## **Xiamen Hualian Electronics**

# **OptoCoupler** Introduction



# Content



# 2 Hualian RD&QC ability

# **3 Optocoupler Introduction**

Hualian's Advantages

4



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Basic Info Stock Code: 872122

- Registered Capital: RMB 129 Million
- **Employee**: 3,600
- **R&D Engineers**: 254
- Plant:250,000 sqm
- Production Lines: 104 lines
- Annual Production Capacity:
  ≥40 million pcs(Controllors)
  ≥420 KK(Optoelectronics)
- Locations: 3 locations in Xiamen



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Xiamen Hualian Electronics Co., LTD., founded in August 1984, was listed on neeQ in August 2017 with the stock code 872122. Since its development in 1984, it has formed a diversified development and health pattern with distinct main business and appropriate relevance. With the mission of "smart green technology, better life", it is committed to becoming a leading enterprise in the field of intelligent display control and a reliable partner worldwide.

Instant	ligged		2014	Example 2022
Huli Lianfa Building No. 18, Aug, 1984	Huli Torch District, Aug, 1994	Siming District, Aug, 2007	Mar, 2014Tongan Gold Industrial District	Phase IV of Hualian Building



## **Optoelectronics Division**

With semiconductor, optics, thermal, materials, photoelectric drive and intelligent control software and hardware technologies, we can provide customers with optical, electrical, thermal, structural system integration technical services and products.





## **Optoelectronics Division - Product Lines**





## Hualian Optocoupler Overall Vision





With over 30 years of experience in packaging of photoelectric devices, and mastering core technologies

Mastering R&D technologies in such fields as semiconductor, optics, heat, materials, photoelectric driving etc.; capable of providing customers with technical services and products of integration of optical, electrical, thermal and structural systems; equipped with international advanced professional devices for packaging of semiconductors, such as automatic dicing saw, automatic die bonder, automatic wire banding machine, and automatic packaging equipment; industrialized enough to quickly adapt to market dynamics.





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## Hualian R&D - Software

#### Simulation, Modeling, Product Tests, Material Analysis







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## Hualian R&D - Equipments







## Hualian R&D - Equipments

High Power Microscope	Metallographic Polishing Machine	X-ray Analyzer	Quadratic Element Measuring Instrument	Differential Scanning Tester
CONDOR 70 Fullestand line it and			Contraction of the second seco	
Multifunctional Push-pull Testing Machine	X-ray Thickness Measuring Machine	X-ray	CCD Spectrometer	Photoelectric Heating Comprehensive Test System
Programmable High Temperature Test Chamber	Salt Spray Test Chamber	ESD Tester	High and Low Temperature Impact Box	Temperature and Humidity Test Chamber



## Hualian R&D - Reliability & Life model

The life of the optical coupler mainly depends on the effective life of LED, LED after a period of light, light intensity will be lower than the original light intensity, that is, light decline, that is, not bright before. We refer to the Arrhenius model, fitting LED light decay curve, get the product life cycle.

> AF = Accelerating Factor Ea = Aactivation Energy Jacc = HTOL Test LED Current Jnorm = 100% duty cycle applied Operating Current  $K = 8.62 \times 10^{-5} \text{ eV/K}$  Boltzamn Constant Tnorm = Applied operating ambiet temperature Tacc = HTOL test temperature

#### **Arrhenius Model**

AF	Ea	k	Tu (℃)	$\frac{\mathrm{Tt}}{(^{\circ}\mathrm{C})}$	$\begin{array}{c} Po\left(\underline{un}\right)\\ (\underline{mW}) \end{array}$	$\frac{Po(tn)}{(\underline{mW})}$
3. 092587539	0.6	8. 61739E-05	90	100	13.5	28

AF	Test Time (hours)	LED Light Intensity (percentage)	Equivalent Life (hours)	Equivalent Life (years)
	0	100%		
	500	99.6%	1546.29	0.1765
2 002597520	1000	99.18%	3092.59	0.3530
3. 092587539	1500	98.86%	4638.88	0.5296
	2000	97.69%	6185.18	0.7061
	2500	96.80%	7731.47	0.8826





## Hualian R&D - Expected failure rate

A, HTOL stands for 1,000 hours High Temperature Operating Lifetime Quality assurance - Design and validation B. MTTF/FIT reliability data pressure test sampling prior to expected failure



MTTF: Mean Time To Failure

Reliability measurement, representing the

operating time before the first failure of the device

FIT: Failure In Time

Estimated number of failures per billion hours of work

1FIT=10<sup>9</sup> device failure 1 time in working hours

C. Pressure conditions based on the maximum allowable specifications of the optocoupler

- -- Ambient temperature (Ta)
- -- LED Forward input current (IF)
- -- Power supply voltage (VCC or VDD)

D. Refer to several HTOL pressure conditions test devices (typical 1,000hour end point)

E. Total hours of device HTOL pressure test

#### **Demonstrated Operating Life Test Performance**

on hours of	Stress Test Condition	Total Device Tested	Total Device Hours	Number of Failed Units	Demonstrated MTTF(hr) @ Ta = 125° C	Demonstrated FITs @ Ta =125° C
ing hours	Ta = 125 °C If=12mA Vdd=5.5V Io=10mA	1018	1,095,000	0	> 1.095,000	<913
Example:		K				~
864units@1000	hours, 154units@1	1500hours		MTTF = 1/2	$(\text{FIT} \times 10^{-9})$	
So (864×1000)+	(154×1500)=1,095	,000hours Total d	levice hours	1,095,000h	ours = $1/(913 \times$	× 10 <sup>-9</sup> )



## Hualian R&D - Patent/Safety



Patent Certificates(Optocoupler only)



Patent Certificates

#### **Professional Testing Lab**



X-RAY检测设备 X-RAY testing equipment Advanced Testing Equipment

Provide good services on new product trial production and pilot plant test



自动光学检测 Automatic optic testing



自动锡膏厚度检测仪 Automatic solder pastes thickness tester



可程式高低温试验箱 Programmable high-low temperature test chamber



自动异形插件机 Automatic special-shaped inserter



#### IATF16949:2016





#### ISO9001:2015





厦门华联电子股份有限公司

BUREAU VERITAS Certification





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#### Integration of informatization and industrialization







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Enclosed is a copy of your completed Multiple listed below. The following documents were a	e Listing Correlation Sheet cov dded (new)or revised on 11/22/2	ering the Basic File 017.
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## **Opto-Coupler - Structure&Function**



High voltage 220V ~ 1200V (HIGHT) Danger of electric shock by human contact  The input terminal connects to the output terminal Optical signal connection transmission.

