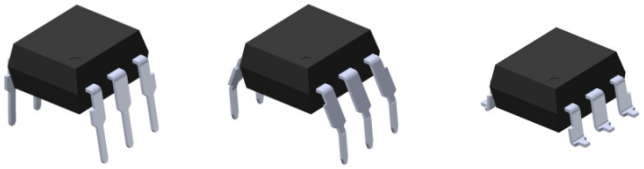
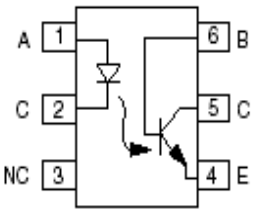
DATASHEET

6 PIN DIP PHOTOTRANSISTOR PHOTOCOUPLER
CNY17-X Series
CNY17F-X Series



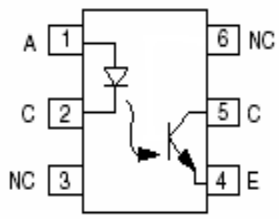
Schematic



CNY17-X

Pin Configuration
1. Anode
2. Cathode
3. No Connection
4. Emitter
5. Collector
6. Base

Schematic



CNY17F-X

Pin Configuration
1. Anode
2. Cathode
3. No Connection
4. Emitter
5. Collector
6. No Connection

Features:

- Current transfer ratios in selected narrow range groups
  CNY17-1, CNY17F-1: 40-80%
  CNY17-2, CNY17F-2: 63-125%
  CNY17-3, CNY17F-3: 100-200%
  CNY17-4, CNY17F-4:160-320%
- High isolation voltage between input and output (Viso = 5000 Vrms)
- Creepage distance > 7.6 mm
- Operating temperature up to +110°C
- The CNY17F-X series offers no external base connection for minimum noise susceptibility
- Compact dual-in-line package
- Pb free and RoHS compliant.
- UL approved (No. E214129)
- VDE approved (No. 132249)
- SEMKO approved
- NEMKO approved
- DEMKO approved
- FIMKO approved
- CSA approved

Description

The CNY17-X and CNY17F-X series of devices each consist of an infrared emitting diode optically coupled to a phototransistor.
They are packaged in a 6-pin DIP package and available in wide-lead spacing and SMD option.

Applications

- Power supply regulators
- Digital logic inputs
- Microprocessor inputs

Absolute Maximum Ratings (Ta=25℃)

Parameter		Symbol	Rating	Unit
Input	Forward current	I_F	60	mA
	Peak forward current (t = 10μs)	I_{FM}	1	A
	Reverse voltage	V_R	6	V
	Power dissipation (T_A = 25°C)	P_D	100	mW
	Derating factor (above 100°C)		3.8	mW/°C
Output	Collector-Emitter voltage	V_{CEO}	80	V
	Collector-Base voltage*[1]	V_{CBO}	80	V
	Emitter-Collector voltage	V_{ECO}	7	V
	Emitter-Base voltage	V_{EBO}	7	V
	Power dissipation (T_A = 25°C)	P_C	150	mW
	Derating factor (above 100°C)		9.0	mW/°C
Total Power Dissipation		P_{TOT}	200	mW
Isolation voltage *[2]		V_{ISO}	5000	V rms
Operating Temperature		T_{OPR}	-55 to 110	°C
Storage Temperature		T_{STG}	-55 to 125	°C
Soldering temperature *[3]		T_{SOL}	260	°C

Notes:
*1 Only for CNY17-X series.
*2 AC for 1 minute, R.H.= 40 ~ 60% R.H. In this test, pins 1, 2 & 3 are shorted together, and pins 4, 5 & 6 are shorted together.
*3 For 10 seconds.

