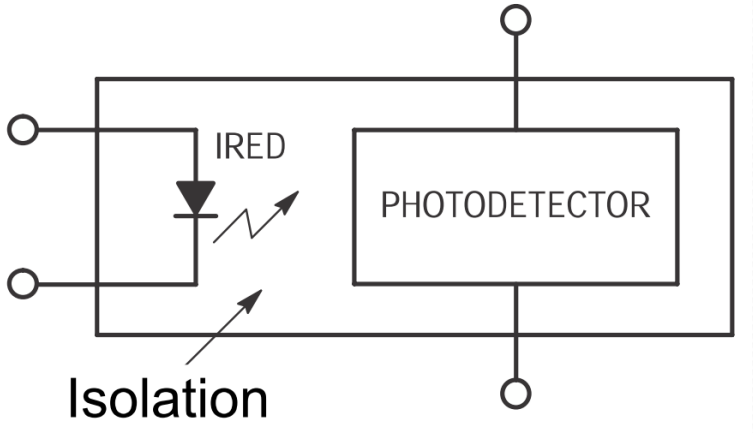
"Quality components when you need them"

Optocoupler

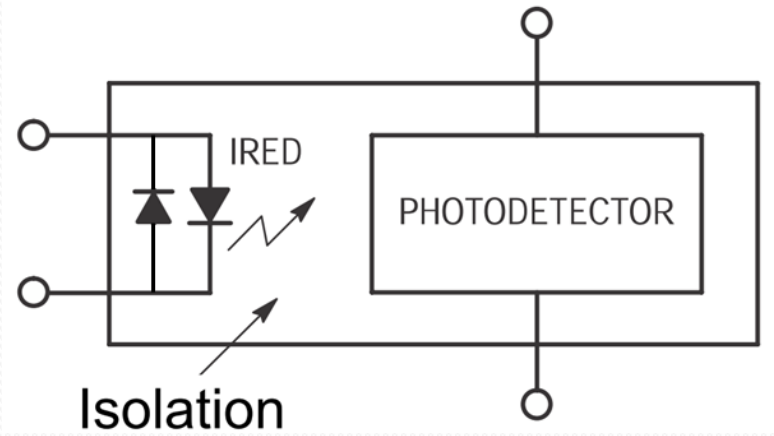
- Isolation between Data Transfer,
- Computer Peripheral Interface,
- Industrial Control,
- Numerical Control,
- SMPS Voltage Regulation,
- Switch,
- Motor Control,
- IGBT / MOSFET Drive in Inverters/UPS
- Signal / Voltage Level Sensing.

Optocoupler

Input : IRED – DC or AC
Output : Photodetector
Isolation : 5000Vac or 3750Vac



DC Input



AC Input

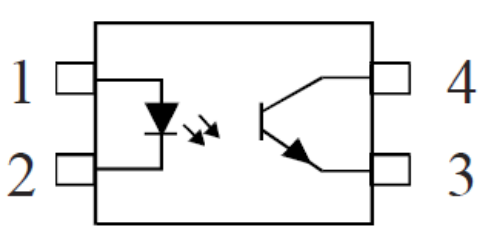
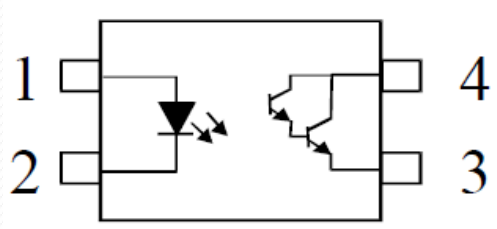
Optocoupler : Output Types

- **Phototransistor / Darlington :**
  - Single Channel – 4 pin,
    6 pin, with Base and without Base,
  - Dual Channel – 8 pin, Symmetrical Configuration available,
  - Quad Channel – 16 pin, Symmetrical Configuration available,
  - Optical Switch.
- **Photo Triac :**
  - Non Zero Crossing (Random Phase),
  - Zero Crossing.
- **Schmitt Trigger**
- **IGBT / MOSFET Driver**
- **High Speed, Single / Dual Channel :**
  - 1 Mbps,
  - 10Mbps,
  - Split Darlington.

Optocoupler : Output Types

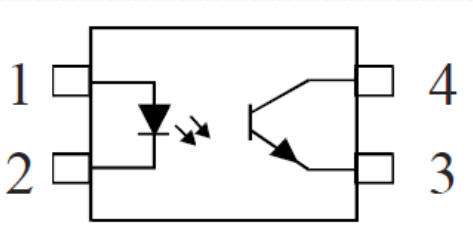
ISOCOM COMPONENTS

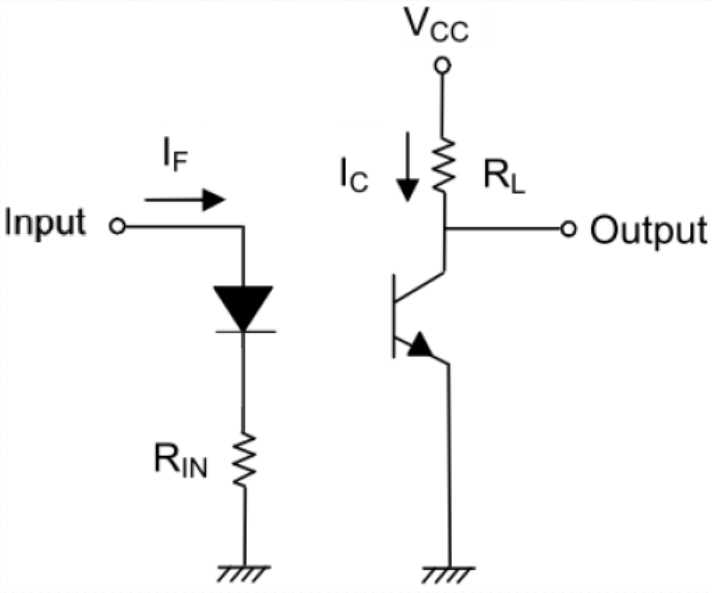
- **Phototransistor / Darlington**

	Transistor	Darlington Transistor
Symbol		
CTR (%)	Normal up to 600 Some PN can be up to 1200	Up to 7500

