



ORIENT

Photo coupler

Product Data Sheet

MPN: ORPC-817 series of GK

Customer: _____

Date: _____

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Preliminary

This datasheet is a preliminary design specification, and the formal specifications are subject to the recognition letter with jointly signed

1. Features

- (1) Current transfer ratio (CTR : MIN. 50% at $I_F = 5\text{mA}$, $V_{CE} = 5\text{V}$)
- (2) High input-output isolation voltage ($V_{iso} = 5,000\text{Vrms}$)
- (3) Response time (t_r : TYP. $2.9\mu\text{s}$ at $V_{CE} = 2\text{V}$, $I_C = 2\text{mA}$, $R_L = 100\Omega$)
- (4) Operating Temperature $-55\text{ }^\circ\text{C}$ to $125\text{ }^\circ\text{C}$
- (5) ESD pass HBM 8000V/MM 2000V
- (6) Safety approval
 - UL approved (No.E323844)
 - VDE approved(No.40029733)
 - CQC approved (No.CQC09001029446)
 - CE approved (No.AC/0431008)
 - State Grid approved (No.SGCM013420240085)
- (7) In compliance with RoHS, REACH standards
- (8) MSL Class I



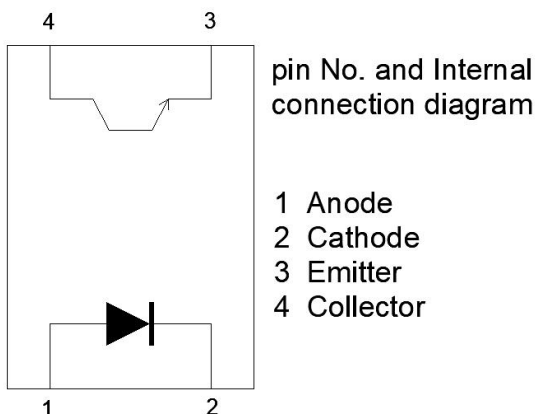
2. Description

- (1) ORPC-817-(GK) photo coupler consist of one piece of GaAs emitter and one piece of NPN transistor.
- (2) Packaged in a 4-pin DIP package and available in wide-lead spacing and SMD option.

3. Applications

- (1) Switching power supply
- (2) Ammeter
- (3) Computer
- (4) Instrumental application, measurement machine
- (5) Signal transforming systems
- (6) Imbursement equipments, duplicating machine, automat
- (7) Family-use electric equipments, such as fans

4. Functional Diagram



5. Absolute Maximum Ratings at Ta=25°C

Parameter		Symbol	Rated Value	Unit
Input	Forward Current	I_F	60	mA
	Peak forward current (100 μ s pulse, 100Hz frequency)	I_{FP}	1	A
	Reverse Voltage	V_R	6	V
	Input Power	P_I	70	mW
Output	Collector and emitter Voltage	V_{CEO}	80	V
	Emitter and collector Voltage	V_{ECO}	7	
	Collector Current	I_C	50	mA
	Output Power	P_O	150	mW
Total Consume Power		P_{tot}	200	mW
*1 Isolation Voltage		V_{iso}	5000	Vrms
Maximum transient isolation voltage (Insulating oil test)		V_{IOTM}	8000	V_{peak}
Maximum repetitive peak isolation voltage		V_{IORM}	850	V_{peak}
Operation Temperature		T_{opr}	-55 to + 125	°C
Storage Temperature		T_{stg}	-55 to + 150	
*2 Soldering Temperature		T_{sol}	260	

*1.AC For 1 Minute, R.H. = 40 ~ 60%

Isolation voltage shall be measured using the following method.

- (1) Short between anode and cathode on the primary side and between collector and emitter on the secondary side.
- (2) The isolation voltage tester with zero-cross circuit shall be used.
- (3) The waveform of applied voltage shall be a sine wave.

*2. Soldering time is 10 seconds

6. Electro-Optical Characteristics (Ta=25°C unless specified otherwise)

Parameter		Symbol	Min	Typ.*	Max	Unit	Condition
Input	Forward Voltage	V_F	---	1.2	1.4	V	$I_F=20\text{mA}$
	Reverse Current	I_R	---	---	5	μA	$V_R=5\text{V}$
	Input Capacitance	C_t	---	20	250	pF	$V=0, f=1\text{MHz}$
Output	Dark Current	I_{CEO}	---	---	100	nA	$V_{CE}=20\text{V}$ $I_F=0\text{mA}$
	Collector-Emitter Breakdown Voltage	BV_{CEO}	80	---	---	V	$I_C=0.1\text{mA}$ $I_F=0\text{mA}$
	Emitter-Collector Breakdown Voltage	BV_{ECO}	7	---	---	V	$I_E=0.1\text{mA}$ $I_F=0\text{mA}$
Transforming Characteristics	*1 Current transfer ratio	CTR	50	---	600	%	$I_F=5\text{mA}$ $V_{CE}=5\text{V}$
	Collector Current	I_C	2.5	---	30	mA	$I_F=5\text{mA}$ $V_{CE}=5\text{V}$
	Collector and Emitter Saturation Voltage	$V_{CE(sat)}$	---	0.1	0.2	V	$I_F=20\text{mA}$ $I_C=1\text{mA}$
	Isolation Impedance	R_{iso}	5×10^{10}	1×10^{12}	---	Ω	DC500V 40~60%R.H.
	Floating Capacitance	C_f	---	0.4	1.0	pF	$V=0, f=1\text{MHz}$
	Cut-off Frequency	f_c	---	80	---	kHz	$V_{CE}=5\text{V}$ $I_C=2\text{mA}$ $R_L=100\Omega, -3\text{dB}$
	Rise Time	t_r	---	2.9	10	μs	$V_{CC}=2\text{V}$ $I_C=2\text{mA}$ $R_L=100\Omega$
	Fall Time	t_f	---	4.5	10	μs	
	Turn-on Time	t_{on}	---	6.3	10	μs	
Turn-off Time	t_{off}	---	7.1	10	μs		

*1 Current Conversion Ratio = $I_C / I_F \times 100\%$, CTR Tolerance: $\pm 3\%$.

