AOTE SEMICONDUCTOR

栅极驱动光耦
Gate Drive Optocoupler

EL3150

Product Data Sheet

AOTE DCC
RELEASE

台湾奥特半导体科技有限公司

TAIWAN AOTE SEMICONDUCTOR TECHNOLOGY CO.,LTD

www.aotesemi.com

概述 Description

EL3150 是一种 0.6A 输出电流的栅极驱动光电耦合器， 可驱动大多数的中功率 IGBTs 和MOSFETs。在电机控制逆变器以及高性能电力系统中， 非常适用于快速切换驱动功率 IGBT 和MOSFET。 它包含一个镓铝砷化合物（ AlGaAs ） 发光二极管， 通过红外光耦合到一个光敏集成电路， 该集成电路具有推挽 MOSFET 输出级的高速驱 动器。

EL3150 is a 0.6A output current gate drive optocoupler, which can drive most mild-power IGBTs and MOSFETs.. In motor control inverters and high-performance power systems, it is very suitable for fast switching drive power IGBT and MOSFET. It contains a gallium aluminum arsenic compound (AlGaAs) light-emitting diode, coupled to a photosensitive integrated circuit through infrared light, which has a high-speed driver for the push-pull MOSFET output stage.

特性 Features

- 15kV/us 最小共模抑制
  15kV/us minimum Common Mode Rejection (CMR)
- 0.6A 峰值输出电流驱动能力
  0.6A maximum peak output current
- 宽工作电压范围: 10V 至 30V
  Wide operating V_{CC} Range: 10V～30V
- 开关速度快
  Fast switching speed
- 延迟时间最大 500ns
  500ns maximum propagation delay
- 带滞后的欠压闭锁
  Under Voltage Lock-Out protection (UVLO) with hysteresis
- 工作温度范围： -40℃ to +105℃
  Operating temperature range: -40°C to +105°C
- 符合加强绝缘标准
  Meet reinforced insulation standards

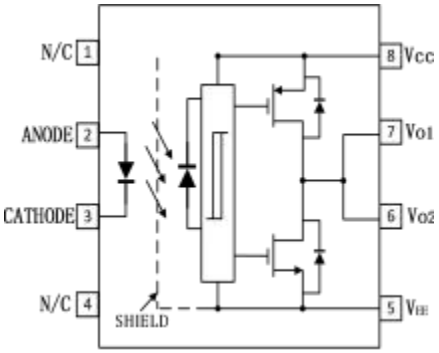
应用 Applications

- 工业逆变器
  Industrial inverter
- 不间断电源
  Uninterrupted Power Supply
- 开关电源
  Switch Mode Power Supplies
- 电机驱动
  Motor Drive
- IGBT 隔离/功率 MOSFET 栅极驱动
  LGBT isolation / power MOSFET gate drive

封装和原理图 Package and Schematic Diagram

SMD8

DIP8-M



Pin Configuration

1、4. NC

2. Anode

3. Cathode

5. VEE

6. VO2

7. VO1

8. VCC

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

绝缘和安规信息 Insulation and Safety related specifications

项目 Item	符号 Symbol	数值 Value	单位 Unit	备注 Note
爬电距离 Creepage Distance	L	≥7	mm	从输入端到输出端，沿本体最短距离路径 Measured from input terminals to output terminals, shortest distance path along body.
电气间隙 Clearance Distance	L	≥7	mm	从输入端到输出端，通过空气的最短距离 Measured from input terminals to output terminals, shortest distance through air.
绝缘距离 Insulation Thickness	DTI	≥0.4	mm	发射器和探测器之间的绝缘厚度 Insulation thickness between emitter and detector.
峰值隔离电压 Peak Isolation Voltage	V_{IORM}	1500	V_{peak}	DIN/EN/IEC EN60747-5-5.
瞬态隔离电压 Transient Isolation Voltage	V_{IOTM}	7000	V_{peak}	DIN/EN/IEC EN60747-5-5.
隔离电压 Isolation Voltage	V_{ISO}	5000	V_{rms}	For 1 min

极限参数 Absolute Maximum Ratings (T_A=25℃)

参数 Parameter	符号 Symbol	额定值 Rating	单位 Unit
平均输入电流 Average Input Current	$I_{F(AVG)}$	25	mA
峰值瞬态输入电流（<1μs pulse，300pps） Peak Transient Input Current	$I_{F(TRAN)}$	1	A
输入反向电压 Reverse Input Voltage	V_R	5	V
高电平峰值输出电流 “High” Peak Output Current	$I_{OH(PEAK)}$	-0.6	A
低电平峰值输出电流 “Low” Peak Output Current	$I_{OL(PEAK)}$	0.6	A
电源电压 Supply Voltage	V_{CC}-V_{EE}	0~35	V
输出电压 Output Voltage	$V_{O(PEAK)}$	0~V_{CC}	V
输入信号上升/下降时间 Rise time/Fall Time	$t_{R(IN)}$, $t_{F(IN)}$	500	ns
工作温度 Operating Temperature	T_{opr}	-40~ +105	℃
存储温度 Storage Temperature	T_{stg}	-55~ +125	℃

