



ORIENT

Photocoupler

Product Data Sheet

Name: ORPC-816

Customer: _____

Date: _____

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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. $4\mu\text{s}$ at $V_{CE} = 2\text{V}$, $I_C = 2\text{mA}$, $R_L = 100\Omega$)
- (4) Safety approval
 - UL approved (No.E323844) VDE approved (No.40029733)
 - CQC approved (No.CQC09001029446 CQC13001086898)
 - CE approved (No.AC/0431008)
 - State Grid approved (No.SGCM013420170152)

2. Description

- (1) ORPC-816 photocoupler consist of one piece of GaAs emitter and one piece of NPN transistor.
- (2) They are 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) Imbursement equipments, duplicating machine, automat
- (6) Family-use electric equipments, such as fans
- (7) Signal transforming systems

4. Absolute Maximum Ratings at $T_a = 25^\circ\text{C}$

Parameter		Symbol	Rated Value	Unit
Input	Forward Current	I_F	60	mA
	Peak forward current (100 μs pulse, 100Hz frequency)	I_{FP}	1	A
	Reverse Voltage	V_R	6	V
	Consume Power	P	70	mW
Output	Collector and emitter Voltage	V_{CEO}	80	V
	Emitter and collector Voltage	V_{ECO}	6	
	Collector Current	I_C	50	mA
	Consume Power	P_C	150	mW
Total Consume Power		P_{tot}	200	mW
*1 Insulation Voltage		V_{iso}	5,000	Vrms
Max Insulation Voltage (Insulating oil test)		V_{IOTM}	10,000	V
Rated Impulse Insulation Voltage		V_{IORM}	630	V
Working Temperature		T_{opr}	-55 to + 110	$^\circ\text{C}$
Deposit Temperature		T_{stg}	-55 to + 125	
*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



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

Parameter		Symbol	Condition	Min	Typ.*	Max	Unit
Input	Forward Current	V_F	$I_F=20\text{mA}$	---	1.2	1.4	V
	Reverse Voltage	I_R	$V_R=4\text{V}$	---	---	10	μA
	Collector capacitance	C_t	$V=0, f=1\text{KHz}$	---	30	250	pF
Output	Collector to emitter Current	I_{CEO}	$V_{CE}=20\text{V}, I_F=0\text{mA}$	---	---	100	nA
	Collector and Emitter attenuation Voltage	BV_{CEO}	$I_C=0.1\text{mA}, I_F=0\text{mA}$	80	---	---	V
	Emitter and Collector attenuation Voltage	BV_{ECO}	$I_E=0.1\text{mA}, I_F=0\text{mA}$	6	---	---	V
Transforming Characteristics	*1 Current conversion ratio	CTR	$I_F=5\text{mA}, V_{CE}=5\text{V}$	50	---	1000	%
	Collector Current	I_C		2.5	---	50	mA
	Collector and Emitter Saturation Voltage	$V_{CE(sat)}$	$I_F=20\text{mA}, I_C=1\text{mA}$	---	0.1	0.2	V
	Insulation Impedance	R_{iso}	DC500V 40~60%R.H.	---	1×10^{12}	---	Ω
	Floating Capacitance	C_f	$V=0, f=1\text{MHz}$	---	0.6	1.0	pF
	Cut-off Frequency	f_c	$V_{CE}=5\text{V}, I_C=2\text{mA}, R_L=100\Omega, -3\text{dB}$	---	80	---	kHz
	Rise Time	t_r	$V_{CE}=2\text{V}, I_C=2\text{mA}, R_L=100\Omega$	---	4	18	μs
	Descend Time	t_f		---	3	18	μs

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

6. Rank Table of Current Transfer Ratio

(1) ORPC-816

Gr ad e Si gn	Min (%)	Ma x (%)
ORPC-816A	80	160
ORPC-816B	130	260
ORPC-816C	200	400
ORPC-816D	300	600
ORPC-816E	50	80
ORPC-816F	80	100
ORPC-816G	100	120
ORPC-816H	600	1000
ORPC-816I	120	140
ORPC-816J	140	180
ORPC-816K	180	220
ORPC-816L	50	100
ORPC-816M	220	260
ORPC-816N	260	300
ORPC-816O	300	340
ORPC-816P	340	380
ORPC-816Q	380	420
ORPC-816R	420	440
ORPC-816S	440	460
ORPC-816T	460	480
ORPC-816U	480	500
ORPC-816V	500	520
ORPC-816W	520	540
ORPC-816X	540	560
ORPC-816Y	560	580
ORPC-816Z	580	600

Note: Working condition: $I_F=5\text{mA}$, $V_{CE}=5\text{V}$, $T_a=25^\circ\text{C}$.