- 2. Electrical isolation
- 3. Small common-mode noise
- 4. Prevent transient voltage

Weak current 3V ~ 5V (LOW) No danger of electric shock in human contact



**Different Technologies** 

## **Opto-Coupler - Structure&Function**

Optocoupler, a device that uses light as a medium to transmit electrical signals, usually encapsulating a luminescent device (infrared LED) with a photoreceptor (photosensitive semiconductor tube).

the receiver after receiving the light will produce the photocurrent, flows out from the output end, so Clear epoxyd Compound Reflected Radiance Emitter Die as to achieve the "electricity-light-Bond Wire Epoxyd Compound electricity" conversion. transistor Leadframe Transformer Detector Die silicon controlled **Optical Different types** MOSFET Insulation Switch Coupler Isolation Transfer Digital high Drive Denoise Isolator speed

When the input end adds the

gate drive

electrical signal - the LED lighting,



## Hualian Optocoupler Technology



Brand	Fairchild	Toshiba	Avago/Broadcom	Toshiba, Sharp
Advantages	The common mode rejection ratio is excellent	Excellent lighting	Excellent lighting	High productivity
Disadvantages	Low productivity	Poor insulation	The process is complex and the control is difficult	High requirements for material control
	Hualian old products			Hualian new products



## **Opto-Coupler - Criteria for isolation**

Compliance with safety standards: Basic or enhanced insulation

- Insulation standard requirements: electrical clearance, creepage distance, insulation penetration distance (DTI)
- Test voltage requirements: pulse, AC or DC

Safety standards	IEC	UL
Insulation standards	60664	840
Component level		
Photoelectric device	60747-5	1577
Device/system level		
Mechanical	60204	508
Measurement, control and experimental	61010	1262
Audio, video and other similar devices	60065	8730
Medical	60601	2601





Minimum clearance distance based on IEC 62368-1 definitions

			(mm)
Overvoltage category	AC mains voltage Vrms	Basic insulation	Reinforced insulation
 (IT equipment)	150	0.5	1.0
(II equipment)	300	1.5	3.0
	400	3.0	5.5
III (industrial equipment)	600 (includes 400 and 690)	5.5	8.0

Pollution degree 2

#### Minimum creepage distance using IEC 62368-1 definitions

.

		(mm)	
Maximum working voltage Vrms	Basic insulation	Reinforced insulation	
160	1.6	3.2	
200	2.0	4.0	
250	2.5	5.0	
320	3.2	6.4	
400	4.0	8.0	
630	6.3	12.6	
800	8.0	16.0	



## **Opto-Coupler - Function**











## HL OptoCoupler History





## HL OptoCoupler History





## HL OptoCoupler Types

Minimizin	g 🏹	•		,	-	-		۲	-	
Photo Transistor Output	HPC814 HPC851 HPC816 HPC817	HPC354 HPC351 HPC356 HPC357	HPC101	HPC214 HPC217	HPC931 HPC932	HPC942 HPC827				
Photo Darlington Transistor Output	HPC815 HPC852 HPC952	HPC355 HPC352 HPC952-MS		HPC215	HPC961 HPC962					
Triac Output	HPC2022 HPC2053	HPC3022-MS HPC3052-MS HPC3053-MS			HPC3022 HPC3053 HPC3063 HPC3083					
High Speed		HPL6S135/136 HPL6S137 HPL6S138/139 HPL6S157				HPL6N135/136 HPL6N137 HPL6N138/139 HPL6N157	HPL6M235/236 HPL6M237 HPL6M238/239 HPL6M257	HPL6L135/136 HPL6L137 HPL6L138/139 HPL6L157	HPL6W135/136 HPL6W137 HPL6W138/139 HPL6W157	
MOS-Relay	HSSR-41A01 HSSR-41A04 HSSR-41A05 HSSR-41A06 HSSR-41A08	HSSR-S1A01-2 HSSR-S1A04-2 HSSR-S1A05-2 HSSR-S1A08-2			HSSR-61A01 HSSR-61A04 HSSR-61A05 HSSR-61A06 HSSR-61A00	HSSR-DA01 HSSR-DA04 HSSR-DA05 HSSR-DA06 HSSR-DA08				
Gate Drive		HGD152				HGD3120		HGD314W HGD314P HGD341W HGD341P	HGD313H	HGD332J
Linear						HPC300				



## HL OptoCoupler Roadmap



## MOSFET Output

## 

The output end is MOSFET, also known as optical MOS relay, which can be used as AC/DC load switch, drive, can also be used for small signal acquisition.

Widely used in industrial control, medical equipment, BMS management and other fields involving DC or micro signal.

The main difference between optical MOS relay and mechanical relay, and thus brings about the difference in life, current impact, thermal switching ability.

