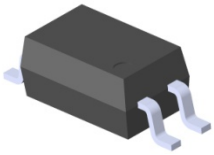
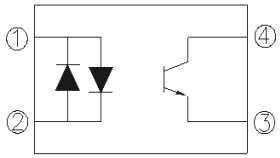
DATASHEET

4 PIN SSOP PHOTOTRANSISTOR PHOTOCOUPLER AC INPUT PHOTOCOUPLER EL3H4-G Series



Schematic



Pin Configuration
1. Anode / Cathode
2. Cathode / Anode
3. Emitter
4. Collector

Features

- Compliance Halogen Free
  (Br < 900 ppm, Cl < 900 ppm, Br+Cl < 1500 ppm)
- AC input response
- Current transfer ratio
  (CTR: Min. 20% at I_F = ±1mA,V_{CE} = 5V)
- High isolation voltage between input
  and output (Viso = 3750 V rms)
- Compact small outline package
- Pb free
- Compliance with EU REACH
- The product itself will remain within RoHS compliant version
- UL and cUL approved(No. E214129)
- VDE approved (No. 132249)
- SEMKO approved
- NEMKO approved
- DEMKO approved
- FIMKO approved
- CQC approved

Description

The EL3H4-G series contains two infrared emitting diode, connected in inverse parallel, optically coupled to a phototransistor encapsulated with green compound.
It is packaged in a 4-pin small outline SMD package

Applications

- AC line monitor
- Programmable controllers
- Telephone line interface
- Unknown polarity DC sensor

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Absolute Maximum Ratings (Ta=25°C)

Parameter		Symbol	Rating	Unit
Input	Forward current	I_F	±50	mA
	Peak forward current (t = 10μs)	I_{FM}	1	A
	Power Dissipation No derating required up to T_a = 100°C	P_D	70	mW
Output	Power dissipation	P_C	150	mW
	Derating factor (above T_a = 80°C)		3.7	mW/°C
	Collector-Emitter voltage	V_{CEO}	80	V
	Emitter-Collector voltage	V_{ECO}	6	V
Total Power Dissipation		P_{TOT}	200	mW
Isolation Voltage*1		V_{ISO}	3750	V rms
Operating Temperature		T_{OPR}	-55 to 100	°C
Storage Temperature		T_{STG}	-55 to 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.

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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 =± 20mA
Input capacitance	C_{in}	-	50	250	pF	V = 0, f = 1kHz

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} = 20V, I_F = 0mA
Collector-Emitter breakdown voltage	BV_{CEO}	80	-	-	V	I_C = 0.1mA
Emitter-Collector breakdown voltage	BV_{ECO}	6	-	-	V	I_E = 0.01mA

Transfer Characteristics

Parameter		Symbol	Min	Typ.	Max.	Unit	Condition
Current Transfer ratio	EL3H4	CTR	20	-	300	%	I_F = ±1mA ,V_{CE} = 5V
	EL3H4A		50	-	150		
	EL3H4B		100	-	300		
CTR Symmetry			0.5		2.0		I_F = ±1mA ,V_{CE} = 5V
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}	10^{11}	-	Ω	V_{IO} = 500Vdc, 40~60% R.H.
Floating capacitance		C_{IO}	-	0.6	1.0	pF	V_{IO} = 0, f = 1MHz
Rise time		t_r	-	-	18	μs	V_{CE} = 2V, I_C = 2mA, R_L = 100Ω
Fall time		t_f	-	-	18	μs	

* Typical values at T_a = 25°C

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Typical Electro-Optical Characteristics Curves

Figure 1. Forward Current vs Forward Voltage

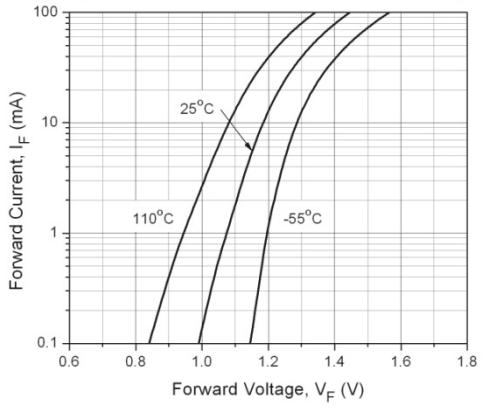

Figure 2. Normalized Collector Current vs Forward Current

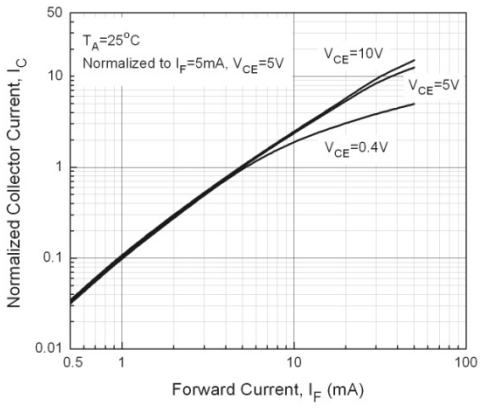

Figure 3. Normalized Current Transfer Ratio vs Forward Current

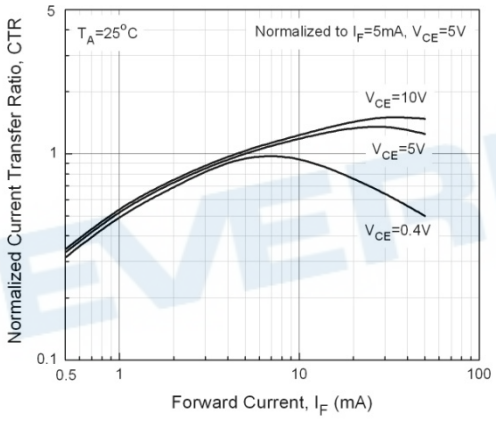

Figure 4. Normalized Collector Current vs Ambient Temperature

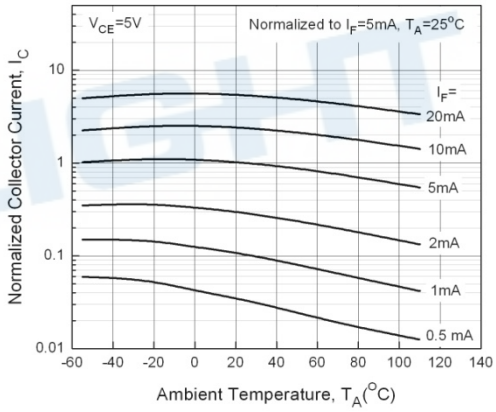

Figure 5. Normalized Current Transfer Ratio vs Ambient Temperature

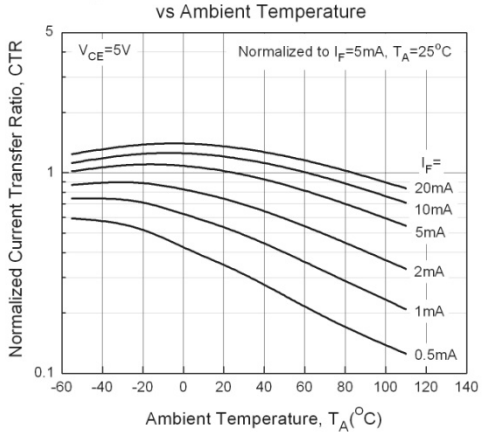

Figure 6. Collector Current vs Collector-Emitter Voltage

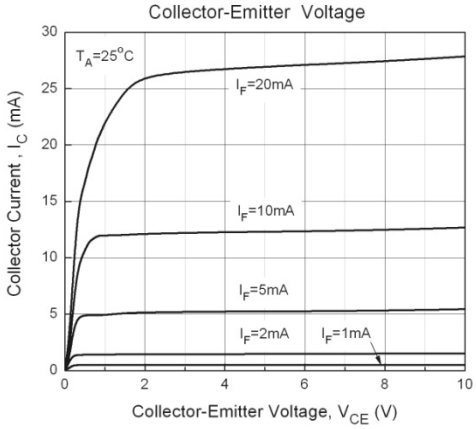

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Figure 7. Collector Current vs Collector-Emitter Voltage

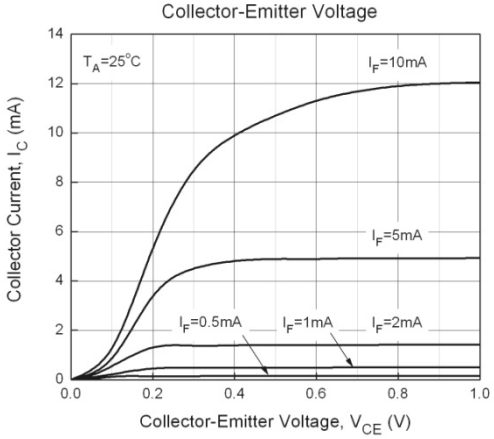


Figure 8. Collector Dark Current vs Ambient Temperature

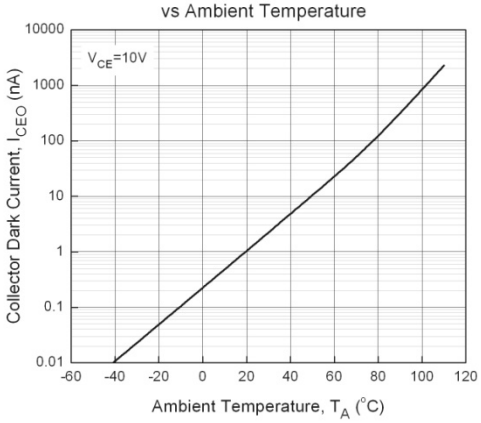


Figure 9. Collector-Emitter Saturation Voltage vs Ambient Temperature

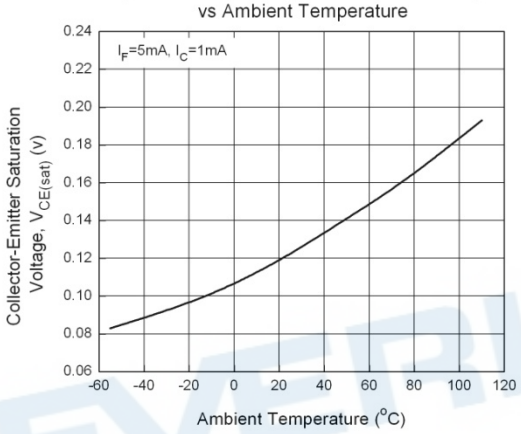
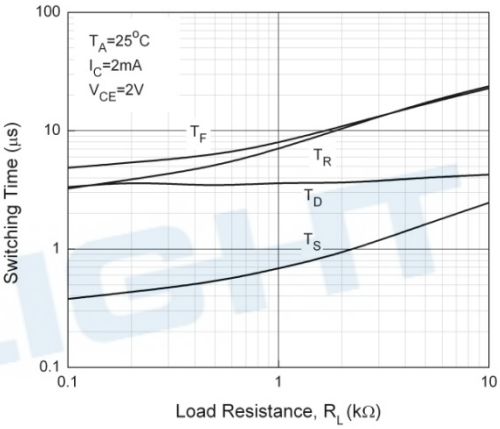


Figure 10. Switching Time vs Load Resistance



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

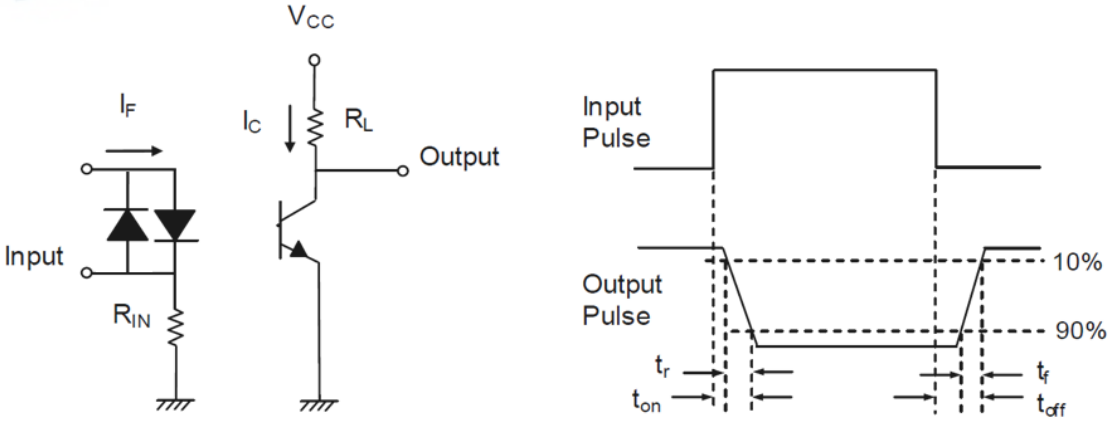


Figure 11. Switching Time Test Circuit & Waveforms

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Order Information

Part Number

EL3H4(Y)(Z)-VG

Notes

Y = CTR Rank (A, B or none)
Z = Tape and reel option (TA, TB, EA, EB or none).
V = VDE (optional)
G = Halogens free

Option	Description	Packing quantity
None	Standard SMD option	150 units per tube
-V	Standard SMD option + VDE	150 units per tube
(TA)	TA Tape & reel option	6000 units per reel
(TB)	TB Tape & reel option	6000 units per reel
(TA)-V	TA Tape & reel option + VDE	6000 units per reel
(TB)-V	TB Tape & reel option + VDE	6000 units per reel
(EA)	TA Tape & reel option	1000 units per reel
(EB)	TB Tape & reel option	1000 units per reel
(EA)-V	TA Tape & reel option + VDE	1000 units per reel
(EB)-V	TB Tape & reel option + VDE	1000 units per reel

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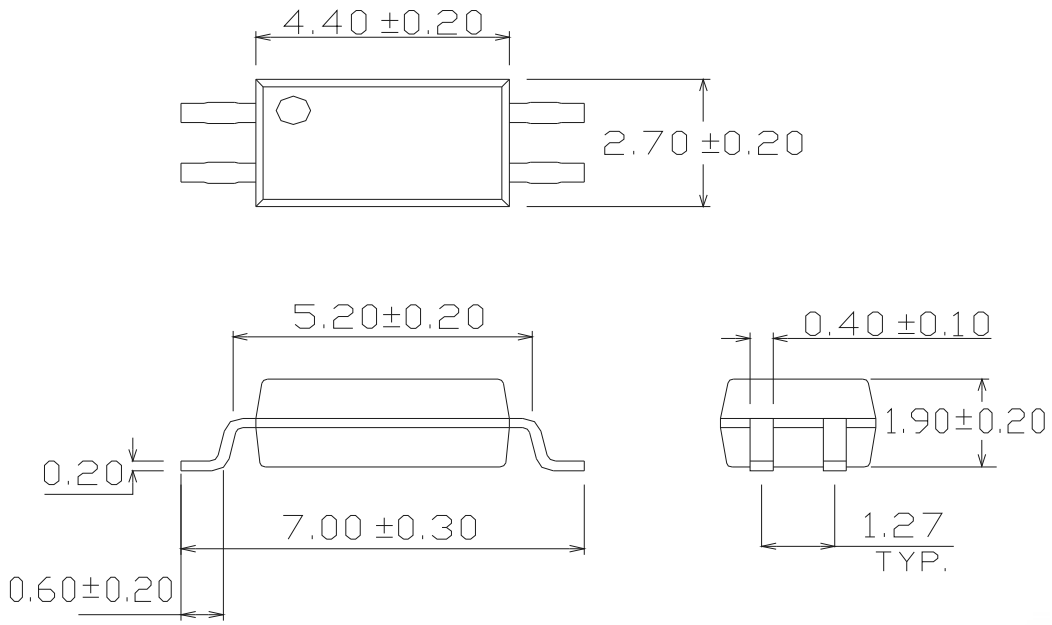
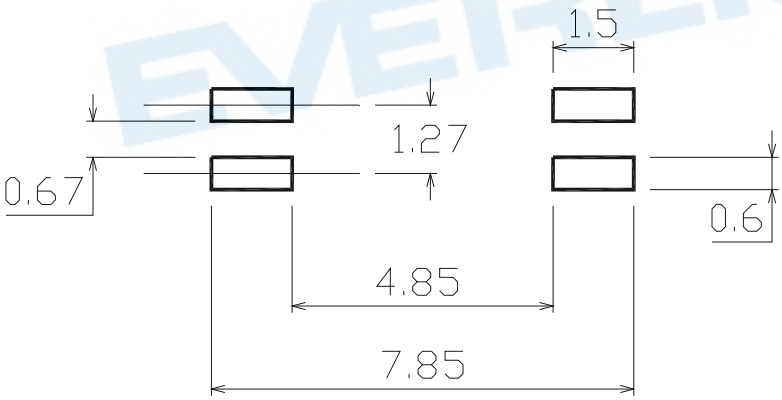
Package Dimension (Dimensions in mm)



Recommended pad layout for surface mount leadform



Notes

Suggested pad dimension is just for reference only.
Please modify the pad dimension based on individual need.

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Device Marking

Notes

EL	denotes EVERLIGHT
3H4	denotes Device Number
R	denotes CTR Rank (A, B or none)
Y	denotes 1 digit Year code
WW	denotes 2 digit Week code
V	denotes VDE (optional)

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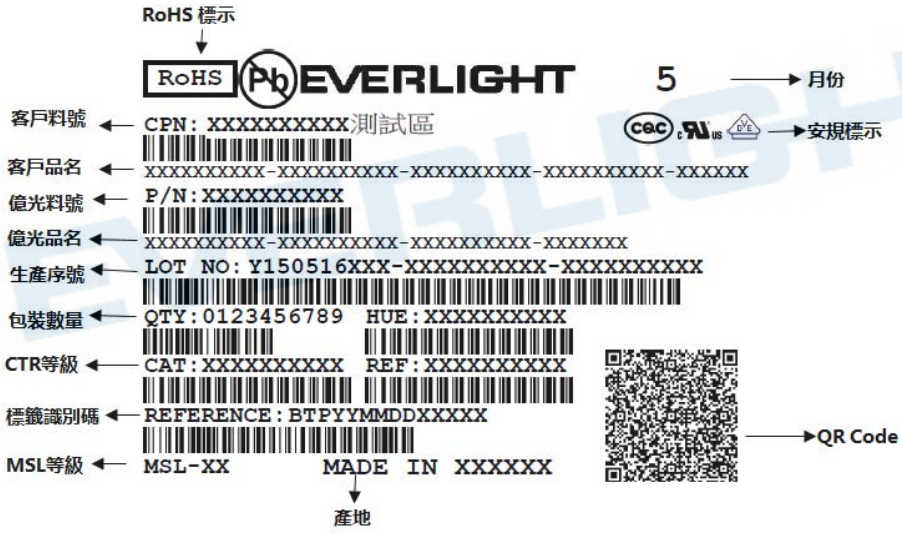
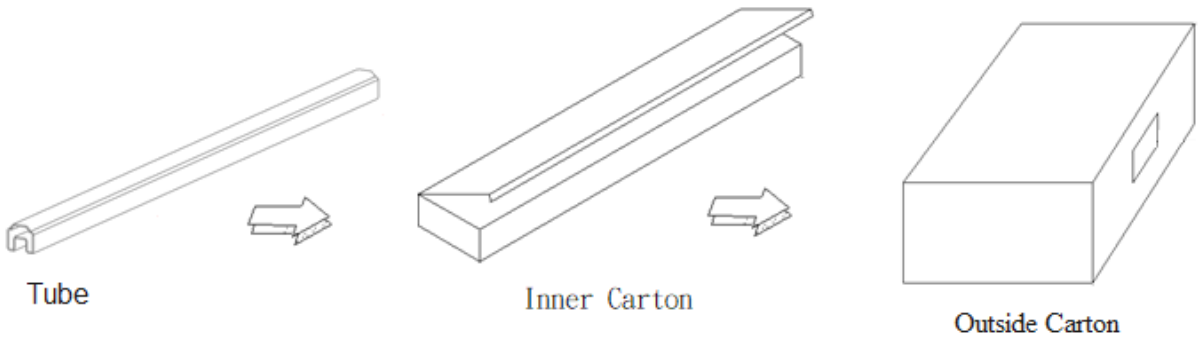
Label form

or



TUBE Dimension



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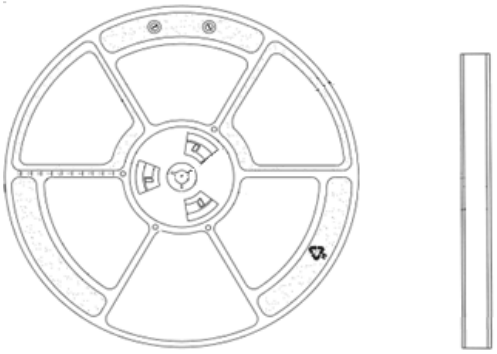
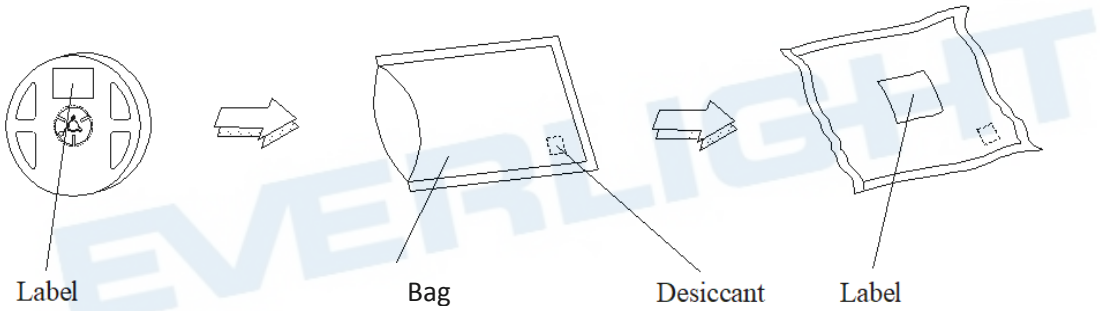
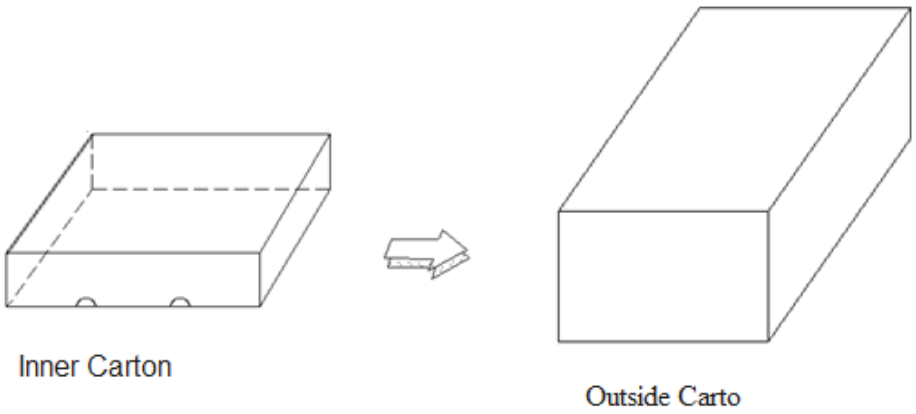
Reel Dimension



Moisture Resistant Packaging





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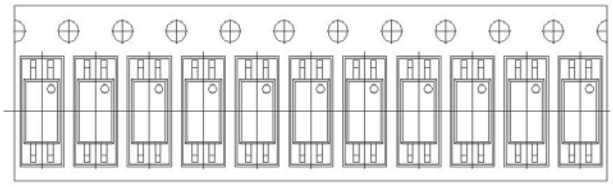
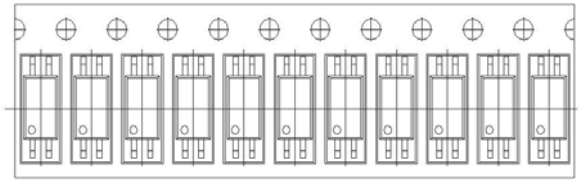
Tape & Reel Packing Specifications

Option TA



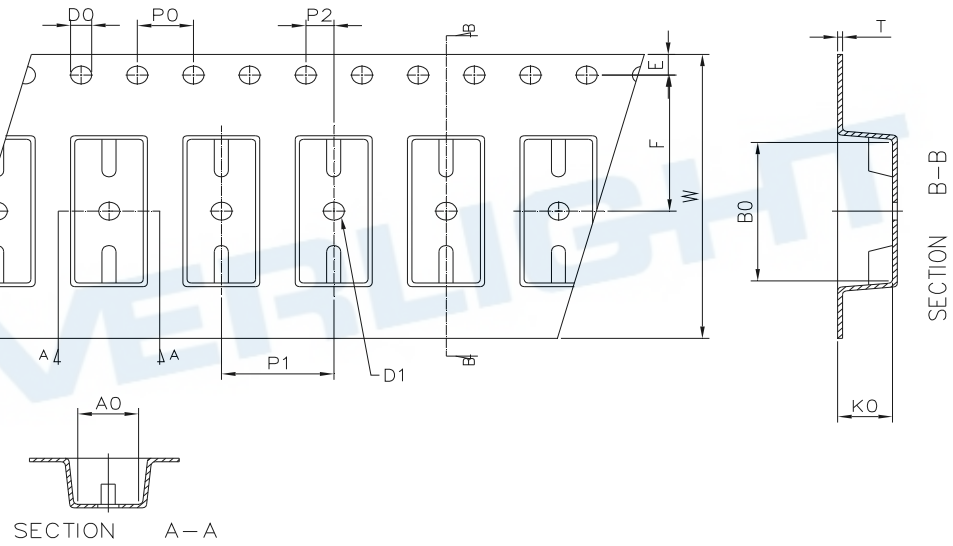
Direction of feed from reel

Option TB



Direction of feed from reel

Tape dimensions



Dimension No.	**A0**	**B0**	**D0**	**D1**	**E**	**F**
Dimension (mm)	3.00 ± 0.10	7.45 ± 0.10	1.50 + 0.1/-0	1.50 ± 0.10	1.75± 0.10	5.50 ± 0.10
Dimension No.	**Po**	**P1**	**P2**	**t**	**W**	**K0**
Dimension (mm)	4.00 ± 0.15	4.00 ± 0.10	2.00 ± 0.10	0.30 ± 0.05	12.1 ± 0.2	2.45 ± 0.1

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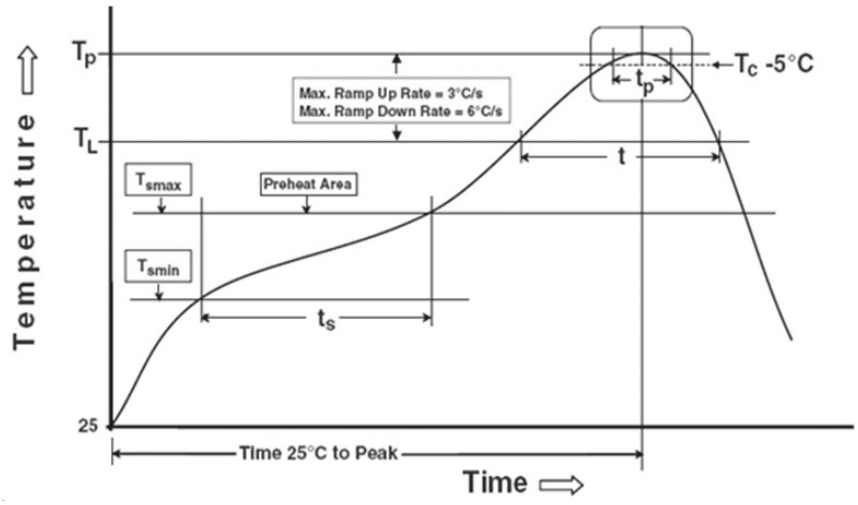
Precautions for Use

1. Soldering Condition

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



Notes	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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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.

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