

HW817X Series

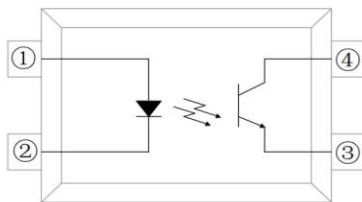
DC Input 4-Pin Phototransistor Optocoupler



Description

HW817X series devices consist of an Gallium Arsenide infrared emitting diodes, optically coupled to a Silicone NPN phototransistor detector.

There are packaged in a 4-pin DIP package and also available in lead formed configuration suitable for surface mounting and are available either on tape and reel, or in standard tube shipping containers.



PIN Configuration

- ① Anode
- ② Cathode
- ③ Emitter
- ④ Collector

Features

- Current transfer ratio
(CTR: 50~600% at IF=5mA, VCE=5V)
- High input-output isolation voltage
(Viso=5000Vrms)
- Creepage distance >7.00mm
- Operating temperature up to +110℃
- RoHS REACH compliance
- Compliance Halogen Free
- MSL Level 1
- UL approved No. UL-US-2331693-0
- VDE approved No. 40058674
- CQC approved No.CQC23001411967

Applications

- Programmable controllers
- System appliances, measuring instruments
- Telecommunication equipments
- Home appliances, such as fan, heaters, etc.

HW817X Series

Absolute Maximum Ratings ($T_a=25^{\circ}\text{C}$)

Parameter		Symbol	Rating	Unit
Input	Forward Current	IF	60	mA
	Peak Forward Current*1	IFP	1	A
	Reverse Voltage	VR	6	V
	Power Dissipation	PD	100	mW
	No Derating Required Up to Ta = 100°C		2.9	mW/°C
Output	Power Dissipation	PC	150	mW
	Derating Factor (above Ta = 80°C)		5.8	mW/°C
	Collector Current	IC	50	mA
	Collector-Emitter Voltage	VCEO	35	V
	Emitter-Collector Voltage	VECO	7	V
Total Power Dissipation		PTOT	200	mW
Isolation Voltage*2		VISO	5000	Vrms
Peak Isolation Voltage		VIORM	890	Vpeak
Transient Isolation Voltage		VIOTM	5000	Vpeak
Operating Temperature		TOPR	-55~110	°C
Storage Temperature		TSTG	-55~125	°C
Soldering Temperature		TSOL	260	°C

*1 100 μs pulse, 100Hz frequency

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

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Electro-Optical Characteristics ($T_a=25^{\circ}\text{C}$)

Input

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Forward Voltage	V_F	---	1.20	1.4	V	$I_F=10\text{mA}$
Reverse Current	I_R	---	---	10	μA	$V_R=6\text{V}$
Input Capacitance	C_{in}	---	10	100	pF	$V=0$, $f=1\text{kHz}$

Output

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Collector-Emitter Dark Current	I_{CEO}	---	---	100	nA	$V_{CE} = 20\text{V}$, $I_F = 0\text{mA}$
Collector-Emitter Breakdown Voltage	BV_{CEO}	35	---	---	V	$I_C=0.1\text{mA}$
Emitter-Collector Breakdown Voltage	BV_{ECO}	7	---	---	V	$I_E=0.1\text{mA}$

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Transfer Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	---	0.1	0.2	V	$I_F=20mA, I_C=1mA$
Isolation Resistance	R_{IO}	5×10^{10}	---	---	Ω	$V_{IO}=500V_{dc}$, 40~60% R.H.
Floating Capacitance	C_{IO}	---	0.6	1.0	pF	$V_{IO}=0, f=1MHz$
Rise Time*3	t_r	---	3	18	us	$V_{CE}=2V, I_C=2mA$, $R_L=100\Omega$
Fall Time*3	t_f	---	4	18	us	
Cut-Off Frequency*4	F_C	---	80	---	kHz	$V_{CE}=2V, I_C=2mA$, $R_L=100\Omega$, -3dB

*3 Fig.12&13

*4 Fig.14

Current Transfer Ratio Binning

Binning		Symbol	Min.	Typ.	Max.	Unit	Condition
Current Transfer Ratio	HW817	CTR	50	---	600	%	$I_F=5mA$, $V_{CE}=5V$
	HW817A		80	---	160		
	HW817B		130	---	260		
	HW817C		200	---	400		
	HW817D		300	---	600		

