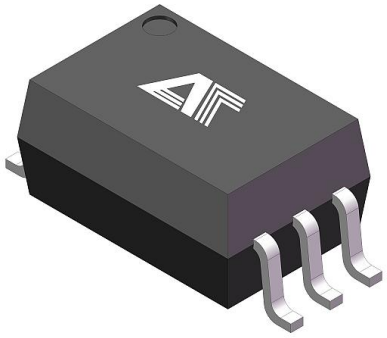
AOTE SEMICONDUCTOR



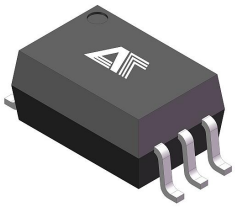
栅极驱动光耦
Gate driven optocoupler

AT314

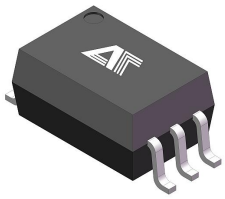
Product Data Sheet

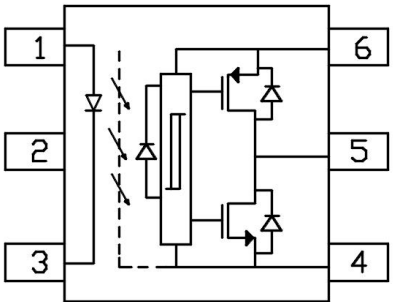
AOTE DCC
RELEASE

SOP6-P



SOP6-W





Pin Configuration
1.Anode
2.NC
3.Cathode
4.VSS
5.VO
6.VDD

◆ 封装逻辑原理图 Encapsulation logic schematic

AT314 光耦采用高效光电转换技术，结合先进封装工艺，提供输入输出间的可靠隔离，支持SOP6-P、SOP6-W封装形式，适配多样化场景需求。

The AT314 optocoupler adopts high-efficiency photoelectric conversion technology and advanced packaging processes, providing reliable input-output isolation. It supports package types SOP6-P、SOP6-W to meet diverse application requirements.

◆ 主要特征 Main features

- 输入-输出隔离电压Vios=5000Vrms
  Input output isolation voltage：Vios=5000Vrms
- 25 kV/μs最小共模抑制;25 kV/μs minimum Common Mode Rejection
- 10V 至 30V 宽工作电压范围；10V ~ 30V Wide operating VCC Range
- 最大峰值输出电流0.6A；Maximum peak output current 0.6A
- 爬电距离>7.0mm；Creepage distance > 7.0mm；
- 输入-输出绝缘距离 >0.4mm； Input-Output insulation Thickness > 0.4mm
- 防潮等级 class1； MSL class1
- 产品符合 ROHS、REACH 及 HF 等环保法规要求；
  The products comply with ROHS, REACH and HF；

◆ 应用领域 Applications

- 工业自动化和电子电力：Industrial automation and electronic power；用于变频器、伺服驱动器等设备的栅极隔离驱动；Gate isolation drive for devices such as frequency converters and servo drives；
- 新能源与电力系统：New Energy and Power Systems车载充电桩(OBC)、电机控制器驱动功率器件；Vehicle mounted charging station (OBC), motor controller drives power devices；
- 电力控制与保护装置：Power control and protection device 固态继电器(SSR)、断路器驱动电路中隔离控制端与功率端；Solid state relay (SSR), isolation control terminal and power terminal in circuit breaker drive circuit
- 噪声环境设备和精密医疗仪器：Noise environment equipment and precision medical instruments适用于电磁干扰严重的工业场景（如电焊机、电磁炉）；Suitable for industrial scenarios with severe electromagnetic interference, such as welding machines and induction cookers

◆ 极限参数 Absolute Maximum Ratings (Ta =25℃)

参数 Parameter		符号 Symbol	最小值 Min.	最大值 Max.	单位 Unit
发射端 Input	平均输入电流 Average Current Input	IF(AVG)	-	25	mA
	峰值瞬态输入电流 (<1 us pulse, 300pps) Peak Transient Input Current (<1 us Pulse, 300pps)	IF(TRAN)	-	1.0	A
	反向电压 Reverse Voltage	VR	-	5	V
	输入功耗 Power Dissipation	PI	-	45	mW
接收端 Output	高峰值输出电流 High Peak Output Current	IOH(PEAK)	-	0.6	A
	低峰值输出电流 Low Peak Output Current	IOL(PEAK)	-	0.6	A
	电源电压 Supply Voltage	VCC-VEE	-0.5	35	V
	峰值输出电压 Peak Output Voltage	VO(PECK)	0.5	VCC	V
	输出功耗 Power Dissipation	PO	-	250	mW
隔离电压 Isolation Voltage		Viso	5000		Vrms
工作温度 Operating Temperature		Topr	-55 ~+110		℃
存储温度 Storage Temperature		Tstg	-55 ~+125		℃
焊接温度 Soldering Temperature		Tsol	260		℃

◆ 推荐操作条件 Recommended Operating Conditions

参数 Parameter	符号 Symbol	最小值 Min	最大值 Max.	单位 Unit
电源电压 Power Supply Voltage	VCC-VEE	10	30	V
开启电流 Input Current (ON)	IF(ON)	8	12	mA
关断电压 Input Voltage (OFF)	VF(OFF)	-3.6	0.8	V

◆ 产品特性参数Product characteristic parameters (Ta =25℃)

除非另有规定，适用于所有的推荐条件，典型值在 T_A =25℃ 下测量 Unless otherwise specified, as appropriate for all recommended conditions, typical values are measured at T_A =25℃

参数 Parameter		符号 Symbol	条件 Condition	最小 Min.	典型 Typ.	最大 Max.	单位 Unit
发射端 Input	正向电压 Forward Voltage	VF	IF =10mA	1.2	1.5	1.8	V
	反向电压 Reverse Voltage	BVR	IR =10uA	5	-	-	V
	阈值电流从低到高 Threshold Input Current Low to High	I_{FLH}	Io =0mA, VO >5V	-	-	7	mA
	阈值电压从高到低 Threshold Input Voltage High to Low	V_{FHL}	Io =0mA, VO <5V	0.8	-	-	V
	输入正向电压的温度系数 Temperature Coefcient Of Input Forward Voltage	ΔVF/ ΔTA	IF = 10mA	-	-1.6	-	mV/℃
	输入电容 Input Capacitance	C-in	V=0, F=1kHz	-	60	-	pF
接收端 Output	高电平输出电流 High Level Output Current	IOH	VO =VCC-4V	0.2	-	-	A
			VO =VCC-10V	0.4	0.5	-	
	低电平输出电流 Low Level Output Current	IOL	VO =VEE+2.5V	0.2	0.4	-	
			VO =VEE+10V	0.4	0.5	-	
	高电平输出电压 High Level Output Voltage	VOH	Io = -100mA	VCC-0.3	VCC-0.1	-	V
	低电平输出电压 Low Level Output Voltage	VOL	Io = 100mA	-	0.4	1	V
	高电平电源电流 High Level Power Supply Current	ICCH	IF =10mA	-	0.7	3	mA
	低电平电源电流 Low Level Power Supply Current	ICCL	IF =0mA	-	1.2	3	

