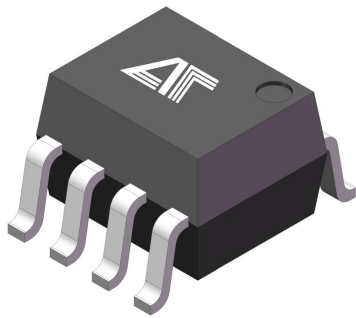


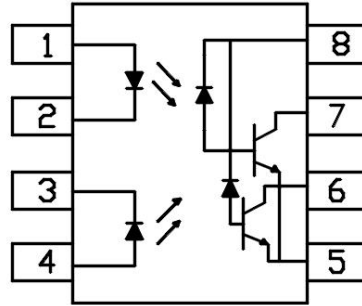
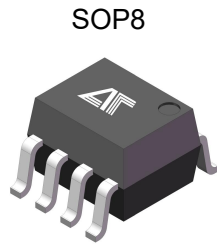


高速光耦
High speed optocoupler

AT053X

Product Data Sheet

AOTE DCC
RELEASE



Pin Configuration

1. Anode 1
2. Cathode 1
3. Cathode 2
4. Anode 2
5. GND
6. VO 2
7. VO 1
8. VCC

封装逻辑原理图 Encapsulation logic schematic

AT053X 系列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SOP8封装形式，适配多样化场景需求。

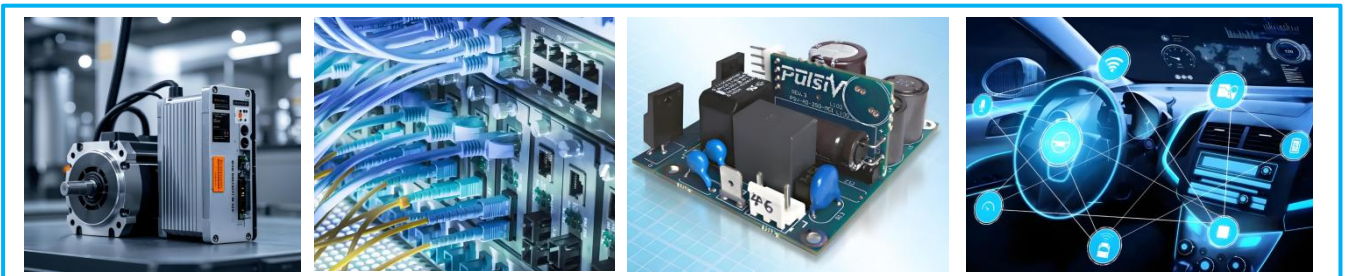
The AT053X series optocoupler adopts high-efficiency photoelectric conversion technology and advanced packaging processes, providing reliable input-output isolation. It supports package types (SOP8) to meet diverse application requirements.