* Typical values at $T_a = 25^\circ C$

HW817X Series

Typical Electro-Optical Characteristics Curves

Fig.1 Forward Current vs. Ambient Temperature

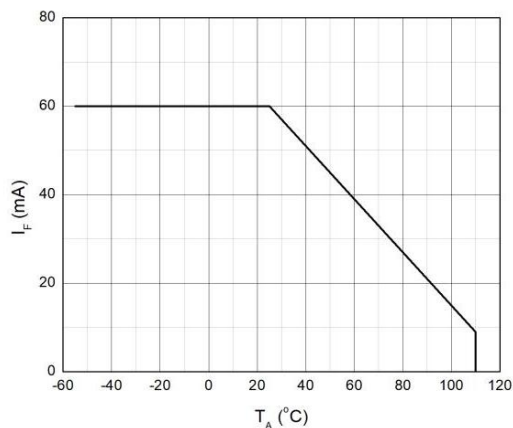
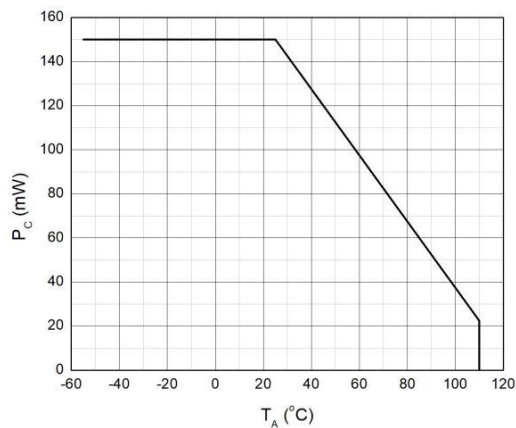
Fig. 2 Collector Power Dissipation
Vs.Ambient Temperature

