ORIENT

Photo coupler

Product Data Sheet

Part Number: OR-152

Customer: _____

Date: _____

SHENZHEN ORIENT COMPONENTS CO ., LTD

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1. Features

(1) Rail-to-rail output voltage
(2) Output peak current: ±2.5 A (max)
(3) Supply current: 3 mA (max)
(4) Supply voltage: 10 to 30 V
(5) Threshold input current: 7.5 mA(max)
(6) Propagation delay time: tpHL = 190 ns (max), tpLH = 170 ns (max)
(7) Common-mode transient immunity: ±20 kV/μs (min)
(8) Isolation voltage: 3750 Vrms (min)
(9) Available in Stretched SO-5 package
(10) Industrial temperature range: -40° C to 100° C
(11) Safety approval
UL approved(No.E323844)
VDE approved(No.40029733)
CQC approved (No.CQC22001345200)
(12) In compliance with RoHS, REACH standard
(13) MSL Level 1

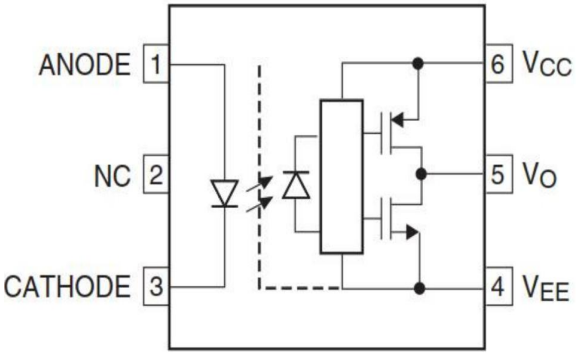
2. Description

The OR-152 is a photocoupler in a SO6 package that consists of a GaAlAs infrared light-emitting diode(LED) optically coupled to an integrated high-gain, high-speed photodetector IC chip.

3. Application Range

(1)Plasma Display Panels (PDPs)
(2)Transistor Inverters
(3)MOSFET Gate Drivers
(4)IGBT Gate Drivers

4. Functional Diagram



Truth Table	
LED	V_O
OFF	LOW
ON	HIGH

1: Anode
3: Cathode
4: VEE
5: VO(Output)
6: VCC

Note: A 0.1-μF bypass capacitor must be connected between pin 6 and pin 4

5. Absolute Maximum Ratings (Ta=25℃)

Parameter		Symbol	Rated Value	Unit
Input	Average Forward Input Current	I_F	20	mA
	Peak transient input forward current	I_{FPT}	1	A
	Reverse Input Voltage	V_R	5	V
	Input power dissipation	P_D	40	mW
Output	"High" Peak Output Current	$I_{OH(PEAK)}$	2.5	A
	"Low" Peak Output Current	$I_{OL(PEAK)}$	2.5	A
	Output Collector Power Dissipation	P_O	260	mW
Supply Voltage		V_{CC}	35	V
Output Voltage		V_O	35	V
Insulation Voltage		Viso	3750	Vrms
Working Temperature		T_{opr}	-40 ～+ 100	℃
Storage Temperature		T_{stg}	-55～ + 125	
*2 Soldering Temperature		T_{sol}	260	

*1. Room temperature = 25 ℃. Exceeding the maximum absolute rating can permanently damage the device. Working long hours at the maximum absolute rating can affect reliability.

*2. soldering time is 10 seconds.