7. Rank Table of Current Transfer Ratio

CTR BIN	Min (%)	Max (%)	Condition
A	80	160	$V_{CE} = 5V / I_F = 5mA, T_a=25^{\circ}C$
	40	100	$V_{CE} = 5V / I_F = 1mA, T_a=25^{\circ}C$
B	130	260	$V_{CE} = 5V / I_F = 5mA, T_a=25^{\circ}C$
	50	150	$V_{CE} = 5V / I_F = 1mA, T_a=25^{\circ}C$
C	200	400	$V_{CE} = 5V / I_F = 5mA, T_a=25^{\circ}C$
	80	300	$V_{CE} = 5V / I_F = 1mA, T_a=25^{\circ}C$
D	300	600	$V_{CE} = 5V / I_F = 5mA, T_a=25^{\circ}C$
	120	400	$V_{CE} = 5V / I_F = 1mA, T_a=25^{\circ}C$

CTR BIN	Min (%)	Max (%)	Condition
A5	4	20	$I_F=0.1mA, V_{CE}=5V, T_a=25^{\circ}C$
B5	6.5	34	
C5	10	52	
D5	15	78	
A6	24	72	$I_F=0.5mA, V_{CE}=5V, T_a=25^{\circ}C$
B6	40	120	
C6	70	140	
D6	90	270	
A7	40	105	$I_F=1mA, V_{CE}=5V, T_a=25^{\circ}C$
B7	65	170	
C7	100	260	
D7	150	390	



8. Order Information

Part Number

ORPC-817XT-V-W-Y-Z-(GK)

Note

X = Lead form option (S, S2, M or none)

T = CTR Rank (A, B, C, D, A5, B5, C5...)

V = Tape and reel option (TP, TP1 or none).

W = Lead frame (F:Iron, C:copper)

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

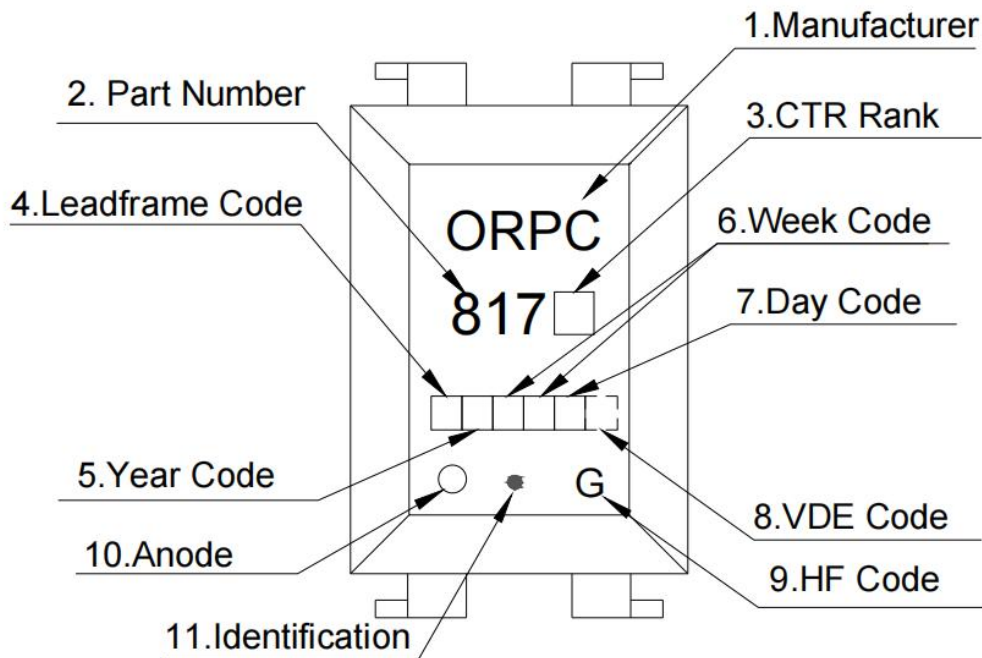
Z = 'G' code for Halogen free (Copper for HF only).

GK = Field Code.

* VDE Code can be selected.

Option	Description	Packing quantity
None	Standard DIP-4	100 units per tube
M	Wide lead bend (0.4 inch spacing)	100 units per tube
S(TP)	Surface mount lead form (low profile) + TP tape & reel option	2000 units per reel
S(TP1)	Surface mount lead form (low profile) + TP1 tape & reel option	2000 units per reel

9. Naming Rule



(1) ORIENT PHOTOCOUPLER.

(2) 817 denotes Device Part Number.

(3) □ denotes Rank Code. (Number not mark, L,A,B,C or D only)

(For example “C6” mark “C” only)

(4) □ denotes Lead Frame Code.

(5) □ denotes Year Code.

(6) □□ denotes Week Code.

(7) □ denotes Day Code.

(8) □□□ denotes VDE Code. (Optional)

(9) □□□ denotes HF Code. (Copper for HF only)

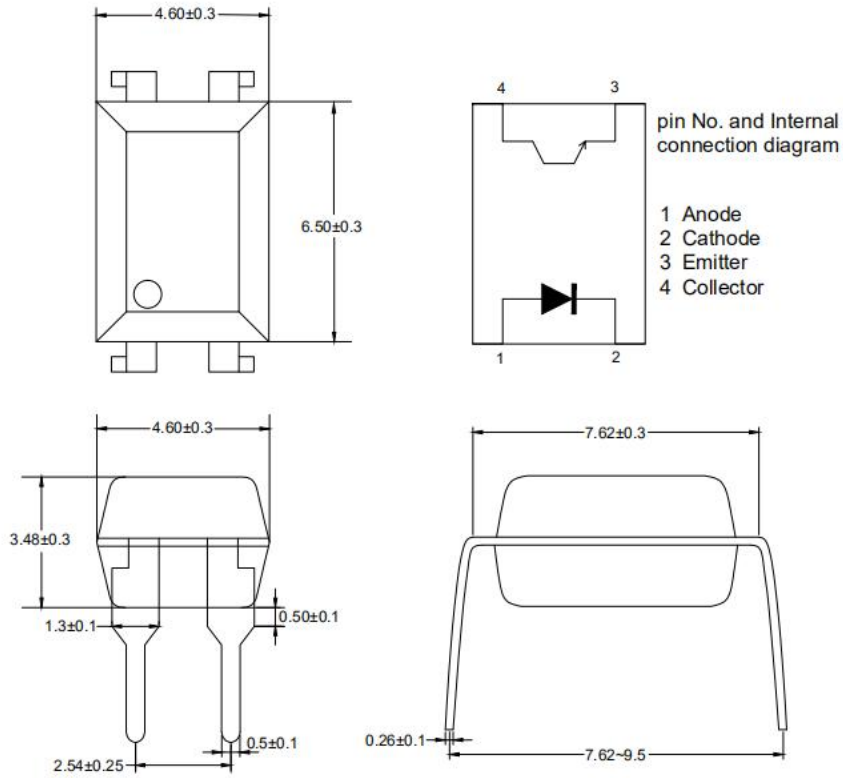
(10) Anode.