Fig.3 Forward Current vs.Forward Voltage

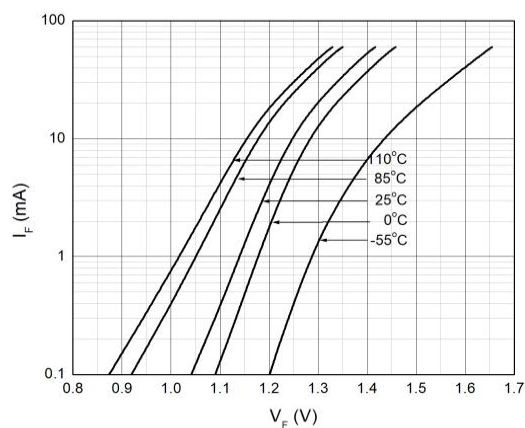


Fig. 4 Collector Dark Current vs.Ambient Temperature

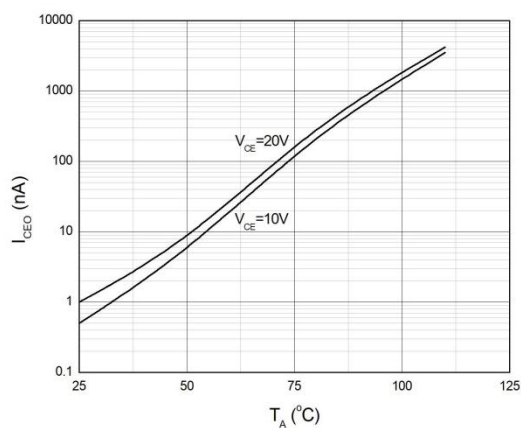


Fig.5 Collector Current vs.Collector-emitter Voltage

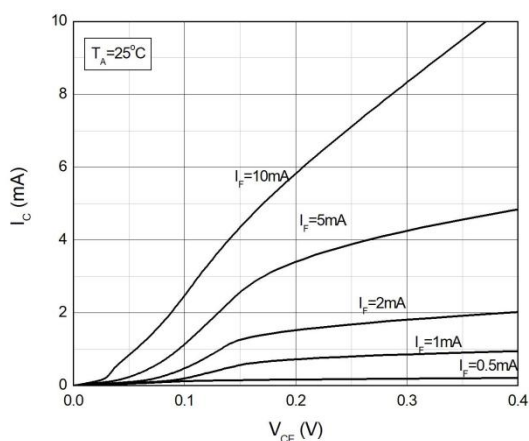
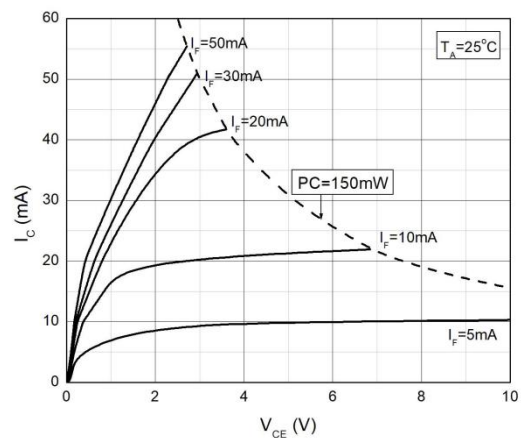


Fig.6 Collector Current vs.Collector-emitter Voltage



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Typical Electro-Optical Characteristics Curves

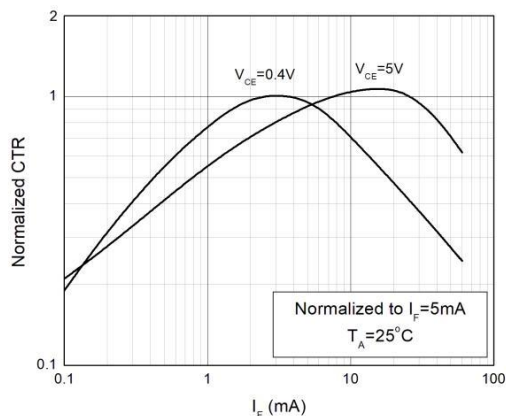
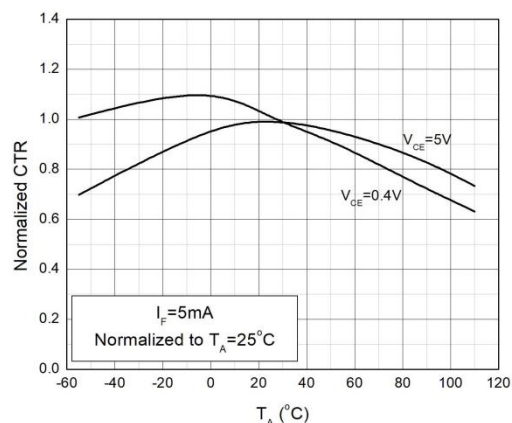
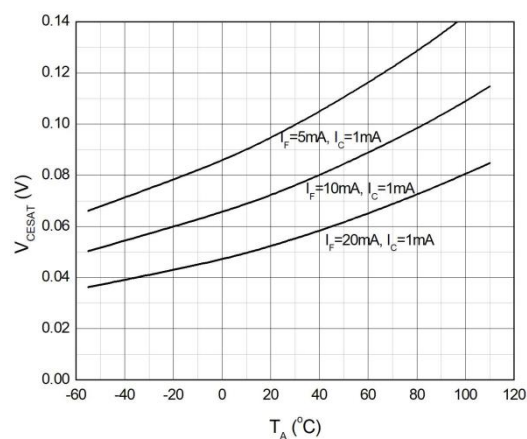
Fig.7 Normalized Current Transfer Ratio
vs. Forward CurrentFig.8 Normalized Current Transfer Ratio
vs. Ambient TemperatureFig.9 Collector-emitter Saturation Voltage
vs. Ambient Temperature