Strongly Recommended HSSR-S1Axx Series, HSSR-DAxx Series

Hualian Part No.	Replacement Part No.	Replacement manufacturer	Package	Load Voltage(V)	Continuous Load Current(A)	Typ. On Resistance (ହ)	Channel	Operating Temperature(℃)	Isolation Voltage (VRMS)	Safety Certification
HSSR-DA01	AQW214			400	0.1	25			5000	VDE
HSSR-DA04	AQW216			600	0.05	40			5000	VDE
HSSR-DA05	AQW212			60	0.5	1	2NO*		5000	VDE
HSSR-DA06	AQW21		DIDO/ON/DO	60	2	0.1			5000	VDE
HSSR-DA11	AQW414		(9.6×6.4 ×3.6)	400	0.1	25	x marcana		5000	VDE
HSSR-DA15	1			60	0.05	1	2NC*		5000	VDE
HSSR-DA21	AQW610			400	0.1	25	1NO	-40~85	5000	VDE
HSSR-DA25	AQW612			60	0.05	1	1NC		5000	VDE
HSSR-41A01	AQY214	Panasonic		400	0.1	25	1NO		5000	VDE
HSSR-41A04	AQY216	Toshiba		600	0.05	40			5000	VDE
HSSR-41A05	AQY212		DIP4/SMD4	60	0.5	1			5000	VDE
HSSR-41A06	AQY272		(4.5×6.4 ×3.6)	60	2	0.1	-		5000	VDE
HSSR-41A11	AQY414			400	0.1	25			5000	VDE
HSSR-41A15	AQY412			60	0.5	1	1NC		5000	VDE
HSSR-S1A01	TLP172GAM			400	0.1	25			3750	VDE
HSSR-S1A04	TLP170J		SOP4 (4.6 × 3.7 ×2.3)	600	0.05	40			3750	VDE
HSSR-S1A05	TLP172AM			60	0.5	1	1NO	-40-110	3750	VDE
	101/010000			0.0	6.05	0.0			0750	UDE

注: NO指代Normally Open, NC指代Normally Closed。 Note: NO is Normally Open and NC is Normally Closed.

## MOSFET Output

## **Product Application**

• Charging pile, intelligent watch, BMS, industrial equipment, medical equipment















## HSSR-61A0D

## Counter Model: AQV258/ASSR-601JV



#### Key Features:

- 1. Single Channel Normally on Single-Pole-Single-Throw(SPST) Relay
- 2. 1500V Output Withstand Voltage
- 3. 20mA Current Rating
- 4. Low Input Current: CMOS Compatibility
- 5. 200 $\Omega$  Low On-Resistance
- 6. Extreme High Output Off-state Impedance: 10 Teraohm Typical
- 7. High Speed Switching: 0.4ms(Ton), 0.03ms(Toff) Typical
- 8. High Input-to-Output Insulation Voltage: 5000 Vrms for 1 min.

AC/DC

Storage batte

ED : 1a 204-2004 1 000V DC

(AQ-A: 1a 10A 600V DC)

56 PhotoMOS

(HE-V - 20 204 1 000V DC2

AQ-A : 1a 10A 600V DO

- 9. AECQ101 Standard
- 10. Package: DIP5/SMD5

#### **Reference Customers:**

CATL 宁德时代

INOVANCE 汇川技术



## HSSR-16S1A0D-2

## Counter Model: ASSR-601JV



#### Key Features:

- 1. Single Channel Normally on Single-Pole-Single-Throw(SPST) Relay
- 2. 1500V Output Withstand Voltage
- 3. 20mA Current Rating
- 4. Low Input Current: CMOS Compatibility
- 5. 200 $\Omega$  Low On-Resistance
- 6. Extreme High Output Off-state Impedance: 10 Teraohm Typical
- 7. High Speed Switching: 0.4ms(Ton), 0.03ms(Toff) Typical
- 8. High Input-to-Output Insulation Voltage: 5000 Vrms for 1 min.
- 9. Package: SOP16

#### **Reference Customers:**

CATL 宁德时代 INOVANCE 汇川技术







(When insulation of high voltage area and chassis is deteriorated)



#### Applications: BMS, EV Charger



#### **Isolation Monitoring**



DCS

Ad Ad

#### Applications:

Industrial Controls, Battery Management, Inspection Equipment

Typical Solar Power System





## HSSR-S1A01-2

#### Counter Model: AQY214S/TLP172GAM



Key Features:

- 1. Micro Photo MOSFET Solid State Relay
- 2. Single Channel Normally on Single-Pole-Single-Throw(SPST) Relay
- 3. 400V Output Withstand Voltage
- 4. 130mA Current Rating
- 5. Low Input Current: CMOS Compatibility
- 6. High Speed Switching: 0.5ms(Ton), 0.2ms(Toff) Typical
- 7. High Input-to-Output Insulation Voltage: 3750 Vrms for 1 min.
- 8. AECQ101 Standard
- 9. Package: SOP4

Applications: Intelligent cockpit - Cigarette lighter







## HSSR-S1A02-2

#### Counter Model: CPC1008NTR



#### Key Features:

- 1. Micro Photo MOSFET Solid State Relay
- 2. Single Channel Normally On Single-Pole-Single-Throw(SPST) Relay
- 3. 400V Output withstand Voltage
- 4. 300 mA Current Rating
- 5. Low Input Current: CMOS Compatibility
- 6. High Speed Switching: 0.2 ms(Ton), 0.1 ms(Toff) Typical
- 7. 3750 Vrms for 1 min.
- 8. Package: SOP4

Applications: Telecommunication Switching, Data Communications, BMS, Industrial Controls, Medical Equipment







## High Speed Optocoupler

The output end is a high-speed logic gate, also known as digital optocoupler, with ns response speed. It can be used in high-speed communication occasions that ordinary 817 optocoupler cannot cover, such as 485 communication port isolation and other computer related equipment interfaces.

Strongly Recommended HPL6S/6M/6W Series





Hualian Part No.	Replacement Part No.	Replacement manufacturer	Package	Output Type	Transmission rate	CMR	Operating Temperature	Isolation Voltage (V <sub>RMS</sub> )	Safety Certification	
HPL6N137	6N137				开集(OC)	10M			5000	UL、VDE
HPL6N237	HCPL-2630	-	(9.6×6.4×3.6)	双路 开集(OC)	10M			5000	UL、VDE	
HPL6N137-D6/S6			DIP6/SMD6 (7.6×6.4×3.6)	开集(OC)	10M		-40~85	5000	UL、VDE	
HPL6N135	6N135			开集(OC)	1M			5000	UL、VDE	
HPL6N136	6N136	Avago	DIP8/SMD8 (9.6×6.4×3.6)	开集(OC)	1M	>10kV		5000	UL、VDE	
HPL6N138	6N138	Toshiba		开集(OC)	1M	1000V)		5000	UL、VDE	
HPL6N139	6N139	- Fairchild		开集(OC)	1M	-		5000	UL、VDE	
HPL6S137	HCPL-M601		SOP5 (4.6×3.7×2.3)	开集(OC)	10M			3750	UL、VDE	
HPL6M237	HCPL-063L		SOP8 (5.1×3.9×3.3)	双路 开集(OC)	10M	-		3750	UL、VDE	
HPL6W157	ACNT-H61L	1	WSOP8 (13.6×6.2×3.6)	图腾柱(INV)	15M		-40~105	7500	UL、VDE	

