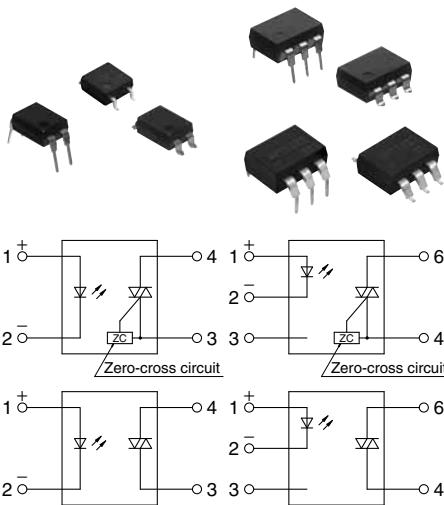


**Phototriac coupler  
ideal for triac driver  
with wide variation**

## APT Phototriac Coupler

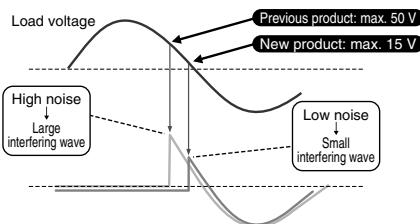
### FEATURES



**RoHS compliant**

1. Low zero-cross voltage (max. 15 V) type added to lineup. Approximately 1/3 of previous product

Helps reduce device noises even further.



2. Two types available: Random type and zero-cross type
3. Many package sizes available. (Wide terminal type with 10.16 mm pitch between I/O terminals available.)
4. High dielectric strength. (Between input and output: SOP 3, 750 V; DIP 5,000 V)
5. Handles both 100 and 200 Vrms loads

This relay handles both voltages in a single product it is not necessary for users that use both types to manage separate part numbers.

6. Terminal 5 of the DIP 6-pin type is completely molded.
7. Complies with safety standards

SOP4pin:

C-UL (UL1577) Certified  
VDE (EN60747-5-5) Certified

DIP4/6pin:

C-UL (UL1577) Certified  
VDE (EN60747-5-5) Certified  
VDE (EN62368-1) Reinforced insulation certified

### TYPICAL APPLICATIONS

1. For triac driver in heater controls of products such as office equipment, home appliances, and industrial machines. (For 100 V/200 V, 50/60 Hz lines)
2. Triac driver for SSRs

### ORDERING INFORMATION

APT **1** **2**

ON-state RMS current

1: 0.05 A/0.1 A

Repetitive peak OFF-state voltage

2: 600 V

Zero-cross function

1: With zero-cross function

2: Random

3: Low zero-cross (max. 15 V)

Number of pin

1: 4 pins

2: 6 pins

Package

Nil: DIP

S: SOP

A: SMD

Packing

Nil: Tube

X: Tape and reel packing X

Z: Tape and reel packing Z

**TYPES****1. SOP4 Type**

Type	Output rating		Type	Package size	Part No.			Packing quantity	
	Repetitive peak OFF-state voltage	ON-state RMS current			Tube packing style	Tape and reel packing style		Tube	Tape and reel
AC type	600 V	50 mA	Zero-cross (max. 50 V)	SOP4pin	APT1211S	APT1211SX	APT1211SZ	1 tube contains: 100 pcs. 1 batch contains: 2,000 pcs.	1,000 pcs.
			Zero-cross (max. 15 V)		APT1231S	APT1231SX	APT1231SZ		
			Random		APT1221S	APT1221SX	APT1221SZ		

Note: For space reasons, the initial letters of the product number "APT" and "S" are omitted on the product seal.

The package type indicator "X" and "Z" are omitted from the seal. (Ex. the label for product number APT1221SZ is 1221).