Fig.10 switching Time vs. Load Resistance

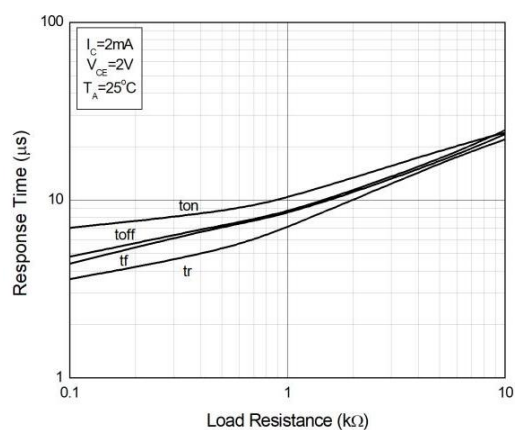


Fig.11 Frequency Response

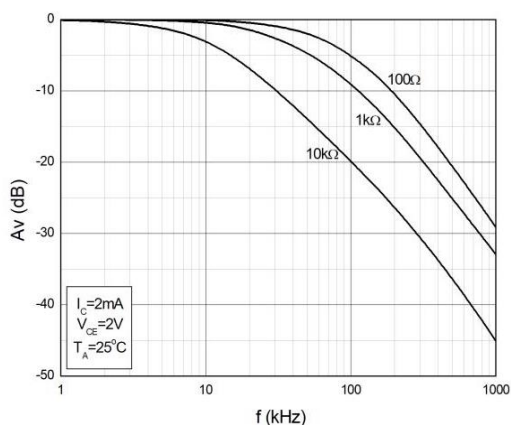
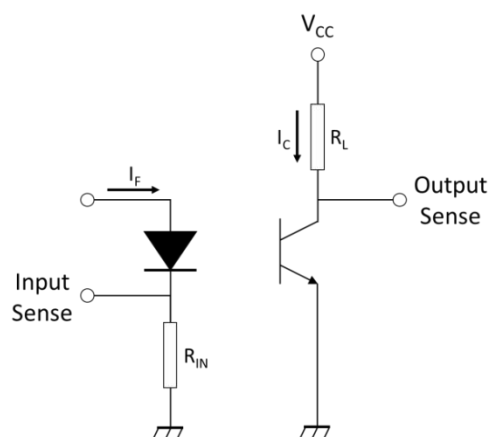


Fig.12 Test Circuits of Response Time



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Typical Electro-Optical Characteristics Curves

Fig.13 Curves of Response Time

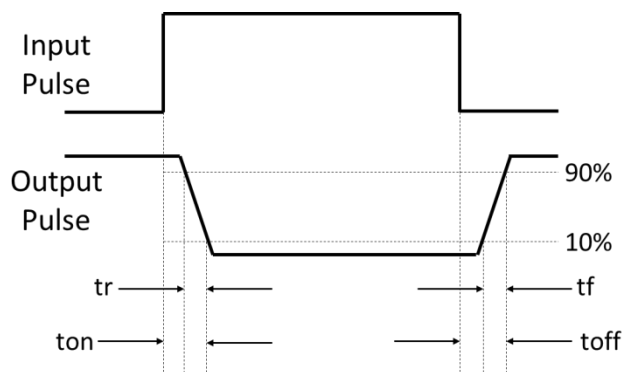
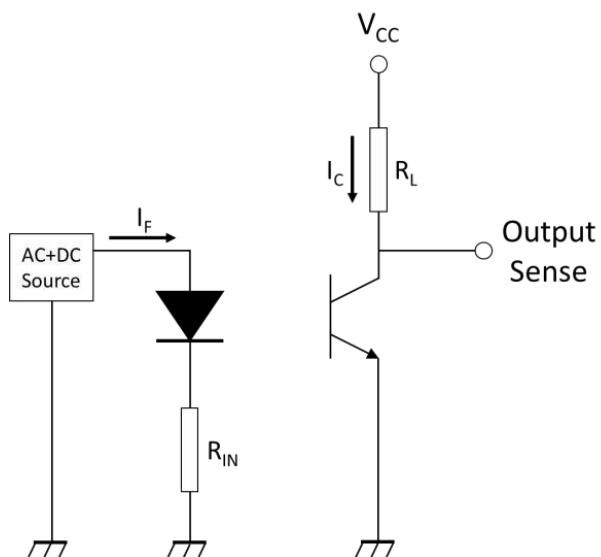