## - *H*L —

## High Speed Optocoupler

## **Product Application**

- Transmission and conversion of digital logic
- Power control and switch
- Eletric insulation and impedance conversion between circuits systems
- Programmable controllers













## HPL6W157

### **Counter Model: ACNT-H61L**



#### Key Features:

- 1. High Speed: 10 Mbit/s
- 2. Logic gate output
- 3. Low IDD power supply consumption: <2mA
- 4. High Input-to-Output Insulation Voltage: 7500 Vrms for 1 min.
- 5. Package:WSOP8

#### Applications: Solar Inverter

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## VEICHI





## HPL6S135

#### Counter Model: TLP2304/ACPL-M50L



#### Key Features:

- 1. High Speed: 1 Mbit/s
- 2. Logic gate output
- 3. TTL/LSTTL Compatible: 5V Supply
- 4. VDE and UL Certificated
- 5. Package: SOP5

#### Applications:

Industrial Inverter, Line Receivers, Computer-peripheral interface, Switching Power Supply

Industrial Inverter Solution: HPL6S135/HGD314/HPC357



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SYSWIN 思源企业







## HPL6M237

## **Counter Model: ACNT-H61L**



#### Key Features:

- 1. High Speed 15 Mbits/s
- 2. Logic Gate output
- 3. Isolation Voltage is high: VISO≥3750 Vrms
- 4. SOP8 Package
- 5. TTL/LSTTL Compatible: 3.3V/5V Dual supply
- 6. Compatible with RoHS and REACH Standards

Applications: Line Receiver, Data Transmission, Computer peripheral interface, Switching power supply

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SYSWIN 思源企业











The output end is a fast charge-discharge circuit, with negative pressure locking function and up to dozens of kV/us common mode noise suppression ability. Can be used as high power MOSFET, IGBT safe and reliable isolation

driver device, widely used in inverter circuit and load driver circuit.

Hualian Part No.	Replacement Part No.	Replacement manufacturer	Package	Output Type	H-L/L-HDelay Time	CMR	Operating Temperature(℃)	Isolation Voltage (VRMS)	Safety Certification
HGD3120	TLP350	Avago	DIP8/SMD8 (9.6×6.4×3.6)					5000	UL、VDE
HGD341W	ACPL-W341	Toshiba	L SOP6	Rail-to-rail	<200ns	>30kV (VCM=1500V)	-40~105	5000	UL、VDE
HGD341P	ACPL-P341	Renesas	(6.8×4.6×3.2)	50Pb 4.6×3.2)				3750	UL, VDE

Covering 0.6mA to 4.0 A Gate Drive Covering 1 KW to 100 KW industrial Inverter



## Gate Drive Optocoupler

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## HGD3120D/S

#### Counter Model: TLP350/TLP352/HCPL-3120





#### Key Features:

- 1. 2.5A Maximum Peak Output Current
- 2. 2.0A Minimum Peak Output Current
- 3. Wide Operating VCC Range: 15V to 30 V
- 4. Fast Switching Speed: 500ns Max. Propagation Delay
- 5. High Input-to-Output Insulation Voltage: VISO≥5000 Vrms
- 6. AECQ Standard
- 7. Package: DIP8/SMD8

Applications:

Servo, Industrial Inverter, Switching Power Supply, IGBT/Mosfet Gate Drive

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VEICHI









## HGD341W/P

#### Counter Model: TLP5702/ACPL-W341



#### Key Features:

- 1. 3.0A Maximum Peak Output Current
- 2. 2.5A Minimum Peak Output Current
- 3. Wide Operating VCC Range: 15V to 30 V
- 4. Fast Switching Speed: 200ns Max. Propagation Delay
- 5. High Input-to-Output Insulation Voltage: VISO≥5000 Vrms
- 6. AECQ Standard
- 7. Package: LSOP6

Applications:

Industrial Inverter, Switching Power Supply, IGBT/Mosfet Gate Drive





## HGD343W/P

#### **Counter Model:** ACPL-P343



#### Key Features:

- 1. 4.0A Maximum Peak Output Current
- 2. 3.0A Minimum Peak Output Current
- 3. Wide Operating VCC Range: 15V to 30 V
- 4. Fast Switching Speed: 200ns Max. Propagation Delay
- 5. High Input-to-Output Insulation Voltage: VISO≥5000 Vrms
- 6. AECQ Standard
- 7. Package: LSOP6

Applications:

Industrial Inverter, Switching Power Supply, IGBT/Mosfet Gate Drive





## Linear Optocoupler

- A photodiode at both the input and output ends responds to the IR signal at the input end, and the responsivity is close to the same, so as to realize the isolated signal acquisition.
  - It is mainly used in the application of high-fidelity isolation acquisition of signals, such as medical, audio, etc.



华联型号 Hualian Part No.	替代型号 Replacement Part No.	替代厂家 Replacement manufacturer	封装形式 Package	线性度指标 Transfer gain linearity	带宽 Frequency response	工作温度 Operating Temperature(℃)	介质耐压 Isolation Voltage (VRMS)	安规认证 Safety Certification
HPC300	HCNR201	安华高 Avago 威士 Vishay	DIP8/SMD8 (9.6 × 6.4 × 3.6)	± 0.5%	200kHz	-55~100	5000	UL. VDE

## **Product Application**

- Transmission and conversion of digital logic
- Modem transformer replacement with no insertion loss
- Digital telephone isolation
- Medical induction transmission equipment
- Electric insulation between circuits systems





## HPC300

## **Counter Model: ACNT-H61L**

- Key Features:
- 1. 0.01% Servo Linearity
- 2. Wide Bandwidth: >200kHz
- 3. High Gain Stability
- 4. Package: LSOP6

#### Applications: Solar Inverter, Digital Telephone











## **Transistor Output Optocoupler**

The output is transistor, also known as direct current optocoupler, which is the most basic and common type of optocoupler.

