ORIENT

Photo coupler

Product Data Sheet

Part Number: OR-2601/OR-2611

Customer: _____

Date: _____

SHENZHEN ORIENT COMPONENTS CO ., LTD

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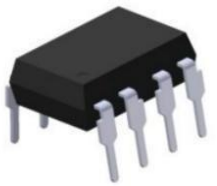
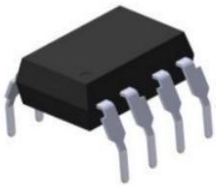
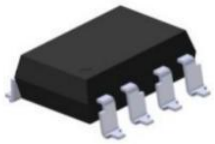
1. Features

(1) High speed 10Mbit/s

(2) 10kV/ps min. common mode transient immunity (OR-2611)

(3) Guaranteed performance from -40 to 85°C

(4) Logic gate output

(5) High isolation voltage between input and output (Viso=5000 V rms)

(6) Safety approval

UL approved (No.E323844)

VDE approved (No.40029733)

CQC approved (No.CQC19001231254)

(7) In compliance with RoHS, REACH standards

(8) MSL Class I

2. Instructions

The OR-2601 and OR-2611 are consists of an infrared emitting diode optically coupled to a high speed integrated photo detector logic gate with a strobable output. It is packaged in a 8-pin DIP package and available in wide-lead spacing and SMD options.

3. Application Range

(1)Ground loop elimination

(2)Line receiver, data transmission

(3)Switching power supplies Pulse

(4)Computer peripheral interface

(5)LSTTL to TTL, LSTTL or 5 volt CMOS

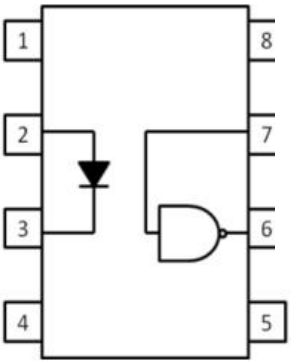
(6)Data multiplexing

(7)transformer replacement

(8)High speed logic ground isolation

4. Functional Diagram

Schematic



A 0.1μF bypass capacitor must be connected between pins 8 and 5 *3

Pin Configuration

1, No Connection
2, Anode
3, Cathode
4. No Connection
5, Gnd
6, V_{out}
7, V_E
8, V_{CC}

Truth Table (Positive Logic)

Input	Enable	Output
H	H	L
L	H	H
H	L	H
L	L	H
H	NC	L
L	NC	H

5. Absolute Maximum Ratings (Ta=25°C)*1

Parameter		Symbol	Rated Value	Unit
Input	Average Forward Input Current	I_F	50	mA
	Reverse Input Voltage	V_R	5	V
	Enable input voltage Not exceed VCC by more than 500mV	V_E	5.5	V
	Power dissipation	P_I	40	mW
Output	Output Collector Current	I_O	50	mA
	Output Collector Voltage	V_O	7	V
	Supply voltage	V_{CC}	7	V
	Power dissipation	P_O	85	mW
Insulation Voltage		V_{iso}	5000	Vrms
Working Temperature		T_{opr}	-40 ~ + 85	°C
Storage Temperature		T_{stg}	-55 ~ + 125	
Soldering Temperature		T_{sol}	260	

Notes:

*1 AC for 1 minute, R.H.= 40 ~ 60% R.H. In this test, pins 1, 2, 3 & 4 are shorted together, and pins 5, 6, 7 & 8 are shorted together.

*2. soldering time is 10 seconds.

6. Opto-electronic Characteristics(Ta=-40 to 85°C unless specified otherwise)

Parameter		Symbol	Min	Typ	Max	Unit	Condition
Input	Forward voltage	V_F	—	1.4	1.8	V	I_F=10mA, T_A=25°C
	Temperature Coefficient of Forward Voltage	$\Delta V_F/\Delta T_A$	—	-1.8	—	mV/°C	I_F= 10mA
	Reverse Voltage	BV_R	5	—	—	V	I_R = 10μA
	Input Capacitance	C_{IN}	—	60	—	pF	f = 1MHz, V_F = 0V
Output	High Level Supply Current	I_{CCH}	—	7	10	mA	V_{CC}=5.5V, I_F=0mA
	Low Level Supply Current	I_{CCL}	—	9	13	mA	V_{CC}=3.3V, I_F=10mA
	High level enable current	I_{EH}	—	-0.6	-1.6	mA	V_E=2.0 V, V_{CC}=5.5V
	Low level enable current	I_{EL}	—	-0.8	-1.6	mA	V_E=0.5V, V_{CC}=5.5V
	High level enable voltage	V_{EH}	2.0	—	—	V	I_F=10mA, V_{CC}=5.5V
	Low level enable voltage*4	V_{EL}	—	—	0.8	V	I_F=10mA, V_{CC}=5.5V
Transfer Characteristics	High Level Output Current	I_{OH}	—	2.1	100	μA	V_{CC}=5.5V, V_O=5.5V, I_F=250μA, V_E=2.0V
	Low Level Output Voltage	V_{OL}	—	0.35	0.6	V	V_{CC}=5.5V, I_F=5mA, I_{CL}=13mA, V_E=2.0V
	Input Threshold Current	I_{FT}	—	2.5	5	mA	V_{CC}=5.5V, V_O=0.6V, I_{OL}=13mA, V_E=2.0V

7. Switching Characteristics(T_a=-40 to 85°C, V_{CC}=5V, I_F=7.5mA unless specified otherwise)

Parameter		Symbol	Min	Typ	Max	Unit	Condition
Propagation delay time to output High level		T_{PLH}	—	35	75	ns	C_L = 15pF,R_L=350Ω, T_A=25°C
Propagation delay time to output Low level		TPHL	—	40	75	ns	C_L= 15pF,R_L=350Ω, T_A=25°C
Pulse width distortion		$\|T_{PHL}-T_{PLH}\|$	—	5	35	ns	C_L= 15pF,R_L=350Ω
Output rise time		t_r	—	40	—	ns	C_L= 15pF,R_L=350Ω
Output fall time		t_f	—	10	—	ns	C_L= 15pF,R_L=350Ω
Enable Propagation Delay Time to Output High Level*9		t_{ELH}	—	15	—	ns	I_F = 7.5mA , V_{EH}=3.5V, C_L = 15pF, R_L=350Ω
Enable Propagation Delay Time to Output Low Level*10		t_{EHL}	—	15	—	ns	I_F = 7.5mA , V_{EH}=3.5V, C_L = 15pF, R_L=350Ω
Common ModeTransient Immunity at Logic High	OR-2601	CM_H	5	—	—	KV/μS	I_F = 0mA , V_{OH}=2.0V, R_L=350Ω, T_A=25°C V_{CM}=50Vp-p
	OR-2611		10	20	—	KV/μS	I_F = 0mA , V_{OH}=2.0V, R_L=350Ω, T_A=25°C V_{CM}=400Vp-p
Common ModeTransient Immunity at Logic Low	OR-2601	CM_L	5	—	—	KV/μS	I_F = 7.5mA , V_{OL}=0.8V, R_L=350Ω, T_A=25°C V_{CM}=50Vp-p
	OR-2611		10	20	—	KV/μS	I_F = 7.5mA , V_{OL}=0.8V, R_L=350Ω, T_A=25°C V_{CM}=400Vp-p