产品特征 Product features

- 输入-输出隔离电压 $V_{ios}=3750V_{rms}$
Input output isolation voltage: $V_{ios}=3750 V_{rms}$
- 高传输比特率: 1MBit/s; High transmission ratio 1MBit/s;
- 输出高电平共模瞬态抑制 1KV/US; Common Mode Transient Immunity at High Output Level 1KV/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	平均正向输入电流 DC/Average forward input current	IF (avg)	25	mA
	反向输入电压 Reverse input voltage	VR	5	V
	峰值瞬态输入电流 (脉宽≤1 μs p.w, 300pps) Peak transient input current (≤1 μs p.w., 300 pps)	IF (trans)	1000	mA
	输入功耗 Input Power Dissipation	PD	70	mW
接收端 Output	电源电压 Supply voltage	VCC	-0.5 ~ 30	V
	输出电流 Output current	IO	8	mA
	峰值输出电流 Peak output current	IO (pk)	16	mA
	输出电压 Output voltage	VO	-0.5 ~ 20	V
总功率消耗 Total Power Dissipation		Ptot	170	mW
隔离电压 Isolation Voltage		Viso	3750	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 Symbol	最小值 Min	最大值 Max	单位 unit
电源电压 Power Supply Voltage	VCC	0.5	30	V
开启电流 Forward Input Current (ON)	IF(ON)	6	20	mA
关断电压 Forward Input Voltage (OFF)	VF(OFF)	0	1.3	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	1.0	1.35	1.7	V
	反向击穿电压 Reverse Breakdown Voltage		BVR	IR = 10μA	5	-	-	V
	输入电容 Input Capacitance		CIN	V=0,f=1MHz	-	60	-	pF
接收端 Output	低电平输出电压 Logic Low Output Voltage	0530	VOL	IF = 16mA, VCC = 4.5V, IO = 1.1mA	-	0.1	0.5	V
		0531、0534		IF = 16mA, VCC = 4.5V, IO = 3mA				
	高电平输出电流 Logic High Output Current		IOH	VCC=VO =5.5V, IF = 0mA	-	0.003	0.5	uA
				VCC =VO =15V, IF = 0mA	-	-	50	uA
	高电平电源电流 Logic High Supply Current		ICCH	VCC = 15V, IF = 0mA	-	0.05	4	uA
	低电平电源电流 Logic Low Supply Current		ICCL	VCC = 15V, IF = 16mA	-	100	400	uA
传输特性 Transfer Characteristics	电流传输比 Current Transfer Ratio	0530	CTR	IF = 16mA, VCC = 4.5V, VO = 0.5V	7	-	-	%
		0531、0534			19	-	-	%
隔离电阻① Isolation Resistance			RI-O	VI-I = 500V, 40 ~60%R.H.	-	10 ¹²	-	Ω
隔离电容① Isolation Capacitance			CI-O	V=0,f=1MHz	-	0.6	-	pF

注：Note:

1. 测量时将 PIN1,2,3,4 短接，PIN5,6,7,8 短接。
When measuring, short-circuit PIN1, 2, 3, and 4, and short-circuit PIN5, 6, 7, and 8.
2. 测量时将 PIN1,2 短接，PIN3,4 短接。
When measuring, short-circuit PIN1, 2, and short-circuit PIN3, 4.

◆ 开关特性 Switching Specification

参数 Parameter		符号 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 High Output Level		TPLH	RL = 4.1kΩ	-	1.3	1.5	us
			RL = 1.9kΩ	-	0.6	0.8	us
输出低电平传播延迟 Propagation Delay Time to Low Output Level		TPHL	RL = 4.1kΩ	-	0.2	1.5	us
			RL = 1.9kΩ	-	0.2	0.8	us
输出高电平共模瞬态抑制 Common Mode Transient Immunity at High Output Level	0530	CMH	IF = 0mA RL = 4.1kΩ TA = 25°C VCM = 10V	1	10	-	kV/μs
	0531		IF = 0mA RL = 1.9kΩ TA = 25°C VCM = 10V	1	10	-	kV/μs
	0534			15	30	-	
输出低电平共模瞬态抑制 Common Mode Transient Immunity at Low Output Level	0530	CML	IF = 16mA RL = 4.1kΩ TA = 25°C VCM = 10V	1	10	-	kV/μs
	0531		IF = 16mA RL = 1.9kΩ TA = 25°C VCM = 10V	1	10	-	kV/μs
	0534			15	30	-	

