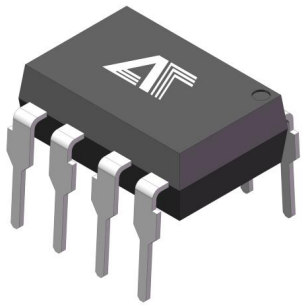


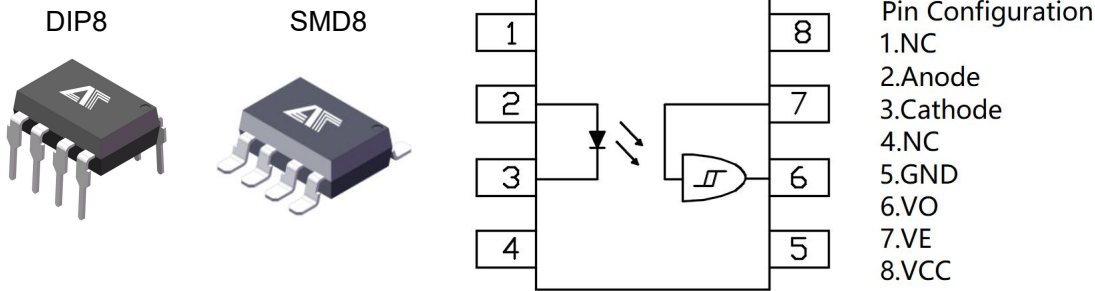


高速光耦
High speed optocoupler

6N137S

Product Data Sheet

AOTE DCC
RELEASE



◆ 封装逻辑原理图 Encapsulation logic schematic

6N137S 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DIP8及SMD8两种封装形式，适配多样化场景需求。

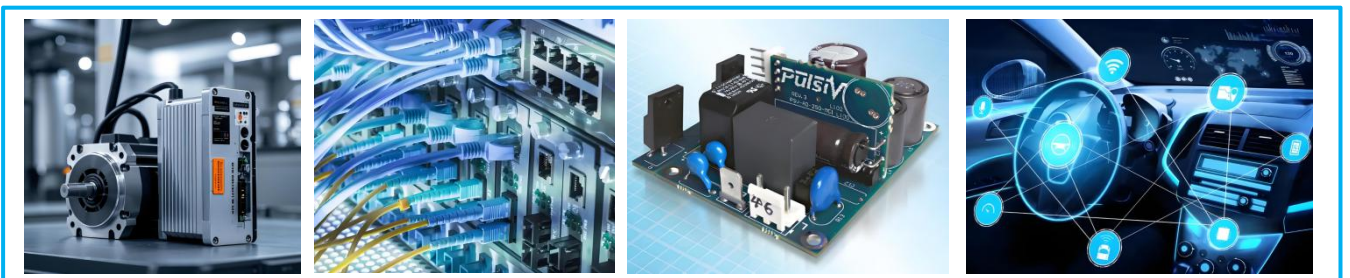
The 6N137S optocoupler adopts high-efficiency photoelectric conversion technology and advanced packaging processes, providing reliable input-output isolation. It supports two package types (DIP8 SMD8) to meet diverse application requirements.

◆ 产品特征Product features

- 输入-输出隔离电压Vios=5000Vrms
Input output isolation voltage: Vios=5000 Vrms
- 高传输比特率: 10MBit/s; High transmission ratio 10MBit/s;
- 输出高电平共模瞬态抑制 5KV/US; Common Mode Transient Immunity at High Output Level 5K/US
- 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

- 通信与网络Communications and Networking光纤通信, 数据中心Fiber optic communication, data center
- 工业自动化与控制 Industrial Automation and Control
PLC与变频器, 伺服驱动系统, 工业机器人 PLC and frequency converter, servo drive system, industrial robot
- 电机驱动与能源管理 Motor Drive and Energy Management; 电机控制, 电机保护, 电力电子, 消费电子
Motor control, motor protection, Power electronics, Consumer Electronics
- 新兴技术领域Emerging technology fields
智能交通系统, 医疗设备, 自动化生产线Intelligent Transportation System, medical equipment, Automatic production line



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

参数 Parameter		符号 Symbol	额定值 Rating	单位 Unit
发射端 Input	正向输入电流 (平均) DC/Average Forward Input Current	IF	20	mA
	使能输入电压不超过 VCC 500mV Enable Input Voltage Not to Exceed VCC by more than 500mV	VE	5.5	V
	反向输入电压 Reverse Input Voltage	VR	5.0	V
	功耗 Power Dissipation	PI	70	mW
接收端 Output	电源电压 Supply Voltage	VCC	7.0	V
	输出电流 Output Current	IO	50	mA
	输出电压 Output Voltage	VO	7.0	V
	输出功率 Collector Output	PO	85	mW
隔离电压 Isolation Voltage		Viso	5000	Vrms
工作温度 Operating Temperature		Topr	-55 ~+110	°C
存储温度 Storage Temperature		Tstg	-55 ~+125	°C
焊接温度 Soldering Temperature		Tsol	260	°C

◆ 推荐操作条件 Recommended Operating Conditions

参数 Parameter	符号 Symbd	最小值 Min	最大值 Max	单位 unit
低电平输入电流 Low Level Input Current	IFL	0	250	μA
高电平输入电流 High Level Input Current	IFH	6.3	15	mA
电源电压 Supply Voltage	VCC	2.7	5.5	V
低电平使能电压 Low Level Enable Voltage	VEL	0	0.8	V
高电平使能电压 Low Level Enable Voltage	VEH	2.0	VCC	V