(11) Identification.

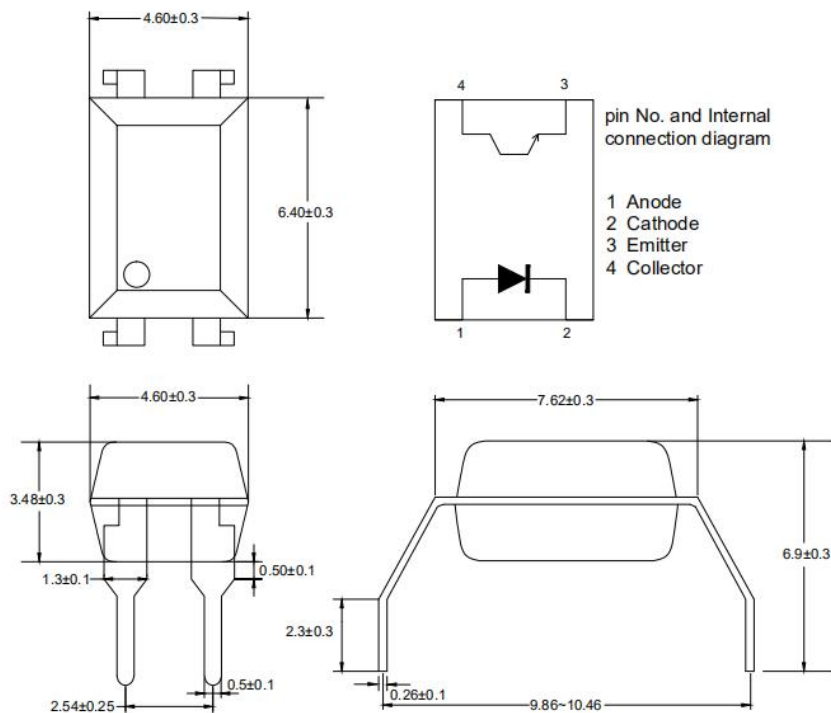
* VDE Mark can be selected.