8. Order Information

Part Number

OR-26XXU-Y-Z

Note

26XX = Part Number, 2601 or 2611.

U = Lead form option (S, M or none)

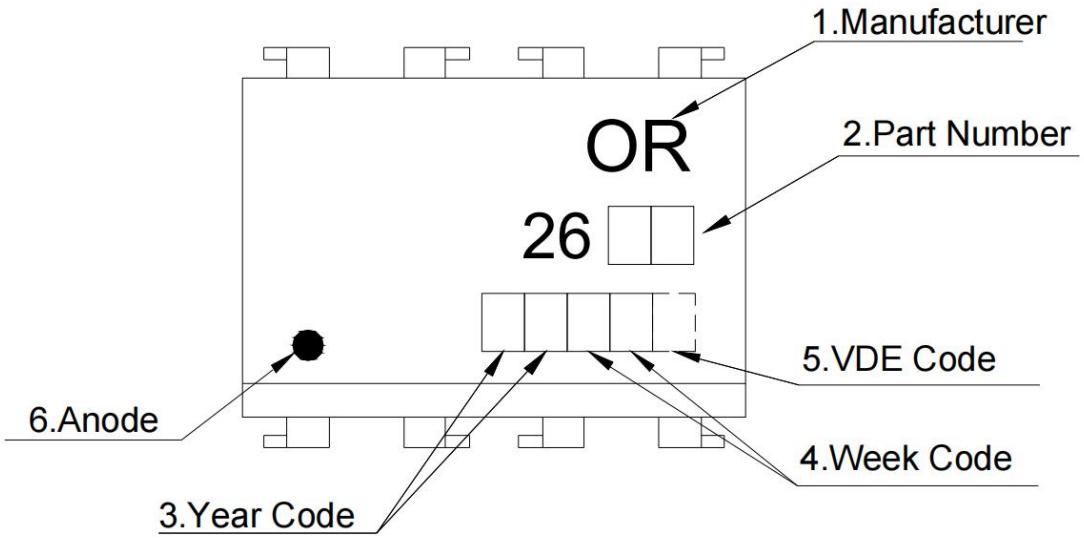
Y = Tape and reel option (TA,TA1 or none).

Z = 'V' code for VDE safety (This options is not necessary).

* VDE Code can be selected.

Option	Description	Packing quantity
None	Standard SMD Option	45 units per tube
M	Wide lead bend (0.4 inch spacing)	45 units per tube
TA	Surface mount lead form (low profile) + TP tape & reel option	1000 units per reel
TA1	Surface mount lead form (low profile) + TP1 tape & reel option	1000 units per reel

9. Naming Rule

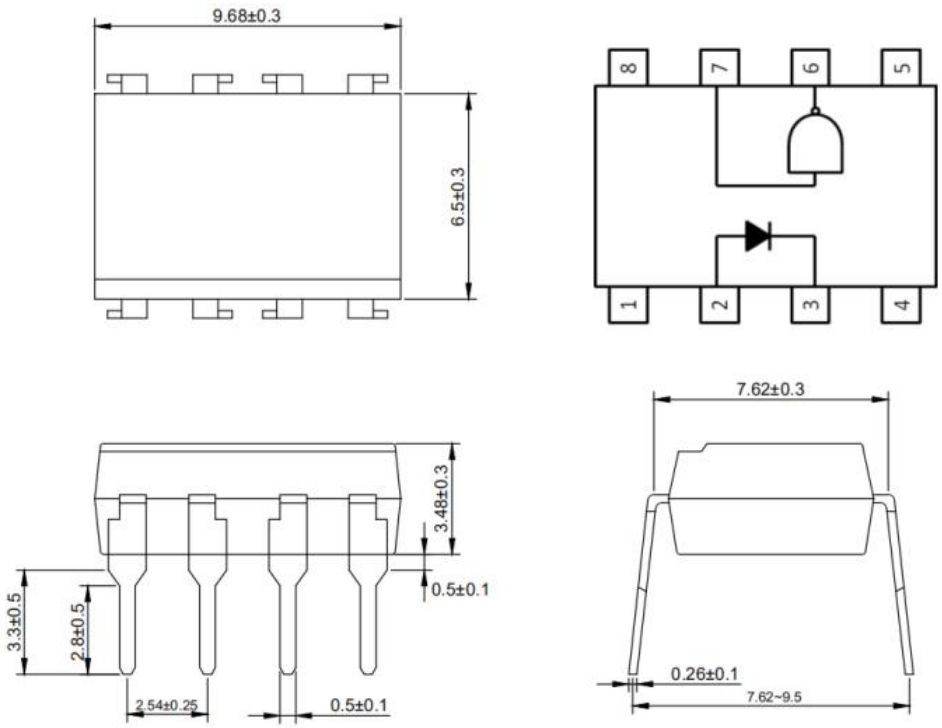


1. Manufacturer : ORIENT.
2. Part Number : 2601 or 2611.
3. Year Code □□ ： '21' means '2021' and so on.
4. Week Code □□： 01 means the first week, 02 means the second week and so on.
5. VDE Code ⬚. (Optional)
6. Anode.