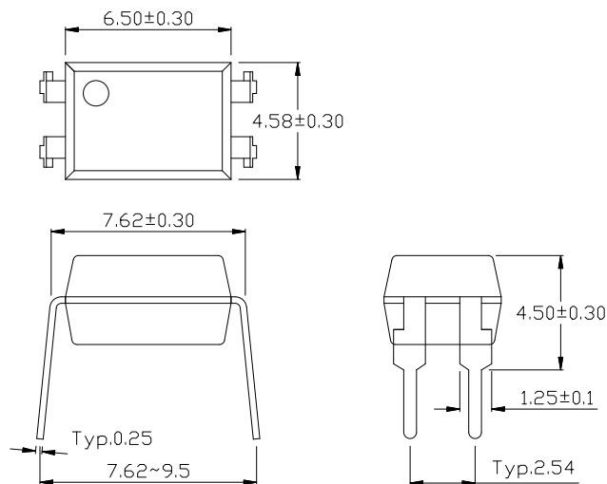
Fig.14 Test Circuits of Frequency Response



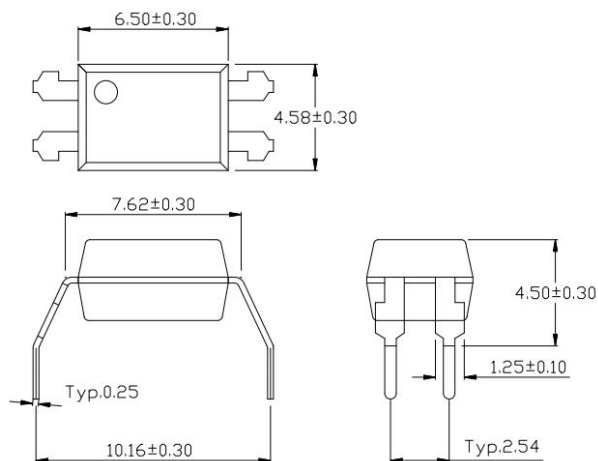
HW817X Series

Package Dimension (Unit: mm)

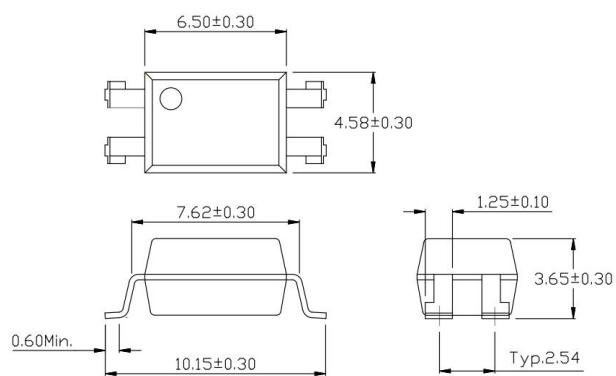
1. Standard DIP - Through Hole (DIP Type)



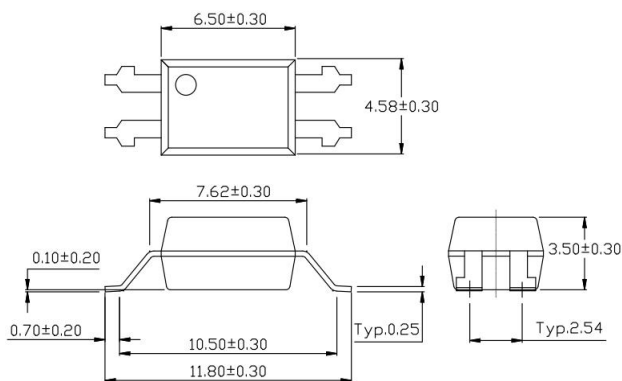
2. Gullwing Lead Forming - Through Hole (M Type)



