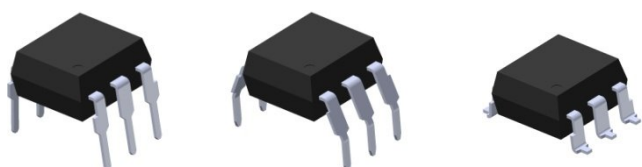


6 PIN DIP PHOTOTRANSISTOR PHOTOCOUPLER CNY17-X Series CNY17F-X Series



Features:

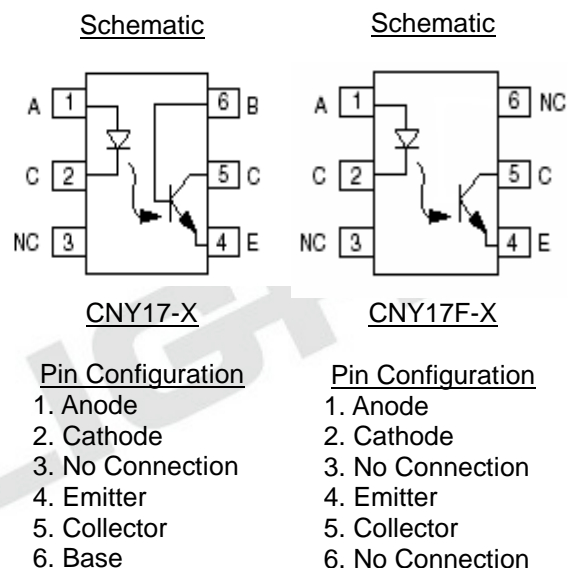
- Current transfer ratios in selected narrow range groups
CNY17-1, CNY17F-1: 40-80%
CNY17-2, CNY17F-2: 63-125%
CNY17-3, CNY17F-3: 100-200%
CNY17-4, CNY17F-4: 160-320%
- High isolation voltage between input and output (Viso = 5000 Vrms)
- Creepage distance > 7.6 mm
- Operating temperature up to +110°C
- The CNY17F-X series offers no external base connection for minimum noise susceptibility
- Compact dual-in-line package
- Pb free and RoHS compliant.
- UL and cUL approved (No. E214129)
- VDE approved (No. 132249)
- SEMKO approved
- NEMKO approved
- DEMKO approved
- FIMKO 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 = 10 μ s)	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	$I_F = 60\text{mA}$
Reverse current	I_R	-	-	10	μA	$V_R = 6\text{V}$
Input capacitance	C_{in}	-	18	-	pF	$V = 0, f = 1\text{MHz}$

Output

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

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

Transfer Characteristics

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

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

Typical Electro-Optical Characteristics Curves

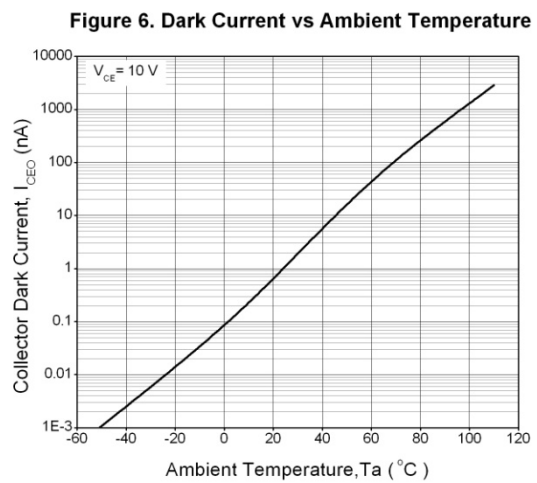
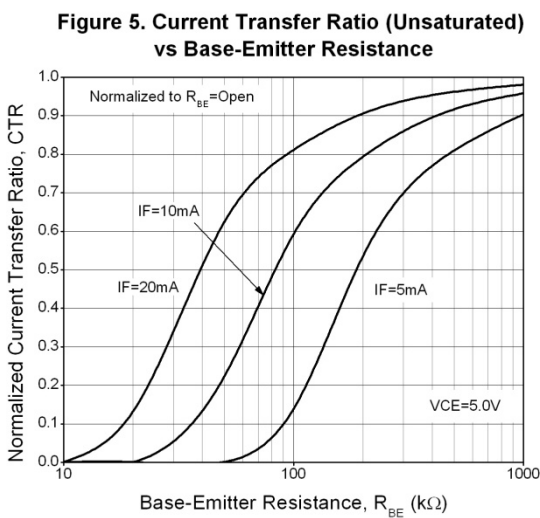
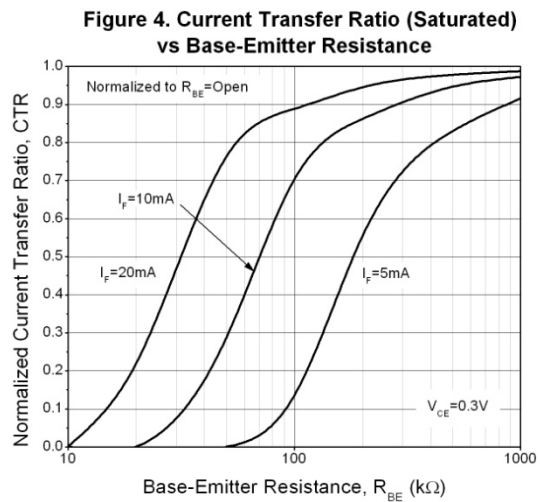
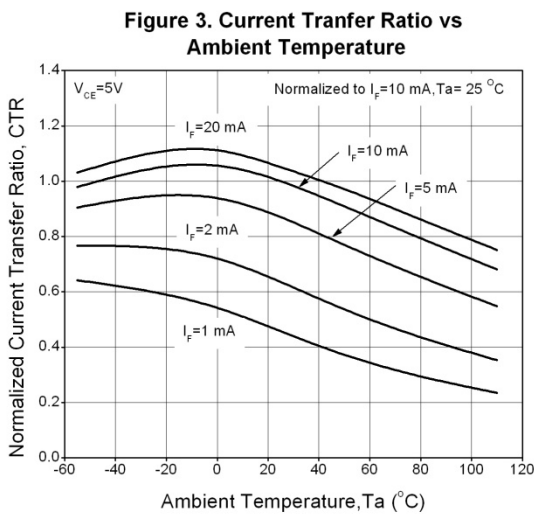
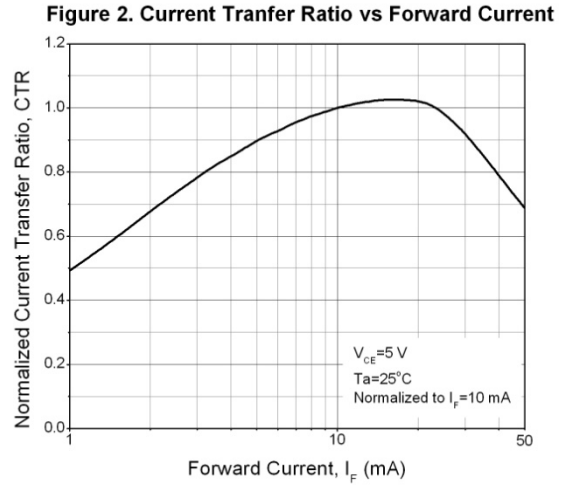
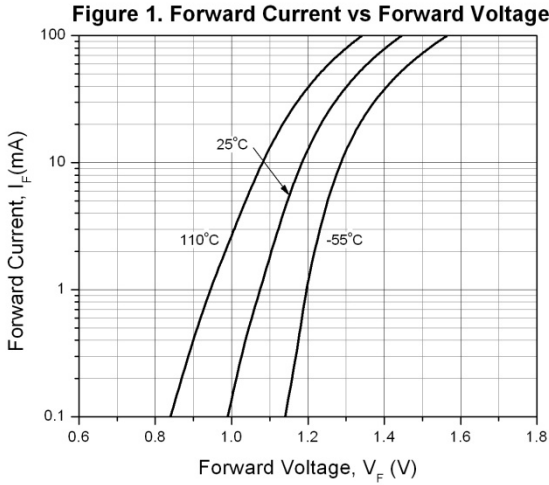


Figure 7. Collector-Emitter Saturation Voltage vs Collector Current

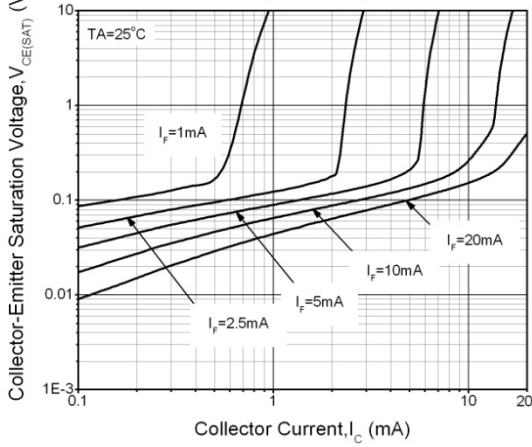


Figure 8. Switching Time vs Load Resistance

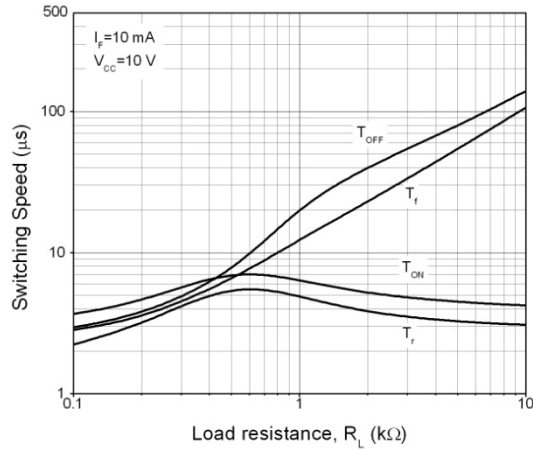


Figure 9. Turn-on Time vs Base-Emitter Resistance

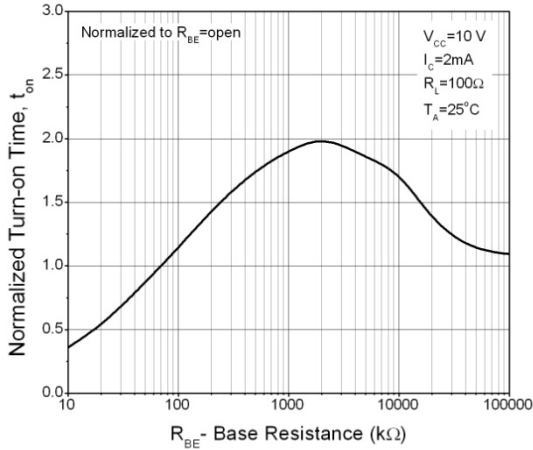


Figure 10. Turn-off Time vs Base-Emitter Resistance

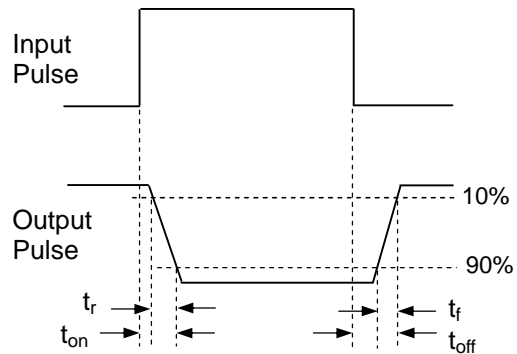
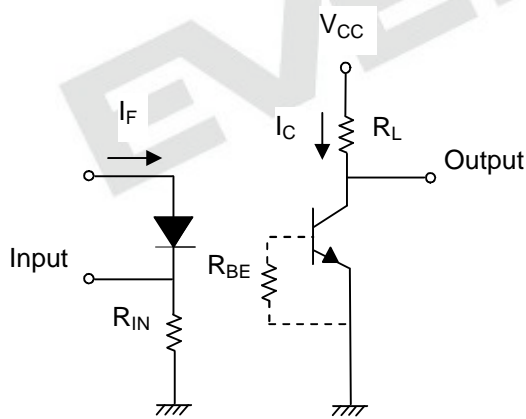
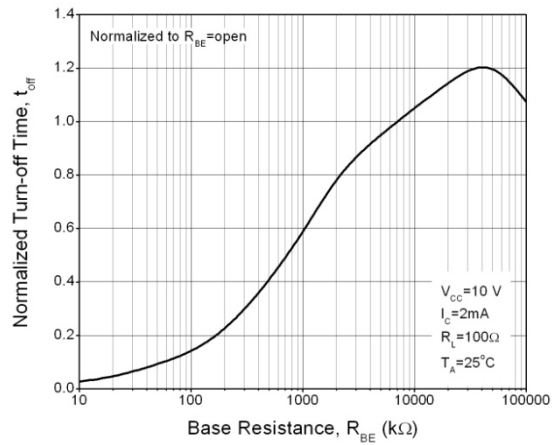


Figure 11. Switching Time Test Circuit & Waveforms

Order Information

Part Number

CNY17-XY(Z)-V

or

CNY17F-XY(Z)-V

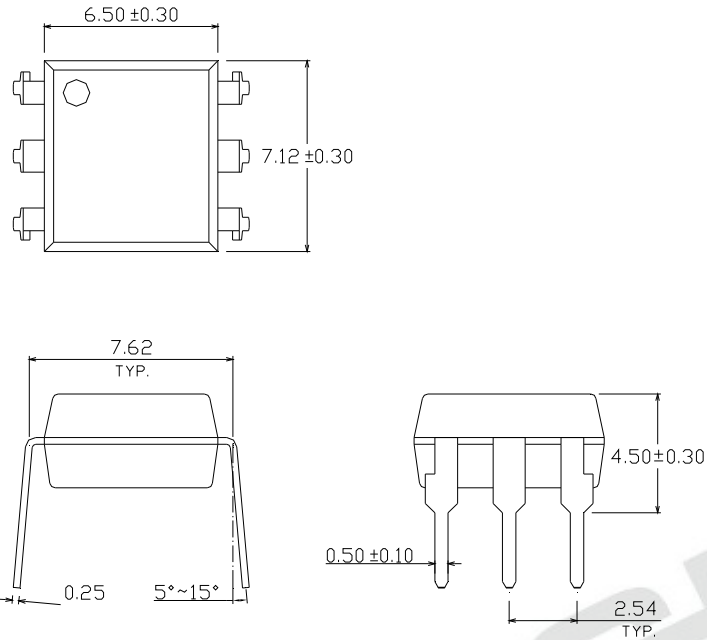
Note

- 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)

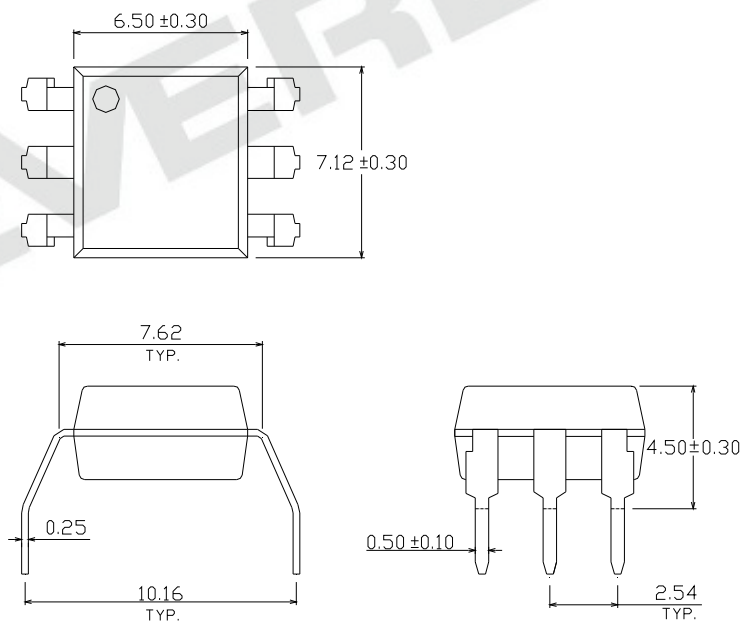
Option	Description	Packing quantity
None	Standard DIP-6	65 units per tube
M	Wide lead bend (0.4 inch spacing)	65 units per tube
S (TA)	Surface mount lead form + TA tape & reel option	1000 units per reel
S (TB)	Surface mount lead form + TB tape & reel option	1000 units per reel
S1 (TA)	Surface mount lead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

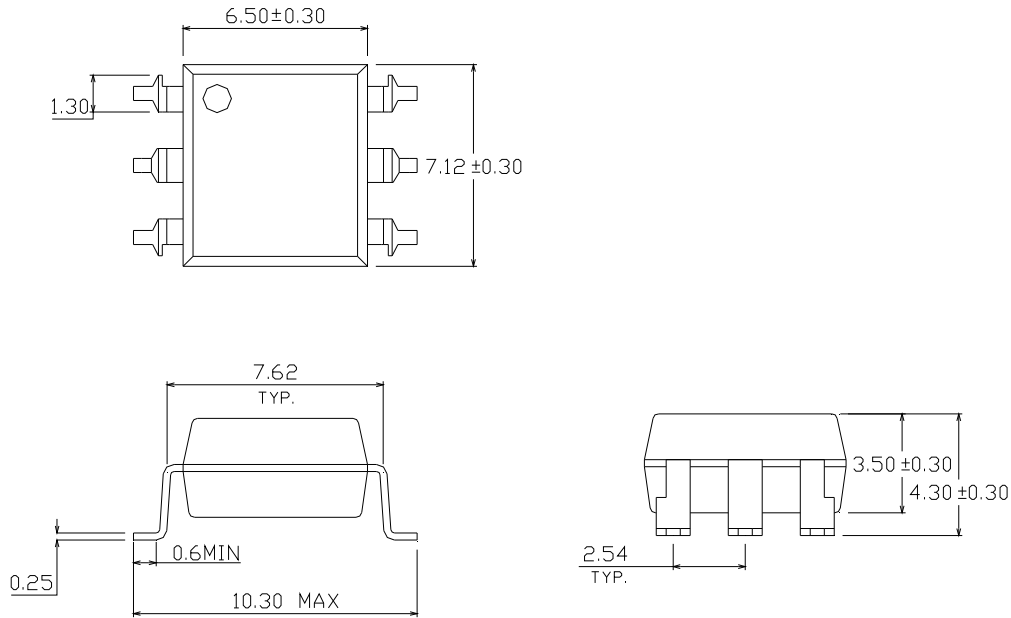
Standard DIP Type



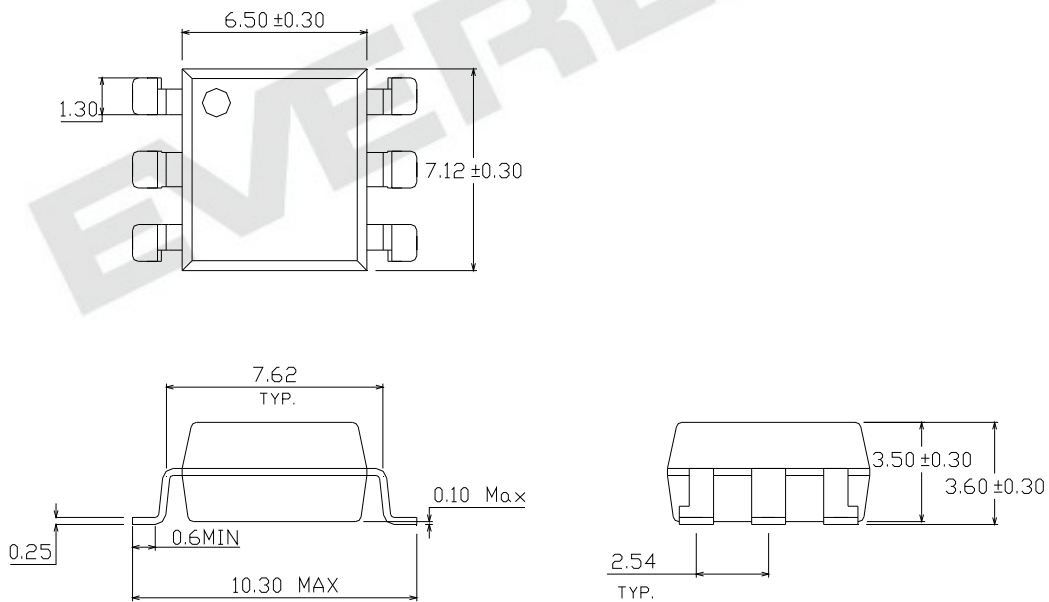
Option M Type



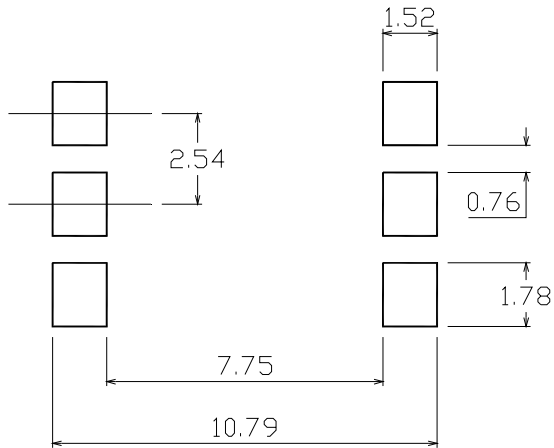
Option S Type



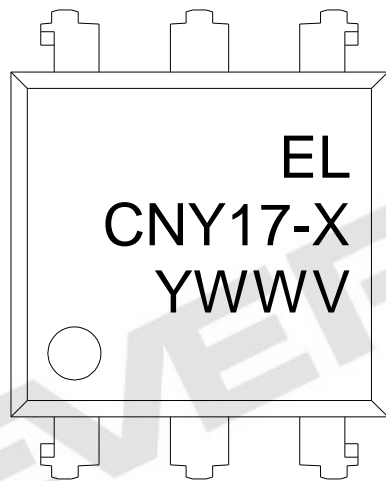
Option S1 Type



Recommended pad layout for surface mount leadform



Device Marking

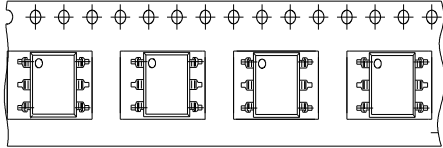


Notes

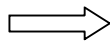
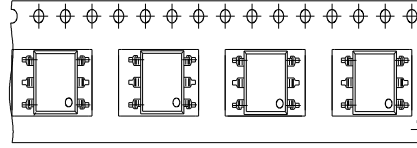
- EL denotes Everlight
- CNY17-X denotes Device Number (X: 1, 2, 3 or 4)
- Y denotes 1 digit Year code
- WW denotes 2 digit Week code
- V denotes VDE (optional)

Tape & Reel Packing Specifications

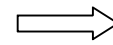
Option TA



Option TB

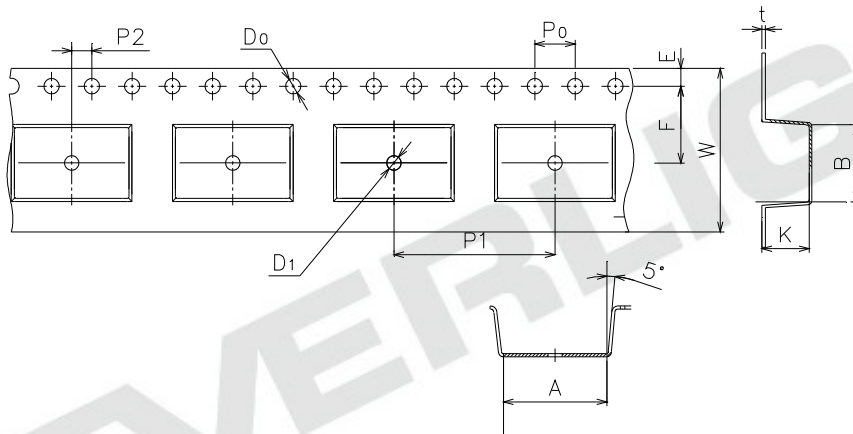


Direction of feed from reel



Direction of feed from reel

Tape dimensions

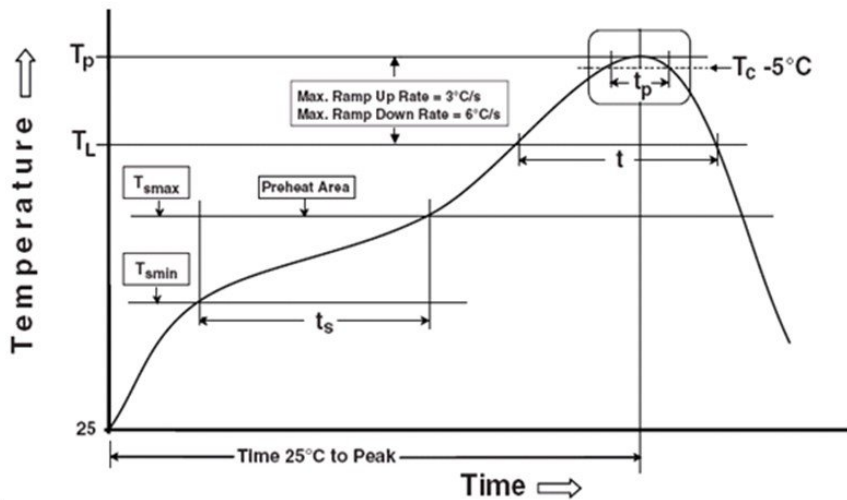


Dimension No.	A	B	Do	D1	E	F
Dimension (mm)	10.4±0.1	7.5±0.1	1.5±0.1	1.5+0.1/-0	1.75±0.1	7.5±0.1
Dimension No.	Po	P1	P2	t	W	K
Dimension (mm)	4.0±0.15	12±0.1	2.0±0.1	0.35±0.03	16.0±0.2	4.5±0.1

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: $T_p - 5^\circ\text{C}$	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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