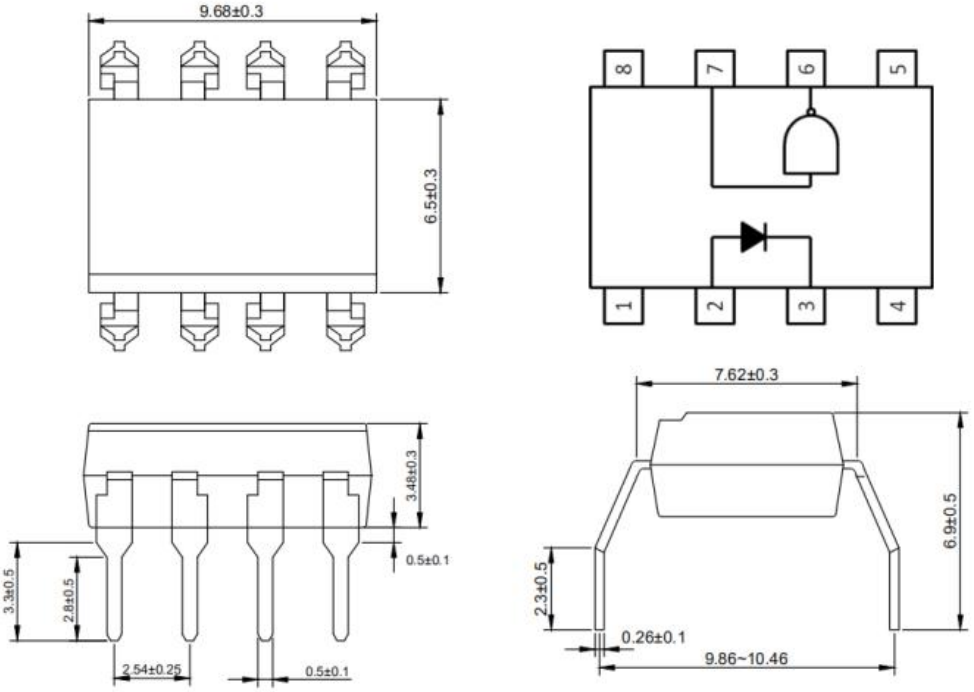
* VDE Mark can be selected.