3. Surface Mount Lead Forming (S1 Type)



4. Surface Mount (Low Profile) Lead Forming (S2 Type)

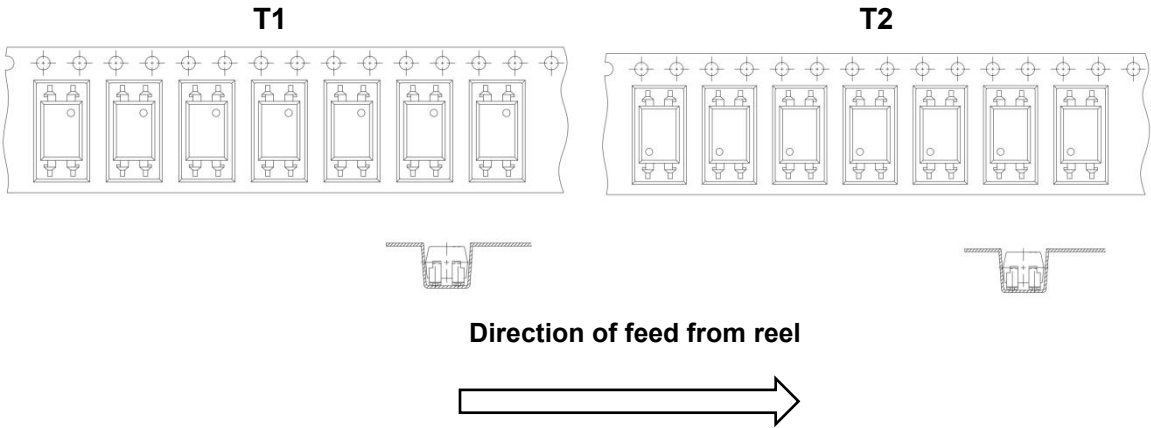


Notes:

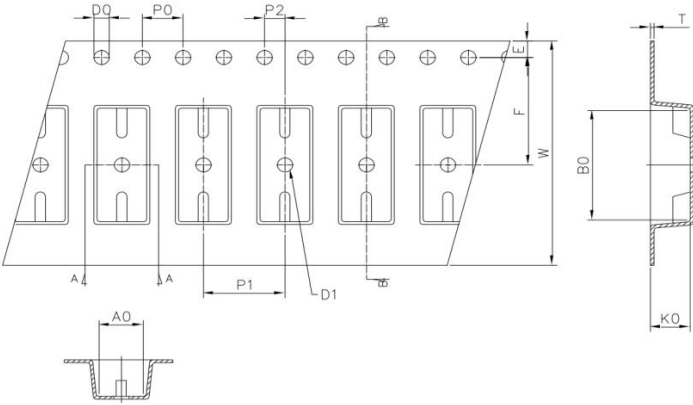
1. All dimensions are in millimeters.
2. Tolerances dimensions ±0.3mm unless otherwise specified.

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Packing Specification Tape & Reel Packing Specifications