(2) ORPC-816M

Gr a de Sign	Min (%)	Ma x (%)
ORPC-816MA	80	160
ORPC-816MB	130	260
ORPC-816MC	200	400
ORPC-816MD	300	600
ORPC-816ME	50	80
ORPC-816MF	80	100
ORPC-816MG	100	120
ORPC-816MH	600	1000
ORPC-816MI	120	140
ORPC-816MJ	140	180
ORPC-816MK	180	220
ORPC-816ML	50	100
ORPC-816MM	220	260
ORPC-816MN	260	300
ORPC-816MO	300	340
ORPC-816MP	340	380
ORPC-816MQ	380	420
ORPC-816MR	420	440
ORPC-816MS	440	460
ORPC-816MT	460	480
ORPC-816MU	480	500
ORPC-816MV	500	520
ORPC-816MW	520	540
ORPC-816MX	540	560
ORPC-816MY	560	580
ORPC-816MZ	580	600

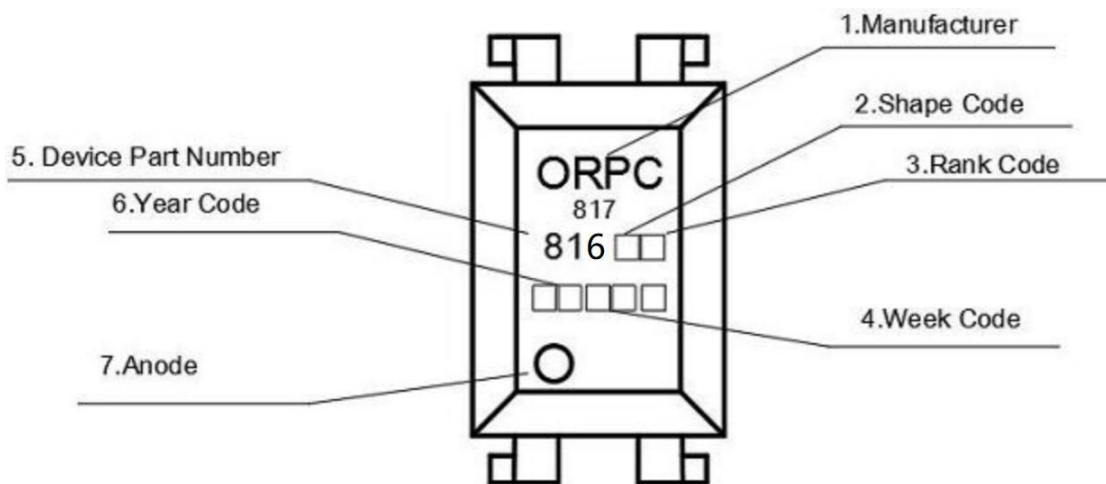
Note: Working condition: $I_F=5\text{mA}$, $V_{CE}=5\text{V}$, $T_a=25^\circ\text{C}$.

(3) ORPC-816S

Gr a de Sign	Min (%)	Ma x (%)
ORPC-816SA	80	160
ORPC-816SB	130	260
ORPC-816SC	200	400
ORPC-816SD	300	600
ORPC-816SD3	300	450
ORPC-816SE	50	80
ORPC-816SF	80	100
ORPC-816SG	100	120
ORPC-816SH	600	1000
ORPC-816SI	120	140
ORPC-816SJ	140	180
ORPC-816SK	180	220
ORPC-816SL	50	100
ORPC-816SM	220	260
ORPC-816SN	260	300
ORPC-816SO	300	340
ORPC-816SP	340	380
ORPC-816SQ	380	420
ORPC-816SR	420	440
ORPC-816SS	440	460
ORPC-816ST	460	480
ORPC-816SU	480	500
ORPC-816SV	500	520
ORPC-816SW	520	540
ORPC-816SX	540	560
ORPC-816SY	560	580
ORPC-816SZ	580	600

Note: Working condition: $I_F=5mA$, $V_{CE}=5V$, $T_a=25^{\circ}C$.

7. Naming Rule



(1)ORPC denotes Shenzhen Orient Tech Ltd . Co ., Ltd.

(2) ☐ denotes Shape Code.

(3) ☐☐ denotes Rankcode.

(4) ☐☐☐ denotes Weekcode.

(5) ☐☐ denotes Device Part Number.