Electro-Optical Characteristics (Ta=25℃ unless specified otherwise)

Input

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Forward voltage	V_F	-	-	1.65	V	I_F = 60mA
Reverse current	I_R	-	-	10	μA	V_R = 6V
Input capacitance	C_{in}	-	18	-	pF	V = 0, f = 1MHz

Output

Parameter		Symbol	Min	Typ.	Max.	Unit	Condition
Collector-Base dark current	CNY17-X only	I_{CBO}	-	-	20	nA	V_{CB} = 10V, I_F = 0mA
Collector-Emitter dark current		I_{CBO}		-	50	nA	V_{CE} = 10V, IF=0mA
Collector-Emitter breakdown voltage		BV_{CEO}	80	-	-	V	I_C = 1mA, I_F = 0mA
Collector-Base breakdown voltage	CNY17-X only	BV_{CBO}	80	-	-	V	I_C = 0.1mA, I_F = 0mA
Emitter-Collector breakdown voltage		BV_{ECO}	7	-	-	V	I_E = 0.1mA, I_F = 0mA
Collector-Emitter capacitance		C_{CE}	-	8	-	pF	VCE = 0V, f =1MHz

* Typical values at T_a = 25°C

Transfer Characteristics

Parameter		Symbol	Min	Typ.	Max.	Unit	Condition
Current Transfer Ratio	CNY17-1 CNY17F-1	CTR	40	-	80	%	I_F = 10mA ,V_{CE} = 5V
	CNY17-2 CNY17F-2		63	-	125		
	CNY17-3 CNY17F-3		100	-	200		
	CNY17-4 CNY17F-4		160	-	320		
Current Transfer Ratio	CNY17-1 CNY17F-1	CTR	13	-	-	%	I_F = 1mA ,V_{CE} = 5V
	CNY17-2 CNY17F-2		22	-	-		
	CNY17-3 CNY17F-3		34	-	-		
	CNY17-4 CNY17F-4		56	-	-		
Collector-Emitter saturation voltage		$V_{CE(sat)}$	-	-	0.3	V	I_F = 10mA , I_C = 2.5mA
Isolation resistance		R_{IO}	10^{11}	-	-	Ω	V_{IO} = 500Vdc
Input-output capacitance		C_{IO}	-	0.5	-	pF	V_{IO} = 0, f = 1MHz
Turn-on time		T_{on}	-	10	12	μs	V_{CC} = 10V, I_C = 2mA, R_L = 100Ω See Fig. 11
Turn-off time		T_{off}	-	9	12		
Rise time		T_r	-	6	10		
Fall time		T_f	-	8	10		
Rise time		T_r	-	2	10		V_{CC} = 5V, I_F = 10mA, R_L = 75Ω, See Fig. 11
Fall time		T_f	-	3	10		