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

Fig.1 Normalized CTR vs. Input current

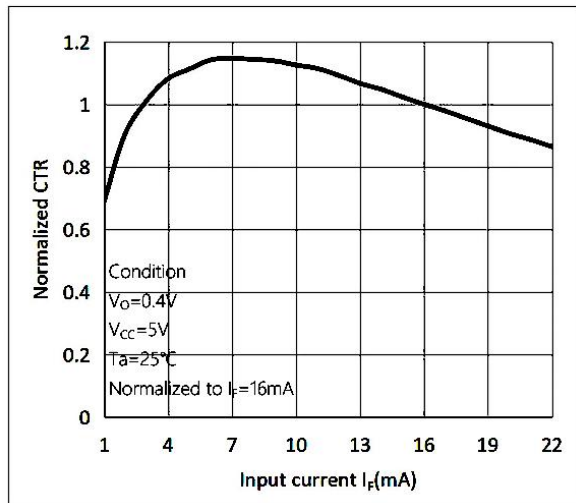


Fig.2 Normalized CTR vs. Ambient temperature

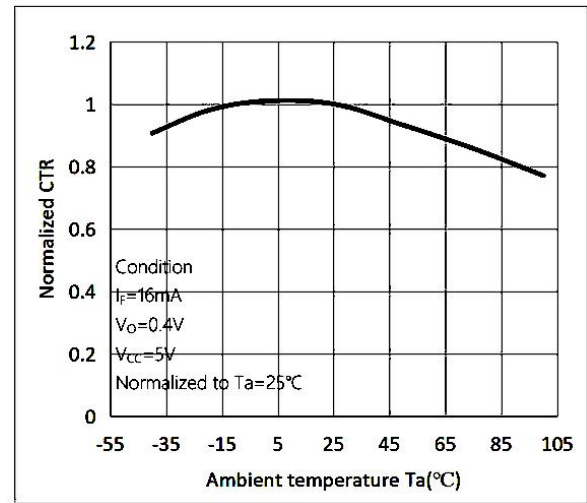


Fig.3 Output current vs. Output voltage

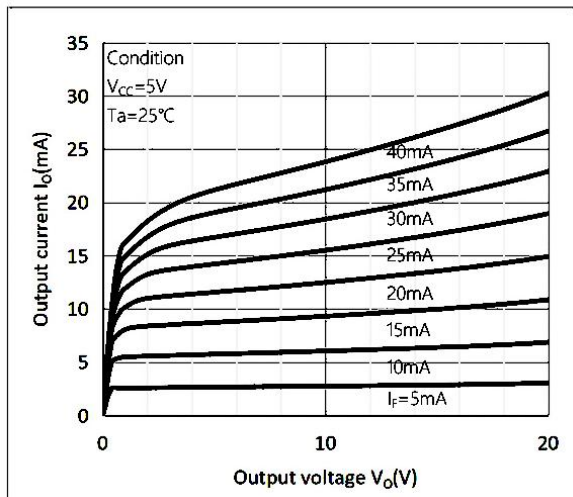


Fig.4 High level output voltage vs. Ambient temperature