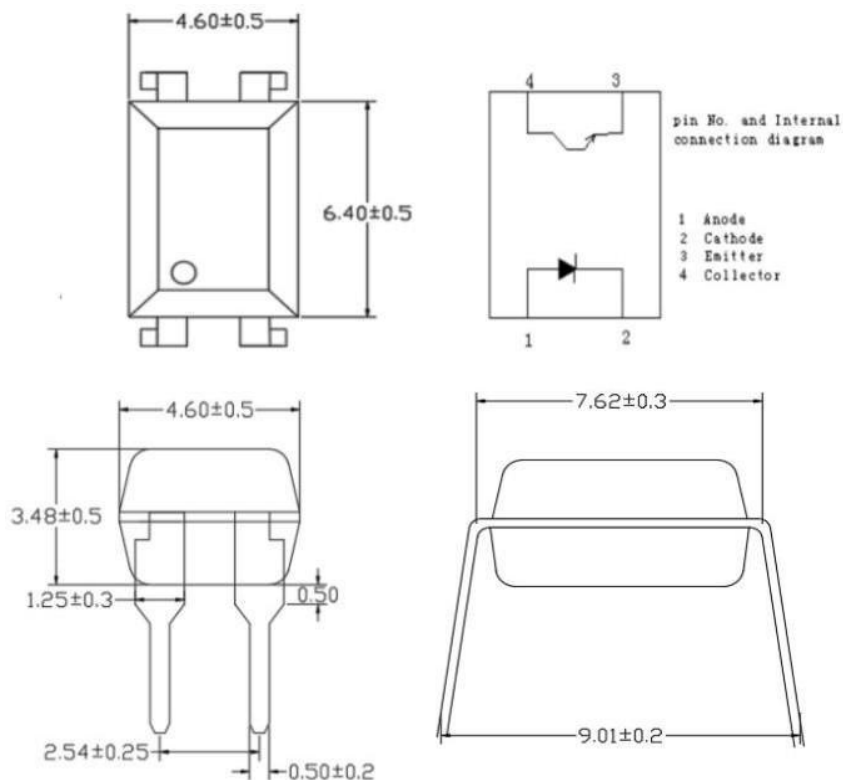
(6) ☐ denotes Year Code

(7) Anode.