10. Outer Dimension

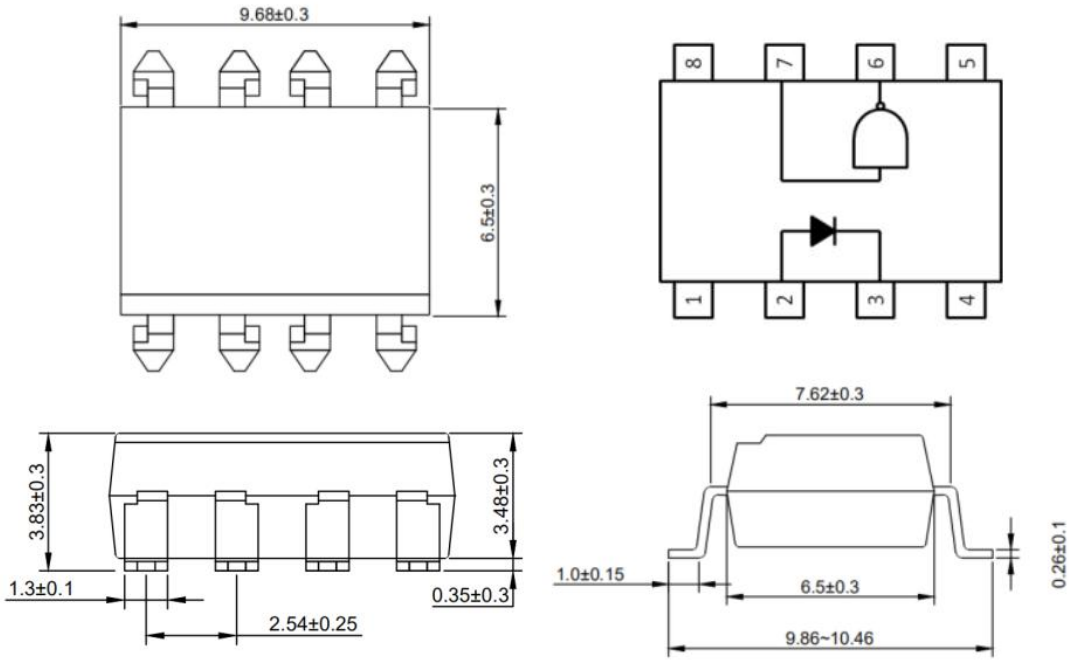
(1) OR-26XX



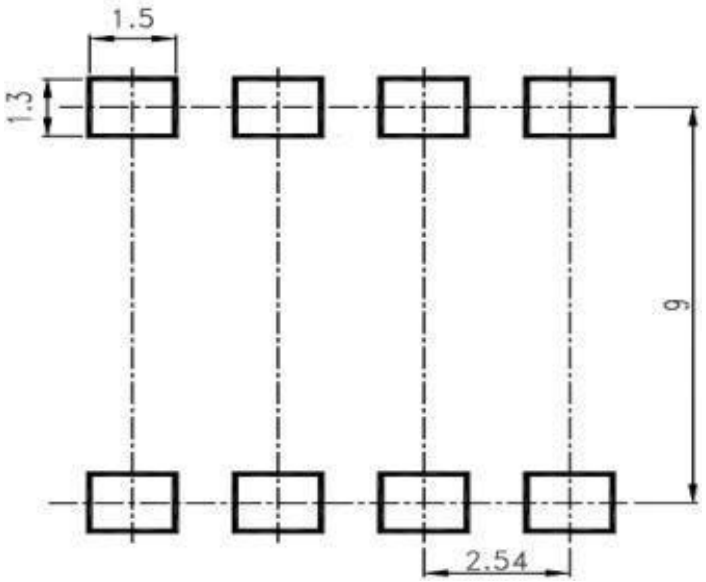
(2) OR-26XXM



(3) OR-26XXS



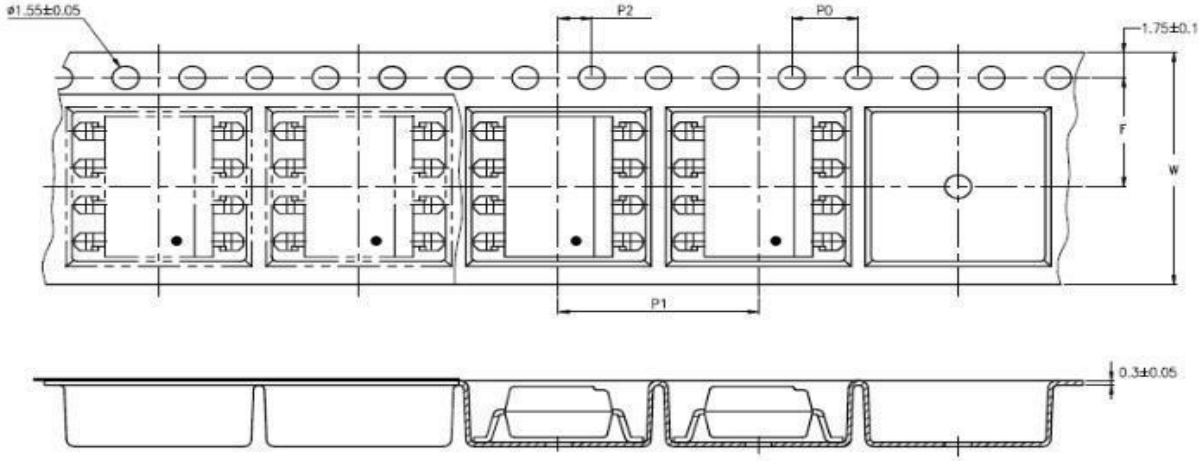
11. Recommended Foot Print Patterns (Mount Pad)



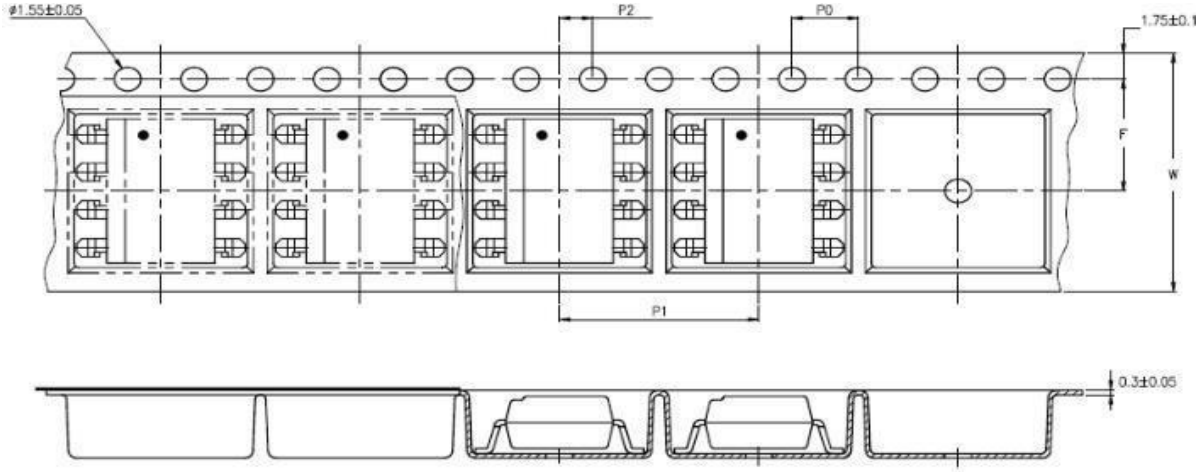
Unit：mm

12. Taping Dimensions

(1) OR-26XXS-TA



(2) OR-26XXS-TA1



type	symbol	Size: mm (inches)
bandwidth	W	16±0.3 (0.63)
pitch	P0	4±0.1 (0.15)
pitch	F	7.5±0.1 (0.295)
	P2	2±0.1 (0.079)
interval	P1	12±0.1 (0.472)

Encapsulation type	TA/TA1
Amount (pcs)	1000

13. Package Dimension

(1) package dimension

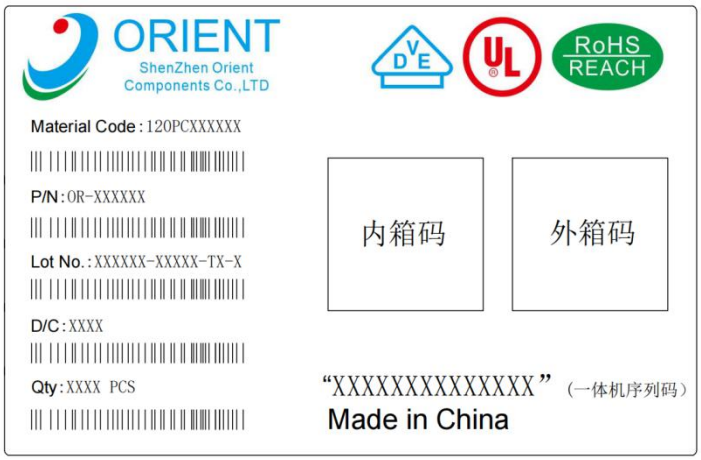
DIP Type

Packing Information	
Packing type	Tube
Qty per Tube	45pcs
Small box (Inner) Dimension	525*128*60mm
Large box (Outer) Dimension	545*290*335mm
The Amount per Inner Box	2,250pcs
The Amount per Outer Box	22,500pcs

SOP Type

Packing Information	
Packing type	Reel type
Tape Width	16mm
Qty per Reel	1,000pcs
Small box (inner) Dimension	345*345*58.5mm
Large box (Outer) Dimension	620x360x360mm
Max qty per small box	2,000pcs
Max qty per large box	20,000pcs

(2)Packing Label Sample



Note:

1. Material Code :Product ID.
2. P/N :Contents with "Order Information" in the specification.
3. Lot No. :Product data.
4. D/C :Product weeks.
5. Quantity :Packaging quantity.