参数 Parameter		符号 Symbol	条件 Condition	最小 Min.	典型 Typ.	最大 Max.	单位 Unit
传输特性 Transfer Characteristics	低电平传输延迟 Propagation Delay Time to Low Output Level	TPHL	VCC=30V IF =8mA Rg =47Ω Cg =3nF f =10 kHz Duty Cycle=50%	0.1	0.3	0.7	us
	高电平传输延迟 Propagation Delay Time to High Output Level	TPLH		0.1	0.2	0.7	us
	传输延迟差 Propagation Delay Diference Between Any Two Parts	PDD		-0.5	-	0.5	us
	上升时间(10% ~90%) Rise Time (10% To 90%)	TR		-	50	-	ns
	下降时间(90% ~10%) Fall Time (90% ~10%)	TF		-	50	-	ns
	输出高电平共模抑制 Output High Level Common Mode Transient Immunity	|CMH|	TA =25℃, VCM=1500V	25	-	-	kV/μs
	输出低电平共模抑制 Output Low Level Common Mode Transient Immunity	|CML|		25	-	-	kV/μs
	隔离电阻 Isolation Resistance	RISO	VI-O≤ 500V	10^{12}	-	-	Ω
	隔离电容 Isolation Capacitance	CISO	VI-O =0V f=1.0MHz	-	0.6	-	PF

◆ 电性特性曲线Electrical characteristic curve(Ta =25℃)

Fig.1 High Level Output Voltage vs Ambient Temperature

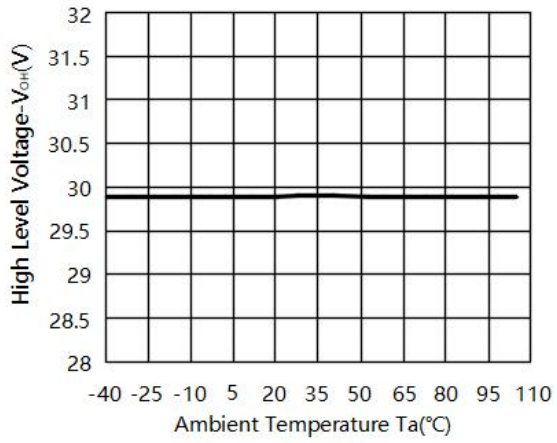


Fig.2 High Level Output Current vs Ambient temperature

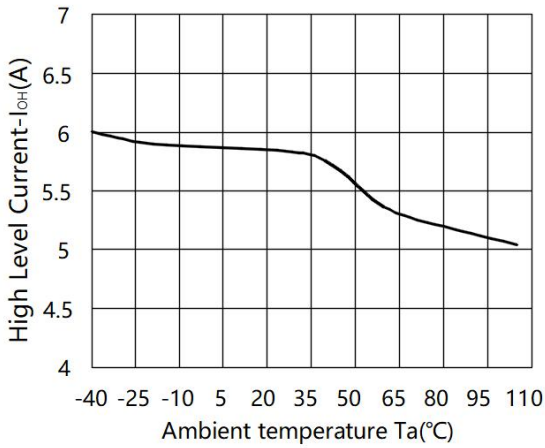


Fig.3 High Level Output Voltage vs High Level Output Current

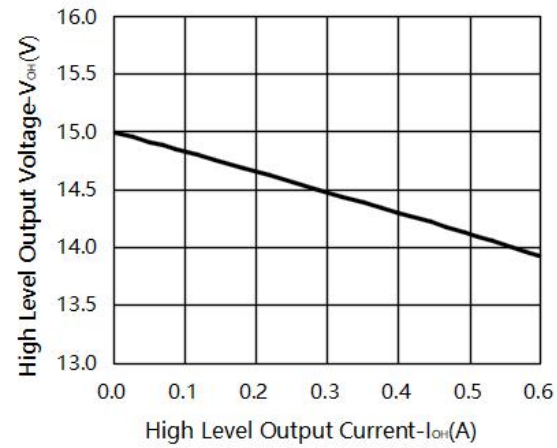


Fig.4 Low Level Output Voltage vs Ambient temperature Ta(℃)

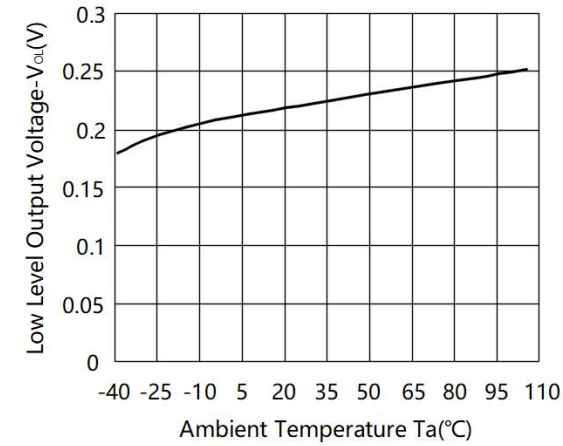


Fig.5 Low Level Output Current vs Ambient Temperature Ta(℃)