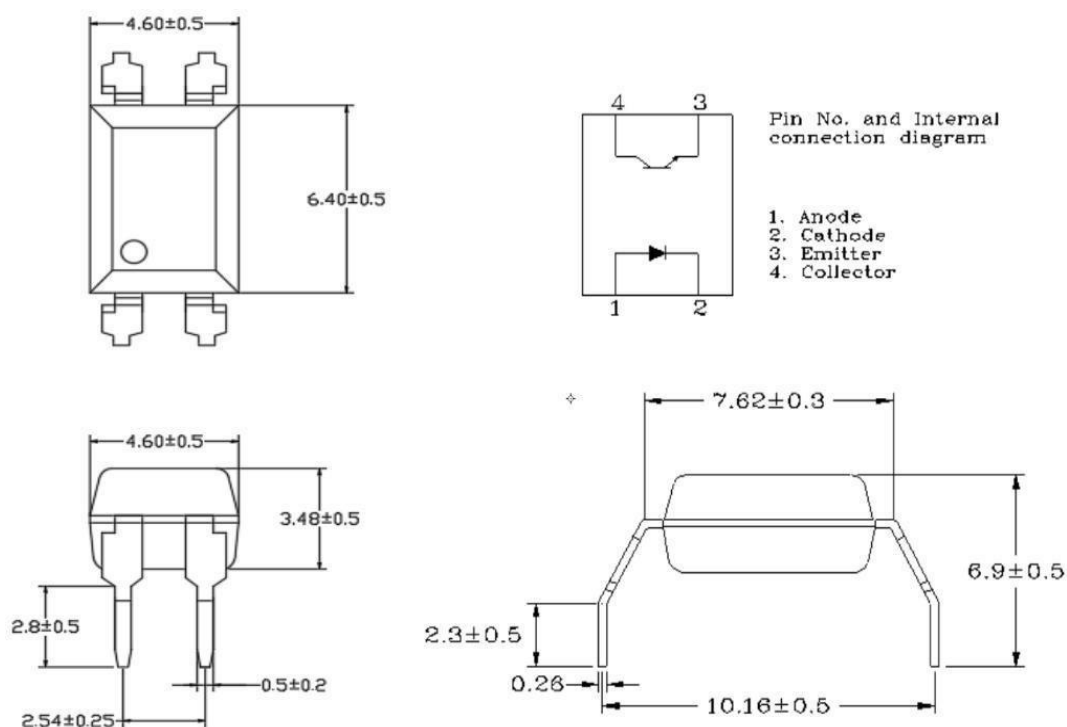
(8) Unit:mm

8. Package Dimension (Unit: mm)

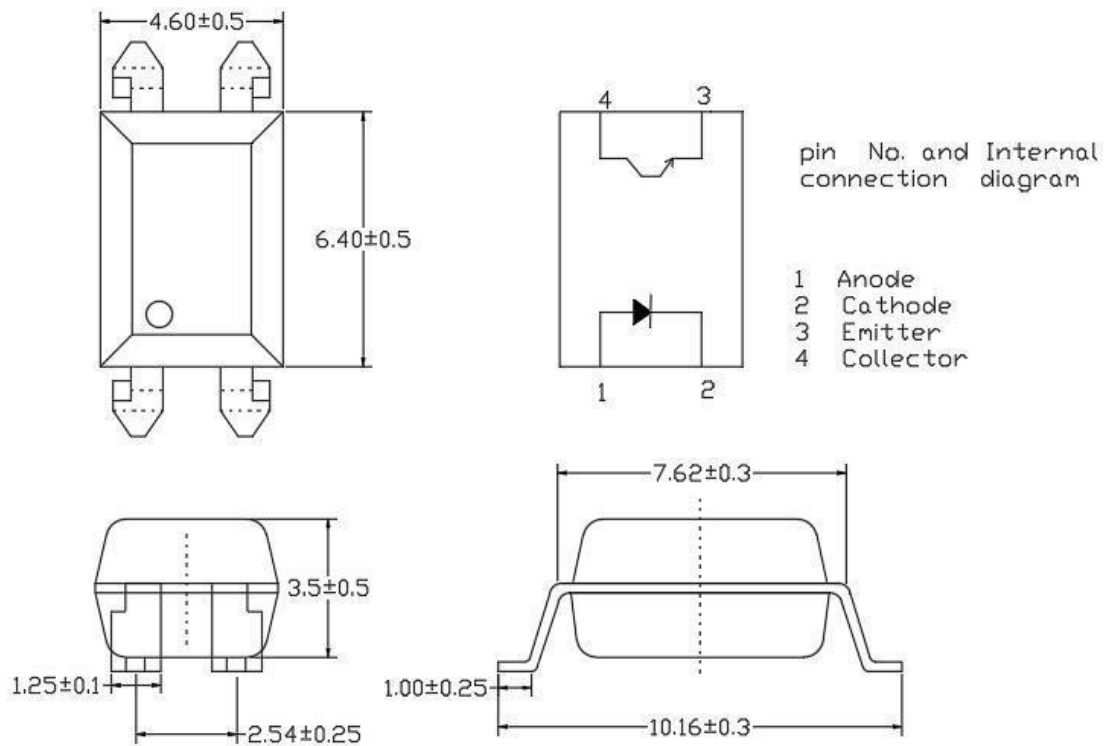
(1) ORPC-816



(2) ORPC-816M

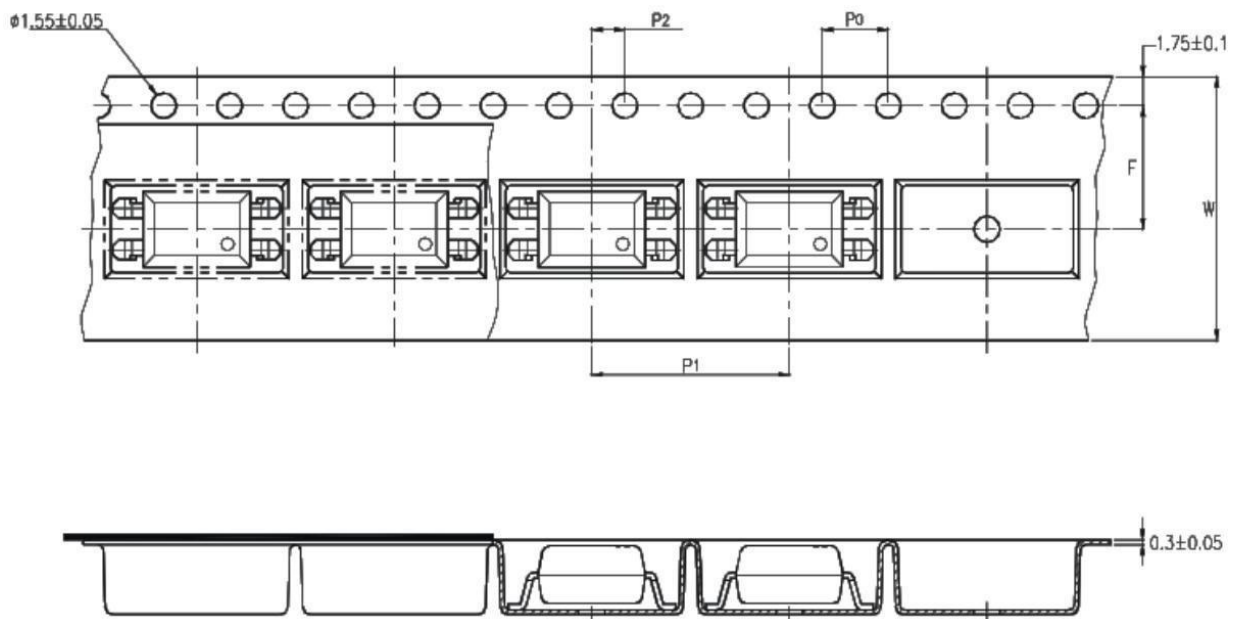


(3) ORPC-816S

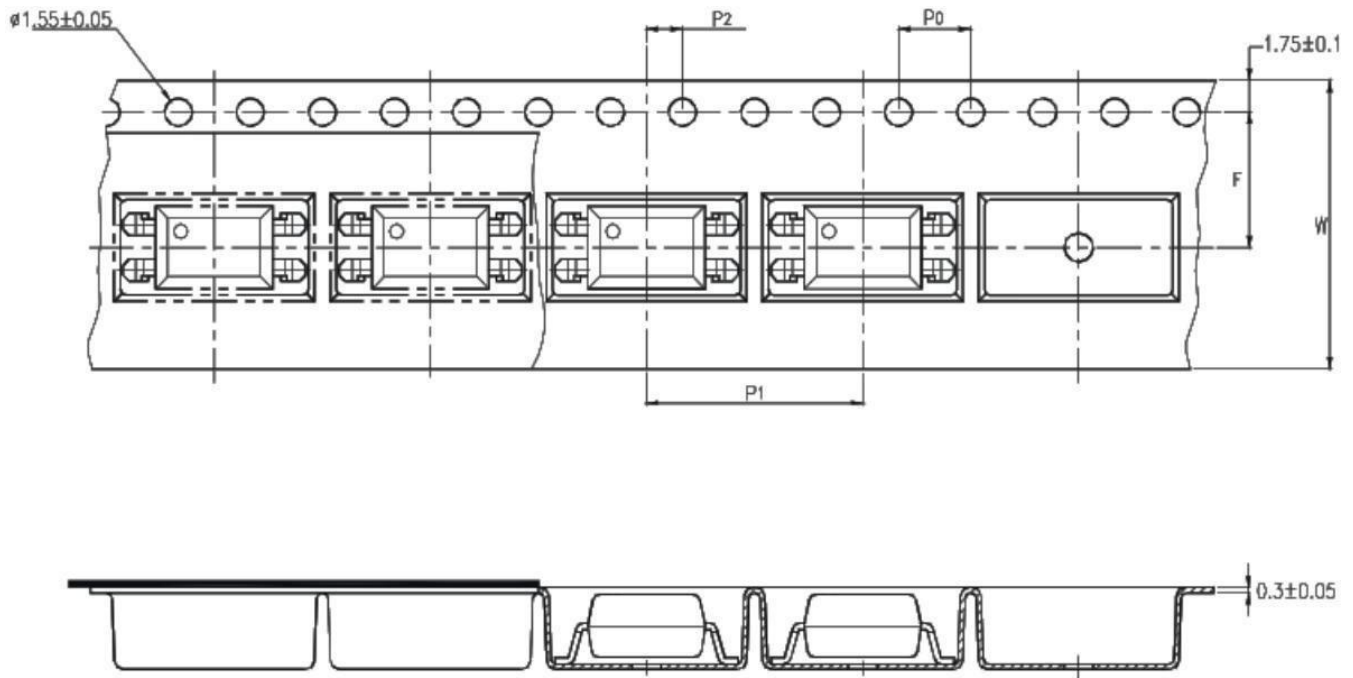


9. Taping Dimensions

(1) ORPC-816S-TA