Optocoupler : CTR

CTR : Current Transistor Ratio　电流传输比



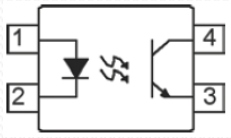
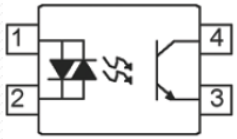
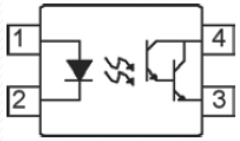
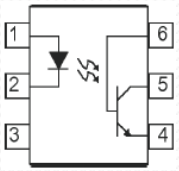
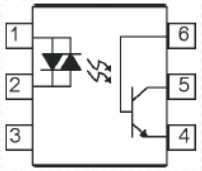
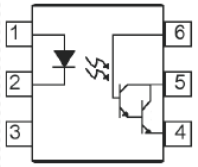
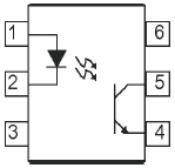
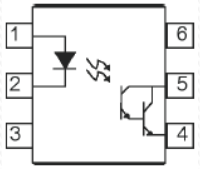
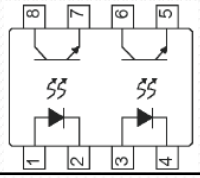
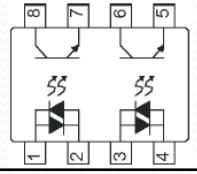
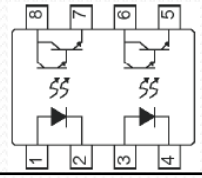
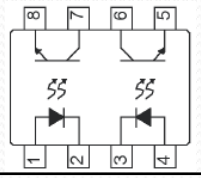
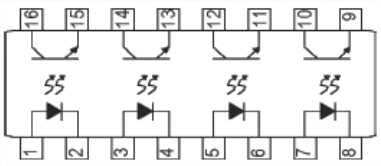
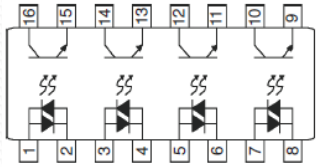
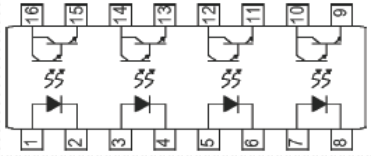
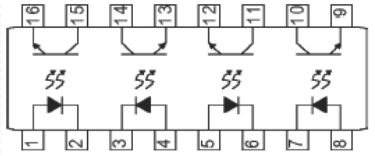


$$CTR = \frac{I_C}{I_F} \times 100\%$$

Optocoupler : Output Types

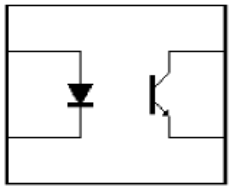
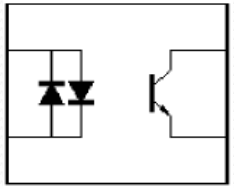
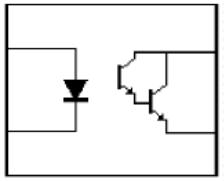
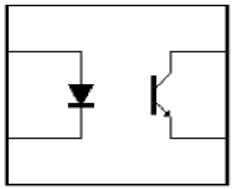
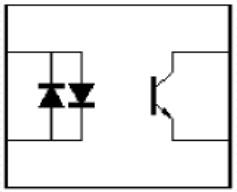
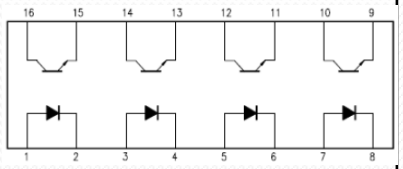
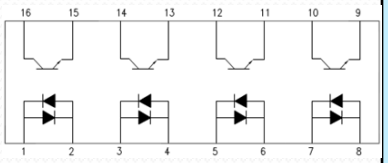
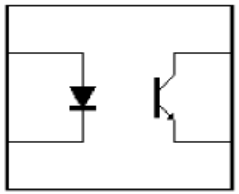
ISOCOM COMPONENTS

- **Phototransistor / Darlington (Standard Size) :**

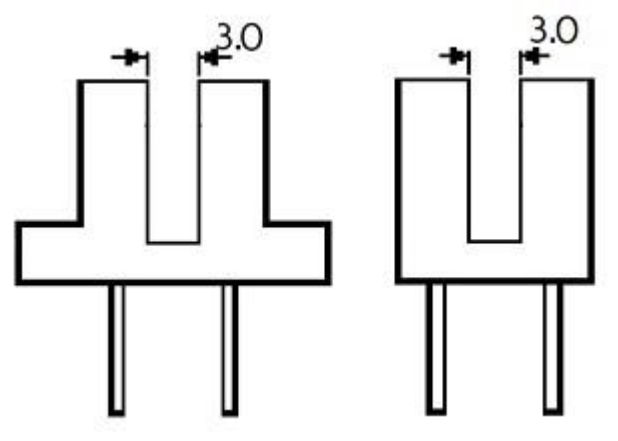
	DC Input	AC Input	Darlington	Symmetrical
4 Pin				
6 Pin With Base				
6 Pin Non Base				
8 Pin Dual Channel				
16 Pin Quad Channel				

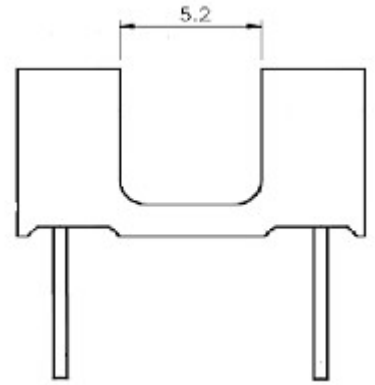
Optocoupler : Output Types

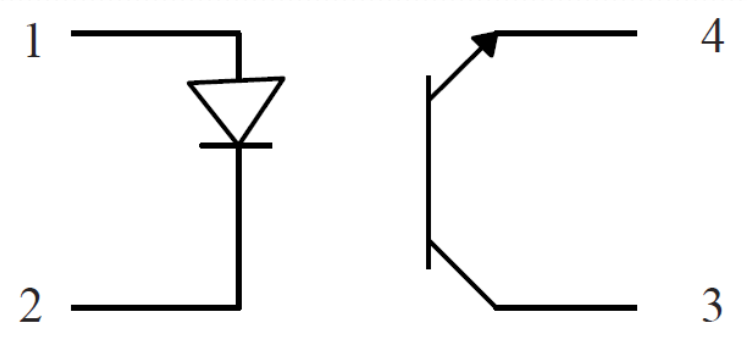
- **Phototransistor / Darlington (Mini Flat and Half Pitch) :**

		DC Input	AC Input	Darlington
Mini Flat	4 Pin			
Half Pitch	4 Pin			
	16 Pin			
Long Creepage	4 Pin			

