

4 PIN SOP PHOTOTRANSISTOR AC INPUT PHOTOCOUPLER

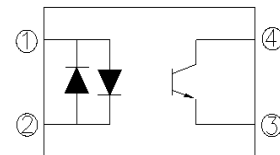
EL354 Series

Features:

- AC input response
- Current transfer ratio
(CTR: Min. 20% at $I_F = \pm 1\text{mA}$, $V_{CE} = 5\text{V}$)
- High isolation voltage between input and output (Viso=3750 V rms)
- Compact small outline package
- Pb free and RoHS compliant.
- UL approved (No. E214129)
- VDE approved (No. 132249)
- SEMKO approved (No. 716108)
- NEMKO approved (No. P06206474)
- DEMKO approved (No. 313924)
- FIMKO approved (No. FI 22807)
- CSA approved (No. 1408633)



Schematic



Pin Configuration

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

Description

The EL354 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



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Absolute Maximum Ratings ($T_a=25^{\circ}\text{C}$)

Parameter		Symbol	Rating	Unit
Input	Forward current	I_F	± 50	mA
	Peak forward current ($t = 10\mu\text{s}$)	I_{FM}	1	A
	Power dissipation No derating required up to $T_a = 100^{\circ}\text{C}$	P_D	70	mW
Output	Power dissipation Derating factor (above $T_a = 80^{\circ}\text{C}$)	P_C	150	mW
			3.7	mW/ $^{\circ}\text{C}$
	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	V rms
Operating temperature		T_{opr}	-55~+100	$^{\circ}\text{C}$
Storage temperature		T_{stg}	-55~+125	$^{\circ}\text{C}$
Soldering temperature ^{*2}		T_{sol}	260	$^{\circ}\text{C}$

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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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
Reverse current	I _R	-	-	10	μA	V _R = 4V
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}	6	-	-	V	I _E =0.01mA