**2. DIP4/6 Type**

Type	Output rating		Type	Package size	Part No.			Packing quantity			
	Repetitive peak OFF-state voltage	ON-state RMS current			Through hole terminal	Surface-mount terminal					
					Tube packing style	Tape and reel packing style	Picked from the 1/2-pin side	Picked from the 3/4-pin side	Tube		
AC type	600 V	100 mA	Zero-cross (max. 50 V)	DIP4pin	APT1211	APT1211A	APT1211AX	APT1211AZ	[DIP4pin] 1 tube contains: 100 pcs. 1 batch contains: 1,000 pcs.	[DIP4pin] [DIP6pin] 1,000 pcs.	
			Zero-cross (max. 15 V)		APT1231	APT1231A	APT1231AX	APT1231AZ			
			Random		APT1221	APT1221A	APT1221AX	APT1221AZ			
	600 V	100 mA	Zero-cross (max. 50 V)	DIP6pin	APT1212	APT1212A	APT1212AX	APT1212AZ	[DIP6pin] 1 tube contains: 50 pcs. 1 batch contains: 500 pcs.	1,000 pcs.	
			Zero-cross (max. 15 V)		APT1232	APT1232A	APT1232AX	APT1232AZ			
			Random		APT1222	APT1222A	APT1222AX	APT1222AZ			

Note: For space reasons the initial letters "APT" of the product number for the DIP 4-pin type, the letter "A", which indicates the SMD terminal shape for the DIP 4-pin and 6-pin types, and the package type indications "X" and "Z" have been omitted from the product label. (Example: The label for product number APT1221AZ is 1221.)

**3. DIP6 Wide Terminal Type**

Type	Output rating*		Type	Package size	Part No.			Packing quantity			
	Repetitive peak OFF-state voltage	ON-state RMS current			Through hole terminal	Surface-mount terminal					
					Tube packing style	Tape and reel packing style	Picked from the 1/6-pin side	Picked from the 3/4-pin side	Tube		
AC type	600 V	100 mA	Zero-cross (max. 50 V)	DIP6pin	APT1212W	APT1212WA	APT1212WAY	APT1212WAW	1 tube contains: 50 pcs. 1 batch contains: 500 pcs.	1,000 pcs.	
			Zero-cross (max. 15 V)		APT1232W	APT1232WA	APT1232WAY	APT1232WAW			
			Random		APT1222W	APT1222WA	APT1222WAY	APT1222WAW			

Note: For space reasons the initial letters the letter "WA", which indicates the SMD terminal shape for the DIP 6-pin types, and the package type indications "Y" and "W" have been omitted from the product label. (Example: The label for product number APT1212WAY is 1212.)

## RATING

**1. Absolute maximum ratings** (Ambient temperature: 25°C 77°F)

1) SOP4 types

Item		Symbol	APT1211S, APT1221S, APT1231S	Remarks
Input	LED forward current	I <sub>F</sub>	50 mA	
	LED reverse voltage	V <sub>R</sub>	6 V	
	Peak forward current	I <sub>FP</sub>	1 A	f = 100 Hz, Duty Ratio = 0.1%
Output	Repetitive peak OFF-state voltage	V <sub>DRM</sub>	600 V	
	ON-state RMS current*	I <sub>T(RMS)</sub>	0.05 A	AC
	Non-repetitive surge current	I <sub>TSM</sub>	0.6 A	In one cycle at 60 Hz
Total power dissipation		P <sub>T</sub>	350 mW	
I/O isolation voltage		V <sub>iso</sub>	3,750 Vrms	
Temperature limits	Operating	T <sub>opr</sub>	-40 to +100°C -40 to +212°F	Non-condensing at low temperatures
	Storage	T <sub>stg</sub>	-40 to +125°C -40 to +257°F	

Note: "X" and "Z" at the end of the part numbers have been omitted.

