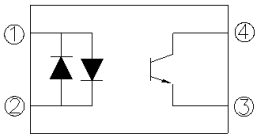
DATASHEET

4 PIN SOP PHOTOTRANSISTOR PHOTOCOUPLER
AC INPUT PHOTOCOUPLE
EL354N-G Series

Schematic



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

Features

- Halogens free
  (Br <900 ppm ,Cl <900 ppm , Br+Cl < 1500 ppm)
- Current transfer ratio
  (CTR: Min. 20% at I_F =±1mA ,V_{CE} =5V)
- High isolation voltage between input and output (Viso=3750 V rms)
- Compact small outline package
- Compliance with EU REACH
- 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 EL354N-G series of devices each consist of two infrared emitting diode, connected in inverse parallel, optically coupled to a phototransistor detector.

They are packaged in a 4-pin small outline package.

Applications

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

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
	Power dissipation Derating factor (above T_a = 90°C)	P_D	70	mW
Output	Power dissipation Derating factor (above T_a = 70°C)	P_C	150	mW
			3.7	mW/°C
	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}	3750	Vrms
Operating temperature		T_{OPR}	-55 ~ +100	℃
Storage temperature		T_{STG}	-55 ~ +125	℃
Soldering Temperature*2		T_{SOL}	260	℃

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 = ± 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}	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	EL354N	CTR	20	-	300	%	I_F = ±1mA ,V_{CE} = 5V
	EL354NA		50	-	150		
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}	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