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

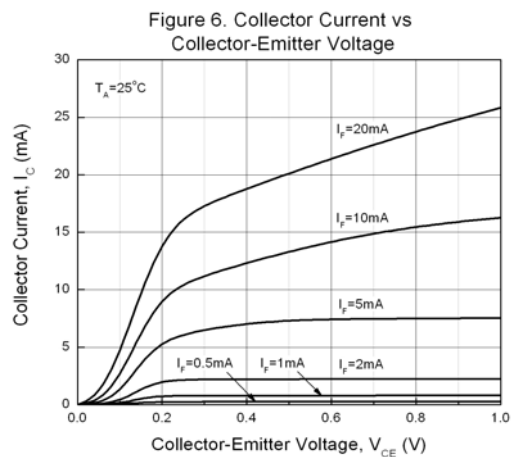
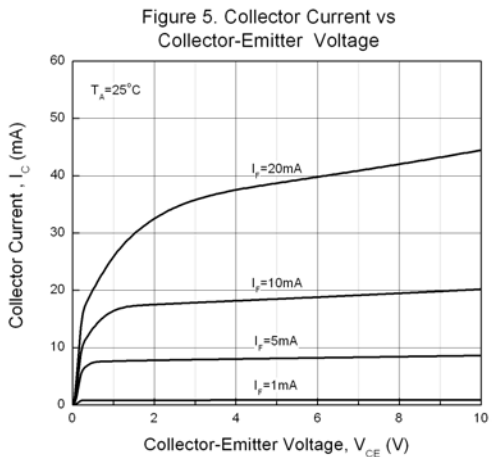
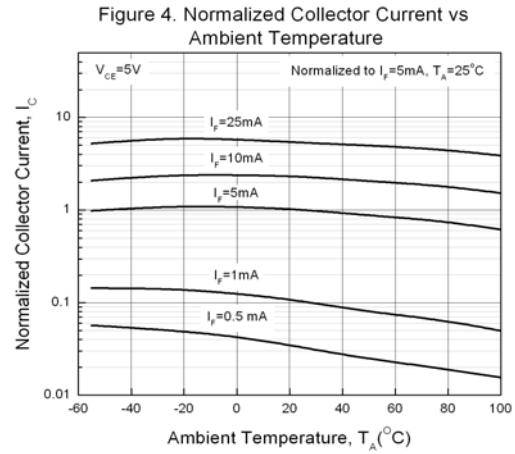
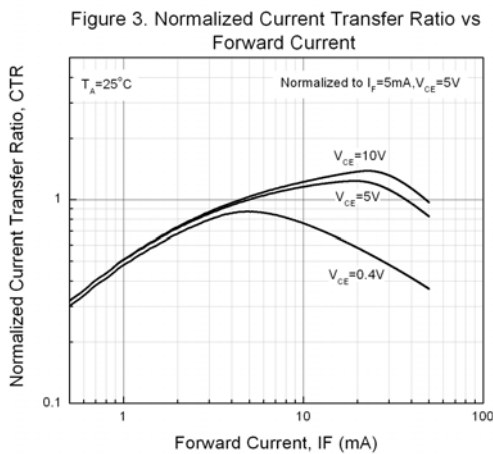
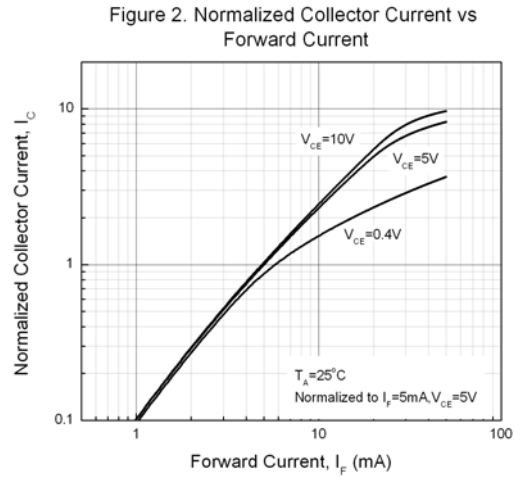
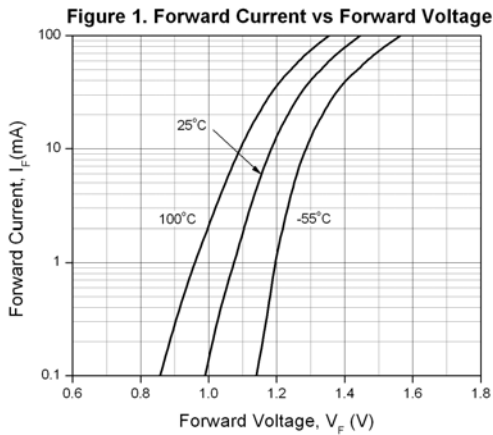
Parameter	Symbol	Min.	Typ.*	Max.	Unit	Condition
Current Transfer ratio	EL354	20	-	300	%	I _F = ±1mA, V _{CE} = 5V
	EL354A	50	-	150		
Collector-emitter saturation voltage	V _{CE(sat)}	-	0.1	0.2	V	I _F = ±20mA, I _C = 1mA
Isolation resistance	R _{IO}	5×10 ¹⁰	10 ¹¹	-	Ω	V _{IO} = 500Vdc, 40~60%R.H
Cut-off 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	-	6	18	μs	V _{CE} =2V, I _C =2mA, R _L =100Ω
Fall time	T _f	-	8	18	μs	

* Typical values at T_a = 25°C

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Typical Performance Curves



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Figure 7. Collector Dark Current vs Ambient Temperature