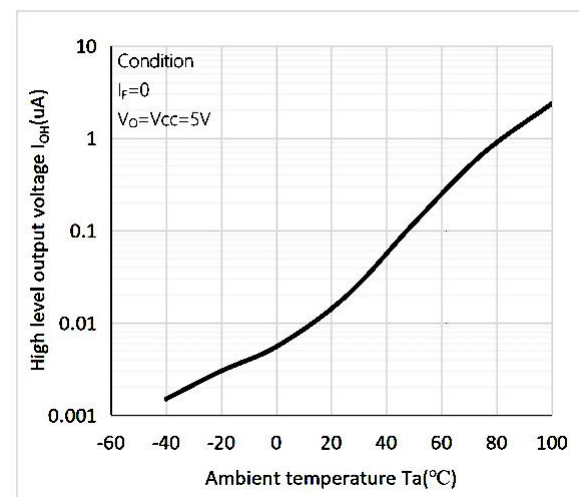


Fig.5 Propagation Delay Time vs. Ambient temperature

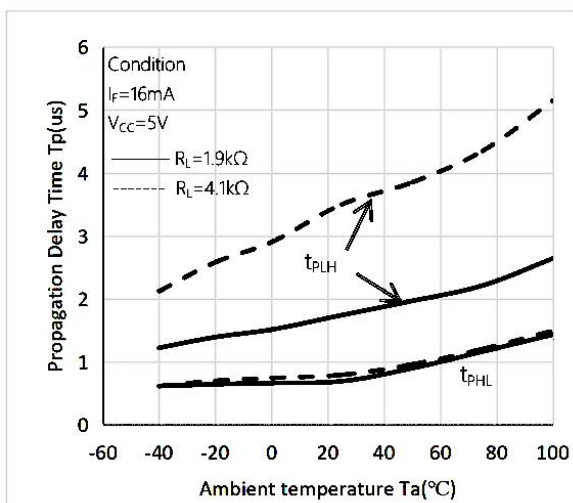


Fig.6 Propagation Delay Time vs. Load resistance

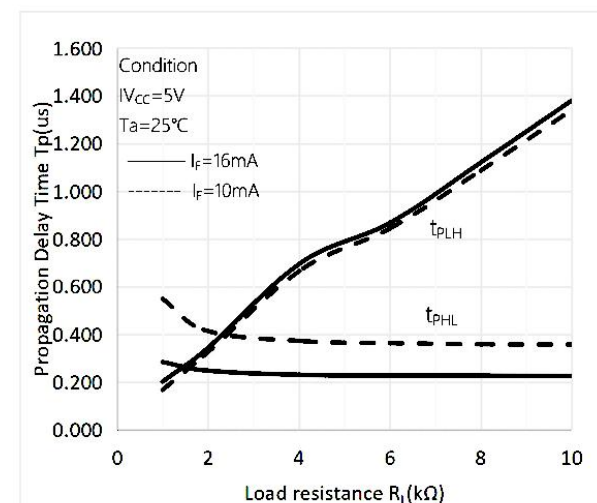


Fig.7 Forward current vs. Forward voltage

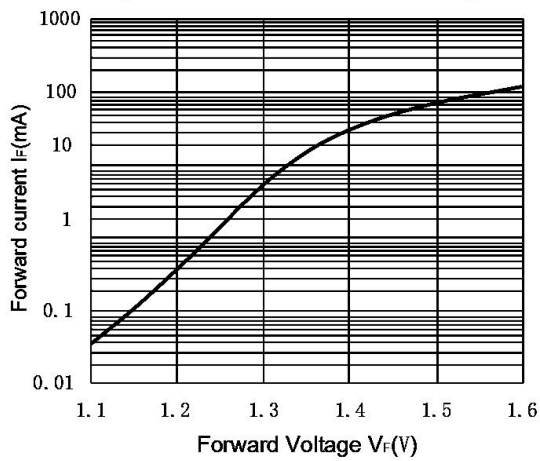
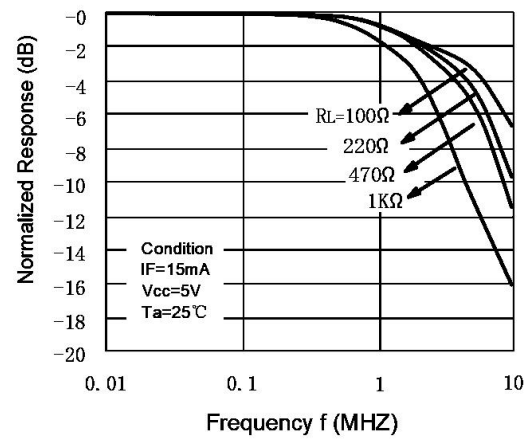
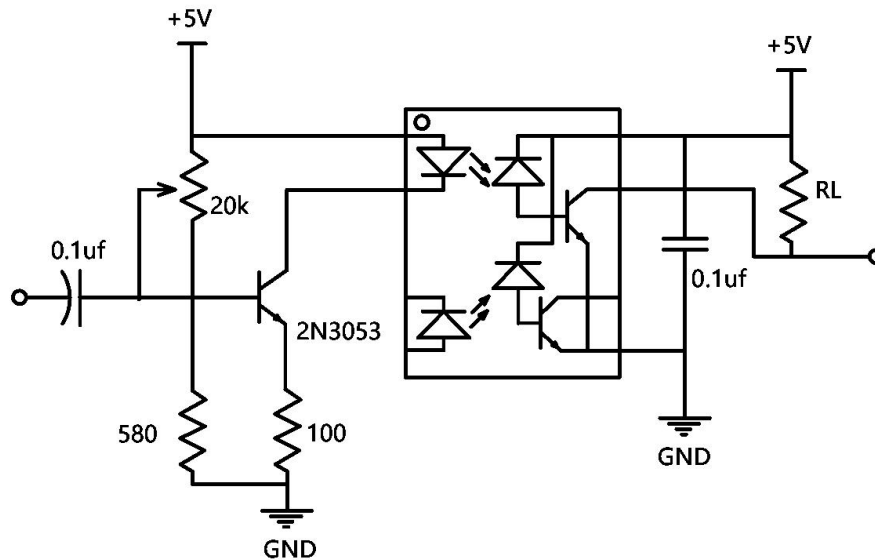