14. Reliability Test

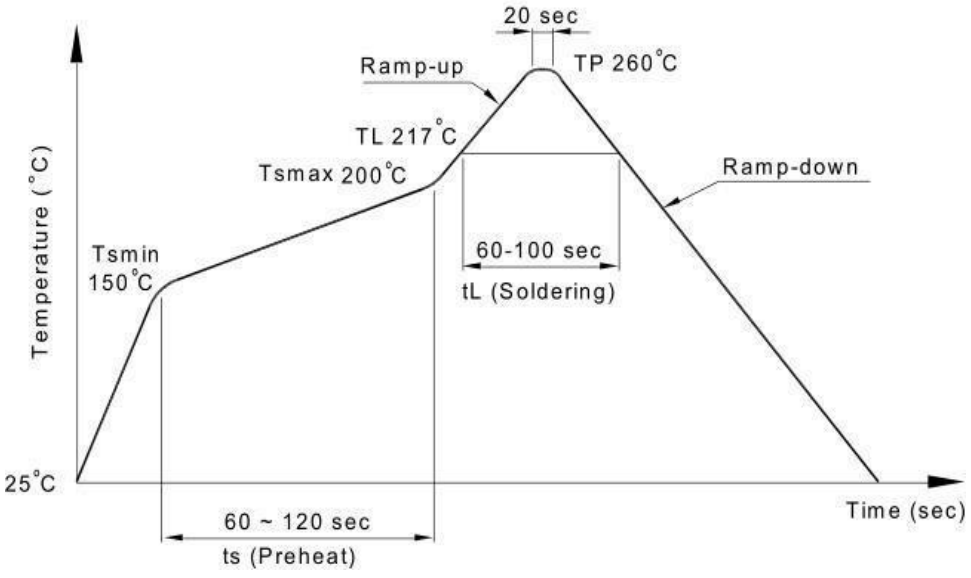
NO.	ITEMS	Reliability Testing				
		QTY. (Pcs)	Condition	Process	Device	Standard
1	RSH 耐焊接热	22	260±5℃	5s/3 次	锡炉	JESD22-A106
2	HTSL 高温存储	77	125℃	168 hrs 500 hrs 1000 hrs	高温烤箱测试仪	JESD22-A103
3	LTSL 低温存储	77	-40℃	168 hrs 500 hrs 1000 hrs	低温箱测试仪	JESD22-A119
4	TC 温度循环	77	H:125℃ 15min ∫5min L:-55℃ 15min	300 cycle	冷热冲击机	JESD22-A104
5	TS 温度冲击	77	H:100℃ 5min ∫15s L:-40℃ 5min	300 cycle	冷热冲击机	JESD22-A106
6	HTOL 高温操作	77	100℃ IF=10mA Vcc=5V	168 hrs 500 hrs 1000 hrs	高温烤箱测试仪、老化电路板	JESD22-A108
7	ESD-HBM 人体模式	22	≥8KV 1Cycle	1次	ESD静电测试仪	JESD22-A114
8	SD 可焊性	22	Pb-free 245±5℃	5s/1次	锡炉	JESD22-B102
9	HTHB 温湿寿命试验	77	85℃,85%RH IF=10mA,Vcc=5V	168 hrs 500 hrs 1000 hrs	恒温恒湿机，测试仪	JESD22-A101
10	Autoclave 压力锅	77	Ta=121 ℃,100%RH,2atm	96hrs	压力锅	JESD22-A102

15. Temperature Profile Of Soldering

(1) IR Reflow soldering (JEDEC-STD-020C compliant)

Note: one solder backflow is recommended under the conditions described below in the temperature and time profile. Do not weld more than three times.

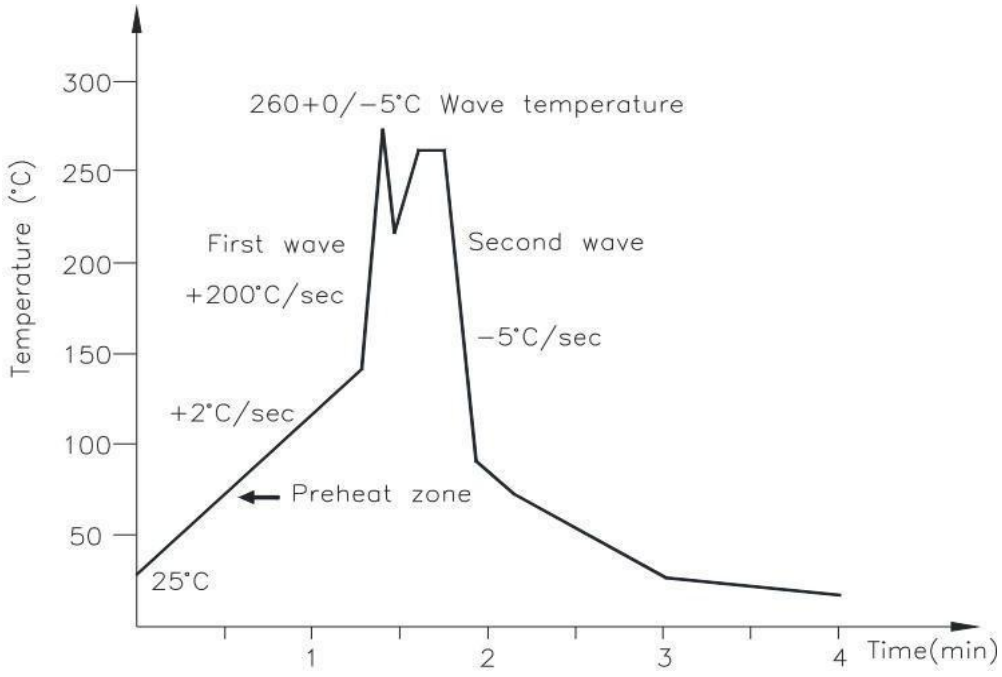
Profile item	Conditions
Preheat - Temperature Min (T Smin) - Temperature Max (T Smax) - Time (min to max) (ts)	 150˚C 200˚C 90±30 sec
Soldering zone - Temperature (TL) - Time (t L)	 217˚C 60 sec
Peak Temperature	260˚C
Peak Temperature time	20 sec
Ramp-up rate	3˚C / sec max.
Ramp-down rate from peak temperature	3~6˚C / sec
Reflow times	≤3



(2) Wave soldering (JEDEC22A111 compliant)

One-time welding is recommended under the temperature condition.

Temperature Time	260+0/-5˚C 10 sec
Preheat temperature Preheat time	5 to 140˚C 30 to 80sec



(3) Hand soldering by soldering iron

Single lead welding is allowed in each process and one-time welding is recommended.