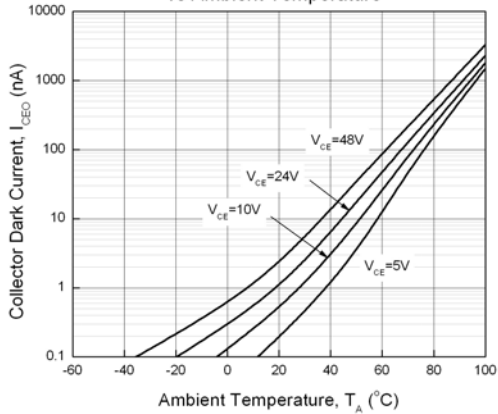


Figure 8. Switching Time vs Load Resistance

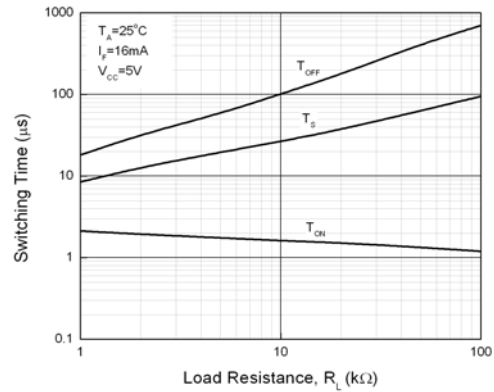


Figure 9. Collector-Emitter Saturation Voltage vs Ambient Temperature

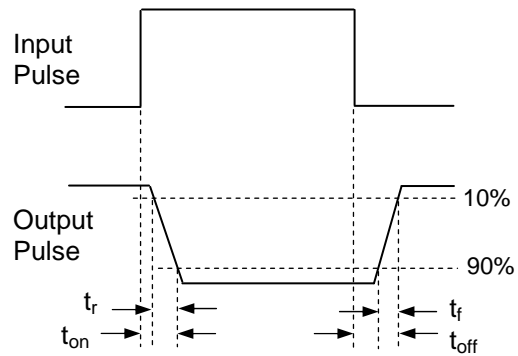
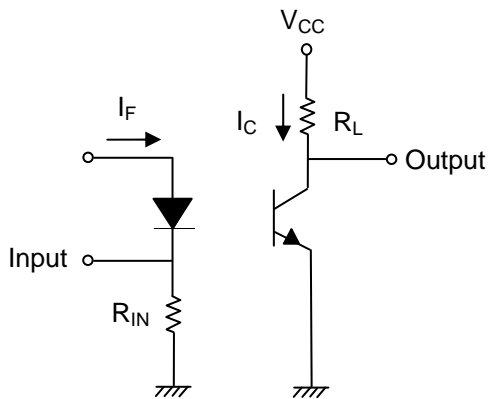
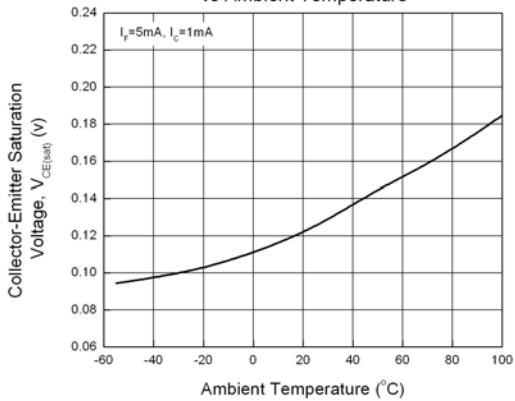


Figure 10. Switching Time Test Circuit & Waveforms



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Order Information

Part Number

EL354(X)(Y)-V

Note

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

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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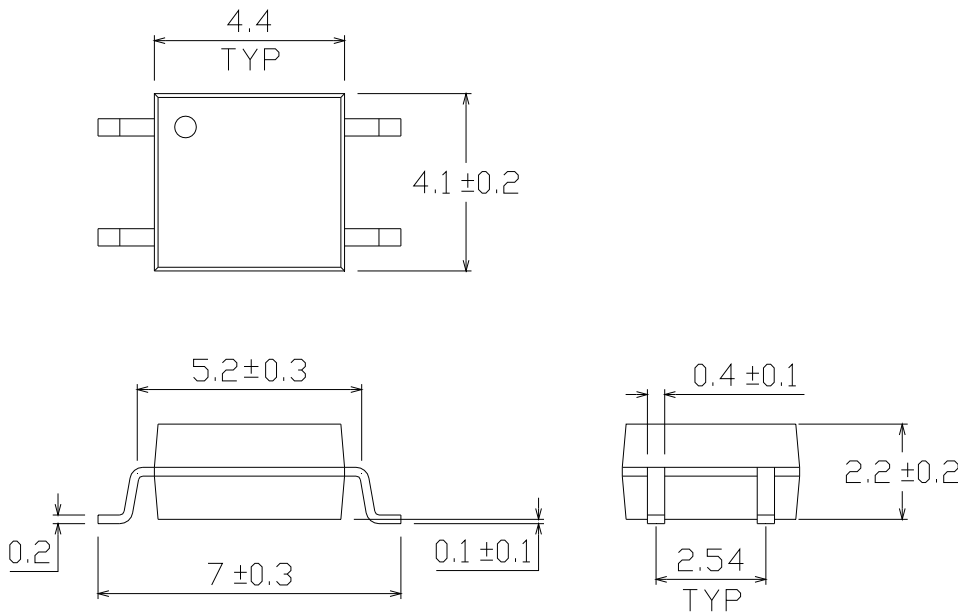
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Package Drawings