* Typical values at T_a = 25°C

Typical Electro-Optical Characteristics Curves

Figure 1. Forward Current vs Forward Voltage

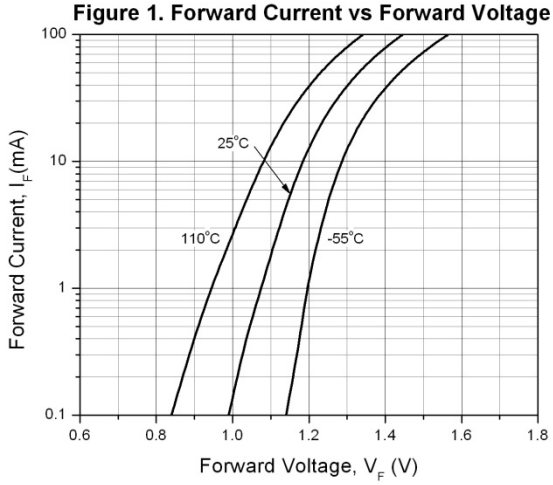


Figure 2. Current Tranfer Ratio vs Forward Current

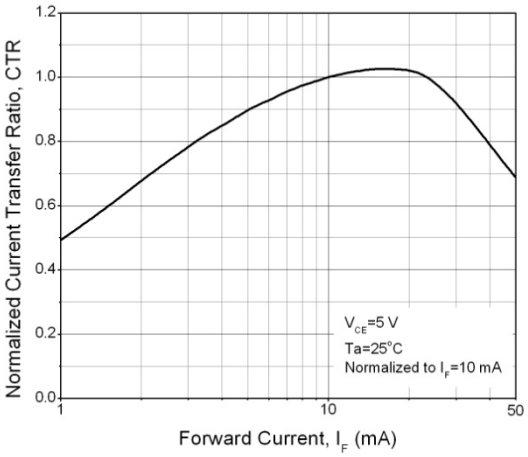


Figure 3. Current Tranfer Ratio vs Ambient Temperature

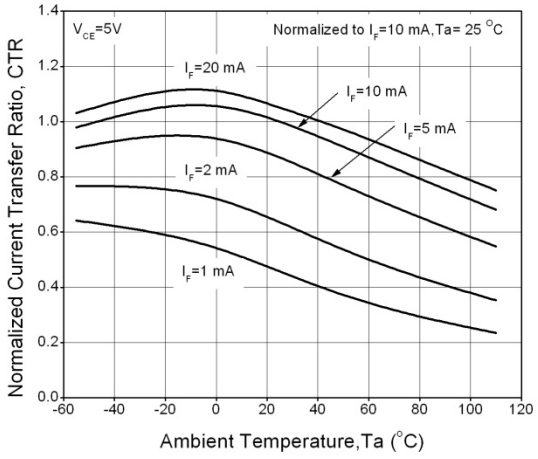


Figure 4. Current Transfer Ratio (Saturated) vs Base-Emitter Resistance

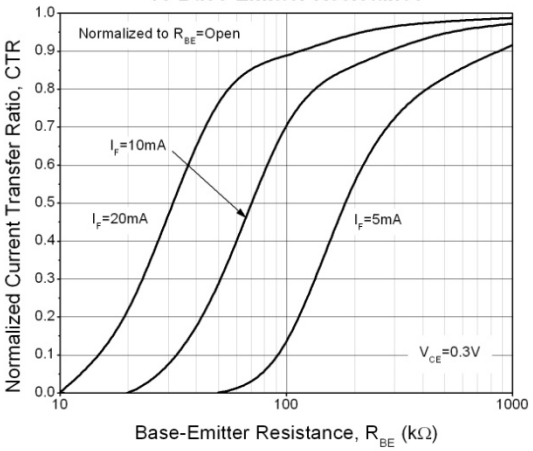