2) DIP4/6 type and DIP6 Wide terminal type

Item		Symbol	APT1211, APT1221, APT1231, APT1212(W), APT1222(W), APT1232(W)	Remarks
Input	LED forward current	I <sub>F</sub>	50 mA	
	LED reverse voltage	V <sub>R</sub>	6 V	
	Peak forward current	I <sub>FP</sub>	1 A	f = 100 Hz, Duty Ratio = 0.1%
Output	Repetitive peak OFF-state voltage	V <sub>DRM</sub>	600 V	
	ON-state RMS current*	I <sub>T(RMS)</sub>	0.1 A	AC
	Non-repetitive surge current	I <sub>TSM</sub>	1.2 A	In one cycle at 60 Hz
Total power dissipation		P <sub>T</sub>	500 mW	
I/O isolation voltage		V <sub>iso</sub>	5,000 Vrms	
Temperature limits	Operating	T <sub>opr</sub>	-40 to +100°C -40 to +212°F	Non-condensing at low temperatures
	Storage	T <sub>stg</sub>	-40 to +125°C -40 to +257°F	

Note: "A", "AX", "AZ" "AY" and "AW" at the end of the part numbers have been omitted.

\* Do not exceed 0.05 A of ON state RMS current in case of following load voltage condition.

DIP4pin (APT1211, APT1221, APT1231): more than 100 Vrms;

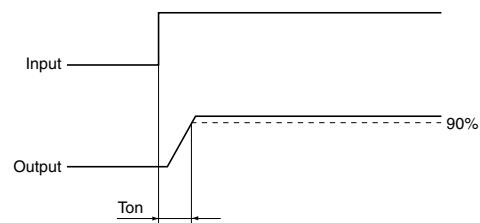
DIP6pin (APT1212, APT1222, APT1232) and DIP6pin wide terminal type (APT1212W, APT1222W, APT1232W): more than 120 Vrms.

**2. Characteristics (Ambient temperature: 25°C 77°F)**

## 1) Zero-cross type (max. 50 V) and random type

Item			Symbol	APT1211S, APT1211, APT1212(W)	APT1221S, APT1221, APT1222(W)	Condition
Input	LED dropout voltage	Typical	V <sub>F</sub>	1.21 V		I <sub>F</sub> = 20 mA
		Maximum		1.3 V		
	LED reverse current	Typical	I <sub>R</sub>	—		V <sub>R</sub> = 6 V
		Maximum		10 µA		
Output	Repetitive peak OFF-state current	Typical	I <sub>DRM</sub>	—		I <sub>F</sub> = 0 mA V <sub>DRM</sub> = 600 V
		Maximum		1 µA		
	Repetitive peak On-state voltage	Typical	V <sub>TM</sub>	1.3 V		I <sub>F</sub> = 10 mA I <sub>TM</sub> = 0.05 A
		Maximum		2.5 V		
	Holding current	Typical	I <sub>H</sub>	0.3 mA		
		Maximum		3.5 mA		
Transfer characteristics	Critical rate of rise of OFF-state voltage	Minimum	dV/dt	500 V/µs		V <sub>DRM</sub> = 600 V × 1/√2
	Trigger LED current	Maximum	I <sub>FT</sub>	10 mA		V <sub>D</sub> = 6 V R <sub>L</sub> = 100 Ω
	Zero-cross voltage	Maximum	V <sub>ZC</sub>	50 V	—	I <sub>F</sub> = 10 mA
	Turn on time*	Maximum	T <sub>on</sub>	100 µs		I <sub>F</sub> = 20 mA V <sub>D</sub> = 6 V R <sub>L</sub> = 100 Ω
	I/O capacitance	Maximum	C <sub>iso</sub>	1.5 pF		f = 1 MHz V <sub>B</sub> = 0 V
	I/O isolation resistance	Minimum	R <sub>iso</sub>	50 GΩ		500 V DC

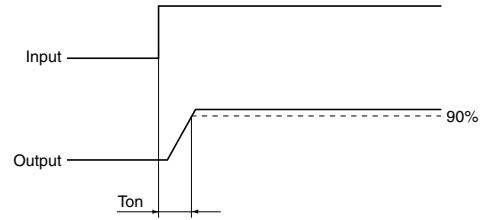
Note: 1. For type of connection, see "SCHEMATIC AND WIRING DIAGRAMS".