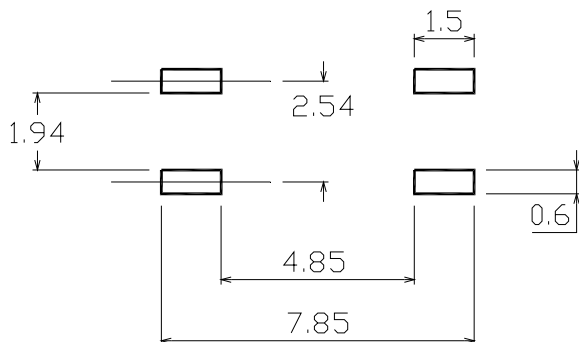
(Dimensions in mm)

Package Drawing

(Dimensions in mm)



Recommended pad layout for surface mount leadform





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Device Marking



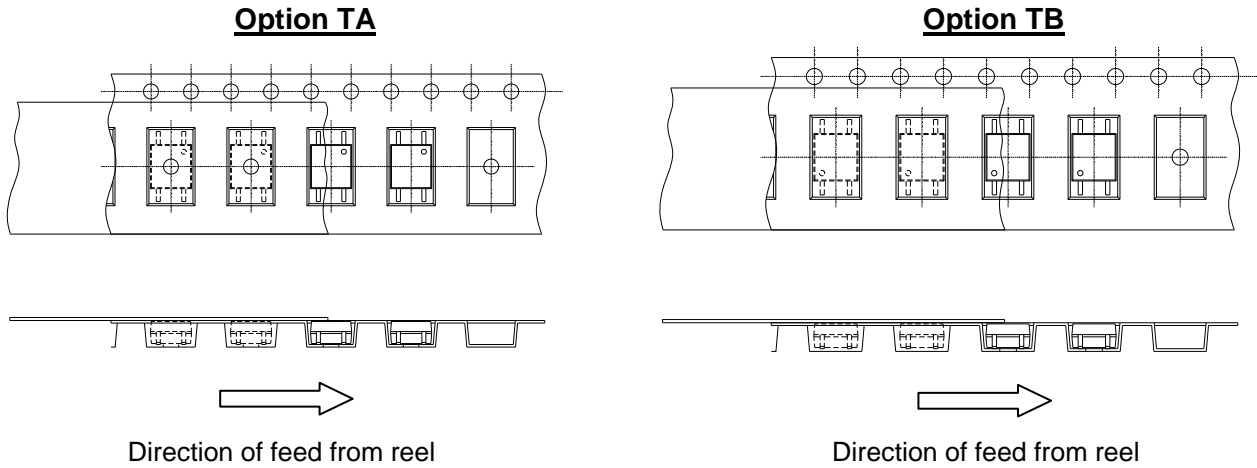
Notes

EL	denotes Everlight
354	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)

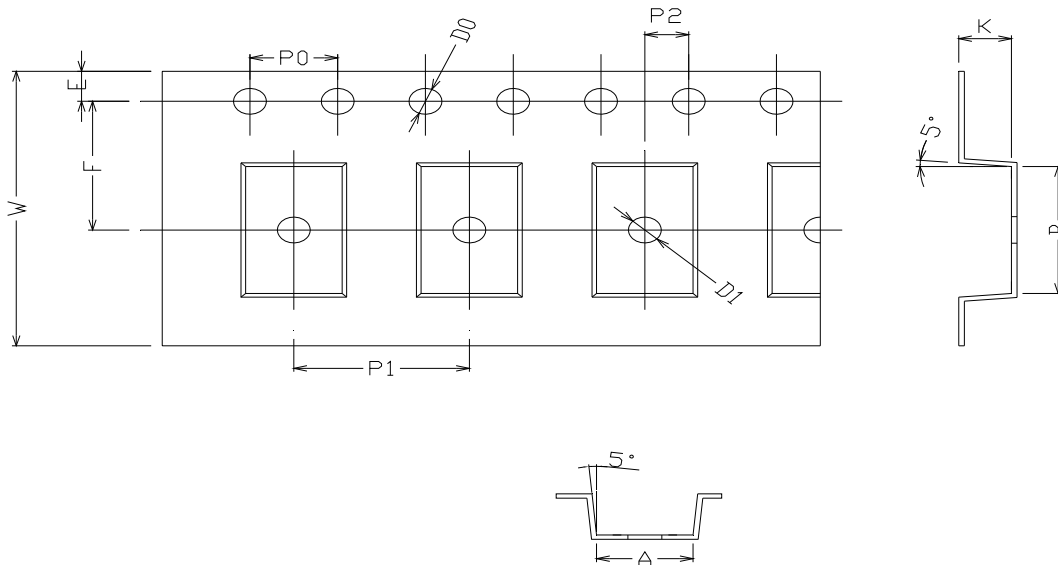
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Tape & Reel Packing Specifications



