



ORIENT

Photo coupler

Product Data Sheet

MPN: _____ ORPC-824 series

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

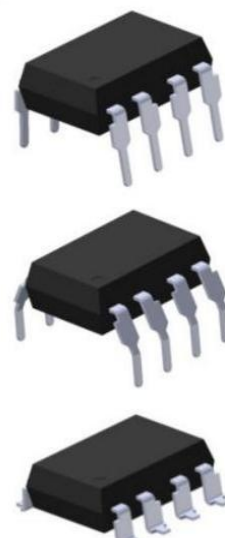
1. Features

- (1) AC input response.
- (2) Current transfer ratio (CTR : MIN. 20% at $I_F = \pm 1\text{mA}$, $V_{CE} = 5\text{V}$)
- (3) Wide Operating temperature range $-55\sim 110^\circ\text{C}$
- (4) High input-output isolation voltage ($V_{iso} = 5,000\text{Vrms}$)
- (5) Response time (t_r : TYP. $4\mu\text{s}$ at $V_{CE} = 2\text{V}$, $I_C = 2\text{mA}$, $R_L = 100$)
- (6) High collector-emitter voltage ($V_{CE} \cong 80\text{V}$)
- (7) ESD pass HBM 8000V/MM 2000V
- (8) ORPC-824: 2-channel type
ORPC-824M: 2-channel type
ORPC-824S: 2-channel type
- (9) In compliance with RoHS, REACH standards
- (10) MSL Class I
- (11) Safety approval

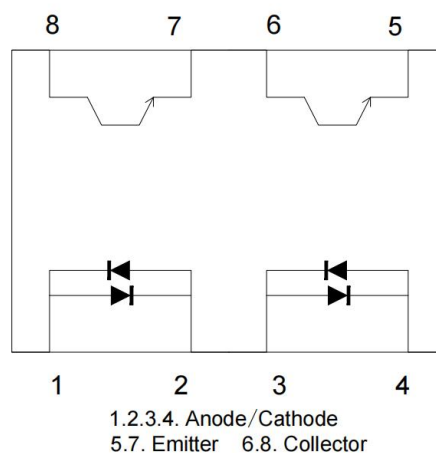
UL approved (No.E323844)

VDE approved (No.40029733)

CQC approved (No.CQC19001231254)



Pin No. and Internal connection diagram



2. Instructions

- (1). ORPC-824 series optical coupler consists of four GaAs transmitting tubes and two NPN transistors
- (2). Pin pitch of ORPC-824 is 2.54mm

3. Application Range

- (1) AC line monitor
- (2) Programmable controllers
- (3) Telephone line interface
- (4) Unknown polarity DC sensor

4. Absolute Maximum Ratings (Ta=25°C)

Parameter		Symbol	Rated Value	Unit
Input	Forward Current	I_F	± 50	mA
	Peak forward Current (100 μ s pulse, 100Hz frequency)	I_{FP}	1	A
	Consume Power	P	70	mW
Output	Collector and emitter Voltage	V_{CEO}	80	V
	Emitter and collector Voltage	V_{ECO}	7	
	Collector Current	I_C	50	mA
	Consume Power	P_C	150	mW
Total Consume Power		P_{tot}	200	mW
*1 Insulation Voltage		V_{iso}	5000	V _{rms}
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 + 110	°C
Storage Temperature		T_{stg}	-55 to + 125	
*2 Soldering Temperature		T_{sol}	260	

*1. AC Test, 1 minute, humidity = 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

5. Electrical optical characteristics at TA=25°C

Parameter		Symbol	Min	Typ.*	Max	Unit	Condition
Input	Forward Voltage	V_F	---	1.2	1.4	V	$I_F = \pm 20\text{mA}$
	Collector Capacitance	C_t	---	30	250	pF	$V=0, f=1\text{KHz}$
Output	Collector to Emitter Current	I_{CEO}	---	---	100	nA	$V_{CE}=20\text{V}, I_F=0\text{mA}$
	Collector and Emitter Breakdown Voltage	BV_{CEO}	80	---	---	V	$I_C=0.1\text{mA}$ $I_F=0\text{mA}$
	Emitter and Collector Breakdown Voltage	BV_{ECO}	7	---	---	V	$I_E=0.1\text{mA}$ $I_F=0\text{mA}$
Transforming Characteristics	*1 Current conversion ratio	CTR	20	---	300	%	$I_F = \pm 1\text{mA}$ $V_{CE}=5\text{V}$
	Collector Current	I_C	0.2	---	3	mA	
	Collector and Emitter Saturation Voltage	$V_{CE(sat)}$	---	0.1	0.2	V	$I_F = \pm 20\text{mA}$ $I_C = 1\text{mA}$
	Insulation Impedance	R_{iso}	5×10^{10}	1×10^{12}	---	Ω	DC500V 40~60%R.H.
	Floating Capacitance	C_f	---	0.6	1.0	pF	$V=0, f=1\text{MHz}$
	Cut-off Frequency	f_c	---	80	---	kHz	$V_{CE}=5\text{V}, I_C=2\text{mA}$ $R_L=100\Omega$, -3dB
	Rise Time	t_r	---	4	18	μs	$V_{CE}=2\text{V},$ $I_C=2\text{mA}$ $R_L=100\Omega$
	Fall Time	t_f	---	3	18	μs	