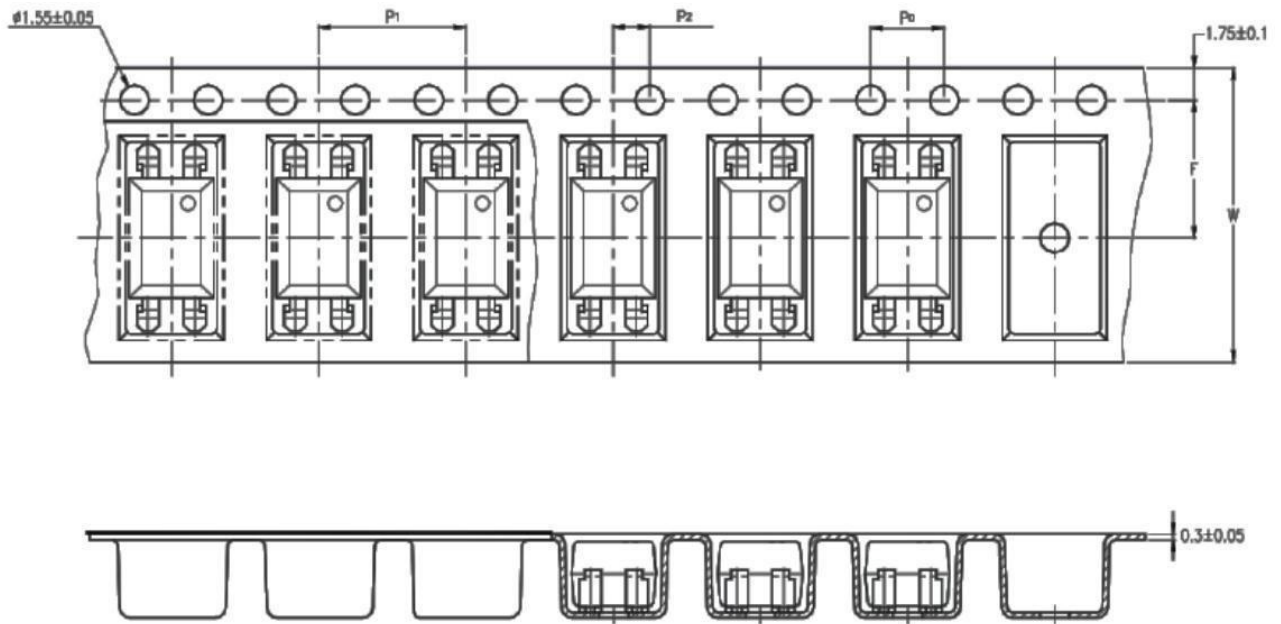
(2) ORPC-816S-TA1



Description	Symbol	Dimension in mm (inch)
Tape wide	W	16 \pm 0.3 (.63)
Pitch of sprocket holes	P ₀	4 \pm 0.1 (.15)
Distance of compartment	F	7.5 \pm 0.1 (.295)
	P ₂	2 \pm 0.1 (.0079)
Distance of compartment to compartment	P ₁	12 \pm 0.1 (.472)