10. Package Dimension (Unit: mm)

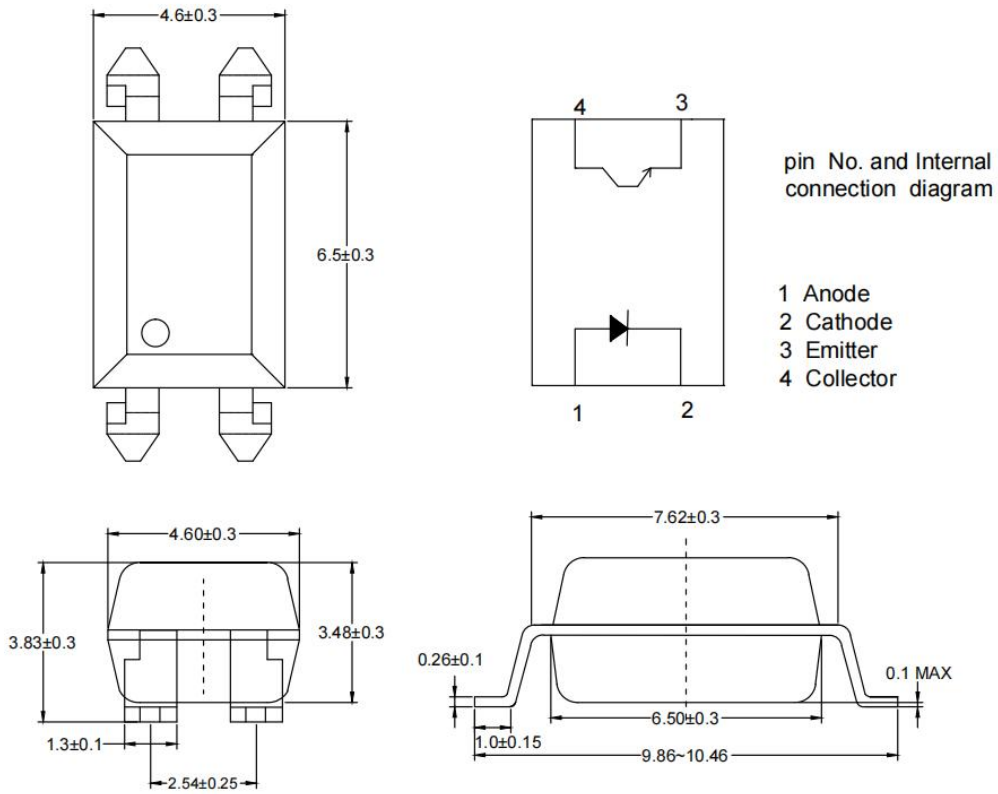
(1) ORPC-817



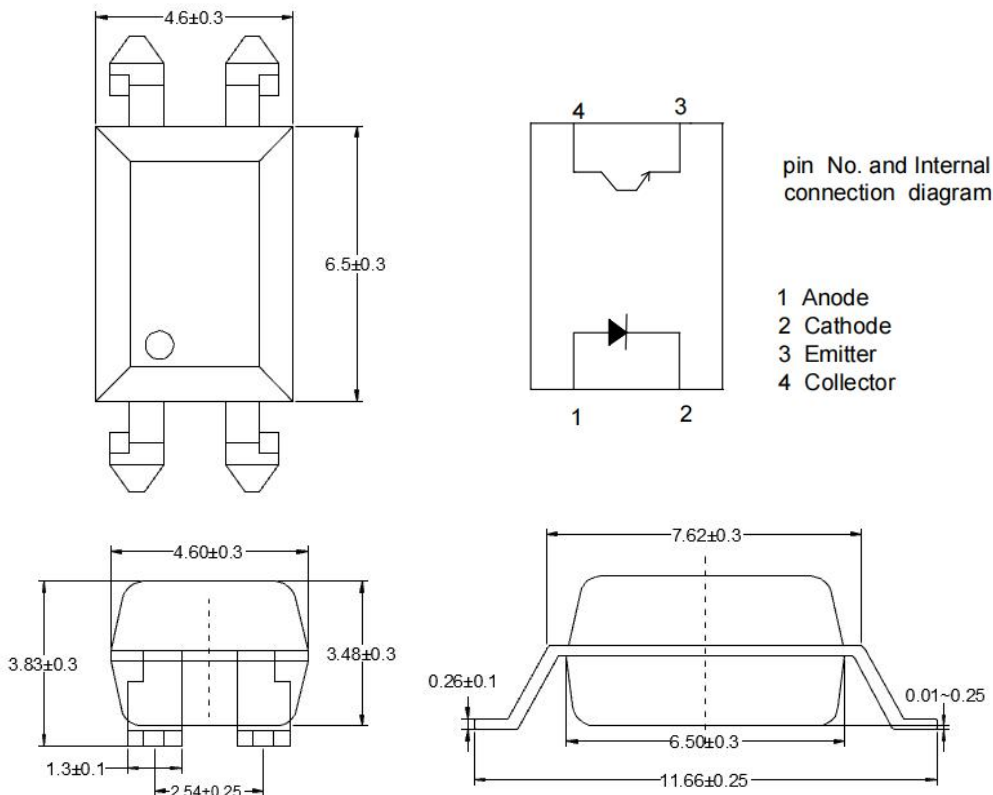
(2) ORPC-817M



(3) ORPC-817S

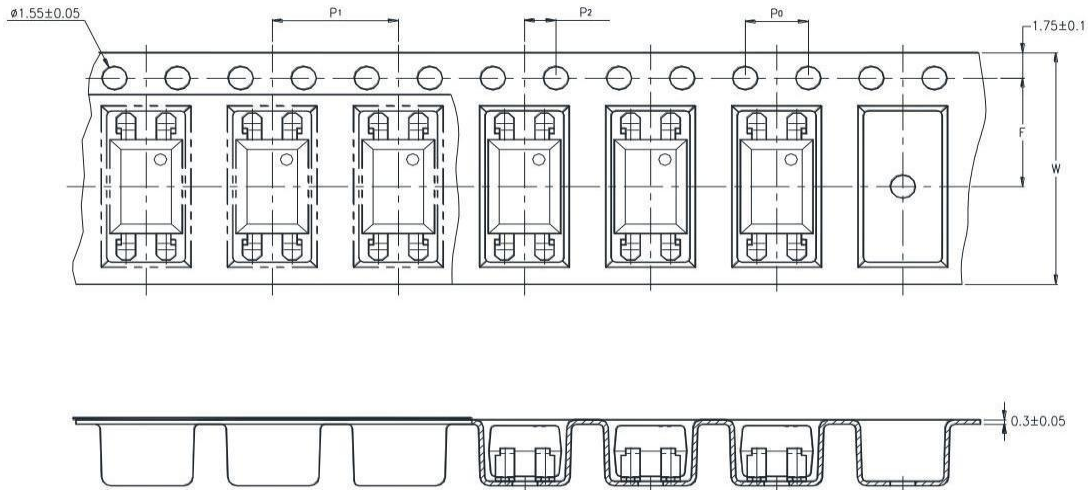


(4) ORPC-817S2

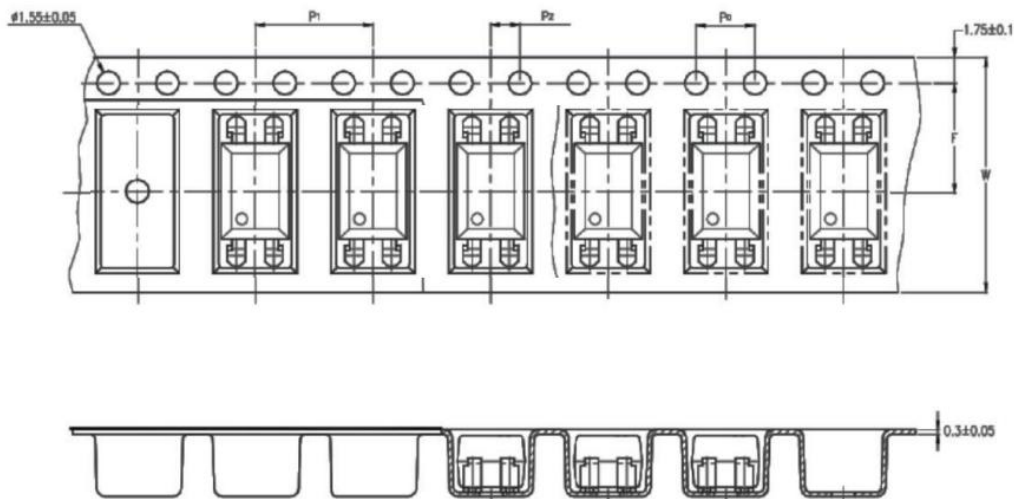


11. Taping Dimensions

(1)ORPC-817S-TP



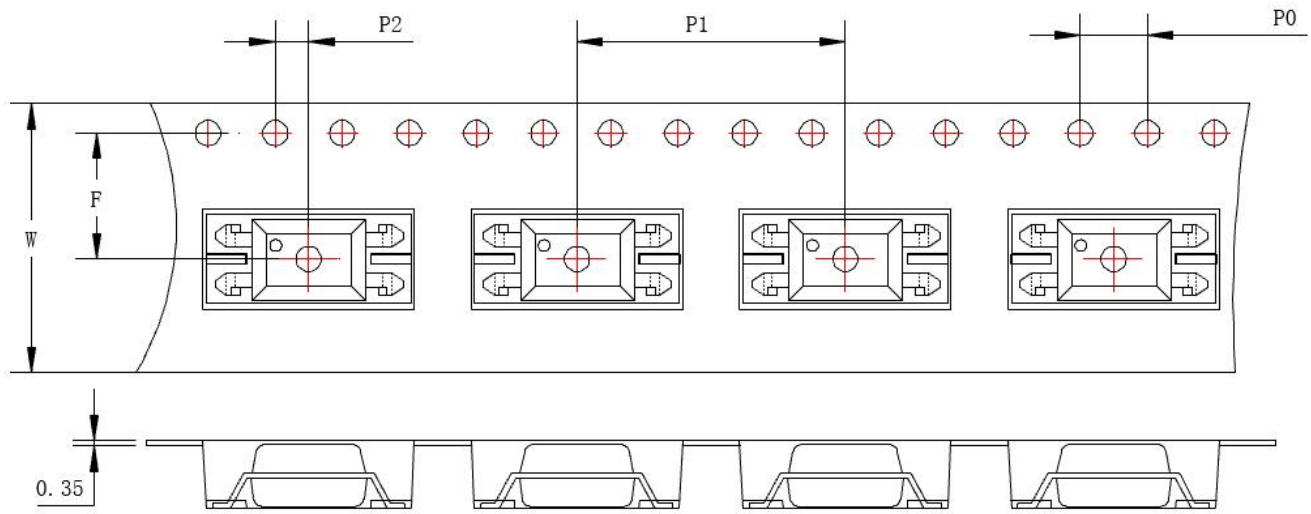
(2)ORPC-817S-TP1



Description	Symbol	Dimension in mm (inch)
Tape wide	W	16±0.3 (.63)
Pitch of sprocket holes	P ₀	4±0.1 (.15)
Distance of compartment	F	7.5±0.1 (.295)
	P ₂	2±0.1 (.0079)
Distance of compartment to compartment	P ₁	8±0.1 (.472)

