

Parameter	Symbol	Rating	Units
Load Voltage	VL	60	V
Load Current	IL	0.40	A
On-Resistance	Ron	1	Ω
I/O Breakdown Voltage	VISO	5000	Vrms

RoHS

Pb-Free

Halogen-Free

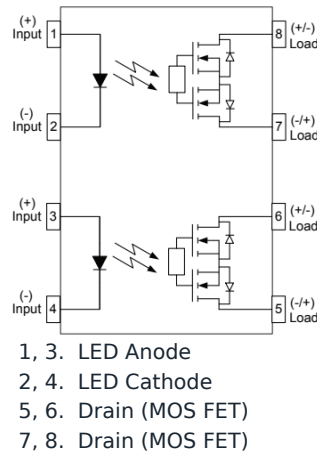
UL E534710



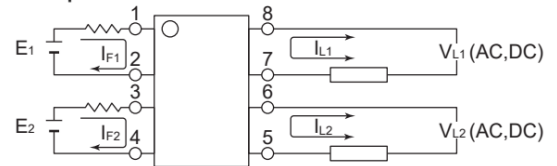
SMD-8



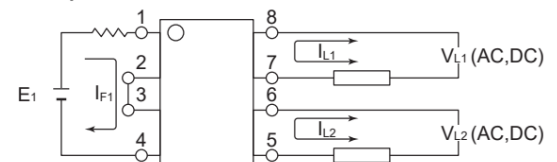
DIP-8



(1) 2 input



(2) 1 input



PhotoRelays

Photorelays are the most reliable, technically advanced logic-to-power interface devices. Their basic function is to take a low current signal from a microprocessor to control the switching of both AC and DC loads, while providing an isolation barrier between logic and power. While this function is common to all relays, Photorelays provide distinct advantages over their mechanical counterparts including:

- Long life (No limit on mechanical and electrical lifetime)
- Bounce-free switching
- Higher speed and high frequency switching
- Higher sensitivity (less power consumption)
- Immunity to EMI or RFI
- No voltaic arc, bounce, and noise
- More resistant to vibration and impact
- AC or DC load switching
- Small package size

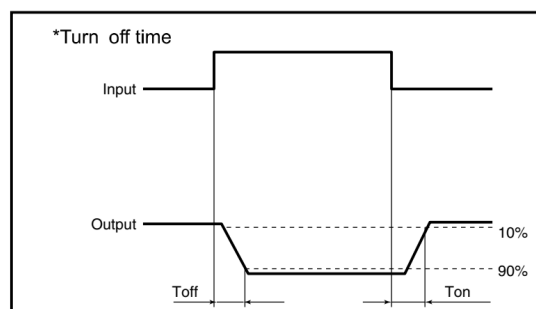
Applications

These advantages make Photorelays the ideal choice for:

- Telecom/Datacom switching
- Multiplexers
- Meter reading systems
- Data acquisition
- Medical equipment
- Battery monitoring
- I/O Sub-Systems
- Robotics
- Aerospace
- Home/Safety security systems
- Process Control
- Energy Management
- Reed Relay EMR Replacement
- Programmable Controllers

TYPES

Category	Output Rating		Package	Part No.	Packing Quantity
	Load Voltage	Load Current			
AC / DC	60V	400mA	DIP-8	OPT2412E	50pcs /tube
			SMD-8	OPT2412EH	1000pcs /reel



Absolute Maximum Ratings (Ta = 25°C)