Widely used in electrical and electronic products which need voltage isolation, noise isolation and ground wire isolation.





Strongly Recommended HPC952 Series, HPC101, HPC217 Series

Photo Darlington Transistor Output Opto-Coupler

Hualian Part No.	Replacement Part No.	Replacement manufacturer	Package	Channel	BVœoMin ( V)	CTR(%)	Operating Temperature	Isolation Voltage (VRMS)	Safety Certification
HPC952a	TLP627 LTV852		DIP4/SMD4 (4.5×6.4×3.6)	1	>300		-55-110	5000	UL, VDE
HPC952b	LTV815	-	DIP4/SMD4 (4.5×6.4×3.6)	1	>80	500-7500		5000	UL, VDE
HPC962a	LTV725	Toshiba Lite On	DIP6/SMD6 (7.6×6.4×3.6)	1	>300			5000	UL, VDE
HPC962b	LTV715		DIP6/SMD6 (7.6×6.4×3.6)	1	>80			5000	UL, VDE
HPC952-MS	TLP187 LTV352		SOP4 (4.6×3.7×2.3)	1	>300			3750	UL, VDE

Photo Transistor Output Opto-Coupler

Hualian Part No.	Replacement Part No.	Replacement manufacturer	Package	Channel	BVœoMin ( V)	CTR(%)	Operating Temperature	Isolation Voltage (V <sub>RMS</sub> )	Safety Certification
HPC817	TLP785 LTV816		DIP4/SMD4 (4.5×6.4×3.6)	1	>80			5000	UL. VDE
HPC814	LTV814		DIP4/SMD4 (4.5×6.4×3.6)	1	>80			5000	UL. VDE
HPC931	TLP531 CNY17	Toshiba	DIP6/SMD6 (7.6×6.4×3.6)	1	>80			5000	UL, VDE
HPC942	LTV826	Renesas	DIP8/SMD8 (9.5×6.4×3.6)	2	>80	50-600	-55-110	5000	UL, VDE
HPC357	TLP181 LTV356	Lite On	SOP4 (4.5 × 3.7 × 2.3)	1	>80			3750	UL, VDE
HPC101	PS2381 LTV101		LSOP4 (7.6×3.6×2.1)	1	>80			5000	UL, VDE
HPC217	TLP291 PS2801 LTV217		1.27SOP4 (4.6×2.6×2.2)	1	>80			3750	UL, VDE

## Transistor Output Optocoupler

## **Product Application**

- Transmission and conversion of digital logic
- Power control and switch
- Electric insulation and impedance conversion between circults systems
- Programmable controllers





## HL

## HPC217S/A/Ph

#### Counter Model: TLP291 / ACPL-217



	表 3 CTR 分档表 Table 3-Bini	ning table of CTR	
代码Code	测试条件Test Condition	最小值Min.	最大值Max.
空格blank	IF=5mA,VCE=5V	50	600
A	$I_F=5mA$ , $V_{CE}=5V$	80	160
B	$I_F=5mA$ , $V_{CE}=5V$	130	260
C	$I_F=5mA$ , $V_{CE}=5V$	200	400
D	$I_F=5mA$ , $V_{CE}=5V$	300	600
E	$I_F=5mA$ , $V_{CE}=5V$	100	600
L	$I_F=5mA$ , $V_{CE}=5V$	100	300
L <sub>1</sub>	$I_F=5mA$ , $V_{CE}=5V$	100	400
S	$I_F=5mA$ , $V_{CE}=5V$	130	300
K	$I_F=5mA$ , $V_{CE}=5V$	50	400
M	IF=10mA, VCE=5V	20	
Р	$I_F=0.5mA$ , $V_{CE}=5V$	200	400

#### Key Features:

- 1. Isolation Voltage VISO≥3750Vrms
- 2. Package: 1.27SOP4
- 3. Compatible with RoHS and REACH Standards
- 4. VDE and UL Certificate

Applications: Transmission and Conversion of Digital Logic, Power Control and Switch, Programmable Controllers





## **HPC817**

#### Counter Model: TLP785/HCPL-817

#### Key Features:

- 1. Phototransistor Output
- 2. Isolation Voltage VISO≥5000Vrms
- 3. Package: DIP4/SMD4
- 4. Compatible with RoHS and REACH Standards
- 5. VDE and UL Certificate

Applications: Transmission and Conversion of Digital Logic, Power Control and Switch, Programmable Controllers



	表 3 CTR 分档表 Table 3-Bin	ning table of CTR	
代码Code	测试条件Test Condition	最小值Min.	最大值Max.
空格blank	$I_F=5mA$ , $V_{CE}=5V$	50	600
A	IF=5mA,VCE=5V	80	160
B	$I_F = 5 \text{mA}$ , $V_{CE} = 5 \text{V}$	130	260
С	$I_F=5mA$ , $V_{CE}=5V$	200	400
D	$I_F=5mA$ , $V_{CE}=5V$	300	600
E	$I_F=5mA$ , $V_{CE}=5V$	100	600







## **HPC814**

#### **Counter Model:** FOD814ASD/TLP620/HCPL-814



#### Key Features:

#### 1. AC Input

- 2. Phototransistor Output
- 3. Isolation Voltage VISO≥5000Vrms
- 4. Package: DIP4/SMD4
- 5. Compatible with RoHS and REACH Standards
- 5. VDE and UL Certificate

Applications: Transmission and Conversion of Digital Logic, Power Control and Switch, Programmable Controllers





#### 表 3 CTR 分档表 Table 3-Binning table of CTR

代码Code	测试条件Test Condition	最小值Min.	最大值Max.
A1	$I_F = \pm 1 \text{mA}$ , $V_{CE} = 5 \text{V}$	50	150
Z	$I_F = \pm 1 \text{mA}$ , $V_{CE} = 5 \text{V}$	20	300