Optocoupler : Opto Switch

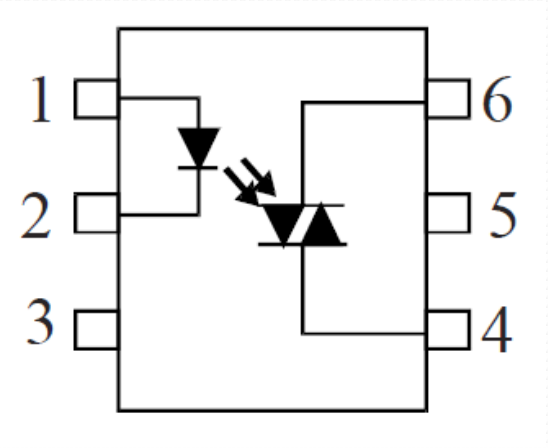




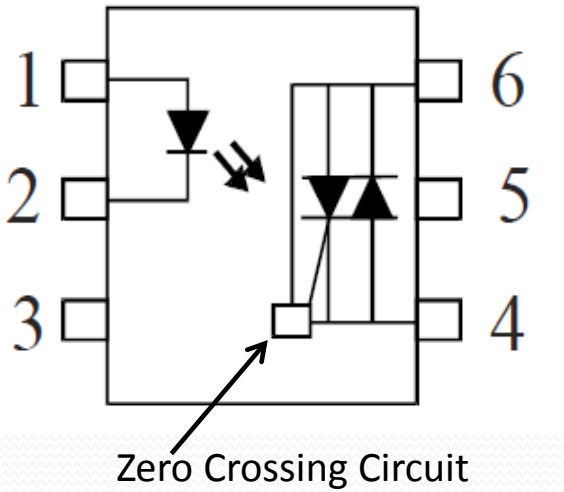


Optocoupler : Output - Triac

Non Zero Crossing (NZC)
Random Phase
非过零触发双向可控硅
随机相位双向可控硅

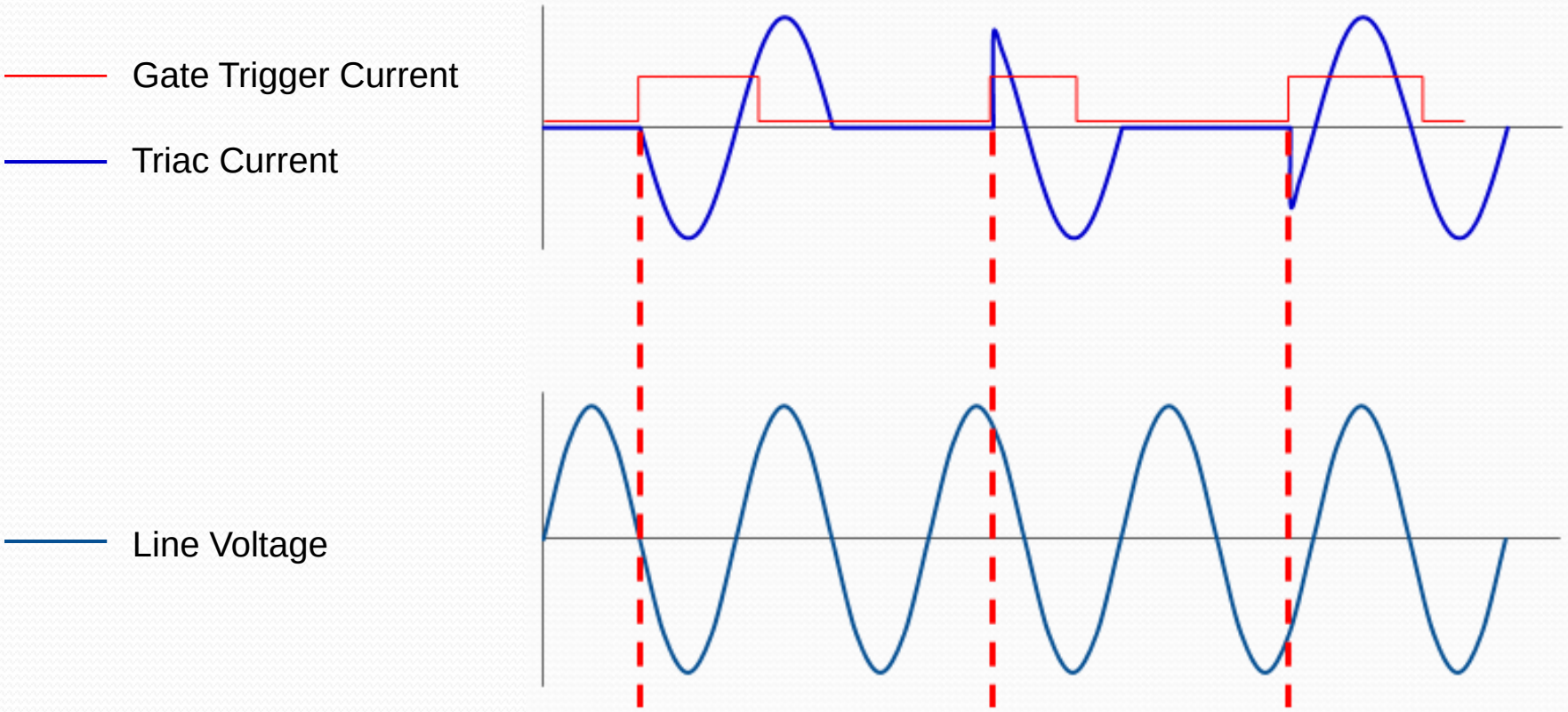


Zero Crossing (ZC)
过零触发双向可控硅



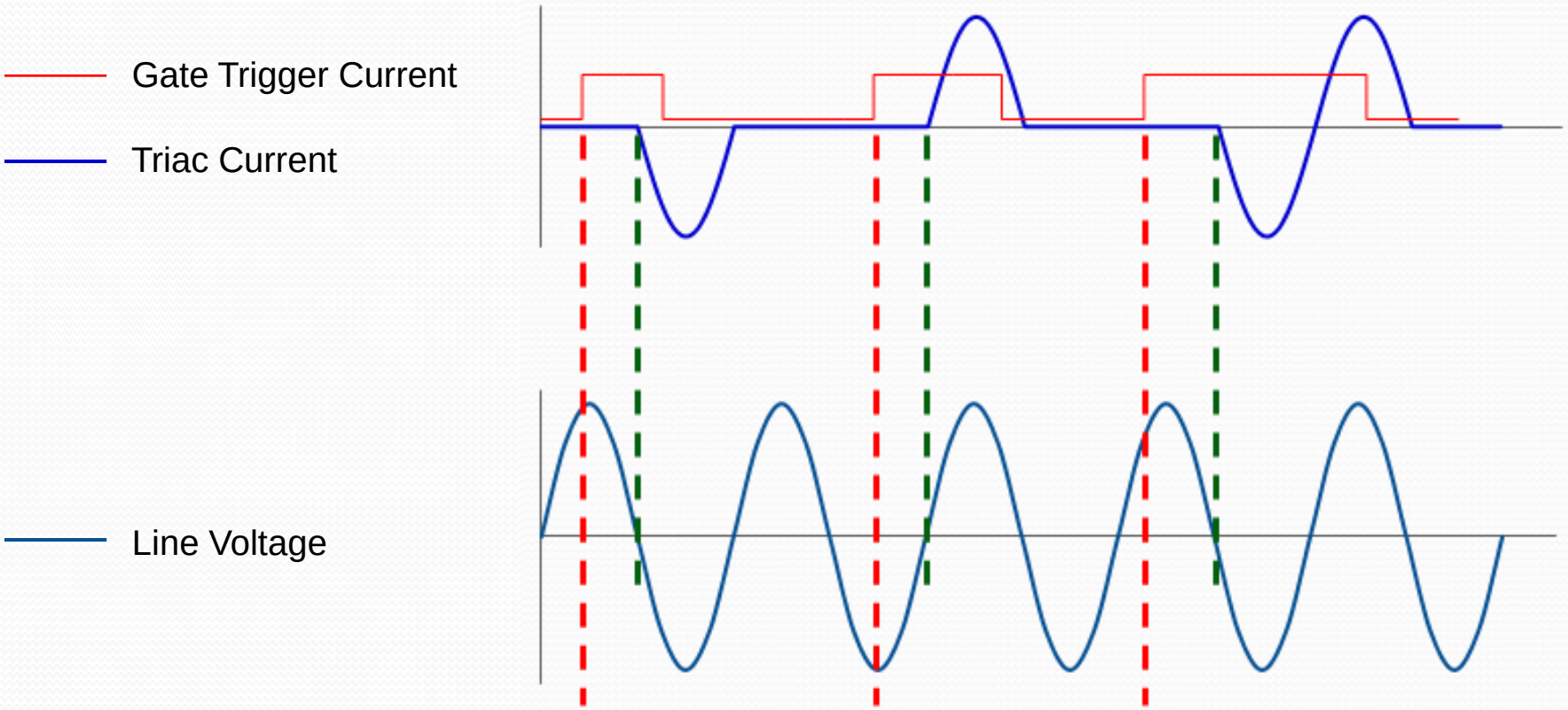
Optocoupler : Output - Triac

Non Zero Crossing (NZC)
(Resistive Load)