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

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 =16mA	-	1.33	1.75	V
	反向击穿电压 Reverse Breakdown Voltage	BVR	IR =10μA	5	20	45	V
	输入电容 Input Capacitance	CIN	V=0, f=1MHz	-	70	-	pF
	正向电压的温度系数 Input Diode Temperature Coefficient	ΔVF/ΔTA	IF =10mA	-	-1.4	-	mV/°C
接收端 Output	高电平电源电流 High Level Supply Current	ICCH	VCC =5.5V, IF =0mA , VE =0.5V	-	6.5	10	mA
	低电平电源电流 Low Level Supply Current	ICCL	VCC =5.5V, IF =10mA	-	9	13	mA
传输特性 Transfer Characteristics	低电平使能电流 Low Level Enable Current	IEL	VCC =5.5V, VE =0.5V	-	-0.8	-1.6	mA
	高电平使能电流 High Level Enable Current	IEH	VCC =5.5V, VE =2.0V	-	-0.6	-1.6	mA
	高电平使能电压 High Level Enable Voltage	VEH	VCC =5.5V, IF =10mA	2.0	-	-	V
	低电平使能电压 Low Level Enable Voltage	VEL	VCC =5.5V, IF =10mA	-	-	0.8	V
	高电平输出电流 High Level Output Current	IOH	VCC =5.5V, VO =5.5V IF = 250μA, VE =2V	-	-	100	μA
	低电平输出电压 Low Level Output Current	VOL	VCC =5.5V, IF =5mA IOL =13mA, VE =2V	-	0.35	0.6	V
	输入阈值电流 Input Threshold Current	IFT	VCC =5.5V, VO <0.6V IOL =13mA, VE =2V	-	3	5	mA
隔离电阻 Isolation Resistance		RI-O	VI-O =500V	-	10 ¹²	-	Ω
隔离电容 Isolation Capacitance		CI-O	f=1MHz	-	0.6	-	pF

注 电流传输比= $I_C/I_F \times 100\%$; Note*: CTR= $I_C/I_F \times 100\%$.

◆ 开关特性 Switching Specification

参数 Parameter	符合 Symbol	条件 Condition	最小 Min.	典型 Typ.	最大 Max.	单位 Unit
输出高电平传播延迟 Propagation Delay Time to Output HIGH Level	TPLH	IF = 7.5mA, VCC = 5V, RL = 350Ω, CL = 15pF	20	41	100	ns
输出低电平传播延迟 Propagation Delay Time to Output LOW Level	TPHL		25	50	100	ns
脉宽失真 (TPHL-TPLH) Pulse Width Distortion	PWD		-	5	35	ns
输出上升时间(10% - 90%) Output Rise Time (10-90%)	tr		-	30	-	ns
输出下降时间(90% - 10%) Output Rise Time (90-10%)	tf		-	10	-	ns
输出高电平使能传播延迟 Enable Propagation Delay Time to Output HIGH Level	tELH	IF = 7.5mA, VEH = 3.5V, RL = 350Ω, CL = 15pF	-	15	-	ns
输出低电平使能传播延迟 Enable Propagation Delay Time to Output LOW Level	tEHL		-	40	-	ns
输出高电平共模瞬态抑制 Common Mode Transient Immunity (at Output HIGH Level)	CMH	TA = 25°C VCC = 5V , IF = 0mA VCM =50V(Peak) VO(MIN) = 2.0V , RL = 350Ω	5000	10000	-	V/μs
输出低电平共模瞬态抑制 Common Mode Transient Immunity (at Output LOW Level)	CML	TA = 25°C VCC = 5V , IF = 10mA VCM =50V(Peak) VO(MAX) = 2.0V, RL = 350Ω	5000	10000	-	V/μs

◆ 电性特性曲线 Electrical characteristic curve ($T_a = 25^\circ\text{C}$)