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
工作温度 Operating Temperature	T_A	-40	+100	℃
电源电压 Supply Voltage	V_{CC}-V_{EE}	10	30	V
输入电流(ON) Input Current(ON)	$I_{FON)}$	7	16	mA
输入电压(OFF) Input Voltage(OFF)	$V_{F(OFF)}$	0	0.8	V

产品特性参数 Electro-optical Characteristics (T_A=25℃)

除非另有规定，适用于所有的推荐条件，典型值在 T_A=25℃，V_{DD}=30V，V_{SS}=GND 下测量。

Unless otherwise specified, as appropriate for all recommended conditions, typical values are measured at T_A=25℃, V_{DD} = 30 V, and V_{SS} = GND.

参数 Parameter	符号 Symbol	条件 Condition	最小 Min.	典型 Typ.	最大 Max.	单位 Unit
正向电压 Forward Voltage	V_F	I_F=10mA	1.2	1.5	1.8	V
反向电流 Reverse Current	I_R	V_R=5V	-	-	10	μA
高电平输出电流 High Level Output Current	I_{OH}	V_O=V_{CC}-4V	-	-0.4	-0.1	A
		V_O=V_{CC}-15V	-	-	-0.5	
低电平输出电流 Low Level Output Current	I_{OL}	V_O=V_{EE}+2.5V	0.1	0.6	-	A
		V_O=V_{EE}+12V	0.5	-	-	
高电平输出电压 High Level Output Voltage	V_{OH}	Io=-100mA	V_{DD}-6	V_{DD}-4	-	V
低电平输出电压 Low Level Output Voltage	V_{OL}	Io=100mA	V_{DD}-0.6	V_{DD}-0.35	-	V
高电平电源电流 High Level Power Supply Current	I_{CCH}	Vo=Open，I_F=7 to 16mA	-	2.5	5	mA
低电平电源电流 Low Level Power Supply Current	I_{CCL}	Vo=Open，V_F=-3 to 0.8V	-	2.7	5	mA
输入开启电流 Input Turn On Current	I_{FLH}	Io=0mA，V_O >5V	-	2.2	5.0	mA
输入关闭电压 Input Turn Off Voltage	V_{FHL}	Io=0mA，V_O <5V	0.8	-	-	V
低电压锁定阈值 UVLO Threshold	V_{UVLO+}	V_O >5V	6.9	7.8	8.7	V
	V_{UVLO-}	I_F=10mA	5.9	6.7	7.5	V
低电压锁定阈值迟滞 UVLO Hysteresis	U_{VLOHYS}	-	-	1.6	-	V

隔离电压 Isolation Voltage	V_{ISO}	T_A =25℃, R.H.<50% t=1.0min, 50Hz	5000	-	-	V_{RMS}
隔离电阻 Isolation Resistance	R_{ISO}	V_{I-O} ≤500V	-	10^{11}	-	Ω
隔离电容 Isolation Capacitance	C_{ISO}	V_{I-O} =0V, Freq=1.0MHz	-	1	-	pF
低电平传输延迟 Propagation Delay Time to Low Output Level	T_{PHL}	I_F =7mA to 16mA Rg=47Ω, Cg=3nF, f=10kHz, 占空比=50%	100	300	500	ns
高电平传输延迟 Propagation Delay Time to High Output Level	T_{PLH}		100	300	500	ns
脉冲失真 Pulse Width Distortion	P_{WD}		-	-	300	ns
传播延迟差 Propagation Delay Difference Between Any Two Parts	P_{DD}		-350	-	350	ns
输出上升时间(10%~90%) Output Rise Time (10%~90%)	T_R	I_F =7mA to 16mA, Rg=10Ω, Cg=10nF, F=10kHz, 占空比=50%	-	100	-	ns
输出下降时间(90%~10%) Output Drop Time (90%~10%)	T_F		-	100	-	ns
UVLO 开启延迟 UVLO Turn On Delay	$T_{UVLO\ ON}$	I_F =10mA, V_O >5V	-	0.8	-	μs
UVLO 关闭延迟 UVLO Turn Off Delay	$T_{UVLO\ OFF}$	I_F =10mA, V_O <5V	-	0.6	-	μs
输出高电平共模抑制 Output High Level Common Mode Transient Immunity	$\|CM_H\|$	T_A =25℃ V_{DD} =30V V_{CM} =1500V I_F =10~16mA	15	30	-	kV/μs
输出低电平共模抑制 Output Low Level Common Mode Transient Immunity	$\|CM_L\|$	T_A =25℃ V_{DD} =30V V_{CM} =1500V V_F =0V	15	30	-	kV/μs

