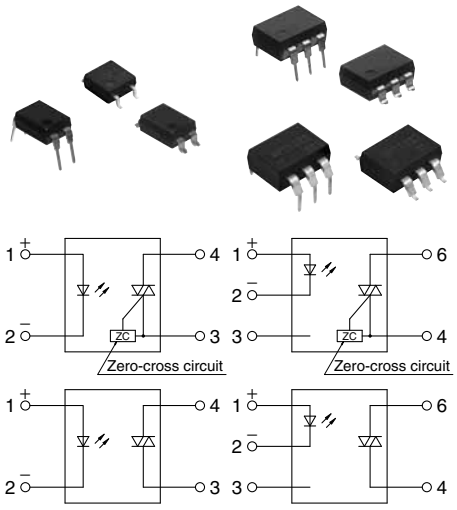
Phototriac coupler ideal for triac driver with wide variation

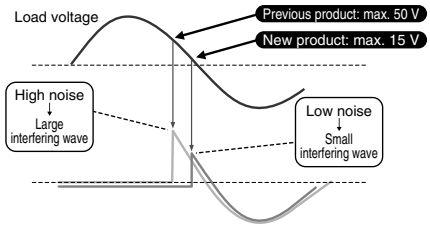
APT Phototriac Coupler



RoHS compliant

FEATURES

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
						Picked from the 1/2-pin side	Picked from the 3/4-pin side		
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	Tape and reel
					Tube packing style		Tape and reel packing style			
							Picked from the 1/2-pin side 1/2/3-pin side	Picked from the 3/4-pin side 4/6-pin side		
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. [DIP6pin] 1 tube contains: 50 pcs. 1 batch contains: 500 pcs.	[DIP4pin] [DIP6pin] 1,000 pcs.
			Zero-cross (max. 15 V)		APT1231	APT1231A	APT1231AX	APT1231AZ		
			Random		APT1221	APT1221A	APT1221AX	APT1221AZ		
			Zero-cross (max. 50 V)	DIP6pin	APT1212	APT1212A	APT1212AX	APT1212AZ		
			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	Tape and reel
					Tube packing style		Tape and reel packing style			
							Picked from the 1/6-pin side	Picked from the 3/4-pin side		
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_F	50 mA	
	LED reverse voltage		V_R	6 V	
	Peak forward current		I_{FP}	1 A	f = 100 Hz, Duty Ratio = 0.1%
Output	Repetitive peak OFF-state voltage		V_{DRM}	600 V	
	ON-state RMS current*		$I_{T(RMS)}$	0.05 A	AC
	Non-repetitive surge current		I_{TSM}	0.6 A	In one cycle at 60 Hz
Total power dissipation			P_T	350 mW	
I/O isolation voltage			V_{iso}	3,750 Vrms	
Temperature limits		Operating	T_{opr}	–40 to +100°C –40 to +212°F	Non-condensing at low temperatures
		Storage	T_{stg}	–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_F	50 mA	
	LED reverse voltage		V_R	6 V	
	Peak forward current		I_{FP}	1 A	f = 100 Hz, Duty Ratio = 0.1%
Output	Repetitive peak OFF-state voltage		V_{DRM}	600 V	
	ON-state RMS current*		$I_{T(RMS)}$	0.1 A	AC
	Non-repetitive surge current		I_{TSM}	1.2 A	In one cycle at 60 Hz
Total power dissipation			P_T	500 mW	
I/O isolation voltage			V_{iso}	5,000 Vrms	
Temperature limits		Operating	T_{opr}	–40 to +100°C –40 to +212°F	Non-condensing at low temperatures
		Storage	T_{stg}	–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.