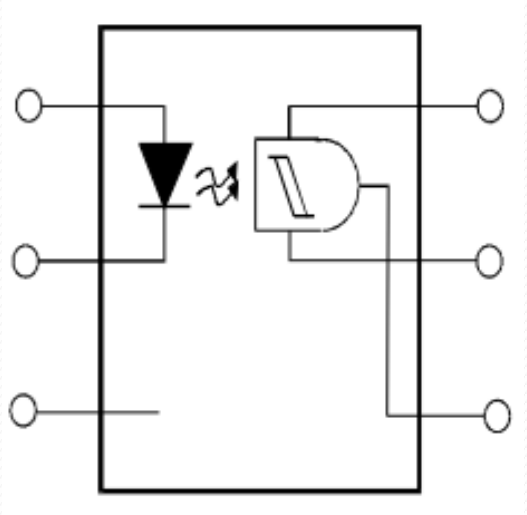


Optocoupler : Output - Triac

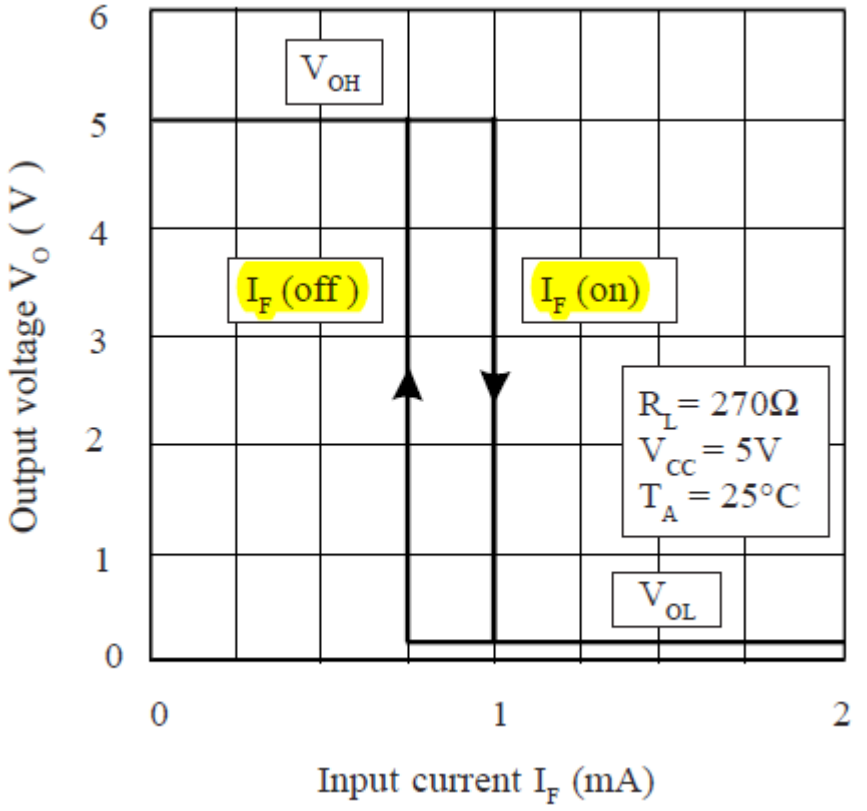
Zero Crossing (ZC)
(Resistive Load)



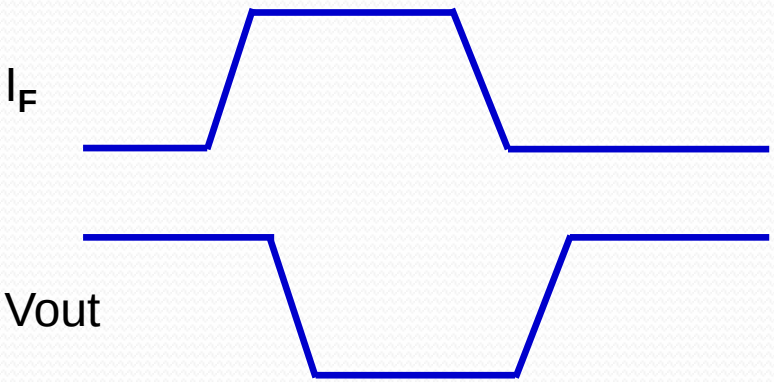
Optocoupler : Output - Schmitt Trigger



Optocoupler : Output - Schmitt Trigger



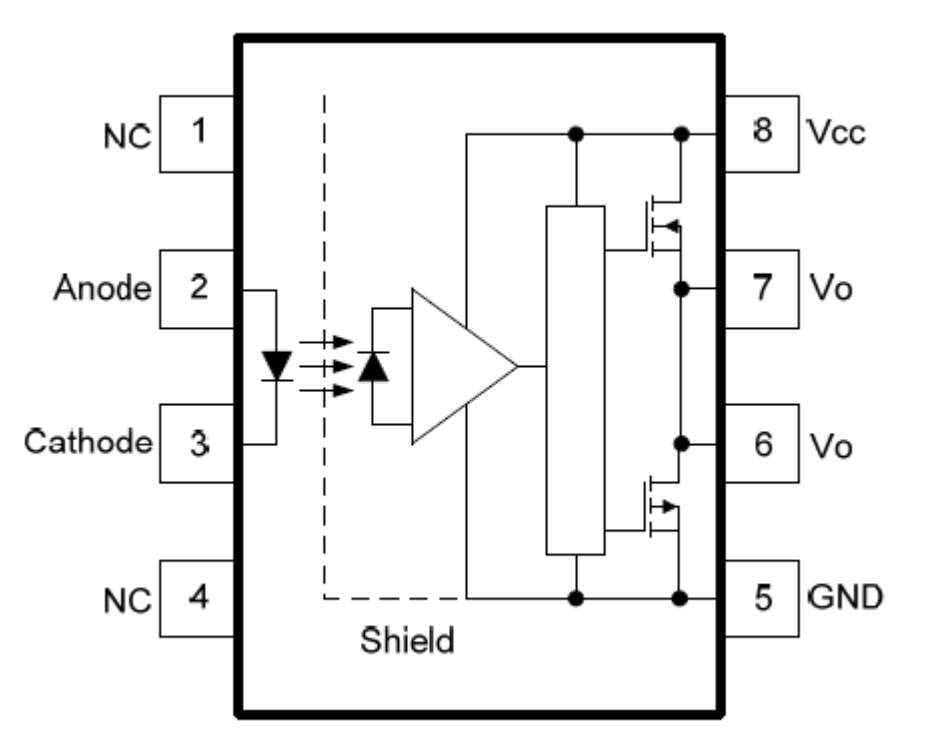
Input	Output
H	L
L	H



Optocoupler : IGBT / MOSFET Gate Drive

ISOCOM COMPONENTS

ICPL-3120



Optocoupler : IGBT / MOSFET Gate Drive

Features :