典型光电特性曲线 Typical Electro-Optical Characteristics Curves

Fig.1 High Level Output Current vs Ambient Temperature

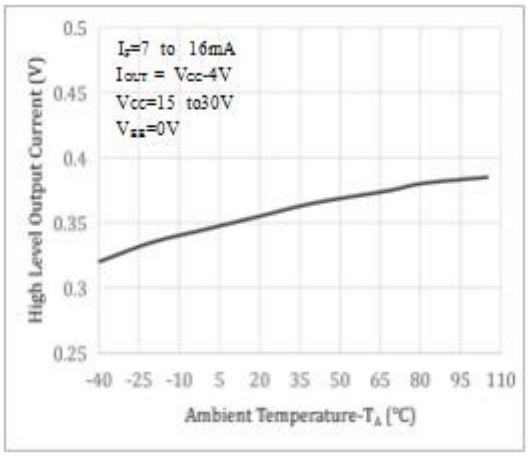


Fig.2 High Level Output Voltage vs Ambient Temperature

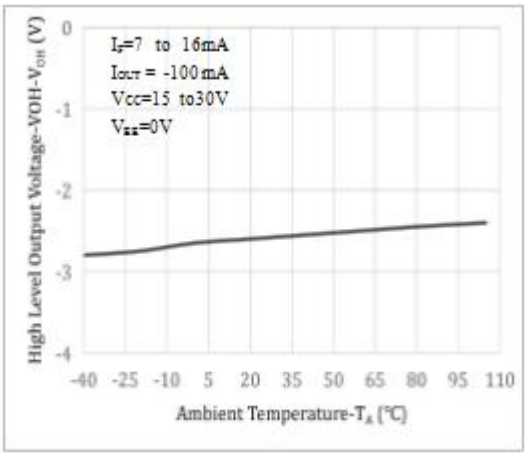


Fig.3 Low Level Output Voltage vs Ambient Temperature

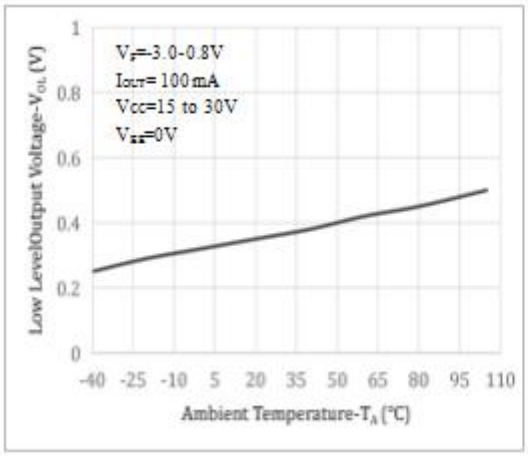


Fig.4 Supply Current vs Ambient Temperature

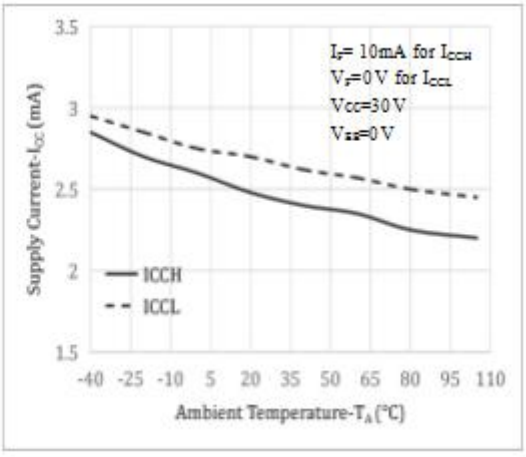


Fig.5 Supply Current vs Supply Voltage

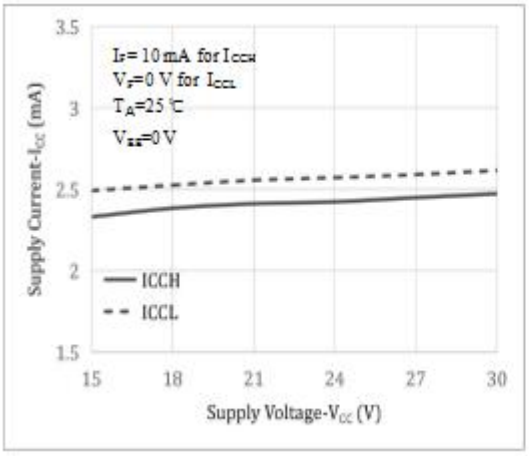


