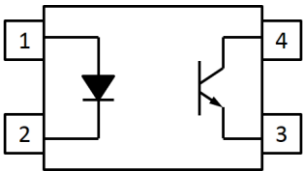
4 PIN SOP PHOTOTRANSISTOR PHOTOCOUPLER
EL357NH-G Series

Features:

- Halogens free
  (Br <900 ppm ,Cl <900 ppm , Br+Cl < 1500 ppm)
- Current transfer ratio
  (CTR: 50~600% at I_F =5mA, V_{CE} =5V)
- Operating temperature -55°C~125°C
- 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

Schematic



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

Description

The EL357NH-G 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

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	5	V
	Input power dissipation	P_D	70	mW
Output	Collector-Emitter voltage	V_{CEO}	80	V
	Emitter-Collector voltage	V_{ECO}	7	V
	Collector current	I_C	50	mA
	Collector power dissipation	P_C	150	mW
Total power dissipation		P_{TOT}	200	mW
Isolation voltage*1		V_{ISO}	3750	Vrms
Operating temperature		T_{OPR}	-55 ~ +125	°C
Storage temperature		T_{STG}	-55 ~ +150	°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

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 = 10mA
Reverse current	I_R	-	-	10	μA	V_R = 5V
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}	-	-	200	nA	V_{CE} = 48V, 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	EL357NH	CTR	50	-	600	%	I_F = 5mA ,V_{CE} = 5V
	EL357NHA		80	-	160		
	EL357NHB		130	-	260		
	EL357NHC		200	-	400		
Collector-Emitter saturation voltage		$V_{CE(sat)}$	-	-	0.3	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