Package Type	TP/TP1
Quantities(pcs)	2000

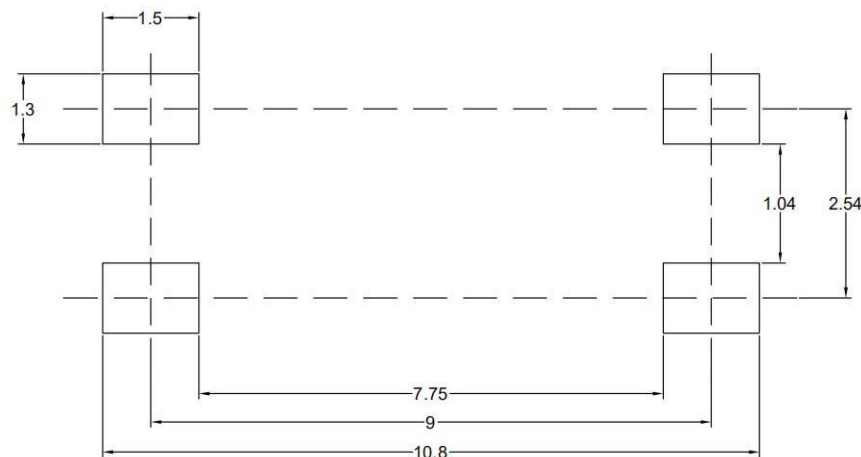
(3)ORPC-817S2-TA1



Description	Symbol	Dimension in mm (inch)
Tape wide	W	16±0.3 (.63)
Pitch of sprocket holes	P_0	4±0.1 (.15)
Distance of compartment	F	7.5±0.1 (.295)
	P_2	2±0.1 (.0079)
Distance of compartment to compartment	P_1	16±0.1 (.472)

Package Type	TA/TA1
Quantities(pcs)	1000

12. Recommended Foot Print Patterns (Mount Pad) (Unit: mm)



13. Package Dimension

DIP Type

Packing Information	
Packing type	Tube
Qty per Tube	100pcs
Small box (Inner) Dimension	525*128*60mm
Large box (Outer) Dimension	545*290*335mm
The Amount per Inner Box	5,000pcs
The Amount per Outer Box	50,000pcs

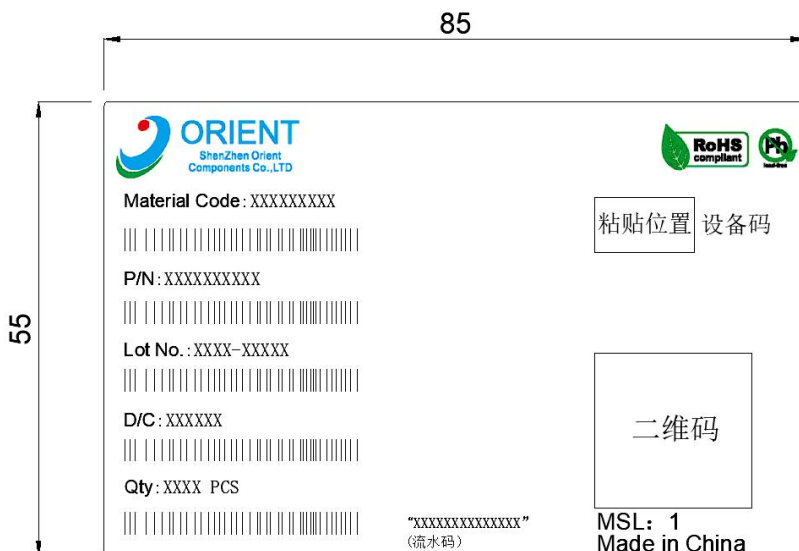
SOP TP Type

Packing Information	
Packing type	Reel type
Tape Width	16mm
Qty per Reel	2,000pcs
Small box (inner) Dimension	345*345*58.5mm
Large box (Outer) Dimension	620x360x360mm
Max qty per small box	4,000pcs
Max qty per large box	40,000pcs

SOP TA1 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:

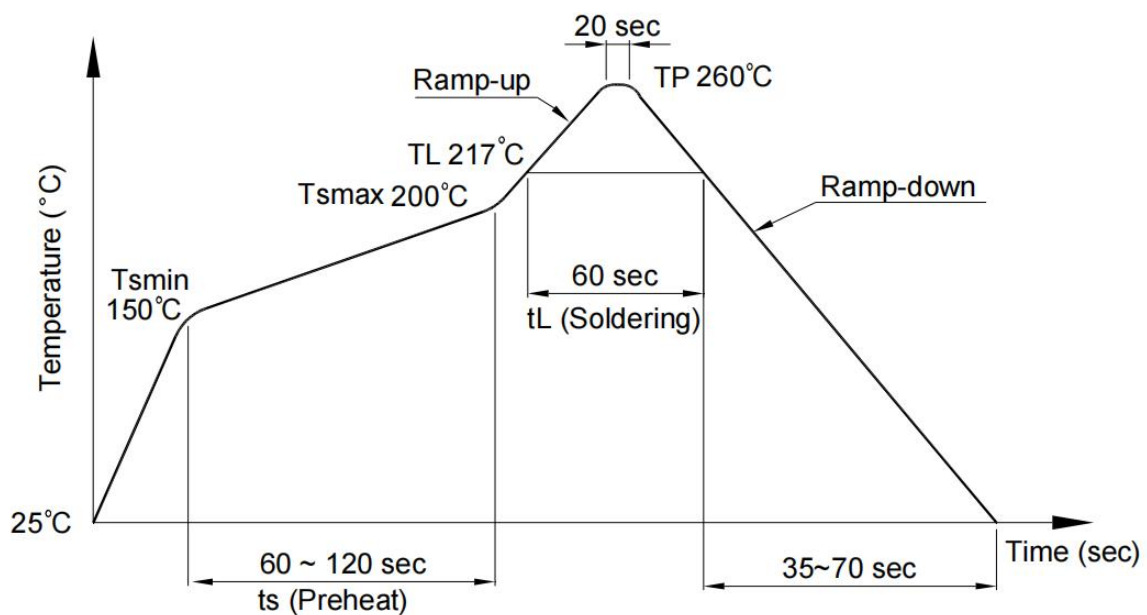
1. Material Code :Product ID.
2. P/N :Contents with "Order Information" in the specification.
3. Lot No. :Product data.
4. D/C :Product weeks.
5. Quantity :Packaging quantity.