Fig.6 Output Voltage vs Threshold Input Current Low to High

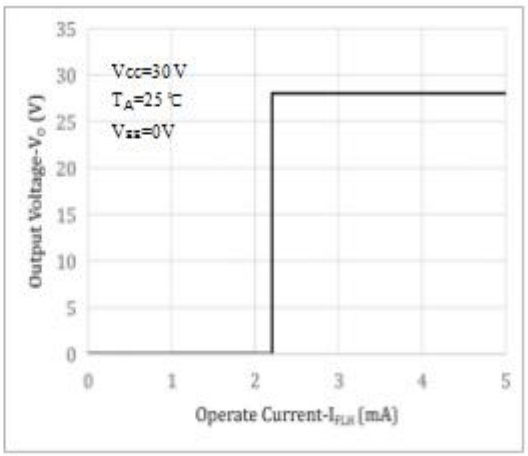


Fig.7 Threshold Input Current Low to High vs Ambient Temperature

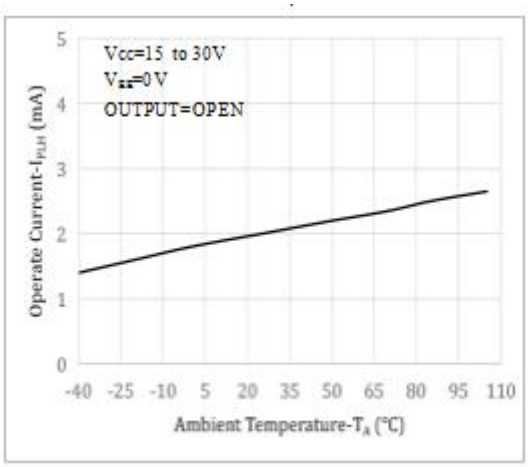


Fig.8 Propagation Delay vs Supply Voltage

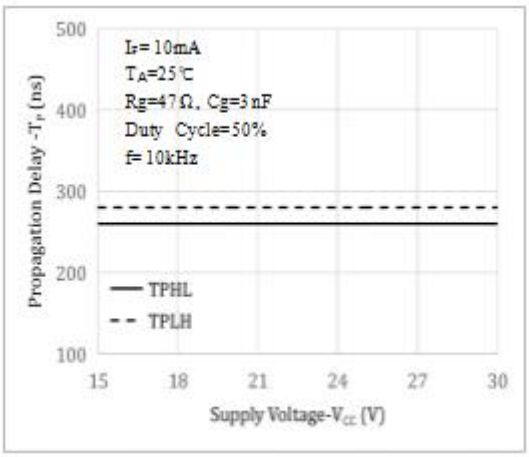


Fig.9 Propagation Delay vs Forward Current

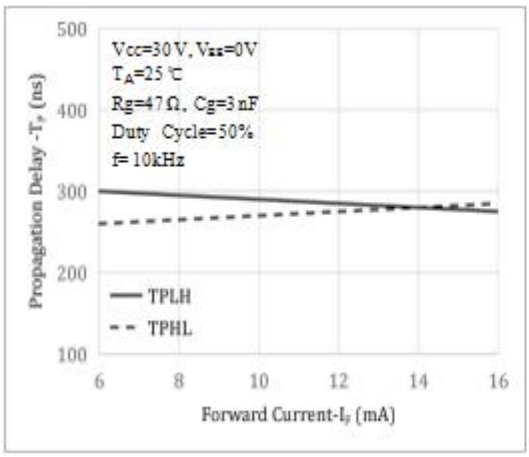


Fig.10 Propagation Delay vs Ambient Temperature

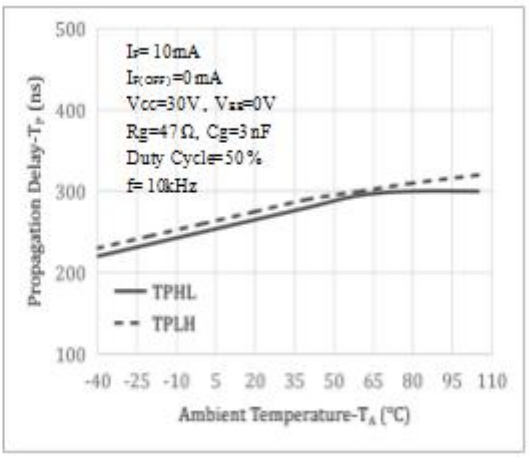
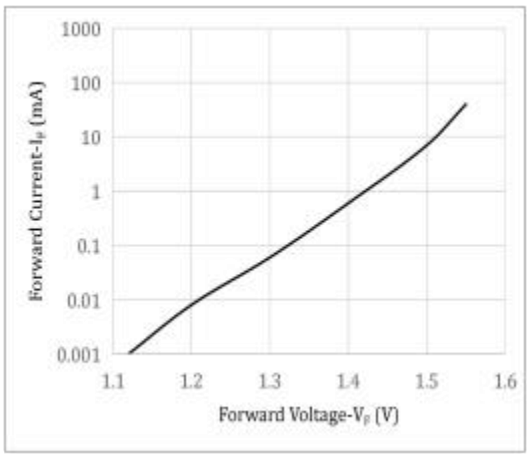


