

# AUTOMOTIVE RELAY FOR EV/PHV ON-BOARD CHARGER 1 POLE – 32A

## FTR-K5 Series

RoHS Compliant

### FEATURES

- 1 pole 32A, 1a contact
- 32A 250VAC switching which corresponds 6.6kW standard charger
- 40A continuous power supply
- Vibration resistance and shock resistance meet automotive relay specification standards
- Operable at up to +105°C ambient temperature
- High insulation
  - Between coil and contact creepage distance 8.8mm  
(Conform to IEC61810-1 277 enhanced insulation)
  - Between coil and contact withstand voltage 5000 VAC
- Selectable from flux free and plastic sealed
- Plastic material: UL flammability 94V-0
- Through hole



### APPLICATIONS

EV/PHV on-board charger (standard charger AC line)

### PART NUMBERS

[Example] FTR-K5 A A 005 Y  
 (a) (b) (c) (d) (e)

|     |                               |           |   |
|-----|-------------------------------|-----------|---|
| (a) | Relay type                    | FTR-K5    | : FTR-K5 series                                 |
| (b) | Contact configuration         | A         | : 1a (1 form A)                                 |
| (c) | Power consumption / Enclosure | A<br>K    | : 900mW / Plastic sealed<br>: 900mW / Flux free |
| (d) | Coil voltage                  | Coil code | : Refer to COIL DATA                            |
| (e) | Contact material              | Y :       | : Silver alloy                                  |

Note: The designation name is stamped on the top of the relay case as follows:

Example: Ordering part number; FTR-K5AA005Y

Stamped on relay case: K5AA005Y

## ■ SPECIFICATIONS

| Item         |                                 | Specifications                               |   | Remarks / Conditions                          |   |
|--------------|---------------------------------|--|---|---|---|
|              |                                 | Plastic sealed                               | Flux free   |   |   |
| Contact Data | Configuration                   | 1a (1 form A)                                |   |   |   |
|              | Material                        | Silver alloy                                 |   |   |   |
|              | Construction                    | Single contact                               |   |   |   |
|              | Contact rating                  | 32A 250VAC                                   |   | Resistive                                     |   |
|              | Drop voltage (Initial)          | Max. 0.32V                                   |   | At 32A  |   |
|              | Resistance                      | Max. 10mΩ                                    |   | At 32A  |   |
|              | Max. carrying current           | 40A (at 105°C, cable size 8mm <sup>2</sup> ) |   | At nominal voltage                            |   |
|              | Min. switching load*            | 1A, 6VDC                                     |   |   |   |
| Coil         | Rated power consumption         | 900mW  |   | At 20°C                                       |   |
|              | Operate power consumption       | 440mW  |   | At 20°C                                       |   |
|              | Operating temperature range     | -40°C to 105°C                               |   | No frost                                      |   |
| Time         | Operate                         | Max. 20ms(without bounce)                    |   | At 20°C, nominal voltage                      |   |
|              | Release                         | Max. 10ms (without bounce, without diode)    |   | At 20°C, nominal voltage                      |   |
| Life         | Mechanical                      | 1,000,000 operations                         |   |   |   |
|              | Electrical                      | 7,000 operations                             | 30,000 operations                                   | At contact rating                             |   |
|              |                                 | 200,000 operations                           |   | Inrush 60A, 250VAC, interrupt 10mA, at 250VAC |   |
|              | 25,000 operations               |  | Inrush 60 A, 250 VAC, interrupt 5A, at 250VAC       |   |   |
| Insulation   | Insulation resistance           | 1,000 MΩ以上                                   |   | 500 VDC                                       |   |
|              | Dielectric withstanding voltage | Open contacts                                | 1,000VAC(50/60Hz), 1 minute                         |   |   |
|              |                                 | Coil-contact                                 | 5,000VAC(50/60Hz), 1 minute                         |   |   |
| Others       | Vibration resistance            | Misoperation                                 | 5~200 Hz, 45 m/s <sup>2</sup> constant acceleration |   | Sense time 1ms, contact ON/OFF                                      |
|              |                                 | Endurance                                    | 5~200 Hz, 45 m/s <sup>2</sup> constant acceleration |   | Up/down 4 hours, left/right/front/back each 2 hours, contact ON/OFF |
|              | Shock resistance                | Misoperation                                 | 100 m/s <sup>2</sup> (11 ms)                        |   | Sense time 1ms, contact ON/OFF                                      |
|              |                                 | Endurance                                    | 1000 m/s <sup>2</sup> (6 ms)                        |   | Contact ON/OFF total 36 times                                       |
|              | Dimensions / weight             | 18.0 x 30.5 x 29.7 mm / Approx. 39g          |   |   |   |

Note: Electrical characteristics mentioned above are the values at JIS standard condition (temperature 15 to 35°C, relative humidity 25 to 75%, atmospheric pressure 86k to 106kPa) unless otherwise specified.