6. Electrical Optical Characteristics at Ta=25°C

Parameter	Symbol	Min.	Typ.	Max.	Units	Test Conditions
Peak high-level output current	I_{OPH}	—	-1.6	-1.0	A	I_F = 10 mA, V_{CC} = 15 V, V_{6-5} = 4 V
		—	-2.4	-2.0		I_F = 10 mA, V_{CC} = 15 V, V_{6-5} = 9 V
Peak low-level output current	I_{OPL}	1.0	1.3	—	A	I_F = 0 mA, V_{CC} = 15 V, V_{5-4} = 2 V
		2.0	2.6	—		I_F = 0 mA, V_{CC} = 15 V, V_{5-4} = 9 V
High Level Output Voltage	V_{OH}	9.7	9.8	—	V	I_F = 10 mA, V_{CC} = 10 V, I_O = -100 mA
Low Level Output Voltage	V_{OL}	—	0.1	1.0	V	V_F = 0.8 V, V_{CC} = 10 V, I_O = 100 mA
High Level Supply Current	I_{CCH}	—	1.8	3.0	mA	I_F = 10 mA, V_{CC} = 10 to 30 V, V_O = Open
Low Level Supply Current	I_{CCL}	—	2.1	3.0	mA	I_F = 0 mA, V_{CC} = 10 to 30 V, V_O = Open
Threshold Input Current Low to High	I_{FLH}	—	2.3	7.5	mA	V_{CC} = 15 V, V_O > 1 V
Threshold Input Voltage High to Low	V_{FHL}	0.8	1.48	—	V	V_{CC} = 15 V, V_O < 1 V
Supply voltage	V_{CC}	10	—	30	V	
U_{VLO} threshold voltage	V_{UVLO+}	7.5	7.8	9.5	V	I_F = 5 mA , V_O > 2.5 V
	VU_{VLO-}	6.5	6.8	9.5	V	I_F = 5 mA, V_O < 2.5 V
U_{VLO} hysteresis	$UVLO_{HYS}$	—	0.3	—	V	I_F = 5 mA , V_O > 2.5 V
Input Forward Voltage	V_F	1.3	1.4	1.8	V	I_F = 10 mA
Temperature Coefficient of Forward Voltage	$\Delta V_F/\Delta T_A$	—	–1.7	—	mV/°C	I_F = 10 mA
Input Reverse Breakdown Voltage	B_{VR}	5	—	—	V	I_R = 100 μA
Input Capacitance	C_{IN}	—	70	—	pF	f = 1 MHz, VF = 0V

Note: All typical values are at T_a = 25℃.

7. Switching Characteristics

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Propagation delay time (L/H)	t_{pLH}	I_F = 0 → 10 mA, V_{CC} = 30 V, Rg = 20 Ω, Cg = 10 nF,Ta = 25℃	—	92	145	ns
Propagation delay time (H/L)	t_{pHL}	I_F = 10 → 0 mA, V_{CC} = 30 V, Rg = 20 Ω, Cg = 10 nF,Ta = 25℃	—	105	165	
Propagation delay time (L/H)	t_{pLH}	I_F = 0 → 10 mA, V_{CC} = 30 V, Rg = 20 Ω, Cg = 10 nF	50	92	170	
Propagation delay time (H/L)	t_{pHL}	I_F = 10 → 0 mA, V_{CC} = 30 V, Rg = 20 Ω, Cg = 10 nF	50	105	190	
Propagation delay skew (device to device)	t_{psk}	I_F = 0 ←→ 10 mA, V_{CC} = 30 V, Rg = 20 Ω, Cg = 10 nF	-85	—	85	
Pulse width distortion	$\|t_{pHL}-t_{pLH}\|$	I_F = 0 ←→ 10 mA, V_{CC} = 30 V, Rg = 20 Ω, Cg = 10 nF	—	13	50	
Rise time	t_r	I_F = 0 → 10 mA, V_{CC} = 30 V, Rg = 20 Ω, Cg = 10 nF	—	16	—	
Fall time	t_f	I_F = 10 → 0 mA, V_{CC} = 30 V, Rg = 20 Ω, Cg = 10 nF	—	20	—	
Common-mode transient immunity at output high	$\|CM_H\|$	V_{CM} = 1000 Vp-p, I_F = 10 mA, V_{CC} = 30 V, Ta = 25℃,$V_{O(min)}$ = 26 V	±20	—	—	kV/μs
Common-mode transient immunity at output low	$\|CM_L\|$	V_{CM} = 1000 Vp-p, IF = 0 mA, V_{CC} = 30 V, Ta = 25℃,$V_{O(max)}$ = 1 V	±20	—	—	

Note: All typical values are at T_a = 25℃.

1.Input signal (f = 125 kHz, duty = 50%, t_r = t_f = 5 ns or less).CL is approximately 15 pF which includes probe and stray wiring capacitance.

2. CM_H is the maximum rate of rise of the common mode voltage that can be sustained with the output voltage in the logic high state (V_O > 26 V).

3.CM_L is the maximum rate of fall of the common mode voltage that can be sustained with the output voltage in the logic low state (V_O < 1 V).

4.The propagation delay skew, t_{psk}, is equal to the magnitude of the worst-case difference in t_{pHL} and/or t_{pLH} that will be seen between units at the same given conditions (supply voltage, input current, temperature, etc).

8. Order Information

Part Number

OR-152-W-Y-Z

Note

W = Tape and reel option. (TP or TP1).