Figure 5. Current Transfer Ratio (Unsaturated) vs Base-Emitter Resistance

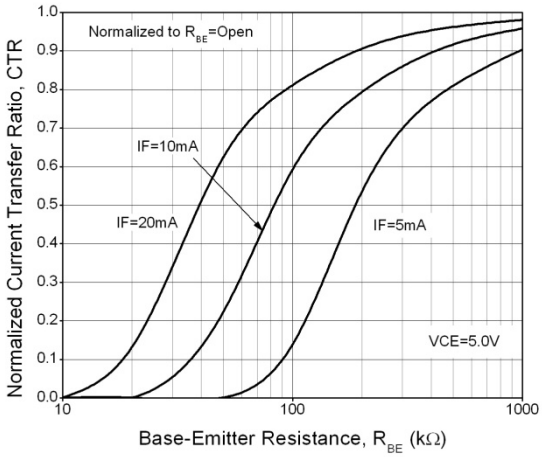


Figure 6. Dark Current vs Ambient Temperature

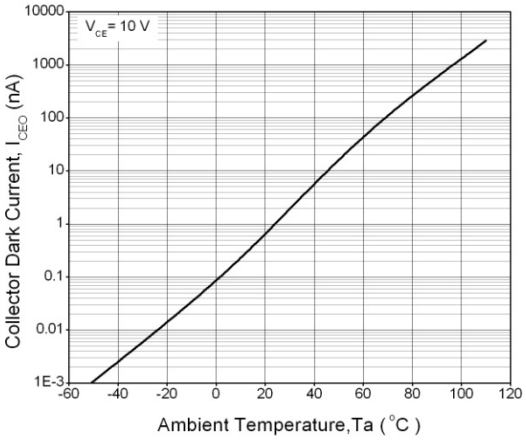


Figure 7. Collector-Emitter Saturation Voltage vs Collector Current

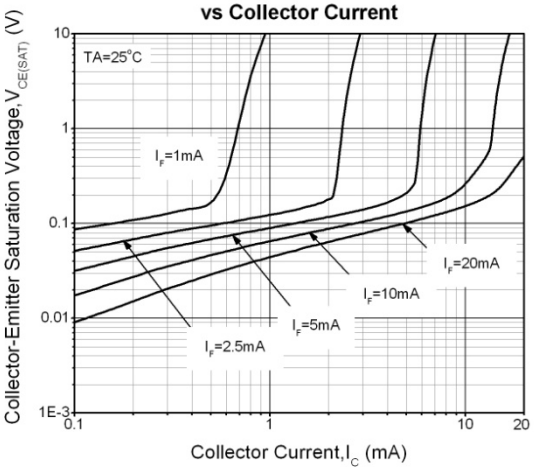


Figure 8. Switching Time vs Load Resistance

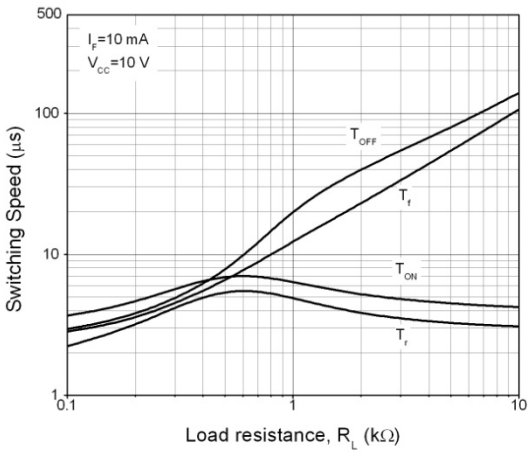


Figure 9. Turn-on Time vs Base-Emitter Resistance)

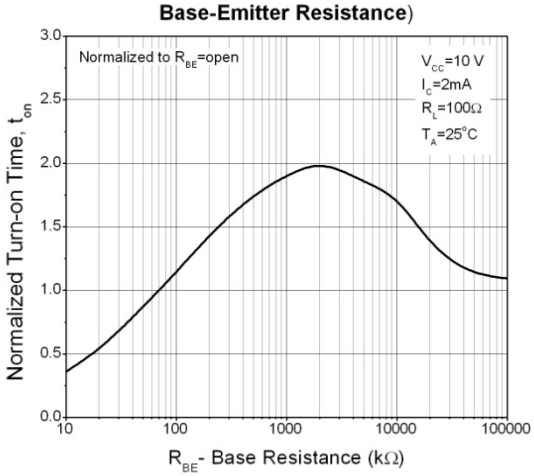
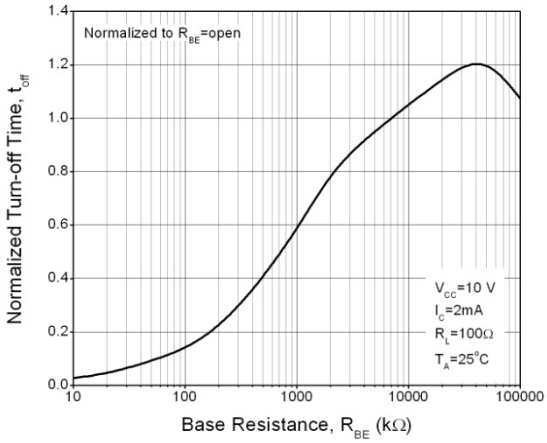


