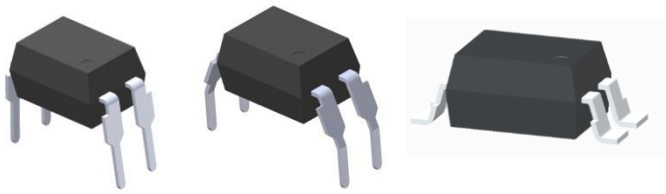
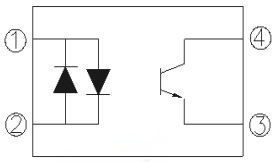
DATASHEET

4 PIN DIP PHOTOTRANSISTOR PHOTOCOUPLER
AC INPUT PHOTOCOUPLER
EL814 Series



Schematic



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

Features

- Compliance Halogens 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 = 5000 V rms)
- Wide Operating temperature range -55~110ºC
- High collector-emitter voltage V_{CEO} = 80V
- Compact dual-in-line package
- The product itself will remain within RoHS compliant version
- Compliance with EU REACH
- UL and cUL approved (No. E214129)
- VDE approved (No. 132249)
- SEMKO approved
- NEMKO approved
- DEMKO approved
- FIMKO approved
- CQC approved

Description

The EL814 series of devices each consist of two infrared emitting diodes, connected in inverse parallel, optically coupled to a phototransistor detector.
They are packaged in a 4-pin DIP package and available in side-lead spacing and SMD option.

Applications

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

Copyright © 2010, Everlight All Rights Reserved. Release Date: October 23, 2018. Issue No: DPC-0000043 Rev.9

Ver.:9 Release Date:10/29/2018 狀態:Approved(正式發行)

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
	Power dissipation	P_D	100	mW
	Derating factor (above 100 ºC)		2.9	mW/ºC
Output	Power dissipation	P_C	150	mW
	Derating factor (above 100 ºC)		5.8	mW/ºC
	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}	5000	V rms
Operating Temperature		T_{OPR}	-55 to 110	°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

Copyright © 2010, Everlight All Rights Reserved. Release Date: October 23, 2018. Issue No: DPC-0000043 Rev.9
Ver.:9 Release Date:10/29/2018 狀態:Approved(正式發行)

Electro-Optical Characteristics (Ta=25℃ 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

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 = 0.1mA

Transfer Characteristics

Parameter		Symbol	Min	Typ.	Max.	Unit	Condition
Current Transfer ratio	EL814	CTR	20	-	300	%	I_F = ±1mA ,V_{CE} = 5V
	EL814A		50	-	150		
CTR Symmetry			0.7		1.3		I_F = ±1mA ,V_{CE} = 5V
Collector-emitter saturation voltage		$V_{CE(sat)}$	-	0.05	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
Cut-off frequency		f_c	-	80	-	kHz	V_{CE}=5V, I_C=2 mA, R_L=100Ω, -3dB
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

Copyright © 2010, Everlight All Rights Reserved. Release Date: October 23, 2018. Issue No: DPC-0000043 Rev.9

Ver.:9 Release Date:10/29/2018 狀態:Approved(正式發行)

Typical Electro-Optical Characteristics Curves

Figure 1. Forward Current vs Forward Voltage

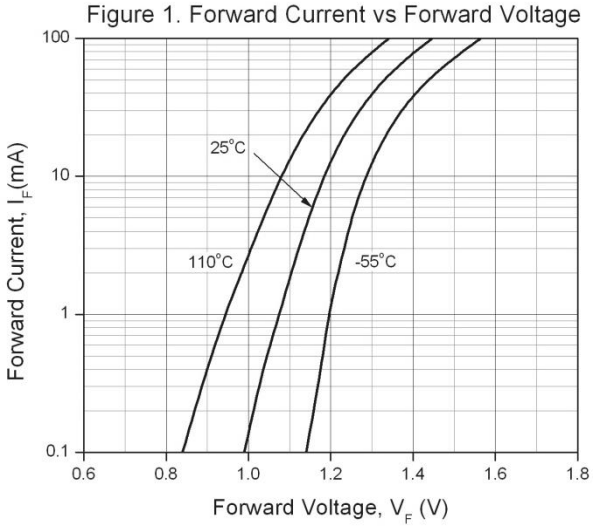


Figure 2. Normalized Current Transfer Ratio vs Forward Current

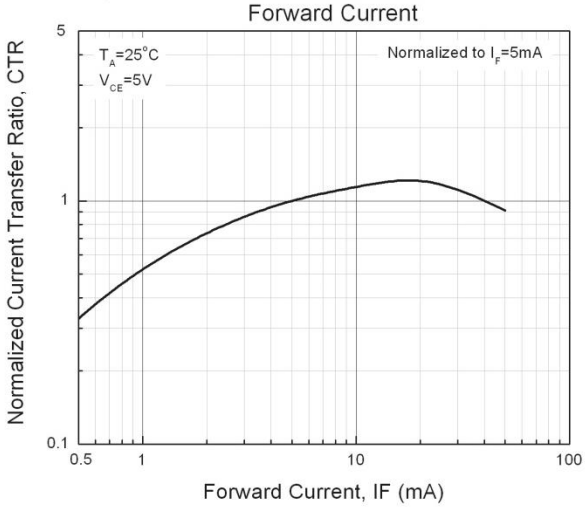


Figure 3. Current Transfer Ratio vs Ambient Temperature

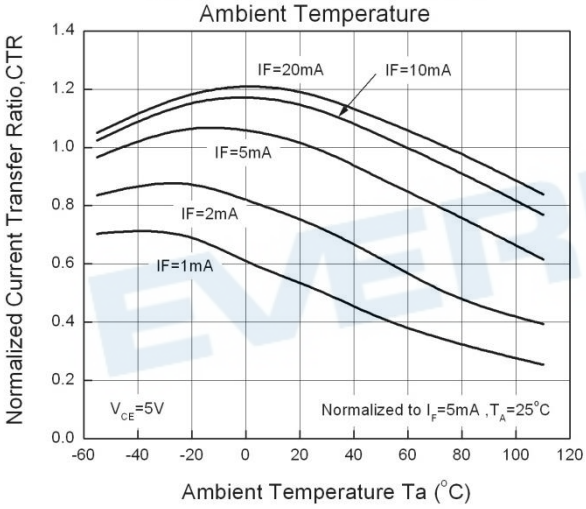


Figure 4. Dark Current vs Ambient Temperature

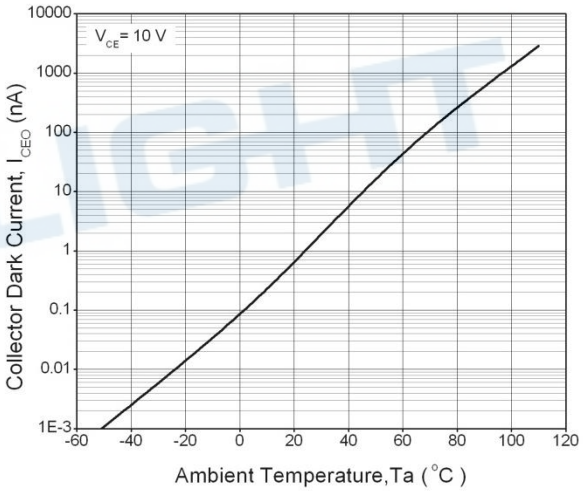


Figure 5. Collector Current vs Collector Voltage

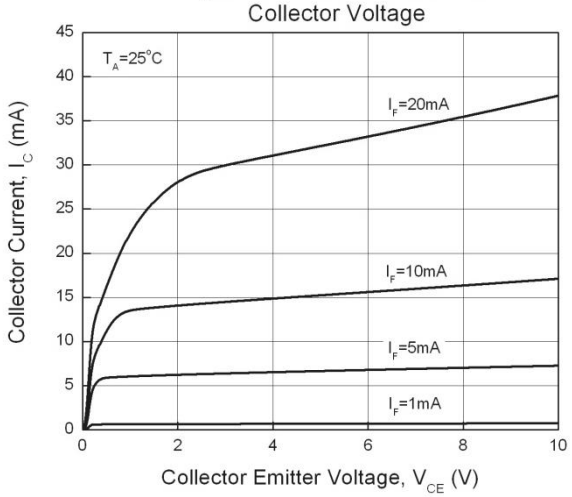
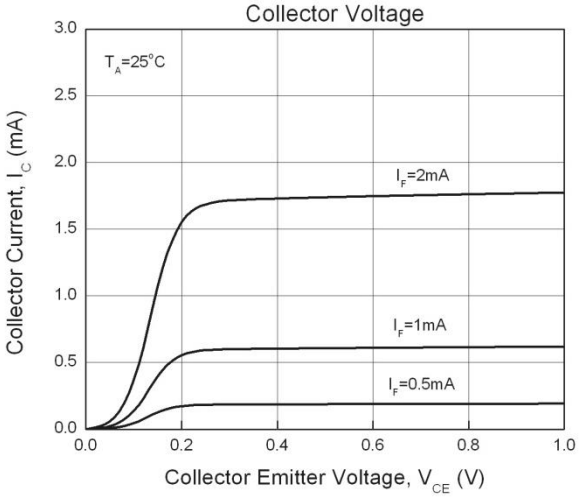


Figure 6. Collector Current vs Collector Voltage



Copyright © 2010, Everlight All Rights Reserved. Release Date: October 23, 2018. Issue No: DPC-0000043 Rev.9

Ver.:9 Release Date:10/29/2018 Approved(正式發行)

Figure 7. Collector-Emitter Saturation Voltage vs Collector Current

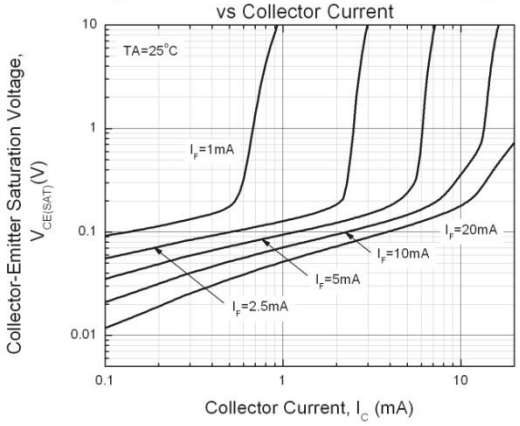
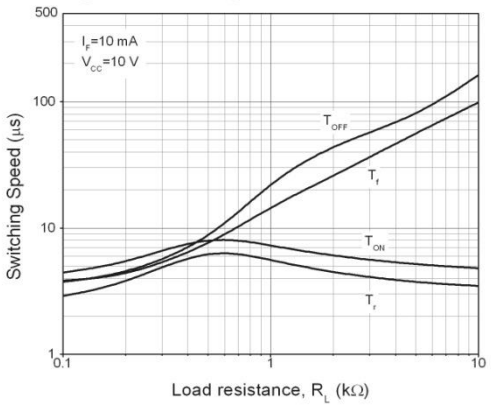


Figure 8. Switching Time vs Load Resistance



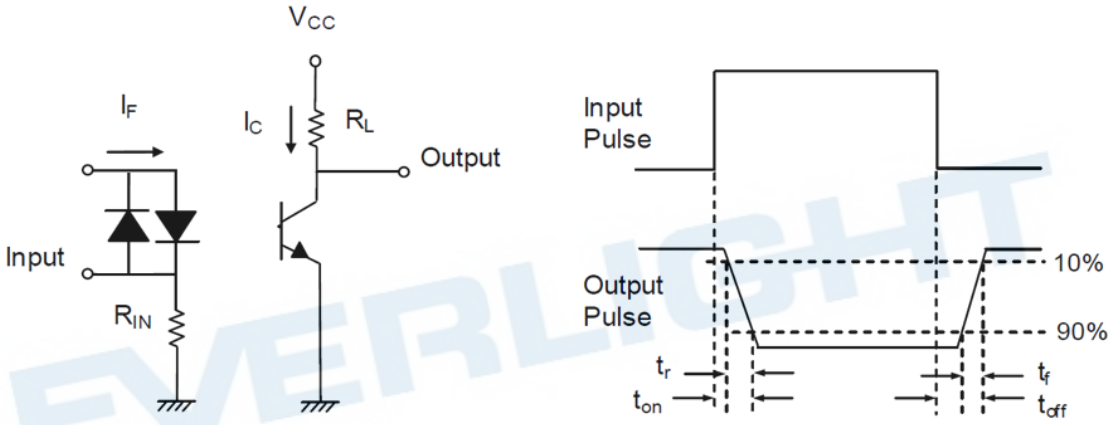


Figure 9. Switching Time Test Circuit & Waveforms

Copyright © 2010, Everlight All Rights Reserved. Release Date: October 23, 2018. Issue No: DPC-0000043 Rev.9

Ver.:9 Release Date:10/29/2018 狀態:Approved(正式發行)

Order Information

Part Number

EL814X(Y)(Z)-V

Notes

X = Lead form option (S, S1, M or none)
Y = CTR Rank (A or none)
Z = Tape and reel option (TA, TB, TU, TD or none)
V = VDE safety (optional)

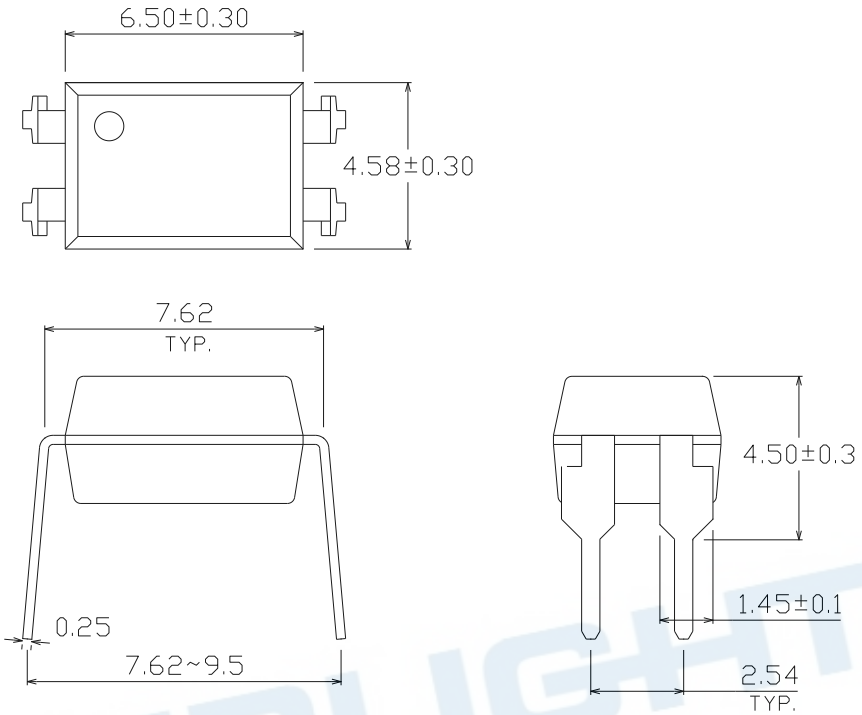
Option	Description	Packing quantity
None	Standard DIP-4	100 units per tube
M	Wide lead bend (0.4 inch spacing)	100 units per tube
S (TA)	Surface mount lead form + TA tape & reel option	1000 units per reel
S (TB)	Surface mount lead form + TB tape & reel option	1000 units per reel
S1 (TA)	Surface mount 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
S (TU)	Surface mount lead form + TU tape & reel option	1500 units per reel
S (TD)	Surface mount lead form + TD tape & reel option	1500 units per reel
S1 (TU)	Surface mount lead form (low profile) + TU tape & reel option	1500 units per reel
S1 (TD)	Surface mount lead form (low profile) + TD tape & reel option	1500 units per reel

Copyright © 2010, Everlight All Rights Reserved. Release Date: October 23, 2018. Issue No: DPC-0000043 Rev.9

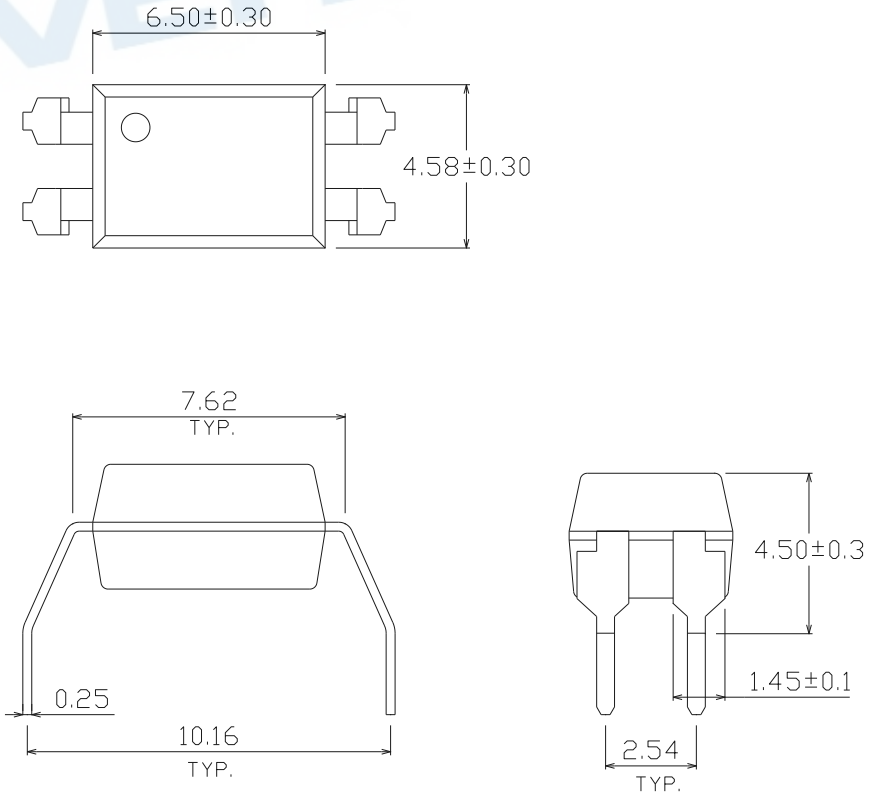
Ver.:9 Release Date:10/29/2018 狀態:Approved(正式發行)

Package Dimension (Dimensions in mm)

Standard DIP Type



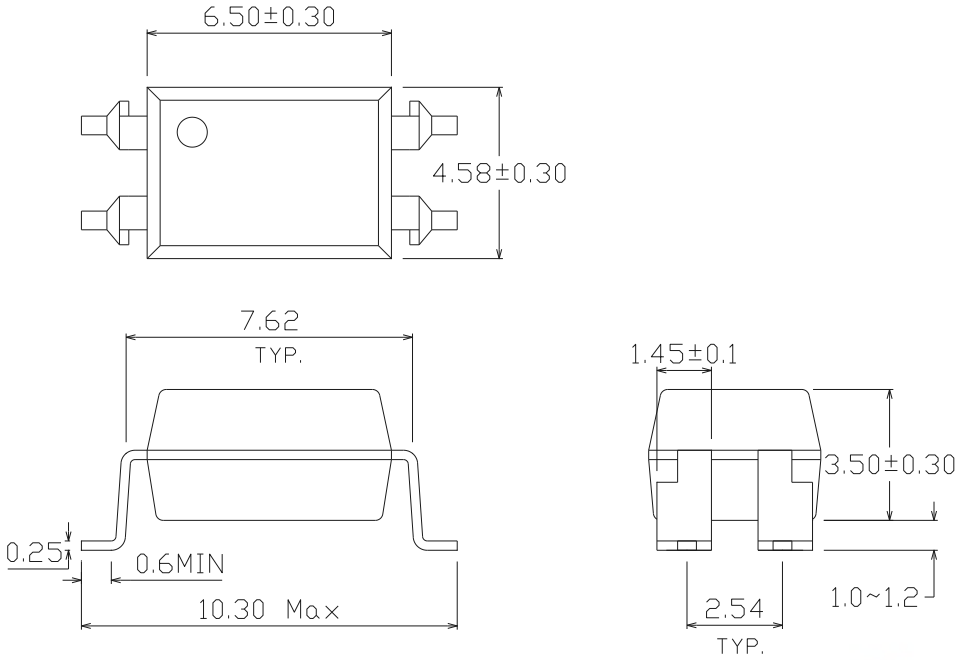
Option M Type



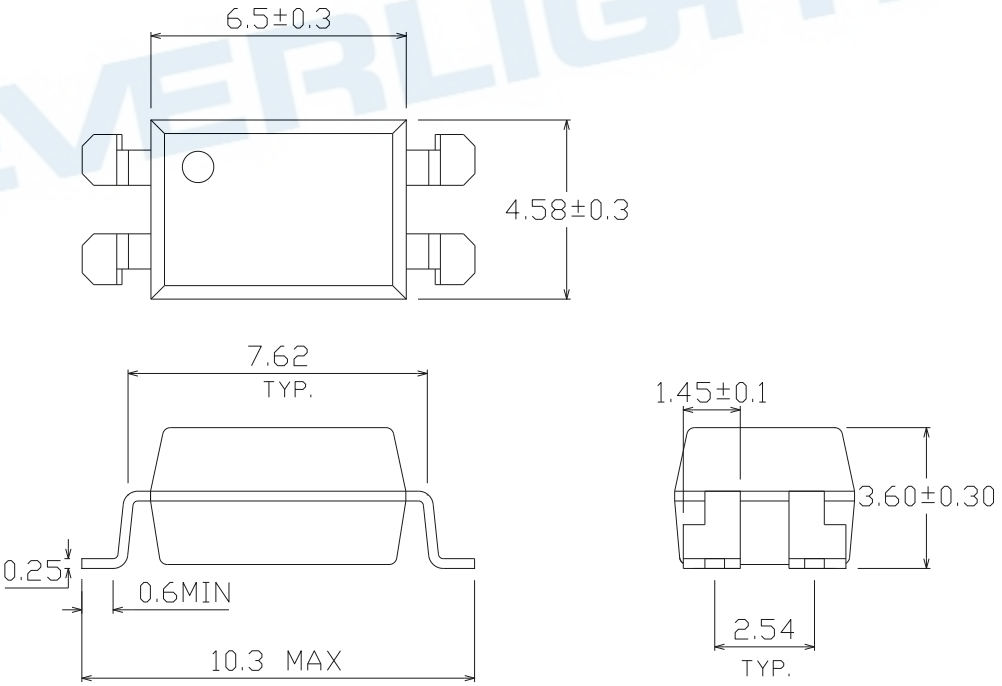
Copyright © 2010, Everlight All Rights Reserved. Release Date: October 23, 2018. Issue No: DPC-0000043 Rev.9

Ver.9 Release Date:10/29/2018 狀態:Approved(正式發行)

Option S Type



Option S1 Type

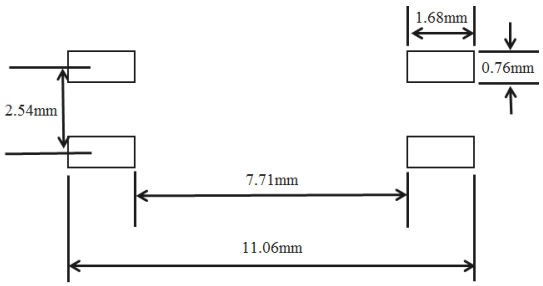


Copyright © 2010, Everlight All Rights Reserved. Release Date: October 23, 2018. Issue No: DPC-0000043 Rev.9

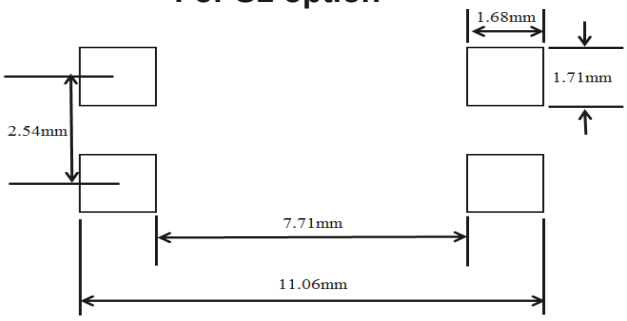
Ver.:9 Release Date:10/29/2018 狀態:Approved(正式發行)

Recommended pad layout for surface mount leadform

For S option



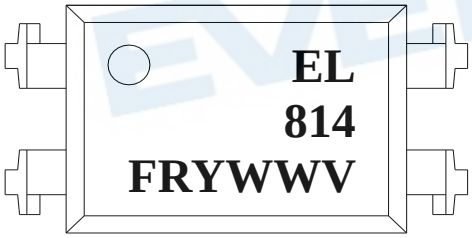
For S1 option



Notes

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

Device Marking



Notes

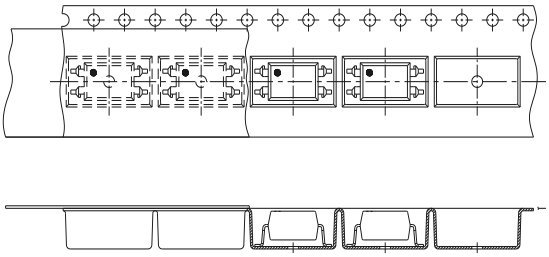
EL	denotes EVERLIGHT
814	denotes Device Number
F	denotes Factory Code (G: China and Green part)
R	denotes CTR Rank (A or none)
Y	denotes 1 digit Year code
WW	denotes 2 digit Week code
V	denotes VDE (optional)

Copyright © 2010, Everlight All Rights Reserved. Release Date: October 23, 2018. Issue No: DPC-0000043 Rev.9

Ver.:9 Release Date:10/29/2018 狀態:Approved(正式發行)

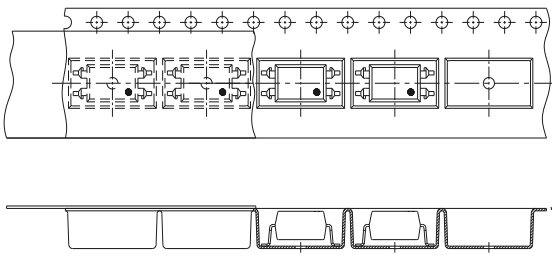
Tape & Reel Packing Specifications

Option TA

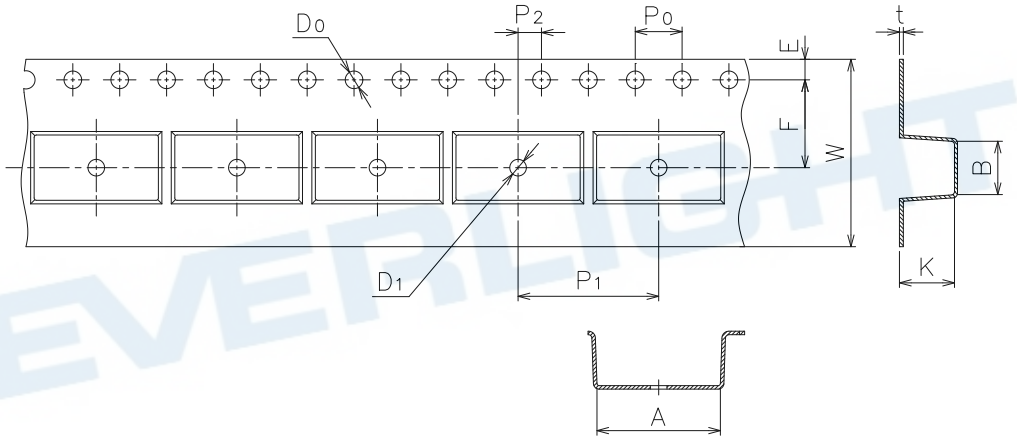


Direction of feed from reel

Option TB



Direction of feed from reel

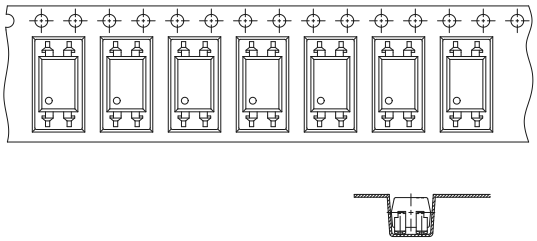


Dimension No.	A	B	Do	D1	E	F
Dimension (mm) S	10.7±0.1	4.65±0.1	1.5±0.1	1.50±0.1	1.75±0.1	7.5±0.1
Dimension (mm) S1	10.7±0.1	4.65±0.1	1.5±0.1	1.50±0.1	1.75±0.1	7.5±0.1
Dimension No.	**Po**	**P1**	**P2**	**t**	**W**	**K**
Dimension (mm) S	4.0±0.1	12.0±0.1	2.0±0.1	0.4±0.1	16.0±0.3	4.75±0.1
Dimension (mm) S1	4.0±0.1	12.0±0.1	2.0±0.1	0.4±0.1	16.0±0.3	3.90±0.1

Copyright © 2010, Everlight All Rights Reserved. Release Date: October 23, 2018. Issue No: DPC-0000043 Rev.9

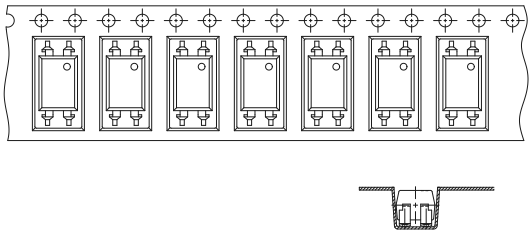
Ver.:9 Release Date:10/29/2018 狀態:Approved(正式發行)

Option TD



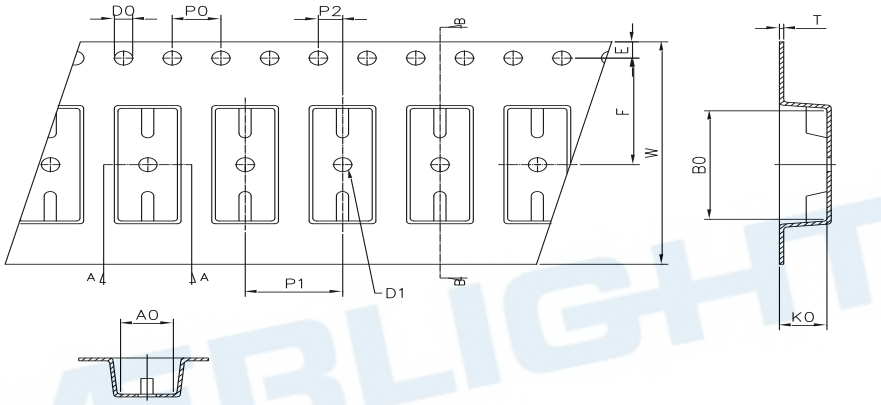
Direction of feed from reel

Option TU



Direction of feed from reel

Tape dimensions



Dimension No.	Ao	Bo	Do	D1	E	F
Dimension (mm) S.S1	4.90±0.1	10.40±0.1	1.5±0.1	1.50±0.1	1.75±0.1	7.50±0.1
Dimension No.	**Po**	**P1**	**P2**	**t**	**W**	**Ko**
Dimension (mm) S.S1	4.00±0.1	8.00±0.1	2.00±0.1	0.40±0.1	16.00±0.3	4.60±0.1

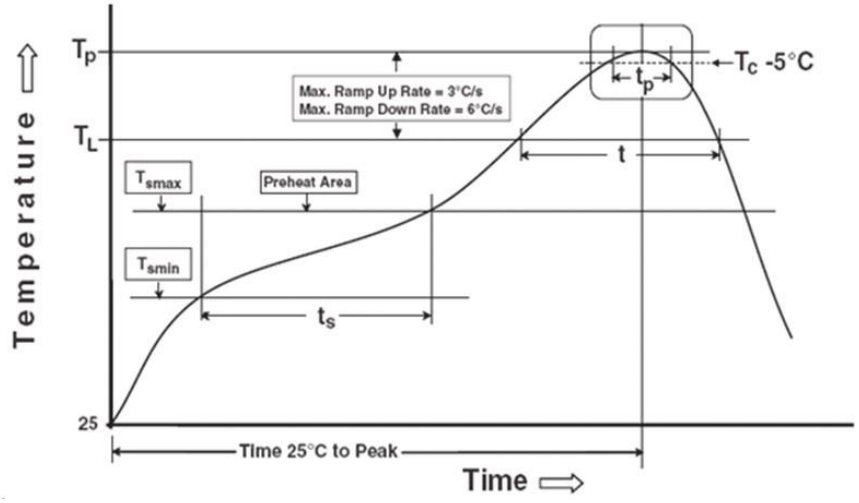
Copyright © 2010, Everlight All Rights Reserved. Release Date: October 23, 2018. Issue No: DPC-0000043 Rev.9

Ver.:9 Release Date:10/29/2018 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



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

.

Copyright © 2010, Everlight All Rights Reserved. Release Date: October 23, 2018. Issue No: DPC-0000043 Rev.9

Ver.:9 Release Date:10/29/2018 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 © 2010, Everlight All Rights Reserved. Release Date: October 23, 2018. Issue No: DPC-0000043 Rev.9

Ver.:9 Release Date:10/29/2018 承認:Approved(IE決裁)