**\*Turn on time**

## 2) Zero-cross type (max. 15 V)

Item			Symbol	APT1231S, APT1231, APT1232(W)	Condition
Input	LED dropout voltage	Typical	V <sub>F</sub>	1.21 V	I <sub>F</sub> = 20 mA
		Maximum		1.3 V	
	LED reverse current	Typical	I <sub>R</sub>	—	V <sub>R</sub> = 6 V
		Maximum		10 µA	
Output	Repetitive peak OFF-state current	Typical	I <sub>DRM</sub>	—	I <sub>F</sub> = 0 mA V <sub>DRM</sub> = 600 V
		Maximum		1 µA	
	Repetitive peak On-state voltage	Typical	V <sub>TM</sub>	1.2 V	I <sub>F</sub> = 10 mA I <sub>TM</sub> = 0.03 A
		Maximum		2 V	
	Holding current	Typical	I <sub>H</sub>	0.3 mA	
		Maximum		3.5 mA	
Transfer characteristics	Critical rate of rise of OFF-state voltage	Minimum	dV/dt	500 V/µs	V <sub>DRM</sub> = 600 V × 1/√2
	Trigger LED current	Maximum	I <sub>FT</sub>	10 mA	I <sub>TM</sub> = 0.03 A
	Zero-cross voltage	Maximum	V <sub>ZC</sub>	15 V	I <sub>F</sub> = 10 mA
	Turn on time*	Maximum	T <sub>on</sub>	100 µs	I <sub>F</sub> = 20 mA I <sub>TM</sub> = 0.03 A
	I/O capacitance	Maximum	C <sub>iso</sub>	1.5 pF	f = 1 MHz V <sub>B</sub> = 0 V
	I/O isolation resistance	Minimum	R <sub>iso</sub>	50 GΩ	500 V DC

Note: 1. For type of connection, see "SCHEMATIC AND WIRING DIAGRAMS".

**\*Turn on time****RECOMMENDED OPERATING CONDITIONS**

Please use under recommended operating conditions to obtain expected characteristics.

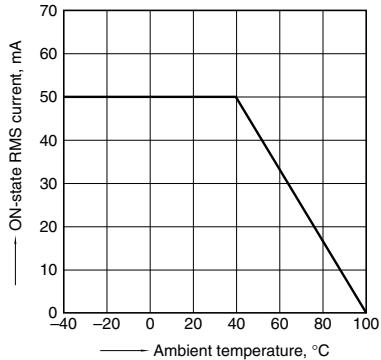
Item	Symbol	Min.	Max.	Unit
Input LED current	I <sub>F</sub>	15	25	mA

## REFERENCE DATA

### 1-(1). ON-state RMS current vs. ambient temperature characteristics

Allowable ambient temperature: -40 to +100°C  
-40 to +212°F

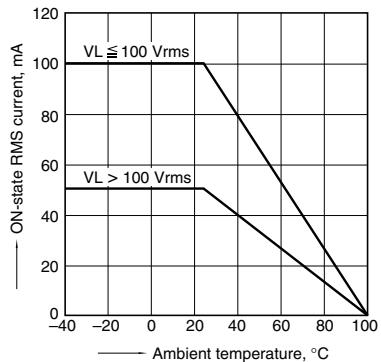
Tested sample: APT1211S, APT1221S



### 1-(4). ON-state RMS current vs. ambient temperature characteristics

Allowable ambient temperature: -40 to +100°C  
-40 to +212°F

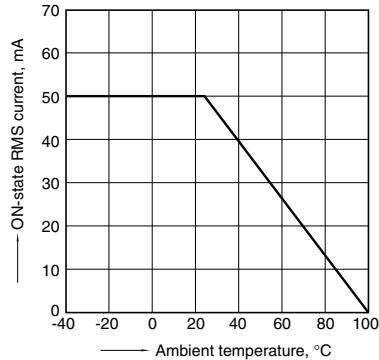
Tested sample: APT1231(A)