Figure 10. Turn-off Time vs Base-Emitter Resistance



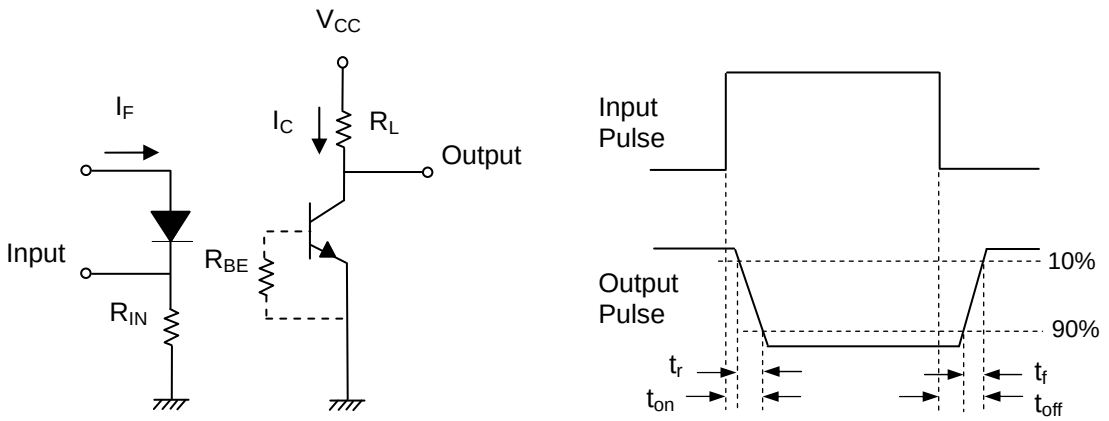


Figure 11. Switching Time Test Circuit & Waveforms

Order Information

Part Number

CNY17-XY(Z)-V

or

CNY17F-XY(Z)-V

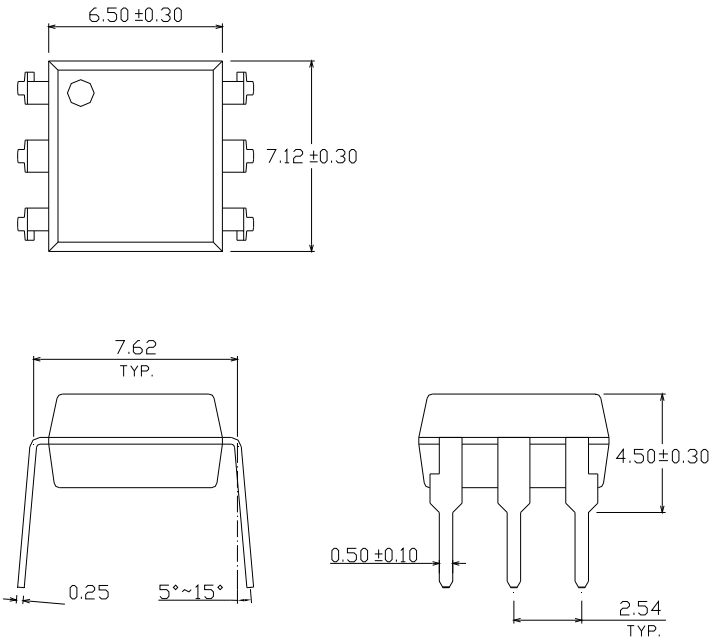
Note

X = Part no. (1, 2, 3 or 4)
Y = Lead form option (S, S1, M or none)
Z = Tape and reel option (TA, TB or none).
V = VDE (optional)