Typical Electro-Optical Characteristics Curves

Figure 1. Forward Current vs Forward Voltage

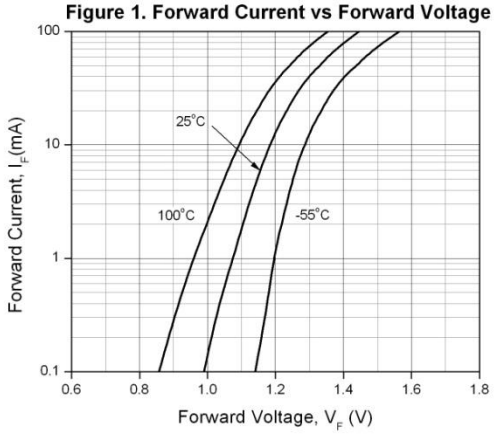


Figure 2. Normalized Collector Current vs Forward Current

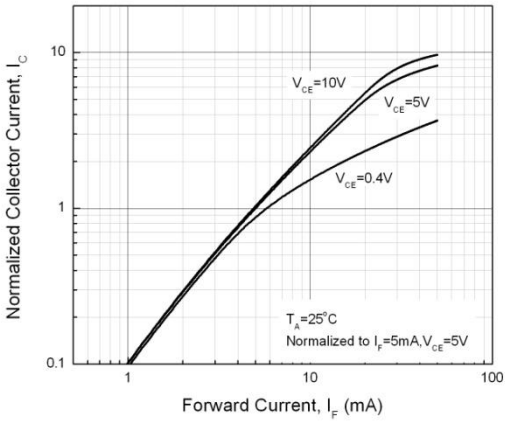


Figure 3. Normalized Current Transfer Ratio vs Forward Current

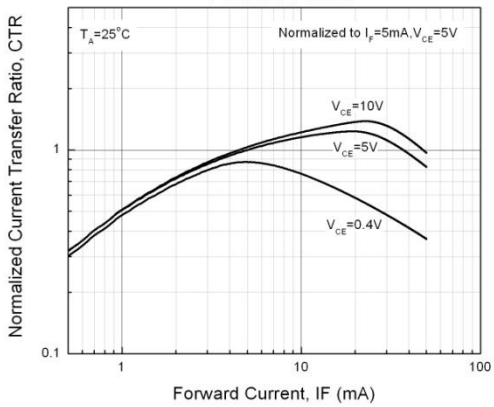


Figure 4. Normalized Collector Current vs Ambient Temperature

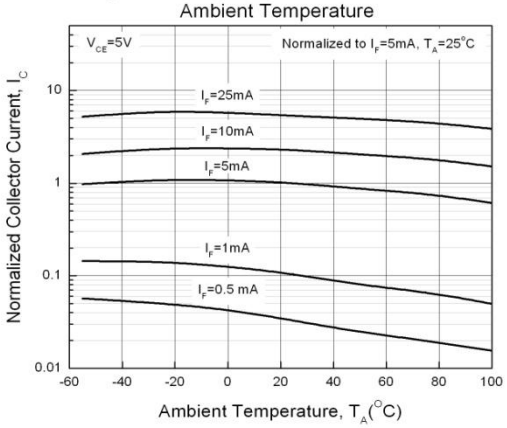


Figure 5. Collector Current vs Collector-Emitter Voltage

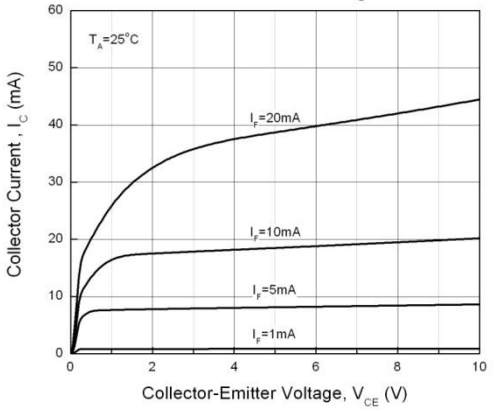


Figure 6. Collector Current vs Collector-Emitter Voltage

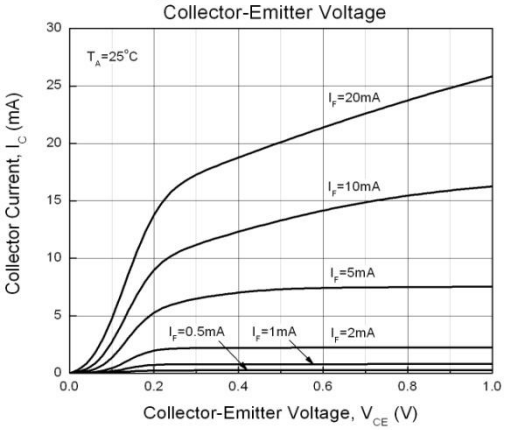


Figure 7. Collector Dark Current vs Ambient Temperature

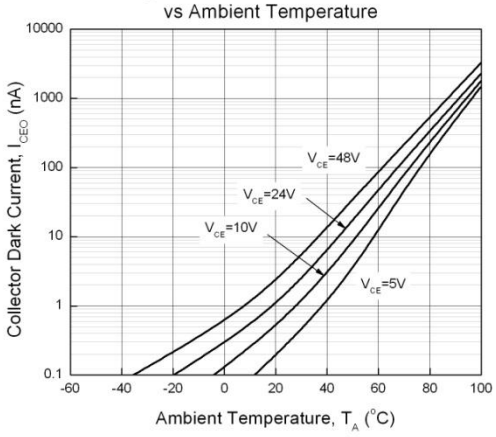


Figure 8. Switching Time vs Load Resistance

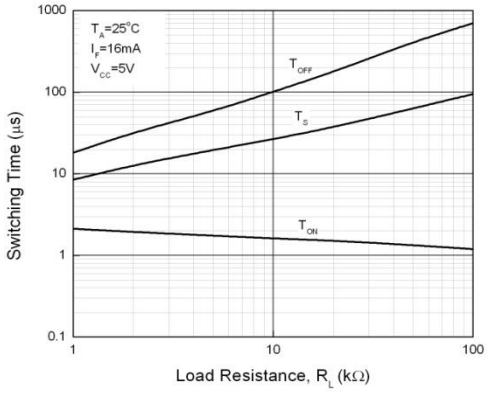
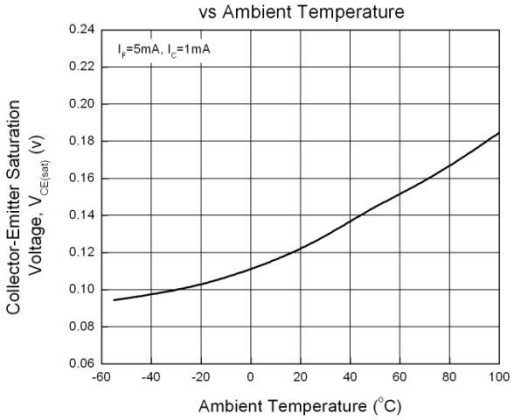
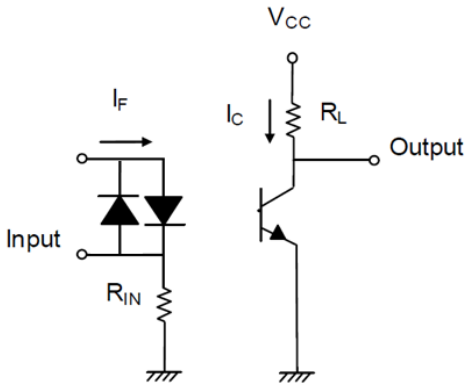