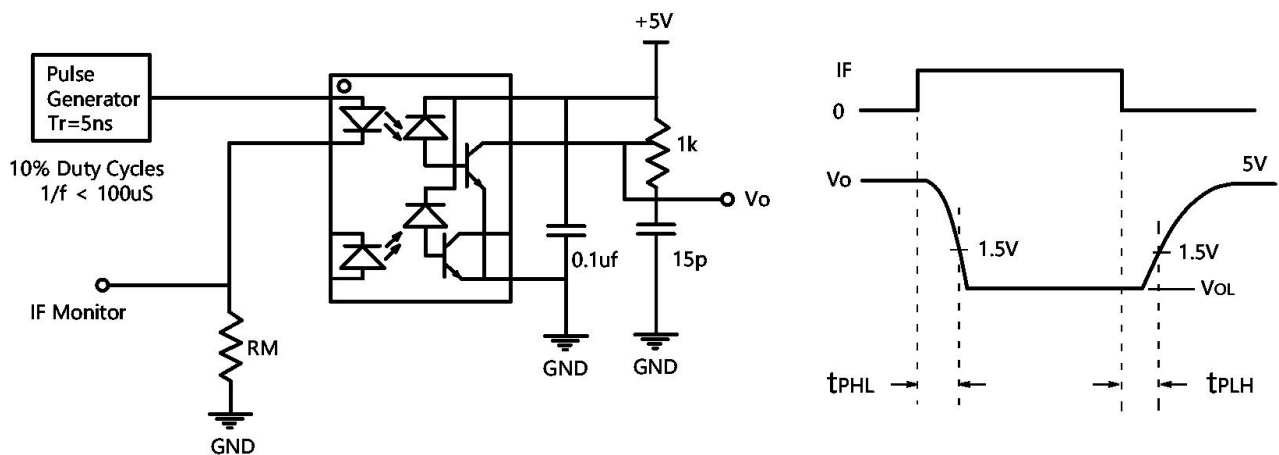
Fig.8 Frequency Response



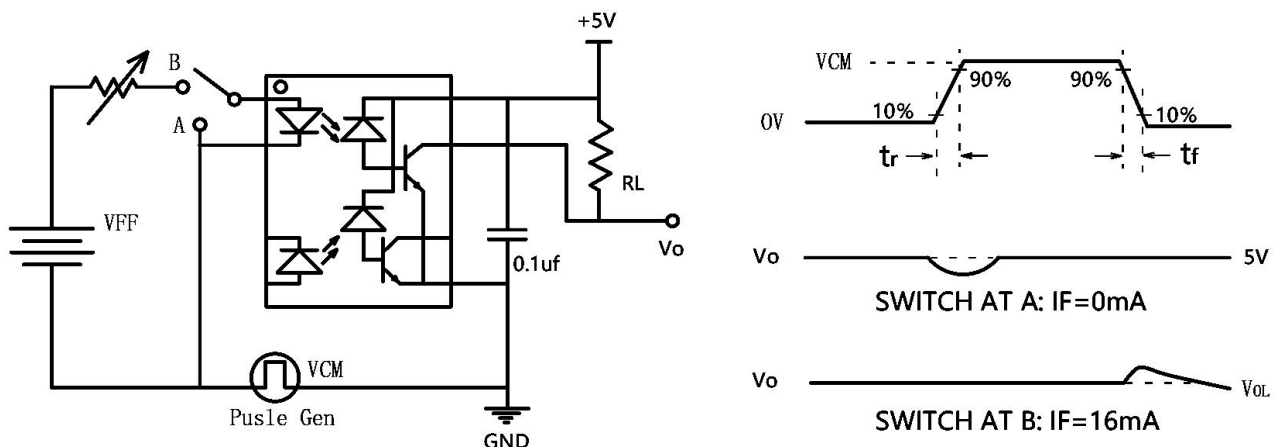
◆ 频率响应测试电路 Test Circuit for Frequency Response



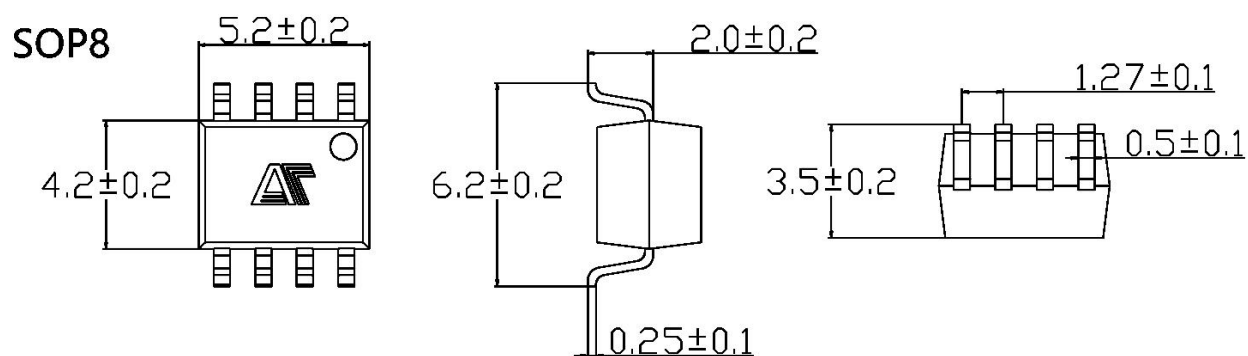
◆ 开关时间测试电路 Witch Time Test Circuit



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

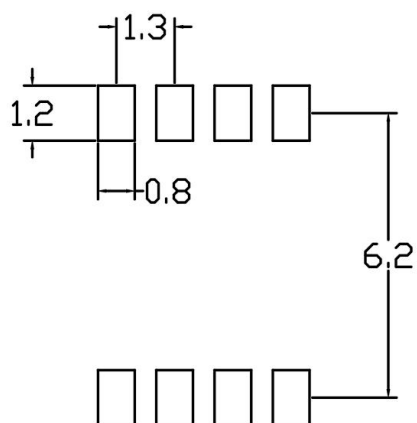


◆ 外形尺寸Overall dimension



推荐焊盘:

Recommended



单位: mm

◆ 产品型号命名规则 Order code

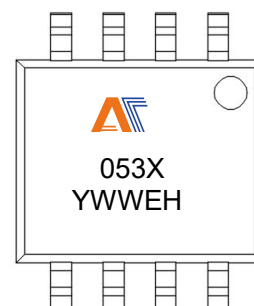
AT 053 X-UN Y-W(V)(ZZ)