Note: Care shall be taken on the heat generated on PC board when maximum carrying current exceed 10A.

\*: Minimum switching loads mentioned above are reference values. Please perform the confirmation test with actual load before production since reference values may vary according to switching frequencies, environmental conditions and expected reliability levels.

## COIL DATA

| Coil Code | Rated Coil Voltage (VDC) | Coil Resistance $\pm 10\%$ ( $\Omega$ ) | Must Operate Voltage* (VDC) | Must Release Voltage* (VDC) | Nominal Power (mW) |
|-----------|--------------------------|---|-----------------------------|-----------------------------|--------------------|
| 005       | 5                        | 28                                      | 3.5                         | 0.5                         | Approx. 900        |
| 006       | 6                        | 40                                      | 4.2                         | 0.6                         |                    |
| 012       | 12                       | 160                                     | 8.4                         | 1.2                         |                    |
| 024       | 24                       | 640                                     | 16.8                        | 2.4                         |                    |

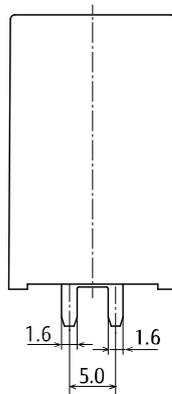
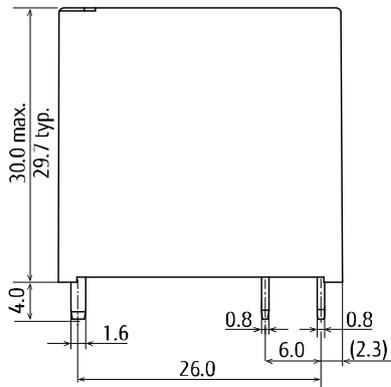
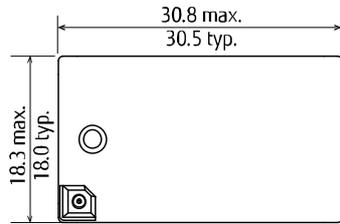
Note: All values in the table are valid at 20°C and zero contact current unless otherwise specified.

Note: Please use at rated coil voltage.

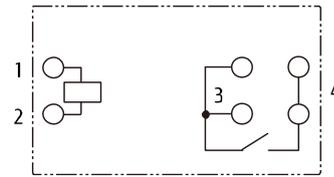
\*: Specified operate values are valid for pulse wave voltage.

## DIMENSIONS

### Dimensions

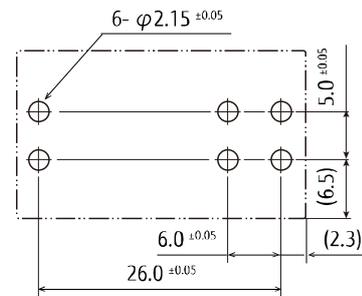


### Schematics (BOTTOM VIEW)



Two terminals of #3 shall be connected on the board and soldered respectively to guarantee carrying current performance. Ditto for #4.

### PC Board Mounting Hole Layout (BOTTOM VIEW)



- Dimensions of the terminals do not include thickness of pre-solder.
- Dimensions do not include tolerances.

( ) : Reference  
Unit: mm

## Cautions

- \* All values mentioned in this datasheet are provided under ideal conditions. Please perform the confirmation test before actual use.
- \* Reflow soldering is prohibited.
- \* Do not use relays in the atmosphere with sulfide gas, chloride gas or nitric oxide. Contact resistance may increase.
- \* Do not use silicon or silicon-containing product or materials near relays. It may cause contact failure.

## General Information

### 1. RoHS Compliance

- All relays produced by Fujitsu Components are compliant with RoHS directive 2011/65/EU, including commission delegated directive 2015/863.

### 2. Recommended Lead free solder condition

- Lead free solder plating on relay terminals is Sn-3.0Ag-0.5Cu, unless otherwise specified. This material has been verified to be compatible with PbSn assembly process.
- Recommended solder for assembly: Sn-3.0Ag-0.5Cu.

#### Flow Solder Condition

Pre-heating: Maximum 120°C with 90 sec.  
Soldering: Dip within 5 sec. at 255°C±5°C solder bath  
Relay must be cooled by air immediately after soldering.

#### Solder by Soldering Iron

Soldering Iron: 30 – 60W  
Temperature: Maximum 350 – 360°C  
Duration: Maximum 3 sec.

**We highly recommend that you confirm your actual solder conditions**

### 3. Moisture Sensitivity

- Moisture Sensitivity Level standard is not applicable to electromechanical relays, unless otherwise indicated.

### 4. Recommended Lead free solder condition

- Dipped SnAgCu solder is known as presenting a low risk to tin whisker development. No considerable length whisker was found by our in house test.

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