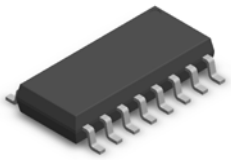
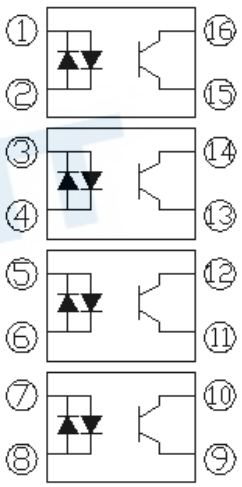
DATASHEET

16 PIN ULTRA SMALL SSOP AC INPUT PHOTOTRANSISTOR PHOTOCOUPLER ELQ3H4 Series



Schematic



①③⑤⑦ Anode/Cathode
②④⑥⑧ Cathode/Anode
⑨⑪⑬⑮ Emitter
⑩⑫⑭⑯ Collector

Features

- Halogens free
- AC input response
- Current transfer ratio (CTR: 20~300% at IF =1mA, VCE =5V)
- High isolation voltage between input and output (Viso=3750 V rms)
- Compact SSOP with a 2.0 mm profile
- Pb free and RoHS compliant.
- UL approved (No. E214129)
- VDE approved (No. 40028116)
- SEMKO approved
- NEMKO approved
- DEMKO approved
- FIMKO approved
- CQC approved

Description

The ELQ3H4 is optically coupled isolator containing GaAs light emitting diodes and an NPN silicon phototransistors in a plastic SOP for high density applications.
This package has shield effect to cut off ambient light.

Applications

- Programmable logic controllers
- Measuring instruments
- Hybrid IC

Absolute Maximum Ratings (T_A=25°C)

	Parameter	Symbol	Rating	Unit
Input	Forward current	I_F	±60	mA
	Peak forward current (1us, pulse)	I_{FP}	1	A
	Power dissipation	P_D	70	mW/Ch
	Power Dissipation Derating		0.7	mW/°C
Output	Collector current	I_C	50	mA
	Collector-Emitter voltage	V_{CEO}	80	V
	Emitter-Collector voltage	V_{ECO}	7	V
	Power dissipation	P_C	150	mW /Ch
	Power Dissipation Derating		1.4	mW/°C
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, LED side pins shorted together, and detector side pins shorted together.

*2 For 10 seconds

Electrical Characteristics (T_A=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}	-	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=-40 to 85°C unless specified otherwise)

Parameter	Symbol	Min	Typ.	Max.	Unit	Condition
Current Transfer ratio	CTR	20	-	300	%	I_F = ±1mA ,V_{CE} = 5V
CTR Ratio	CTR1/ CTR2	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}	-	-	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 Electro-Optical Characteristics Curves