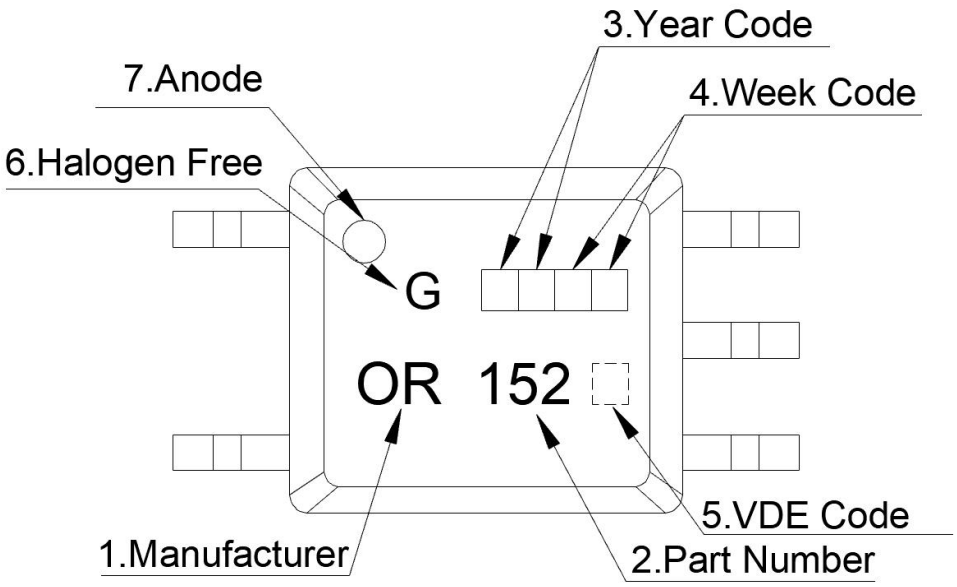
Y = 'V' code for VDE safety (This options is not necessary).

Z = 'G' code for Halogen free.

* VDE Code can be selected.

Option	Description	Packing quantity
S(TP)	Surface mount lead form (low profile) + TP tape & reel option	3000 units per reel
S(TP1)	Surface mount lead form (low profile) + TP1 tape & reel option	3000 units per reel