*1 Current Conversion Ratio = $I_C / I_F \times 100\%$



6. Rank table of current transfer ratio (CTR)

Part Number	CTR Rank	Min (%)	Max (%)	Condition
ORPC-824	NO BIN	20	300	IF=±1mA, VCE=5V, Ta=25°C

7. Order Information

Part Number

ORPC-824X-T-W-Y-Z

Note

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

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

W = Lead frame option (C:copper)

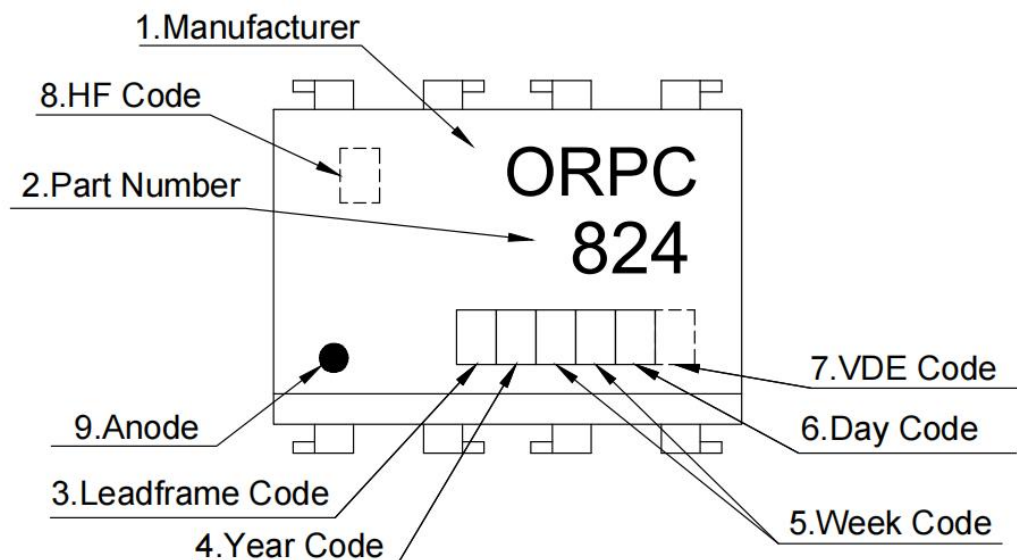
Y = 'V' code for VDE safety (This options is not necessary).

Z = 'G' code for Halogen free.

* VDE Code can be selected.

Option	Description	Packing quantity
None	Standard DIP-8	45 units per tube
M	Wide lead bend (0.4 inch spacing)	45 units per tube
S(TA)	Surface mount lead form (low profile) + TA tape & reel option	1000 units per reel
S(TA1)	Surface mount lead form (low profile) + TA1 tape & reel option	1000 units per reel

8. Naming Rule

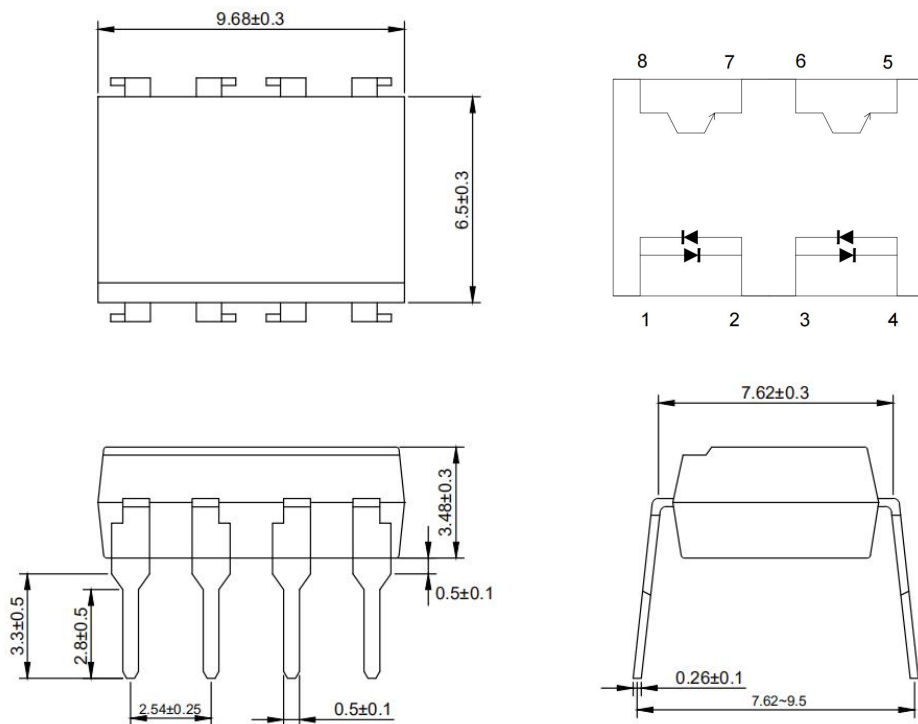


1. Manufacturer : ORIENT.
2. Part Number : 824.
3. Lead frame Code ☐: 'F' means Iron, 'C' means Copper.
4. Year Code ☐ : '1' means '2021' and so on.
5. Week Code ☐☐: 01 means the first week, 02 means the second week and so on.
6. Day Code ☐: "A to G" means "Monday to Sunday"
7. VDE Code ☐☐☐☐. (Optional)
8. HF Code ☐☐☐☐: Halogen Free .
9. Anode.