① ② ③ ④ ⑤ ⑥ ⑦ ⑧

- ① 公司代码 Company Code (AT: 奥特 Aote)
- ② 产品系列 Product Series (053X)
- ③ 产品序列号 serial number (0,1,2)
- ④ 框架类型 Lead Frame (Cu: 铜框架 Copper)
- ⑤ 树脂类型 Epoxy Type (H: 无卤 Halogen-free)
- ⑥ 封装形式 Package (S: SOP)
- ⑦ 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)
- ⑧ 内部补充代码 Internal Supplementary Code (数字或者空白 Number or None)

◆ 印字信息 Marking Information

- 印字中 “” 为奥特品牌LOGO
“” denotes LOGO
- 印字中的 “X” 代表产品分档： A、B 、C、D或空白
“X” denotes the classification： A、B 、C、D or None
- 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
SOP8	编带 ($\phi 330$ mm 蓝盘)	2k /盘	2 盘/盒	10 盒/箱	450*390*0.1mm	340*60*340mm	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
SOP8	Reel ($\phi 330$ mm Blue)	2k pcs/reel	2 reels /box	10 boxes /ctn	450*390*0.1mm	340*60*340mm	620*360*365mm	Guard band 200mm min.

• 编带包装 Tape & Reel

1) 每卷数量: 2000 只。

Qty/reel: 2000 pcs.

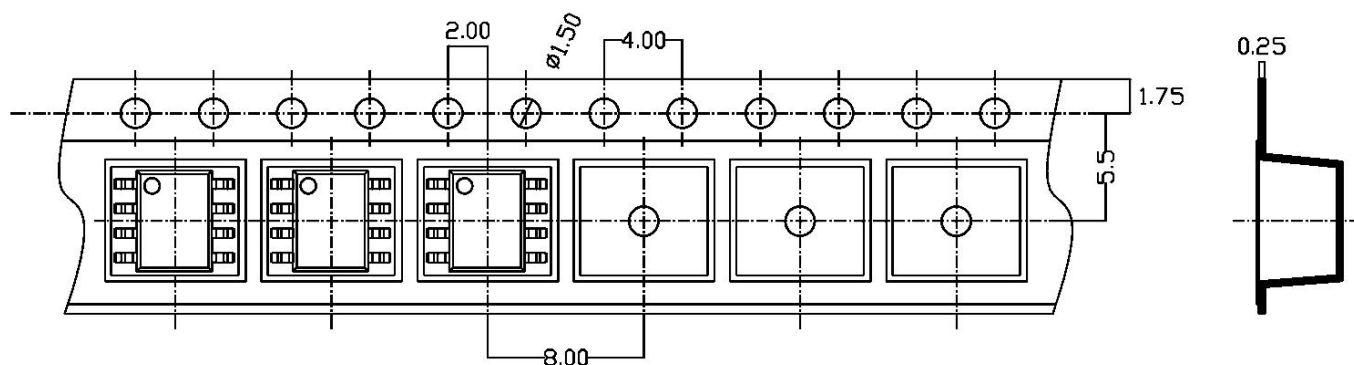
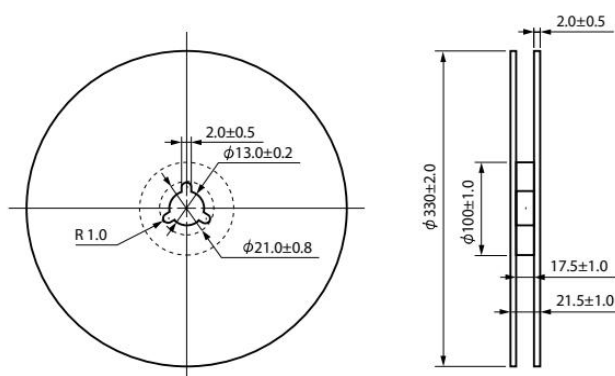
2) 每箱数量: 40000 只。

Qty/ctn: 40000 pcs.