## HPC357B/C/D

#### **Counter Model: TLP185**



#### 表 3 CTR 分档表 Table 3-Binning table of CTR

代码Code	测试条件Test Condition	最小值Min.	最大值Max.
空格blank	$I_F=5mA$ , $V_{CE}=5V$	50	600
A	$I_F=5mA$ , $V_{CE}=5V$	80	160
В	$I_F=5mA$ , $V_{CE}=5V$	130	260
С	$I_F=5mA$ , $V_{CE}=5V$	200	400
D	$I_F=5mA$ , $V_{CE}=5V$	300	600

#### Key Features:

- 1. Isolation Voltage VISO≥5000Vrms
- 2. Package: SOP4
- 3. Compatible with RoHS and REACH Standards
- 4. VDE and UL Certificate

Applications: Transmission and Conversion of Digital Logic, Power Control and Switch, Programmable Controllers









## HPC354

#### **Counter Model: TLP184**



#### Key Features:

#### 1. AC Input

- 2.Isolation Voltage VISO≥3750Vrms
- 3. Package: SOP4
- 4. Compatible with RoHS and REACH Standards
- 5. VDE and UL Certificate

Applications: Transmission and Conversion of Digital Logic, Power Control and Switch, Programmable Controllers



	A 5 OW MAX TAKE 5-Dimining table of CTK									
代码Code	测试条件Test Condition	最小值Min.	最大值Max.							
Z	$I_F = \pm 1 \text{mA}$ , $V_{CE} = 5 \text{V}$	20	300							
A <sub>1</sub>	$I_F = \pm 1 \text{mA}$ , $V_{CE} = 5 \text{V}$	50	150							

主 3 CTP 公档主 Table 3 Dinning table of CTD







## HPC101

#### **Counter Model:**

#### Key Features:

- 1. Isolation Voltage VISO≥5000Vrms
- 2. Package: LSOP4
- 3. Compatible with RoHS and REACH Standards
- 4. VDE and UL Certificate

Applications: Transmission and Conversion of Digital Logic, Power Control and Switch, Programmable Controllers



表	3	CTR	分档表	Table 3-Binning table of CTR	
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代码Code	测试条件Test Condition	最小值Min.	最大值Max.
0	$I_F=5mA$ , $V_{CE}=5V$	300	600
5	$I_F=5mA$ , $V_{CE}=5V$	50	150
6	$I_F = 5 \text{mA}$ , $V_{CE} = 5 \text{V}$	100	300
7	$I_F = 5 \text{mA}$ , $V_{CE} = 5 \text{V}$	80	160
8	$I_F = 5 \text{mA}$ , $V_{CE} = 5 \text{V}$	130	260
9	$I_F = 5mA$ , $V_{CE} = 5V$	200	400





## HL

## Triac Output Optocoupler

## 

The output end is photosensitive thyristor or SCR, also known as ac optocoupler, which can directly drive the AC load of appropriate power or act as the isolated drive of power SCR. Widely used in ac motor, solenoid valve, resistance wire and other power load driving circuit.



Hualian Part No.	Replacement Part No.	Replacement manufacturer	Package	Output Type	On-state RMS Current	Peak Off-state Voltage(V)	Operating Temperature	Isolation Voltage (V <sub>RMS</sub> )	Safety Certification
HSCR-0223	AQH0223			NZC	0.3A			5000	UL, VDE
HSCR-1223	AQH1223	-		NZC	0.6A			5000	UL、VDE
HSCR-2223	AQH2223			NZC	0.9A	-		5000	UL. VDE
HSCR-3223	AQH3223		DIP7/ SMD7 (9.6×6.4	NZC	1.2A		-30-85	5000	UL, VDE
HSCR-0213	AQH0213		×3.6)	ZC	0.3A	600∨		5000	UL、VDE
HSCR-1213	AQH1213	Panasonic		ZC	0.6A			5000	UL, VDE
HSCR-2213	AQH2213			ZC	0.9A			5000	UL, VDE
HSCR-3213	AQH3213	Sharp		ZC	1.2A			5000	UL, VDE
HSCR-0123	PR32MF5	Fairchild		NZC	0.3A	600∨		5000	UL, VDE
HPC3023	MOC3023		DIP6/	NZC	0.1A	400∨		5000	UL, VDE
HPC3053	MOC3053	4 ( ) 	SMD6 (7.6×6.4 ×3.6)	NZC	0.1A	600V		5000	UL, VDE
HPC3063	MOC3063			ZC	0.1A	600∨	-40~100	5000	UL. VDE
HPC3083	MOC3083			ZC	0.1A	800∨		5000	UL, VDE
HPC3053-MS	TLP265		SOP4	NZC	0.1A	600∨		3750	UL. VDE
HPC3063-MS	TLP266		×2.3)	ZC	0.1A	600V		3750	UL. VDE



## Silicon Controlled Output Optocoupler

## **Product Application**

 Air conditioners, microwave ovens, washing machines, personal hygiene systems, refrigerators, fan heaters, inductive heating cooker, and water heaters, industrial equipment market.



#### 大家电 ◆ Large Household Electrical Appliances







#### 小家电 O Small Household Electrical Appliances





其 它 🖸 Other









HL Optocoupler Main Customer





HL



Technical benchmarking and continuous development

Develop and invest in high temperature working characteristics, low current input characteristics and miniaturization of optocoupler products, and make technical standards with Toshiba.