### 1-(2). ON-state RMS current vs. ambient temperature characteristics

Allowable ambient temperature: -40 to +100°C  
-40 to +212°F

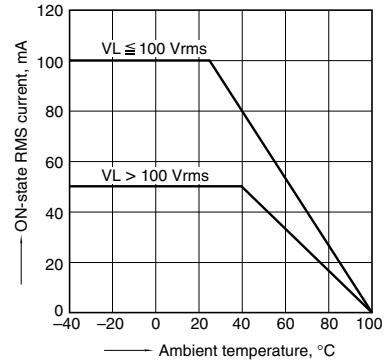
Tested sample: APT1231S



### 1-(3). ON-state RMS current vs. ambient temperature characteristics

Allowable ambient temperature: -40 to +100°C  
-40 to +212°F

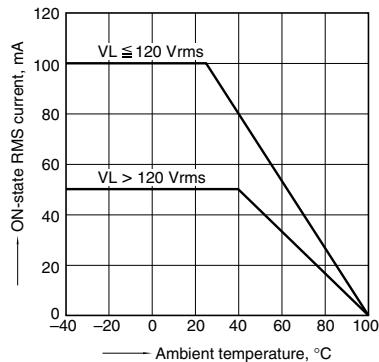
Tested sample: APT1211(A), APT1221(A)



### 1-(5). ON-state RMS current vs. ambient temperature characteristics

Allowable ambient temperature: -40 to +100°C  
-40 to +212°F

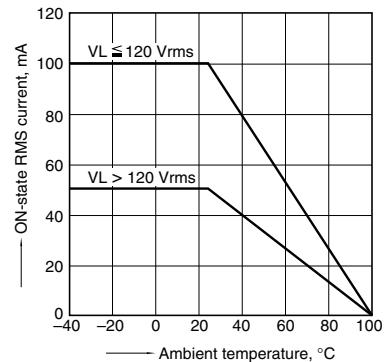
Tested sample: APT1212(A), APT1222(A), APT1212W(A), APT1222W(A)



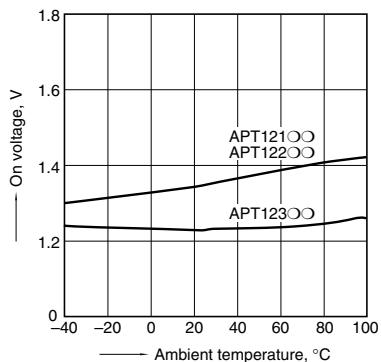
### 1-(6). ON-state RMS current vs. ambient temperature characteristics

Allowable ambient temperature: -40 to +100°C  
-40 to +212°F

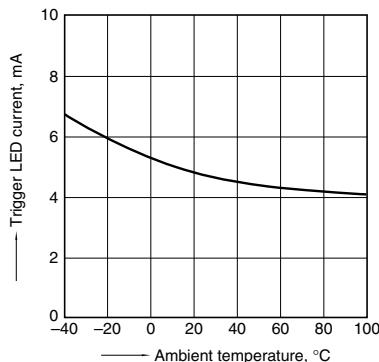
Tested sample: APT1232(A), APT1232W(A)



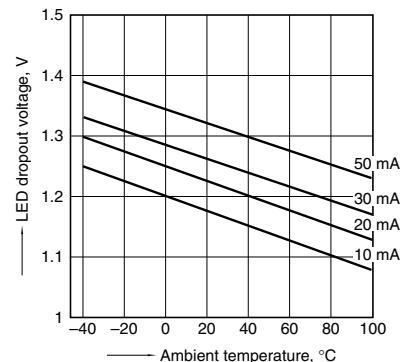
### 2. On voltage vs. ambient temperature characteristics