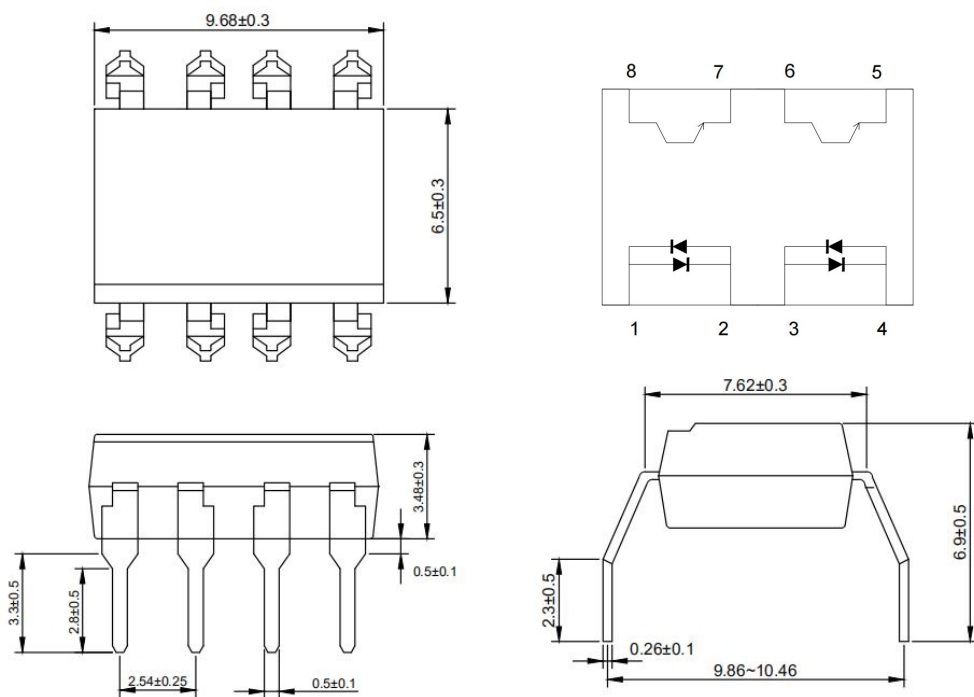
* VDE Mark can be selected.