Typical Electro-Optical Characteristics Curves

Figure 1. Forward Current vs Forward Voltage

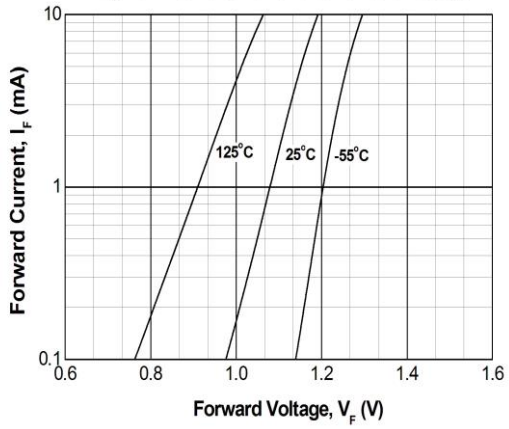


Figure 2. Normalized Current Transfer Ratio vs Forward Current

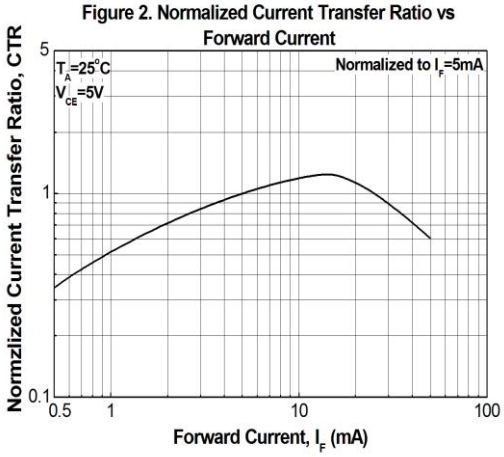


Figure 3. Current Transfer Ratio vs Ambient Temperature

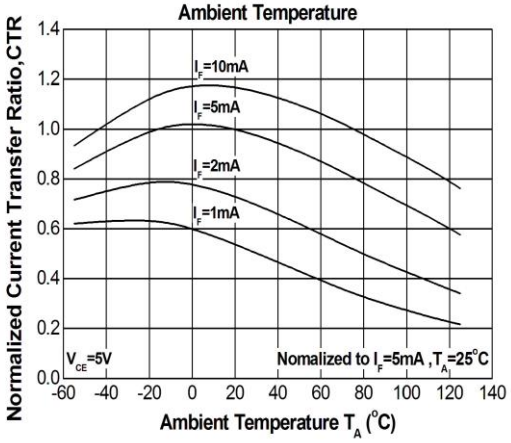


Figure 4. Dark Current vs Ambient Temperature

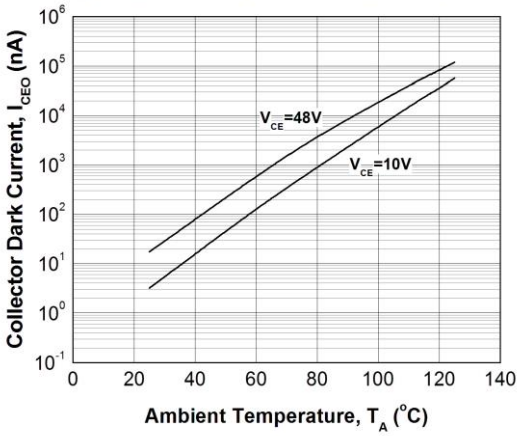


Figure 5. Collector-Emitter Saturation Voltage vs Collector Current

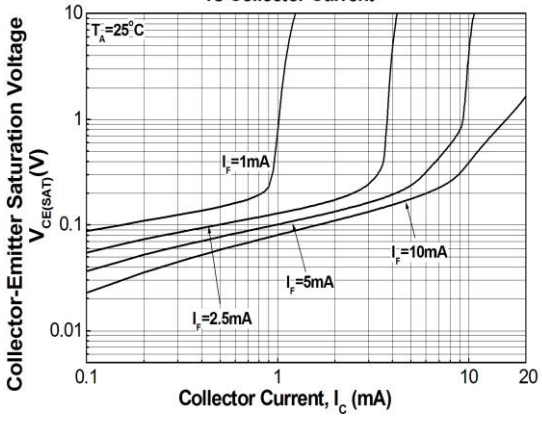
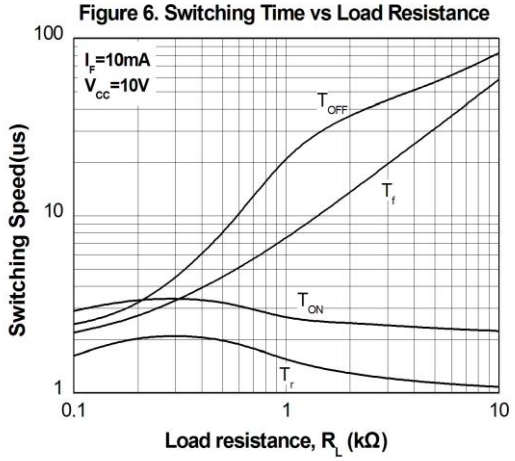


Figure 6. Switching Time vs Load Resistance



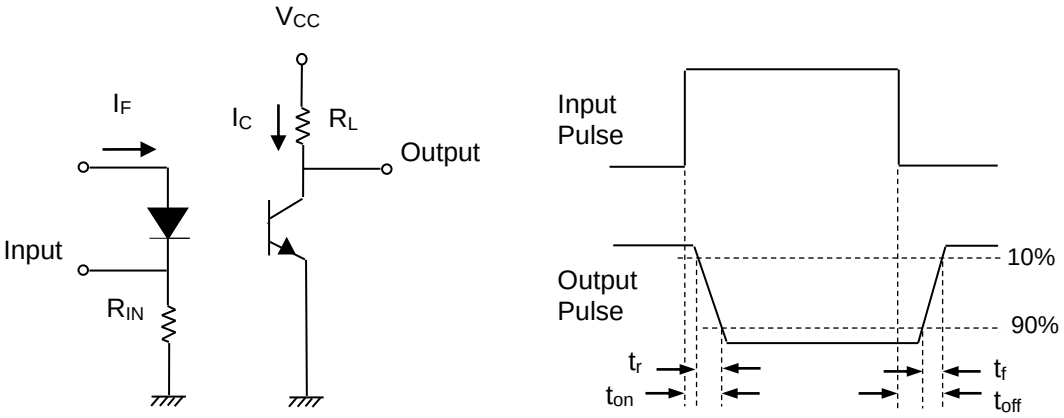


Figure 7. Switching Time Test Circuit & Waveforms

Order Information

Part Number

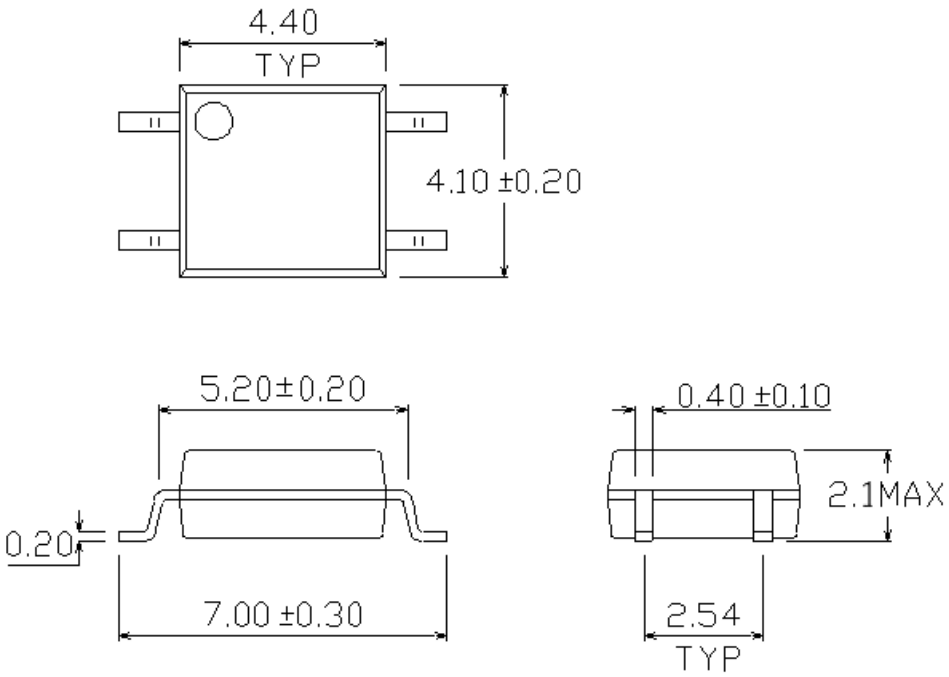
EL357NH(X)(Y)-VG

Note

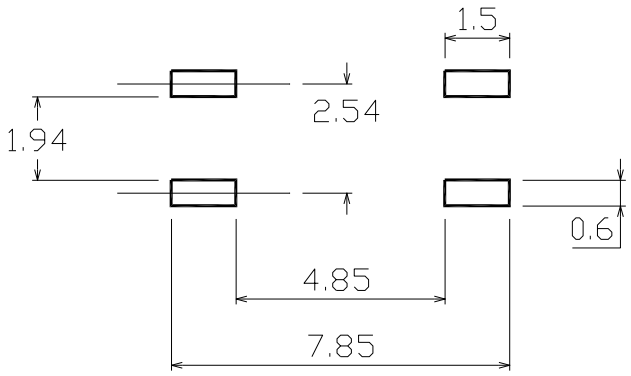
H = High operating temperature
X = CTR rank (A,B,C,D or none)
Y = Tape and reel option (TA, TB or none).
V = VDE (option)
G = Halogen free

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	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

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.

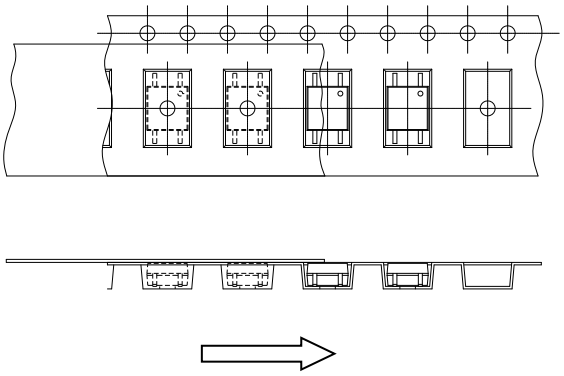
Device Marking

Notes

EL denotes XI BNANG
357N denotes Device Number
H denotes High operating temperature
R denotes CTR Rank
Y denotes 1 digit Year code WW denotes 2 digit Week code
V denotes VDE approved (optional)

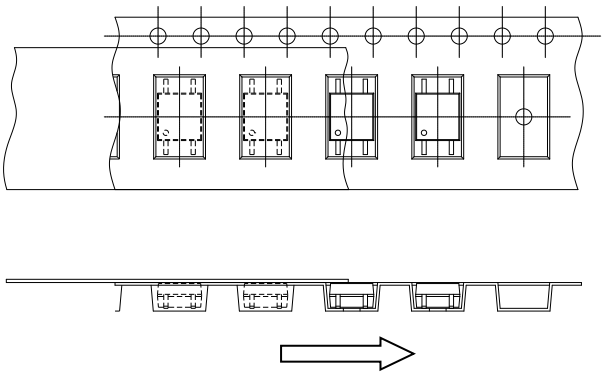
Tape & Reel Packing Specifications

Option TA



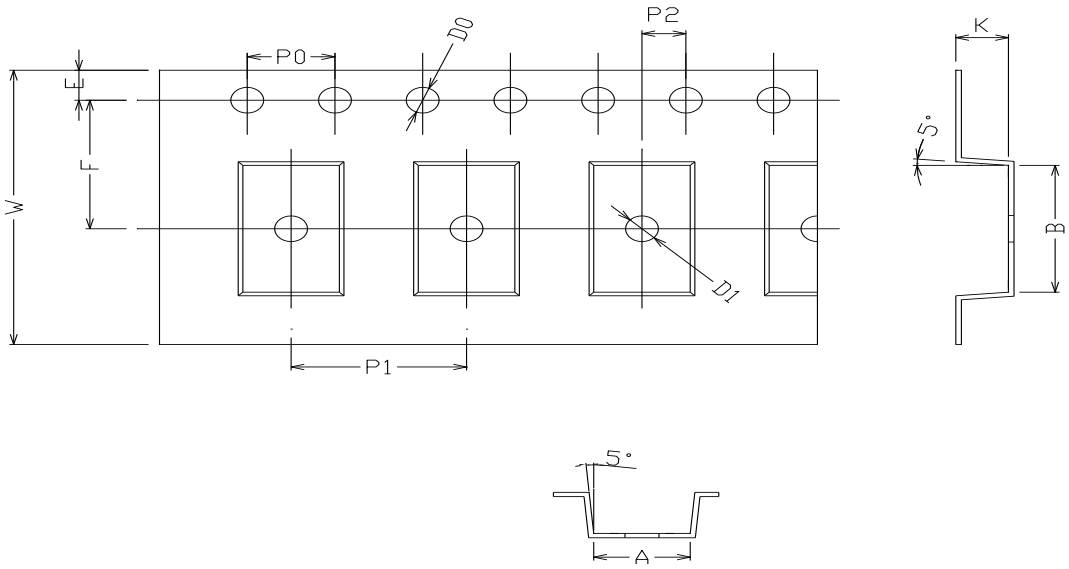
Direction of feed from reel

Option TB



Direction of feed from reel

Tape dimensions

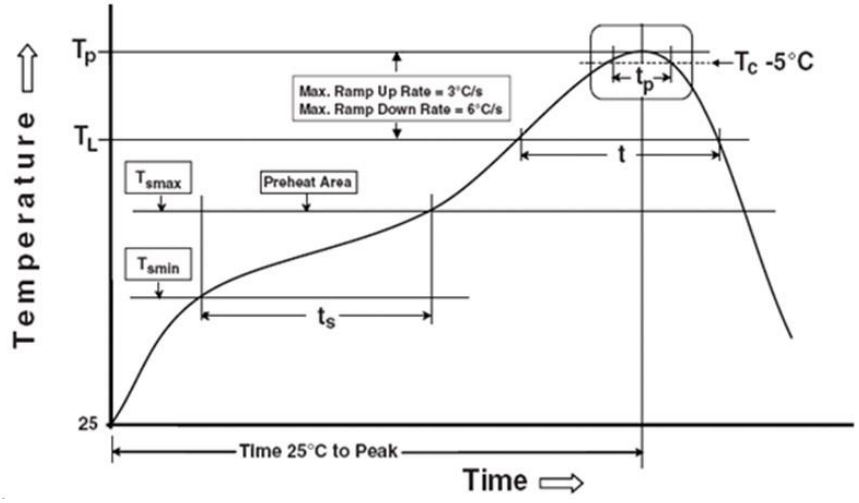


Dimension No.	**A**	**B**	**Do**	**D1**	**E**	**F**
Dimension (mm)	4.4 ± 0.1	7.4 ± 0.1	1.5 + 0.1/-0	1.5 ± 0.1	1.75± 0.1	7.5 ± 0.05
Dimension No.	**Po**	**P1**	**P2**	**t**	**W**	**K**
Dimension (mm)	4.0 ± 0.15	8.0 ± 0.1	2.0 ± 0.1	0.25 ± 0.03	16.0 ± 0.2	2.4± 0.1

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

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DISCLAIMER

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