Fig.11 Forward Current vs Forward Voltage



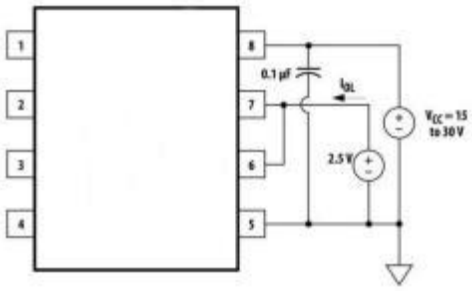


Fig.12 I_{OL} test circuit

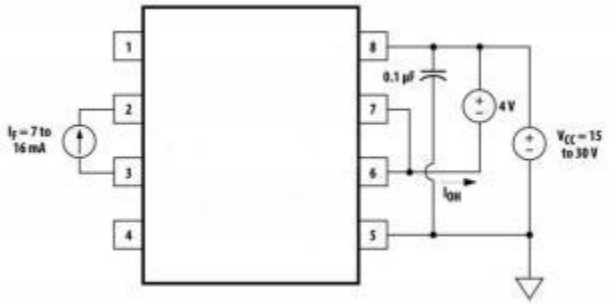


Fig.13 I_{OH} test circuit

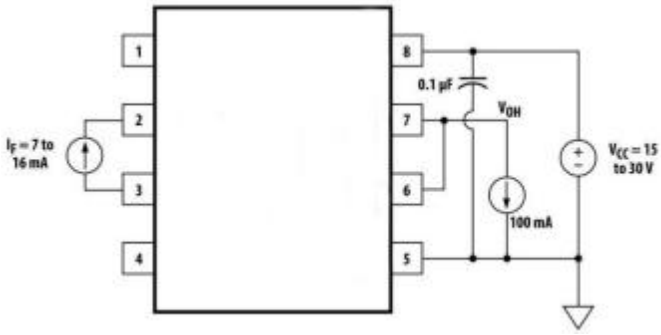


Fig.14 V_{OH} test circuit

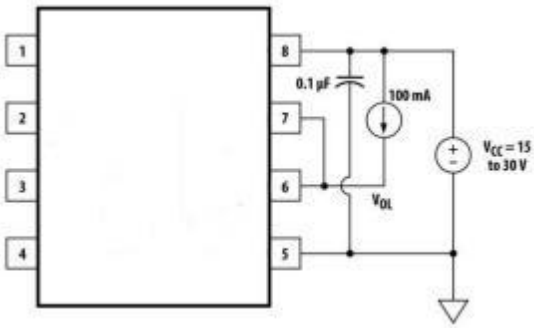


Fig.15 V_{OL} test circuit

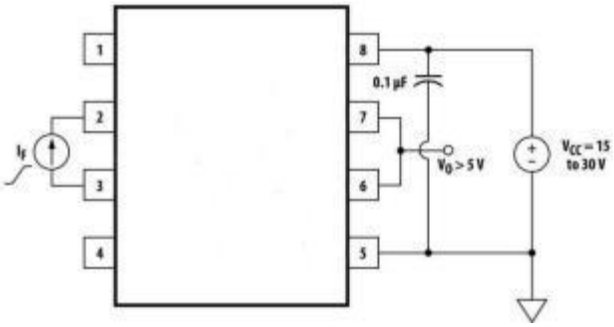


Fig.16 I_{FLH} test circuit

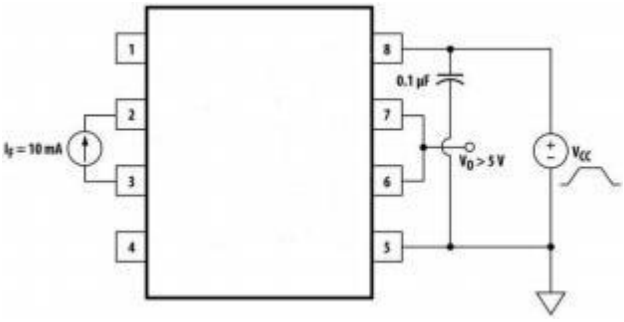
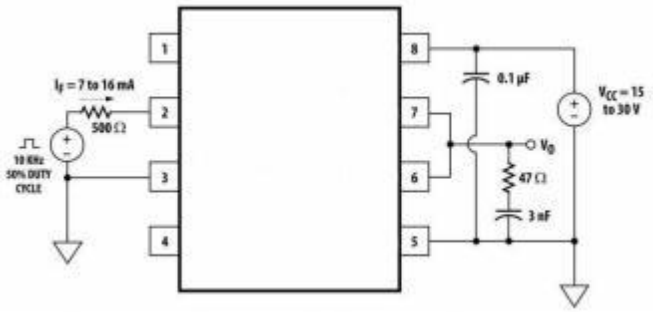