Fig.1 Low-level output voltage vs. Ambient temperature

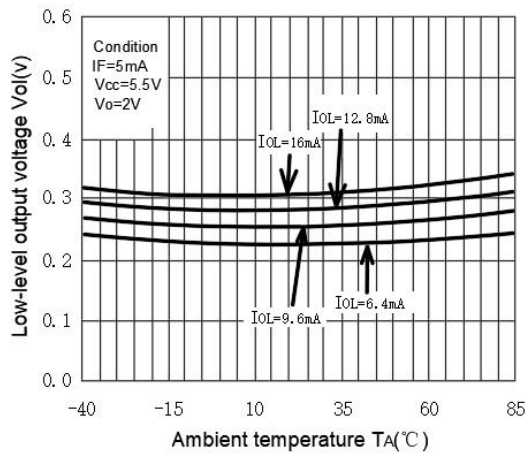


Fig.2 Forward current vs. Forward voltage

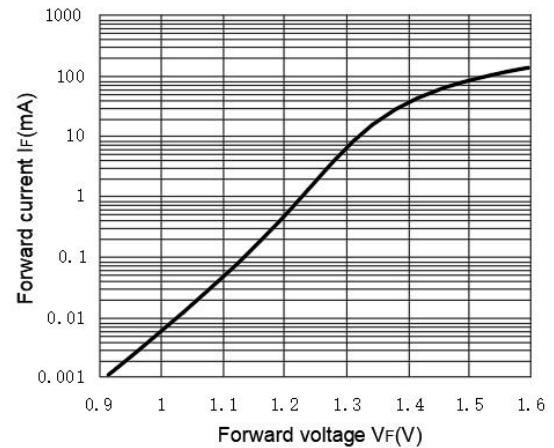


Fig.3 Propagation delay time vs. Forward current

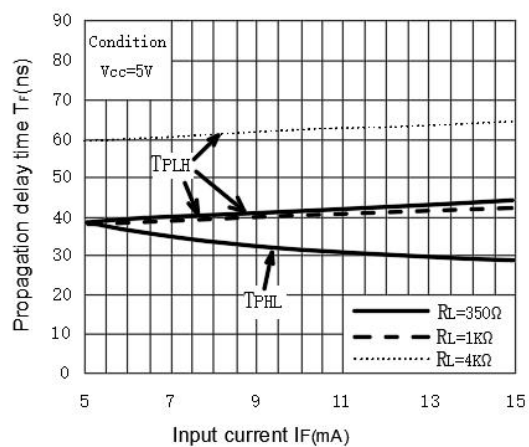


Fig.4 low-level output current vs. Ambient temperature

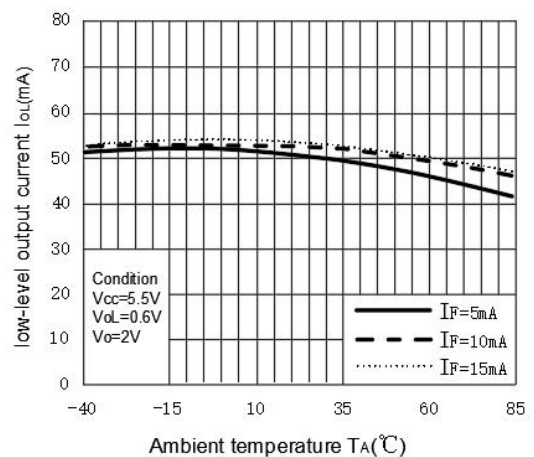


Fig.5 Input threshold current vs. Ambient temperature

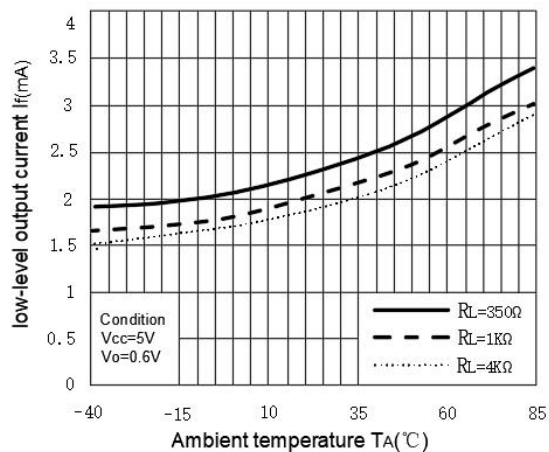


Fig.6 Output voltage vs. Forward current

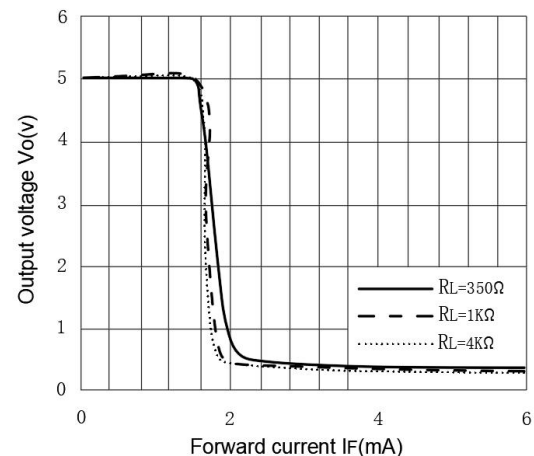


