FUJITSU

# COMPACT POWER RELAY

## 1 POLE - 25A (For Automotive Applications)

# FTR-G1 Series

### ■ FEATURES

- Compact for high density packaging
- High contact capacity with proven contact material (min. 100,000 operations, 14V, 25A)
- Coil power savings (640mW nominal achived with state-of-the-art magnetic analysis/design)
- Ease of PCB layout (all terminals on perimeter, coil and contact terminals separated)
- Lower noise (60dB average at 5cm)
- Plastic sealed
- Through hole reflow capable type available
- RoHS compliant

Please see page 6 for more information

### ■ APPLICATIONS

- Power window
- Door lock
- Tilt steering
- Sunroof
- Power seat
- Wiper/IWW
- Retractable antenna

### ■ PARTNUMBER INFORMATION

[Example] FTR-G1 C N 012 W1 - RW

(a) (b) (c) (d) (e) (f)

| | | | |
|---|---|---|---|
| (a) | Relay type | FTR-G1 | : FTR-G1 Series |
| (b) | Contact configuration | C | : 1 form C |
| (c) | Contact gap | N | : 0.25 mm |
| (d) | Coil rated voltage | 010 | : 9.....12 VDC<br>Coil rating table at page 3 |
| (e) | Contact material / TV type | W1 | : Silver-tin oxide indium |
| (f) | Soldering | Nil<br>RW | : Standard (Flow soldering) : Reflow capable (THR) |

Actual marking does not carry the type name: "FTR"
E.g.: Ordering code: FTR-G1CN010W1 Actual marking: G1CN010W1

## ■ SPECIFICATION

| Item | | | FTR-G1 | |
|---|---|---|---|---|
| | | | Standard | Reflow capable |
| Contact Data | Configuration | | 1 form C | |
| | Material | | Silver-tin oxide indium | |
| | Contact voltage drop | | Max. 100mV at 1A, 6VDC (after stabilization) | |
| | Contact rating | | 25A at 14VDC (locked motor load) | |
| | Max. carrying current *1 | | 25A/1 hour (25 °C, 100% rated coil voltage) | |
| | Max. switching voltage | | 16VDC (reference) | |
| | Max. switching current | | 35A (reference) | |
| | Min. switching load * 2 | | 1A, 6VDC | |
| Life | Mechanical | | Min. 10 x $10^6$ operations | |
| | Electrical | | * Min. 100 x $10^3$ operations,<br>14VDC, 25A inrush power window motor<br>* Min. 100 x $10^3$ operations<br>14VDC, 20A inrush door locked motor | |
| Coil Data | Rated power | | 640mW | |
| | Operate power | | 237mW | |
| | Operating temperature range | | -40 °C to +85 °C (no frost) | -40 °C to +125 °C (no frost) |
| Timing Data | Operate (at nominal voltage) | | Max. 10 ms (without bounce) | |
| | Release (at nominal voltage) | | Max. 5 ms (without bounce) | |
| Insulation | Resistance (initial) | | Min. 100MΩ at 500VDC | |
| | Dielectric withstanding voltage | Open contacts | 500VAC, 1 min. | |
| | | Between coil and contacts | 500VAC, 1 min. | |
| Other | Vibration resistance | Misoperation | 10 to 200Hz, 44m/s$^2$ (4.5G), constant acceleration | |
| | | Endurance | 10 to 200Hz, 44m/s$^2$ (4.5G), constant acceleration | |
| | Shock | Misoperation | 100m/s² minimum (11+/-1ms) | |
| | | Endurance | 1,000m/s² minimum (6+/-1ms) | |
| | Weight | | Approximately 3.5 g | |
| | Sealing | | Plastic sealed cat III | |

* 1 Care shall be taken on the heat generated on PC board when maximum carrying current exceeds 10A. Please perform the confirmation test with actual conditions.
* 2 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 RATING

Standard type

| Coil Code | Rated Coil Voltage (VDC) | Coil Resistance +/- 10% (Ohm) | Must Operate Voltage (VDC) * | Must Release Voltage (VDC) * |
|---|---|---|---|---|
| 009 | 9 | 126 | 5.4 | 0.7 |
| | | | 6.8 (at 85 °C) | 0.9 (at 85 °C) |
| 010 | 10 | 160 | 6.5 | 0.8 |
| | | | 8.2 (at 85 °C) | 1.0 (at 85 °C) |
| 012 | 12 | 225 | 7.3 | 1.0 |
| | | | 9.2 (at 85 °C) | 1.3 (at 85 °C) |