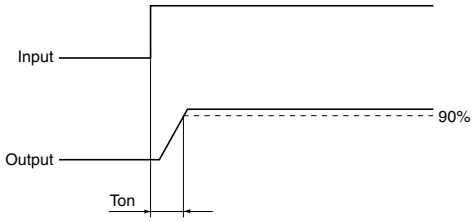
2. Characteristics (Ambient temperature: 25°C 77°F)

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_F	1.21 V		I_F = 20 mA
		Maximum		1.3 V		
	LED reverse current	Typical	I_R	—		V_R = 6 V
		Maximum		10 μA		
Output	Repetitive peak OFF-state current	Typical	I_{DRM}	—		I_F = 0 mA V_{DRM} = 600 V
		Maximum		1 μA		
	Repetitive peak On-state voltage	Typical	V_{TM}	1.3 V		I_F = 10 mA I_{TM} = 0.05 A
		Maximum		2.5 V		
	Holding current	Typical	I_H	0.3 mA		
		Maximum		3.5 mA		
	Critical rate of rise of OFF-state voltage	Minimum	dv/dt	500 V/μs		V_{DRM} = 600 V ×1/√2
Transfer characteristics	Trigger LED current	Maximum	I_{FT}	10 mA		V_D = 6 V R_L = 100 Ω
	Zero-cross voltage	Maximum	V_{ZC}	50 V	—	I_F = 10 mA
	Turn on time*	Maximum	T_{on}	100 μs		I_F = 20 mA V_D = 6 V R_L = 100 Ω
	I/O capacitance	Maximum	C_{iso}	1.5 pF		f = 1 MHz V_B = 0 V
	I/O isolation resistance	Minimum	R_{iso}	50 GΩ		500 V DC

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

***Turn on time**

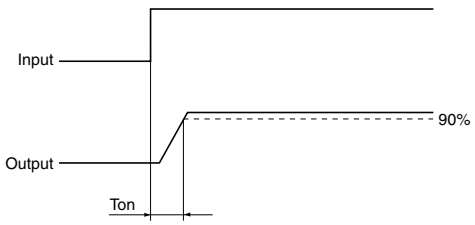


2) Zero-cross type (max. 15 V)

Item			Symbol	APT1231S, APT1231, APT1232(W)	Condition
Input	LED dropout voltage	Typical	V_F	1.21 V	I_F = 20 mA
		Maximum		1.3 V	
	LED reverse current	Typical	I_R	—	V_R = 6 V
		Maximum		10 μA	
Output	Repetitive peak OFF-state current	Typical	I_{DRM}	—	I_F = 0 mA V_{DRM} = 600 V
		Maximum		1 μA	
	Repetitive peak On-state voltage	Typical	V_{TM}	1.2 V	I_F = 10 mA I_{TM} = 0.03 A
		Maximum		2 V	
	Holding current	Typical	I_H	0.3 mA	
		Maximum		3.5 mA	
	Critical rate of rise of OFF-state voltage	Minimum	dv/dt	500 V/μs	V_{DRM} = 600 V ×1/√2
Transfer characteristics	Trigger LED current	Maximum	I_{FT}	10 mA	I_{TM} = 0.03 A
	Zero-cross voltage	Maximum	V_{ZC}	15 V	I_F = 10 mA
	Turn on time*	Maximum	T_{on}	100 μs	I_F = 20 mA I_{TM} = 0.03 A
	I/O capacitance	Maximum	C_{iso}	1.5 pF	f = 1 MHz V_B = 0 V
	I/O isolation resistance	Minimum	R_{iso}	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.

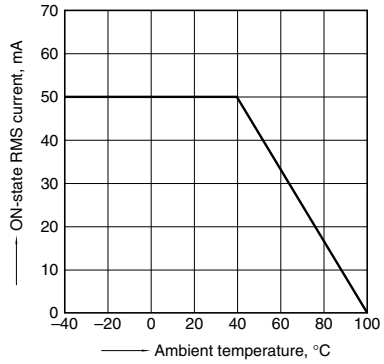
Item	Symbol	Min.	Max.	Unit
Input LED current	I_F	15	25	mA