14. Temperature Profile Of Soldering

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

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

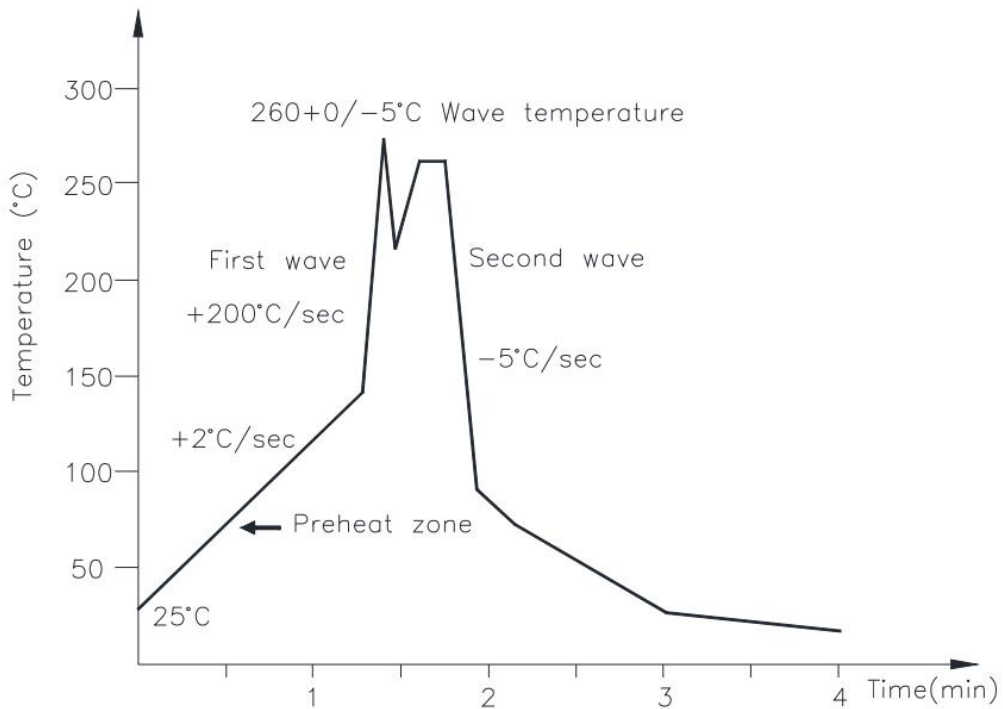
Profile item	Conditions
Preheat	
- Temperature Min (T Smin)	150°C
- Temperature Max (T Smax)	200°C
- Time (min to max) (ts)	90±30 sec
Soldering zone	
- Temperature (TL)	217°C
- Time (t L)	60 sec
Peak Temperature	260°C
Peak Temperature time	20 sec
Ramp-up rate	3°C / sec max.
Ramp-down rate from peak temperature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



(2).Wave soldering (JEDEC22 A111 compliant)

One time soldering is recommended within the condition of temperature.

Temperature	260+0/-5°C
Time	10 sec
Preheat temperature	25 to 140°C
Preheat time	30 to 80 sec