Fig.17 UVLO test circuit



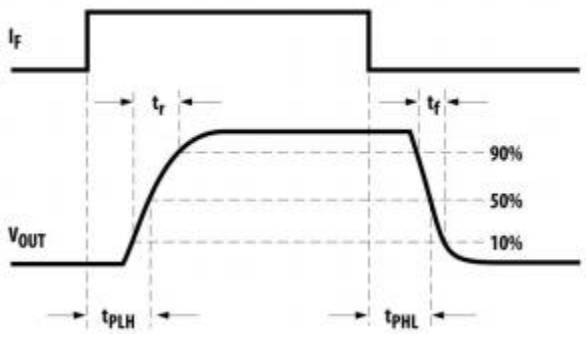


Fig.18 T_{PHL}、T_{PLH}、T_R、T_F test circuit

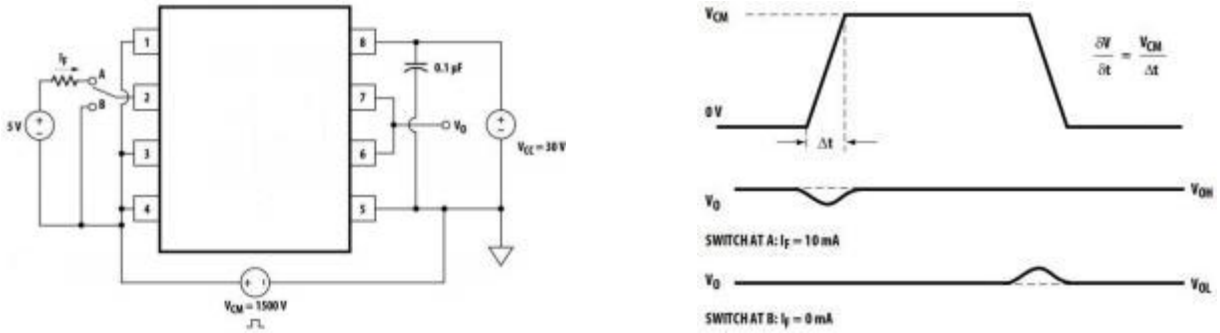
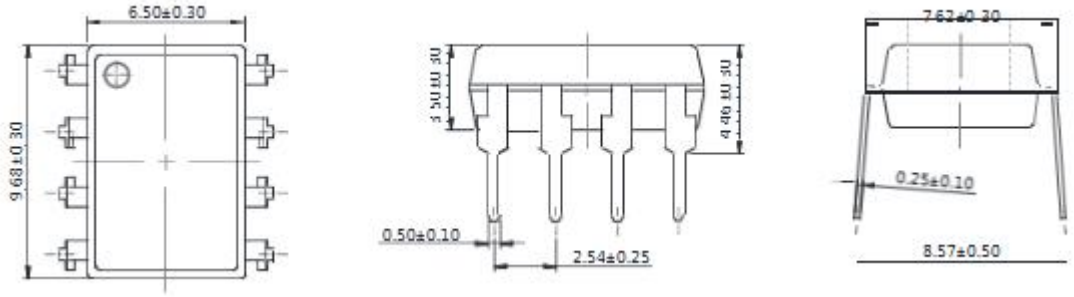


