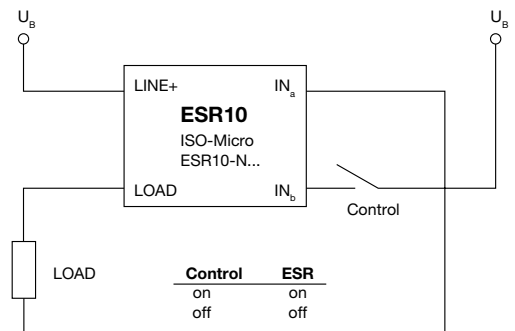
### Alternative control of bipolar control inputs

| Control inputs | $IN_a$ | $IN_b$ |
|----------------|--------|--------|
| alternative 1  | $U_B$  | GND    |
| alternative 2  | GND    | $U_B$  |

#### alternative 1



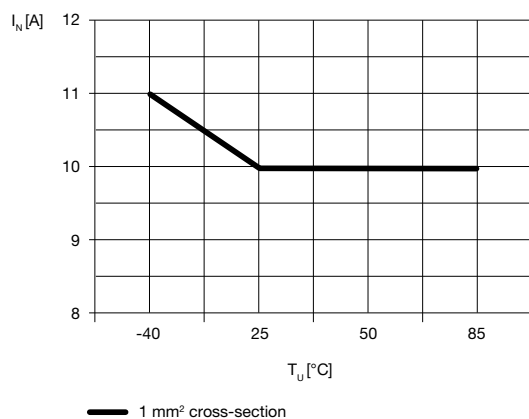
#### alternative 2



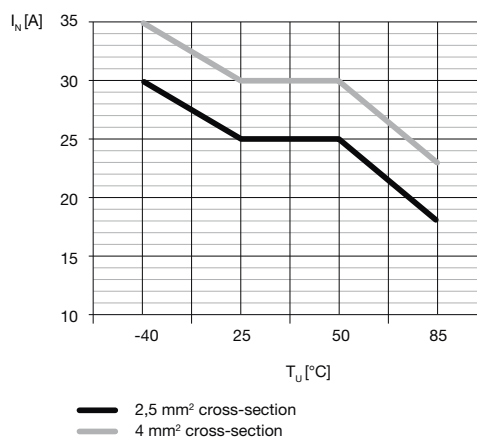
All dimensions without tolerances are for reference only. E-T-A reserves the right change specifications at any time in the interest of improved design, performance and cost effectiveness, the right to make changes in these specifications without notice is reserved. Product markings may not be exactly as the ordering codes. Errors and omissions excepted.