- Output Peak Current : ±2.5A Maximum
- UVLO (Under Voltage Lock Out)
- MOSFET Output → high V_{OH} and low V_{OL}
- A 0.1uF Bypass Capacitor must be connected between V_{CC} (pin 8) and Ground (pin 5)

Optocoupler : IGBT / MOSFET Gate Drive

ISOCOM COMPONENTS

- Output Peak Current : ±2.5A Maximum
- UVLO (Under Voltage Lock Out)
- MOSFET Output → high V_{OH} and low V_{OL}

LED	V_{CC}-GND Turn-ON, (+ve going)	V_{CC}-GND Turn-OFF (-ve going)	V_O
OFF	0 - 30V	0 - 30V	Low
ON	0 - 11.5V	0 - 10V	Low
ON	11.5 - 13.5V	10 - 12V	Transition
ON	13.5 - 30V	12 - 30V	High

Parameter	Symbol	Min	Max	Unit
Operating Temperature	T_A	- 40	100	°C
Supply Voltage	V_{CC}	15	30	V
Input Current (ON)	$I_{F(ON)}$	7	16	mA
Input Voltage (OFF)	$V_{F(OFF)}$	-3.0	0.8	V

Optocoupler : IGBT / MOSFET Gate Drive

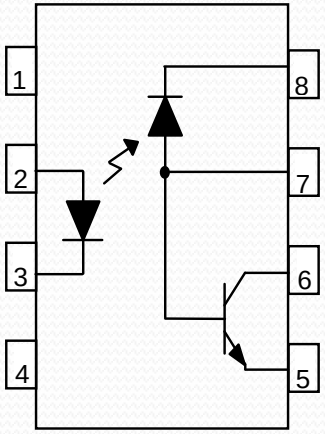
- Output Peak Current : ±2.5A Maximum
- UVLO (Under Voltage Lock Out)
- MOSFET Output → high V_{OH} and low V_{OL}

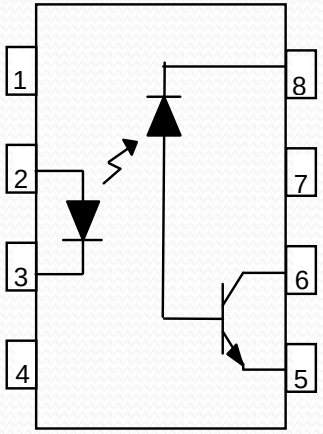
Parameter	Symbol	Test Condition	Min	Typ.	Max	Unit
High Level Output Voltage	V_{OH}	I_F = 10mA, I_O = -100mA	V_{CC} -0.25	V_{CC} -0.1		V
Low Level Output Voltage	V_{OL}	I_F = 0mA, I_O = 100mA		V_{EE} +0.1	V_{EE} +0.25	V

Optocoupler : High Speed 1Mbps

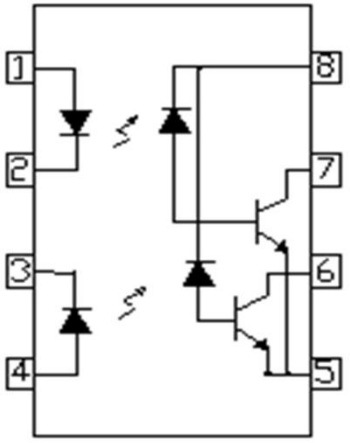
ISOCOM COMPONENTS

Single Channel





Dual Channel



Output	Pitch	V_B (Photodiode Bias)	
		Accessible	No Connection
Single Channel	Standard Pitch	6N135, 6N136	ICPL4502, ICPL4503
	Half Pitch	ICPL0500, ICPL0501	ICPL0452, ICPL0453
Dual Channel	Standard Pitch		ICPL2530, ICPL2531

Optocoupler : High Speed 1Mbps

ISOCOM COMPONENTS

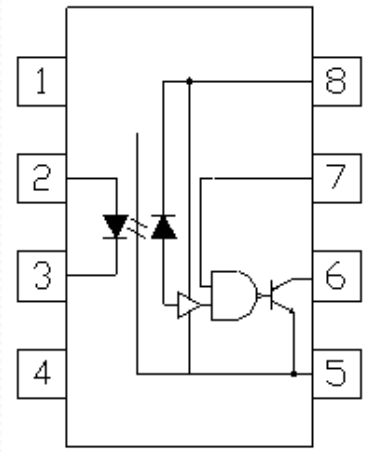
Part Number	Vcc (V)	Current Transfer Ratio V_{CC} = 4.5V I_F = 16mA V_O = 0.4V (%)	CM_H Min (V/µs)	CM_L Min (V/µs)
6N135	30	7-50	1000	1000
6N136		19-50	1000	1000
ICPL4502				
ICPL4503			15000	15000
ICPL0500	30	7-50	1000 Typical	1000 Typical
ICPL0501		19-50	1000 Typical	1000 Typical
ICPL0452				
ICPL0453			15000	15000
ICPL2530	30	7-50	1000	1000
ICPL2531		19-50	1000	1000

Note : CMRR for reference comparison due to different testing conditions.

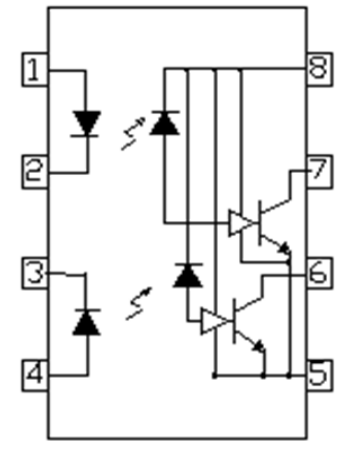
Optocoupler : High Speed 10Mbps

ISOCOM COMPONENTS

Single Channel



Dual Channel



Output	Pitch	PN
Single Channel	Standard Pitch	6N137, ICPL2601, ICPL2611
	Half Pitch	ICPL0600, ICPL0601, ICPL0611
Dual Channel	Standard Pitch	ICPL2630, ICPL2631

Optocoupler : High Speed 10Mbps

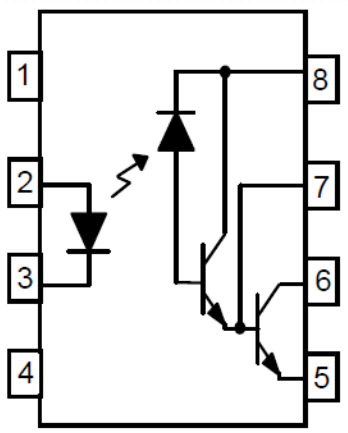
Part Number	Vcc (V)	CM_H Min (V/μs)	CM_L Min (V/μs)
6N137	7	5000 Typical	5000 Typical
ICPL2601		5000	5000
ICPL2611		20000	20000
ICPL0600	7	1000 Reference	1000 Reference
ICPL0601		5000	5000
ICPL0611		15000	15000
ICPL2630	7	5000	5000
ICPL2631		10000	10000

Note : CMRR for reference comparison due to different testing conditions.