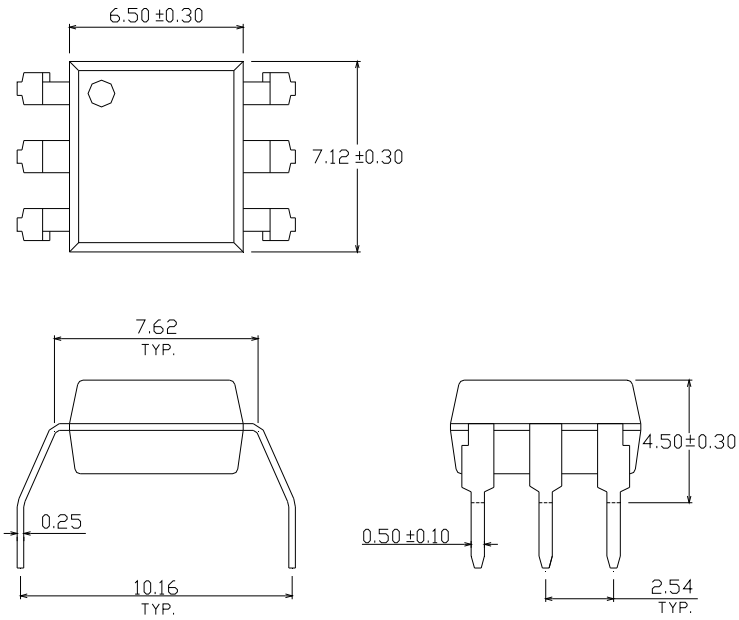
Option	Description	Packing quantity
None	Standard DIP-6	65 units per tube
M	Wide lead bend (0.4 inch spacing)	65 units per tube
S (TA)	Surface mount lead form + TA tape & reel option	1000 units per reel
S (TB)	Surface mount lead form + TB tape & reel option	1000 units per reel
S1 (TA)	Surface mount lead form (low profile) + TA tape & reel option	1000 units per reel
S1 (TB)	Surface mount lead form (low profile) + TB tape & reel option	1000 units per reel

Package Dimension (Dimensions in mm)