(3).Hand soldering by soldering iron

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

Temperature	380+0/-5°C
Time	3 sec max

15.Characteristics Curve

Fig.1 Forward current vs Ambient temperature

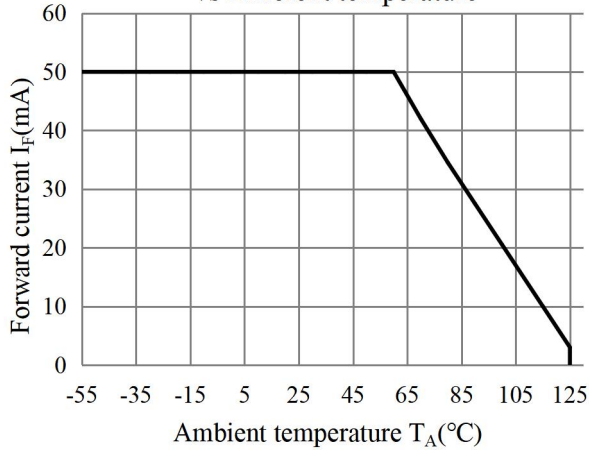


Fig.2 Collector Power Dissipation vs. Ambient temperature

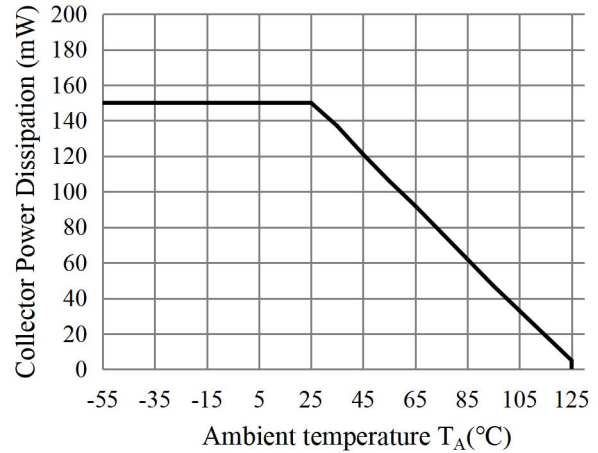


Fig.3 Forward Current vs. Forward Voltage

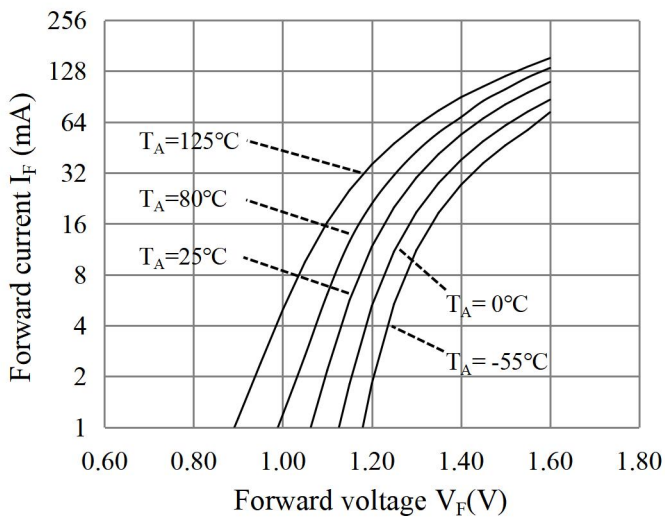


Fig.4 Collector-emitter Saturation Voltage vs. Forward Current

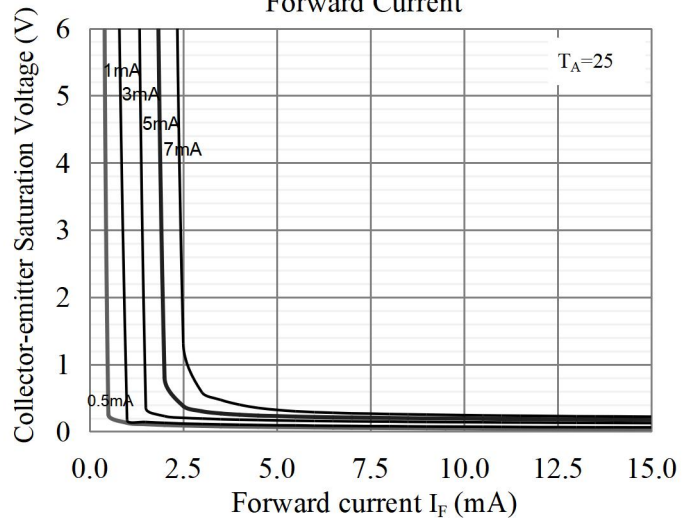


fig.5 Collector Current vs. Non-Saturated Collector Emitter Voltage

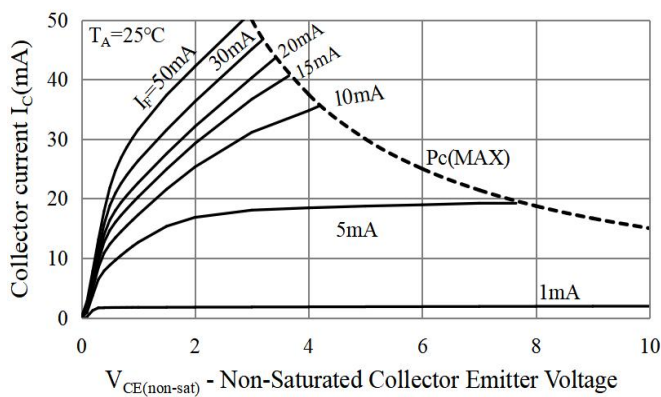


fig.6 Collector Current vs. Non-Saturated Collector Emitter Voltage

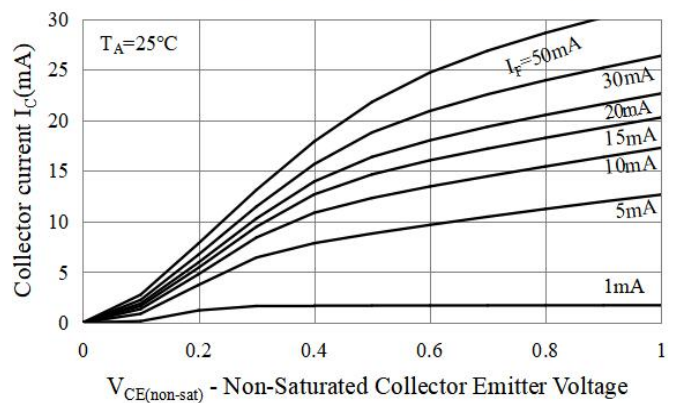


Fig.7 Relative Current Transfer Ratio vs. Ambient Temperature

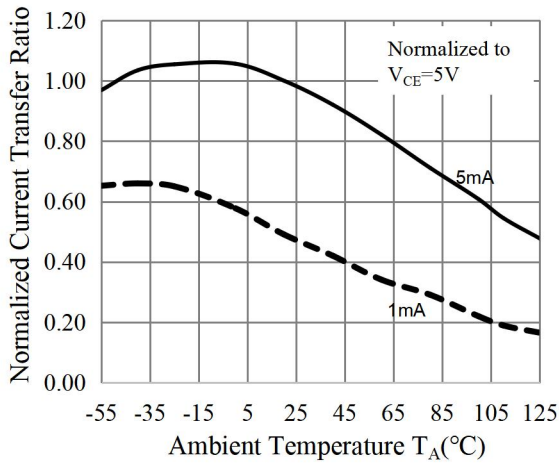


Fig.8 Relative Current Transfer Ratio vs. Ambient Temperature

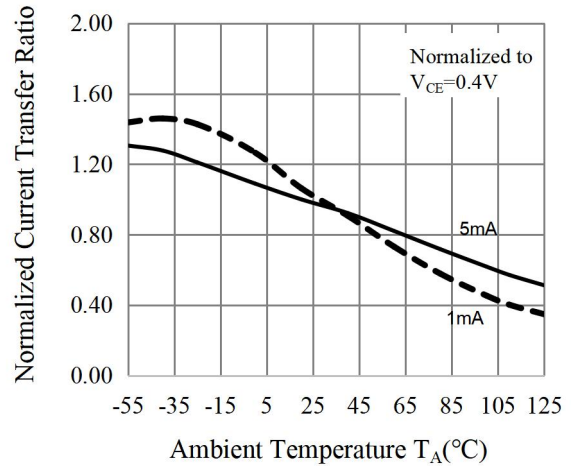


Fig.9 Forward Current vs. Current Transfer Ratio

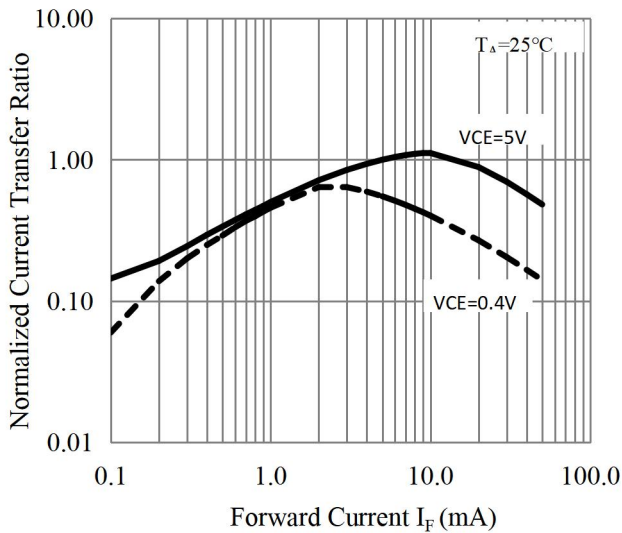


Fig.10 Collector Dark Current vs. Ambient Temperature

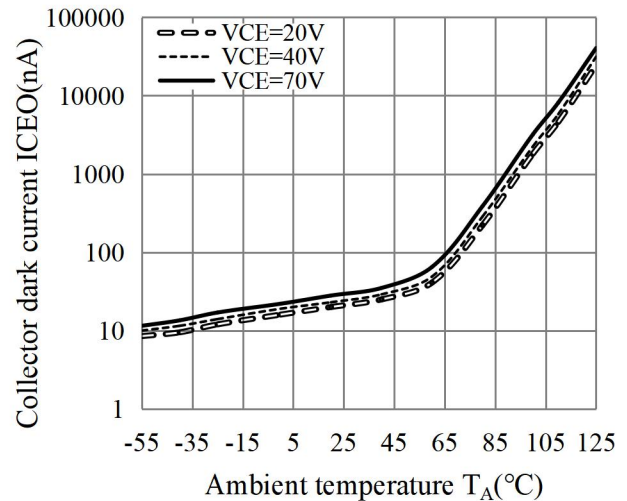


Fig.11 Collector-emitter Saturation Voltage vs. Ambient Temperature