Temperature Time	380+0/-5˚C 3 sec max

16. Typical Electro-Optical Characteristics Curves

Fig.1 Input Diode Forward Voltage vs. Forward Current

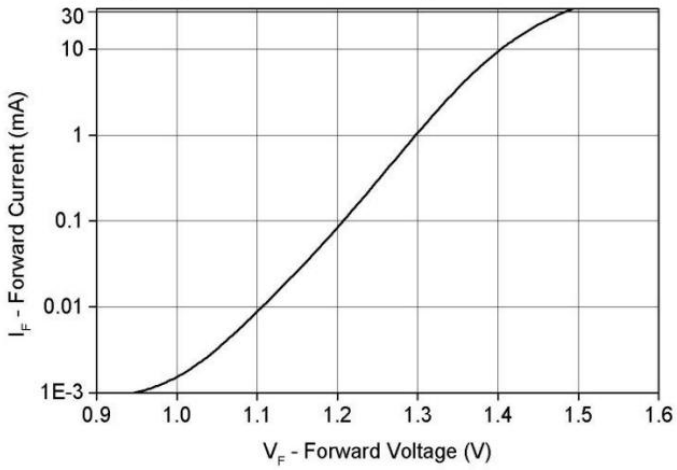


Fig.2 Low Level Output Voltage vs. Ambient Temperature

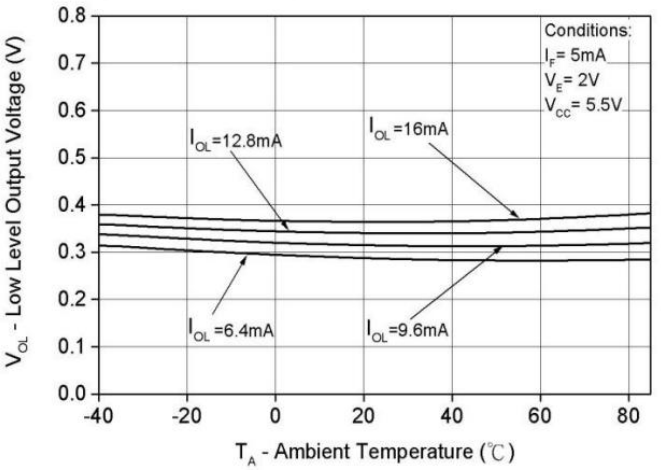


Fig.3 Low Level Output Current vs. Ambient Temperature

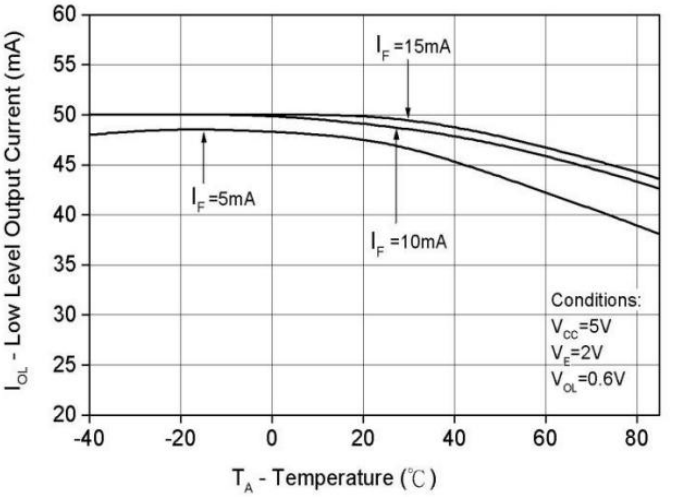


Fig.4 Input Threshold Current vs. Ambient Temperature

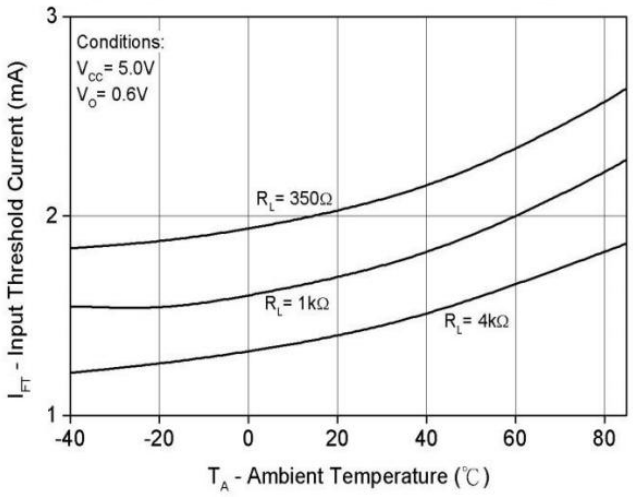