## Derating

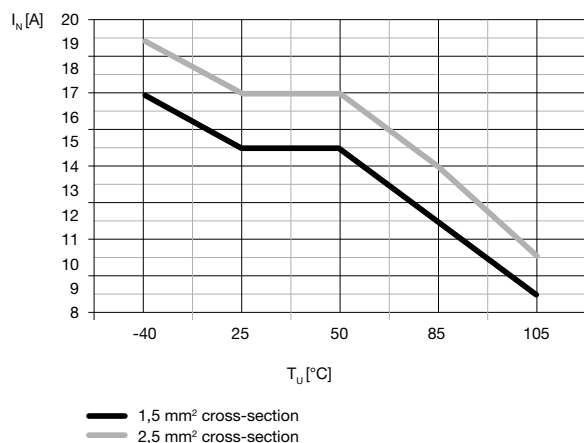
Load current for – 10 A variant



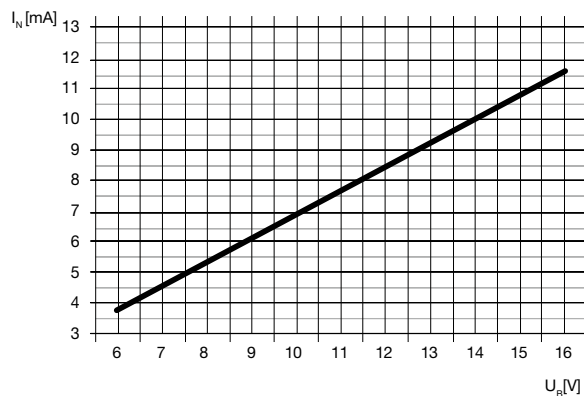
Load current for – 30 A variant



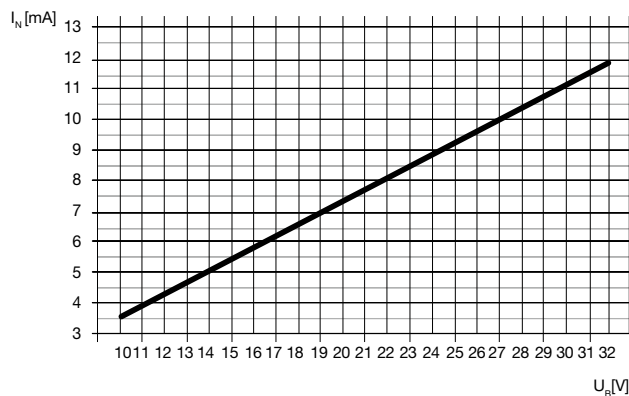
Load current for 17 A variant



Control current for 12 V – 10 A / 17 A / 30 A variant



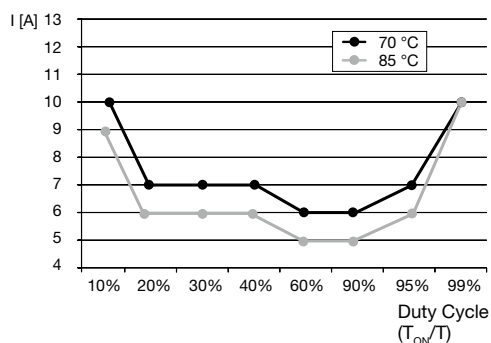
Control current for 24 V – 10 A / 17 A / 30 A variant



## Frequency control 10 A

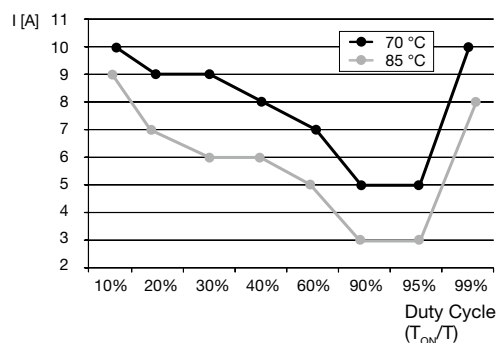
### 10 A / 12 V variant

Frequency measurement with 100 Hz

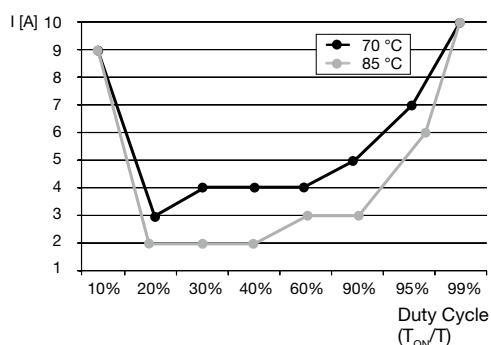


### 10 A / 24 V variant

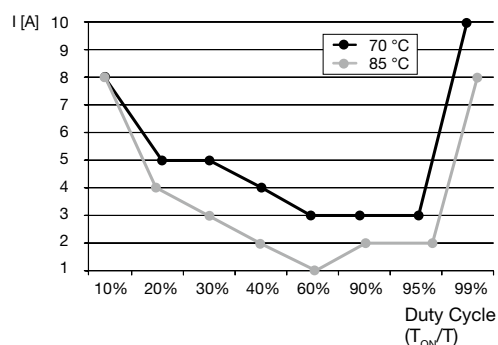
Frequency measurement with 50 Hz



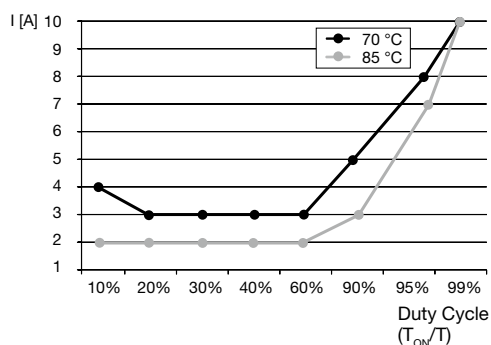
Frequency measurement with 150 Hz



Frequency measurement with 100 Hz



Frequency measurement with 200 Hz

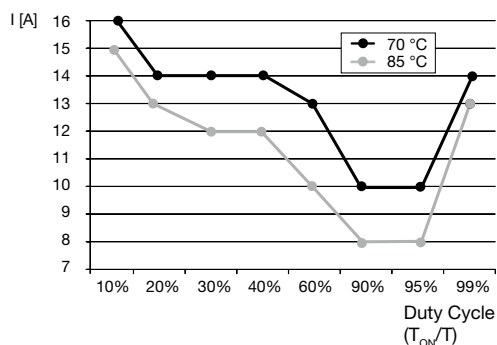


The max. load current depends on the load type. Please contact the manufacturer of the load if the limit values shown above are reached. E-T-A is able to test whether the relay works in the limit range.