Figure 1. Forward Current vs Forward Voltage

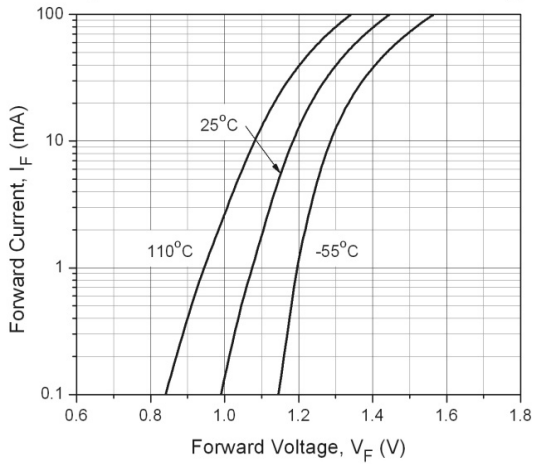


Figure 2. Normalized Collector Current vs Forward Current

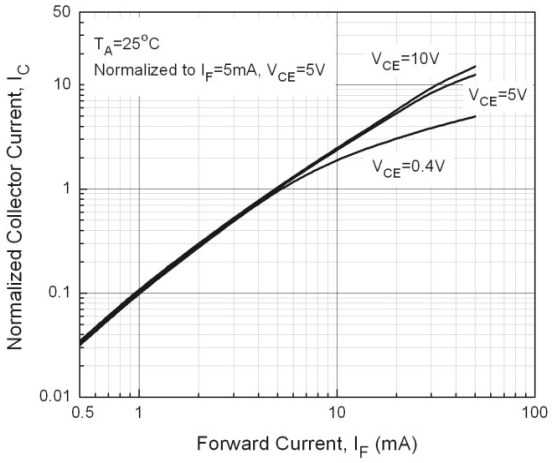


Figure 3. Normalized Current Transfer Ratio vs Forward Current

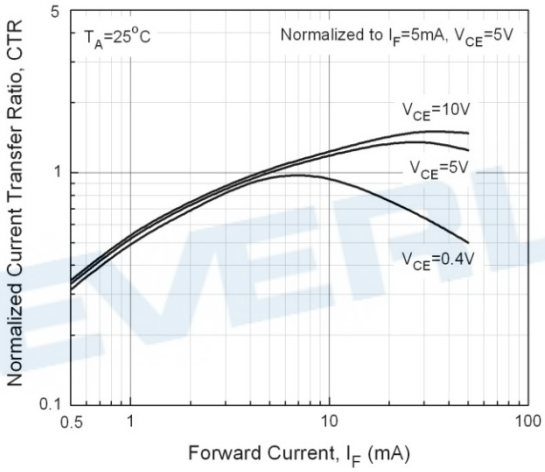


Figure 4. Normalized Collector Current vs Ambient Temperature

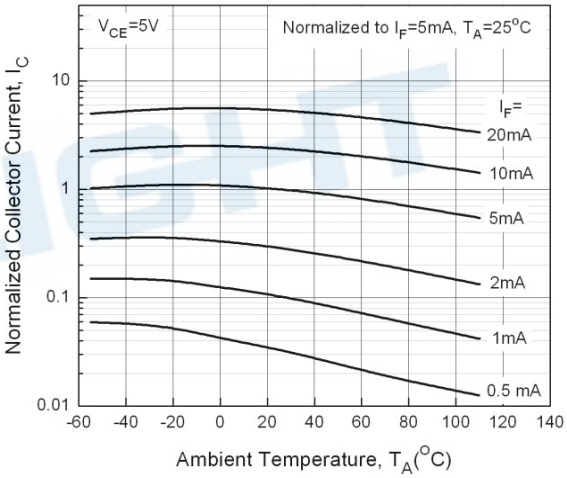


Figure 5. Normalized Current Transfer Ratio vs Ambient Temperature

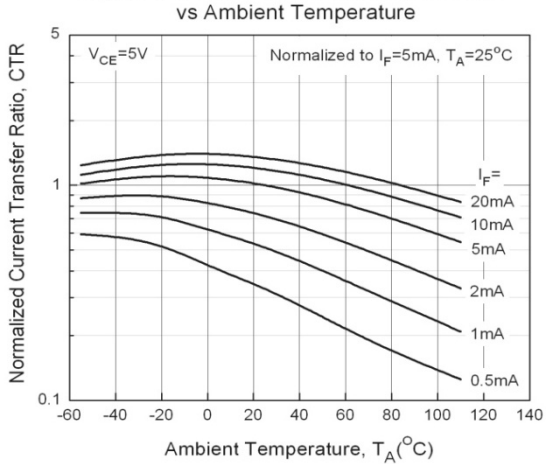


