



Discontinued as of December 31, 2011



**Panasonic**  
ideas for life

TV-5 rated small  
1 Form A 5A power relay  
with 16 mm height

**LT-S RELAY (ALTS)**

New



## FEATURES

1. Small size: 7.0(W) × 20.7(L) × 16(H) mm **.276(W) × .815(L) × .630(H) inch**
2. Pitch between contact terminals: 7.7 mm **.303 inch**
3. TV-5 rating approved

## TYPICAL APPLICATIONS

- Flat-panel TVs
- Audio visual equipment
- OA equipment
- HA equipment
- Air conditioner
- Microwave ovens

RoHS compliant

## ORDERING INFORMATION

ALTS **3** **5**

Contact arrangement  
3: 1 Form A

Nominal coil voltage (DC)  
05: 5V, 09: 9V, 12: 12V, 24: 24V

TV standard  
5: TV-5

Note: Certified by UL/C-UL, VDE and SEMKO

## TYPES

Contact arrangement	Nominal coil voltage	Part No.
1 Form A	5V DC	ALTS3055
	9V DC	ALTS3095
	12V DC	ALTS3125
	24V DC	ALTS3245

Standard packing Carton: 200 pcs. Case: 1,000 pcs. (200 pcs. × 5 boxes)

## RATING

### 1. Coil data

Nominal coil voltage	Pick-up voltage (at 20°C 68°F)	Drop-out voltage (at 20°C 68°F)	Nominal operating current [±10%] (at 20°C 68°F)	Coil resistance [±10%] (at 20°C 68°F)	Nominal operating power	Max. applied voltage (at 20°C 68°F)
5V DC	75%V or less of nominal voltage (Initial)	5%V or more of nominal voltage (Initial)	56.2mA	89Ω	280mW	6.5V DC
9V DC			31.1mA	289Ω		11.7V DC
12V DC			23.3mA	514Ω		15.6V DC
24V DC			11.7mA	2057Ω		31.2V DC



## 2. Specifications

Characteristics	Item	Specifications
Contact	Arrangement	1 Form A
	Contact resistance (Initial)	Max. 100 mΩ (By voltage drop 6 V DC 1A)
	Contact material	AgSnO <sub>2</sub> type
Rating	Nominal switching capacity (resistive load)	5A 277V AC
	Max. switching power (resistive load)	1,385VA
	Max. switching voltage	277V AC
	Max. switching current	5A (AC)
	Min. switching capacity (reference value)*1	100mA, 5V DC
Electrical characteristics	Insulation resistance (Initial)	Min. 1,000MΩ (at 500V DC) Measurement at same location as "Breakdown voltage" section.
	Breakdown voltage (Initial)	Between open contacts 1,000 Vrms for 1 min. (Detection current: 10 mA)
		Between contact and coil 4,000 Vrms for 1 min. (Detection current: 10 mA)
	Temperature rise (coil)	Max. 35°C 95°F (By resistive method, nominal coil voltage applied to the coil; contact carrying current: 5A, at 70°C 158°F)
	Surge breakdown voltage*2 (Between contact and coil) (Initial)	10,000 V
	Operate time (at nominal voltage) (at 20°C 68°F)	Max. 15 ms (excluding contact bounce time.) (Initial)
	Release time (at nominal voltage) (at 20°C 68°F)	Max. 5 ms (excluding contact bounce time) (Without diode) (Initial)
Mechanical characteristics	Shock resistance	Functional 100 m/s <sup>2</sup> (Half-wave pulse of sine wave: 11 ms; detection time: 10μs.)
		Destructive 1,000 m/s <sup>2</sup> (Half-wave pulse of sine wave: 6 ms.)
	Vibration resistance	Functional 10 to 55 Hz at double amplitude of 1.5 mm (Detection time: 10μs.)
		Destructive 10 to 55 Hz at double amplitude of 1.5 mm
Expected life	Mechanical (at 180 times/min.)	Min. 10 <sup>6</sup>
	Electrical (at 20 times/min.)	Min. 5 × 10 <sup>4</sup> (5A 277V AC) (resistive load at 20°C 68°F)
Conditions	Conditions for operation, transport and storage*3	Ambient temperature: -40°C to +70°C -40°F to +158°F, Humidity: 5 to 85% R.H. (Not freezing and condensing at low temperature), Air pressure: 86 to 106kPa
	Max. operating speed (at nominal switching capacity)	20 times/min.
Unit weight		Approx. 4 g .14 oz

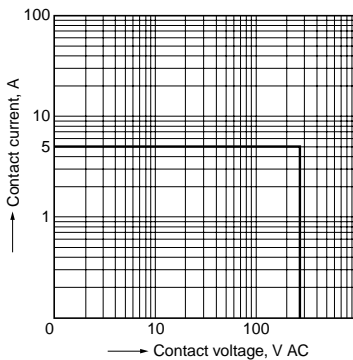
Notes: \*1. This value can change due to the switching frequency, environmental conditions, and desired reliability level, therefore it is recommended to check this with the actual load.