Reflow capable type

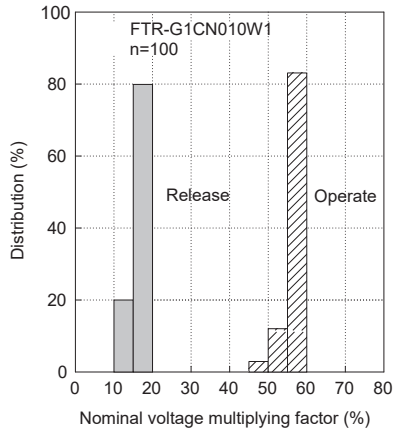
| Coil Code | Rated Coil Voltage (VDC) | Coil Resistance +/- 10% (Ohm) | Must Operate Voltage (VDC) * | Must Release Voltage (VDC) * |
|---|---|---|---|---|
| 009 | 9 | 126 | 5.4 | 0.7 |
| | | | 6.8 (at 85 °C) | 0.9 (at 85 °C) |
| | | | 7.6 (at 125 °C) | 1.0 (at 125 °C) |
| 010 | 10 | 160 | 6.5 | 0.8 |
| | | | 8.2 (at 85 °C) | 1.0 (at 85 °C) |
| | | | 9.2 (at 125 °C) | 1.1 (at 125 °C) |
| 012 | 12 | 225 | 7.3 | 1.0 |
| | | | 9.2 (at 85 °C) | 1.3 (at 85 °C) |
| | | | 10.3(at125 °C) | 1.4 (at 125 °C) |

Note: All values in the table are valid for 20 °C and zero contact current, unless otherwise indicated.
* Specified operate values are valid for pulse wave voltage.

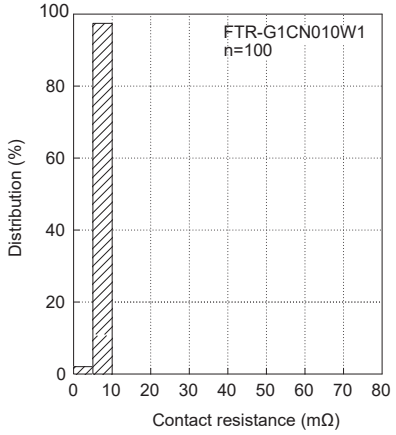
## ■ CHARACTERISTIC DATA

(Characteristic data is not guaranteed value but measured values of samples from production line.)