Fig.7 Pulse-width distortion vs. Ambient temperature

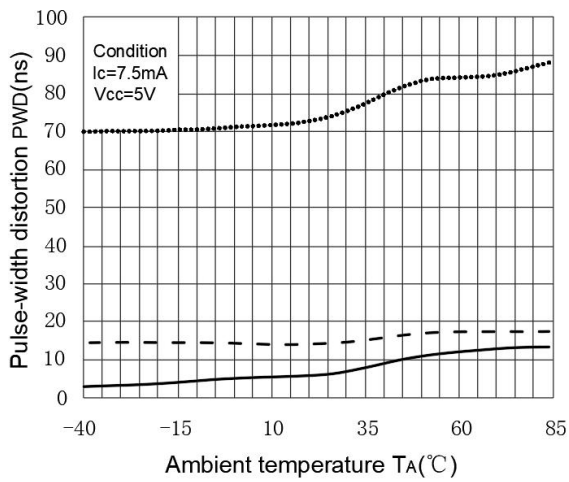


Fig.8 Switching time vs. Ambient temperature

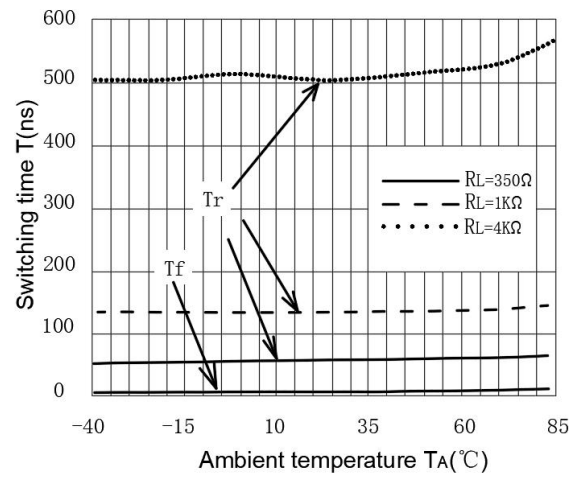


Fig.9 Propagation delay time vs. Ambient temperature

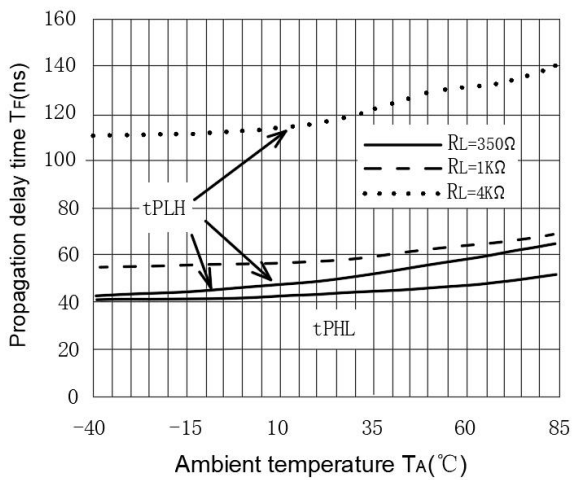


Fig.10 Propagation delay time vs. Ambient temperature

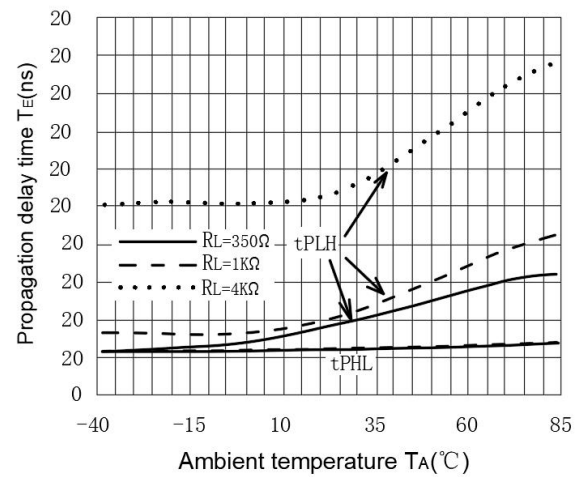
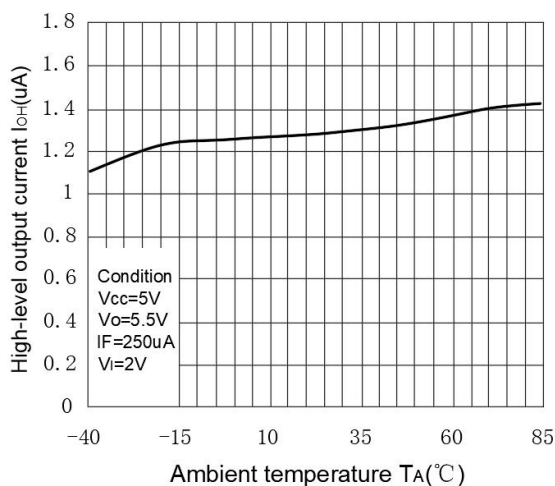
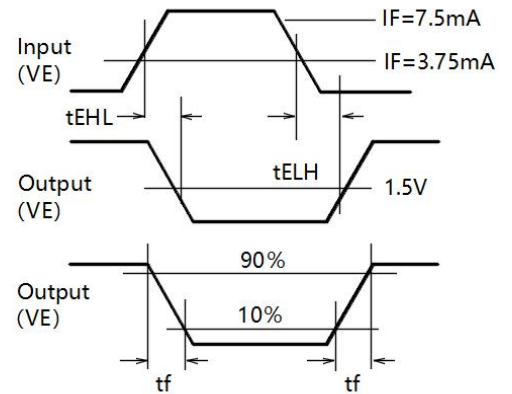
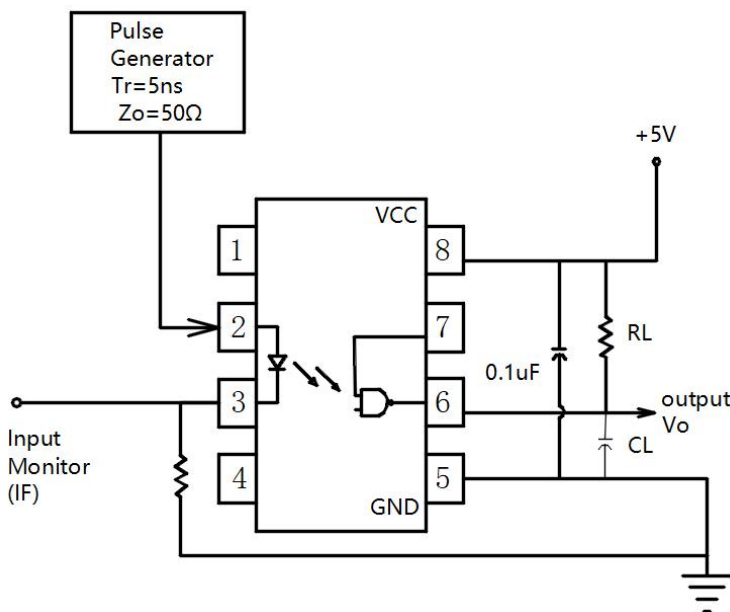
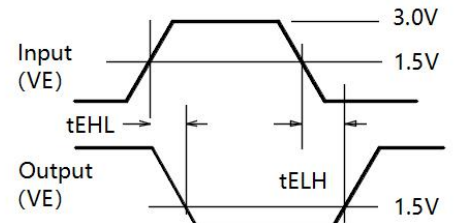
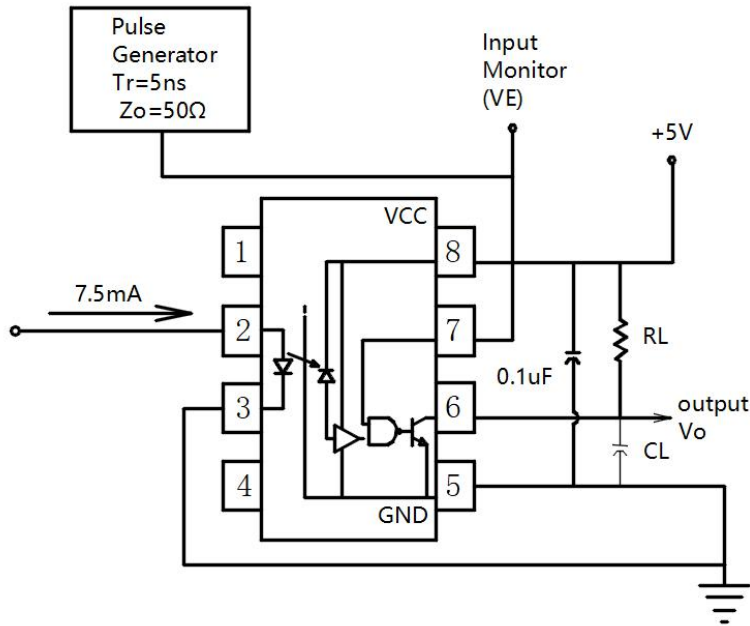