REFERENCE DATA

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

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

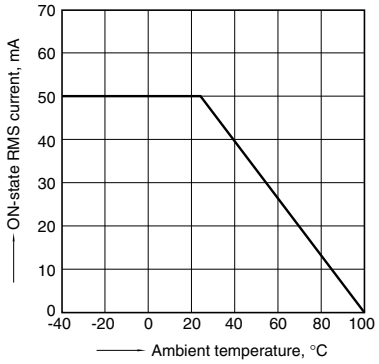
Tested sample: APT1211S, APT1221S



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

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

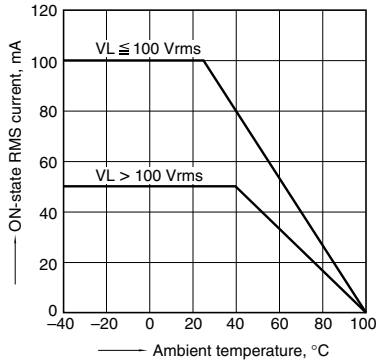
Tested sample: APT1231S



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

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

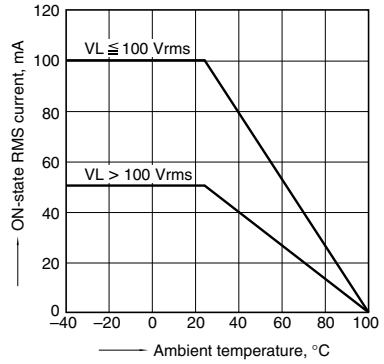
Tested sample: APT1211(A), APT1221(A)



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

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

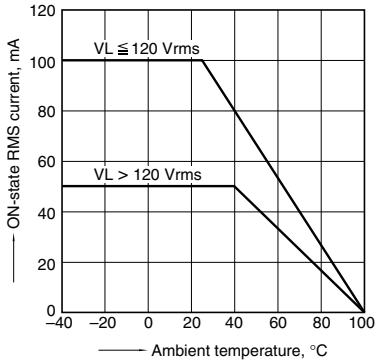
Tested sample: APT1231(A)



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

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

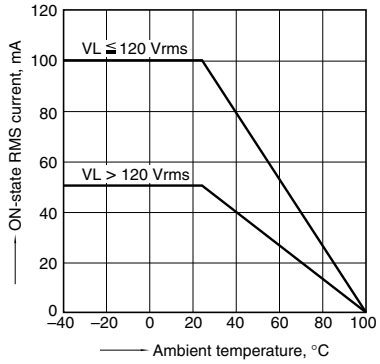
Tested sample: APT1212(A), APT1222(A), APT1212W(A), APT1222W(A)



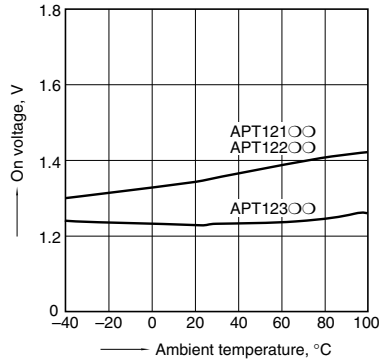
1-(6). ON-state RMS current vs. ambient temperature characteristics

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

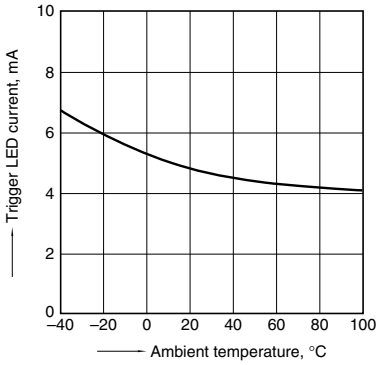
Tested sample: APT1232(A), APT1232W(A)