**Establish AECQ standard production lines** 

#### VDA6.3 Customer audit standard training

#### IATF 16949 system audit was promoted







#### **AECQ101 product testing certification**

1.00		İbrasi I	le-10 - F	lan a la la	larm	- leave at		i	1	- in a second	in a subset of the
席号。	项目 🔹	简称	* 是否实施 - *	谁来买)	劉単	* 輸业理	试验条件	(万力测试时点) 💌	同力測试判照	▼ 耳戸粉測要求	▼ 补充分析要求
1	高温反偏	HIRB	Ϋ́.	第三方	1783	N/A	VL=1500VDC, Ta=125℃, t=2000h	t=0h, 168h, 500h, 1000h, 2000	NIR/IOFF符合规格书目小干10倍初始情;其它参数符合规格-	H N/A	N/A
2	高温下偏	HTTF8	ĩ	第三方	17*3	N/A	IF=10mA, Io=10mA, Ta=105°C, t=2000h	t=0h, 168h, 500h, 1000h, 2000	NIK/IOFF符合规格书目小平10倍初始值;其它参数符合规格·	15 (N/A	N/8
3	高温栅偏压	HTGB	B (楊祝不引出)	N/A	N/A	N/A	B/A	N/A	N/A	N/A	N/A
4	温度循环	TC	T	第三方	1783	<u></u>	Ta=-45℃~125℃,存储时间15min,转移时间<1min,1000cycle	0,200,500,1000cycle	IR/IOFF符合规格书目小干10倍初始值;其它参数符合规格-	B 100% C-SAM: t=Oh, 20008	。 每批洗取分层
5	高压蒸煮	SC.	T	华联	17*3	문	Ts=121℃, RH=100%, 2个大气压, t=96h	t=0h,96h	IR/IOFF符合理格书目小干10倍初始值;其它参数符合规格:	5 N/A	N/8
6	高温高湿反偏	BITRB	T	第三方	1783	是	VL=1200VDC, 85℃/85WAB, t=1000h	t=0h, 168h, 500h, 1000h	IR/IOFF符合规格书日小干10倍初始情;其它参数符合规格-	# N/A	告批洗取10FF3
7	高温高湿下偏	HTTHHB	Y	第三方	17*3	문	IF=20mA, Io=10mA, 85℃/85%RH, t=1000h	t=0h, 168h, 500h, 1000h	IR/IOFF符合规格书目小干10倍初始值;其它参数符合规格:	# N/A	每批洗取10FF3
8	间则运行寿命	IOL	Y	第三方	1783	是	IF=0 or 7mA (0.5h ON, 0.5h OFF) , VL=1500VDC, RL=5MΩ, Ta=- 45℃125℃, 告10min, t=2000h	t=0h, 168h, 500h, 1000h, 2000	alk/IOFF符合规格书旦小于10倍初始值,其它参数符合规格	书 外观检验	N/A
9	静电防护能力	ESD	T	华联	383	N/A	HBM, 1000V起, 每500V步进, 器件失效为止	10007, 15007, 20007,	参数符合规格书	N/A	N/A
10	碳坏性物理分析	DPA	Y	第三方	583	N/A	按4、6项的补充分析要求执行	R/A	键合界面、粘接或焊接界面不得有分层,焊料不得有迁移等 异常形狼,芯片表面不得有腐蚀变色等异常形狼。	N/A	N/A
11	物理尺寸	PD	T	华联	30#1	N/A	全民寸測量	N/A	尺寸符合规格书	N/A	N/A
12	端子强度	TS	Y	华联	30*1	N/A	使用固定或钳夹方法,保证施加力的点和所施加的力位于引出端轴 向上;逐渐施加5g大小应力至引出端上,保持5g-10g	R/A	解除应力后用10倍放大镜检验,没有断裂、松动或引线和器 件管体之间的相对移动	N/A	N/K
13	耐溶剂性	RTS	11(激光经印)	B/A	R/A	N/A	N/A	N/A	3/4	N/A	N/A
14	耐焊接热	RSH	Y	华联	3#3	N/A	DIP方法	R/A	恢复后观察外现无变形或损伤,测量各项电性能符合产品频 格书要求。	N/A	N/K
15	可焊性	SD	Y	华联	3#3	N/A	样品引脚受过即焊剂后,沿20°~45°(对于有引脚封装)方向浸 入245±5℃的锅炉中2°35,样品本体距J鹞螅焊料1.6mm,取出后用3 ~10倍放大爆观察。	N/A	浸入部分应上铆用壳光滑,浸润面积大于05%,只允许有少 量分散的如针孔不浸润或弱浸润之类的缺陷,且这些缺陷不 出现在同一位需。	N/A	N/K
16	拗阳	TR	Y	第三方	10*1	문	测试IE和MOSPET, 预处理前和预处理后对比数据	N/A	提供对比数据	N/A	N/6
17	绑持强度	YES	T	第三方	5	문	每个器件测试两条焊线,预处理前和预处理后对比数据	N/A	提供对比教报	N/A	N/A
18	绑线剪切	BS	Y	第三方	5	문	每个器件测试两条焊线,预处理前和预处理后对比数据	N/A	提供对比教报	N/A	N/A
19	晶片剪片	DS	Y	第三方	5	문	预处理前和预处理后对计数据	N/A	提供对计数据	B/A	8/6
20	钳位感应开关	UIS	10(无钳位)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
21	介电性	DI	11(編粉不引出)	B/A	R/A	N/A	B/A	B/A	8/4	N/A	N/A
22	<b>损豁可</b> 囊性	SCR	N(非功率器件)	N/A	11/8	N/A	N/A	N/A	9/8	N/A	N/8
23	无铅	LF	T	华联	N/A	N/A	N/A	N/A	N/A	N/A	N/A

GRGTEST
广州广电计量检测股份有限公司

#### 元器件筛选及失效分析实验 室报价单

委(月	托单位 (方): 厦门华联(	电子股份存	有限公司			服务单位 (乙方): 广电计量检测(杭州)有	限公司			
联	系人: 段果		手机:	15959204	107	联系人: 钟江			手机:	18668881130
序号	筆武項目	编写	样品數 /批	批數	执行标准	附加条件	苏本	单价	金額	备往
1	Pre- and Post- Stress Electrical and Photometric Test	TEST	所有应力 后均进	b试验前 行测试	用户规范或供 应商的标准规 范	在室温下根据合适的应力参考条件进行测试	0	10/样/ 次	¥25,000	应力前后电测试
2	Pre-conditioning	PC	SMD产 8、9和 前预	品在7、 10试验 处理	AEC-Q101, AE-CQ102	1、仅在试验#7.8,9和10之前在表面贴装部 件(SMD)上执行; 2、PC前后TEST; 3、任何器件更换均须报备	0	20000/ 批	¥20,000	不包含SAT费用
3	External Visual	EV	每项试验 进行	舗 に り していた していた していた していた していた していた していた していた	AEC-Q101, AE-CQ102	产品外观检查(结构、标识、工艺)	0	5/样/次	1	
4	Parametric Verification	PV	26	3	AEC-Q101, AE-CQ102	广电只能完成产品室温下的光电参数,建议 由客户完成,则可实现规格书中规定的不同 温度下的光电参数	0	100/样	¥7,800	
5	High Temperature	HTRB	77	3	AEC-0101	1、试验周期: 1000H; 2、根据规格书或用户规范施加最大反向额	0	30///\81	¥30.000	Mos管,温度是否为150°0