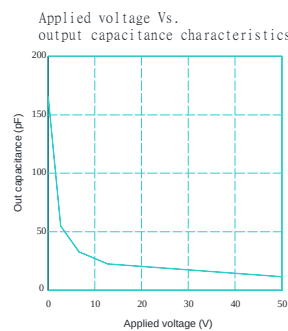
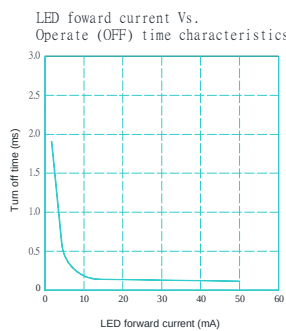
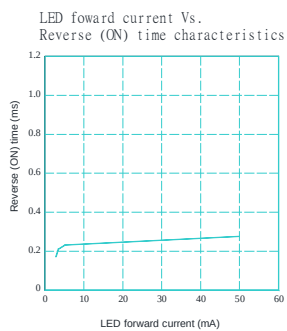
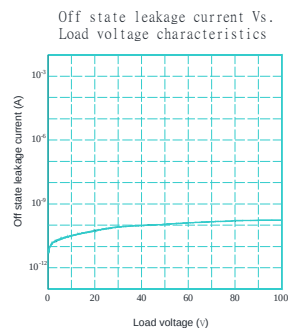
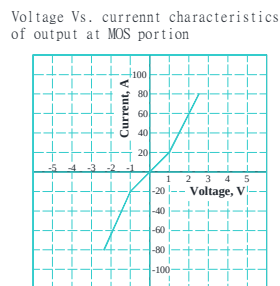
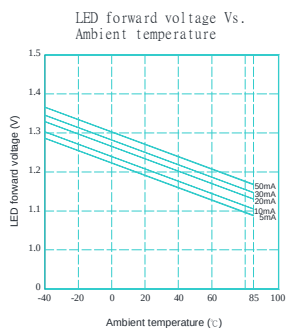
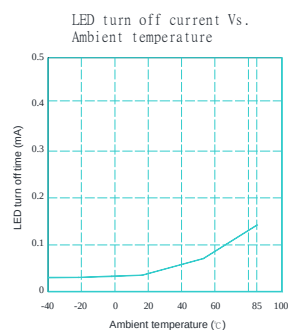
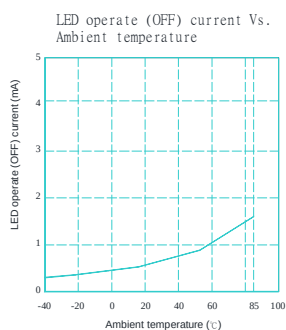
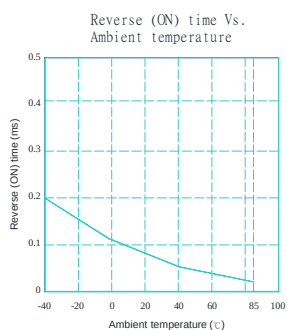
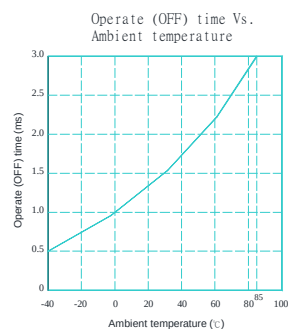
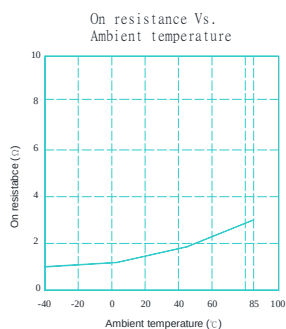
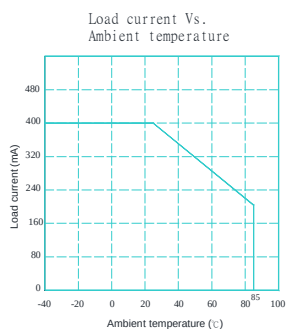
Item		Symbol	Value	Units	Note
Input	Continuous LED Current	IF	50	mA	
	Peak LED Current	IFP	1000	mA	f=100Hz, duty=1%
	LED Reverse Voltage	VR	5	V	
	Input Power Dissipation	Pin	75	mW	
Output	Load Voltage	VL	60	V(AC peak or DC)	
	Load Current	IL	0.40	A	
	Peak Load Current	IPeak	1.00	A	1ms (1 pulse)
	Output Power Dissipation	Pout	350	mW	
	Total Power Dissipation	PT	400	mW	
	I/O Breakdown Voltage	VI/O	5000	Vrms	RH=60%, 1min
	Operating Temperature	Topr	-40 to 85	°C	
	Storage Temperature	Tstg	-40 to 100	°C	
	Pin Soldering Temperature	Tsol	260	°C	10 sec max.

Electrical Characteristics (Ta = 25°C)

Item		Symbol	MIN.	TYP.	MAX.	Units	Conditions
Input *	LED Forward Voltage	VF		1.2	1.4	V	IF=10mA
	Operation LED Current	IFon		0.5	3.0	mA	
	Recovery LED Current	IFoff	0.1	0.4		mA	
	Recovery LED Voltage	VFoff	0.5			V	
Output	On-Resistance	Ron		1	6	Ω	IF=0mA, IL=100mA, within 1 sec.
	Off-State Leakage Current	ILeak	0.01	0.02	0.1	uA	VL=Rating
	Output Capacitance	Cout		165		pF	VL=0, f=1MHz
Transmission	Turn-On Time	Ton		0.50	1.5	ms	IF=5mA, IL=100mA,
	Turn-Off Time	Toff		0.25	2.0	ms	
Coupled	I/O Isolation Resistance	RI/O	10 ¹⁰			Ω	DC500V
	I/O Capacitance	CI/O		0.8		pF	f=1MHz