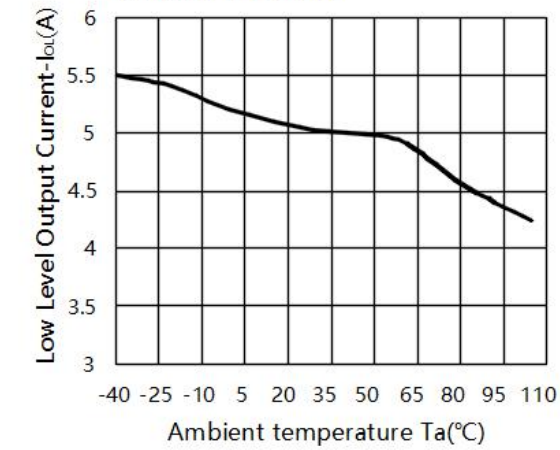


Fig.6 Low Level Output Voltage vs Low Level Output Current

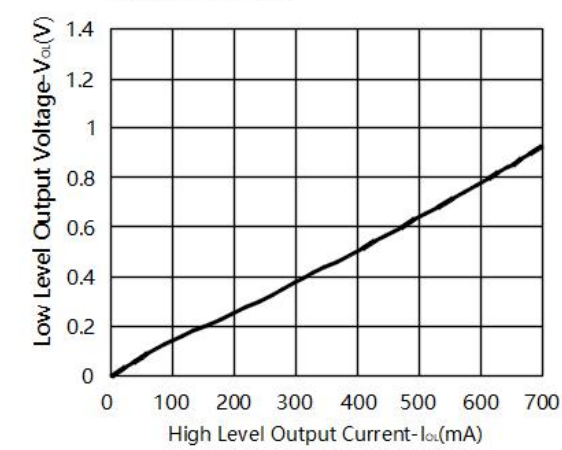


Fig.7 Supply Current vs Ambient Temperature

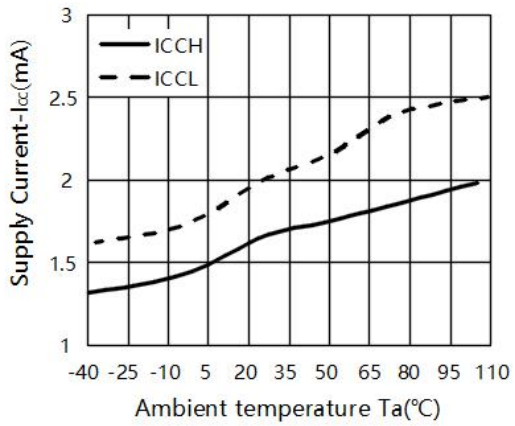


Fig.8 Supply Current vs Supply Voltage

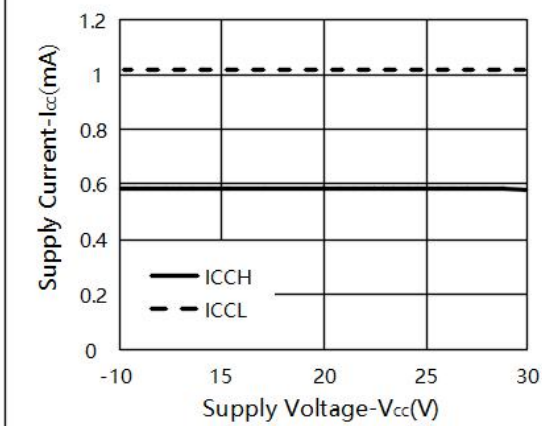


Fig.9 Threshold Input Current Low to High vs Ambient Temperature

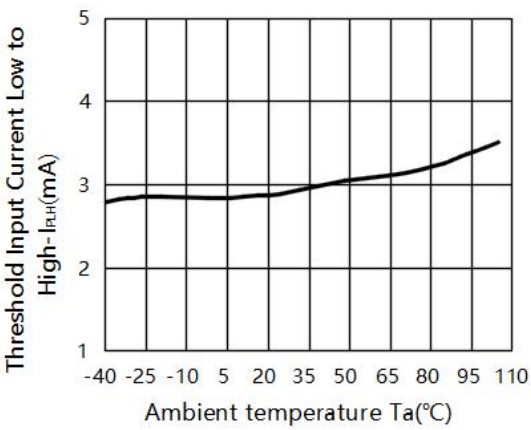


Fig.10 Propagation Delay vs. VCC

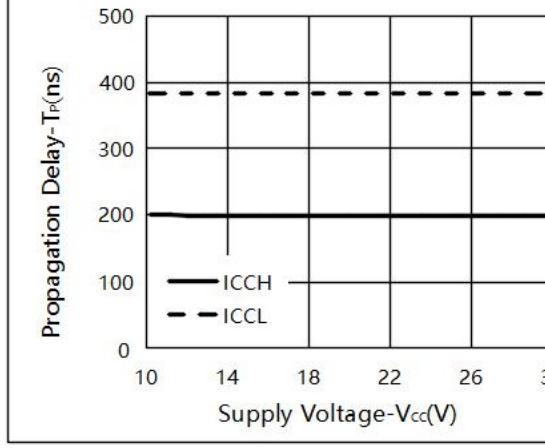


Fig.11 Propagation Delay vs Input Forward Current

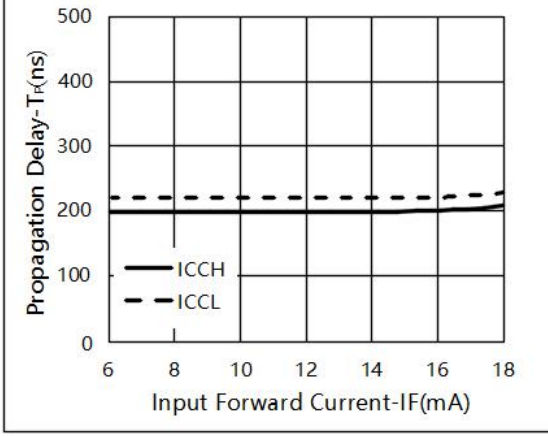


Fig.12 Propagation Delay vs Ambient Temperature

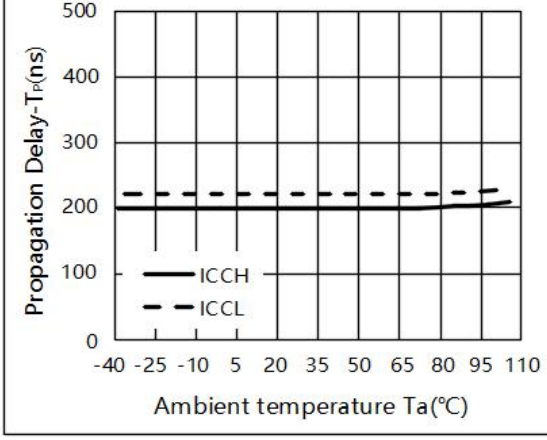


Fig.13 Propagation Delay vs Load Resistance

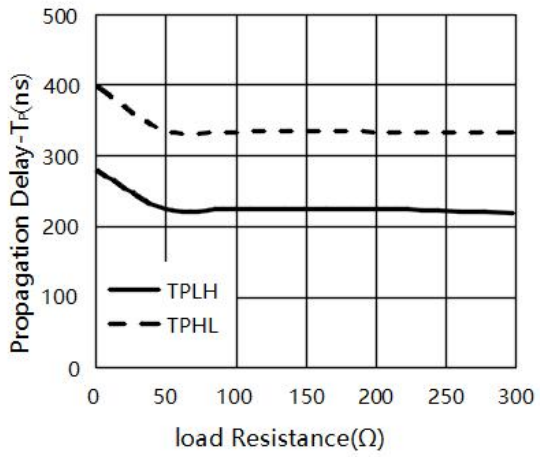


Fig.14 Propagation Delay vs Load Capacitance

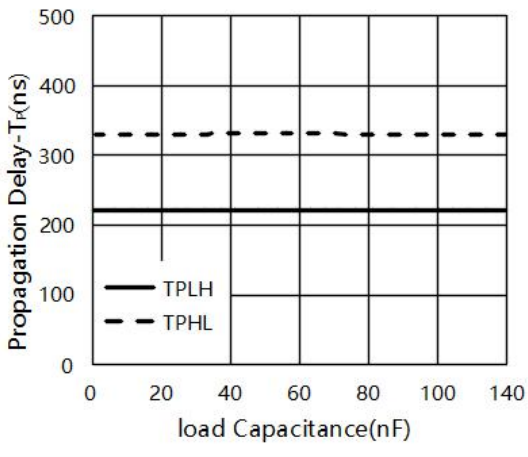


Fig.15 Output Voltage vs Forward Current

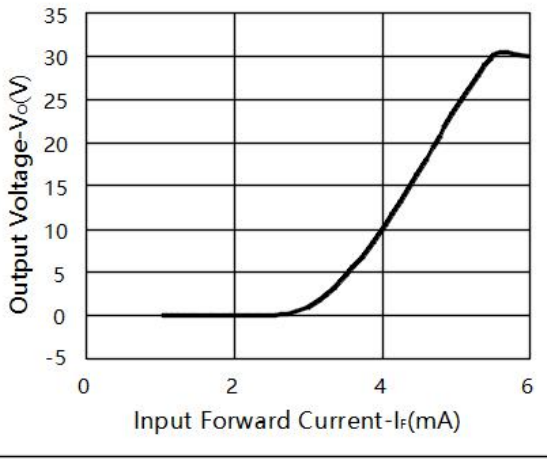
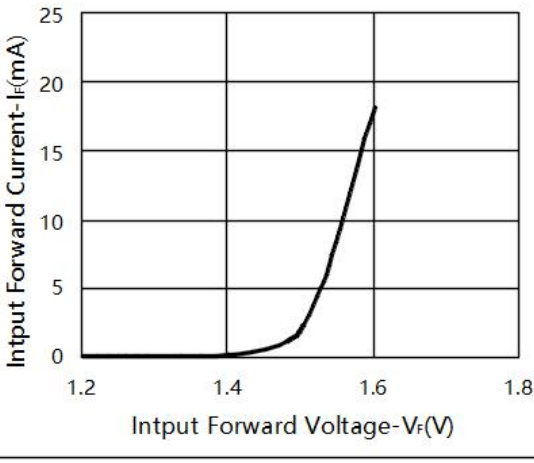