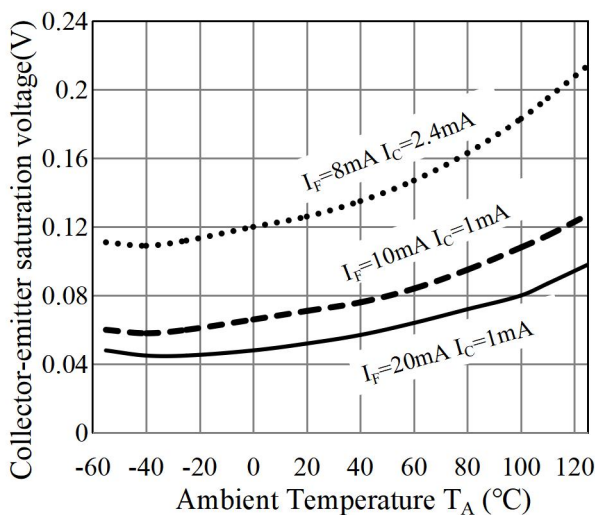


Fig.12 Switching Time vs. Load Resistance

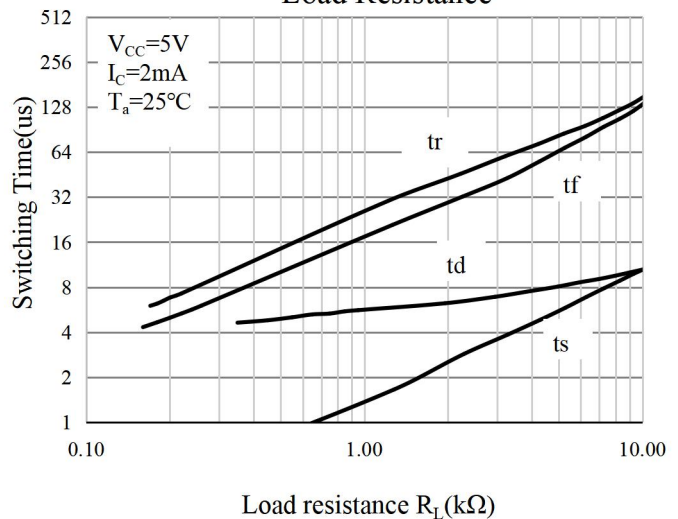


Fig.13 Respinse Time vs. Ambient temperature

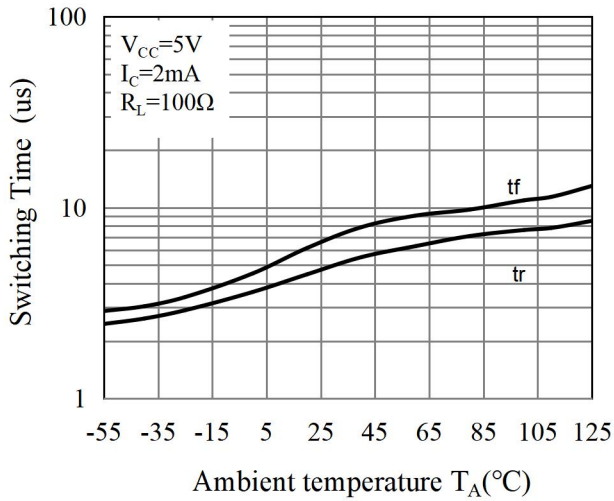
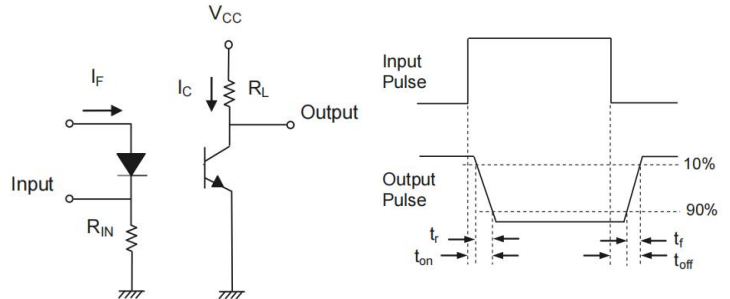


Fig.14 Switching Time Test Circuit & Waveforms



16. NOTES

1. Orient is continually improving the quality, reliability, function or design and Orient reserves the right to make changes without further notices.
2. The products shown in this publication are designed for the general use in electronic applications such as office automation equipment, communications devices, audio/visual equipment, electrical application and instrumentation.
3. For equipment/devices where high reliability or safety is required, such as space applications, nuclear power control equipment, medical equipment, etc, please contact our sales representatives.
4. When requiring a device for any "specific" application, please contact our sales in advice.
5. If there are any questions about the contents of this publication, please contact us at your convenience.
6. The contents described herein are subject to change without prior notice.
7. Immerge unit's body in solder paste is not recommended.