Tape dimensions

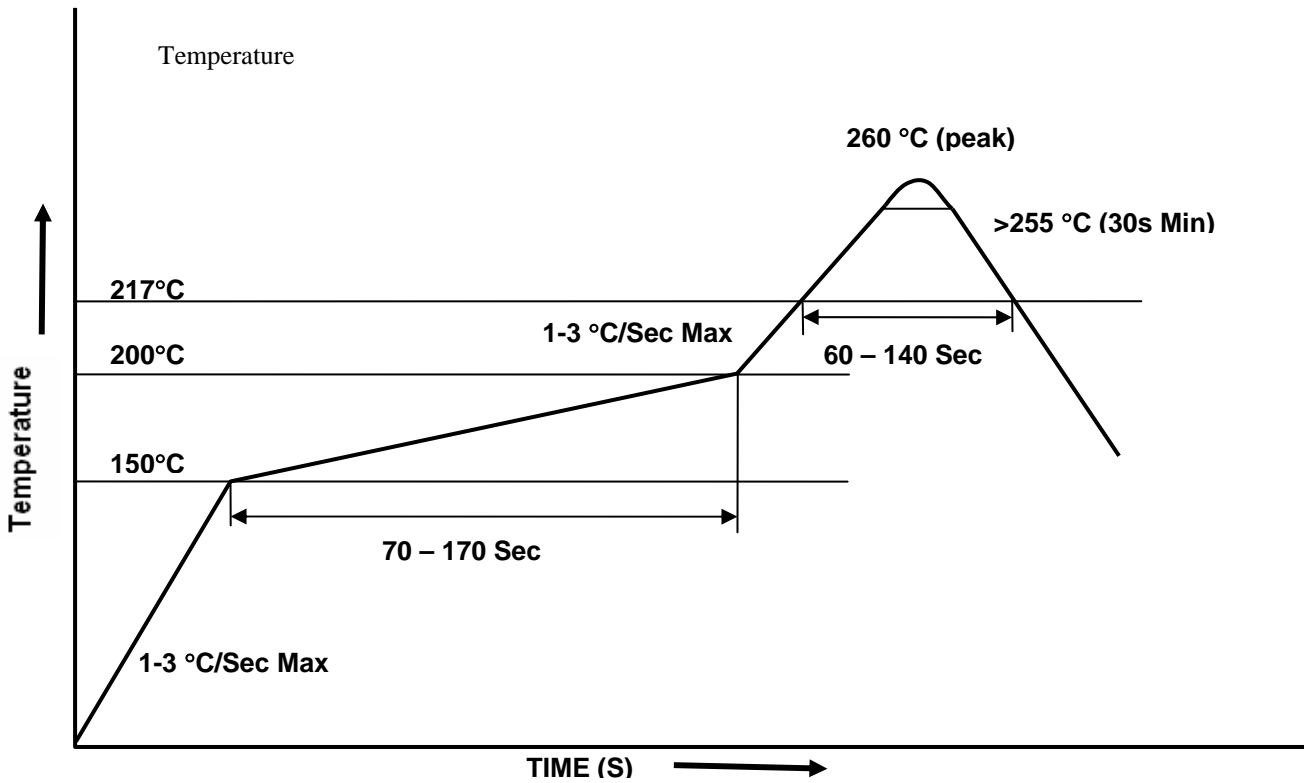


Dimension No.	A	B	Do	D1	E	F
Dimension (mm)	4.4 ± 0.1	7.4 ± 0.1	1.5 + 0.1/-0	1.5 ± 0.1	1.75 ± 0.1	7.5 ± 0.1
Dimension No.	Po	P1	P2	t	W	K
Dimension (mm)	4.0 ± 0.15	8.0 ± 0.1	2.0 ± 0.1	0.25 ± 0.03	16.0 ± 0.2	2.4 ± 0.1

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Solder Reflow Temperature Profile





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