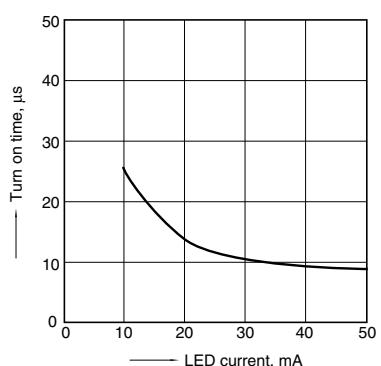
### 3. Trigger LED current vs. ambient temperature characteristics



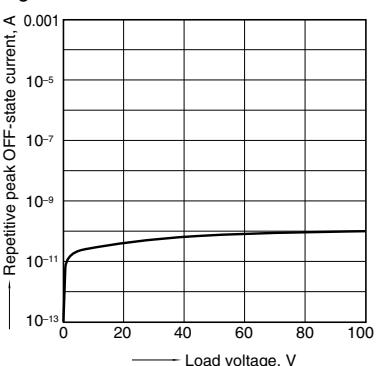
### 4. LED dropout voltage vs. ambient temperature characteristics



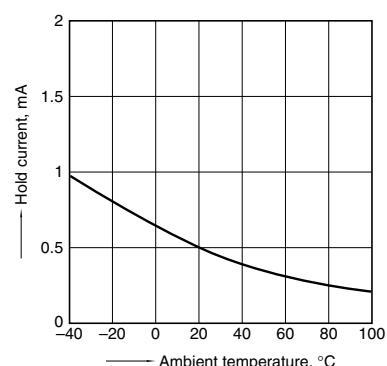
### 5. Turn on time vs. LED current characteristics



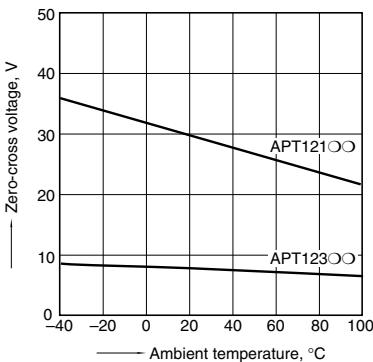
### 6. Repetitive peak OFF-state current vs. Load voltage characteristics



### 7. Hold current vs. ambient temperature characteristics



8. Zero-cross voltage vs. ambient temperature characteristics



## DIMENSIONS (mm inch)

### 1. SOP Type

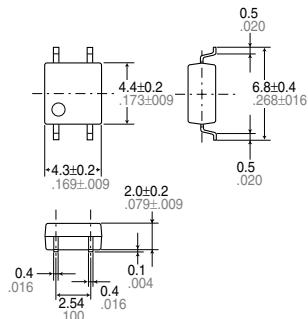
APT1211S, APT1221S, APT1231S

**CAD**

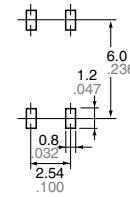


The CAD data of the products with a **CAD** mark can be downloaded from: <https://industrial.panasonic.com/ac/e/>

#### External dimensions



#### Recommended mounting pad (TOP VIEW)



Tolerance:  $\pm 0.1 \pm .004$

Terminal thickness = 0.15 .006  
General tolerance:  $\pm 0.1 \pm .004$

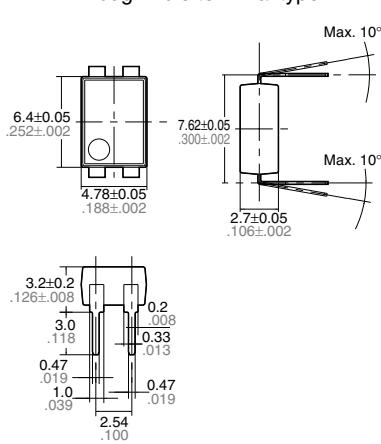
### 2. DIP4 Type

APT1211(A), APT1221(A), APT1231(A)