Fig.16 Intput Forward Current vs Forward Voltage



◆ **测试电路TestCircuits:**

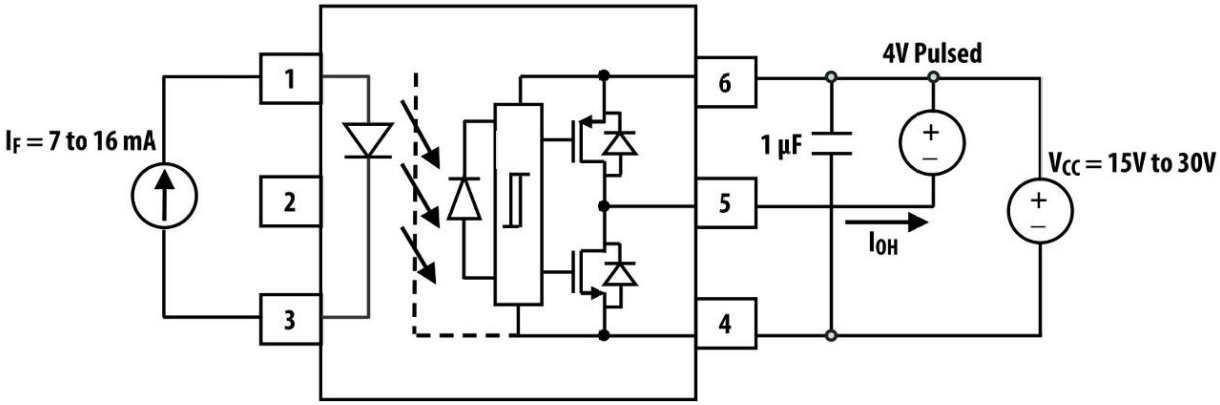


Fig17. I_{OH} Pulsed Test Circuit

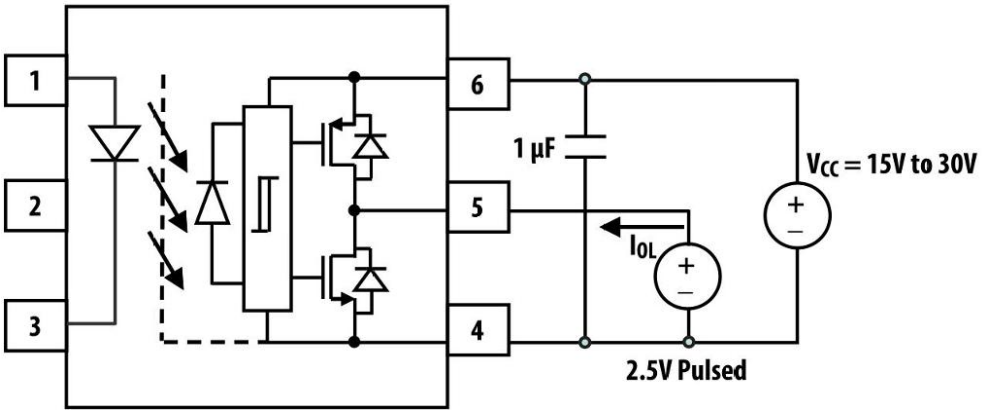


Fig18. I_{OHL} Pulsed Test Circuit