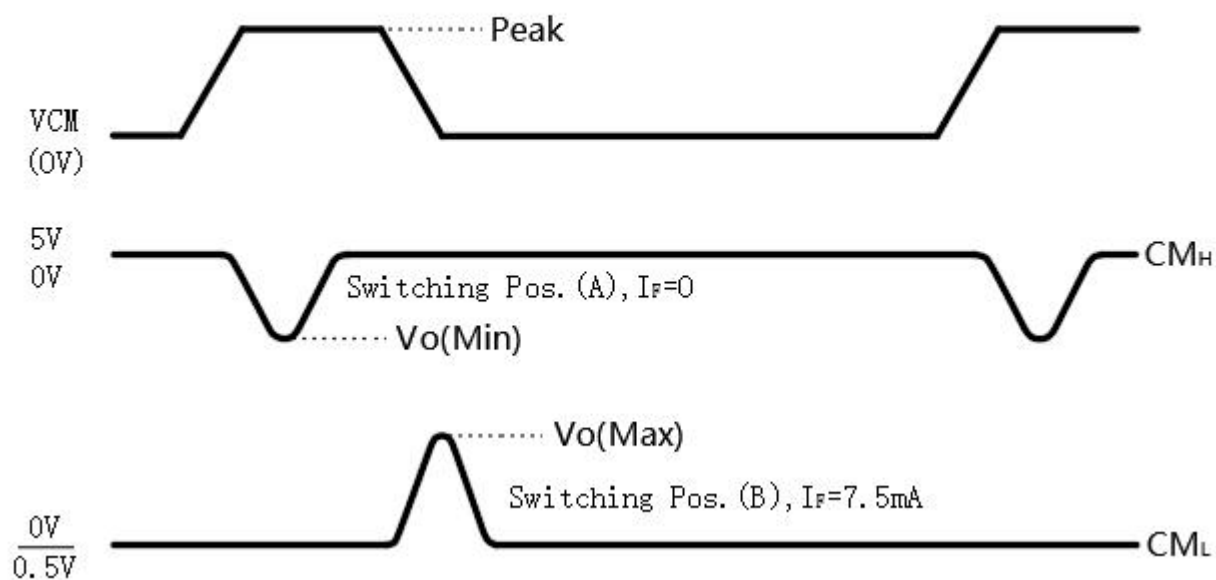
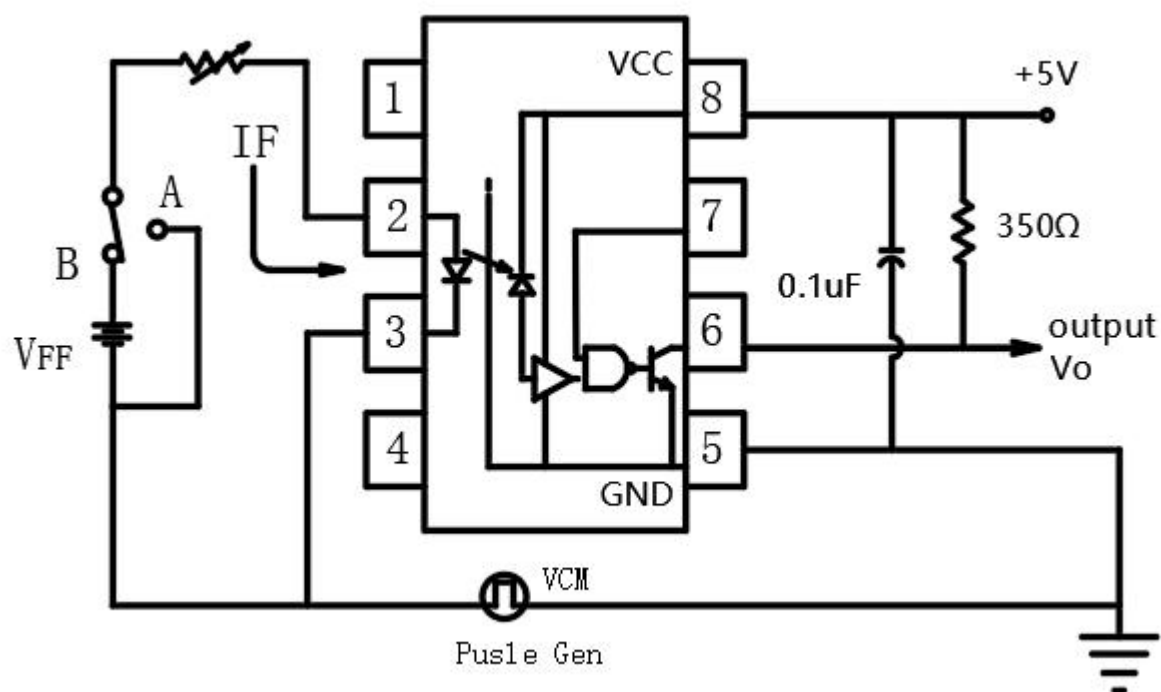
Fig.11 High-level output current vs. Ambient temperature