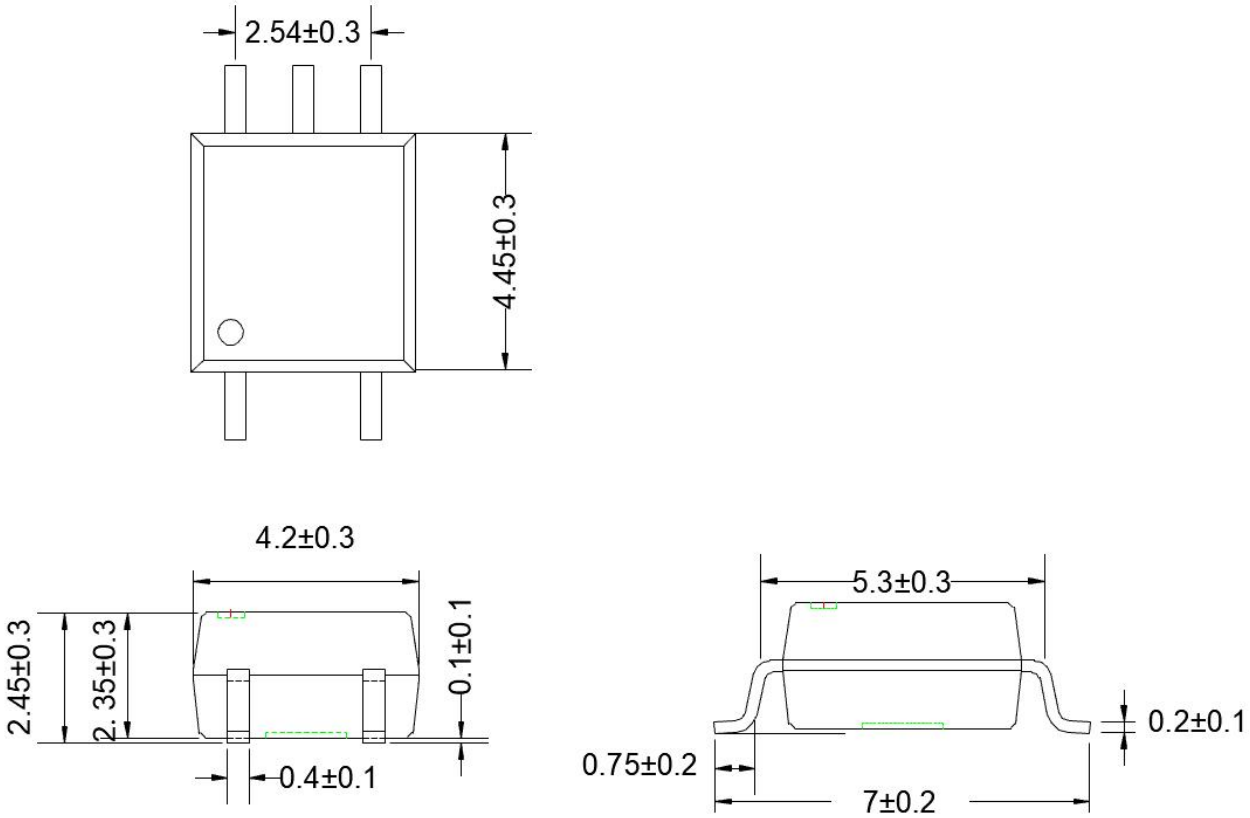
9. Naming Rule



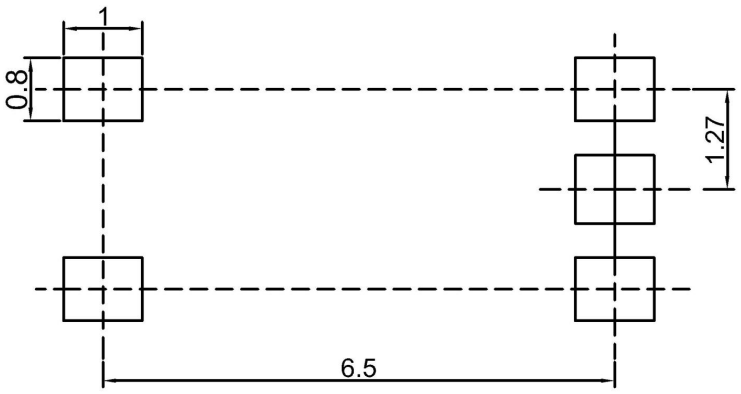
1. Manufacturer : ORIENT.
2. Part Number : 152.
3. Year Code □□ : '21' means '2021' and so on.
4. Week Code □□: 01 means the first week, 02 means the second week and so on.
5. VDE Code ⬚. (Optional)
6. Halogen free code.
7. Anode.

* VDE Mark can be selected.

1. Outer Dimension



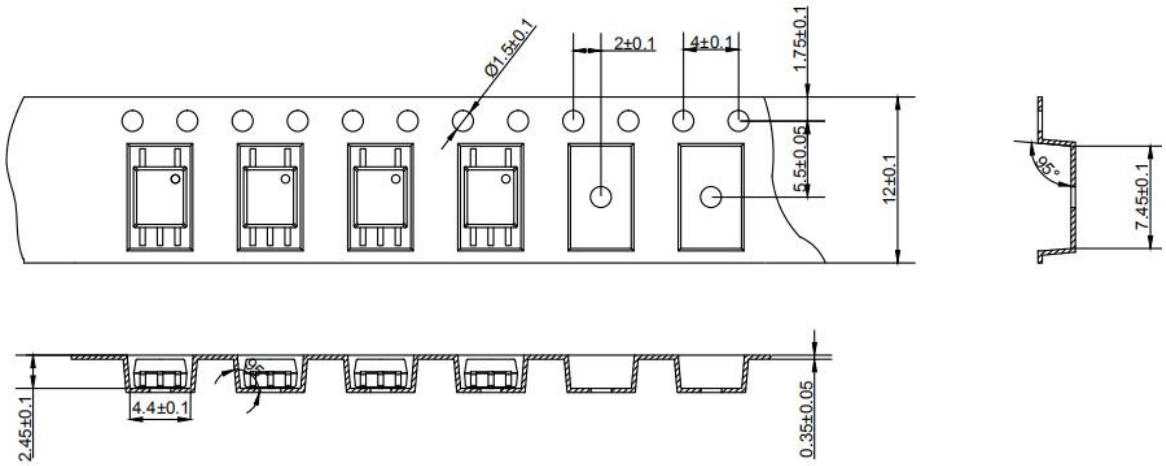
2. Recommended Foot Print Patterns (Mount Pad)