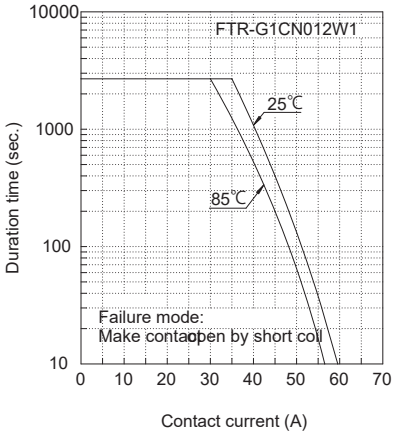
Distribution of operate/release voltage



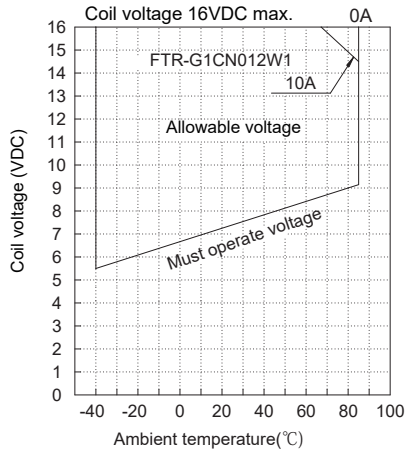

Distribution of contact resistance



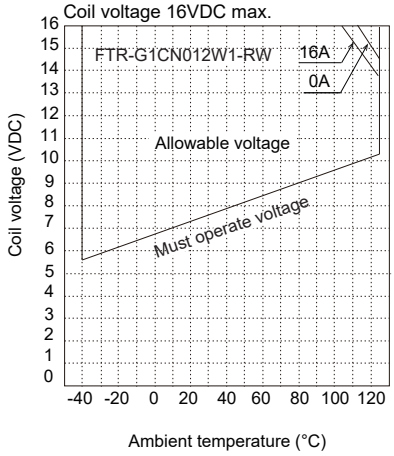

Contact current



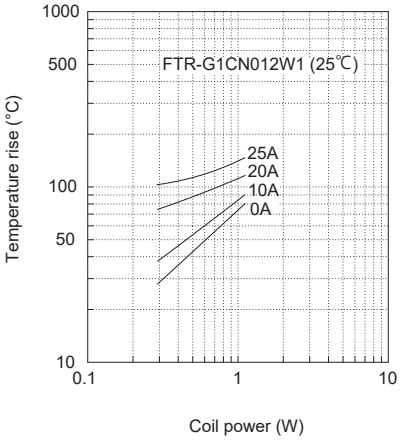

Ambient temperature vs voltage (standard type)



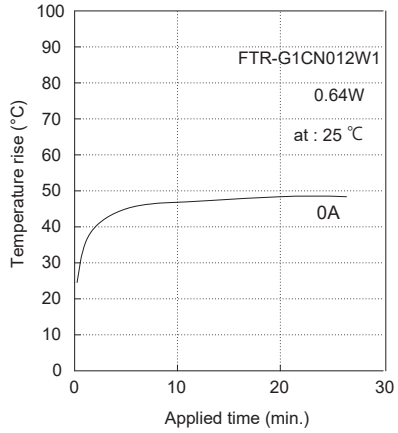

Ambient temperature vs voltage (reflow capable type)