◆ 传输延迟时间测试电路 Test Circuit for Propagation Delay Time

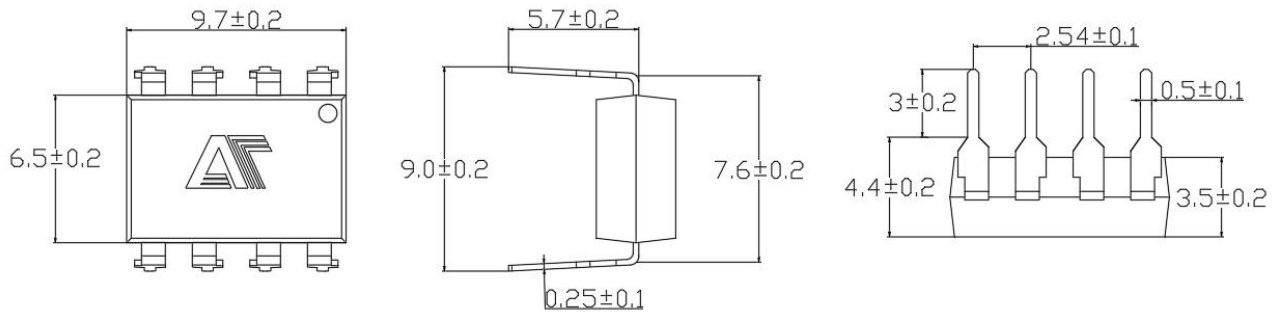


◆ **CMR 测试电路 Test Circuit for Common Mode Transient Immunity**

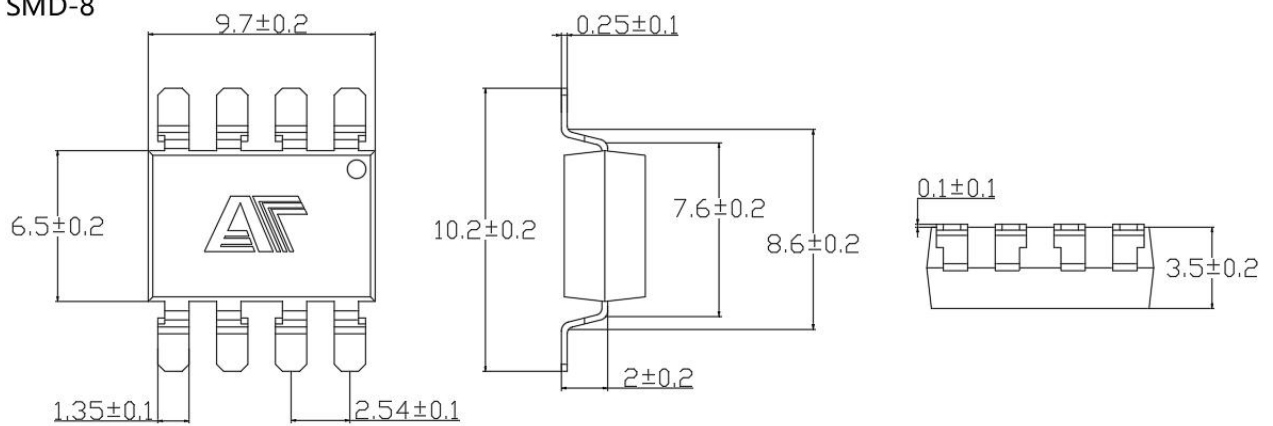


◆ 外形尺寸Overall dimension

DIP8

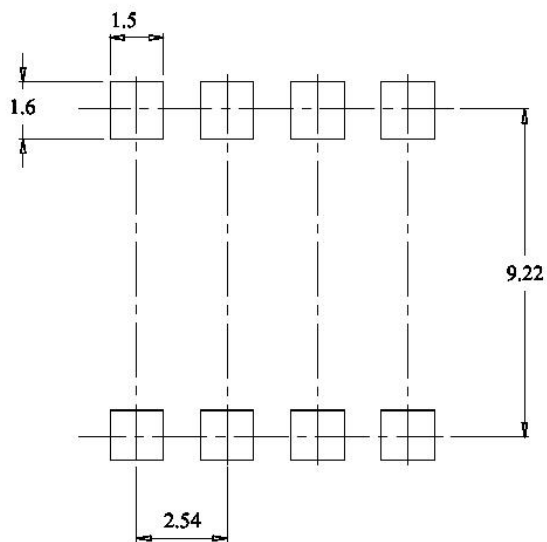


SMD-8



推荐焊盘:

Recommended



单位: mm

◆ 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

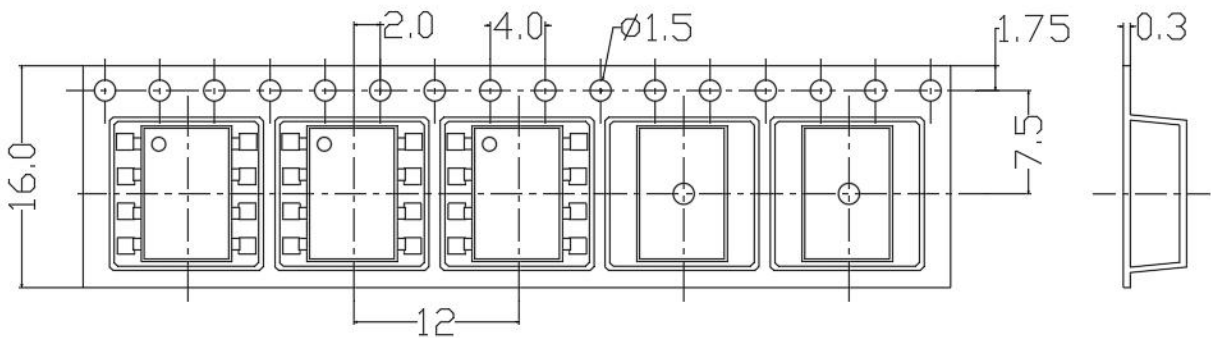
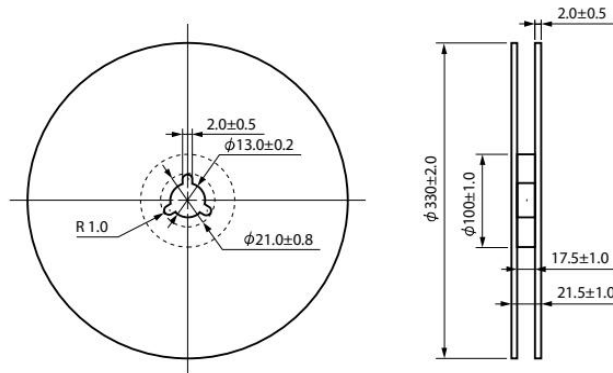


◆ 包装packing

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
SMD8	卷盘 ($\phi 330$ mm蓝盘)	1000 只/盘	2 盘/盒	10 盒/箱	450*390*0.1mm	340*60*340mm	620*360*365mm	首尾端空至少200mm
DIP8	管装 (500*12*11mm)	45 只/管	50 管/盒	10 盒/箱	不适用	525*128*56mm	535*275*300mm	每管使用蓝白胶塞，方向须一致