Figure 6. Collector Current vs Collector-Emitter Voltage

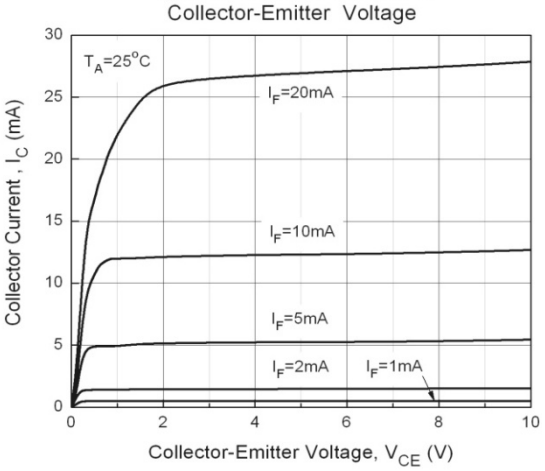


Figure 7. Collector Current vs Collector-Emitter Voltage

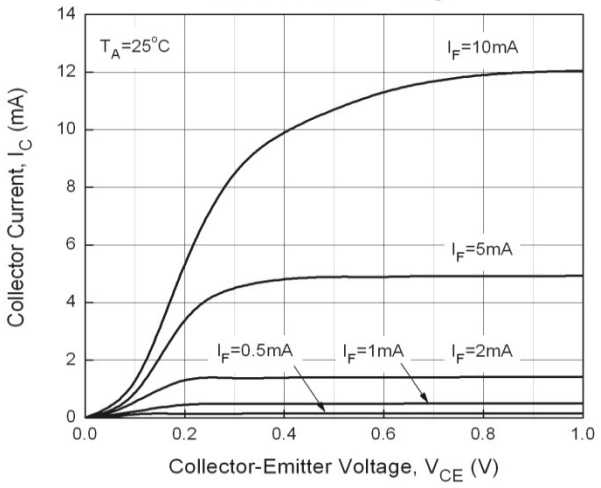


Figure 8. Collector Dark Current vs Ambient Temperature

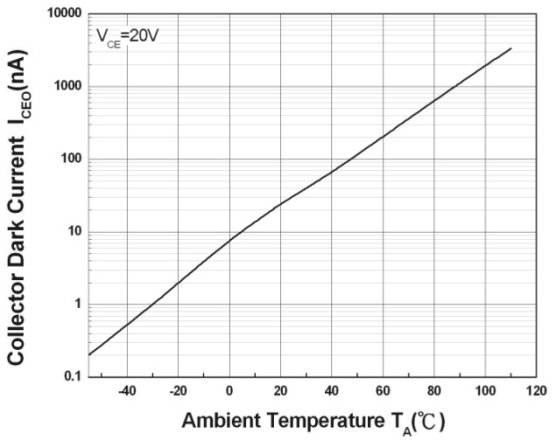


Figure 9. Collector-Emitter Saturation Voltage vs Ambient Temperature

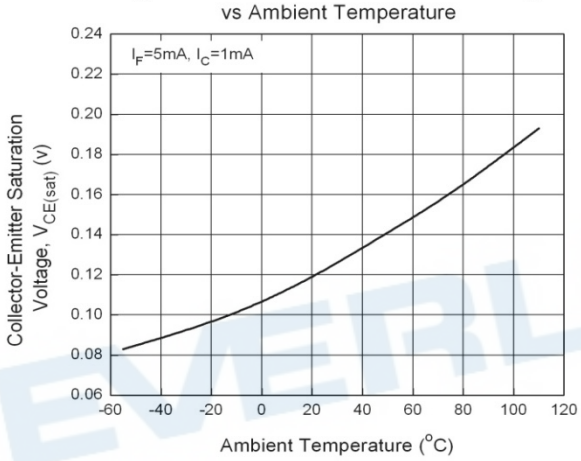


Figure 10. Switching Time vs Load Resistance

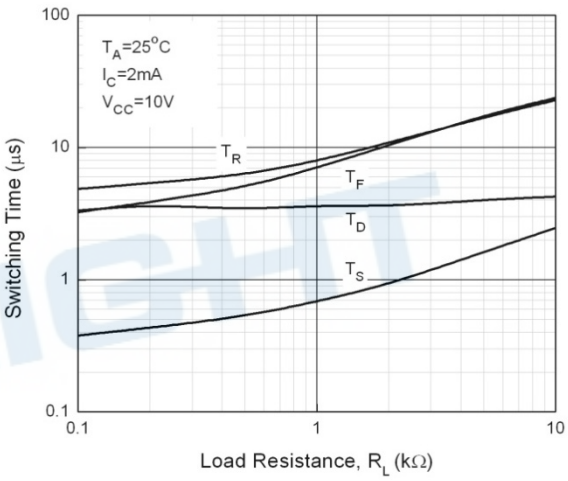
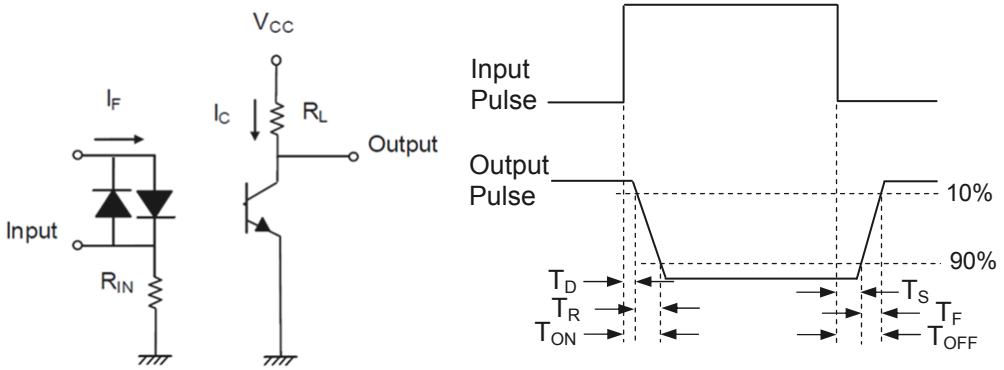


Figure 11. Switching Time Test Circuit & Waveform



Order Information

Part Number

ELQ3H4(Z)-V

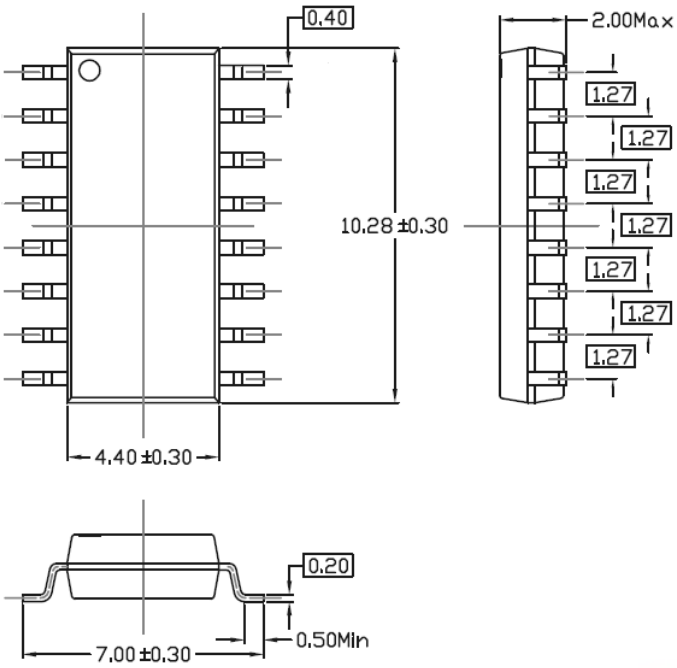
Note

Z = Tape and reel option (TA or none).
V = VDE (optional)

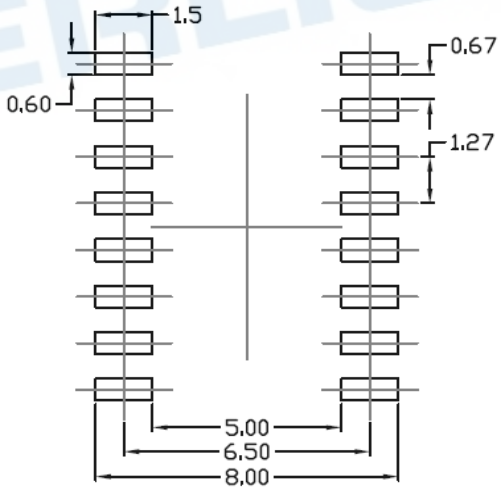
Option	Description	Packing quantity
None	Tube option of ELQ3H4	40 units per tube
(TA)	Tape & reel option of ELQ3H4	1000 units per reel

Package Dimension

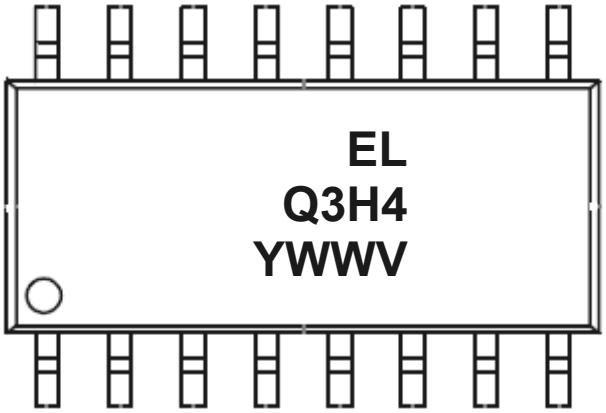
(Dimensions in mm)



Recommended pad layout for surface mount leadform



Device Marking

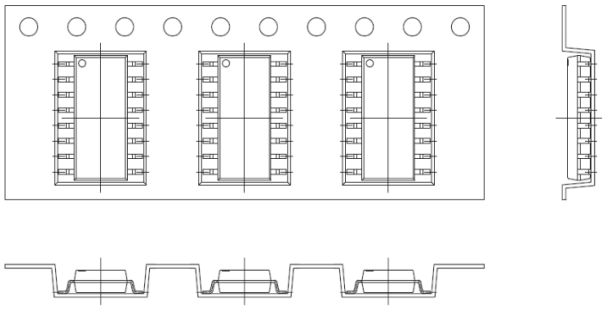


Notes

EL	denotes EVERLIGHT
Q3H4	denotes Device Number
Y	denotes 1 digit Year code
WW	denotes 2 digit Week code
V	denotes VDE (optional)

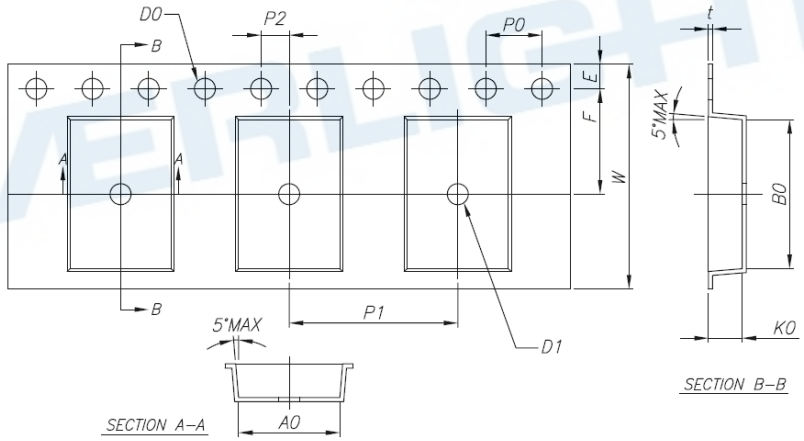
Tape & Reel Packing Specifications

ELQ3H4



Direction of feed from reel

Tape dimension

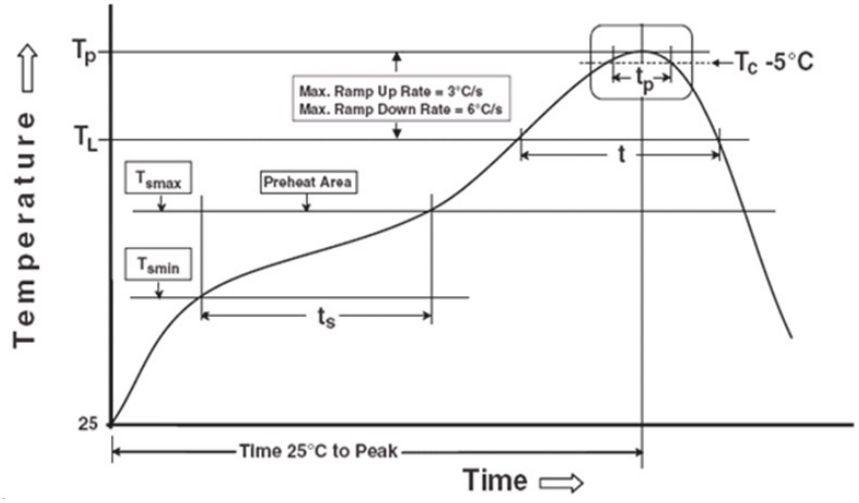


Dimension No.	***A0***	***B0***	***D0***	***D1***	***E***	***F***
Dimension (mm)	7.2±0.1	10.6±0.1	1.5+0.1 -0	1.5+0.1 -0	1.75±0.1	7.5±0.1
Dimension No.	***P0***	***P1***	***P2***	***t***	***W***	***K0***
Dimension (mm)	4.0±0.1	12.0±0.1	2.0±0.1	0.3±0.05	16.0±0.3	2.4±0.1

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°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

Disclaimer

1. Above specification may be changed without notice. EVERLIGHT will reserve authority on material change for above specification.
2. The graphs shown in this datasheet are representing typical data only and do not show guaranteed values.
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