Figure 9. Collector-Emitter Saturation Voltage vs Ambient Temperature





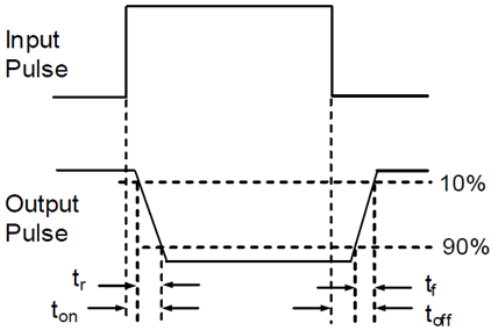


Figure 10. Switching Time Test Circuit & Waveforms

Order Information

Part Number

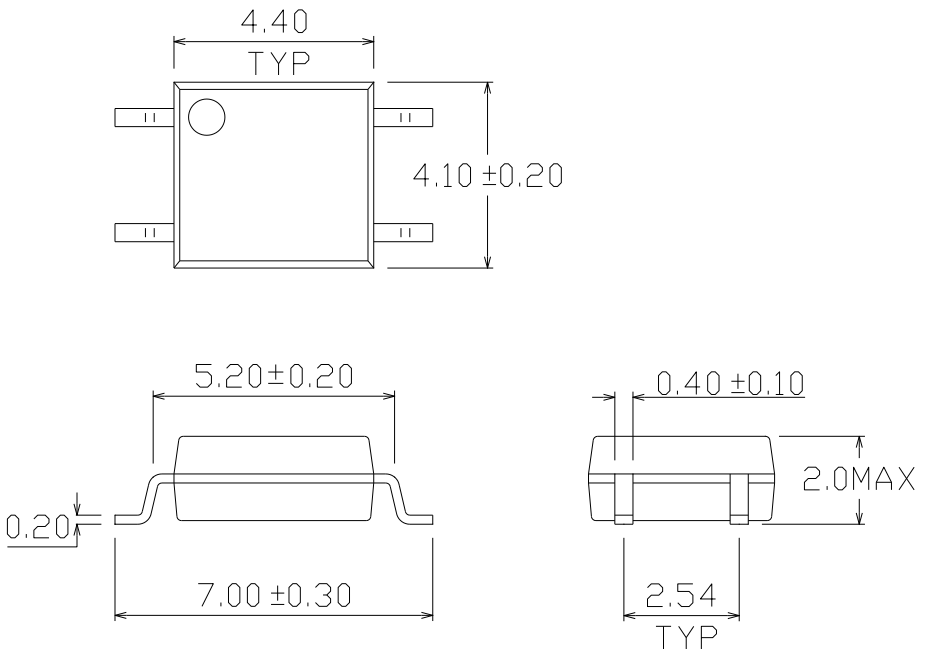
EL354N(X)(Y)-VG

Notes

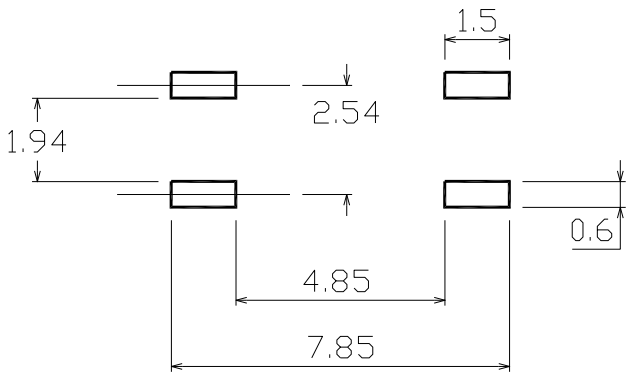
X = CTR Rank option (A, or none)
Y = Tape and reel option (TA, TB, or none).
V = VDE (option)
G = Halogens free

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	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.

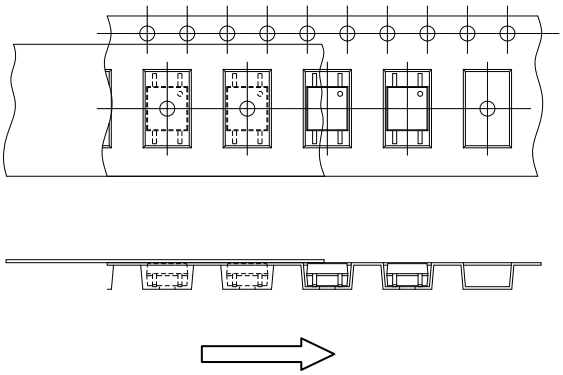
Device Marking

Notes

EL	denotes Everlight
354N	denotes Device Number
R	denotes CTR Rank (A or none)
Y	denotes 1 digit Year code
WW	denotes 2 digit Week code
V	denotes VDE approved (optional)