Package Type	TA/TA1
Quantities(pcs)	1000

(3) ORPC-816S-TP



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)

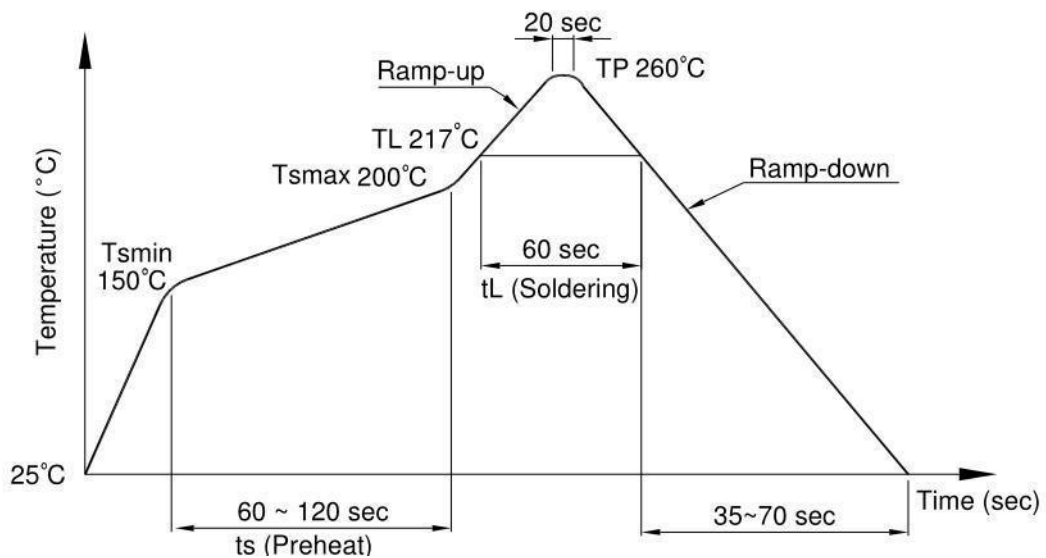
Package Type	TP
Quantities(pcs)	2000

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.

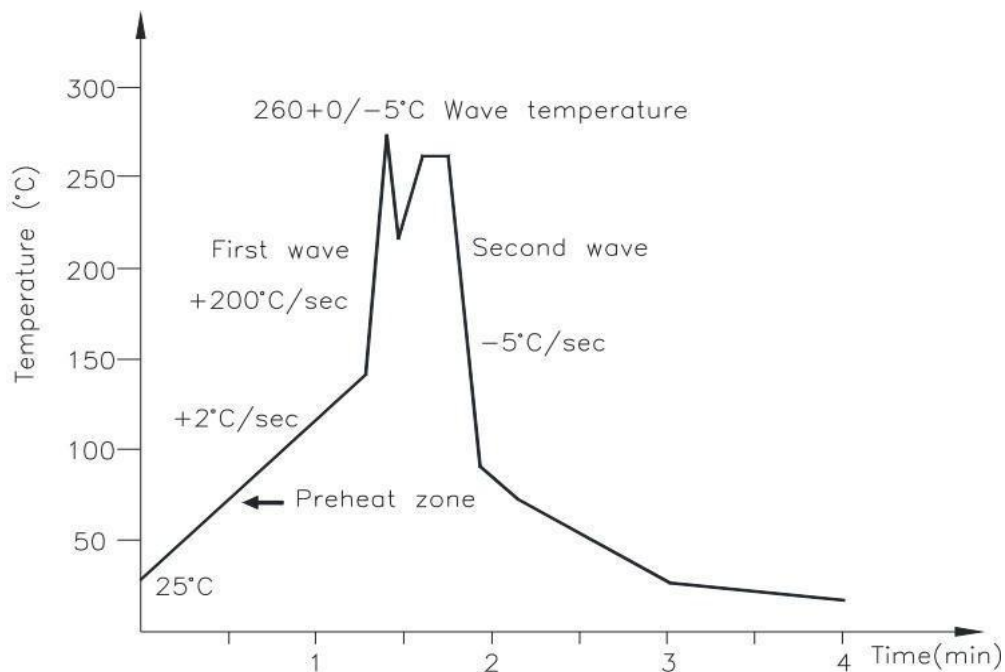
Profile item	Conditions
Preheat	
- Temperature Min (T_{Smin})	150°C
- Temperature Max (T_{Smax})	200°C
- Time (min to max) (t_s)	90±30 sec
Soldering zone	
- Temperature (T_L)	217°C
- Time (t_L)	60 sec
Peak Temperature(T_P)	260°C
Ramp-up rate	3°C / sec max.
Ramp-down rate	3~6°C / sec