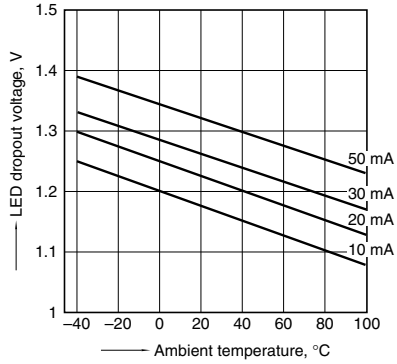
2. On voltage vs. ambient temperature characteristics



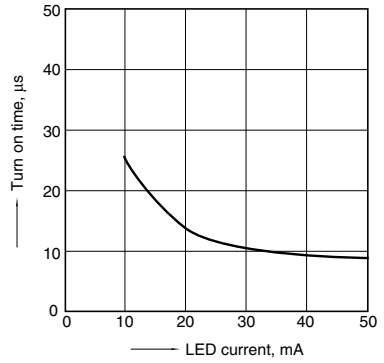
3. Trigger LED current vs. ambient temperature characteristics



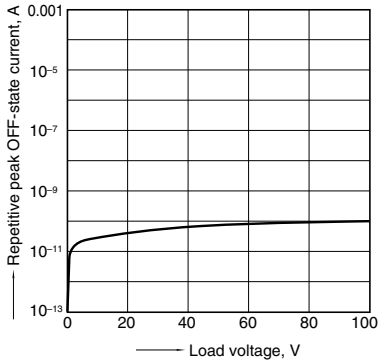
4. LED dropout voltage vs. ambient temperature characteristics



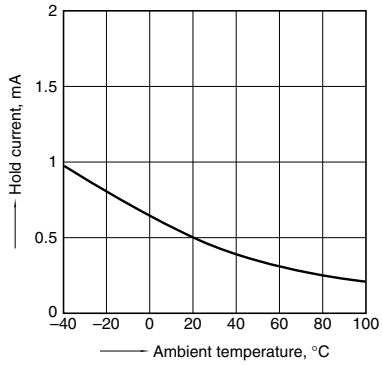
5. Turn on time vs. LED current characteristics



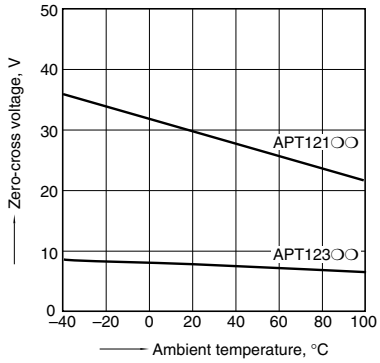
6. Repetitive peak OFF-state current vs. Load voltage characteristics



7. Hold current vs. ambient temperature characteristics



8. Zero-cross voltage vs. ambient temperature characteristics



DIMENSIONS (mm inch)

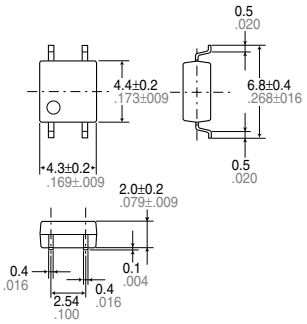
The CAD data of the products with a CAD mark can be downloaded from: https://industrial.panasonic.com/ac/e/

1. SOP Type

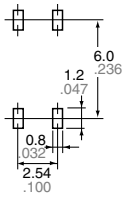
APT1211S, APT1221S, APT1231S

CAD

External dimensions



Recommended mounting pad (TOP VIEW)