* To ensure satisfactory performance of the device across the temperature range, taking into account both circuit loss and interference, it is recommended to operate when the working condition is: IF (input current) ≥ 5 mA and ≤ 30 mA

Engineering Data (Typical Characteristics)

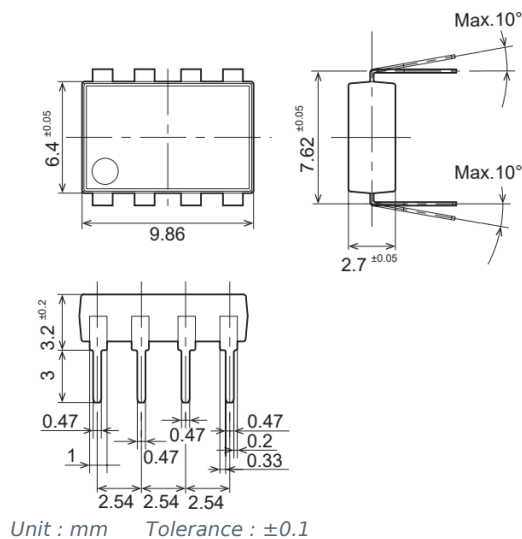


Dimensions and DIP-8 Package

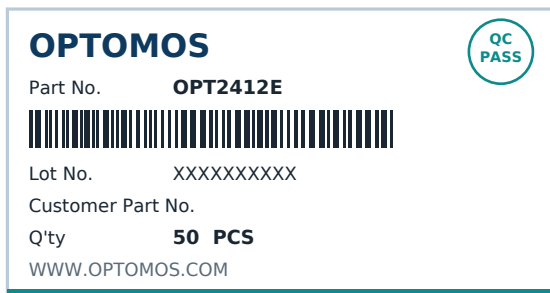
Marking



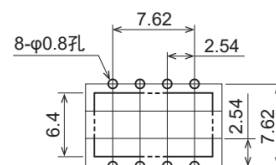
Through hole terminal type



Label

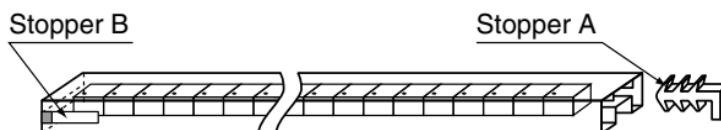


PC board pattern (Bottom view)



DIP Tape dimensions

Devices are packaged in a tube so that pin No. 1 is on the stopper B side. Observe correct orientation when mounting them on PC boards.