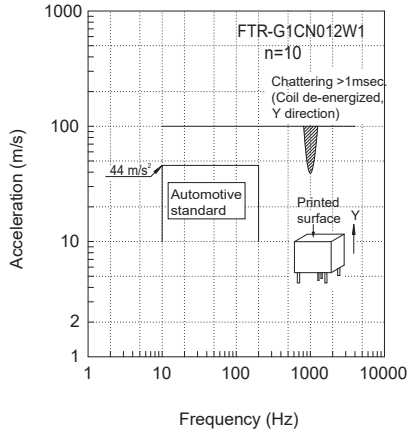

Coil temperature rise



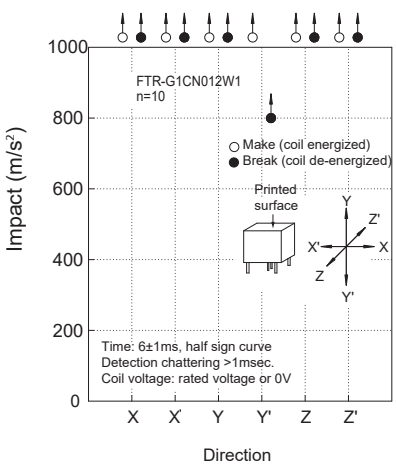

Coil temperature rise




Vibration resistance

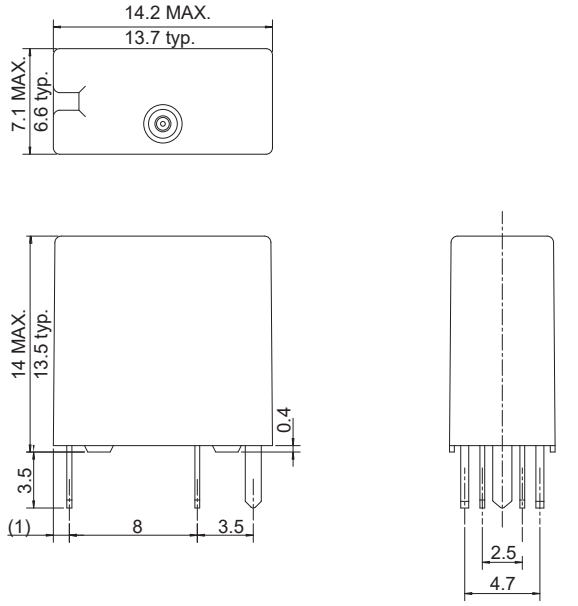



Shock resistance

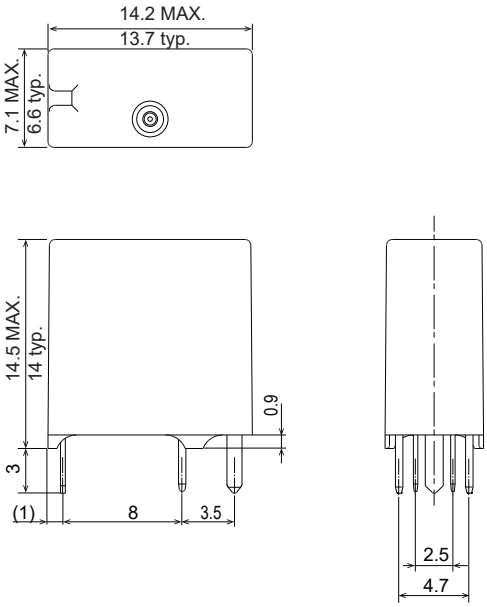


## ■ DIMENSIONS

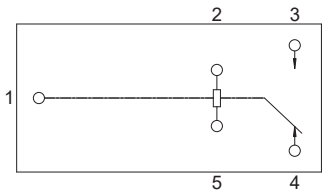
● **Dimensions** (Standard type)



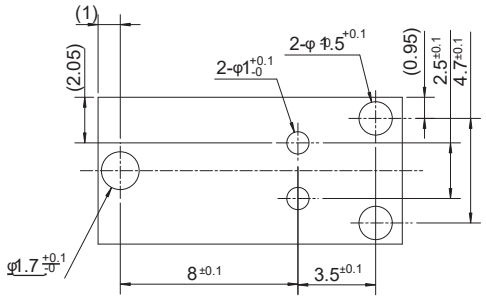

● **Dimensions**
(Reflow capable type)




● **Schematics**
(BOTTOM VIEW)




● **PC board mounting hole layout**
(BOTTOM VIEW)




* Dimensions of the terminals do not include thickness of pre-solder.
* Tolerance of PC board mounting hole layout : ±0.1 unless otherwise specified.
* Dimensions do not include tolerances. Please ask specification in case you need tolerances.

(1) : 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 for flow soldering type.
- 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 within 90 sec.
Soldering: dip within 5 sec. at 255°C±5°C solder bath

Relay must be cooled by air immediately after soldering

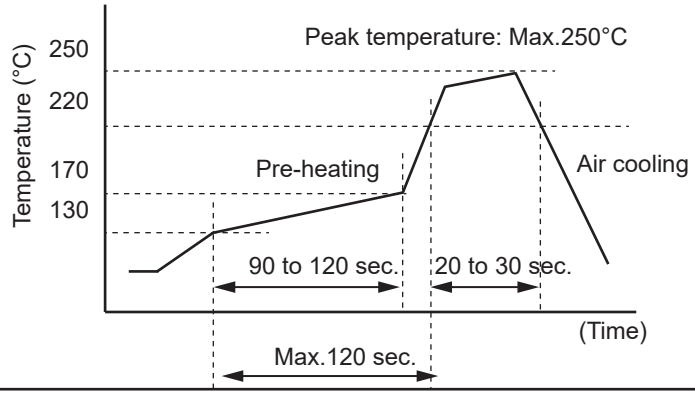
**Solder by Soldering Iron:**

Soldering Iron: 30-60W
Temperature: maximum 350-360˚C
Duration: maximum 3 sec.

**Refow Solder Condition:**

**(Applicable only for reflow capable type)**

Recommended reflow soldering profile:
IRS (infrated reflow soldering)




**Important Notes for reflow Soldering**

- Temperature shall be measured at PC boartd uppler surface.
- Temperature at PC board upper surface may be changed depending on size of PC board, components mounted on the PC board and/or heating method. Please perform the confiramtion test with your actual PC board.
- This reflow condition is applicable only for reflow-capable relays. Do not reflow reflow-incapable relays.

**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. Tin Whiskers

- 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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