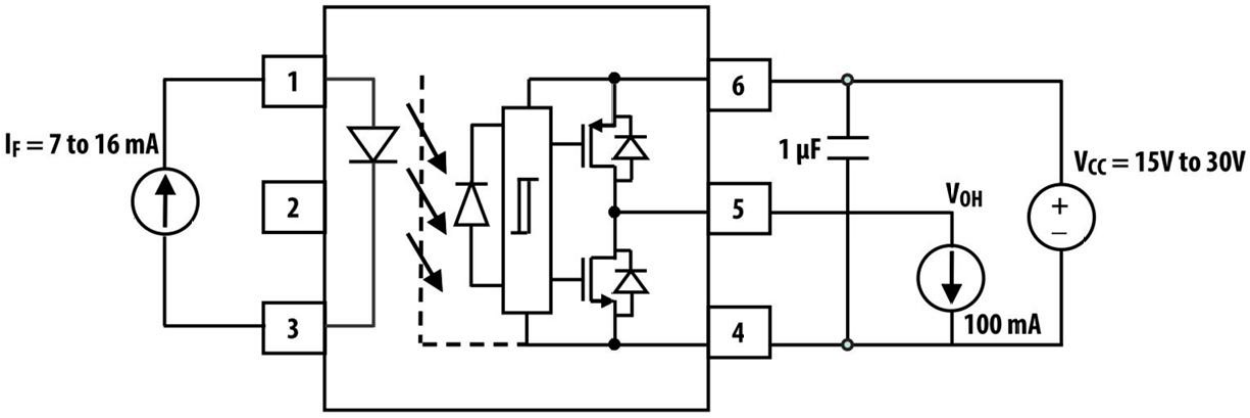


Fig19. V_{OH} Pulsed Test Circuit

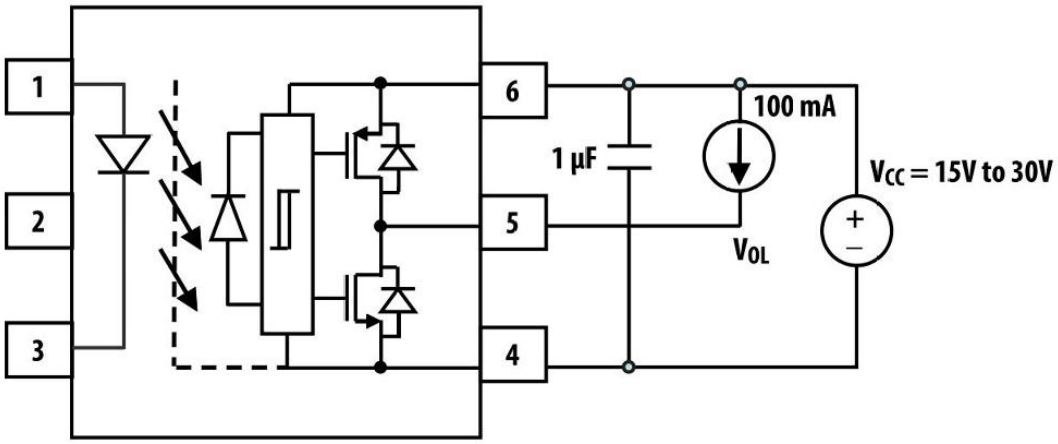


Fig20. V_{OL} Pulsed Test Circuit

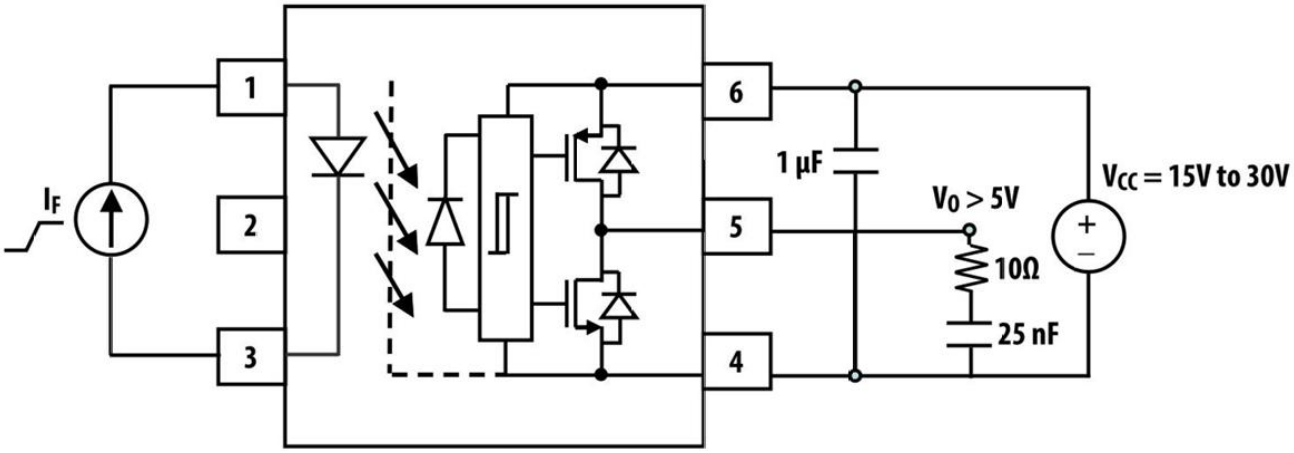


Fig21. I_{FLH} Pulsed Test Circuit

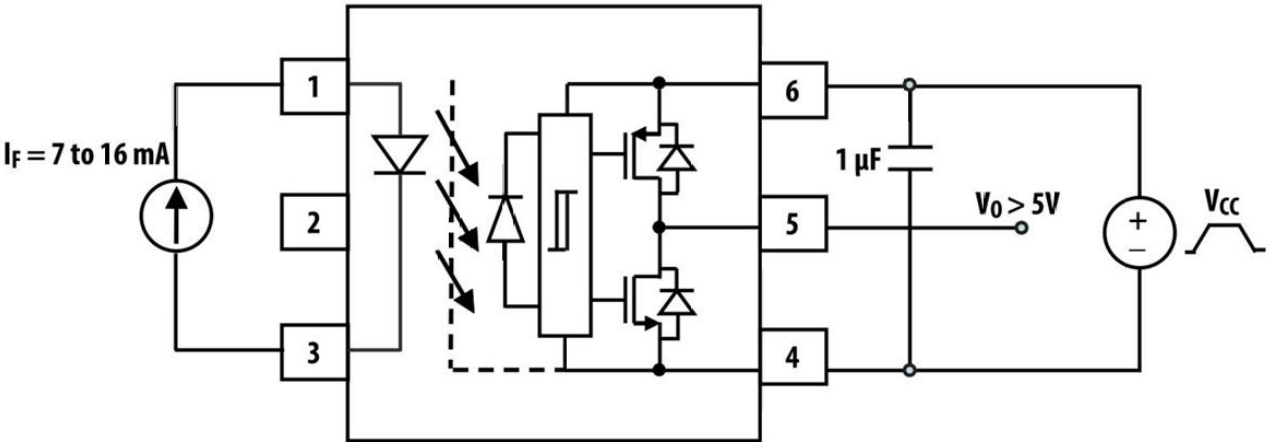