Fig.5 Output Voltage vs. Input Forward Current

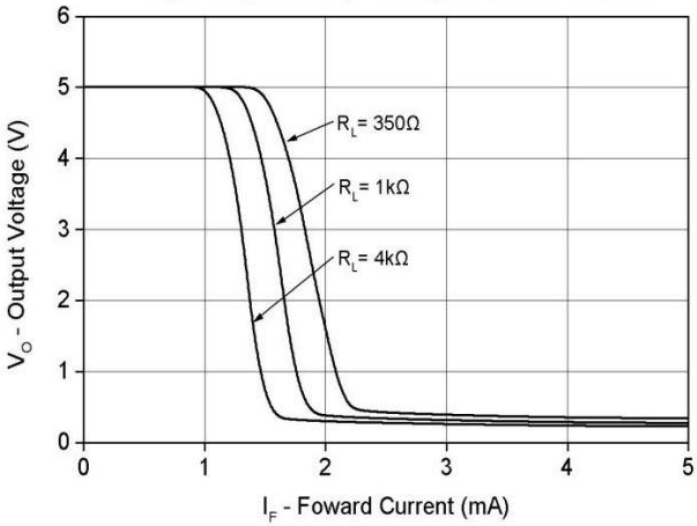


Fig.6 High Level Output Current vs. Temperature

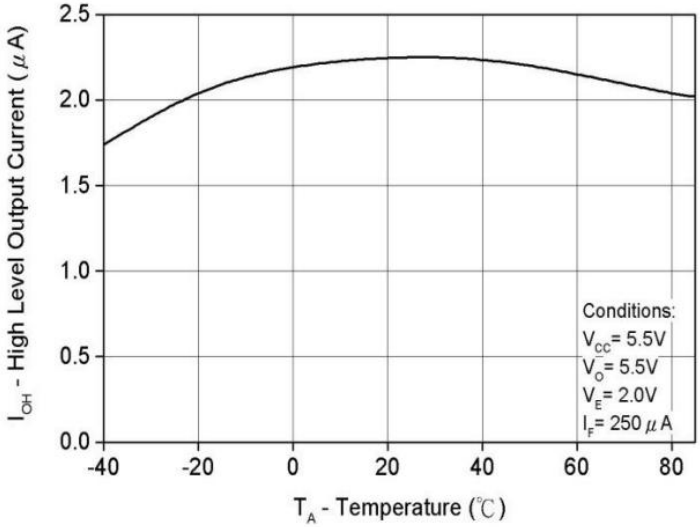


Fig.7 Switching Time vs. Forward Current

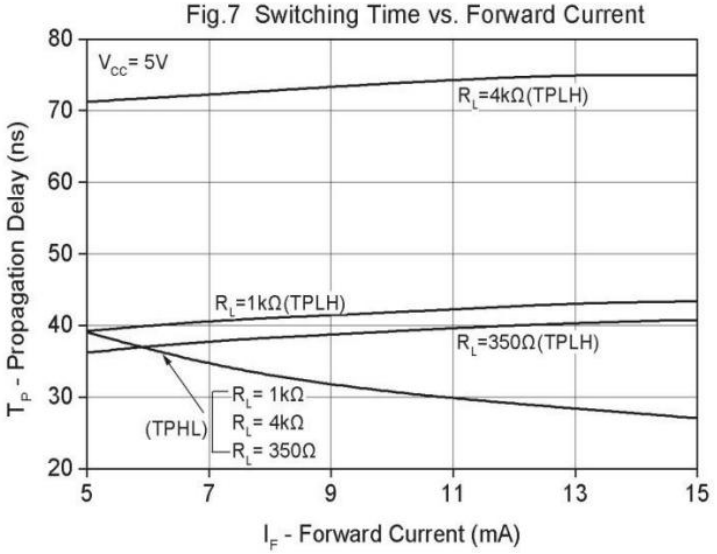


Fig.8 Switching Time vs. Temperature

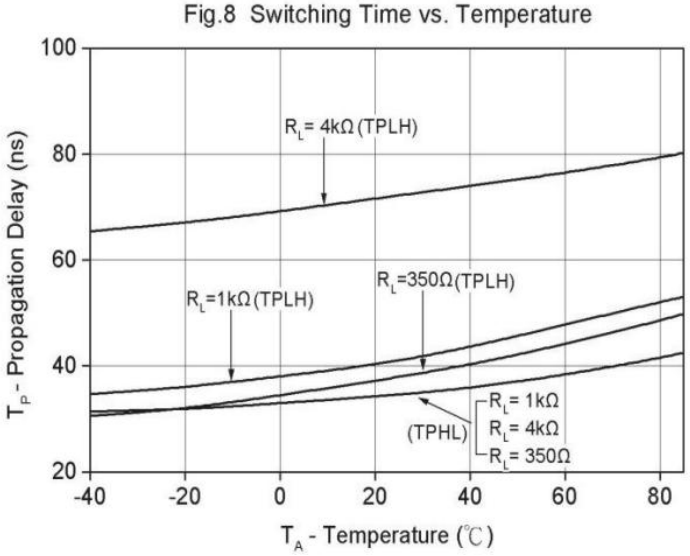


Fig.9 Pulse Width Distortion vs. Temperature

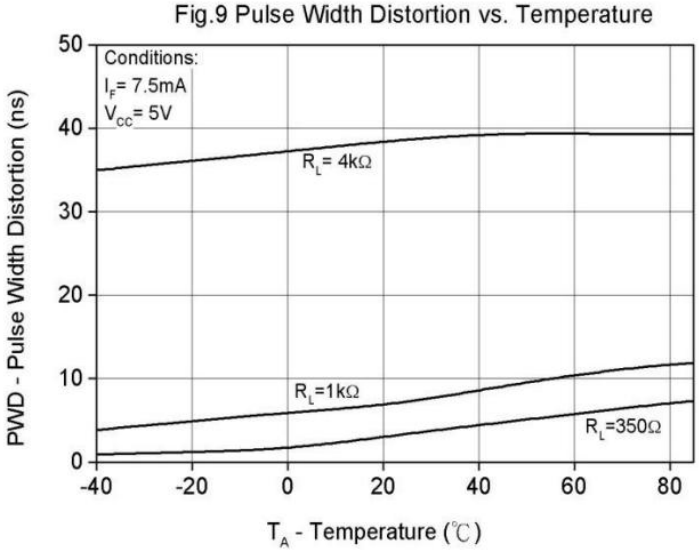


Fig.10 Rise and Fall Time vs. Temperature