\*2. Wave is standard shock voltage of  $\pm 1.2 \times 50 \mu s$  according to JEC-212-1981

\*3. The upper limit of the ambient temperature is the maximum temperature that can satisfy the coil temperature rise value. Refer to Usage, transport and storage conditions in NOTES.

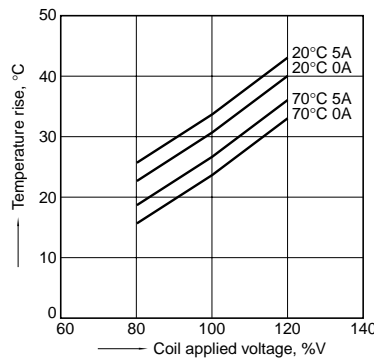
## REFERENCE DATA

### 1. Max. switching power (AC resistive load)

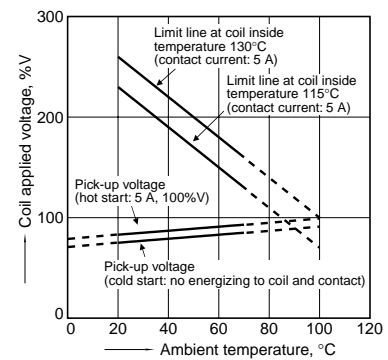


### 2. Coil temperature rise

Sample: ALTS3125, 6 pcs.  
Point measured: coil inside  
Contact current: 0 A, 5A



### 3. Ambient temperature characteristics and coil applied voltage



### 4. Electrical life test

(5 A 277 V AC, resistive load)

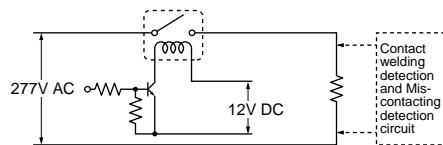
Sample: ALTS3125, 6 pcs.

Operation frequency: 20 times/min.

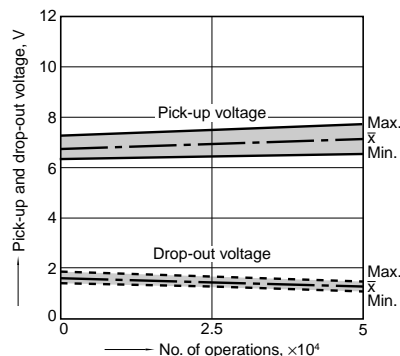
(ON/OFF = 1.5s: 1.5s)

Ambient temperature: 20°C 68°F

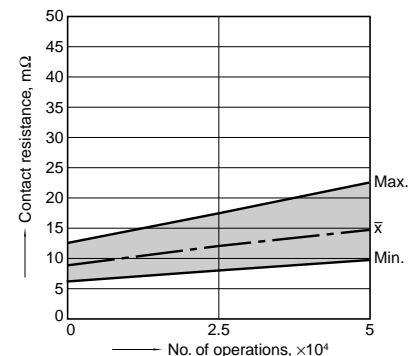
Circuit:



### Change of pick-up and drop-out voltage



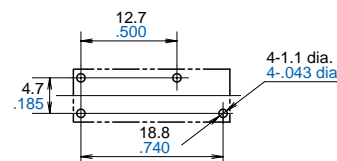
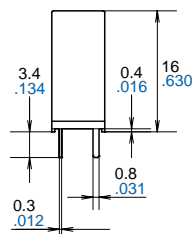
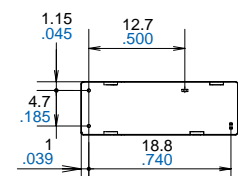
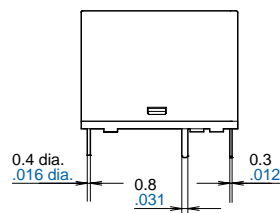
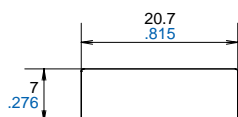
### Change of contact resistance



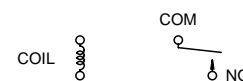
**DIMENSIONS** (mm *inch*)The CAD data of the products with a **CAD Data** mark can be downloaded from: <http://industrial.panasonic.com/ac/e/>**CAD Data**

## External dimensions

## PC board pattern (Bottom view)

Tolerance:  $\pm 0.1 \pm .004$ 

## Schematic (Bottom view)

Dimension:Less than 1mm **.039inch**:Min. 1mm **.039inch** less than 3mm **.118 inch**:Min. 3mm **.118 inch**:General tolerance $\pm 0.1 \pm .004$  $\pm 0.2 \pm .008$  $\pm 0.3 \pm .012$ **SAFETY STANDARDS**

UL/C-UL (Recognized)		VDE (Certified)		SEMKO (Certified)	
File No.	Contact rating	File No.	Contact rating	File No.	Contact rating
E43149	TV-5 5A 277V AC 50,000 times 8A 277V AC 10,000 times	40030107	5A 250V AC ( $\cos\phi=1.0$ ) 50,000 times 8A 250V AC ( $\cos\phi=1.0$ ) 10,000 times	1011454	10/80A 250V AC 40T85 $\mu$ 10,000 times 3/120A 250V AC 40T85 $\mu$ 10,000 times 5A 250V AC ( $\cos\phi=1.0$ ) 50,000 times 8A 250V AC ( $\cos\phi=1.0$ ) 10,000 times



## NOTES

### ■ Usage, transport and storage conditions

#### 1) Temperature:

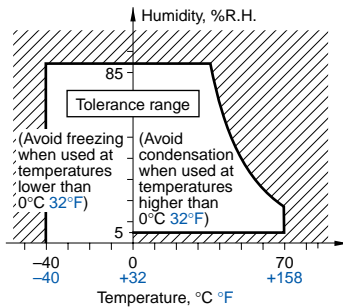
–40 to +70°C **–40 to +158°F**

#### 2) Humidity: 5 to 85% RH

(Avoid freezing and condensation.)