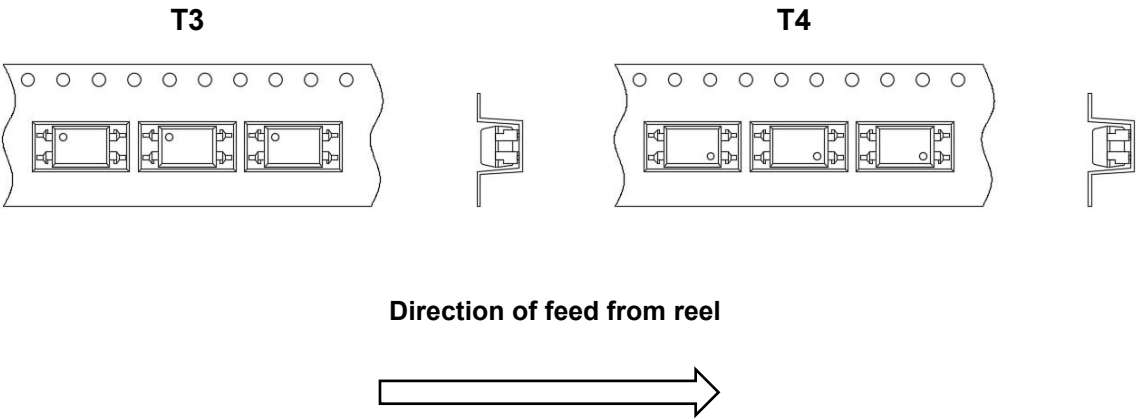
Tape Dimensions



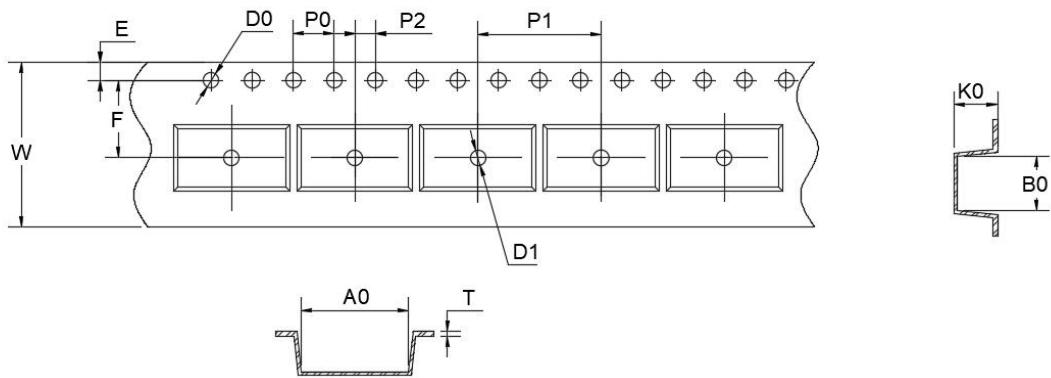
Dimension No.	A0	B0	D0	D1	E	F
Dimension (mm) S1	4.85±0.10	10.45±0.10	1.5±0.10	1.50+0.10	1.75±0.10	7.50±0.05
Dimension (mm) S2	4.70±0.10	12.30±0.10	1.5±0.10	1.50+0.10	1.75±0.10	11.50±0.05
Dimension No.	P0	P1	P2	t	W	K0
Dimension (mm) S1	4.00±0.10	8.00±0.10	2.00±0.10	0.35±0.05	16.00±0.30	4.10±0.10
Dimension (mm) S2	4.00±0.10	8.00±0.10	2.00±0.10	0.40±0.05	24.00±0.3	4.20±0.10

HW817X Series

Packing Specification Tape & Reel Packing Specifications



Tape Dimension

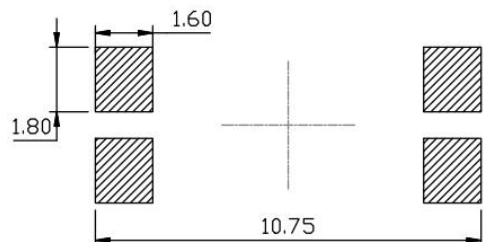


Dimension No.	A0	B0	D0	D1	E	F
Dimension (mm) S1	10.50±0.10	5.20±0.10	1.5±0.10	1.50+0.10	1.75±0.10	7.50±0.10
Dimension No.	P0	P1	P2	T	W	K0
Dimension (mm) S1	4.00±0.10	12.00±0.10	2.00±0.10	0.40±0.05	16.00±0.20	4.00±0.10

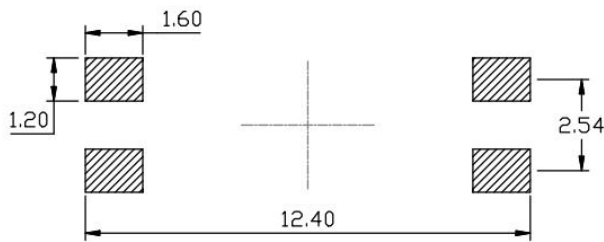
HW817X Series

Recommended Foot Print for Surface Mount Device (Unit: mm)