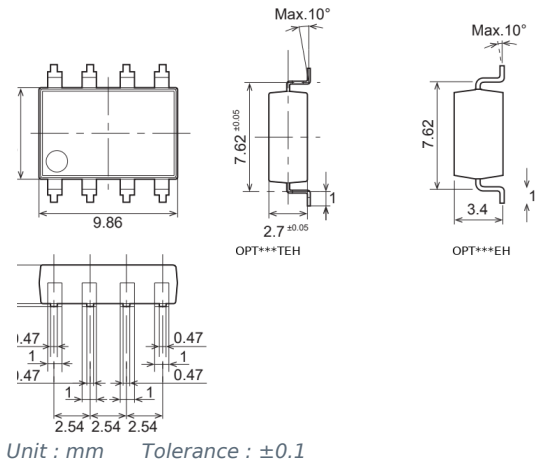


Dimensions and SMD-8 Package

Marking



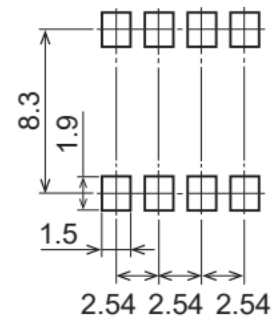
Surface mount terminal type



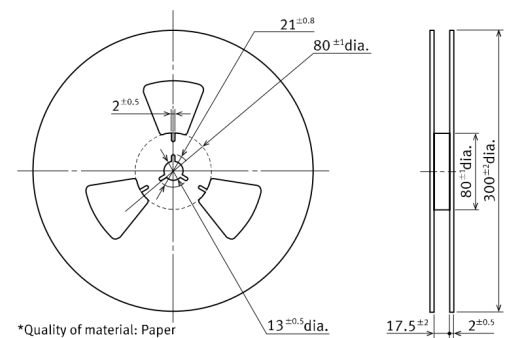
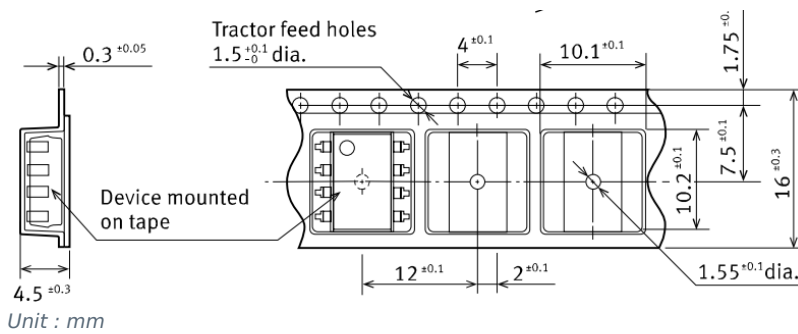
Label



Recommended mounting pad (Top view)

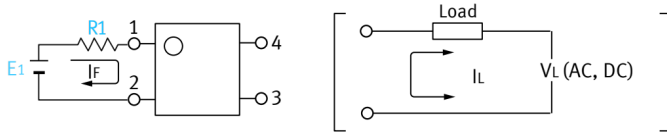


Tape dimensions (tape reel)



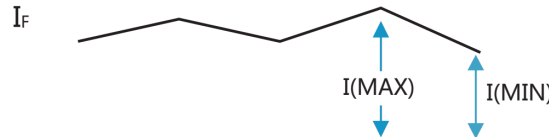
Using Methods

Examples of resistance value to control LED forward current ($I_F = 5\text{mA}$)



E1	R1 (Approx)
3.3V	300 Ω
5.0V	600 Ω
12V	1.9K Ω
24V	4.1K Ω

LED forward current must be more than 5mA, at $I_F(\text{MIN})$, and less than 30mA, at $I_F(\text{MAX})$.



Recommended Operating Conditions

Please obey the following conditions to ensure proper device operation and resetting. Input LED current (Recommended value):

Characteristic	Symbol	Min	Typ.	Max	Unit
Forward current	I_F	5.0	7.0	30	mA

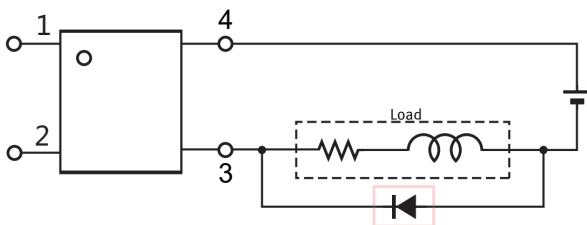
For usage with high reliability, Recommended Operation Conditions is a measure that takes into account the derating of Absolute Maximum Ratings and Electrical Characteristics. Each item on this list is an independent condition, so it is not simultaneously satisfy several conditions.

Protection Circuit

Output spike voltages: if an inductive load generates spike voltages which exceed the absolute maximum rating, the spike voltage shall be limited.

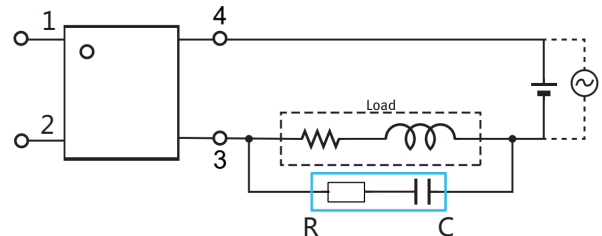
Clamp diode is connected in parallel with the load.

Absorb capacity with external diode.



CR Snubber is connected in parallel with the load.

Absorb capacity with buffer capacity.



When adding diodes, buffer circuits (C-R), and other protections, they need to be installed near the MOS RELAY to be effective. Adding protection elements may result in a slow reset time, so adjust them according to the actual situation before use.