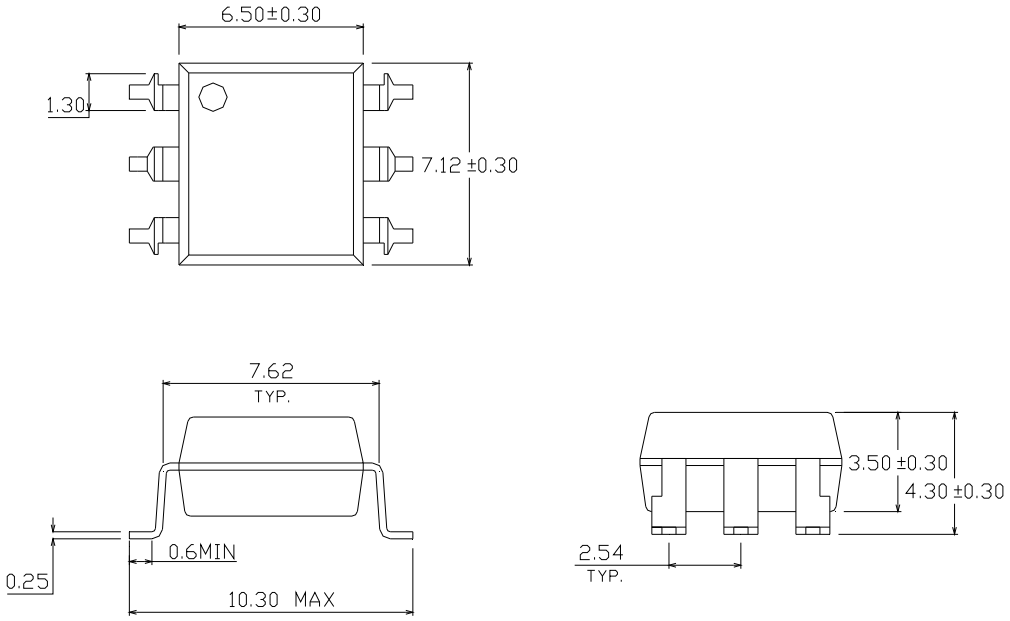
Standard DIP Type



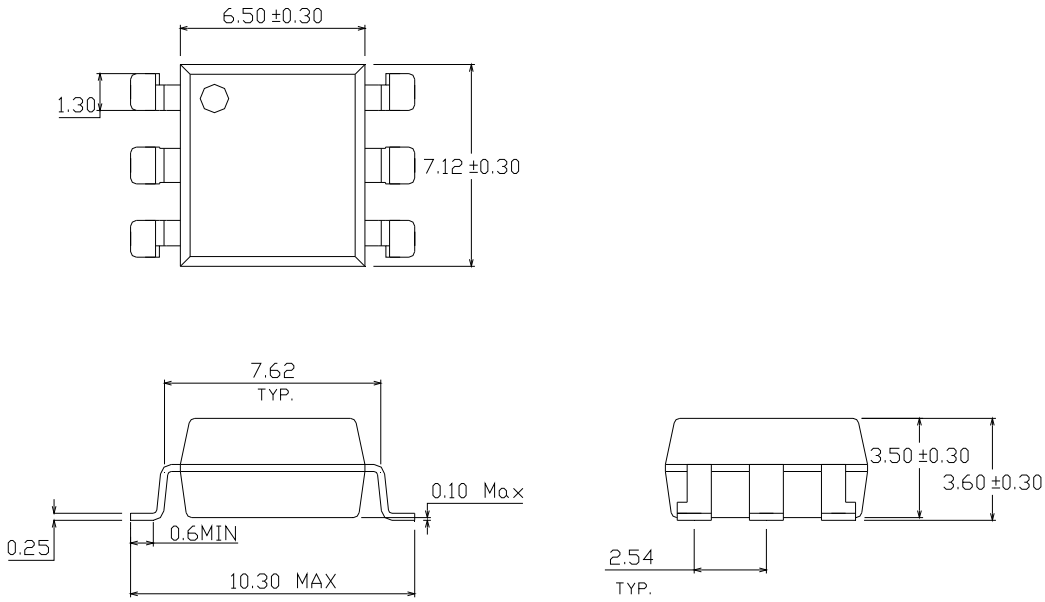
Option M Type



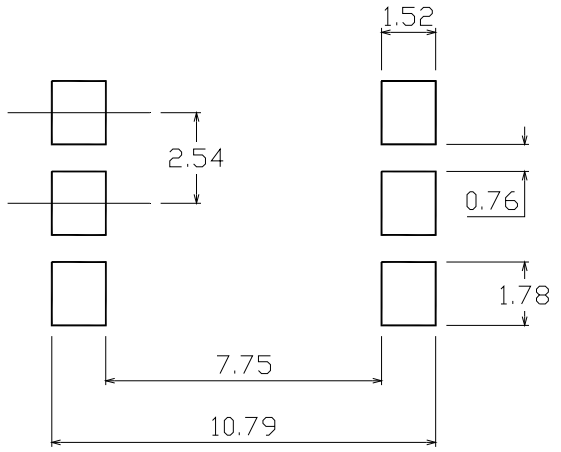
Option S Type



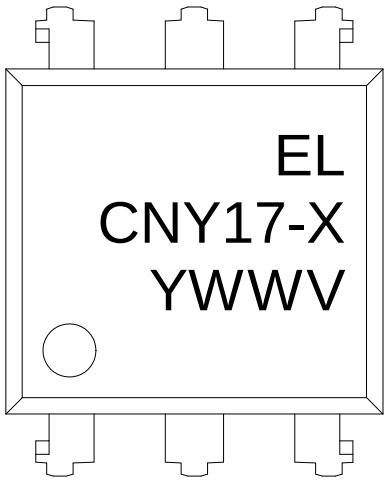
Option S1 Type



Recommended pad layout for surface mount leadform



Device Marking

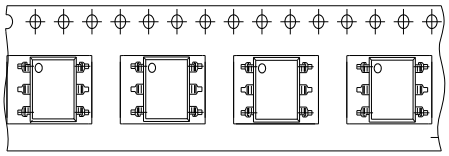


Notes

EL	denotes Everlight
CNY17-X	denotes Device Number (X: 1, 2, 3 or 4)
Y	denotes 1 digit Year code
WW	denotes 2 digit Week code
V	denotes VDE (optional)