9. Outer Dimension (Unit: mm)

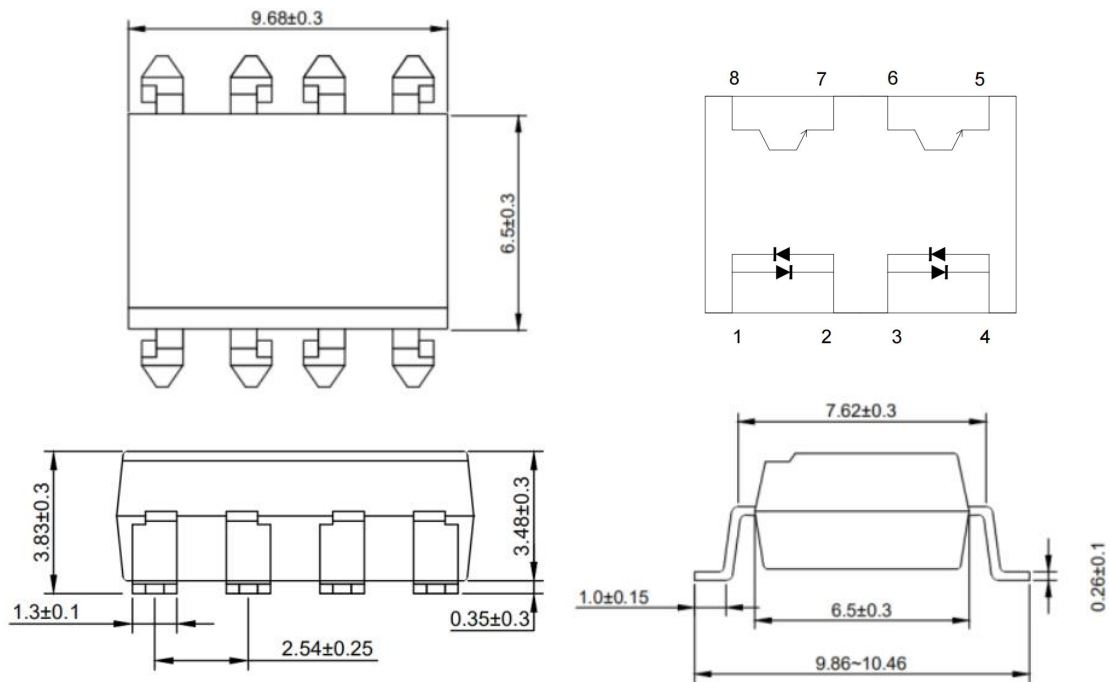
1. ORPC-824



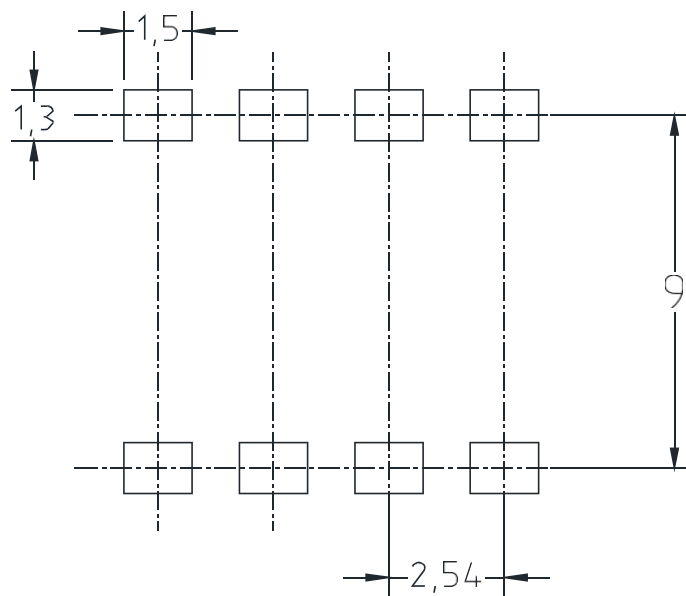
2. ORPC-824M



3.ORPC-824S



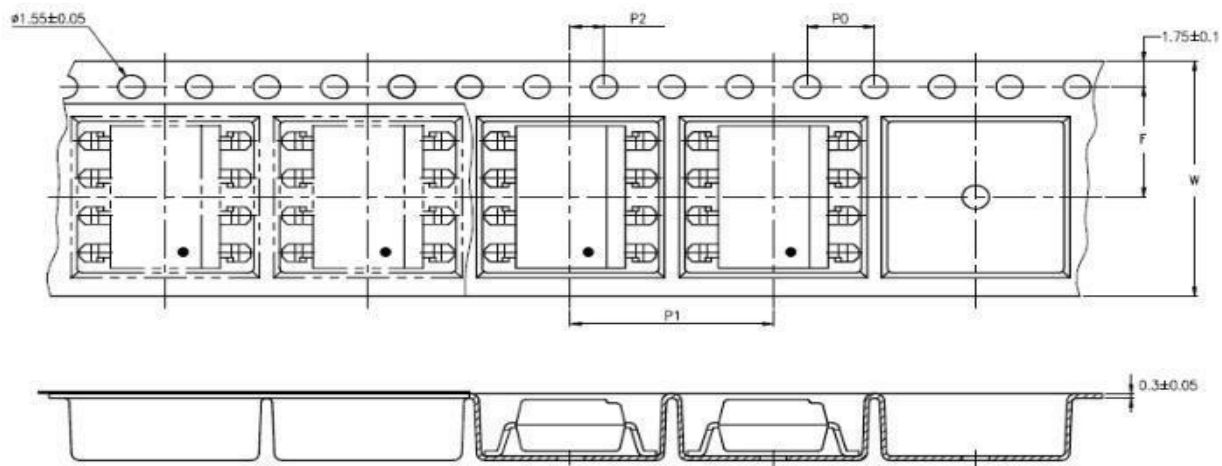
10. RECOMMENDED FOOT PRINT PATTERNS (MOUNT PAD)



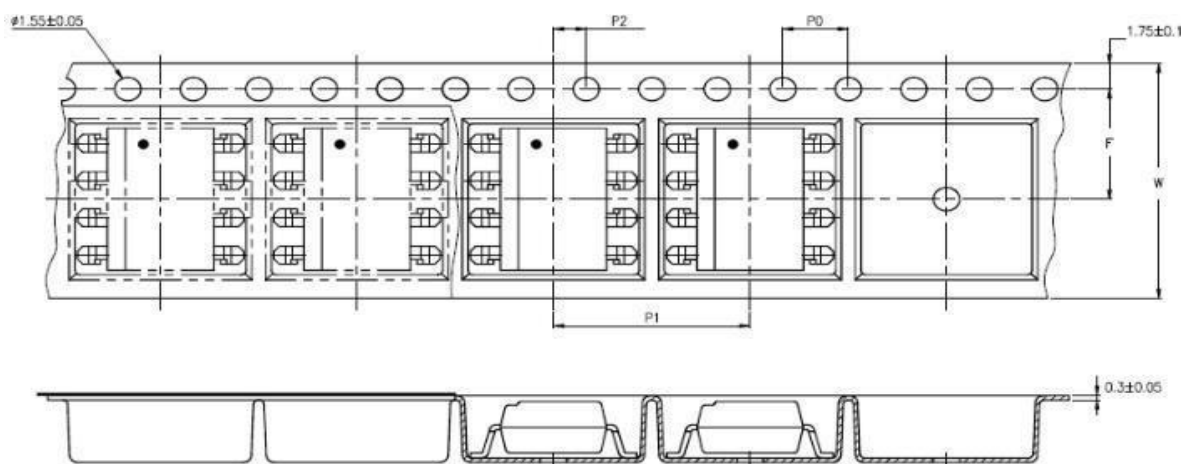
Unit: mm

11. Taping Dimensions

(1) ORPC-824-TA



(2) ORPC-824-TA1



Description	Symbol	Dimension in mm(inch)
Tape wide	W	16±0.3(0.63)
Pitch of sprocket holes	P0	4±0.1(0.15)
Distance of compartment	F	7.5±0.1(0.295)
	P2	2±0.1(0.079)
Distance of compartment to compartment	P1	12±0.1(0.472)