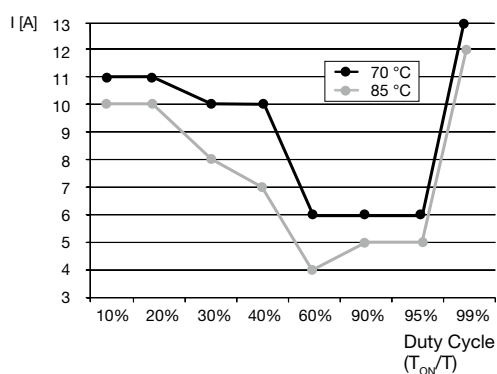
## Frequency control 17 A / 30 A

### 17 A / 12 V variant

Frequency measurement with 50 Hz

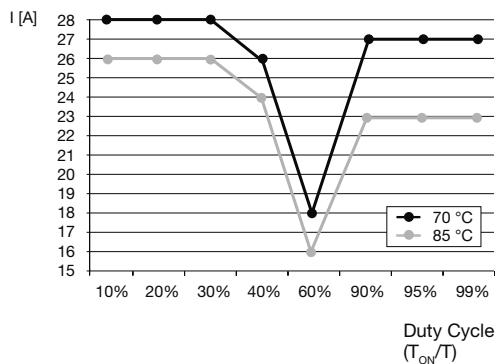


Frequency measurement with 100 Hz

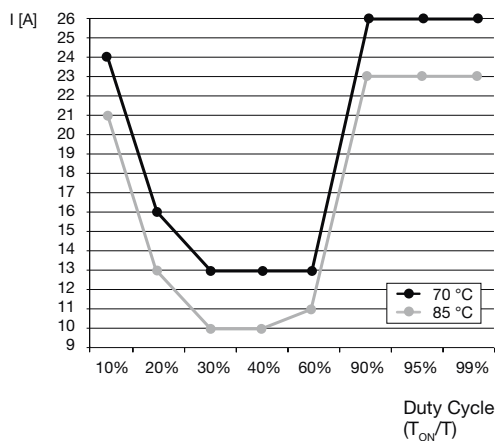


### 30 A / 12 V variant

Frequency measurement with 50 Hz

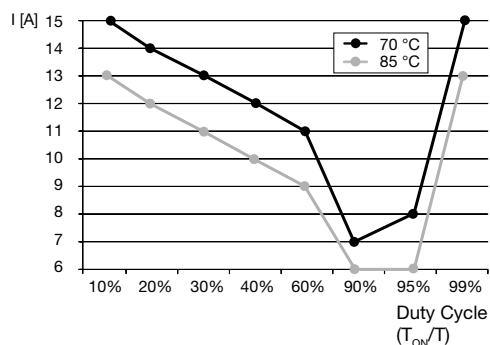


Frequency measurement with 100 Hz

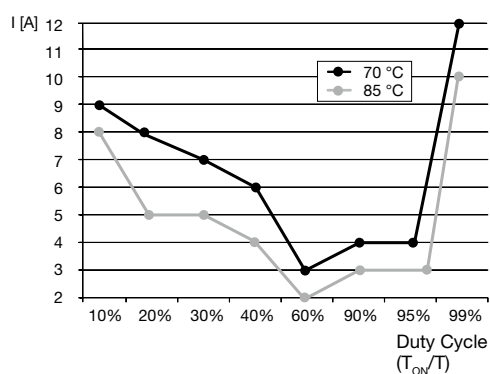


### 17 A / 24 V variant

Frequency measurement with 50 Hz



Frequency measurement with 100 Hz



The max. load current depends on the load type. Please contact the manufacturer of the load if the limit values shown above are reached. E-T-A is able to test whether the relay works in the limit range.

Компания «Life Electronics» занимается поставками электронных компонентов импортного и отечественного производства от производителей и со складов крупных дистрибьюторов Европы, Америки и Азии.

С конца 2013 года компания активно расширяет линейку поставок компонентов по направлению коаксиальный кабель, кварцевые генераторы и конденсаторы (керамические, пленочные, электролитические), за счёт заключения дистрибьюторских договоров

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- Конкурентоспособные цены и скидки постоянным клиентам.
- Специальные условия для постоянных клиентов.
- Подбор аналогов.
- Поставку компонентов в любых объемах, удовлетворяющих вашим потребностям.
- Приемлемые сроки поставки, возможна ускоренная поставка.
- Доставку товара в любую точку России и стран СНГ.
- Комплексную поставку.
- Работу по проектам и поставку образцов.
- Формирование склада под заказчика.
- Сертификаты соответствия на поставляемую продукцию (по желанию клиента).
- Тестирование поставляемой продукции.
- Поставку компонентов, требующих военную и космическую приемку.
- Входной контроль качества.
- Наличие сертификата ISO.

В составе нашей компании организован Конструкторский отдел, призванный помогать разработчикам, и инженерам.

Конструкторский отдел помогает осуществить:

- Регистрацию проекта у производителя компонентов.
- Техническую поддержку проекта.
- Защиту от снятия компонента с производства.
- Оценку стоимости проекта по компонентам.
- Изготовление тестовой платы монтаж и пусконаладочные работы.



Тел: +7 (812) 336 43 04 (многоканальный)

Email: [org@lifeelectronics.ru](mailto:org@lifeelectronics.ru)

[www.lifeelectronics.ru](http://www.lifeelectronics.ru)