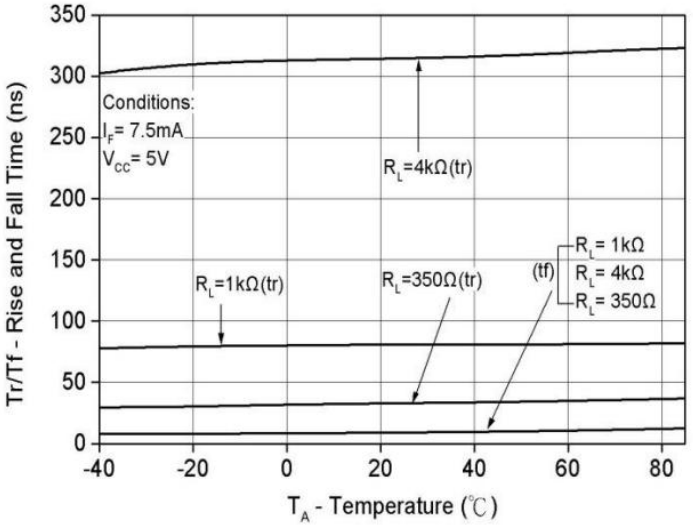


Fig.11 Enable Propagation Delay vs. Temperature

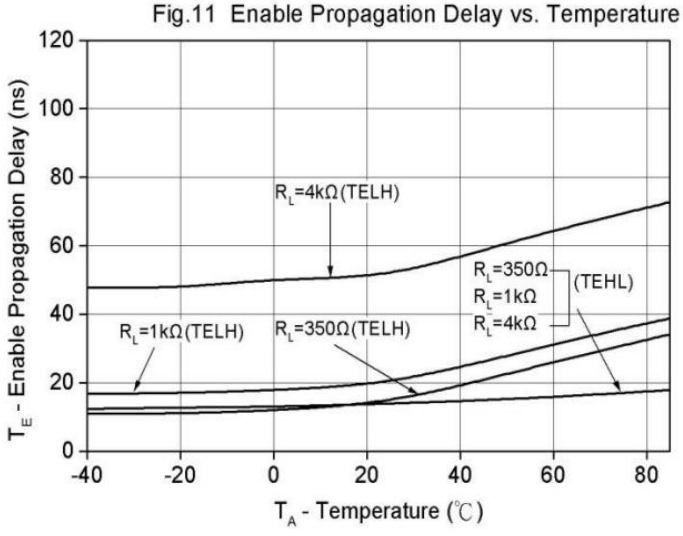


Fig. 12 Test circuit and waveforms for tPHL, tPLH, tr, and tf

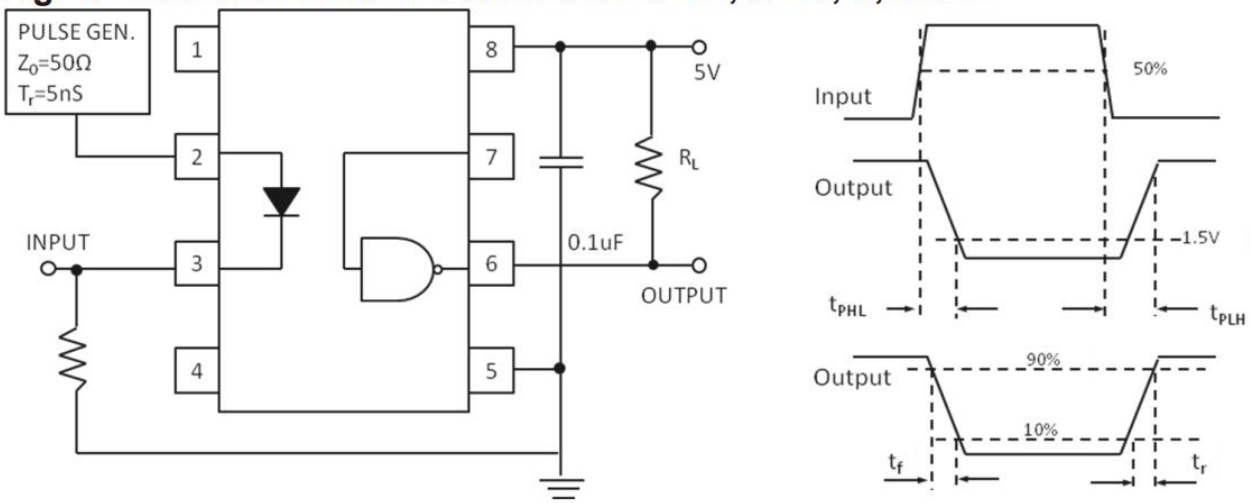


Fig. 13 Test circuit and waveform for t_{EHL} and t_{ELH}

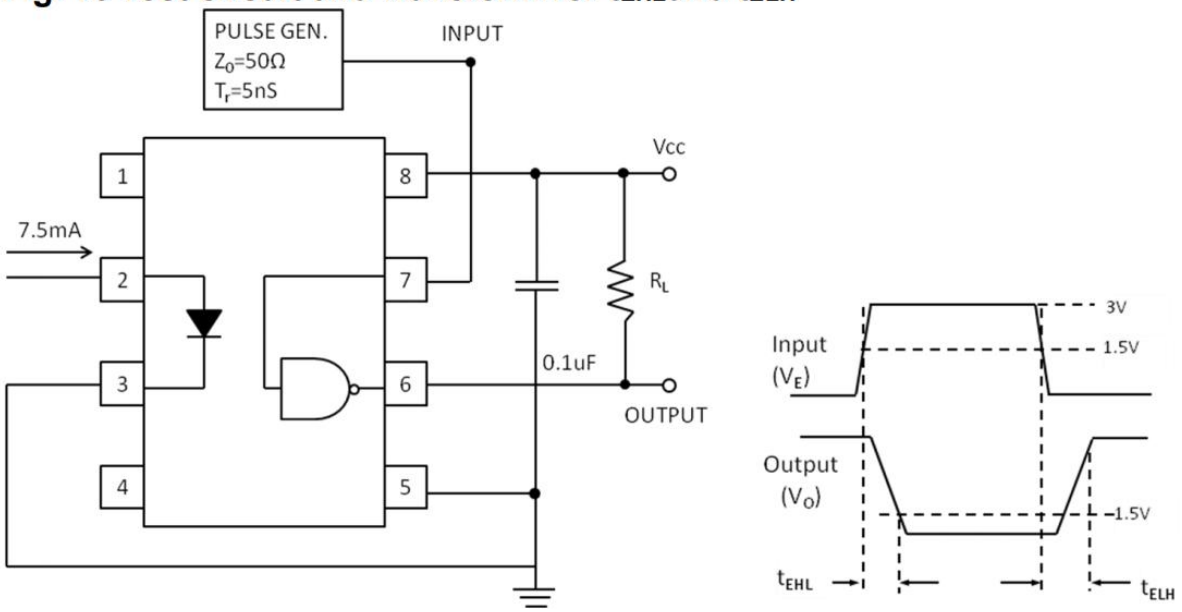


Fig. 14 Test circuit Common mode Transient Immunity

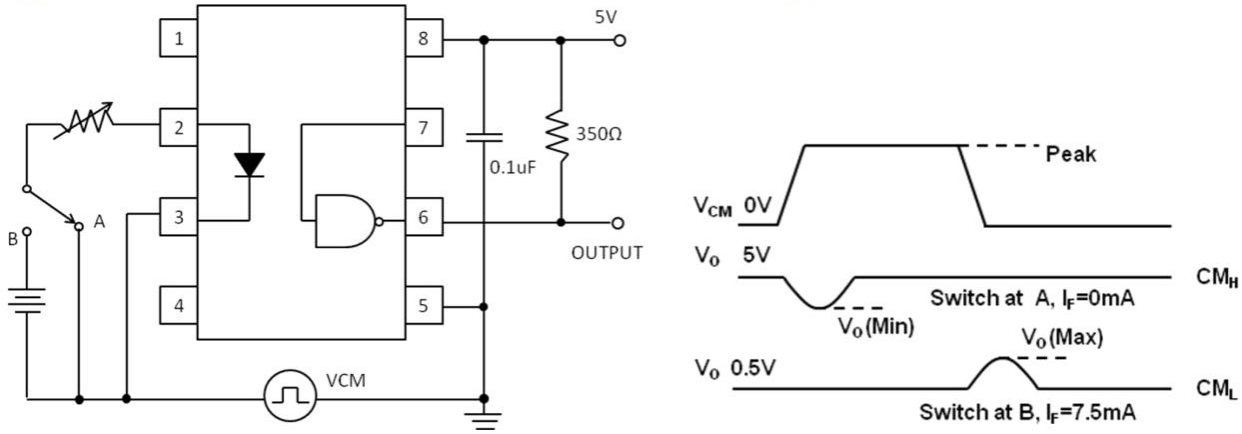


Fig. 15 Recommended drive circuit for EL2611 families for high-CMR