Package Type	TA/TA1
Quantities(pcs)	1000

12. Package Dimension

(1) package dimension

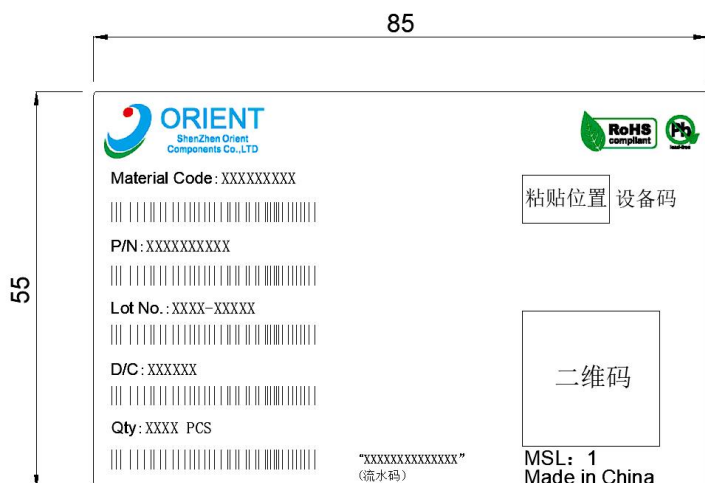
DIP Type

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 weeks.
4. D/C :Product data.
5. Quantity :Packaging quantity.

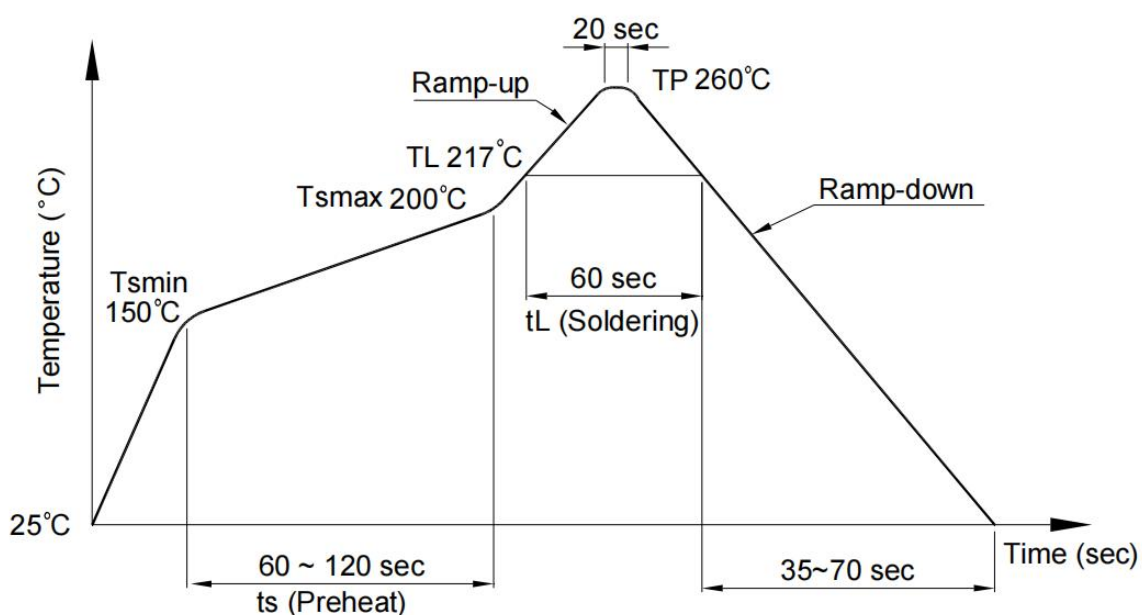
13. Temperature Profile Of Soldering

(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.

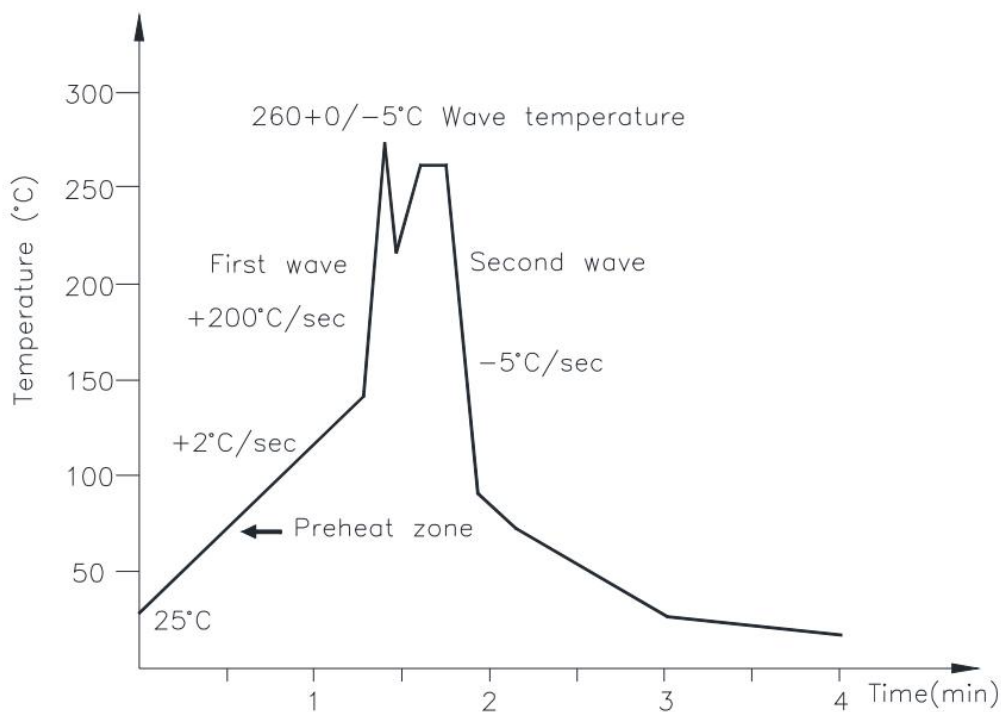
Profile item	Conditions
Preheat	
- Temperature Min (T Smin)	150°C
- Temperature Max (T Smax)	200°C
- Time (min to max) (ts)	90±30 sec
Soldering zone	
- Temperature (TL)	217°C
- Time (t L)	60 sec
Peak Temperature	260°C
Peak Temperature time	20 sec
Ramp-up rate	3°C / sec max.
Ramp-down rate from peak temperature	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	5 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