Optocoupler : High Speed Darlington

ISOCOM COMPONENTS

Single Channel



Standard Pitch	6N138, 6N139

Optocoupler : High Speed Darlington

Part Number	Vcc (V)	Current Transfer Ratio V_{CC} = 4.5V I_F = 16mA V_O = 0.4V Min (%)	CM_H Min (V/µs)	CM_L Min (V/µs)
6N138	7	300	1000	1000
6N139	18	500	1000	1000

Note : CMRR for reference comparison due to different testing conditions.

Optocoupler : Selection Parameters (Reference)

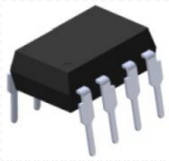
ISOCOM COMPONENTS

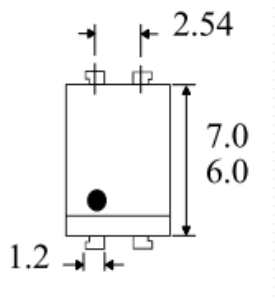
Output Type	Parameters
Transistor / Darlington	CTR, Output Voltage, Package, Switching Time
Triac	ZC, NZC, Gate Trigger Current, Output Voltage
Schmitt Trigger	Turn On/Off Threshold Current, Supply Voltage, Switching Speed
IGBT/MOSFET Gate Drive	Output Current, Supply Voltage, Output Voltage, Common Mode Transient Immunity, Switching Time
High Speed	Switching Speed, Supply Voltage, Output Voltage, CTR, Common Mode Transient Immunity
Optical Switch	Slot Width, CTR, Output Voltage

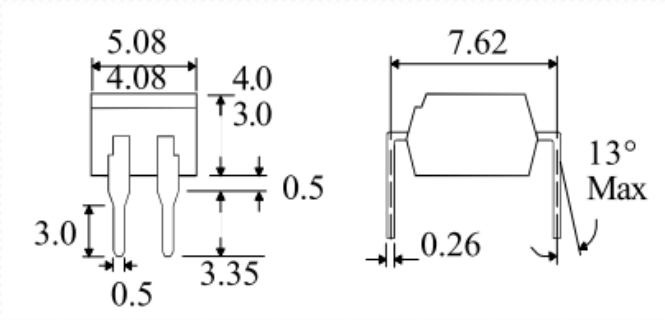
Optocoupler : Standard Packages

ISOCOM COMPONENTS

- **DIP**



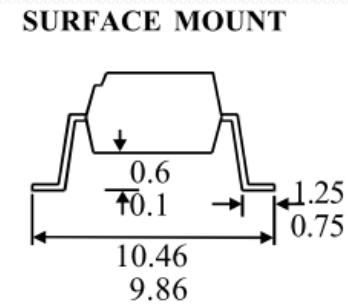


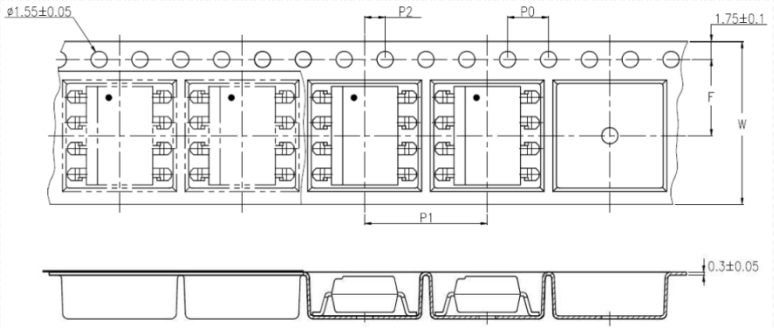


- **SMD**

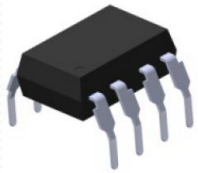
(T&R available)

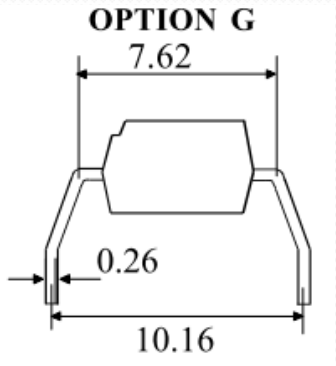
4 Pins and 8 Pins





- **G Form**





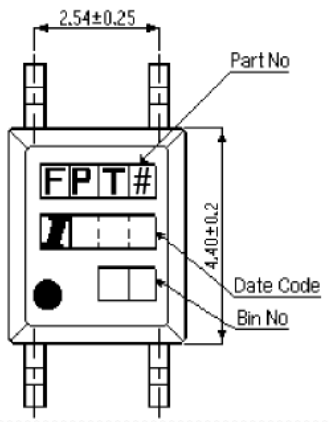
Optocoupler : Small Outlines – Mini Flat

