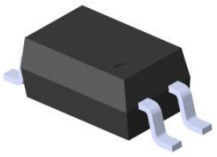
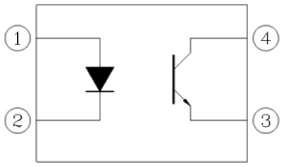
DATASHEET

4 PIN SSOP PHOTOTRANSISTOR PHOTOCOUPLER
EL3H7-G Series



Schematic



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

Features:

- Halogens free
- Current transfer ratio
  (CTR: 50~600% at IF =5mA, VCE =5V)
  (CTR: 40~320% at IF =10mA, VCE =5V)
- High isolation voltage between input and output (Viso=3750 V rms)
- Compact 4 Pin SSOP with a 2.0 mm profile
- Pb free and RoHS compliant.
- UL approved (No. E214129)
- VDE approved (No. 132249)
- SEMKO approved
- NEMKO approved
- DEMKO approved
- FIMKO approved
- CSA approved

Description

The EL3H7-G series devices consist of an infrared emitting diode, optically coupled to a phototransistor detector encapsulated with green compound.

They are packaged 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

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Absolute Maximum Ratings (Ta=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	P_D	70	mW
	Derating factor (above T_a = 90°C)		2.0	mW/°C
Output	Power dissipation	P_C	150	mW
	Derating factor (above T_a = 70°C)		3.1	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	Vrms
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

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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
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 = 0.1mA

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

Parameter		Symbol	Min	Typ.	Max.	Unit	Condition
Current Transfer ratio	EL3H7	CTR	50	-	600	%	I_F = 5mA ,V_{CE} = 5V
	EL3H7A		80	-	160		
	EL3H7B		130	-	260		
	EL3H7C		200	-	400		
	EL3H7D		300	-	600		
	EL3H7E		100	-	200		
	EL3H7F		150	-	300		
	EL3H7H		40	-	80		I_F = 10mA ,V_{CE} = 5V
	EL3H7I		63	-	125		
	EL3H7J		100	-	200		
	EL3H7K		160	-	320		
Collector-Emitter saturation voltage		$V_{CE(sat)}$	-	0.1	0.2	V	I_F = 10mA ,I_C = 1mA
Isolation resistance		R_{IO}	5×10^{10}	-	-	Ω	V_{IO} = 500Vdc, 40~60% R.H.
Floating capacitance		C_{IO}	-	0.3	1.0	pF	V_{IO} = 0, f = 1MHz
Rise time		t_r	-	5	18	μs	V_{CE} = 2V, I_C = 2mA, R_L = 100Ω
Fall time		t_f	-	3	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

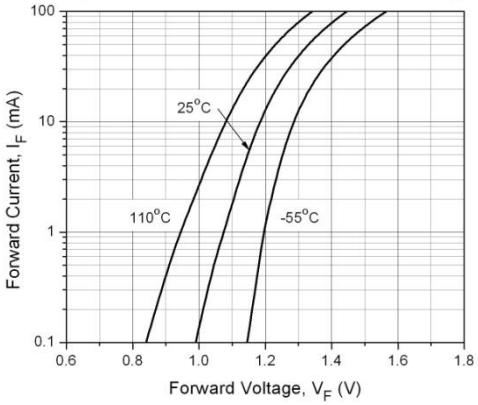

Figure 2. Normalized Collector Current vs Forward Current

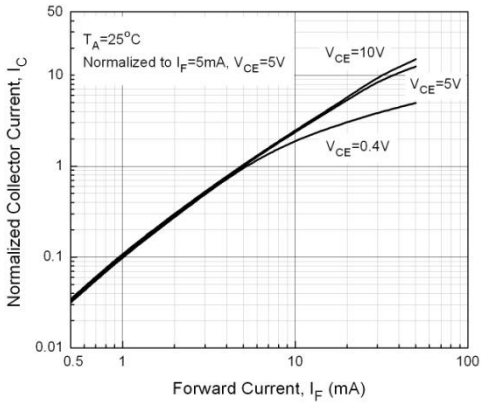

Figure 3. Normalized Current Transfer Ratio vs Forward Current

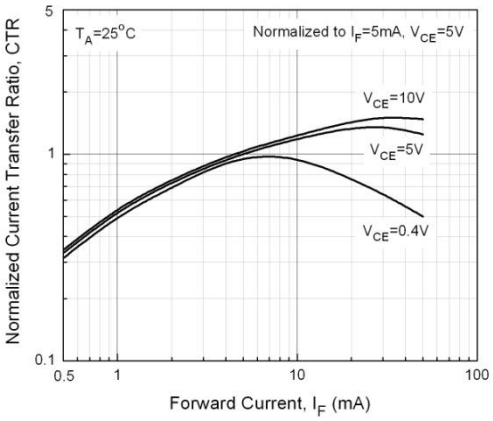

Figure 4. Normalized Collector Current vs Ambient Temperature

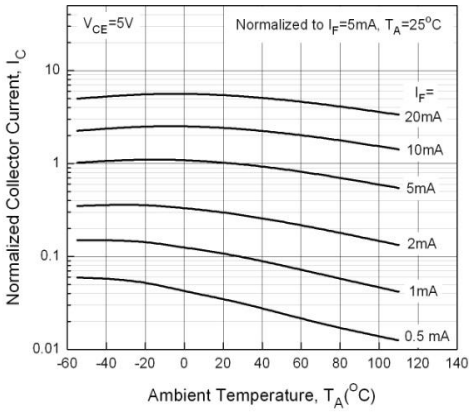

Figure 5. Normalized Current Transfer Ratio vs Ambient Temperature

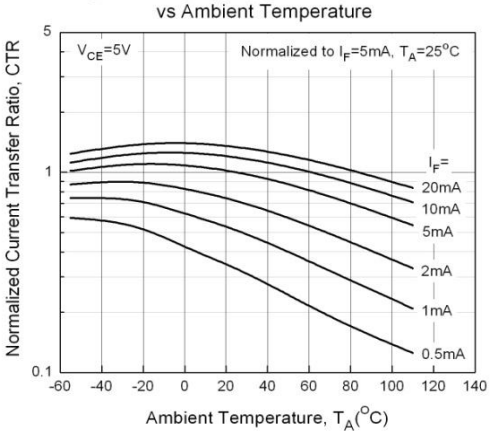

Figure 6. Collector Current vs Collector-Emitter Voltage

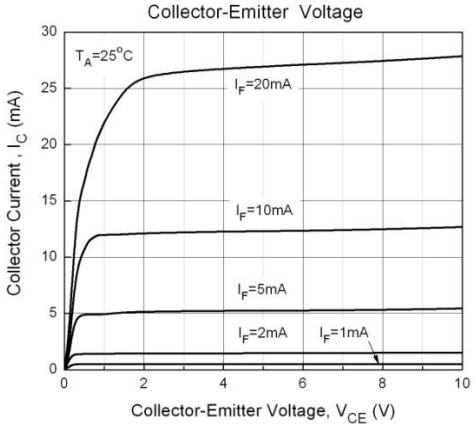

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Figure 7. Collector Current vs Collector-Emitter Voltage

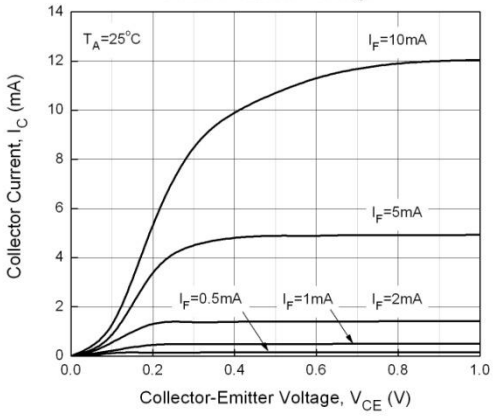


Figure 8. Collector Dark Current vs Ambient Temperature

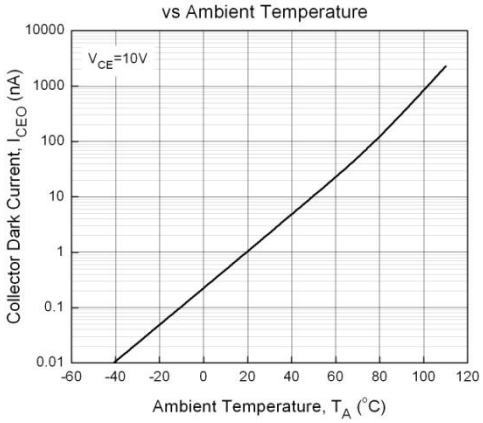


Figure 10. Switching Time vs Load Resistance

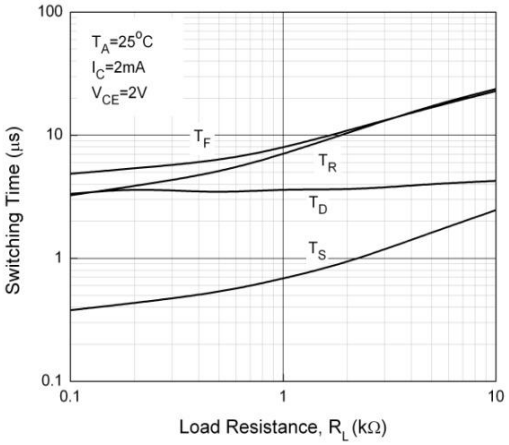
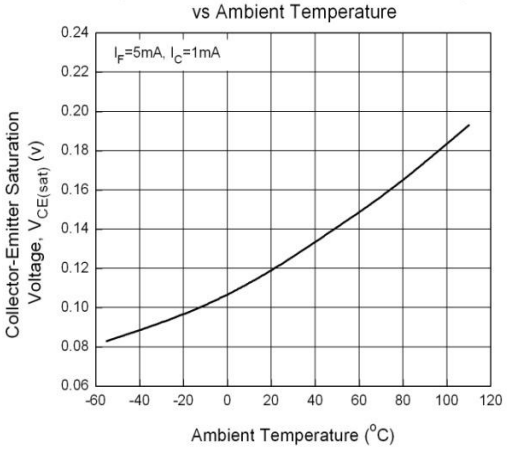


Figure 9. Collector-Emitter Saturation Voltage vs Ambient Temperature



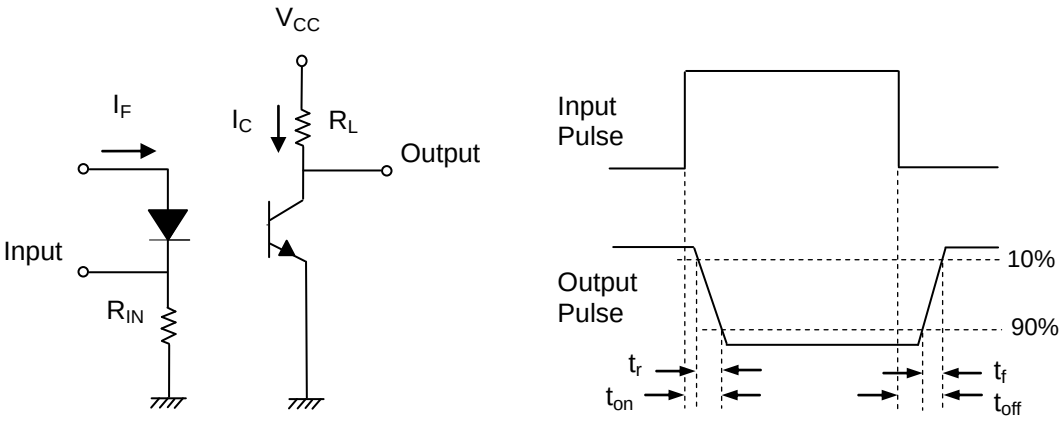


Figure 11. Switching Time Test Circuit & Waveforms

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Order Information

Part Number

EL3H7(X)(Y)-VG

Note

X = CTR Rank (A, B, C, D, E, F, H, I, J, K or none)
Y = Tape and reel option (TA, TB, EA, EB or none)
V = VDE (optional)
G = Halogens 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	5000 units per reel
(TB)	TB Tape & reel option	5000 units per reel
(TA)-V	TA Tape & reel option + VDE	5000 units per reel
(TB)-V	TB Tape & reel option + VDE	5000 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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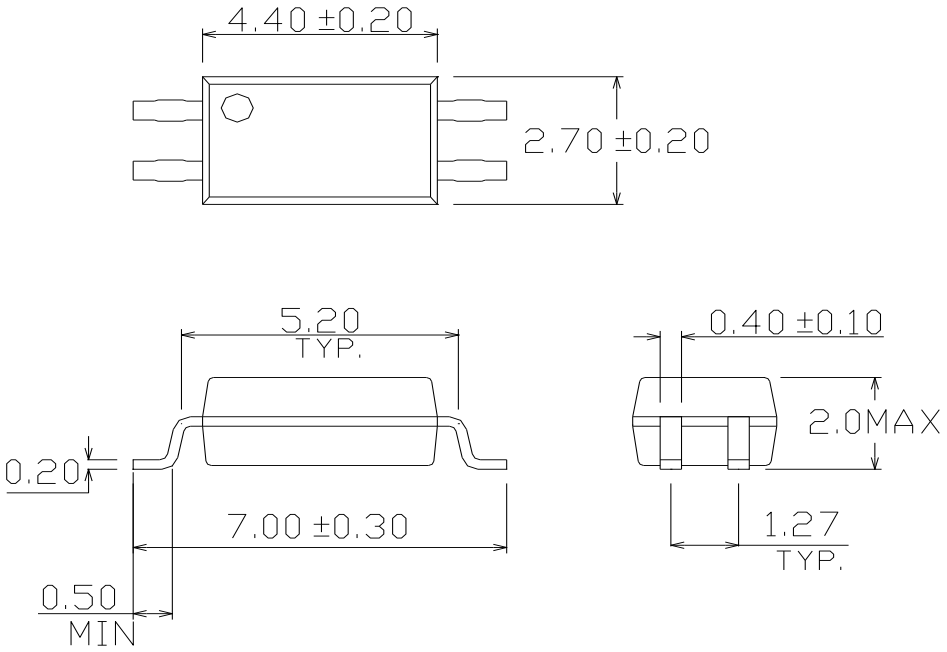
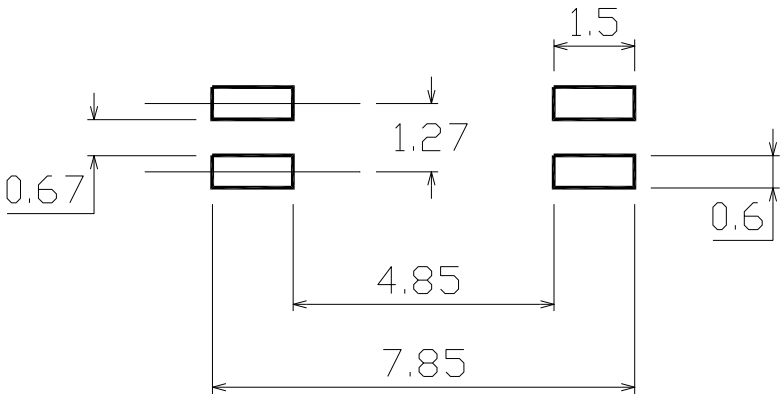
Package Dimension (Dimensions in mm)



Recommended pad layout for surface mount leadform



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Device Marking



Notes

EL	denotes Everlight
3H7	denotes Device Number
R	denotes CTR Rank (A, B, C, D, E ,F, H, I, J, K or none)
Y	denotes 1 digit Year code
WW	denotes 2 digit Week code
V	denotes VDE (optional)

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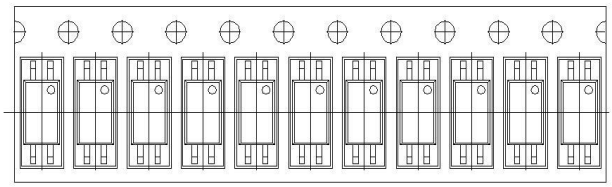
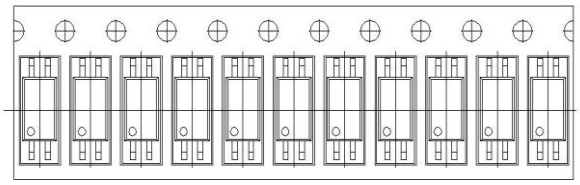
Tape & Reel Packing Specifications

Option TA



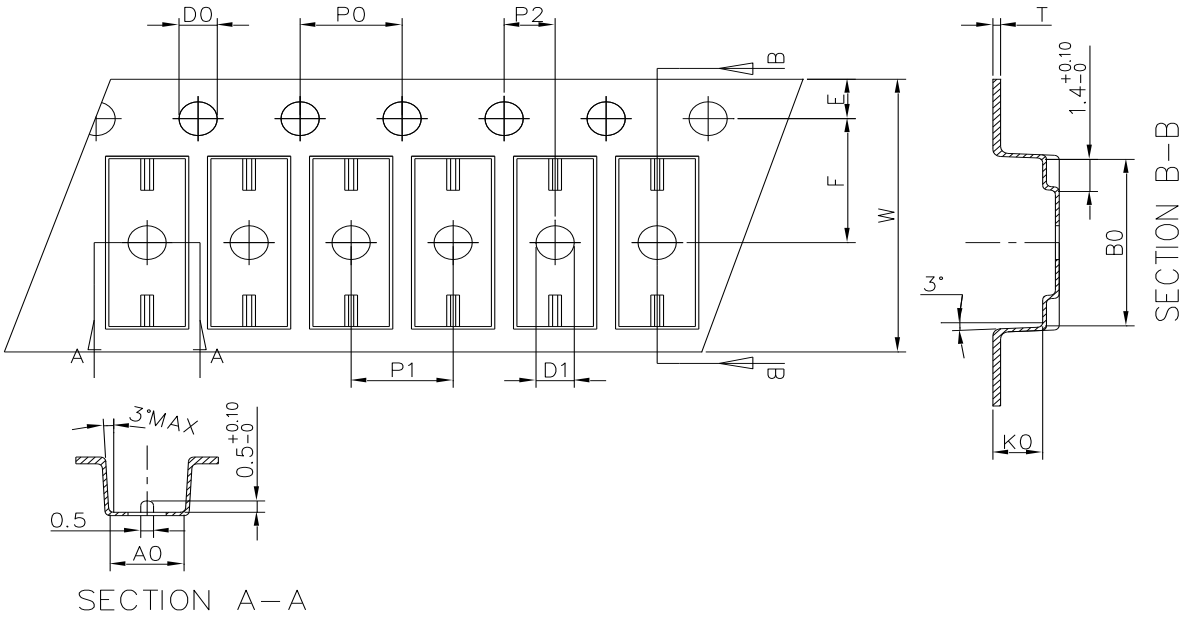
Direction of feed from reel

Option TB



Direction of feed from reel

Tape dimesions



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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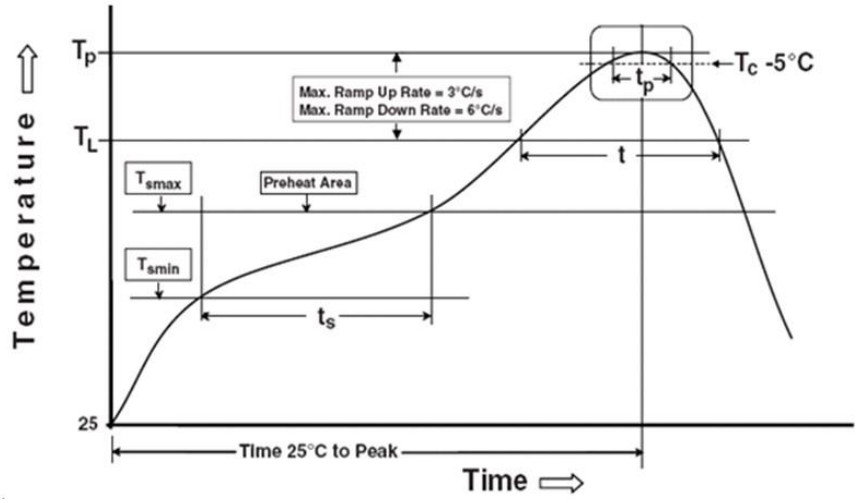
Precautions for Use

1. Soldering Condition

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



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

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