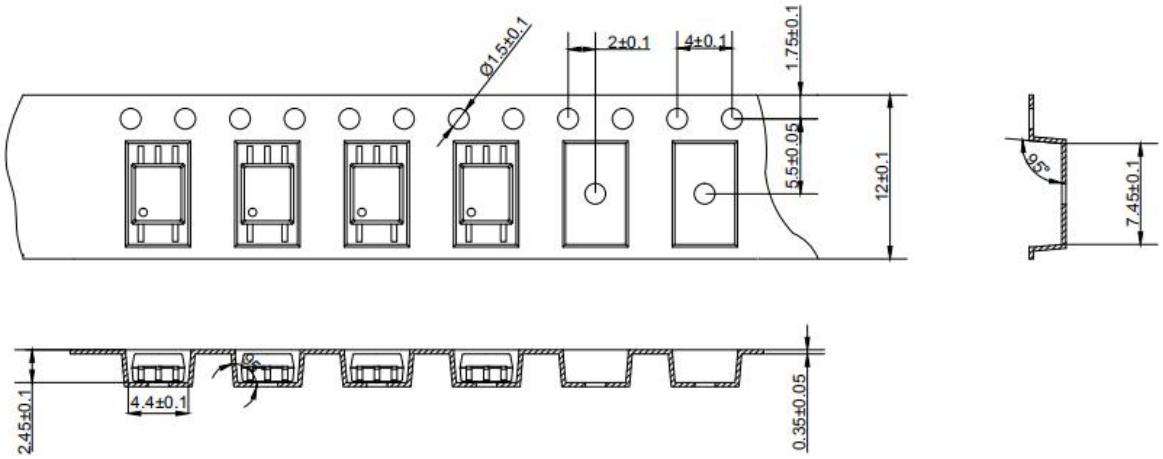
unit： mm

3. Taping Dimensions

(1) OR-152-TP



(2) OR-152-TP1



Description	Symbol	Dimension in mm(inch)
Tape wide	W	12±0.3（0.472）
Pitch of sprocket holes	P0	4±0.1（0.157）
Distance of compartment	F	5.5±0.1（0.217）
	P2	2±0.1（0.079）
Distance of compartment to compartment	P1	8±0.1（0.315）

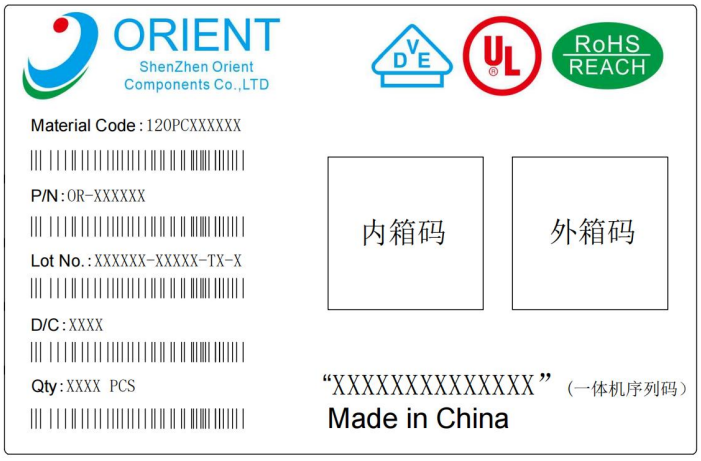
Encapsulation type	TP/TP1
amount （pcs）	3000

4. Package Dimension

(1) package dimension

Packing Information	
Packing type	Reel type
Tape Width	12mm
Qty per Reel	3,000pcs
Small box (inner) Dimension	345*345*45mm
Large box (Outer) Dimension	480x360x360mm
Max qty per small box	6,000pcs
Max qty per large box	60,000pcs

(2) Packing Label Sample



Note:

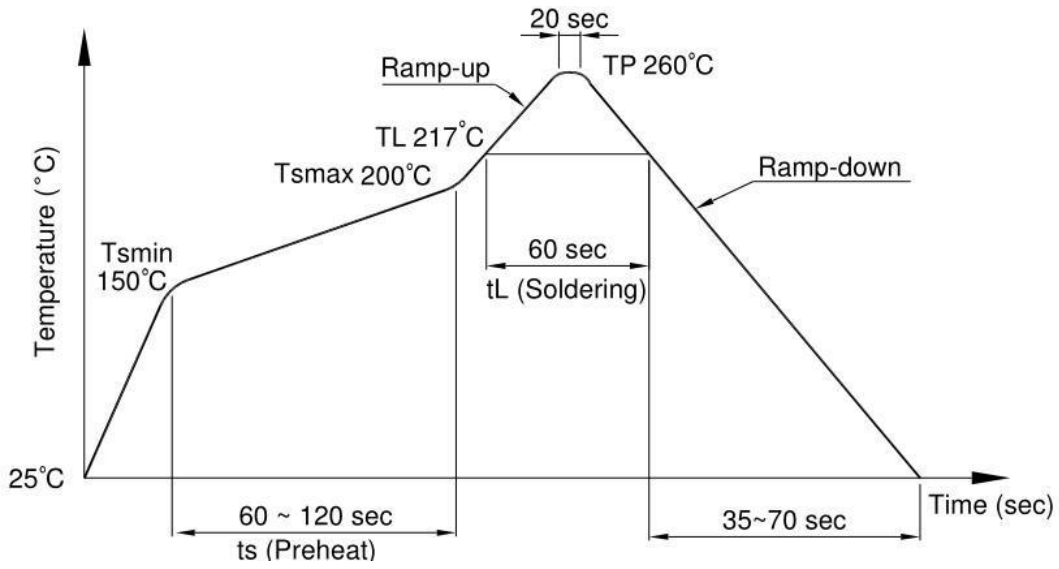
1. Material Code :Product ID.
2. P/N :Contents with "Order Information" in the specification.
3. Lot No. :Product data.
4. D/C :Product weeks.
5. Quantity :Packaging quantity.

10. Temperature Profile Of Soldering

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

One time soldering reflow is recommended within the condition of temperature and time profile shown below. Do not solder more than three times.

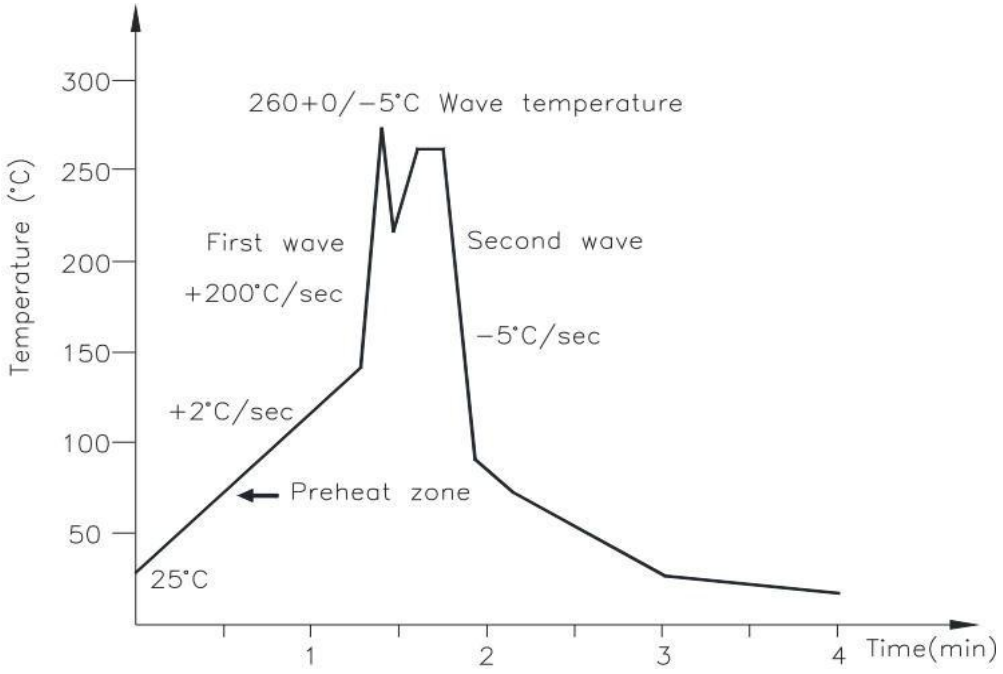
Profile item	Conditions
Preheat - Temperature Min (T Smin) - Temperature Max (T Smax) - Time (min to max) (ts)	 150˚C 200˚C 90±30 sec
Soldering zone - Temperature (TL) - Time (t L)	 217˚C 60 sec
Peak Temperature	260˚C
Peak Temperature time	20 sec
Ramp-up rate	3˚C / sec max.
Ramp-down rate from peak temperature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



(3) .Wave soldering (JEDEC22A111 compliant)

One time soldering is recommended within the condition of temperature.