Tolerance: ±0.1 ±.004

Terminal thickness = 0.15 .006
General tolerance: ±0.1 ±.004

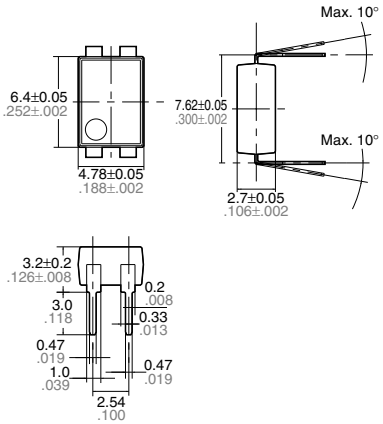
2. DIP4 Type

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

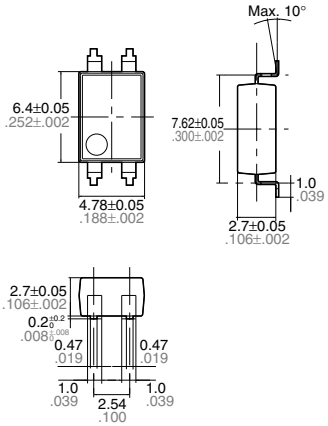
CAD

External dimensions

Through hole terminal type

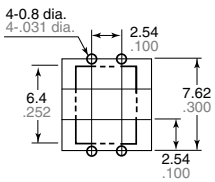


Surface mount terminal type



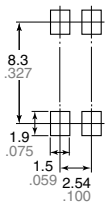
Terminal thickness = 0.20 .008
General tolerance: ±0.1 ±.004

PC board pattern (BOTTOM VIEW)



Tolerance: ±0.1 ±.004

Recommended mounting pad (TOP VIEW)



Tolerance: ±0.1 ±.004

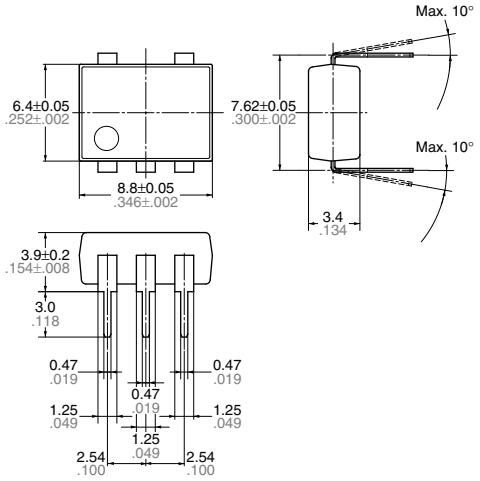
3. DIP6 Type

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

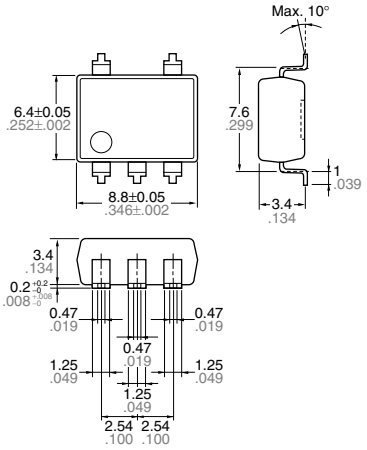
CAD

External dimensions

Through hole terminal type

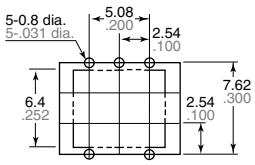


Surface mount terminal type



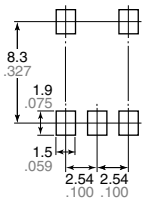
Terminal thickness = 0.25 .010
General tolerance: ±0.1 ±.004

PC board pattern (BOTTOM VIEW)



Tolerance: ±0.1 ±.004

Recommended mounting pad (TOP VIEW)

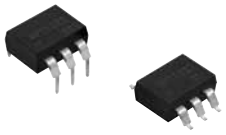


Tolerance: ±0.1 ±.004

4. DIP6 Wide Terminal Type

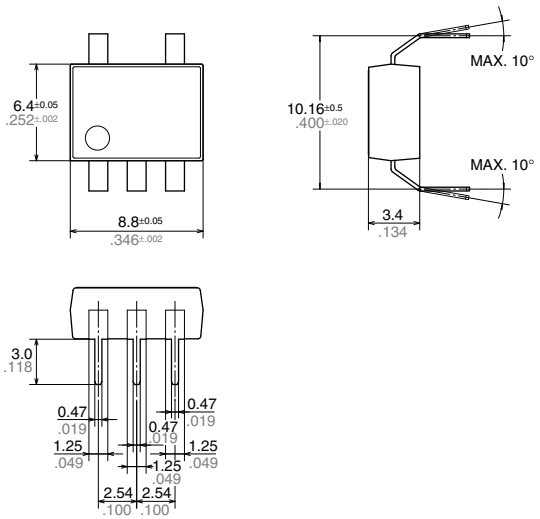
APT1212W(A), APT1222W(A), APT1232W(A)