For S1 option



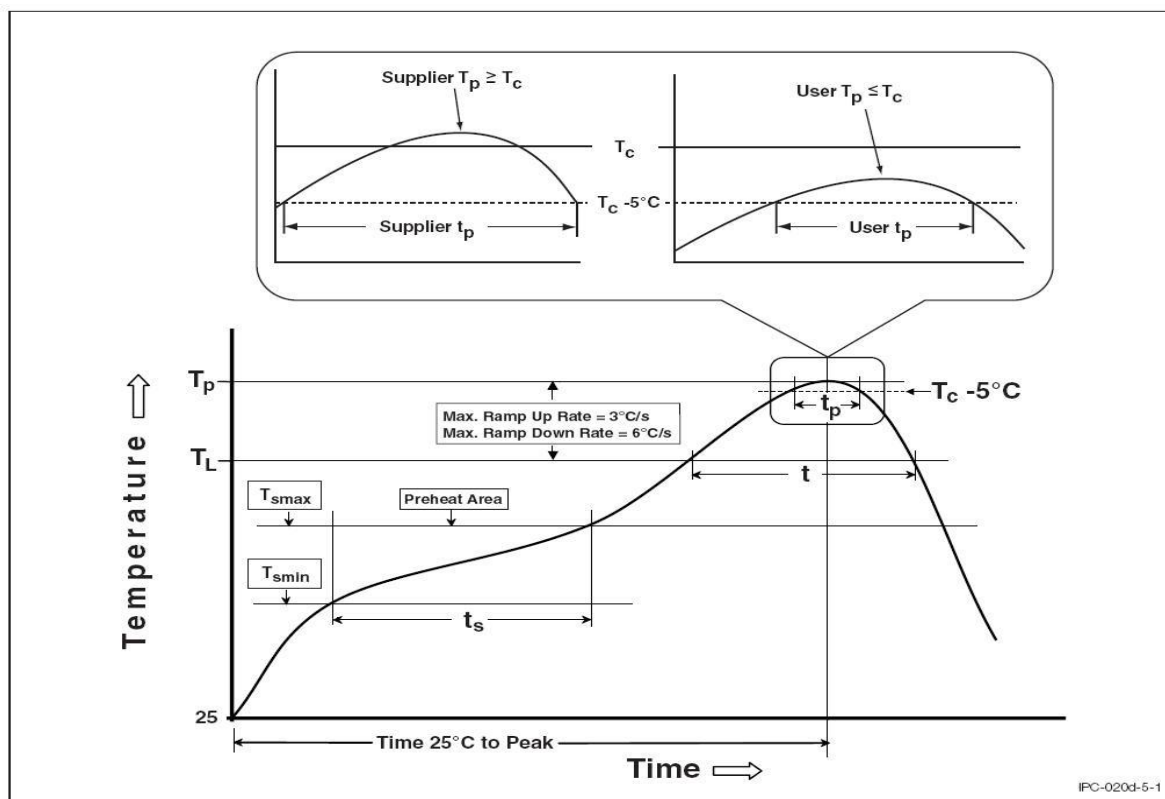
For S2 option



Precautions for Use

1. Soldering Condition

Maximum Body Case Temperature Profile For Evaluation of Reflow Profile



HW817X Series

1. Soldering Condition (cont.)

Preheat	Condition
Temperature min (T_{smin})	150 °C
Temperature max (T_{smax})	200°C
Time (T_{smin} to T_{smax}) (t_s)	60-120 sec
Average Ramp-Up Rate (T_{smax} to T_P)	3 °C/sec max
Other	Condition
Liquidus Temperature (T_L)	217 °C
Time Above Liquidus Temperature (T_L)	60-100 sec
Peak Temperature (T_P)	260°C
Time within 5 °C of Actual Peak Temperature: $T_P - 5^{\circ}\text{C} / T_c$	30 sec
Ramp- Down Rate From Peak Temperature	6°C /sec max
Time 25°C to Peak Temperature	8 minutes max
Max. Reflow Times	3 times

HW817X Series

Order Information

Part Number

HW817X-FGV(Y)(Z)

Note:

HW – Company Abbr

817 – Part Number

X – CTR Rank (A, B, C, D, or none)

F – Lead frame option (F: Iron, C: Copper)

G – Halogen free

V – VDE Option (V or None)

Y – Lead Form Option (M/S1/S2/None)

Z – Tape and Reel Packaging form (T1/T2/T3/T4/None)

Lead form Option	Description	Packing Quantity
D	Standard DIP-4	100 units per tube
M	Wide lead bend (0.4 inch spacing)	100 units per tube
S1	Surface mount profile	2000 units per reel
S2	Surface mount (low) profile	2000 units per reel

Device Marking

Note:



HW	Denotes HOIWAY Optoelectronic Technologies
817	Denotes Device Number
X	Denotes CTR Rank (A, B, C, D or none)
•	Denotes Cu (None) / Fe (•)
Y	Denotes 1 digit Year code
WW	Denotes 2 digit Week code
V	Denotes VDE (optional)