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



(3).Hand soldering by soldering iron

Allow single lead soldering in every single process. One time soldering is recommended.

Temperature Time	380+0/-5˚C 3 sec max

11. CHARACTERISTICS CURVES (TYPICAL PERFORMANCE)

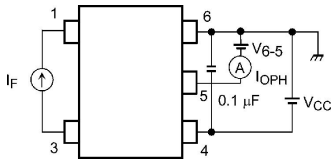


Fig. 12.1.1 I_{OPH} Test Circuit

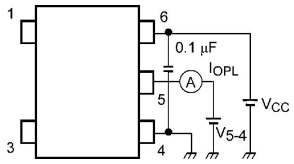
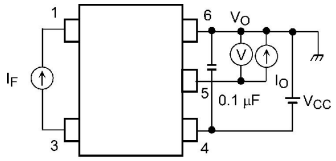


Fig. 12.1.2 I_{OPL} Test Circuit



*$V_{OH} = V_{CC} - V_O$

Fig. 12.1.3 V_{OH} Test Circuit

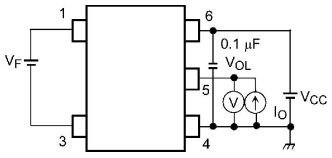


Fig. 12.1.4 V_{OL} Test Circuit

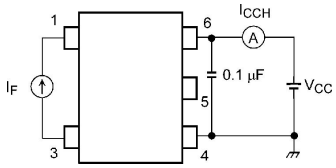


Fig. 12.1.5 I_{CCH} Test Circuit

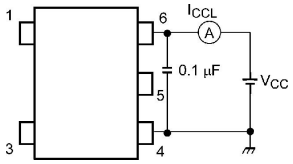
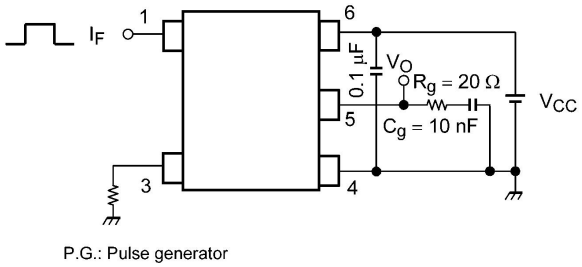
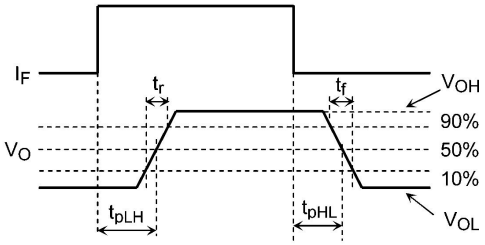


Fig. 12.1.6 I_{CCL} Test Circuit

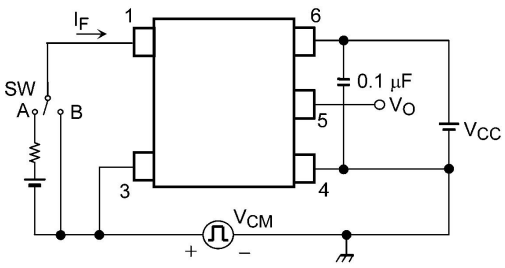
I_F = 10 mA (P.G.)
(f = 125 kHz, duty = 50%, $t_r = t_f$ = 5 ns)

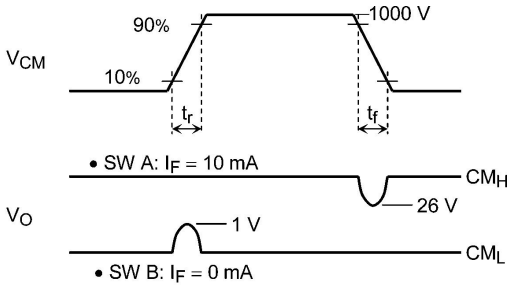




P.G.: Pulse generator

Fig. 12.1.7 Switching Time Test Circuit and Waveform





$$CM_L = \frac{800\ V}{t_r\ (\mu s)} \qquad CM_H = -\frac{800\ V}{t_f\ (\mu s)}$$

Fig. 12.1.8 Common-Mode Transient Immunity Test Circuit and Waveform