#### Quality assurance - information assurance of whole processes



- OCAP process exception handling system
- Temperature control device data traceability system

Inspection records IT - proof Check NG automatic warning Automatic braid tension test IT- oriented abnormal equipment, replacement, and parts inspection

Automation



#### Quality assurance - set up a complete FA laboratory

		FA lab	equipment schedule										
Start t	ime: 2021-1			Pl	an					2			
Comp	letion time: 2021-10			Ac	tual								
No.	Device name	Status	Status Information	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
1	Keens ultra Depth of field microscope	OK	Import and use, complete acceptance					2.0.0					
2	Metallographic grinding machine	OK	Import and use, complete acceptance						2			í	
3	Constant temperature heating platform	ОК	Import and use, complete training materials										
4	Regulated DC power supply	OK	Import and use										
5	Fume hood	To be performed	Equipment evaluation										
6	X-ray	To be performed	Poor resolution of existing equipment, evaluate new equipment										
7	Ultrasonic scanning microscope	To be performed	Equipment evaluation										
8	Electronic scanning electron microscopy	To be performed	Equipment evaluation										

The introduction of basic FA techniques has been completed, including physical anatomy and chemical anatomy, sample preparation capability of slice and documents of FA analysis process, but high-level analysis needs to be outsourced for the time being

Due to the limitation of the existing site, the remaining newly purchased equipment will be in place after the factory is moved. The test center of Xiang 'an New Area is 5,000 square meters



## Quality assurance - Introduction of reliability testing

Test type	Test No.	Test Item	Transistor	Traic	AQH	Logic	Mosfet	Gate Driver
	A1	End strength - tension	~	~	~	~	~	~
	A2	End strength - Play it	~	~	~	~	~	1
A Terminal quality	A3	Weldability of terminal	~	~	~	~	~	~
A. Terminal quality	A4	25H salt spray test (iron lead-frame)	~		-			
	A5	48H salt spray test (copper lead-frame)	~	~	~	~	~	~
	A6	The corrosion resistance	~	~	~	~	~	1
	B1	Resistance to welding heat - dip welding resistance						
B. Resistance to	B2	Extreme resistance to welding heat - dip welding	~	~	~	~	~	~
	B3	Resistance to welding heat - soldering iron	~	~	~	~	~	~
welding heat	B4	Resistance to welding heat - reflow welding once				1		
weitung near	B5	Resistance to welding heat- reflow welding for three times	~	~	~	~	~	~
	B6	Resistance to welding heat- wave soldering three times	~	~	~	~	~	~
C. MSL	C1	Humidity sensitivity grade test	~	~	~	~	~	~
	D1	96H high pressure cooking	~	~	~	~	~	~
	D2	The fluorescence solution was permeated for 0.5H						
	D3	The fluorescent solution was permeated for 2H	~	~	~	~	~	~
D. Air tightness	DI	After three reflow welding, the fluorescent solution						
	D4	penetrates for 0.5H	~	~	~	r.	V	~
	DE	After the first wave welding, the fluorescent solution						
	05	penetrates for 0.5H	r 1	~	~	r -		r r



Notice: (1) "" for the items that must be tested and passed,

(2) "C" For projects where tests have to be arranged but the results are for reference only;

(3)Resistance is preferred for resistive load, AC motor for inductive load and ceramic capacitor for capacitive load. Specific parameters shall be confirmed according to product specifications.

Test type	Test No.	Test Item	Transistor	Traic	AQH	Logic	Mosfet	Gate Driver
	E1	300 cycles of high and low temperature		0.000				
	E2	1000 cycles of high and low temperature	C	С	C	С	С	C
	E3	High and low temperature cycles were followed by three wave soldering for 300 times	v	v	~	v	~	v
E. Environment	E4	MSL followed by 300 cycles of high and low temperature	~	v	¥	~	~	~
	E5	1000H high temperature storage	~	~	v	~	~	×
	E6	Low temperature storage at 1000H	~	~	~	~	~	~
	E7	1000H dual 85 storage	~	~	~	~	~	~
8	F1	Electrical endurance of normal temperature on-state, DC						
	F2	Electrical endurance of high temperature on-state, DC	~				v	
	F3	Electrical endurance of Dual 85 on-state, DC				-		
	F4	Electrical endurance of normal temperature off-state, DC						
	F5	Electrical endurance of high temperature off-state, DC	v				less than 200V	
,	F6	Electrical endurance of dual 85 off-state, DC					C less than 200V	v
2	<b>F</b> 7	Electrical endurance of normal temperature on-state, AC			~			
היהור היב היהורה ו <u>אר</u> ינני	F8	Electrical endurance of high temperature on-state, AC		v				
F. Electrical aging	F9	Electrical endurance of Dual 85 on-state, AC						
	FA	Electrical endurance of normal temperature off-state, AC						
	FB	Electrical endurance of high temperature off-state, AC					✓ more than 200V	
	FC	Electrical endurance of dual 85 off-state, AC		~	~		C more than 200V	
	FD	Electrical endurance of normal temperature on-off-state			Resistive load Inductive load			
	FE	Electrical endurance of high temperature on-off-state				Resistive load	Resistive load	Capacitive load
8	FF	Electrical endurance of dual 85 on-off-state						
C A P II	G1	ESD	~	~	~	~	~	~
G. Application	G2	Single pulse current shock			~			

THE END THANK YOU!