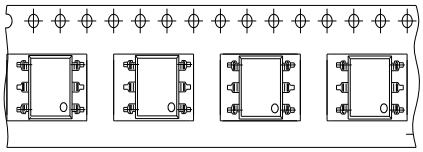
Tape & Reel Packing Specifications

Option TA



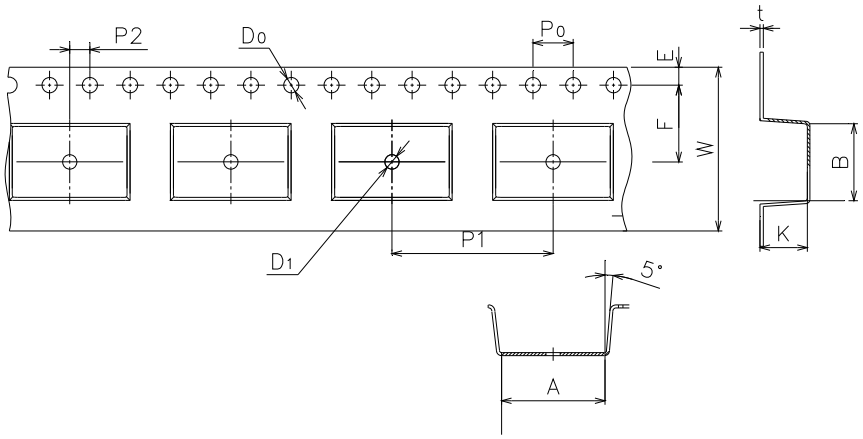
Direction of feed from reel

Option TB



Direction of feed from reel

Tape dimensions

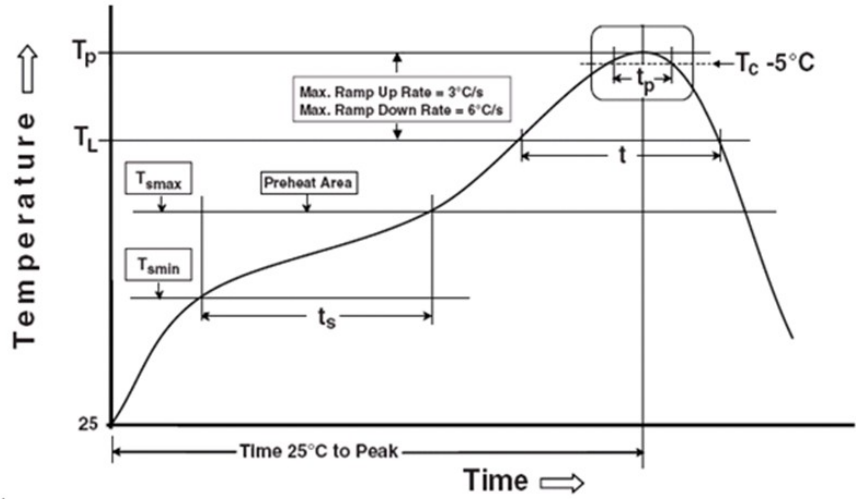


Dimension No.	A	B	Do	D1	E	F
Dimension (mm)	10.4±0.1	7.52±0.1	1.5±0.1	1.5+0.1/-0	1.75±0.1	7.5±0.1
Dimension No.	**Po**	**P1**	**P2**	**t**	**W**	**K**
Dimension (mm)	4.0±0.15	16.0±0.1	2.0±0.1	0.35±0.03	16.0±0.2	4.5±0.1

Precautions for Use

1. Soldering Condition

1.1 (A) Maximum Body Case Temperature Profile for evaluation of Reflow Profile



Note: Reference: IPC/JEDEC J-STD-020D

Preheat	
Temperature min (T_{smin})	150 °C
Temperature max (T_{smax})	200°C
Time (T_{smin} to T_{smax}) (t_s)	60-120 seconds
Average ramp-up rate (T_{smax} to T_p)	3 °C/second max
Other	
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°C	30 s
Ramp- Down Rate from Peak Temperature	6°C /second max.
Time 25°C to peak temperature	8 minutes max.
Reflow times	3 times

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