**CAD**

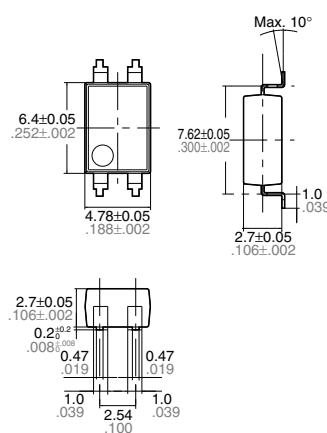


#### External dimensions



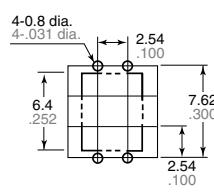
#### External dimensions

#### Surface mount terminal type



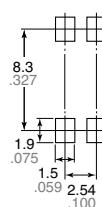
Terminal thickness = 0.20 .008  
General tolerance:  $\pm 0.1 \pm .004$

#### PC board pattern (BOTTOM VIEW)



Tolerance:  $\pm 0.1 \pm .004$

#### Recommended mounting pad (TOP VIEW)



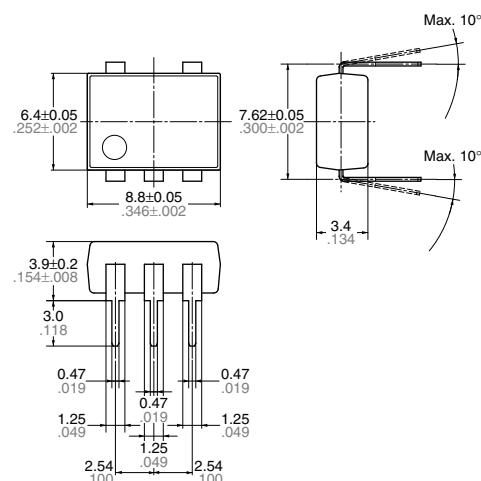
Tolerance:  $\pm 0.1 \pm .004$

**3. DIP6 Type**

APT1212(A), APT1222(A), APT1232(A)

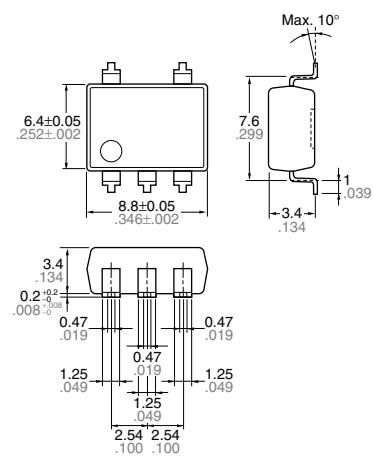
**CAD**

Through hole terminal type



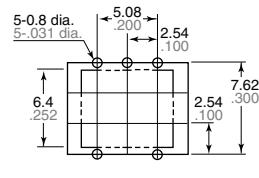
External dimensions

Surface mount terminal type

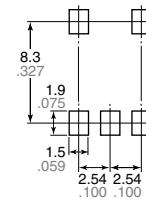


Terminal thickness = 0.25 .010  
General tolerance:  $\pm 0.1 \pm 0.004$

PC board pattern (BOTTOM VIEW)

Tolerance:  $\pm 0.1 \pm 0.004$ 

Recommended mounting pad (TOP VIEW)

Tolerance:  $\pm 0.1 \pm 0.004$

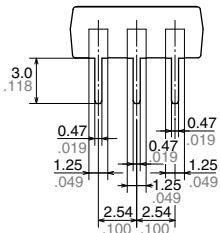
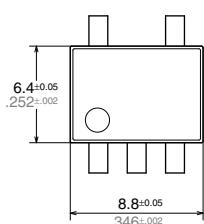
## 4. DIP6 Wide Terminal Type

APT1212W(A), APT1222W(A), APT1232W(A)