(2).Wave soldering (JEDEC22A111 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

11. Characteristics Curves

Fig.1 Forward Current vs. Ambient Temperature

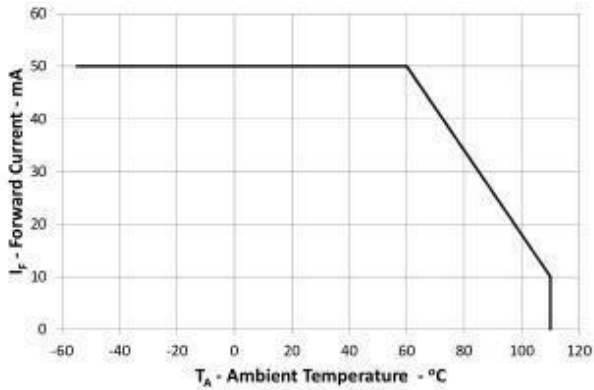


Fig.2 Collector Power Dissipation vs. Ambient Temperature

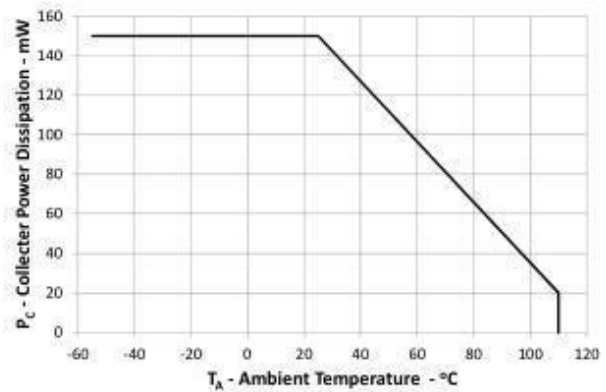


Fig.3 Collector-emitter Saturation Voltage vs. Forward Current

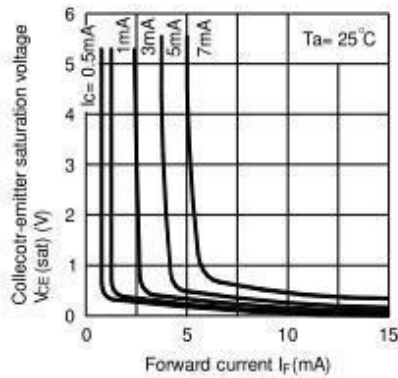


Fig.4 Forward Current vs. Forward Voltage

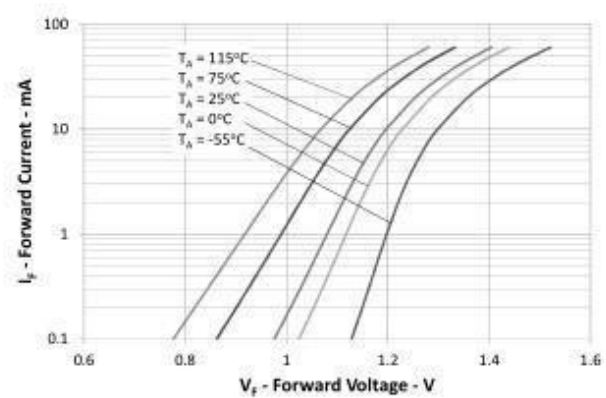


Fig.5 Current Transfer Ratio vs. Forward Current

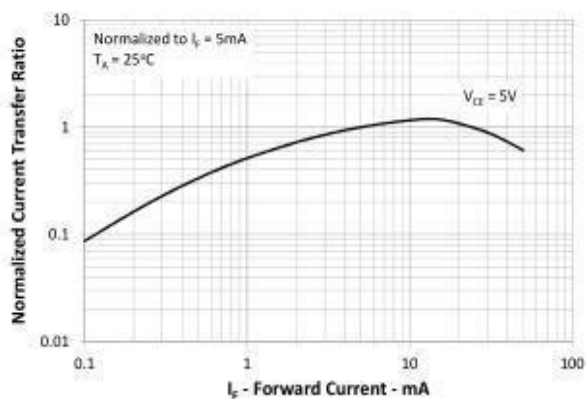


Fig.6 Collector Current vs. Collector-emitter Voltage

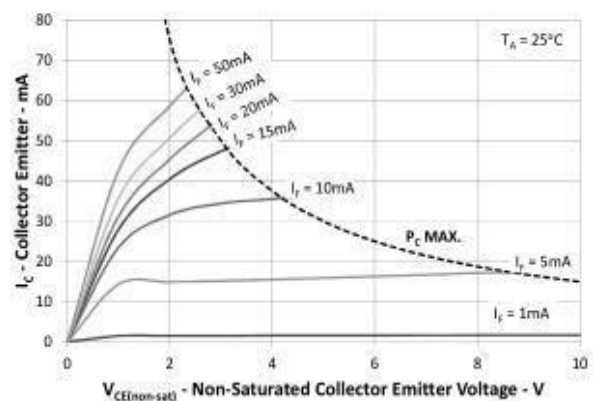


Fig.7 Relative Current Transfer Ratio vs. Ambient Temperature

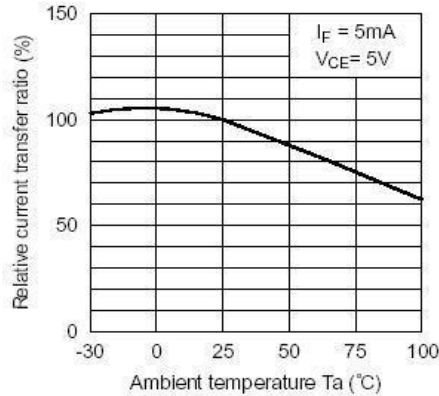


Fig.8 Collector-emitter Saturation Voltage vs. Ambient Temperature

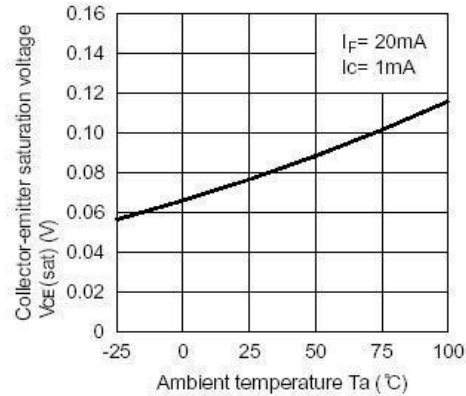


Fig.9 Collector Dark Current vs. Ambient Temperature

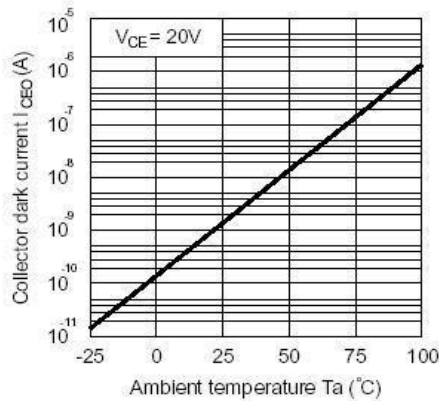


Fig.10 Response Time vs. Load Resistance

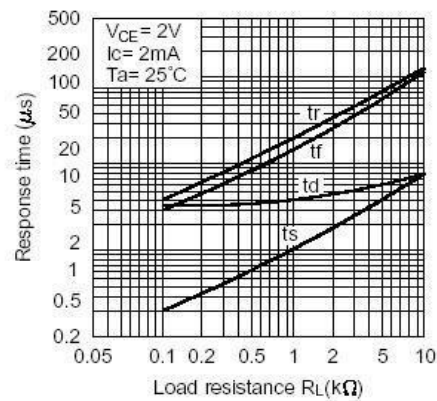
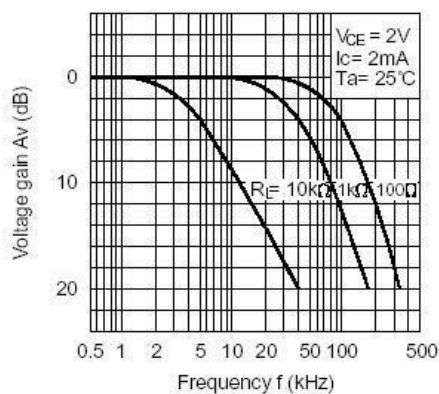
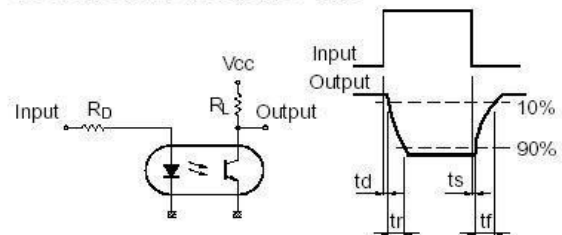


Fig.11 Frequency Response



Test Circuit for Response Time



Test Circuit for Frequency Response