CAD

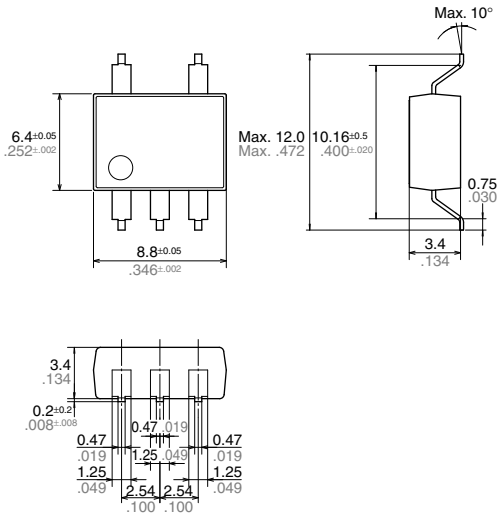


External dimensions

Through hole terminal type



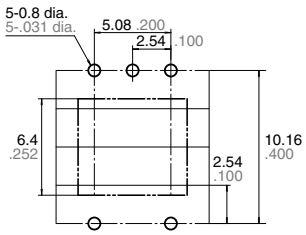
Surface mount terminal type



Terminal thickness = 0.25 .010

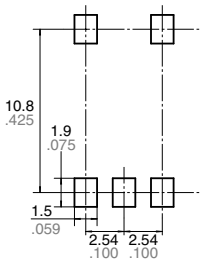
General tolerance: ±0.1 ±.004

PC board pattern (BOTTOM VIEW)



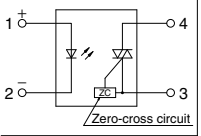
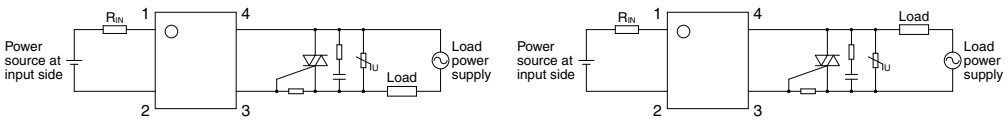
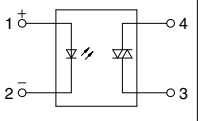
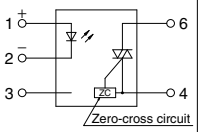
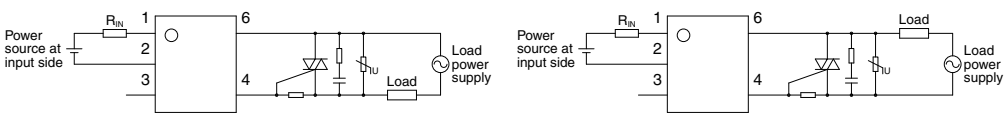
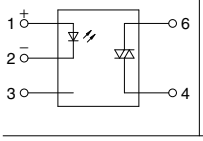
Tolerance: ±0.1 ±.004

Recommended mounting pad (TOP VIEW)



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, Kadoma-shi, Osaka 571-8506, Japan
industrial.panasonic.com/ac/e/

Panasonic®

ASCTB217E-1 201806-T

Mouser Electronics

Authorized Distributor

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

Panasonic:

APT1221S APT1211S APT1232AZ APT1231S APT1231W APT1231AX APT1232W APT1231WA APT1231 APT1232AX APT1231WAY APT1231A APT1232WAY APT1232 APT1232WA APT1231SX