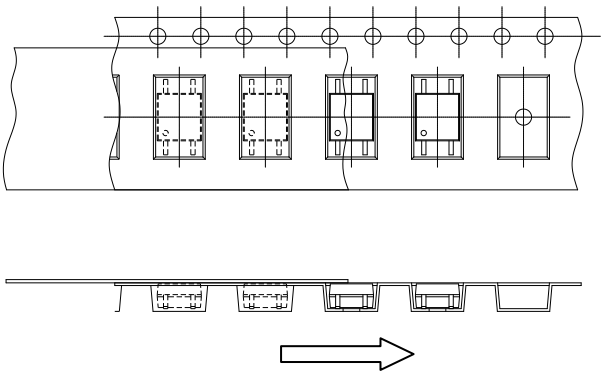
Tape & Reel Packing Specifications

Option TA



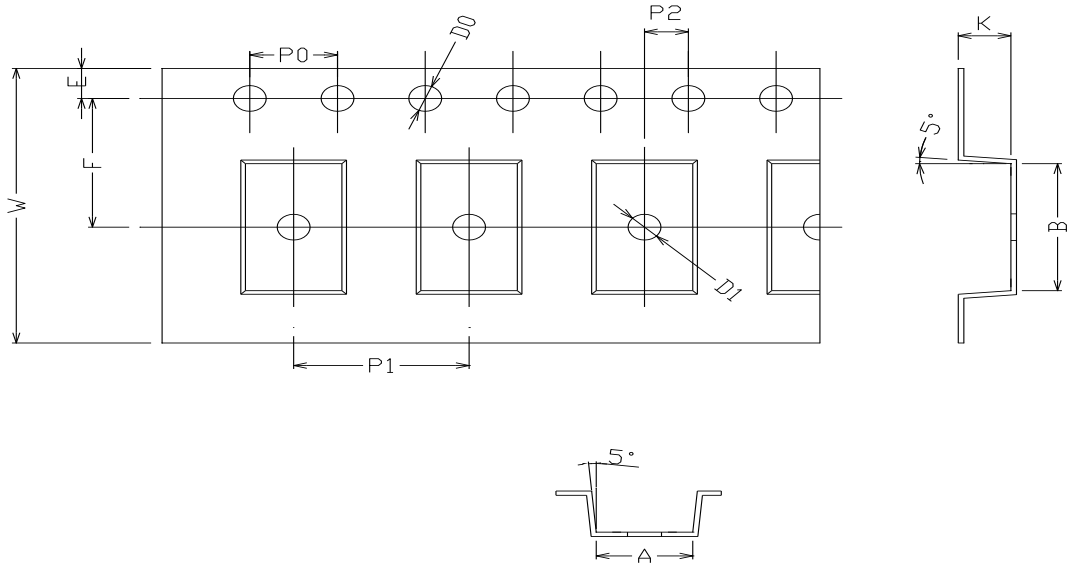
Direction of feed from reel

Option TB



Direction of feed from reel

Tape dimensions

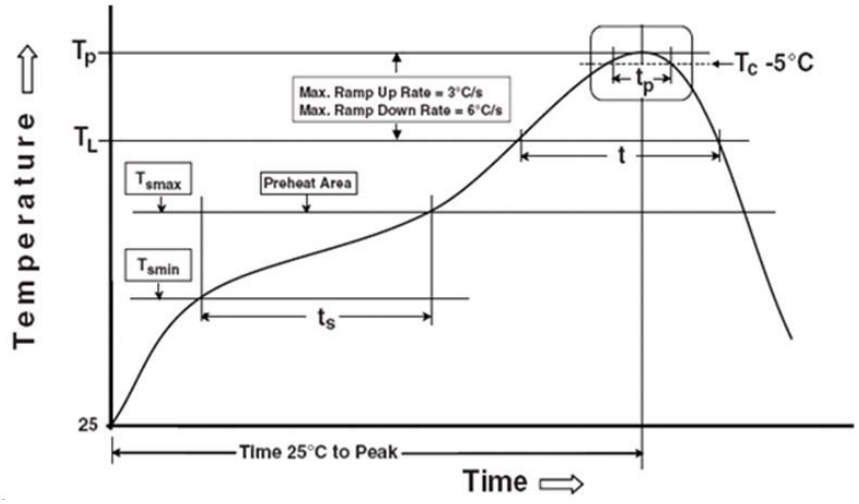


Dimension No.	A	B	Do	D1	E	F
Dimension (mm)	4.4 ± 0.1	7.6 ± 0.1	1.5 + 0.1/-0	1.5 ± 0.1	1.75± 0.1	7.5 ± 0.05
Dimension No.	**Po**	**P1**	**P2**	**t**	**W**	**K**
Dimension (mm)	4.0 ± 0.05	8.0 ± 0.1	2.0 ± 0.05	0.25 ± 0.03	16.0 ± 0.2	2.4± 0.1

Precautions for Use

1. Soldering Condition

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



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

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