14. Characteristics Curves

Fig.1 Forward current vs Ambient temperature

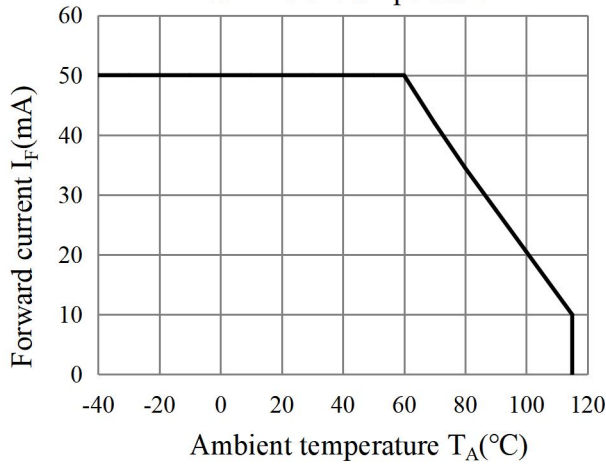


Fig.2 Collector Power Dissipation vs. Ambient temperature

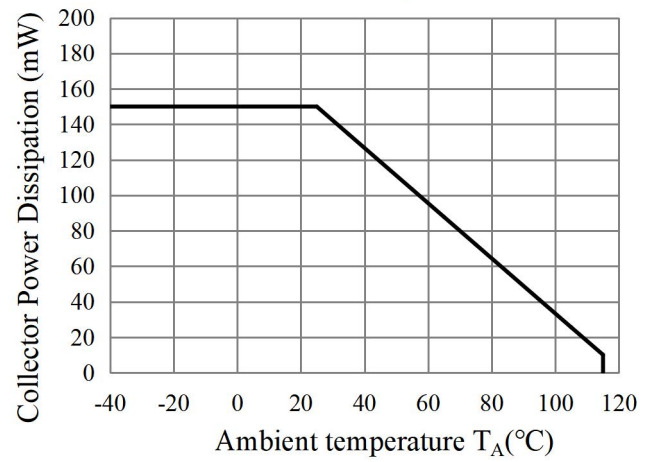


Fig.3 Forward Current vs. Forward Voltage

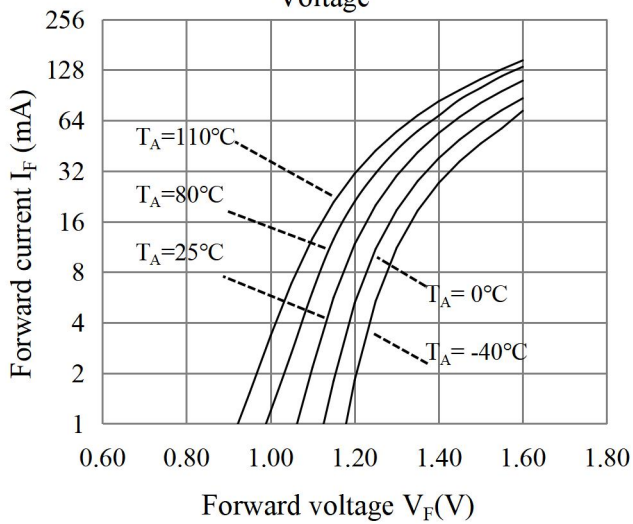


Fig.4 Collector-emitter Saturation Voltage vs. Forward Current

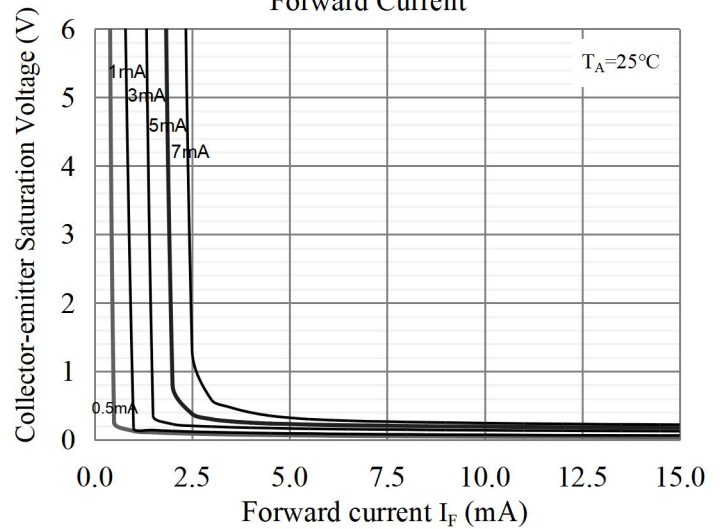


fig.5 Collector Current vs. Non-Saturated Collector Emitter Voltage

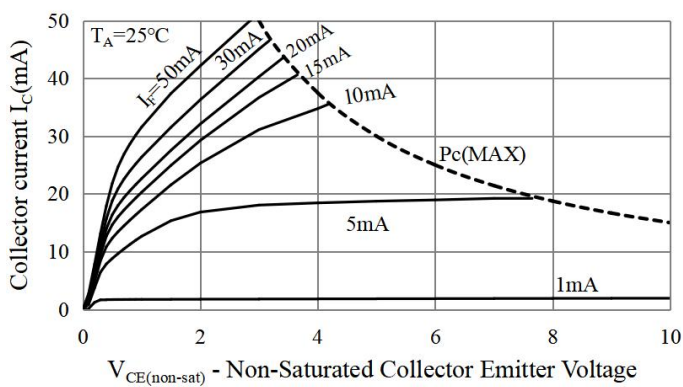