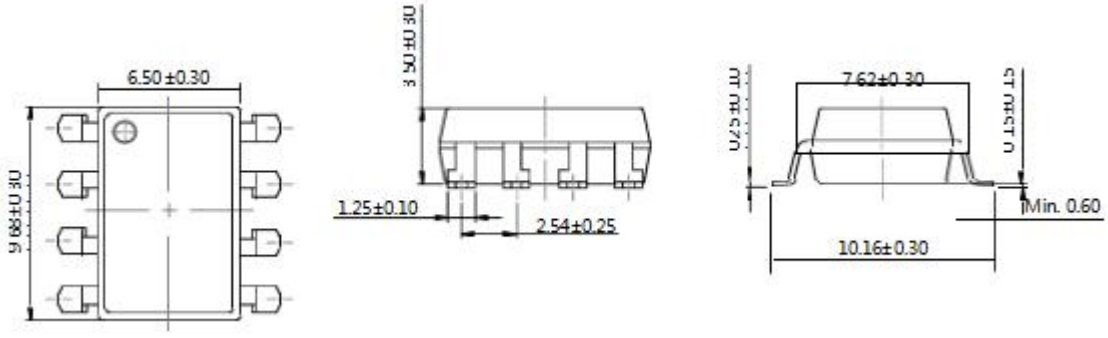
Fig.19 CMR test circuit

外形尺寸 Outline Dimensions

DIP8

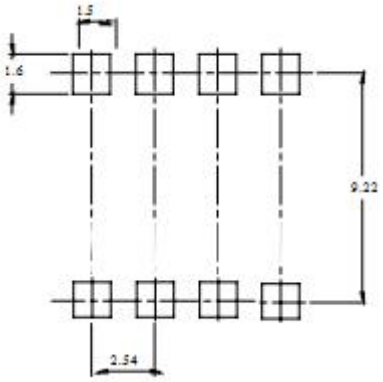


SMD8



单位 Unit: mm

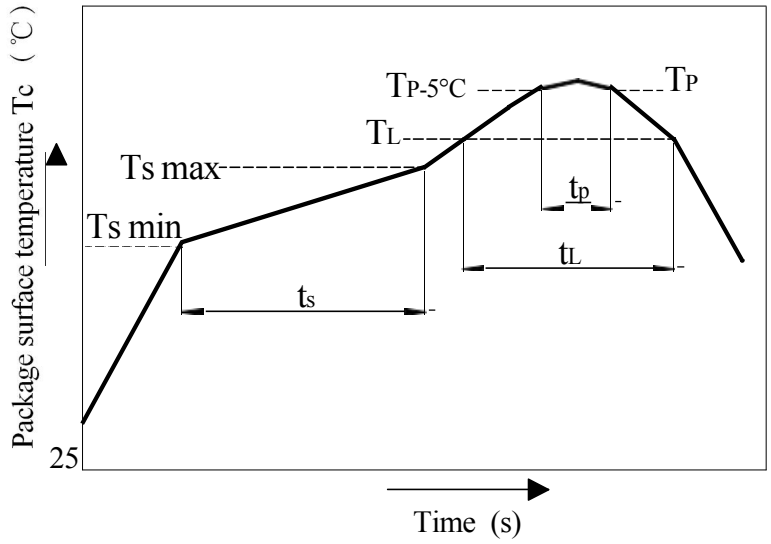
建议焊盘布局 Recommended Pad Layout



单位 Unit: mm

注：上图为产品正视图。
Note：The picture above is the front view of the product.

回流焊温度曲线图 Solder Reflow Profile



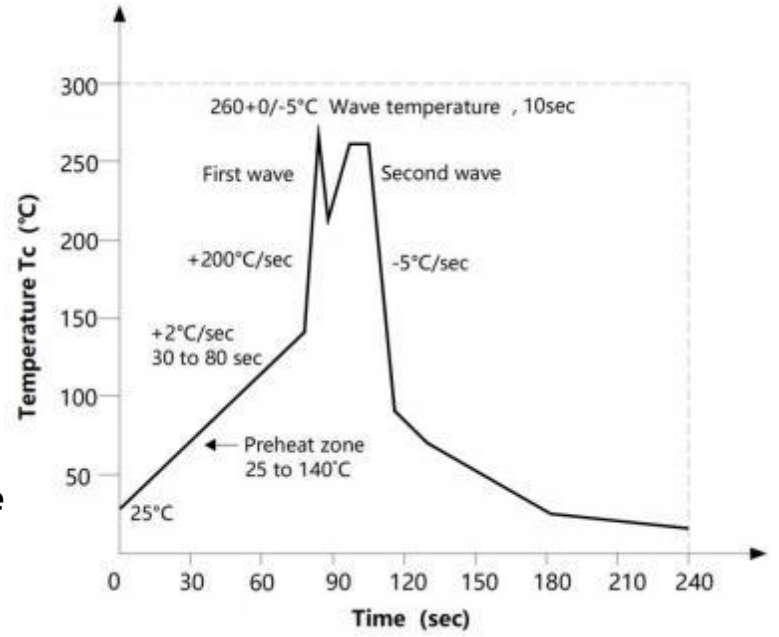
项目 Item	符号 Symbol	最小值 Min.	最大值 Max.	单位 Unit
预热温度 Preheat Temperature	T_s	150	200	℃
预热时间 Preheat Time	t_s	60	120	s
升温速率 Ramp-Up Rate (T_L to T_P)	-	-	3	℃/s
液相线温度 Liquidus Temperature	T_L	217		℃
时间高于 T_L Time Above T_L	t_L	60	150	s
峰值温度 Peak Temperature	T_P	-	260	℃
T_C 在(T_P-5)和 T_P 之间的时间 Time During Which T_C Is Between (T_P-5) and T_P	t_p	-	30	s
降温速率 Ramp-down Rate (T_P to T_L)	-	-	6	℃/s

注：建议在所示的温度和时间条件下进行回流焊，最多不能超过三次。

Note: Reflow soldering is recommended at the temperatures and times shown, no more than three times.

