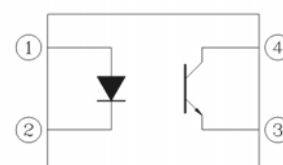


4 PIN SOP PHOTOTRANSISTOR PHOTOCOUPLER EL357N-G Series



Schematic



Features:

- Halogens free
(Br <900 ppm ,Cl <900 ppm , Br+Cl < 1500 ppm)
- Current transfer ratio
(CTR: 50~600% at $I_F = 5\text{mA}$, $V_{CE} = 5\text{V}$)
- High isolation voltage between input and output (Viso=3750 V rms)
- Compact 4 Pin SOP with a 2.0mm profile
- Compliance with EU REACH
- Pb free and RoHS compliant
- UL and cUL approved (No. E214129)
- VDE approved (No. 132249)
- SEMKO approved
- NEMKO approved
- DEMKO approved
- FIMKO approved
- CQC approved

Pin Configuration

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

Description

The EL357N-G series contains an infrared emitting diode, optically coupled to a phototransistor detector. The devices in a 4-pin small outline SMD package.

Applications

- DC-DC Converters
- Programmable controllers
- Telecommunication equipments
- Signal transmission between circuits of different potentials and impedances

Absolute Maximum Ratings (Ta=25°C)

	Parameter	Symbol	Rating	Unit
Input	Forward current	I _F	50	mA
	Peak forward current (1us, pulse)	I _{FP}	1	A
	Reverse voltage	V _R	6	V
	Power dissipation Derating factor (about Ta=100°C)	P _D	70 2.9	mW mW/C
Output	Power dissipation Derating factor (above T _a = 70°C)	P _C	150 3.7	mW mW/°C
	Collector current	I _C	50	mA
	Collector-Emitter voltage	V _{CEO}	80	V
	Emitter-Collector voltage	V _{ECO}	7	V
	Total Power Dissipation	P _{TOT}	200	mW
	Isolation Voltage*1	V _{ISO}	3750	V rms
	Operating temperature	T _{OPR}	-55 ~ +110	°C
	Storage temperature	T _{STG}	-55 ~ +125	°C
	Soldering Temperature*2	T _{SOL}	260	°C

Notes:

*1 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.

*2 For 10 seconds

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

Input

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Forward voltage	V_F	-	1.2	1.4	V	$I_F = 20\text{mA}$
Reverse current	I_R	-	-	10	μA	$V_R = 4\text{V}$
Input capacitance	C_{in}	-	30	250	pF	$V = 0, f = 1\text{kHz}$

Note: Reverse Voltage(VR) Condition is applied to IR test only The device is not designed for reverse operation

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}	80	-	-	V	$I_C = 0.1\text{mA}$
Emitter-Collector breakdown voltage	BV_{ECO}	7	-	-	V	$I_E = 0.01\text{mA}$

Transfer Characteristics (Ta=25°C unless specified otherwise)

Parameter	Symbol	Min	Typ.	Max.	Unit	Condition
Current Transfer ratio	EL357N	50	-	600	%	$I_F = 5\text{mA}, V_{CE} = 5\text{V}$
	EL357NA	80	-	160		
	EL357NB	130	-	260		
	EL357NC	200	-	400		
	EL357ND	300	-	600		
	EL357NE	100	-	200		
	EL357NF	150	-	300		
Collector-Emitter saturation voltage	$V_{CE(sat)}$	-	0.1	0.2	V	$I_F = 20\text{mA}, I_C = 1\text{mA}$
Isolation resistance	R_{IO}	5×10^{10}	-	-	Ω	$V_{IO} = 500\text{Vdc}, 40\sim 60\% \text{ R.H.}$
Floating capacitance	C_{IO}	-	0.6	1.0	pF	$V_{IO} = 0, f = 1\text{MHz}$
Rise time	t_r	-	-	18	μs	$V_{CE} = 2\text{V}, I_C = 2\text{mA}, R_L = 100\Omega$
Fall time	t_f	-	-	18		

* Typical values at Ta = 25°C

Typical Electro-Optical Characteristics Curves

Figure 1. Forward Current vs Forward Voltage

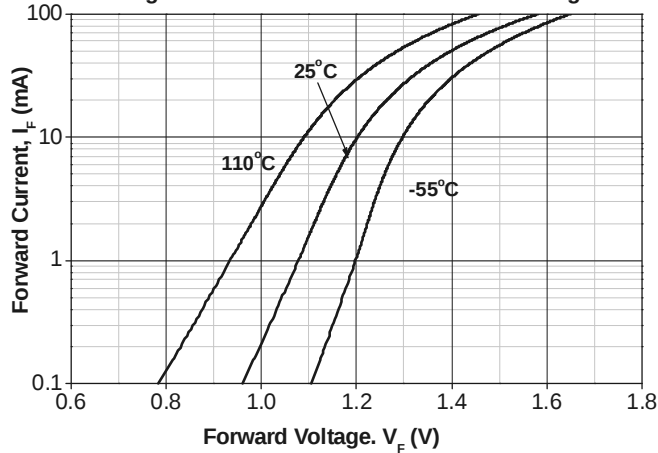


Figure 2. Normalized Collector Current vs Forward Current

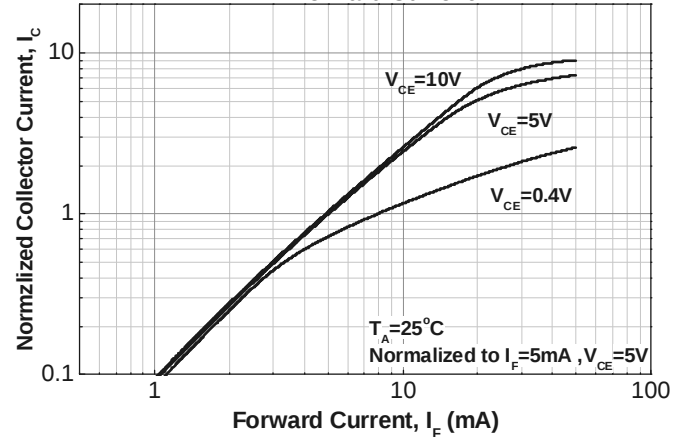


Figure 3. Normalized Collector Current vs Forward Current

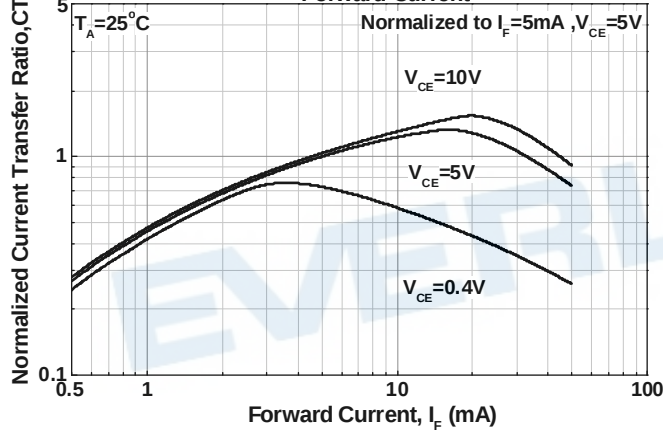


Figure 4. Normalized Collector Current vs Ambient Temperature

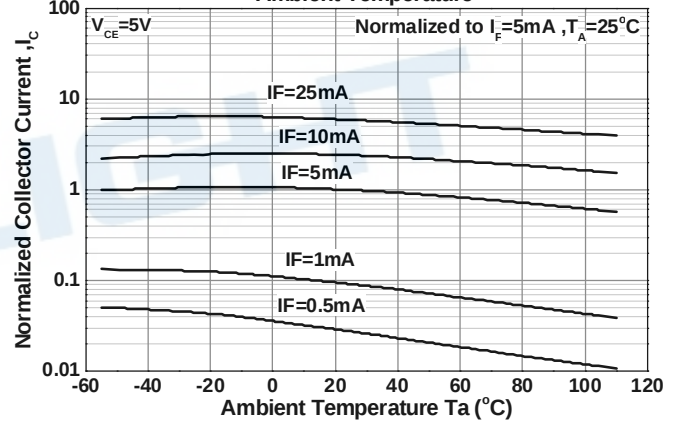


Figure 5. Collector Current vs Collector - Emitter Voltage

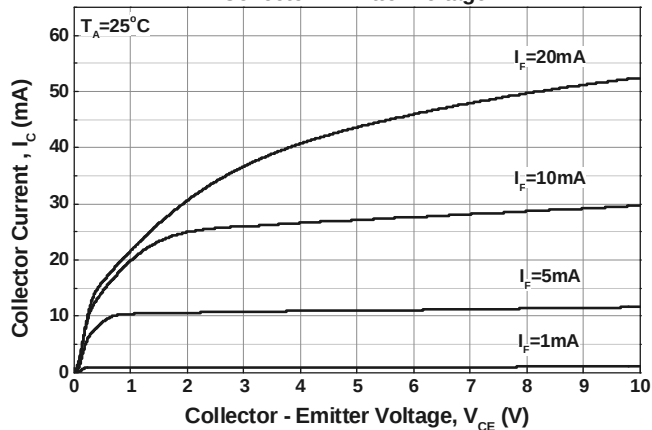


Figure 6. Collector Current vs Collector - Emitter Voltage

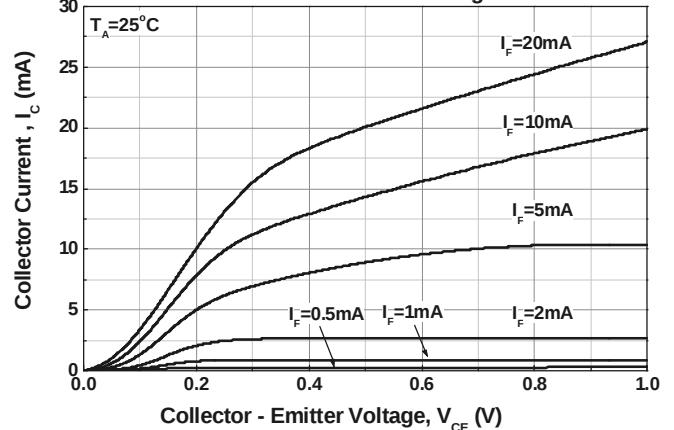


Figure 7 Collector Dark Current vs Ambient Temperature

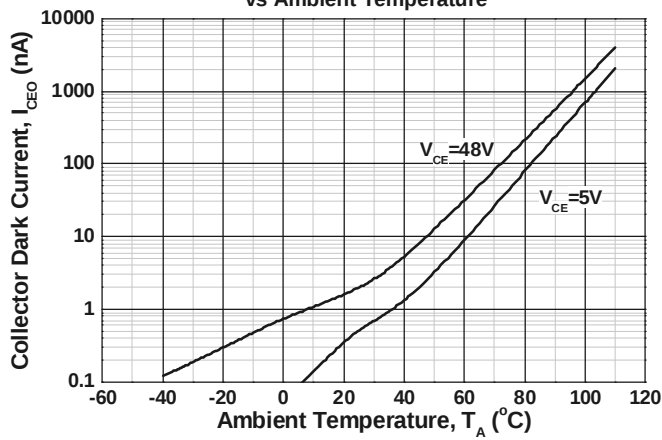


Figure 8. Switching Time vs Load Resistance

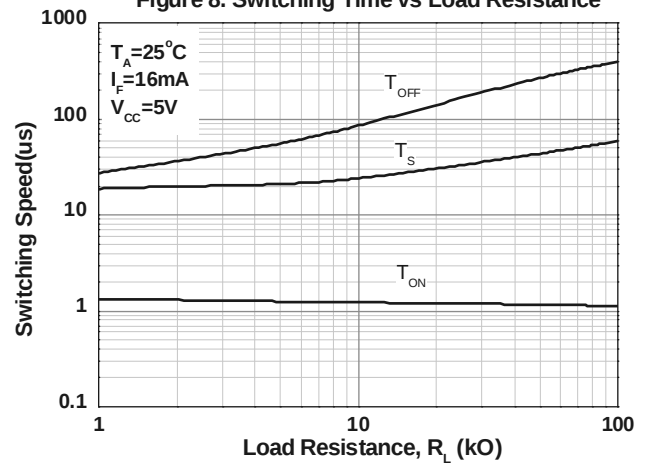


Figure 9. Collector Emitter Saturation Voltage vs Ambient Temperature

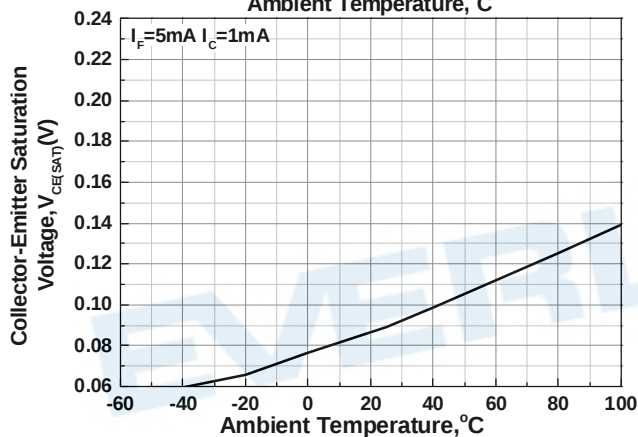
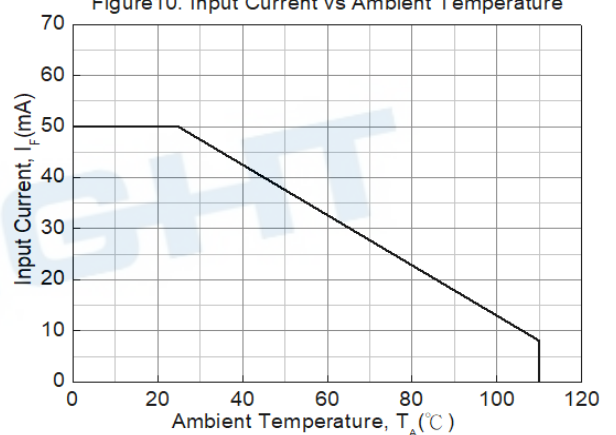
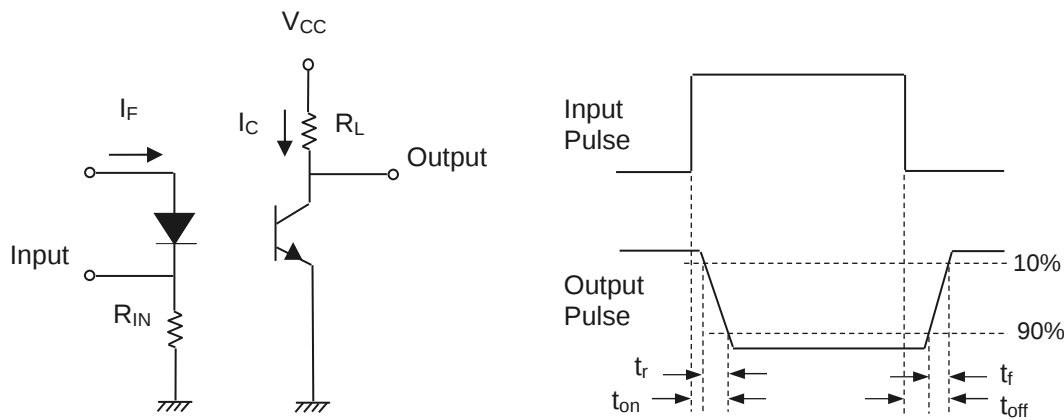


Figure 10. Input Current vs Ambient Temperature



Note: The graphs shown in this datasheet are representing typical data only and do not show guaranteed values

Figure 11. Switching Time Test Circuit & Waveforms



Order Information

Part Number

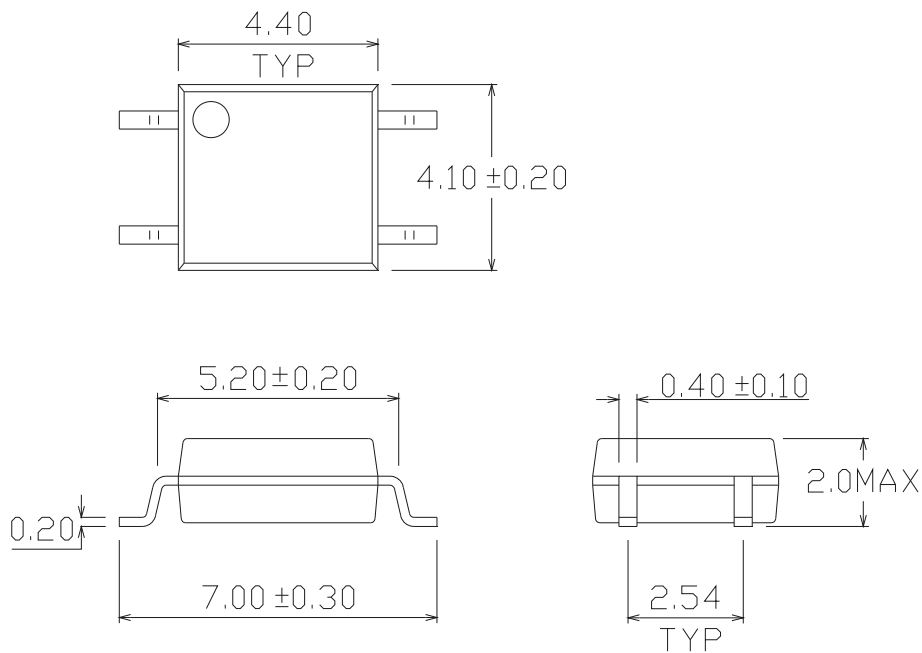
EL357N(X)(Y)-VG

Note

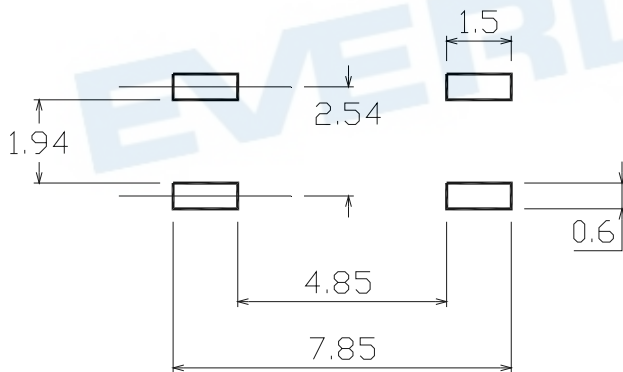
- X = CTR Rank (A, B, C, D, E, F or none)
- Y = Tape and reel option (TA, TB or none).
- V = VDE (option)
- G = Halogen free

Option	Description	Packing quantity
None	Standard SMD option	100 units per tube
-V	Standard SMD option + VDE	100 units per tube
(TA)	TA Tape & reel option	3500 units per reel
(TB)	TB Tape & reel option	3500 units per reel
(TA)-V	TA Tape & reel option + VDE	3500 units per reel
(TB)-V	TB Tape & reel option + VDE	3500 units per reel

Package Dimension (Dimensions in mm)



Recommended pad layout for surface mount leadform



Device Marking



Notes

EL	denotes Everlight
357N	denotes Device Number
R	denotes CTR Rank
Y	denotes 1 digit Year code
WW	denotes 2 digit Week code
V	denotes VDE approved (optional)

EVERLIGHT

Label form

Pb **EVERLIGHT** 11 → 月份

客戶料號 ← CPN: XXXXXXXXXXXX 測試區

億光料號 ← P/N: XXXXXXXXXXXX

億光品名 ← EL817M(C)-VG

生產周別 ← D/C: YWWX CAT: X QTY: 000000 → 包裝數量

生產序號 ← LOT NO: Y151130XXXXXXXXXX

標籤識別碼 ← REFERENCE: BTPyyMMddXXXXX

產地 ← MADE IN XXXXXX

RoHS 標示

CEC e US DVE → 安規標示

QR Code

or

RoHS 標示

RoHS **Pb** **EVERLIGHT** 5 → 月份

客戶料號 ← CPN: XXXXXXXXXXXX 測試區

客戶品名 ← XXXXXXXXXXXX-XXXXXXXXXX-XXXXXXXXXX-XXXXXXXXXX-XXXXXX

億光料號 ← P/N: XXXXXXXXXXXX

億光品名 ← XXXXXXXXXXXX-XXXXXXXXXX-XXXXXXXXXX-XXXXXX

生產序號 ← LOT NO: Y150516XXX-XXXXXXXXXX-XXXXXXXXXX

包裝數量 ← QTY: 0123456789 HUE: XXXXXXXXXXXX

CTR等級 ← CAT: XXXXXXXXXXXX REF: XXXXXXXXXXXX

標籤識別碼 ← REFERENCE: BTPYYMMDDXXXXX

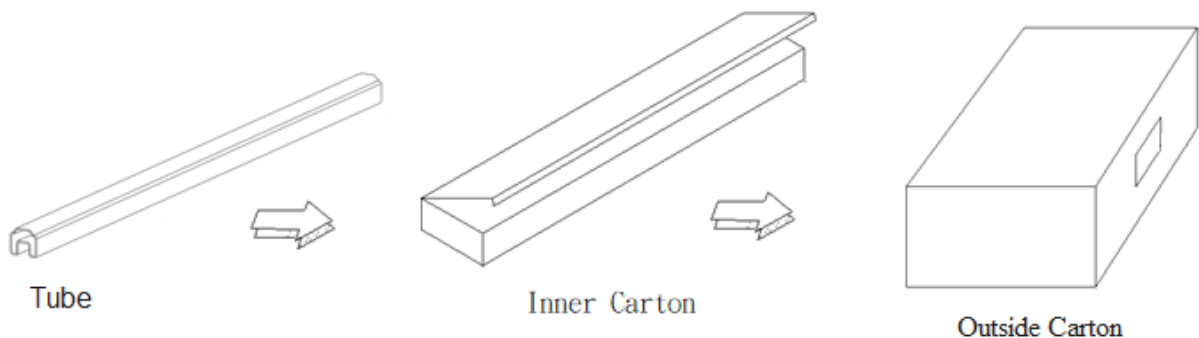
MSL等級 ← MSL-XX MADE IN XXXXXX

產地

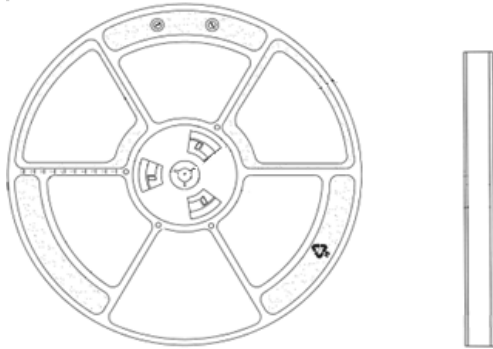
CEC e US DVE → 安規標示

QR Code

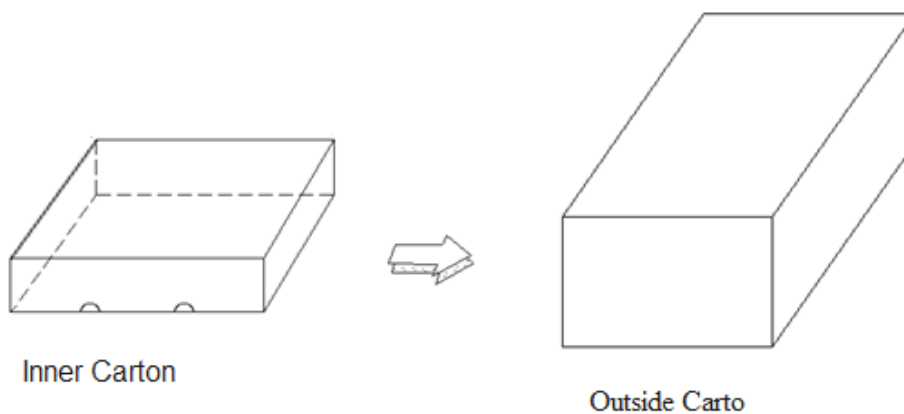
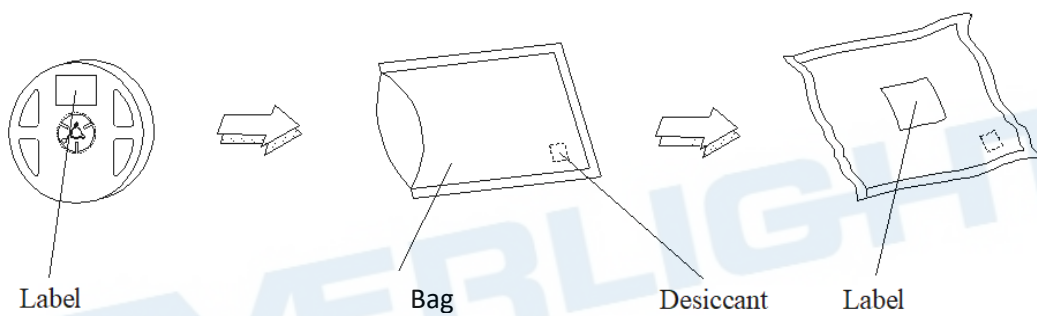
TUBE Dimension



Reel Dimension

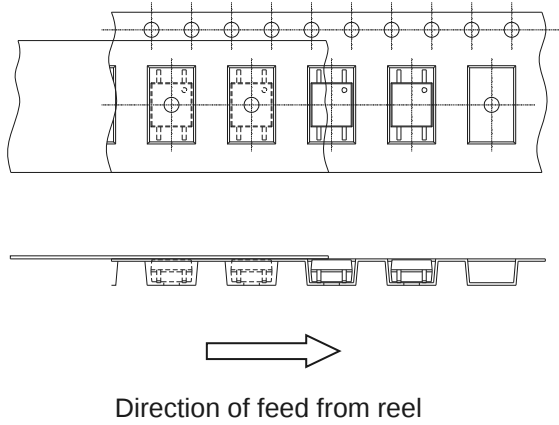


Moisture Resistant Packaging

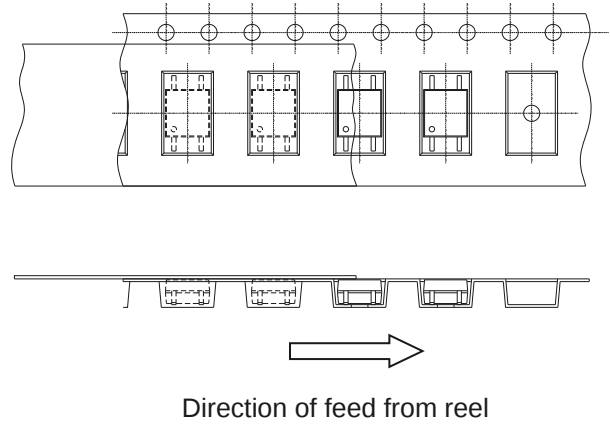


Tape & Reel Packing Specifications

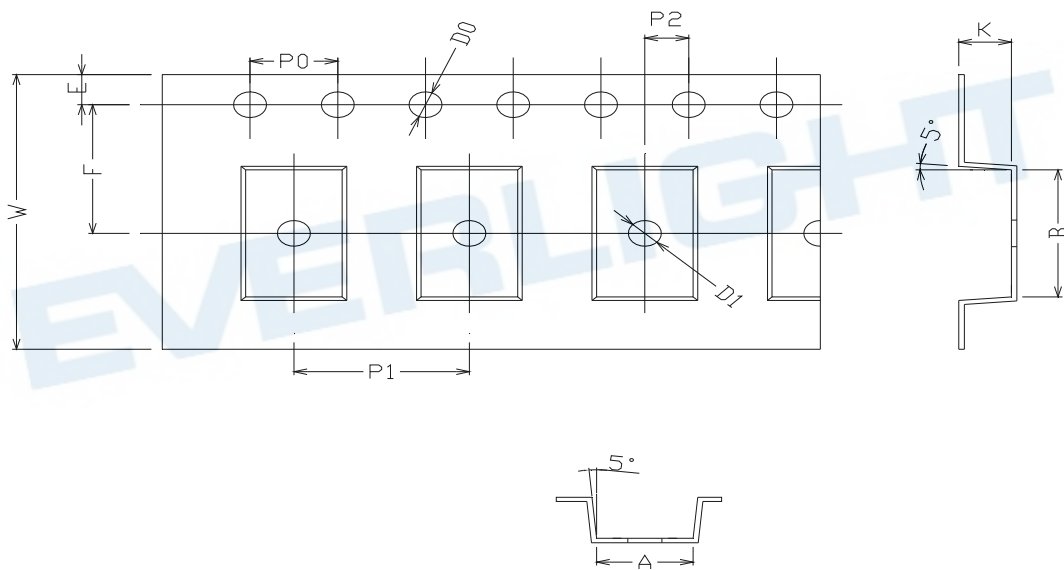
Option TA



Option TB



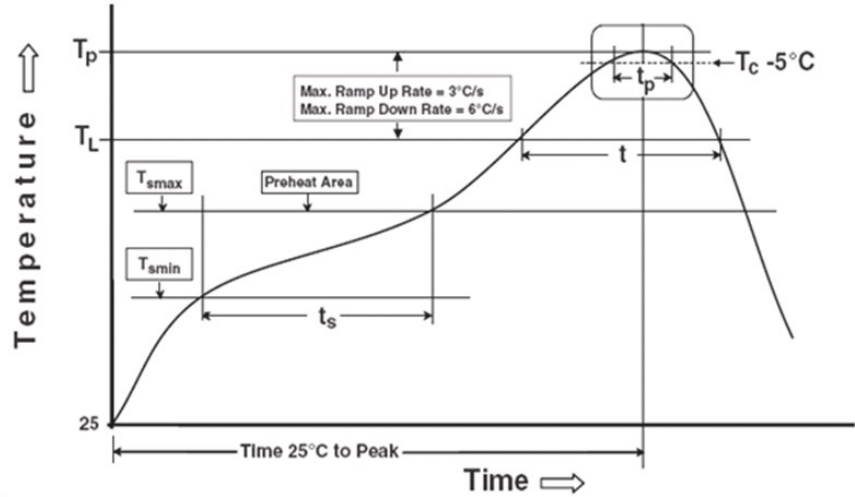
Tape dimensions



Dimension No.	A	B	Do	D1	E	F
Dimension (mm)	4.4 ± 0.1	7.4 ± 0.1	$1.5 + 0.1/-0$	1.5 ± 0.1	1.75 ± 0.1	7.5 ± 0.05
Dimension No.	Po	P1	P2	t	W	K
Dimension (mm)	4.0 ± 0.15	8.0 ± 0.1	2.0 ± 0.1	0.25 ± 0.03	16.0 ± 0.2	2.4 ± 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

Precautions for General Storage

- Avoid storage locations where devices may be exposed to moisture or direct sunlight.
- Follow the precautions printed on the packing label of the device for transportation and storage.
- Keep the storage location temperature and humidity within a range of 5°C to 35°C and 20 % to 60 %, respectively.
- Do not store the products in locations with poisonous gases (especially corrosive gases) or in dusty conditions.
- Store the products in locations with minimal temperature fluctuations. Rapid temperature changes during storage can cause condensation, resulting in lead oxidation or corrosion, which will deteriorate the solderability of the leads.
- When restoring devices after removal from their packing, use anti-static containers.
- Do not allow loads to be applied directly to devices while they are in storage.
- If devices have been stored for more than two years under normal storage conditions, it is recommended that you check the leads for ease of soldering prior to use.

EVERLIGHT

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