Fig22. UVLO Test Circuit

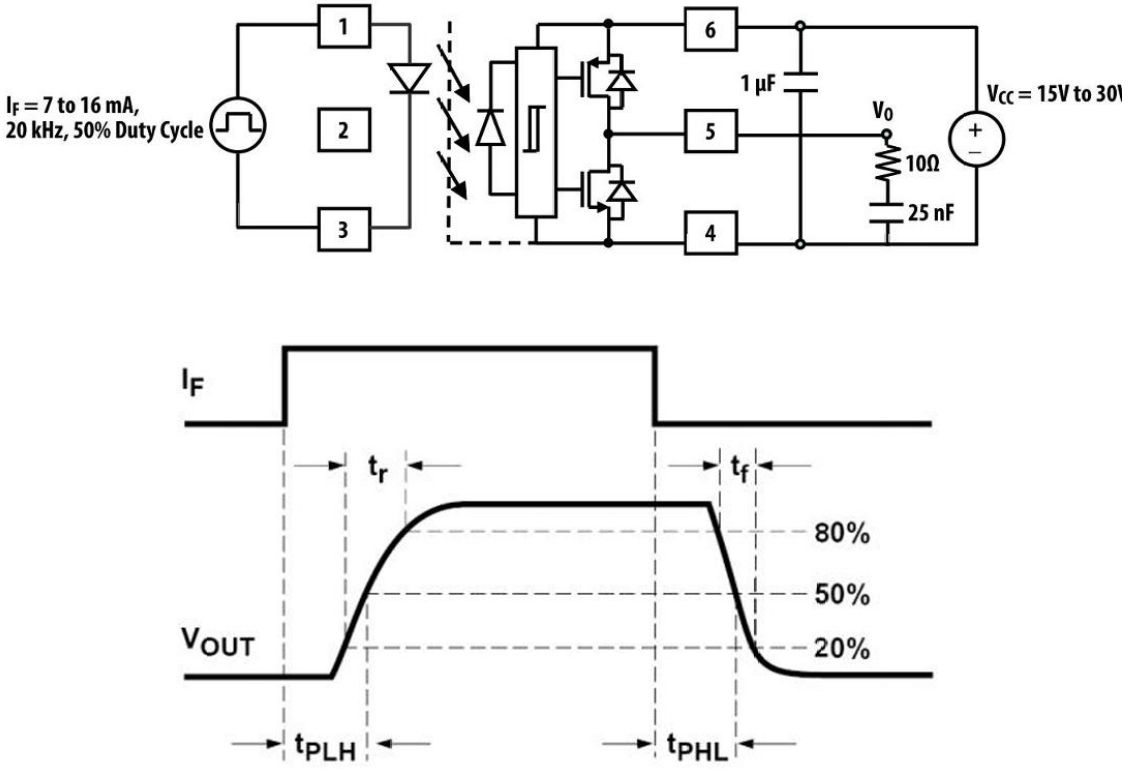


Fig23. TPHL、TPLH、TR、TF Test Circuit

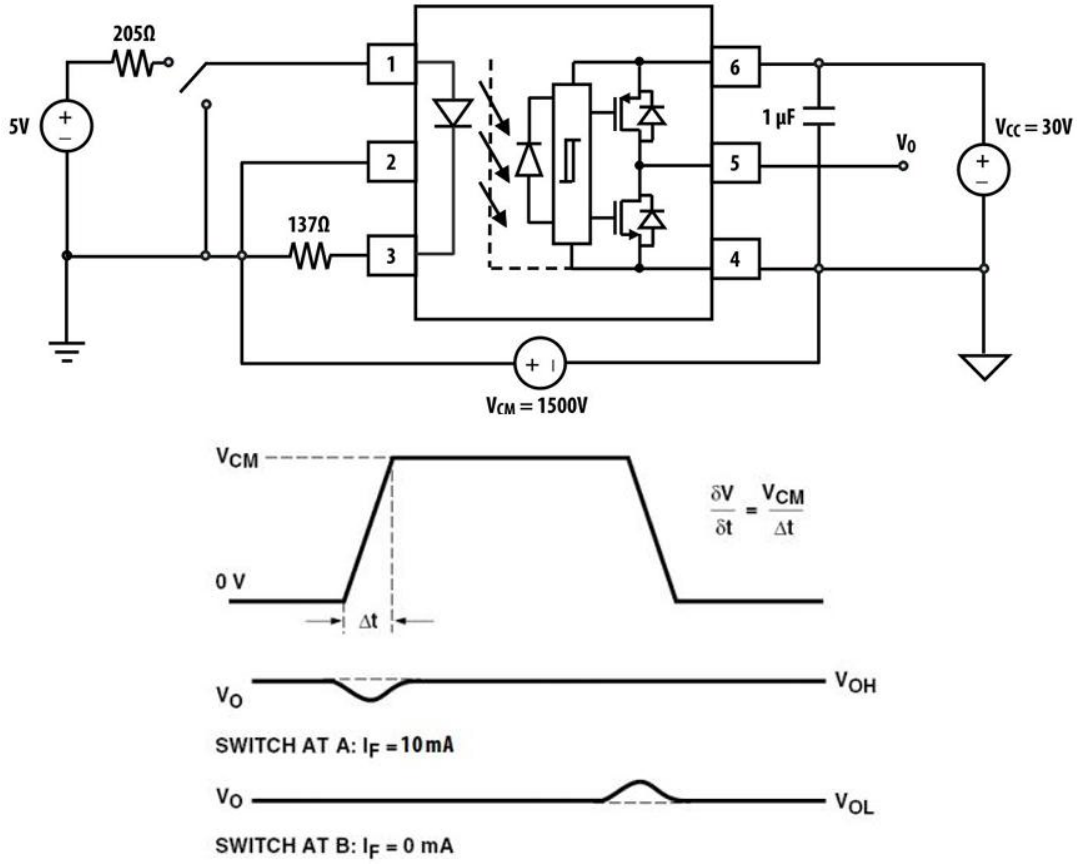
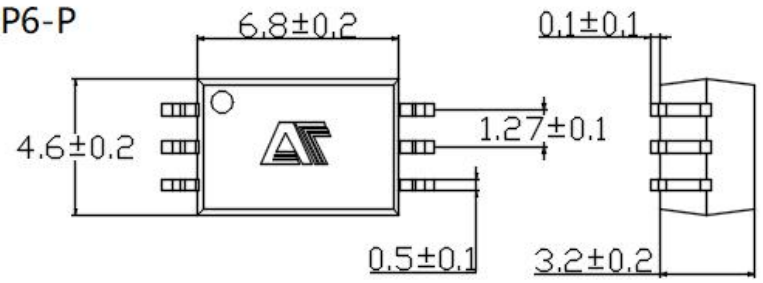
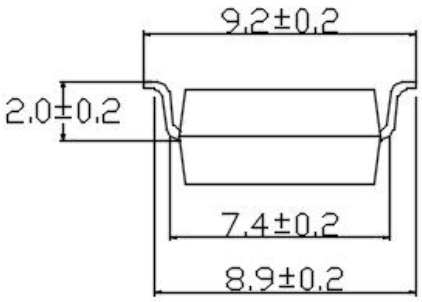