The humidity range varies with the temperature. Use within the range indicated in the graph below.

#### 3) Atmospheric pressure: 86 to 106 kPa Temperature and humidity range for usage, transport, and storage



#### 4) Condensation

Condensation forms when there is a sudden change in temperature under high temperature and high humidity conditions. Condensation will cause deterioration of the relay insulation.

#### 5) Freezing

Condensation or other moisture may freeze on the relay when the temperatures is lower than 0°C **32°F**. This causes problems such as sticking of movable parts or operational time lags.

#### 6) Low temperature, low humidity environments

The plastic becomes brittle if the relay is exposed to a low temperature, low humidity environment for long periods of time.

### ■ Solder and cleaning conditions

#### 1) Please obey the following conditions when soldering automatically.

##### (1) Preheating: Within 120°C **248°F**

(solder surface terminal portion) and within 120 seconds

##### (2) Soldering iron: 260°C±5°C

**500°F±41°F** (solder temperature) and within 6 seconds (soldering time)

2) Since this is not a sealed type relay, do not clean it as is. Also, be careful not to allow flux to overflow above the PC board or enter the inside of the relay.

### ■ Certification

#### 1) This relay is UL and C-UL certified.

UL and C-UL standards: TV-5

5 A 277 V AC, 50,000 times

8 A 277 V AC, 10,000 times

#### 2) This relay is certified by VDE as an electromagnetic relay that complies with EN61810-1.

VDE standards: TV-5

5 A 250 V  $\cos\phi = 1.0$ , 50,000 times

8 A 250 V  $\cos\phi = 1.0$ , 10,000 times

#### 3) This relay is certified by SEMKO.

10/80 A 250 V AC 40T85μ, 10,000 times  
(Steady-state current: 10A/Inrush

current: 80 A, Load voltage: 250 V AC, Ambient temperature: –40 to +85°C **–40 to +185°F**, Micro-gap)

3/120 A 250 V AC 40T85μ, 10,000 times  
(Steady-state current: 3A/Inrush current:

120 A, Load voltage: 250 V AC, Ambient temperature: –40 to +85°C **–40 to +185°F**, Micro-gap)

5 A 250 V  $\cos\phi = 1.0$ , 50,000 times

8 A 250 V  $\cos\phi = 1.0$ , 10,000 times

### ■ Others

#### 1) For precautions regarding use and explanations of technical terminology, please refer to our web site.

(<http://industrial.panasonic.com/ac/e/>)

#### 2) To ensure good operation, please keep the voltage on the coil ends to ±5% (at 20°C **68°F**) of the rated coil operation voltage. Also, please be aware that the pick-up voltage and drop-out voltage may change depending on the temperature and conditions of use.

#### 3) Keep the ripple rate of the nominal coil voltage below 5%.

#### 4) The cycle lifetime is defined under the standard test condition specified in the JIS C 5442 standard (temperature 15 to 35°C **59 to 95°F**, humidity 25 to 75%).

Check this with the real device as it is affected by coil driving circuit, load type, activation frequency, activation phase, ambient conditions and other factors. Also, be especially careful of loads such as those listed below.

#### (1) When used for AC load-operating and the operating phase is synchronous. Rocking and fusing can easily occur due to contact shifting.

#### (2) Highly frequent load-operating When highly frequent opening and closing of the relay is performed with a

load that causes arcs at the contacts, nitrogen and oxygen in the air is fused by the arc energy and  $\text{HNO}_3$  is formed. This can corrode metal materials.

Three countermeasures for these are listed here.

- Incorporate an arc-extinguishing circuit.
- Lower the operating frequency
- Lower the ambient humidity

#### 5) This value can change due to the switching frequency, environmental conditions, and desired reliability level, therefore it is recommended to check this with the actual load.

#### 6) Heat, smoke, and even a fire may occur if the relay is used in conditions outside of the allowable ranges for the coil ratings, contact ratings, operating cycle lifetime, and other specifications. Therefore, do not use the relay if these ratings are exceeded.

#### 7) If the relay has been dropped, the appearance and characteristics should always be checked before use.

#### 8) Incorrect wiring may cause unexpected events or the generation of heat or flames.

#### 9) There are no restrictions as to how this relay should be oriented during installation. However, due to gravitation there may be slight differences in pick-up/drop-out voltage and operate/release time, etc., depending on the orientation. Therefore, when evaluating the relay, please do so with the relay installed with the actual orientation.