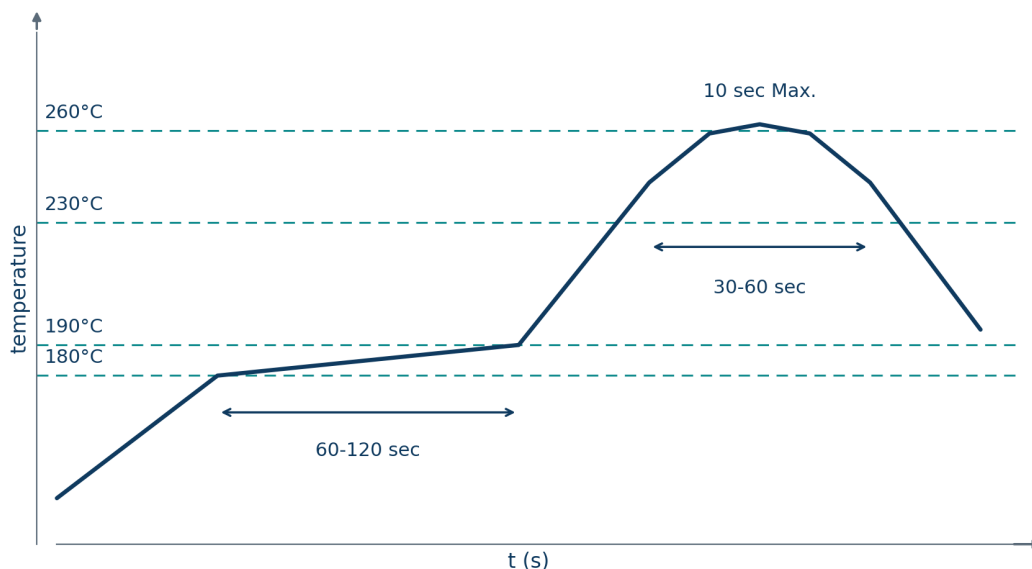
Note: When developing designs using this product, perform the expected performance of the equipment under the operating conditions recommended by the guidelines in this document. Continuous use under heavy loads (including, but not limited to, the application of high temperatures/current/voltage and significant changes in temperature, etc.) may result in deterioration of the reliability of this product.

Recommended Soldering Conditions

(a) Infrared reflow soldering :

- Peak reflow soldering : 260°C or below (package surface temperature)
- Time of peak reflow temperature : 10 sec
- Time of temperature higher than 230°C : 30-60 sec
- Time to preheat temperature from 180~190°C : 60-120 sec
- Time(s) of reflow : Two
- Flux : Rosin flux containing small amount of chlorine (The flux with a maximum chlorine content of 0.2 Wt% is recommended.)

Recommended Temperature Profile of Infrared Reflow



(b) Wave soldering :

- Temperature : 260°C or below (molten solder temperature)
- Time : 10 seconds or less
- Preheating conditions : 120°C or below (package surface temperature)
- Time(s) of reflow : One
- Flux : Rosin flux containing small amount of chlorine (The flux with a maximum chlorine content of 0.2 Wt% is recommended.)

(c) Cautions :

- Fluxes : Avoid removing the residual flux with freon-based and chlorine-based cleaning solvent.
- Avoid shorting between portion of frame and leads.

■ RESTRICTIONS ON PRODUCT USE

OPTOMOS Co. and its subsidiaries and affiliates (collectively "OPTOMOS") reserve the right to make changes to all information contained in this document relating to hardware, software, and systems (collectively "Products").

No information in this document may be reproduced without the prior written permission of OPTOMOS. Even with OPTOMOS's written permission, this document may only be reproduced if it is guaranteed to be unaltered or missing.

OPTOMOS assumes no responsibility for unintended uses of the product:

Unintended uses include, but are not limited to, equipment used in nuclear facilities, equipment used in the aerospace industry, medical equipment, automobiles, trains, ships, and other transportation equipment, traffic signalling equipment, equipment used for the control of combustion or explosions, safety devices, elevators and escalators, equipment used in electrical power-related applications, and equipment used in financial-related applications.

OPTOMOS assumes no responsibility for the product if you use it for any purpose other than the specific purpose described in this document.

- The information contained herein is provided only as a guide for the use of the product. OPTOMOS assumes no responsibility for infringement of third party patents or any other intellectual property rights that may result from the use of the product. This document does not grant any license, express or implied, estoppel or otherwise, to any intellectual property.
- GaAs (Gallium Arsenide) is used in products and is harmful to humans. Inadvertent ingestion or absorption of GaAs can harm the human body, so handle the product with care and do not break, cut, crush, grind, chemically dissolve, or otherwise expose GaAs in the product.
- Please be aware of environmental issues and use products in compliance with all applicable laws and regulations governing the inclusion or use of controlled substances, including but not limited to the EU RoHS Directive. OPTOMOS assumes no responsibility for damages or losses resulting from non-compliance with applicable laws and regulations.