Package Type	Packing Form	Quantity per Reel	Quantity per Box	Quantity per Carton	Antistatic Bag Specification	Box Specification	Carton Specification	Note
SMD8	Reel ($\phi 330$ mm Blue)	1000 pcs/reel	2 reels/box	10 boxes/ctn	450*390*0.1mm	340*60*340mm	620*360*365mm	Leave at least 200mm of blank space at both ends
DIP8	Tube (500*12*11mm)	45 pcs/tube	50 tubes/box	10 boxes/ctn	NA	525*128*56mm	535*275*300mm	Use blue and white rubber plugs for each tube in the same direction

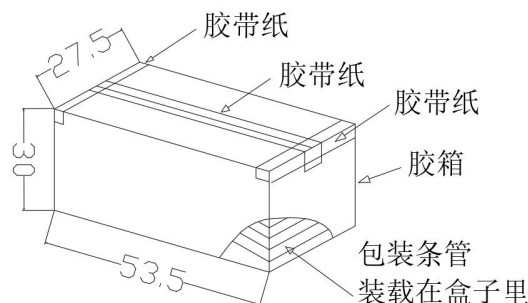
• 编带包装 Tape & Reel

- 1) 每卷数量: 2000 只;
Qty/reel: 2000 pcs;
- 2) 每箱数量: 40000 只;
Qty/ctn: 40000 pcs;
- 3) 内包装: 每盒 2 盘;
Inner packing: 2 reels/box;
- 4) 示意图 Schematic:



• 管条包装Tape&Tube

- 1) 每管数量: 45 只。
Qty/Tube : 45 pcs.
- 2) 每箱数量: 22500 只。
Qty/ctn: 22500 pcs.
- 3) 内包装: 每盒 50 管。
Inner packing: 50 Tube/box.
- 4) 示意图 Schematic