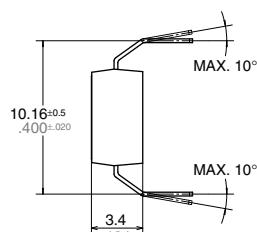
CAD



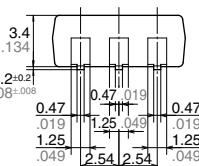
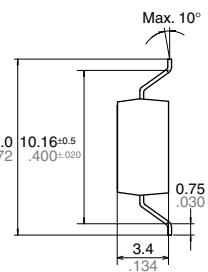
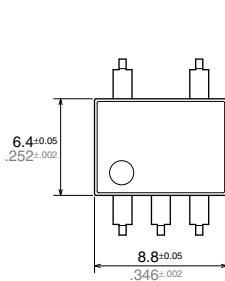
Through hole terminal type



External dimensions

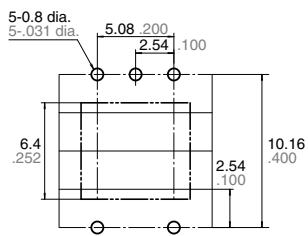


Surface mount terminal type

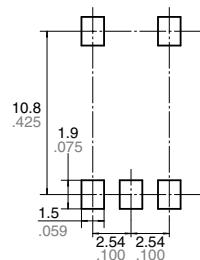


Terminal thickness = 0.25 .010  
General tolerance: ±0.1 ±.004

PC board pattern (BOTTOM VIEW)



Recommended mounting pad (TOP VIEW)



Tolerance: ±0.1 ±.004

Tolerance: ±0.1 ±.004

## SCHEMATIC AND WIRING DIAGRAMS

Schematic	Output configuration	Load	Wiring diagram
	1 Form A	AC	

---

Please contact .....

## Panasonic Corporation

Electromechanical Control Business Division

■ 1006, Oaza Kadoma, Kadomashi, Osaka 571-8506, Japan  
[industrial.panasonic.com/ac/e/](http://industrial.panasonic.com/ac/e/)

# Panasonic®

©Panasonic Corporation 2018

# Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

## Panasonic:

[APT1211](#) [APT1211AX](#) [APT1211AZ](#) [APT1211SX](#) [APT1211SZ](#) [APT1211W](#) [APT1211WA](#) [APT1211WAW](#)  
[APT1211WAY](#) [APT1212A](#) [APT1212AX](#) [APT1212AZ](#) [APT1212W](#) [APT1212WA](#) [APT1212WAW](#) [APT1212WAY](#)  
[APT1221AX](#) [APT1221AZ](#) [APT1221SX](#) [APT1221SZ](#) [APT1221W](#) [APT1221WA](#) [APT1221WAW](#) [APT1221WAY](#)  
[APT1222A](#) [APT1222AX](#) [APT1222AZ](#) [APT1222W](#) [APT1222WA](#) [APT1222WAW](#) [APT1222WAY](#) [APT1232A](#)  
[APT1212D05](#) [APT1222D05](#)

**Данный компонент на территории Российской Федерации****Вы можете приобрести в компании MosChip.**

Для оперативного оформления запроса Вам необходимо перейти по данной ссылке:

<http://moschip.ru/get-element>

Вы можете разместить у нас заказ для любого Вашего проекта, будь то серийное производство или разработка единичного прибора.

В нашем ассортименте представлены ведущие мировые производители активных и пассивных электронных компонентов.

Нашей специализацией является поставка электронной компонентной базы двойного назначения, продукции таких производителей как XILINX, Intel (ex.ALTERA), Vicor, Microchip, Texas Instruments, Analog Devices, Mini-Circuits, Amphenol, Glenair.

Сотрудничество с глобальными дистрибуторами электронных компонентов, предоставляет возможность заказывать и получать с международных складов практически любой перечень компонентов в оптимальные для Вас сроки.

На всех этапах разработки и производства наши партнеры могут получить квалифицированную поддержку опытных инженеров.

Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ Р В 0015-002 и ЭС РД 009

**Офис по работе с юридическими лицами:**

105318, г.Москва, ул.Щербаковская д.3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: [info@moschip.ru](mailto:info@moschip.ru)

Skype отдела продаж:

moschip.ru  
moschip.ru\_4

moschip.ru\_6  
moschip.ru\_9