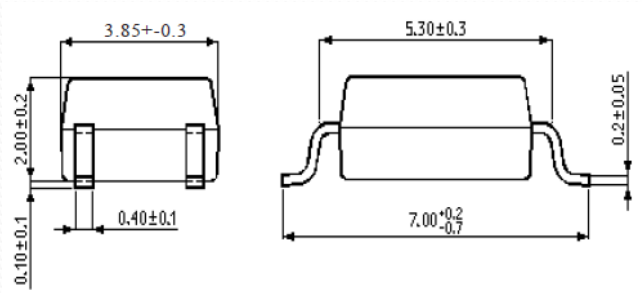
ISOCOM COMPONENTS

Pitch : 2.54mm

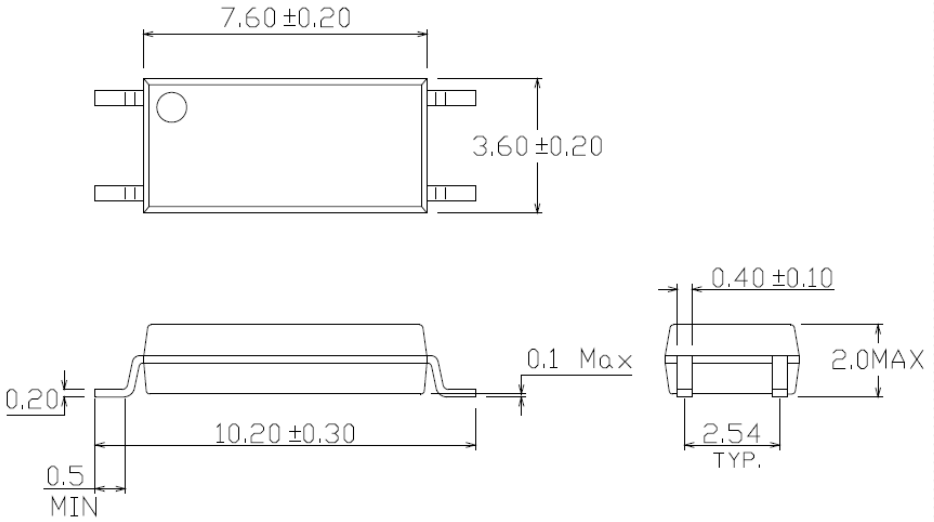
- **4 pin**

Standard





Long Creepage

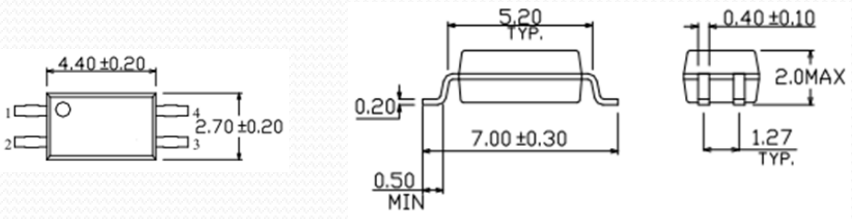


Optocoupler : Small Outlines – Half Pitch

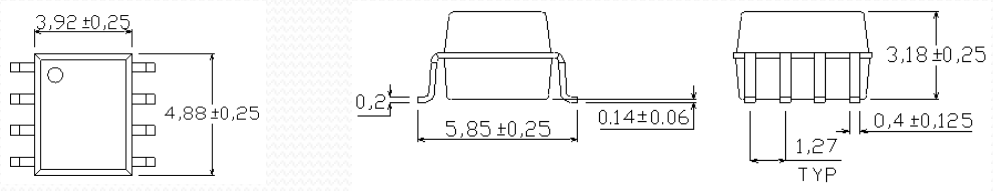
ISOCOM COMPONENTS

Pitch : 1.27mm

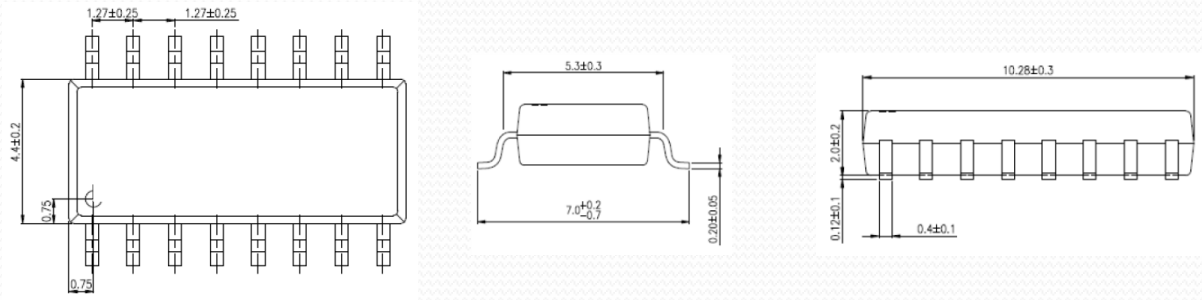
- **4 pin**



- **8 pin**

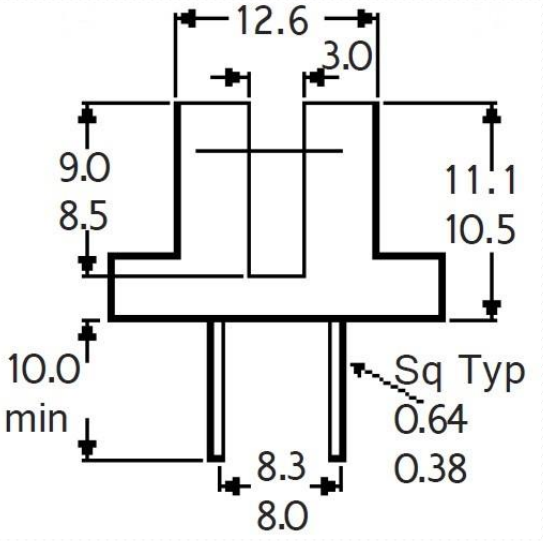


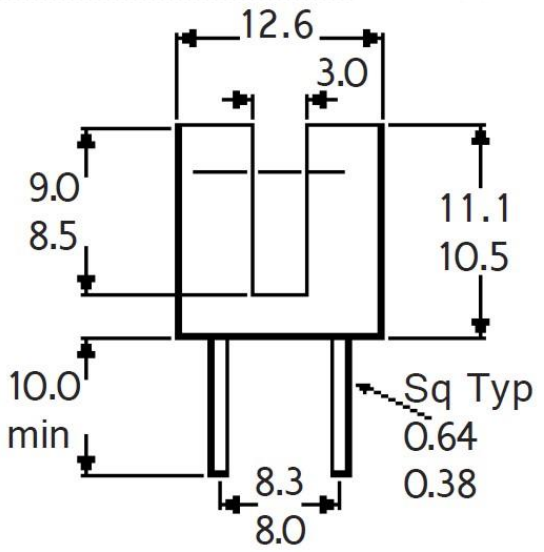
- **16 pin**



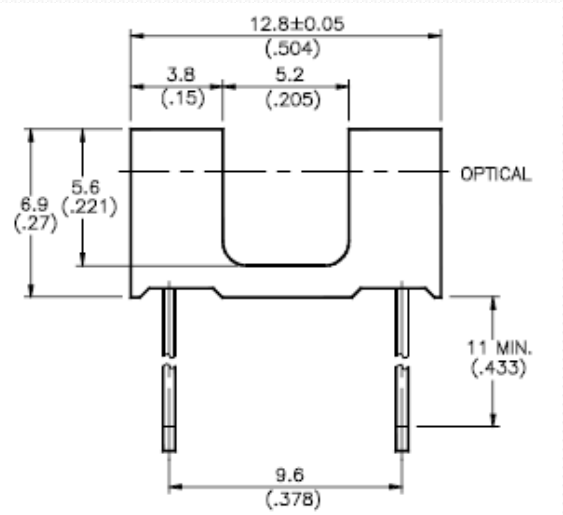
Optocoupler : Outlines – Optical Switch

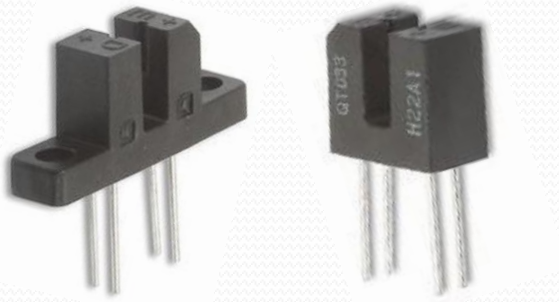
- **Slot Width 3mm**





- **Slot Width 5.2mm**





Optocoupler : Safety Approvals

- UL Cert No. E91231 -- UL1577
- VDE Cert No. 40028086 -- EN60747-5-2
- EN60950-1:2006 by Nemko (selected PNs)

International	Europe	Germany	USA	Canada
IEC	CENELEC (EN)	DIN/VDE	UL	CSA
IEC 60747-5-2	EN 60747-5-2	DIN/EN 60747-5-2	UL1577	Component Acceptance Notice #5

Note : Original PN already implies UL approval,
To include VDE approval, add “X” after the PN.