Fig24. CMR Test Circuit

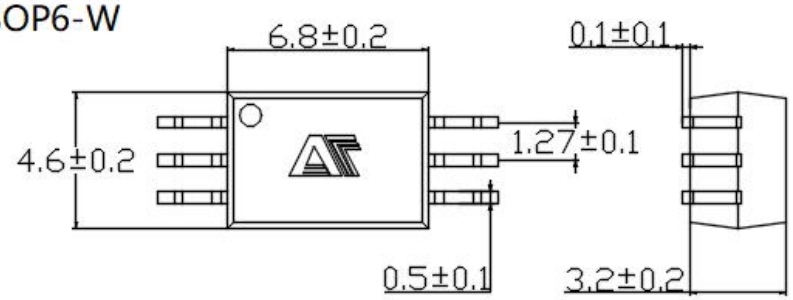
◆ 外形尺寸Overall dimension

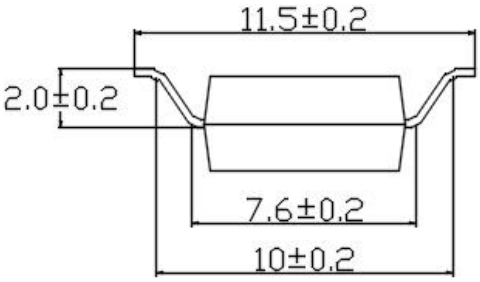
SOP6-P



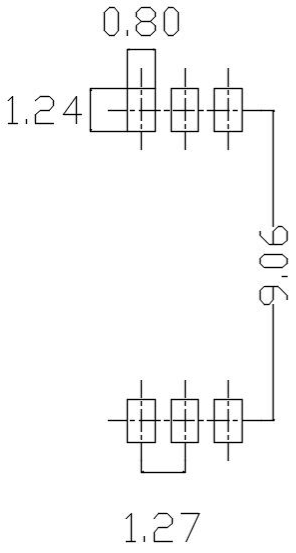


SOP6-W

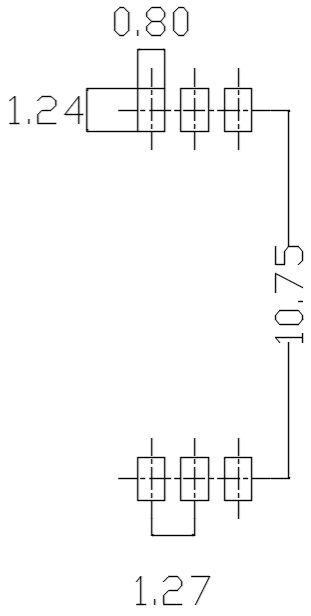




推荐焊盘：
Recommended



Sop6-p



sop6-w

单位：mm

◆ 产品型号命名规则 Order code

AT 314 -UN Y-W(V)(ZZ)
① ② ③ ④ ⑤ ⑥ ⑦

① 公司代码 Company Code (AT: 奥特 Aote)
② 产品系列 Product Series (314)
③ 框架类型 Lead Frame (Cu: 铜框架 Copper)
④ 树脂类型 Epoxy Type (H: 无卤 Halogen-free)
⑤ 封装形式 Package (S: SOP)
⑥ 器件工作温度范围 Device Operating Temperature Range (特殊范围需填或者空白 Special Range need to be filled in or left blank)
⑦ 内部补充代码 Internal Supplementary Code (数字或者空白 Number or Non)

◆ 印字信息 Marking Information

- 印字中“ ”为奥特品牌LOGO
  “ ”denotes LOGO
- 印字中“Y”代表年份； A(2018),B(2019),C(2020) … …
  “Y”denotes YEAR： A(2018), B(2019), C(2020) … …
- 印字中“WW”代表周号
  “WW”denotes Week’s number
- 印字中“ E”代表内部代码
  “E”denotes Internal code
- 印字中的“H”代表无卤
  “H”denotes Halogen-free

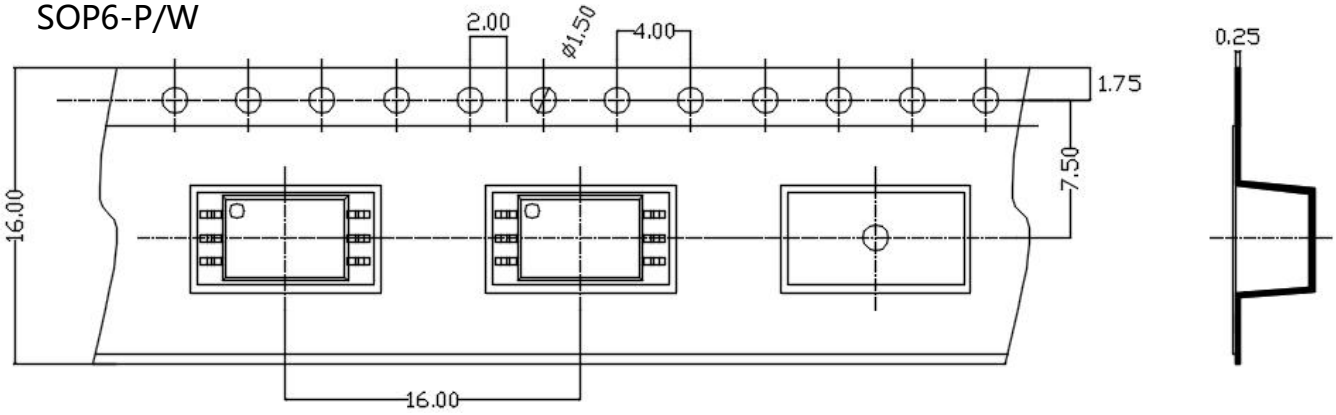
◆ 包装packing

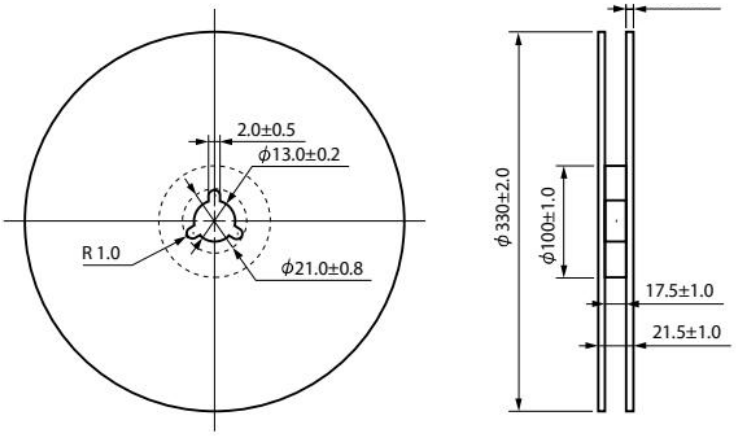
封装形式	包装方式	盘数量	盒数量	箱数量	静电袋规格	盒规格	箱(双瓦楞)规　格	备注
SOP6	卷盘 (ϕ330mm 蓝盘)	1000 只/盘	2 盘/盒	10 盒/箱	380*380mm	340*60*340 mm	620*360*365mm	首尾端空至少 200mm
Package Type	Packing Form	Quantity per Reel	Quantity per Box	Quantity per Carton	Antistatic Bag Specification	Box Specification	Carton Specification	Note
SOP6	Reel (ϕ330mm Blue)	1k pcs/reel	2Reel/box	10box/ctn	380*380mm	340*60*340 mm	620*360*365mm	Leave at least 200mm of blank space at both ends

• 编带包装 Tape & Reel

1) 每卷数量：1000 只；Qty/reel：1000 pcs；
2) 每箱数量：20000 只；Qty/ctn：20000 pcs；
3) 内包装：每盒 2 盘；Inner packing：2 reels/box；
4) 示意图 Schematic:

SOP6-P/W



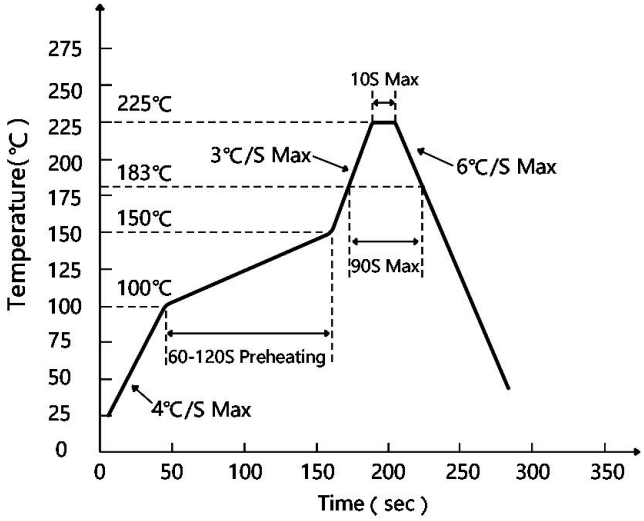


单位：mm

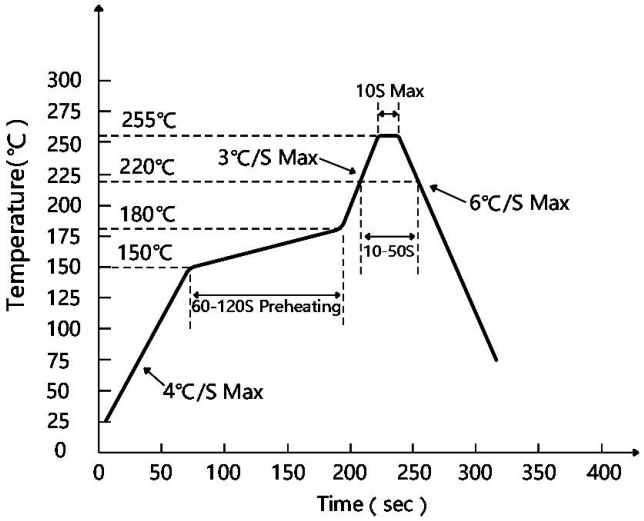
◆ 可靠性测试 Reliability Test Items And Conditions

实验项目 Test Items	参考标准 Reference	实验条件 Test Conditions	时间 Time	样品数 Quantity	判据 Criterion
可焊性 Solderability	JESD22-B102	Tsol=（245±5）℃, t=5s;	1 次1 times	22	0/22
耐焊接热 Resistance to Soldering Heat	JESD22-A106	Tsol=（260±5）℃, t=10s	3 次3 times	22	0/22
静电放电 ESD-HBM	JESD22-A114	Ta=25℃, HBM (2000V)	正反各 3 次 P&N 3 times	10	0/10
高温贮存 High emperature Storage	JESD22-A103	Ta=125℃	1000h	22	0/22
低温贮存 Low Temperature Storage	JESD22-A119	Ta= -55℃	1000h	22	0/22
冷热冲击 Thermal Shock	JESD22-A104	-55℃(15min)⟷ 125℃(15min)	循环 300 次 300 cycles	22	0/22
常温寿命试验 Lifespan Test	JESD22-A108	Ta=25℃, IF=50mA ， Vcc=5V	1000h	22	0/22
高温寿命试验 DC Operating Life	JESD22-A108	Ta=110℃, IF=20mA ， Vcc=5V	1000h	76	0/76
高温高湿偏压 High Temperature High Humidity bias Voltage	JESD22-A101	Ta =85℃ , RH=85% IF=0mA ， VCE=64V	1000h	22	0/22
高温偏压 High Temperature bias Voltage	JESD22-A108	Ta =110℃ , IF=0mA ， VCE=80V	1000h	22	0/22
高压蒸汽试验 High pressure steam test	JESD22-A102	P=15PSIG ， 121℃, 100%RH	96h	22	0/22

◆ 回流焊温度曲线图 Solder Reflow Profile

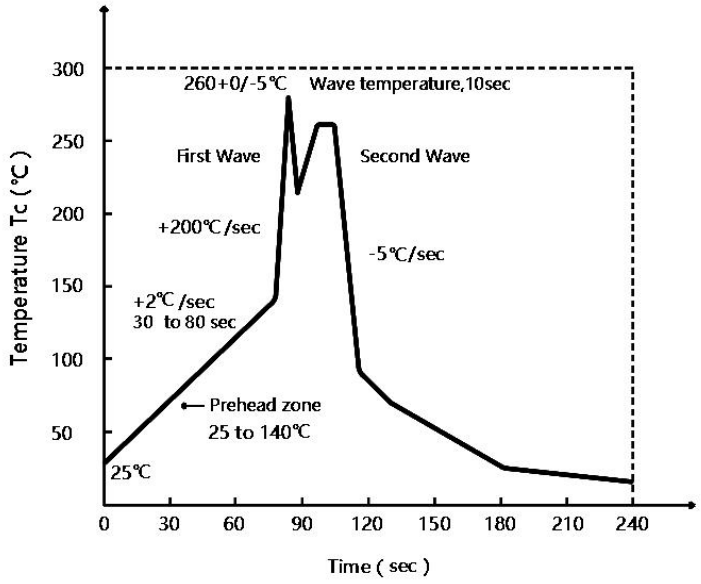


有铅制程 Lead Process



无铅制程 Lead Process

◆ 波峰焊温度曲线图 Wave Soldering Profile



◆ 手工烙铁焊接 Soldering with hand soldering iron

A. 手工烙铁焊仅用于产品返修或样品测试;

Hand soldering iron is only used for product rework or sample testing;

B. 手工烙铁焊要求: 温度 350℃ ± 5℃, 时间≤3s。

Hand soldering iron requirements: Temperature: 350℃ ± 5℃, within 3s.

◆ 注意 Attention

- 奥特半导体实施动态技术迭代机制，产品规格可能随工艺升级调整，最新技术参数以官网发布版本为准。

AOTE implements dynamic technical updates. Specifications are subject to change. Refer to the official website for the latest version.

- 用户需严格遵循本规格书限定的操作条件，因超范围使用（包括但不限于过载、高温、非兼容电路设计）导致的器件失效，不在质量保证范围内。

Users must strictly adhere to specified conditions. Failures caused by misuse (overload, high temperature, incompatible circuits) are excluded from warranty.

- 医疗设备、工业控制等关键场景应用前，需联系技术支持获取定制化验证方案。

Contact technical support for customized validation in critical applications (medical devices, industrial control).

- 本文档有效期至2025年12月31日，后续更新将通过官网公告推送。

This document is valid until Dec 31, 2025. Updates will be notified on the official website.

- 如需对技术参数或应用方案进行进一步确认，欢迎通过以下渠道获取官方支持：

For further clarification on technical specifications or application solutions, please contact us through official channels: