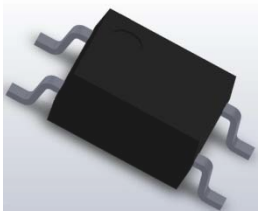
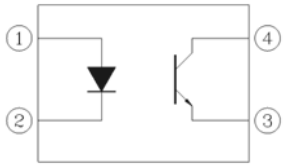
DATASHEET

4 PIN SOP PHOTOTRANSISTOR PHOTOCOUPLER
EL121N Series



Schematic



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

Features:

- Halogens free
- Current transfer ratio
  (CTR: 50~400% at I_F =5mA, V_{CE} =5V)
- High isolation voltage between input and output (Viso=3750 V rms)
- Compact 4 Pin SOP with a 2.0 mm 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

Description

The EL121N 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

Copyright © 2014, Everlight All Rights Reserved. Release Date : Sept 23, 2023. Issue No: DPC-0000253 Rev.5

Ver.:5 Release Date:10/13/2023 狀態:Approved(正式發行)

Absolute Maximum Ratings (T_a=25℃)

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	mW
			2.9	mW/C
Output	Power dissipation Derating factor (above T_a = 70°C)	P_C	150	mW
			3.7	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

Copyright © 2014, Everlight All Rights Reserved. Release Date : Sept 23, 2023. Issue No: DPC-0000253 Rev.5

Ver.:5 Release Date:10/13/2023 狀態:Approved(正式發行)

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

Input

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

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}	7	-	-	V	I_E = 0.01mA

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

Parameter		Symbol	Min	Typ.	Max.	Unit	Condition
Current Transfer ratio	EL121N	CTR	50	-	400	%	I_F = 5mA ,V_{CE} = 5V
	EL121N B		130	-	260		
	EL121N C		200	-	400		
	EL121N BC		130	-	400		
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} = 500Vdc, 40~60% R.H.
Floating capacitance		C_{IO}	-	0.6	1.0	pF	V_{IO} = 0, f = 1MHz
Rise time		t_r	-	6	18	μs	V_{CE} = 2V, I_C = 2mA, R_L = 100Ω
Fall time		t_f	-	8	18		

* Typical values at T_a = 25°C

Copyright © 2014, Everlight All Rights Reserved. Release Date : Sept 23, 2023. Issue No: DPC-0000253 Rev.5

Ver.:5 Release Date:10/13/2023 狀態:Approved(正式發行)

Typical Electro-Optical Characteristics Curves

Figure 1. Forward Current vs Forward Voltage

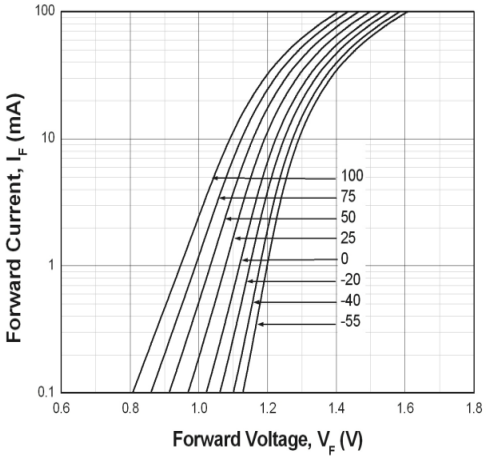


Figure 2. Normalized Collector Current vs Forward Current

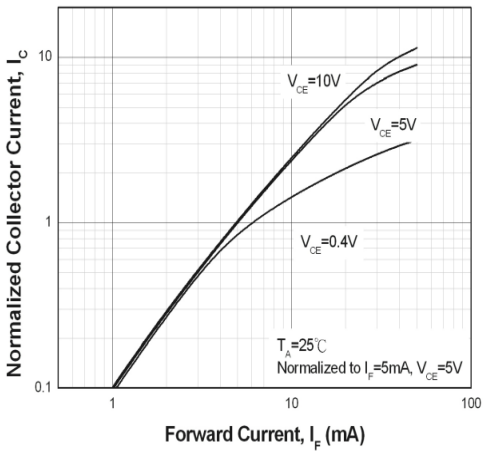


Figure 3. Normalized Current Transfer Ratio vs Forward Current

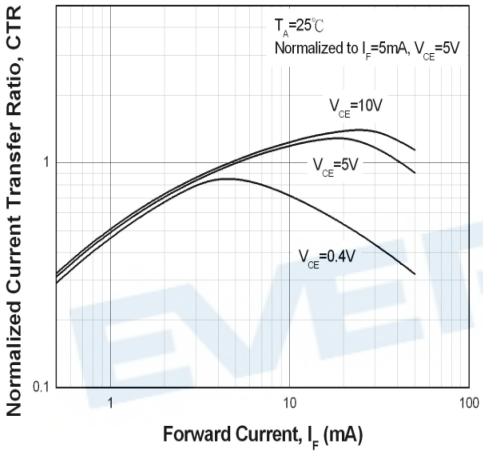


Figure 4. Normalized Collector Current vs Ambient Temperature

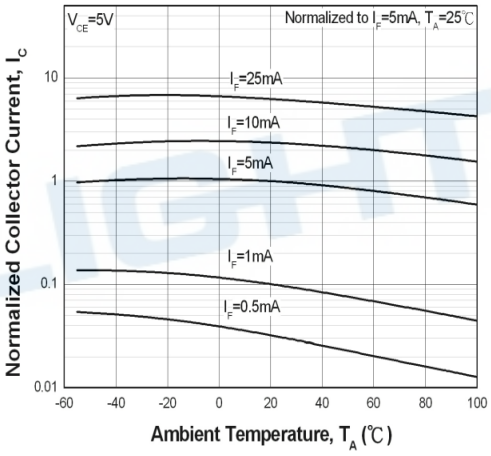


Figure 5. Collector Current vs Collector-Emitter Voltage

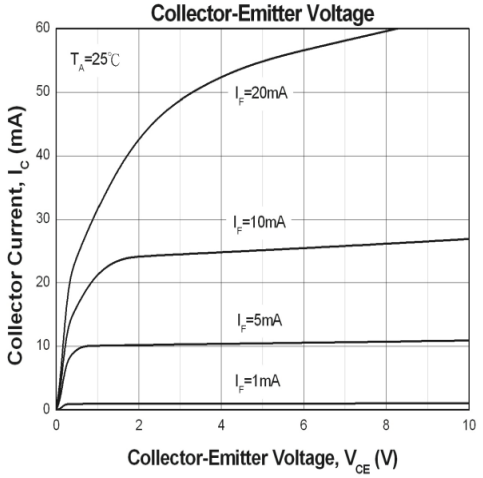
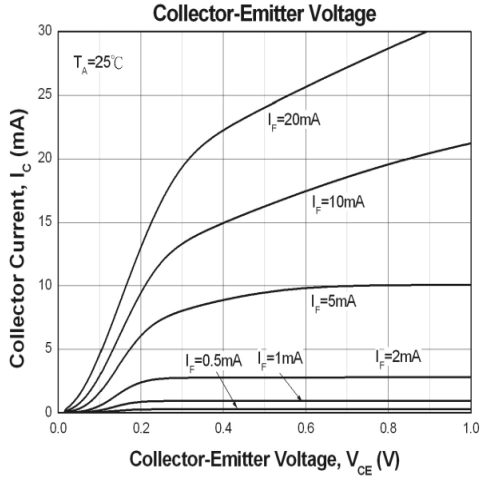


Figure 6. Collector Current vs Collector-Emitter Voltage



Copyright © 2014, Everlight All Rights Reserved. Release Date : Sept 23, 2023. Issue No: DPC-0000253 Rev.5

Ver.:5 Release Date:10/13/2023 狀態:Approved(正式發行)

Figure 7. Collector Dark Current vs Ambient Temperature

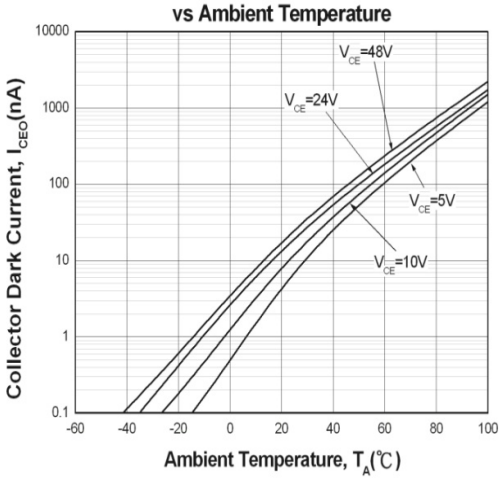


Figure 8. Switching Time vs Load Resistance

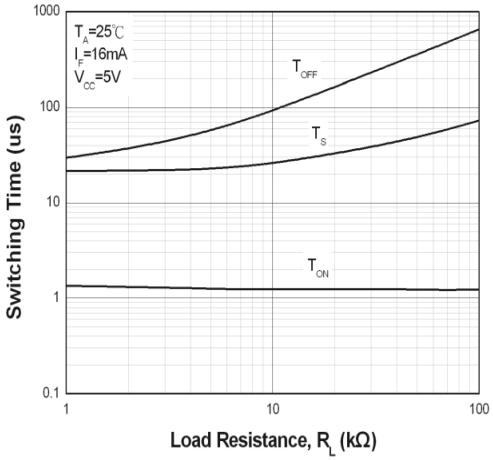
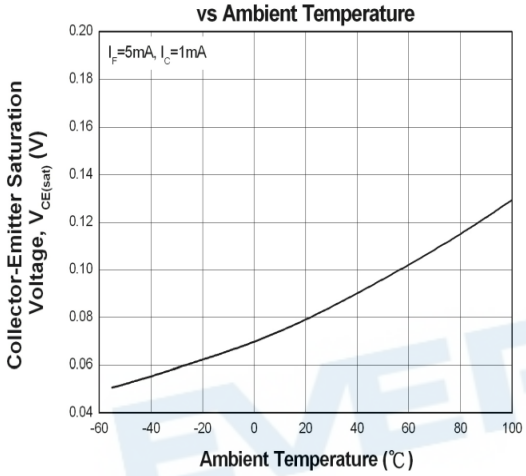
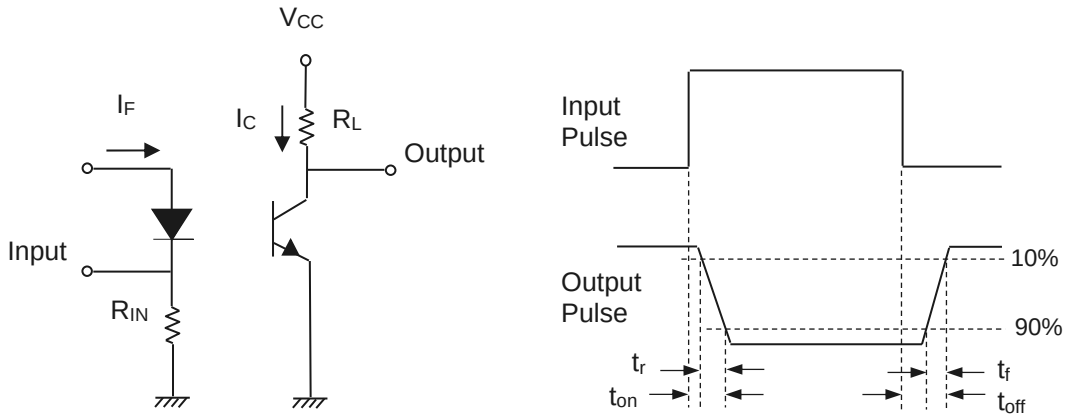


Figure 9. Collector-Emitter Saturation Voltage vs Ambient Temperature



EVERLIGHT

Figure 10. Switching Time Test Circuit & Waveforms



Copyright © 2014, Everlight All Rights Reserved. Release Date : Sept 23, 2023. Issue No: DPC-0000253 Rev.5

Ver.:5 Release Date:10/13/2023 狀態:Approved(正式發行)

Order Information

Part Number

EL121N(X)(Y)-V

Note

X = CTR Rank (B, C, BC or none)
Y = Tape and reel option (TA or TB).
V = VDE

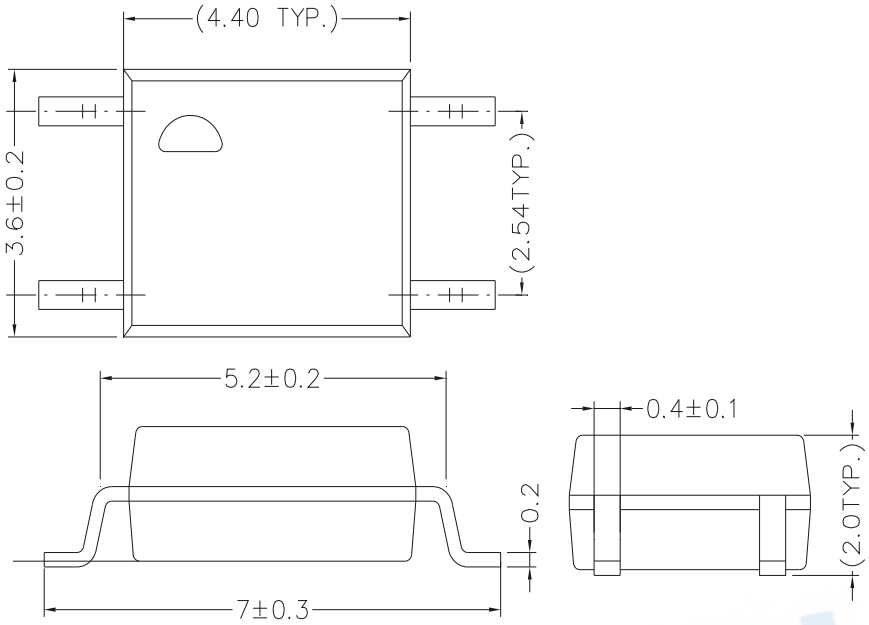
Option	Description	Packing quantity
(TA)	TA Tape & reel option	3000 units per reel
(TB)	TB Tape & reel option	3000 units per reel
(TA)-V	TA Tape & reel option + VDE	3000 units per reel
(TB)-V	TB Tape & reel option + VDE	3000 units per reel

EVERLIGHT

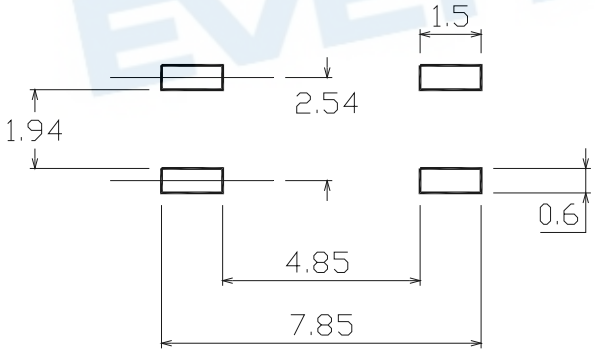
Copyright © 2014, Everlight All Rights Reserved. Release Date : Sept 23, 2023. Issue No: DPC-0000253 Rev.5

Ver.:5 Release Date:10/13/2023 狀態:Approved(正式發行)

Package Dimension (Dimensions in mm)



Recommended pad layout for surface mount leadform



Copyright © 2014, Everlight All Rights Reserved. Release Date : Sept 23, 2023. Issue No: DPC-0000253 Rev.5

Ver.:5 Release Date:10/13/2023 狀態:Approved(正式發行)

Device Marking



Notes

EL	denotes Everlight
121N	denotes Device Number
R	denotes CTR Rank (B or C)
Y	denotes 1 digit Year code
WW	denotes 2 digit Week code
V	denotes VDE

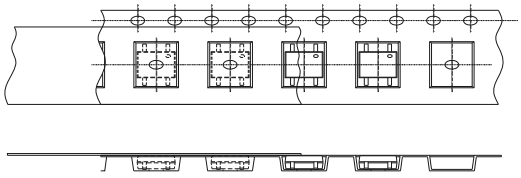
EVERLIGHT

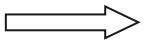
Copyright © 2014, Everlight All Rights Reserved. Release Date : Sept 23, 2023. Issue No: DPC-0000253 Rev.5

Ver.:5 Release Date:10/13/2023 狀態:Approved(正式發行)

Tape & Reel Packing Specifications

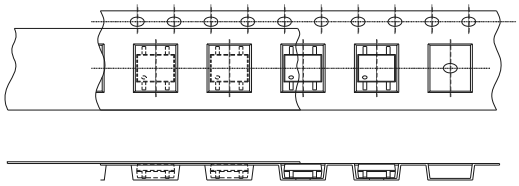
Option TA

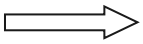




Direction of feed from reel

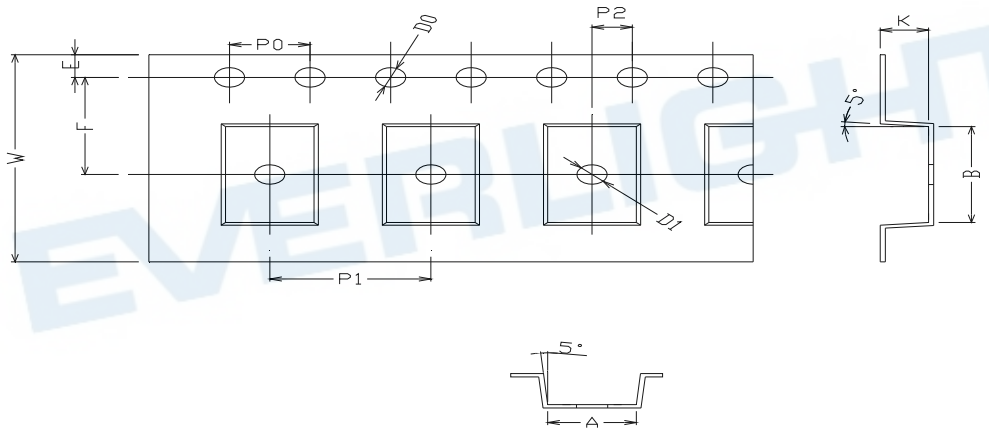
Option TB





Direction of feed from reel

Tape dimensions



Tape dimensions

Dimension No.	A	B	Do	D1	E	F
Dimension (mm)	4.1 ± 0.1	7.6 ± 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 ± 0.05	8.0 ± 0.1	2.0 ± 0.05	0.25 ± 0.05	16.0 ± 0.2	2.4± 0.1

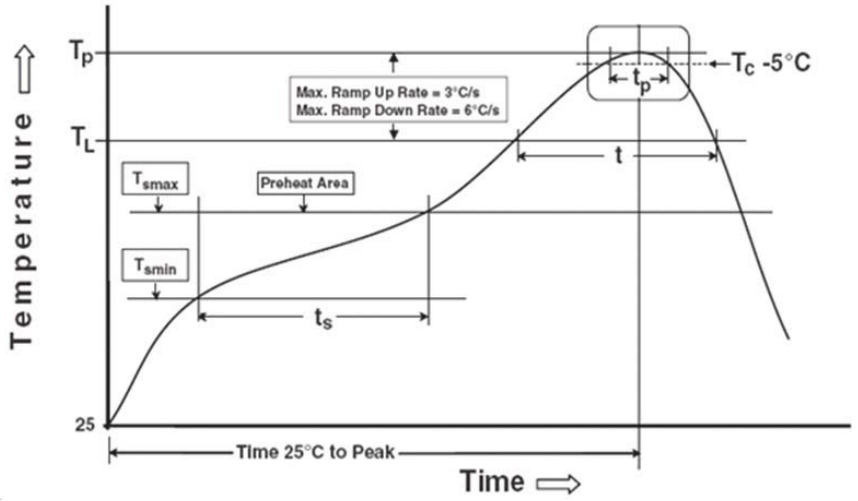
Copyright © 2014, Everlight All Rights Reserved. Release Date : Sept 23, 2023. Issue No: DPC-0000253 Rev.5

Ver.:5 Release Date:10/13/2023 狀態:Approved(正式發行)

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

.

Copyright © 2014, Everlight All Rights Reserved. Release Date : Sept 23, 2023. Issue No: DPC-0000253 Rev.5

Ver.:5 Release Date:10/13/2023 狀態:Approved(正式發行)

DISCLAIMER

1. Above specification may be changed without notice. EVERLIGHT will reserve authority on material change for above specification.
2. When using this product, please observe the absolute maximum ratings and the instructions for using outlined in these specification sheets. EVERLIGHT assumes no responsibility for any damage resulting from use of the product which does not comply with the absolute maximum ratings and the instructions included in these specification sheets.
3. These specification sheets include materials protected under copyright of EVERLIGHT corporation. Please don't reproduce or cause anyone to reproduce them without EVERLIGHT's consent.
4. These specification sheets include materials protected under copyright of EVERLIGHT. Reproduction in any form is prohibited without the specific consent of EVERLIGHT.
5. This product is not intended to be used for military, aircraft, automotive, medical, life sustaining or life saving applications or any other application which can result in human injury or death. Please contact authorized Everlight sales agent for special application request.
6. Statements regarding the suitability of products for certain types of applications are based on Everlight's knowledge of typical requirements that are often placed on Everlight products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and/or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Everlight's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Copyright © 2014, Everlight All Rights Reserved. Release Date : Sept 23, 2023. Issue No: DPC-0000253 Rev.5

Ver.:5 Release Date:10/13/2023 狀態:Approved(正式發行)