fig.6 Collector Current vs. Non-Saturated Collector Emitter Voltage

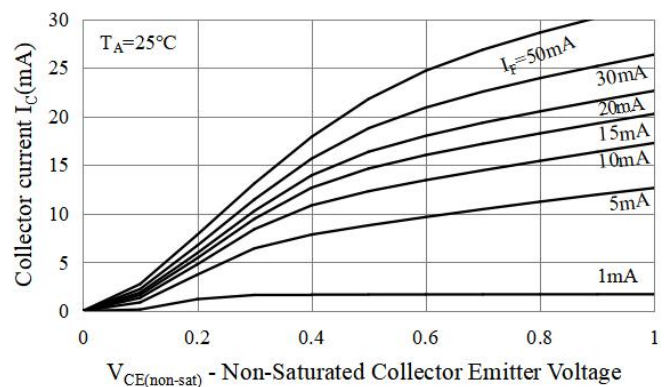


Fig.7 Relative Current Transfer Ratio vs. Ambient Temperature

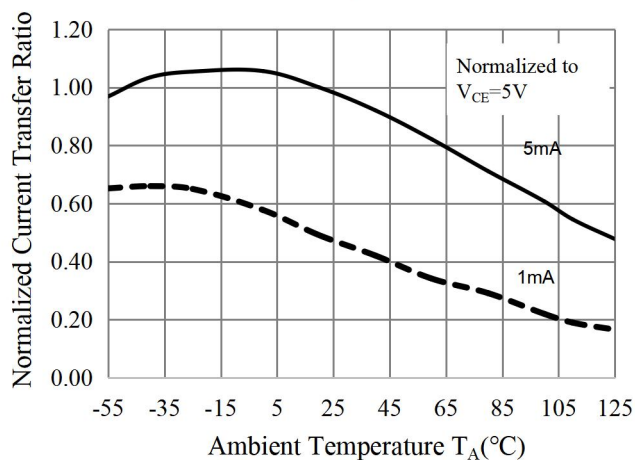


Fig.8 Relative Current Transfer Ratio vs. Ambient Temperature

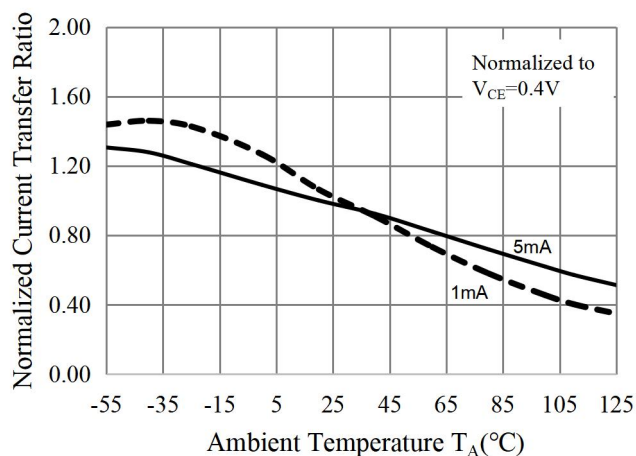


Fig.9 Forward Current vs. Current Transfer Ratio

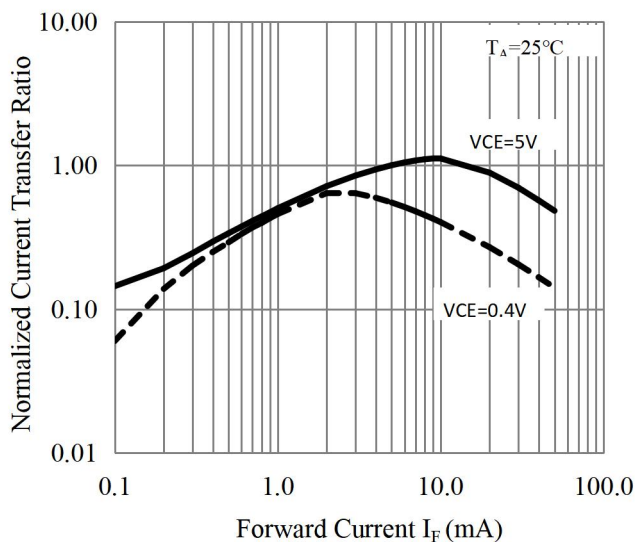


Fig.10 Collector Dark Current vs. Ambient Temperature

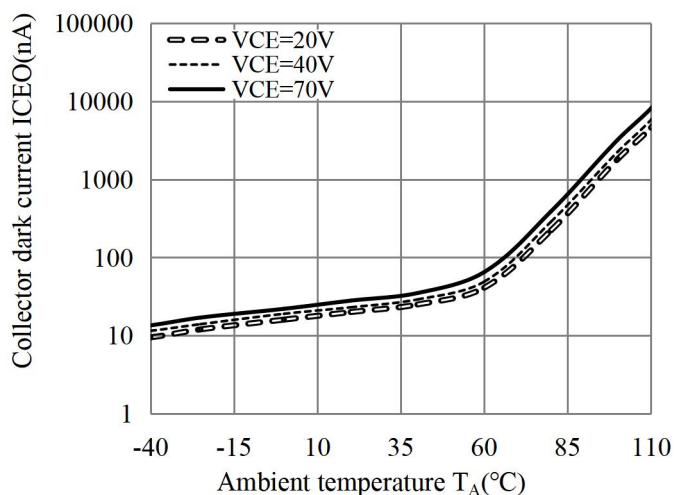