3) 内包装: 每盒 2 盘。

Inner packing: 2reels/box

4) 示意图 Schematic:

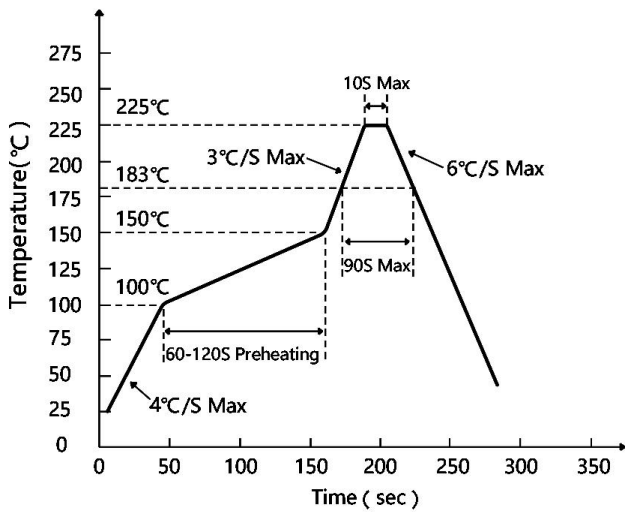


单位: mm

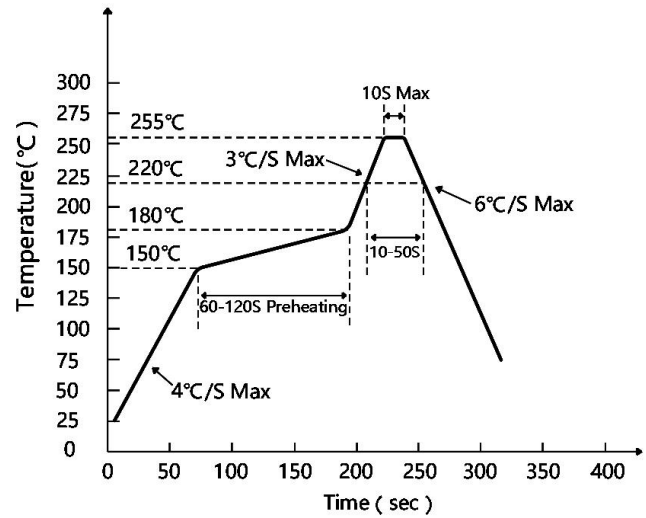
◆ 可靠性测试 Reliability Test Items And Conditions

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

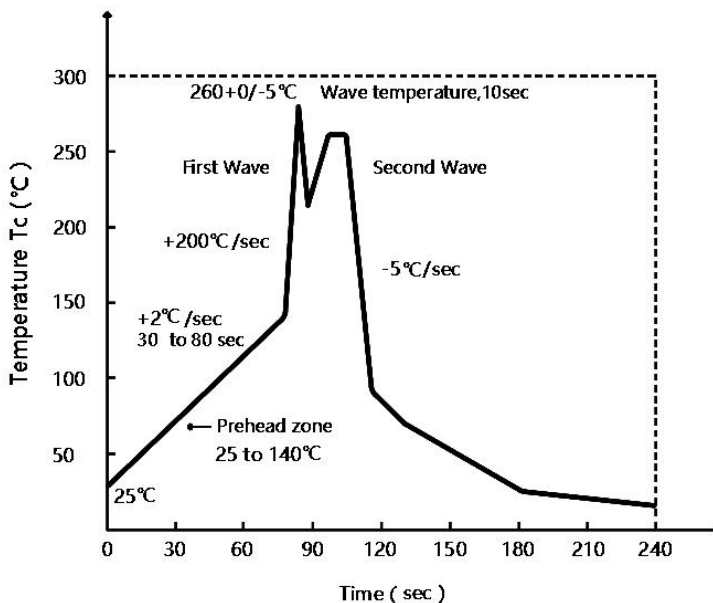


有铅制程 Lead Process



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: