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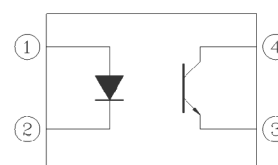
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### 4 PIN SOP PHOTOTRANSISTOR PHOTOCOUPLER EL357N-G Series



Schematic



#### Features:

- Halogens free  
(Br <900 ppm ,Cl <900 ppm , Br+Cl < 1500 ppm)
- Current transfer ratio  
(CTR: 50~600% at  $I_F = 5\text{mA}$ ,  $V_{CE} = 5\text{V}$ )
- 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

#### Pin Configuration

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

#### Description

The EL357N-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

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**Absolute Maximum Ratings (Ta=25 °C)**

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

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**Electro-Optical Characteristics (Ta=25 °C unless specified otherwise)**

**Input**

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Forward voltage	V <sub>F</sub>	-	1.2	1.4	V	I <sub>F</sub> = 20mA
Reverse current	I <sub>R</sub>	-	-	10	μA	V <sub>R</sub> = 4V
Input capacitance	C <sub>in</sub>	-	30	250	pF	V = 0, f = 1kHz

**Output**

Parameter	Symbol	Min	Typ.	Max.	Unit	Condition
Collector-Emitter dark current	I <sub>CEO</sub>	-	-	100	nA	V <sub>CE</sub> = 20V, I <sub>F</sub> = 0mA
Collector-Emitter breakdown voltage	BV <sub>CEO</sub>	80	-	-	V	I <sub>C</sub> = 0.1mA
Emitter-Collector breakdown voltage	BV <sub>ECO</sub>	7	-	-	V	I <sub>E</sub> = 0.01mA

**Transfer Characteristics (T<sub>a</sub>=25°C unless specified otherwise)**

Parameter	Symbol	Min	Typ.	Max.	Unit	Condition
Current Transfer ratio	EL357N	50	-	600	%	I <sub>F</sub> = 5mA, V <sub>CE</sub> = 5V
	EL357NA	80	-	160		
	EL357NB	130	-	260		
	EL357NC	200	-	400		
	EL357ND	300	-	600		
	EL357NE	100	-	200		
	EL357NF	150	-	300		
Collector-Emitter saturation voltage	V <sub>CE(sat)</sub>	-	0.1	0.2	V	I <sub>F</sub> = 20mA, I <sub>C</sub> = 1mA
Isolation resistance	R <sub>IO</sub>	5×10 <sup>10</sup>	-	-	Ω	V <sub>IO</sub> = 500Vdc, 40~60% R.H.
Floating capacitance	C <sub>IO</sub>	-	0.6	1.0	pF	V <sub>IO</sub> = 0, f = 1MHz
Rise time	t <sub>r</sub>	-	3	18	μs	V <sub>CE</sub> = 2V, I <sub>C</sub> = 2mA, R <sub>L</sub> = 100Ω
Fall time	t <sub>f</sub>	-	4	18		

\* Typical values at T<sub>a</sub> = 25°C

Typical Electro-Optical Characteristics Curves

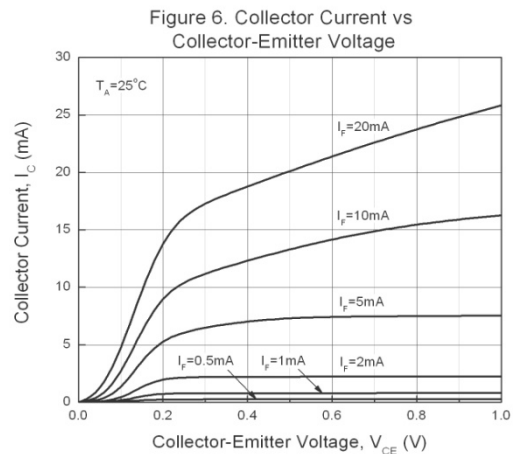
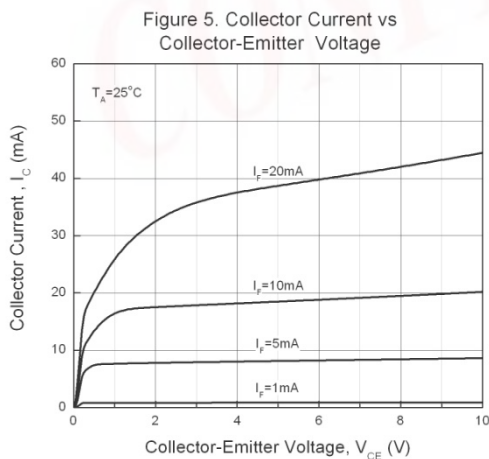
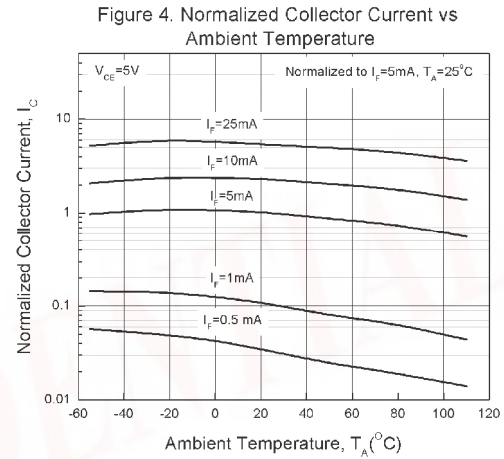
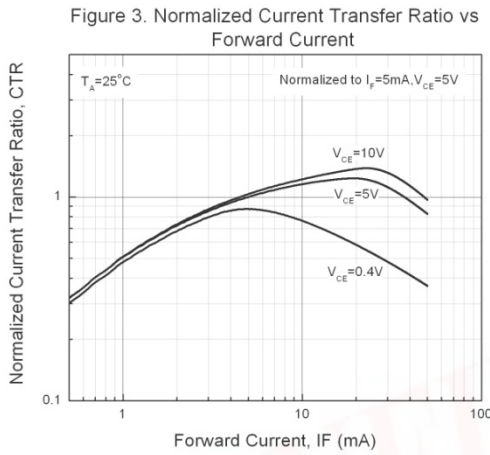
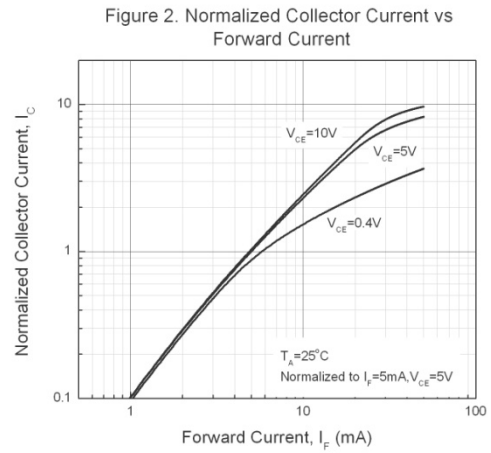
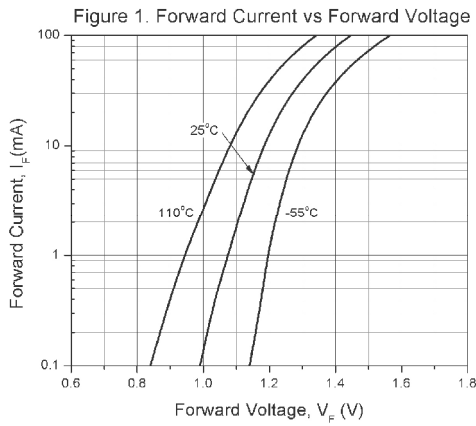


Figure 7. Collector Dark Current vs Ambient Temperature

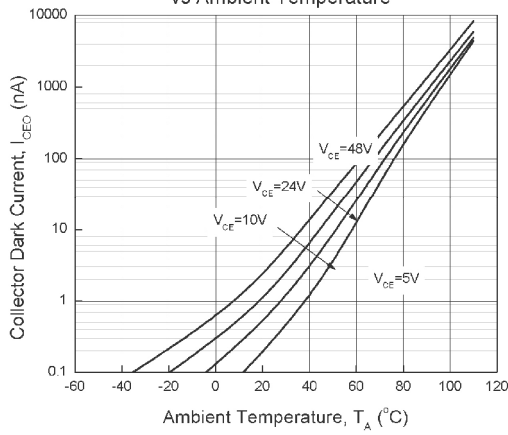


Figure 8. Switching Time vs Load Resistance

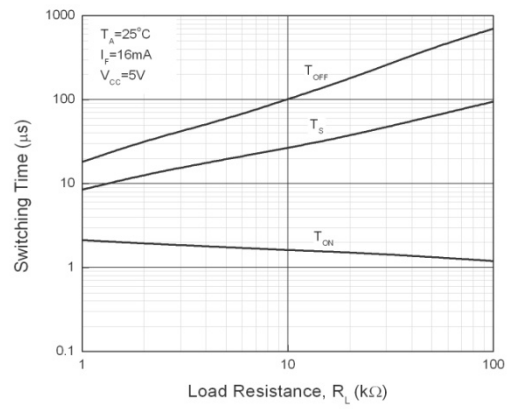


Figure 9. Collector-Emitter Saturation Voltage vs Ambient Temperature

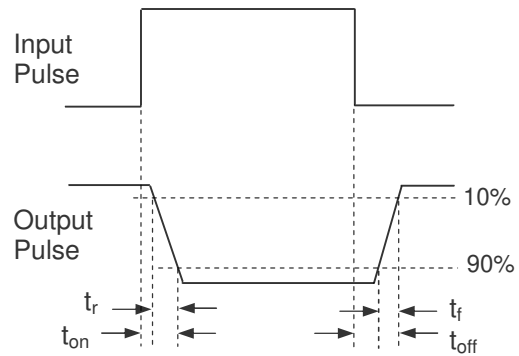
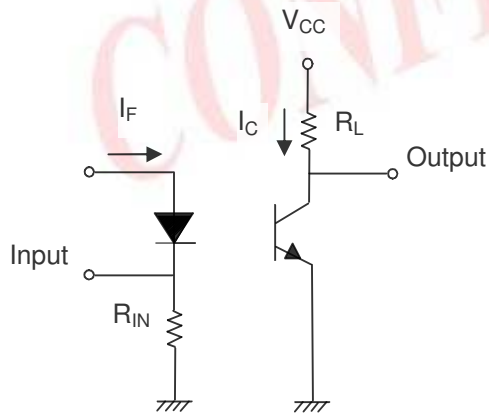
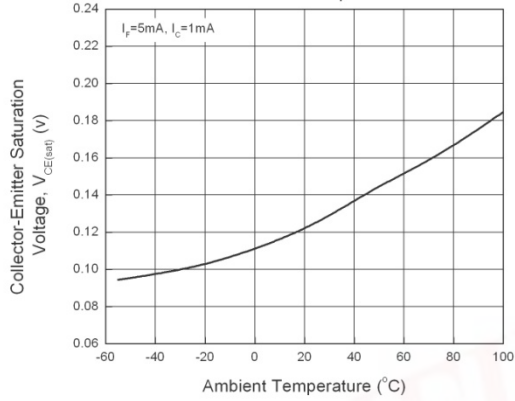


Figure 10. Switching Time Test Circuit & Waveforms

## Order Information

### Part Number

**EL357N(X)(Y)-VG**

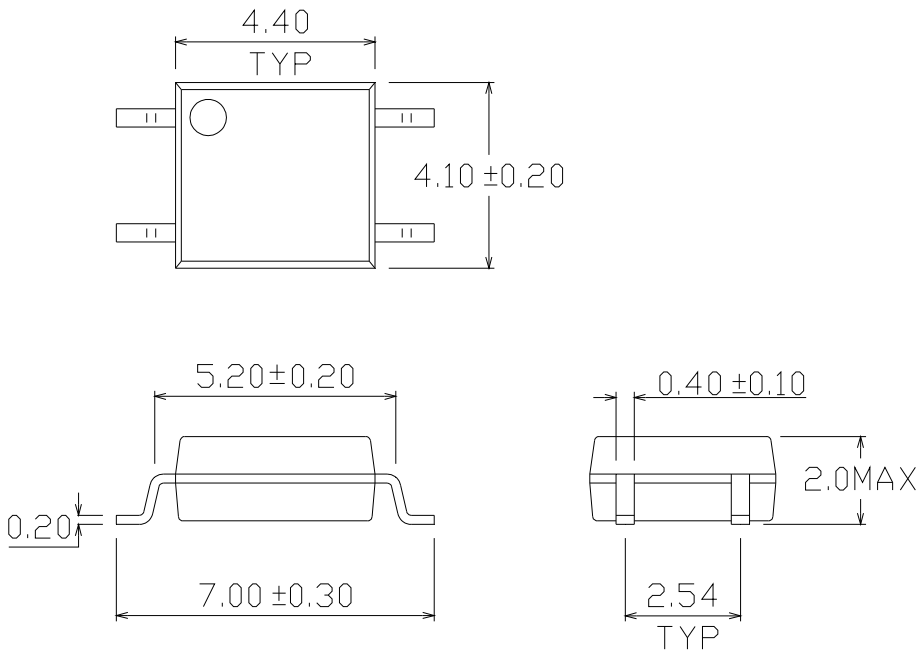
### Note

- X = CTR Rank (A, B, C, D, E, For none)
- Y = Tape and reel option (TA, TB or none).
- V = VDE (option)
- G = Halogen free

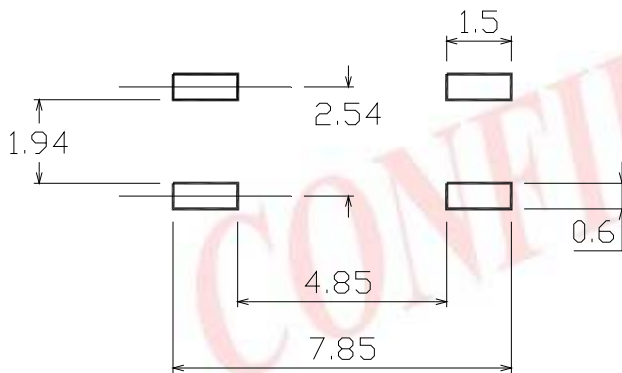
Option	Description	Packing quantity
None	Standard SMD option	100 units per tube
-V	Standard SMD option + VDE	100 units per tube
(TA)	TA Tape & reel option	3000 units per reel
(TB)	TB Tape & reel option	3000 units per reel
(TA)-V	TA Tape & reel option + VDE	3000 units per reel
(TB)-V	TB Tape & reel option + VDE	3000 units per reel

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Package Dimension (Dimensions in mm)



Recommended pad layout for surface mount leadform





## Device Marking

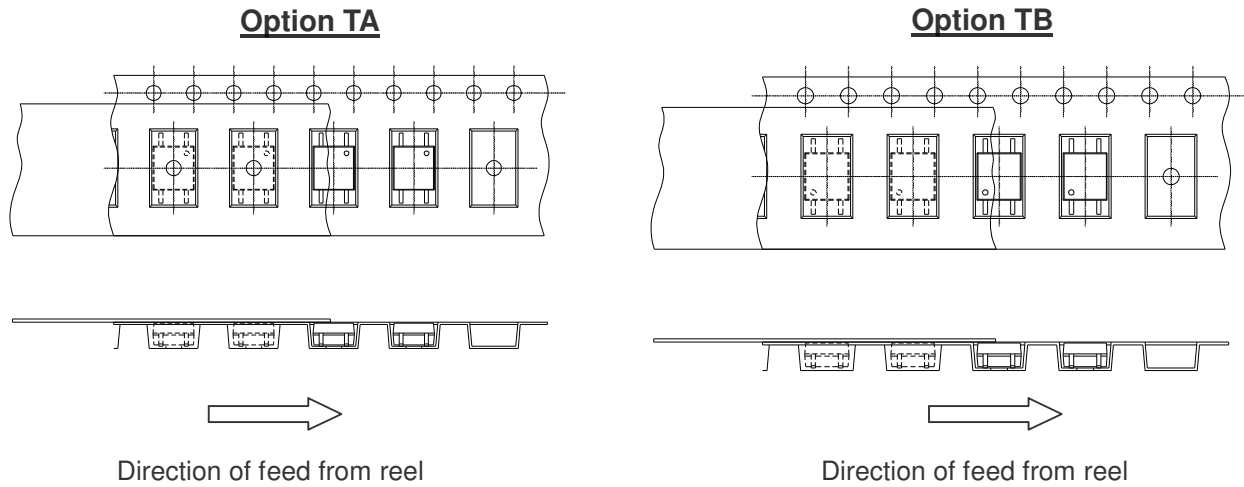


## Notes

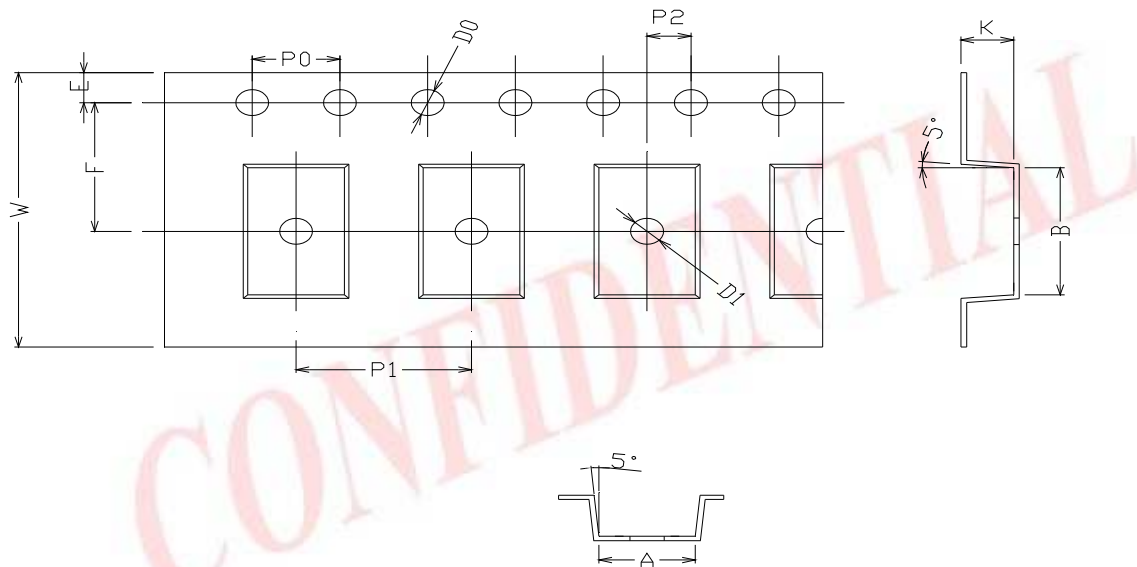
EL	denotes Everlight
357N	denotes Device Number
R	denotes CTR Rank
Y	denotes 1 digit Year code
WW	denotes 2 digit Week code
V	denotes VDE approved (optional)

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**Tape & Reel Packing Specifications**



**Tape dimensions**

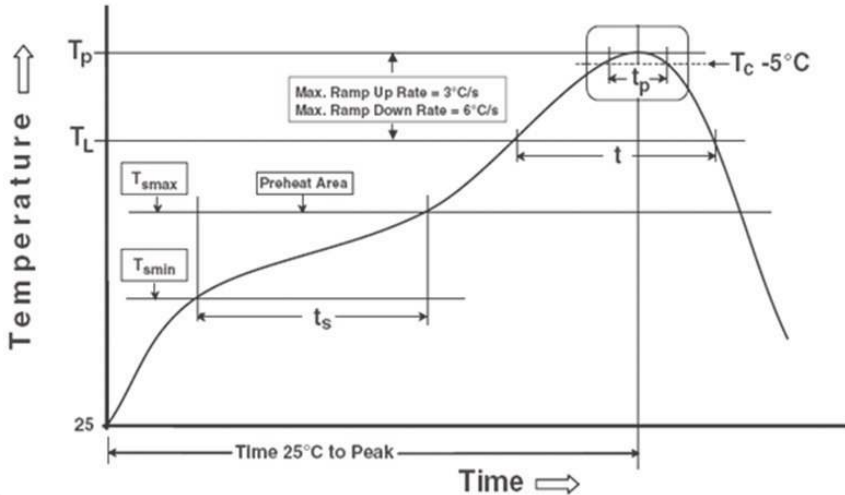


Dimension No.	<b>A</b>	<b>B</b>	<b>Do</b>	<b>D1</b>	<b>E</b>	<b>F</b>
Dimension (mm)	4.4 ± 0.1	7.4 ± 0.1	1.5 + 0.1/-0	1.5 ± 0.1	1.75 ± 0.1	7.5 ± 0.05
Dimension No.	<b>Po</b>	<b>P1</b>	<b>P2</b>	<b>t</b>	<b>W</b>	<b>K</b>
Dimension (mm)	4.0 ± 0.15	8.0 ± 0.1	2.0 ± 0.1	0.25 ± 0.03	16.0 ± 0.2	2.4 ± 0.1

## 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: $T_P - 5^\circ\text{C}$	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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