Fig.11 Collector-emitter Saturation Voltage vs. Ambient Temperature

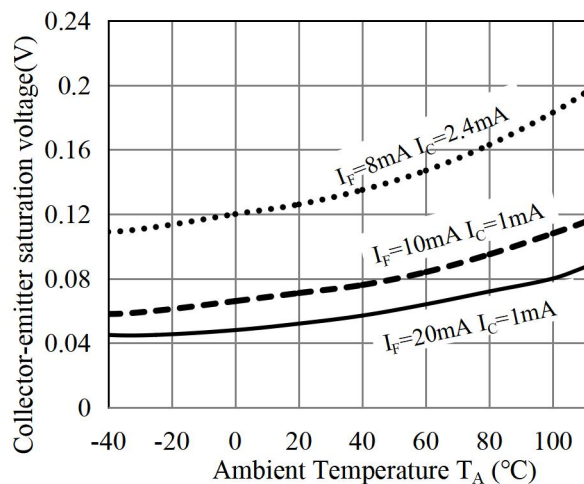


Fig.12 Switching Time vs. Load Resistance

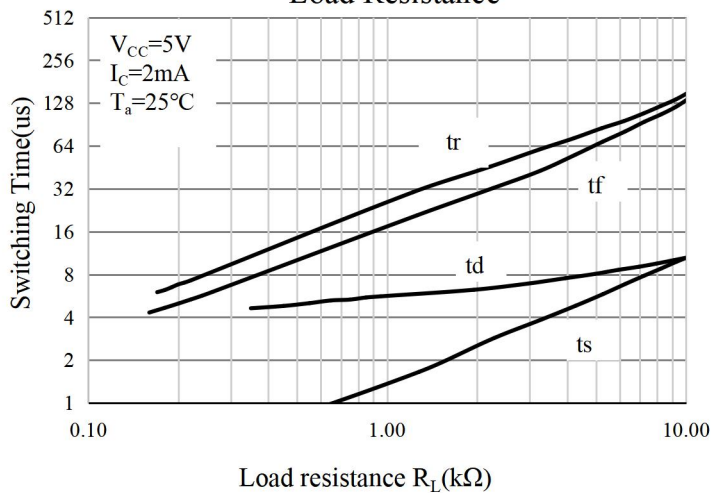


Fig.13 Respinse Time vs.
Ambient temperature

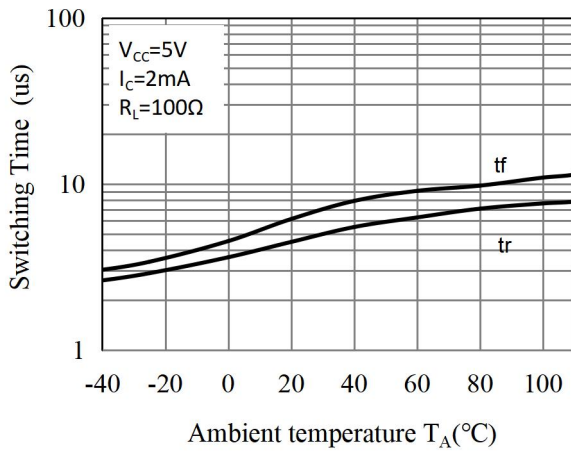
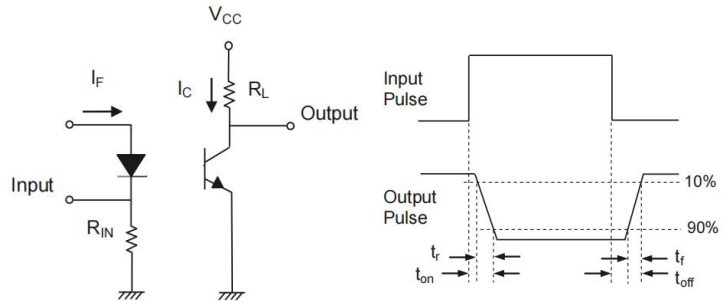


Fig.14 Switching Time Test Circuit
& Waveforms



15. NOTES

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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.