Optocoupler : Packaging and Order Information

ISOCOM COMPONENTS

Lead Form & Packaging

- All devices are supplied in **tubes** in standard straight lead form unless specified
- All devices are available in **10.16mm lead spread** to ensure a minimum creepage distance of 8.0mm
- All devices are available in **surface mount lead form** (**SMD**)
- All surface mount devices are available in **Tape and Reel** packaging

How to Order

- All part numbers without any Suffix are **UL** approved (e.g. **ISP521-1**)
- For **VDE** approval, add the suffix **X** to the required part number (e.g. **ISP521-1X**)
- For **10.16mm lead spread**, add the suffix **G** to the required part number (e.g. **ISP521-1XG**)
- For **surface mount** option, add the suffix **SM** to the required part number (e.g. **ISP521-1XSM**)
- For **tape and reel** packaging, add the suffix **T&R** to the required part number (e.g. **ISP521-1XSMT&R**)

- 4 Pins and 8 Pins Standard SMD have option of Tape and Reel.
- Suffix G (10.16mm Lead Spread) devices are supplied in DIP only.
- Mini Flat and Half Pitch Products are supplied in Tape and Reel.

Optocoupler : Transistor Output Application

- Switch Mode Power Supply
- Telephone/Fax
- Logic Controller
- Telecom
- **Industrial Controls**
- **Security Monitor / IP Surveillance System**
- **AC / DC Voltage Detection**
- **Sensor / Detector**
- **Smart Meter, Smart Grid**
- **RS232 / RS485 communication**

Example PN

DC Input : TLP521, TLP621,SFH615A, SFH618A, ISP817
AC Input : PS2505, SFH620A, SFH628A, ISP814
Darlington Output : PS2502, TLP627, ISP815

Optocoupler : Triac Output Application

- Solenoid / Valve Controls
- Lamp Ballasts
- Static AC Power Switch
- Solid State Relay
- **Lamp Dimmers (NZC)**
- **Temperature Controls**
- **Motor Controls / Variable Frequency Motor Controls**
- **Home Appliances**
- **Industrial Air-Conditioners**

Example PN

NZC : MOC3010, MOC3020, MOC3051

ZC : MOC3030, MOC3040, MOC3060, MOC3080

Optocoupler : Schmitt Trigger Application

- Logic to Logic isolator
- Line Receiver
- Programmable Current Level Sensor
- Digital Programming of Power Supplies
- **Digital Control of Motors and other Servo Machines**
- **Computer and Peripherals Interface**

Example PN

H11L1, H11L2, H11L3, H11L4

Optocoupler : High Speed Coupler Application

- Digital Logic Ground Isolation
- Line Receiver
- Microprocessor Bus Isolation
- **Numerical Control**
- **High Common Mode Noise Line Receiver**
- **RS232 / RS485 Communication with High BAUD Rate**
- Switch Mode Power Supply

Example PN

1Mbps : 6N135, 6N136, ICPL4502, ICPL0500, ICPL0452, ICPL2530
10Mbps : 6N137, ICPL2601, ICPL2611, ICPL0600, ICPL2630
Split Darlington : 6N138, 6N139

Optocoupler : IGBT/MOSFET Gate Drive Application

- **UPS**
- **Solar Inverter**
- **Variable Frequency Inverter**
- **AC / DC Servo Motor**

PN
ICPL3120

Optocoupler : Mini Flat Package Application

ISOCOM COMPONENTS

Ideally suited for High Density Surface Mounting

- **AC Adaptor**
- **I/O Interface Board**
- **Programmable Controller**
- **Measuring Instruments**
- **Office Machines**
- **Monitor and Detection Circuits**

Example PN

DC Input : IS181, IS357, IS2701-1
AC Input : IS126, IS2705-1, IS354
Darlington Output : IS355, IS2702-1, IS127, IS452

Optocoupler : Half Pitch Package Application

ISOCOM COMPONENTS

Ideally suited for High Density Surface Mounting such as PCMCIA and High Density PCB's

- **Computer and Peripherals Interface**
- **Microprocessor System Interface**
- **Sequence Controller**
- **Measuring Instruments**
- **PC Card (PCMCIA)**
- **AC/DC Input Module**

Example PN

DC Input : IS281, IS2801, IS281-4, ISLT1102

AC Input : IS3H4, IS280

Optocoupler : Optical Switch Application

- **Printer**
- **Copier**
- **Scanner**
- **Fax Machine**
- **Vending Machine**
- **Optoelectronic Switches**

Example PN

Slot Width 3.0mm : H21A1, H21A2, H21A3, H22A1, H22A2, H22A3

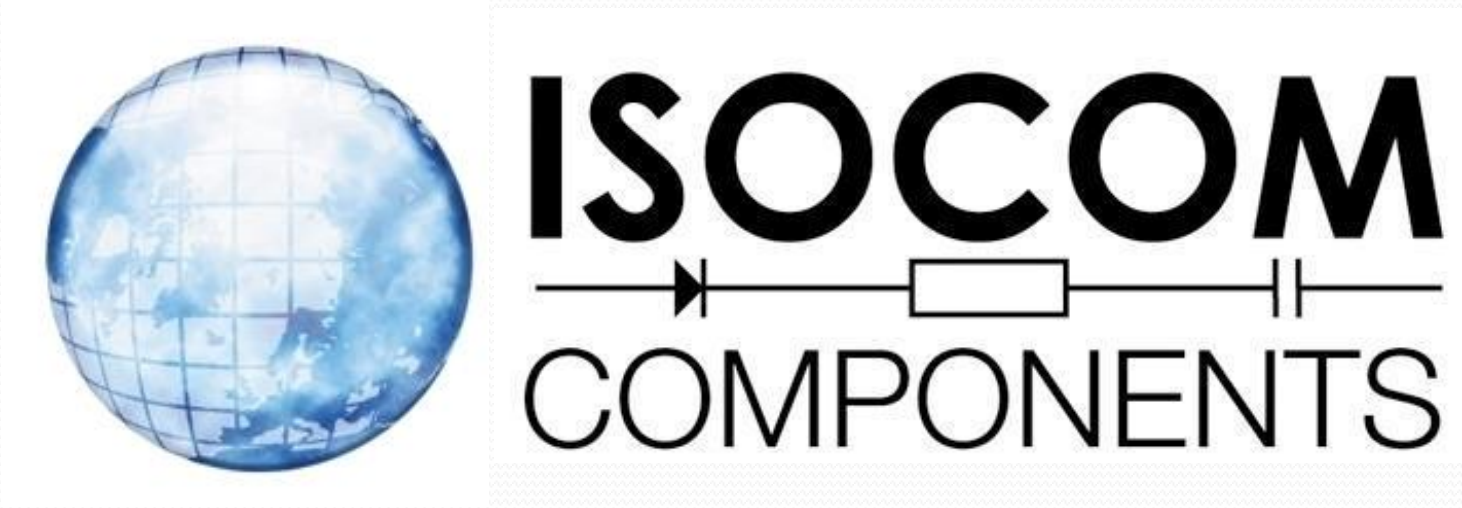
Slot Width 5.2mm : ISTS105A

Optocoupler

ISOCOM COMPONENTS

Notes on Specifications

- Isocom is continually improving the quality, reliability, function or design and Isocom reserves the right to make changes without further notices.
- The products shown in this publication are designed for the general use in electronic applications such as office automation equipment, communications devices, audio/visual equipment, electrical application and instrumentation.
- For equipment/application where high reliability or safety is required, such as space applications, nuclear power control equipment, medical equipment, etc., please contact our sales representatives.
- When requiring a device for any ”specific” application, please contact our sales for advice.
- The contents described herein are subject to change without prior notice.
- Do not immerse device body in solder paste.



"Quality components when you need them"

THANKS