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 360℃ ± 5℃， 时间≤3s。
Manual soldering method Temperature: 360℃ ± 5℃, within 3s.

包装 Packing

■ 汇总表 Summary table

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 (ϕ330mm 蓝盘)	1k/盘	2 盘/盒	10 盒/箱	450*390*0.1mm	353*340*60mm	650*375*365mm	首端空 50 个空格，末端空 100 个空格
DIP8	管装 (500*12*11mm)	45/管	50 管/盒	10 盒/箱	不适用	525*130*57mm	550*280*320mm	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	Tube (ϕ330mm Blue)	1k pcs/reel	2 reels /box	10 boxes /ctn	450*390*0.1mm	353*340*60mm	650*375*365mm	Leave 50 Spaces at the beginning and 100 Spaces at the end
DIP8	Reel (500*12*11mm)	45 pcs/Tube	50 tubes/box	10 boxes/ctn	Not applicable	525*130*57mm	550*280*320mm	Use blue and white rubber stoppers for each tube, with the same direction

■ 管条包装 Tube

1) 每管数量：45 只。

   Qty/Tube：45 pcs.

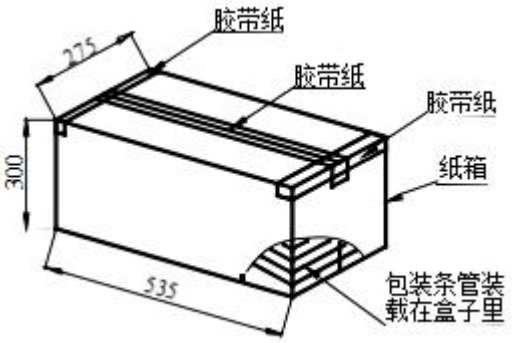
2) 每箱数量：22500 只。

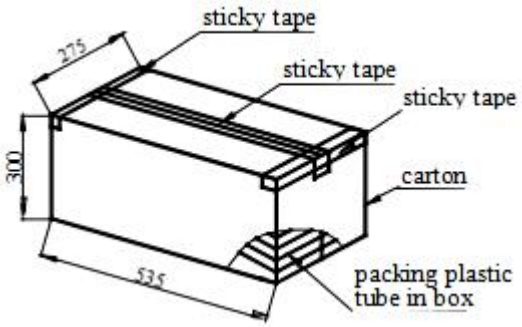
   Qty/ctn：22500 pcs.

3) 内包装 ：每盒 50 管。

   Inner packing：50 tubes/box.

4) 示意图 Schematic：





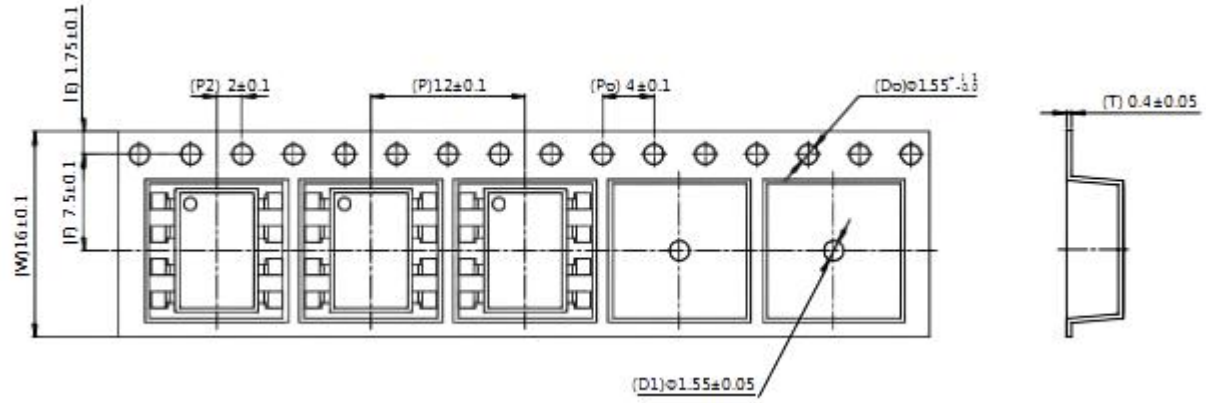
■ **编带包装 Tape & Reel**

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：



单位 Unit ：mm

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