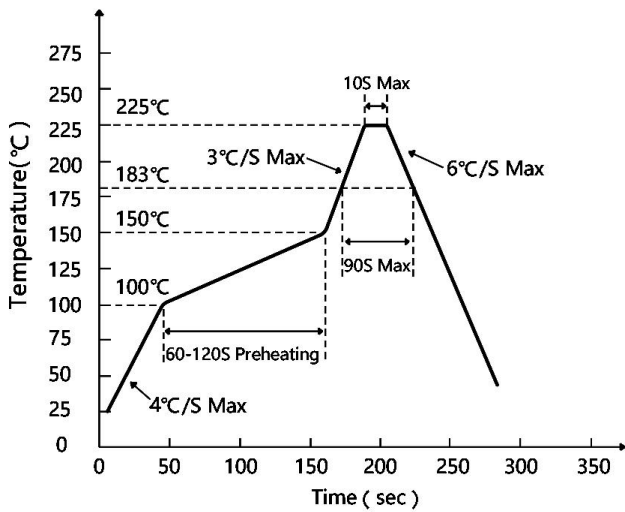


单位: mm

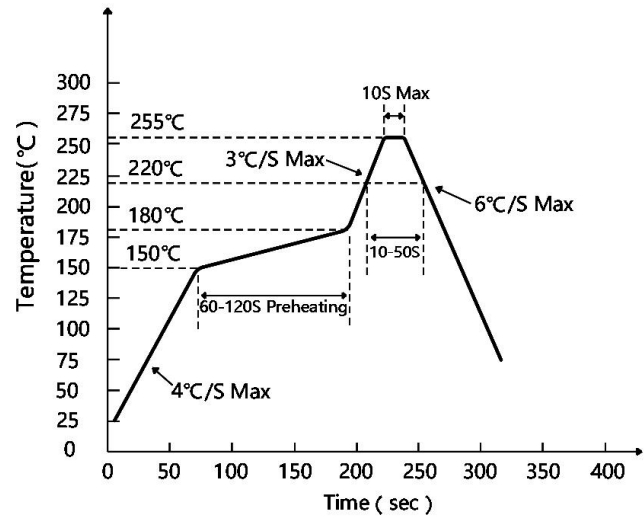
◆ 可靠性测试 Reliability Test Items And Conditions

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) °C, t=5s;	1 次1 times	22	0/22
耐焊接热Resistance to Soldering Heat	JESD22-A106	Tsol= (260±5) °C, t=10s	3 次3 times	22	0/22
静电放电 ESD-HBM	JESD22-A114	Ta=25°C, 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°C	1000h	22	0/22
低温贮存 Low Temperature Storage	JESD22-A119	Ta= -55°C	1000h	22	0/22
冷热冲击 Thermal Shock	JESD22-A104	-55°C(15min)←→ 125°C(15min)	循环 300 次 300 cycles	22	0/22
常温寿命试验 Lifespan Test	JESD22-A108	Ta=25°C, IF=50mA , Vcc=5V	1000h	22	0/22
高温寿命试验 DC Operating Life	JESD22-A108	Ta=110°C, IF=20mA , Vcc=5V	1000h	76	0/76
高温高湿偏压 High Temperature High Humidity bias Voltage	JESD22-A101	Ta =85°C , RH=85% IF=0mA , VCE=64V	1000h	22	0/22
高温偏压 High Temperature bias Voltage	JESD22-A108	Ta =110°C , IF=0mA , VCE=80V	1000h	22	0/22
高压蒸汽试验 High pressure steam test	JESD22-A102	P=15PSIG , 121°C, 100%RH	96h	22	0/22

◆ 回流焊温度曲线图 Solder Reflow Profile

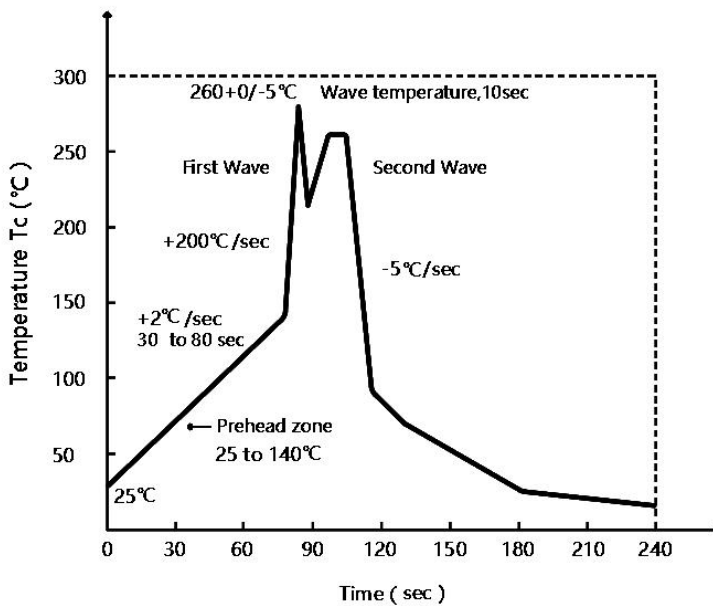


有铅制程 Lead Process



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 $350^{\circ}\text{C} \pm 5^{\circ}\text{C}$, 时间 $\leq 3\text{s}$.

Hand soldering iron requirements: Temperature: $350^{\circ}\text{C} \pm 5^{\circ}\text{C}$, 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: