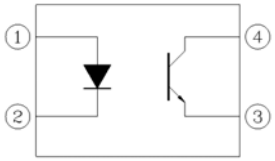
4 PIN SOP PHOTOTRANSISTOR PHOTOCOUPLER

EL357 Series

Features:

- Current transfer ratio (CTR: 50~600% at I_F =5mA, V_{CE} =5V)
- 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. 7161608)
- NEMKO approved (No. P06206474)
- DEMKO approved (No. 313924)
- FIMKO approved (No. FI 22807)
- CSA approved (No. 1969127)

Schematic



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

Description

The EL357 series contains an infrared emitting diode, optically coupled to a phototransistor. It is packaged in a 4-pin small outline SMD package.

Applications

- Programmable controllers
- System appliances, measuring instruments
- Telecommunication equipments
- Home appliances, such as fan heaters, etc.
- Signal transmission between circuits of different potentials and impedances

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Absolute Maximum Ratings (T_a=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 No derating required up to T_a = 100°C	P_D	70	mW
Output	Power dissipation	P_C	150	mW
	Derating factor (above T_a = 80°C)		3.7	mW/°C
	Collector current	I_C	80	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 ~ +100	°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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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}	-	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=25°C unless specified otherwise)

Parameter		Symbol	Min.	Typ.*	Max.	Unit	Condition
Current Transfer ratio	EL357	CTR	50	-	600	%	I_F = 5mA ,V_{CE} = 5V
	EL357A		80	-	160		
	EL357B		130	-	260		
	EL357C		200	-	400		
	EL357D		300	-	600		
Collector-Emitter saturation voltage		$V_{CE(sat)}$	-	0.1	0.2	V	I_F = 1mA ,I_C = 20mA
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
Cut-off frequency		fc	-	80	-	kHz	V_{CE} = 5V, I_C = 2mA R_L = 100Ω, -3dB
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

Figure 1. Forward Current vs Forward Voltage

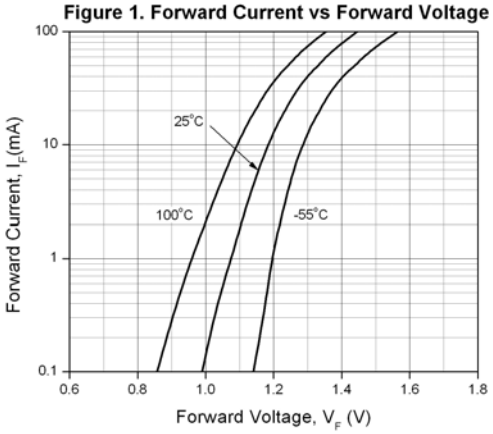

Figure 2. Normalized Collector Current vs Forward Current

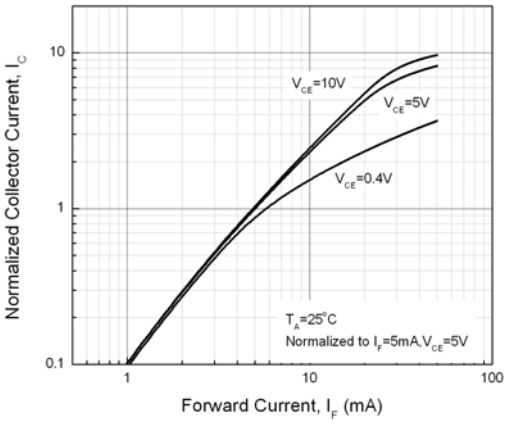

Figure 3. Normalized Current Transfer Ratio vs Forward Current

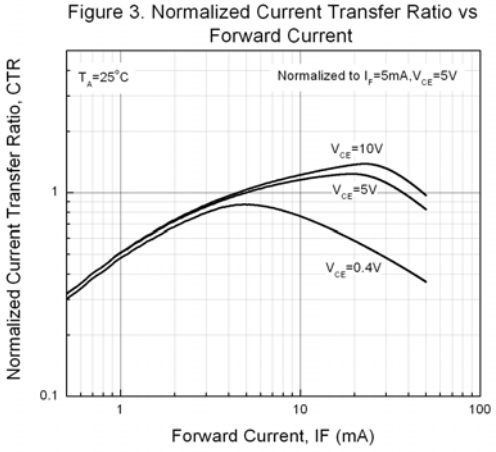

Figure 4. Normalized Collector Current vs Ambient Temperature

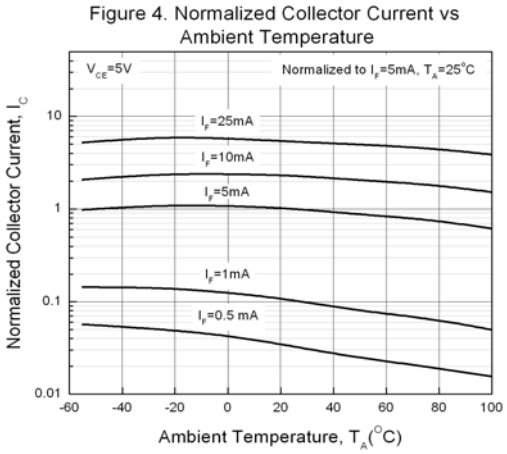

Figure 5. Collector Current vs Collector-Emitter Voltage

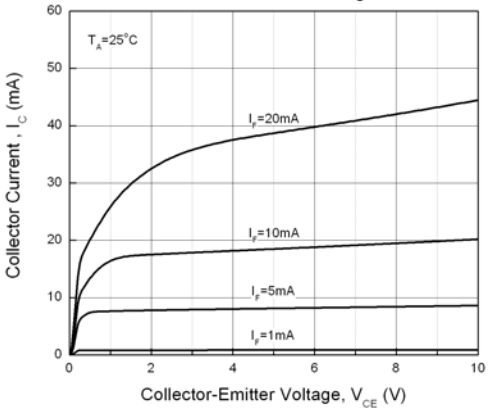

Figure 6. Collector Current vs Collector-Emitter Voltage

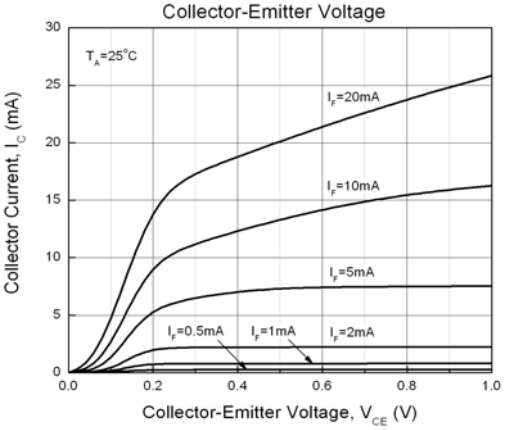

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Figure 7. Collector Dark Current vs Ambient Temperature

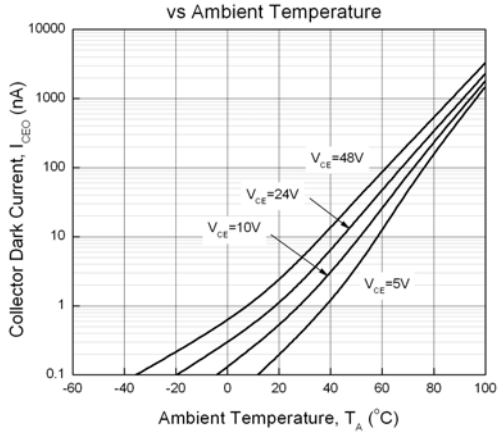


Figure 8. Switching Time vs Load Resistance

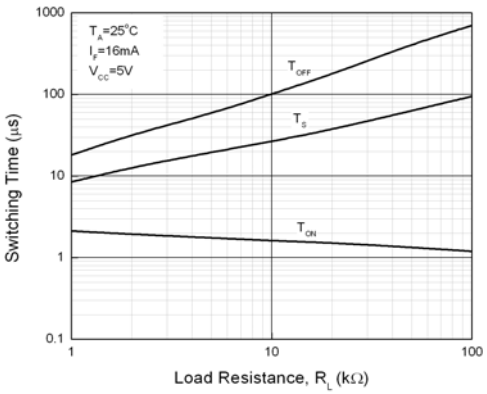
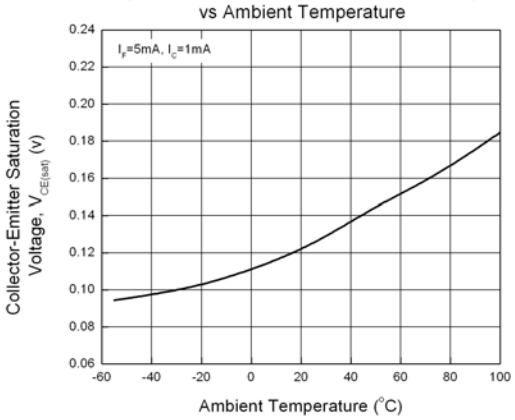


Figure 9. Collector-Emitter Saturation Voltage vs Ambient Temperature



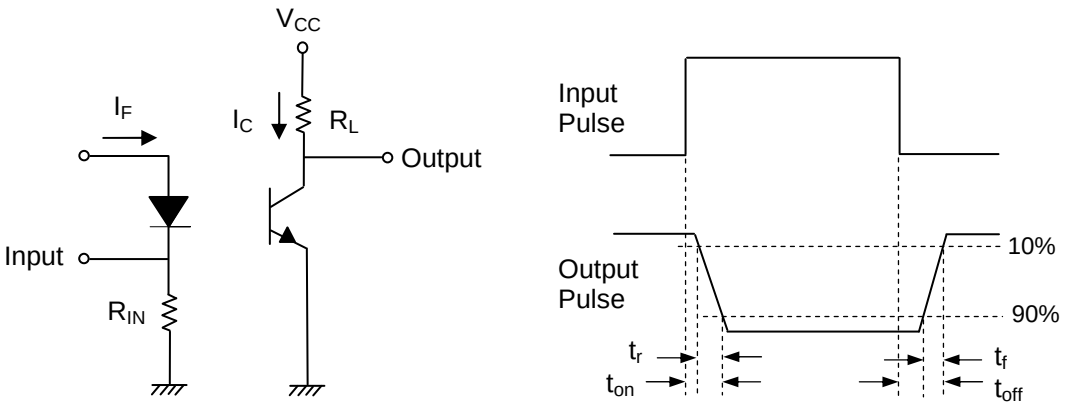


Figure 10. Switching Time Test Circuit & Waveforms

Order Information

Part Number

EL357(X)(YY)-V

Note

X = CTR Rank (A, B, C, D or none)
YY = Tape and reel option (TA, TB or none).
V = VDE 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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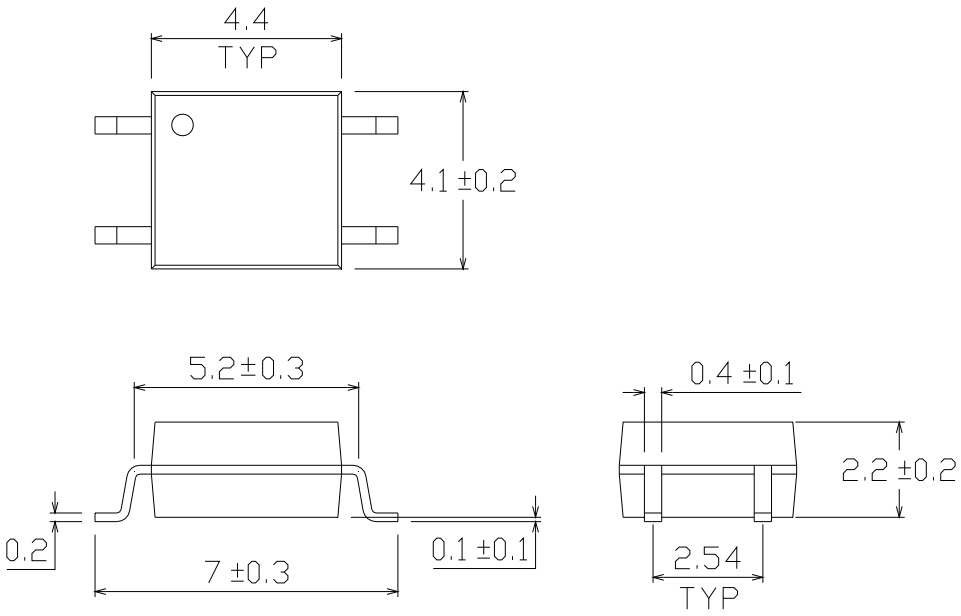
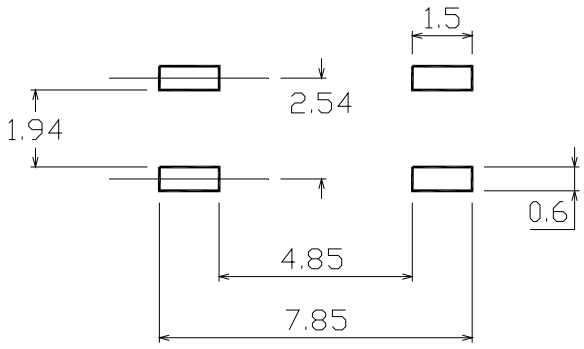
Package Drawing

(Dimensions in mm)



Recommended pad layout for surface mount leadform



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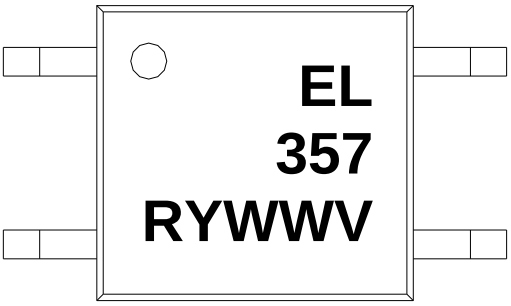
Device Marking



Notes

EL	denotes Everlight
357	denotes Part Number
R	denotes CTR Rank (A, B, C, D or none)
Y	denotes 1 digit Year code
WW	denotes 2 digit Week code
V	denotes VDE (optional)

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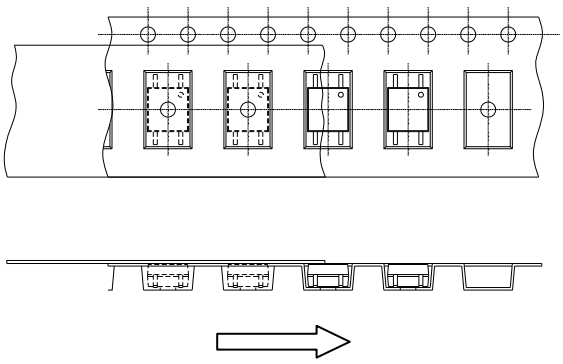
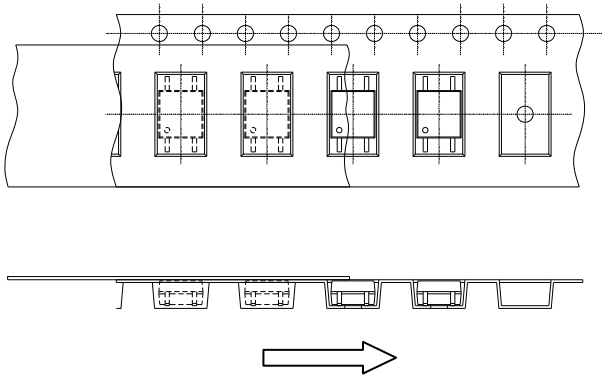
Tape & Reel Packing Specifications

Option TA



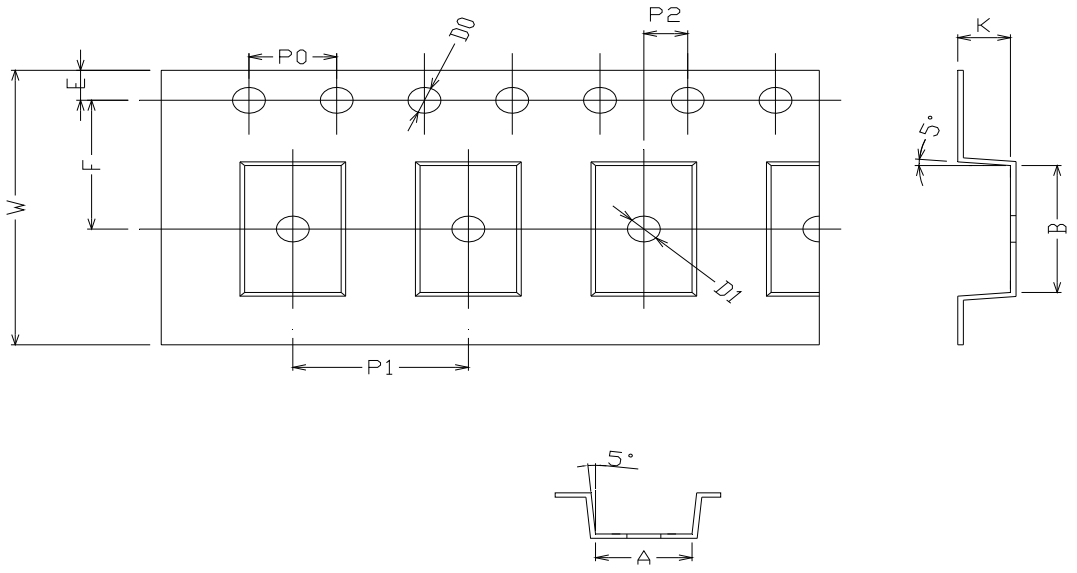
Direction of feed from reel

Option TB



Direction of feed from reel

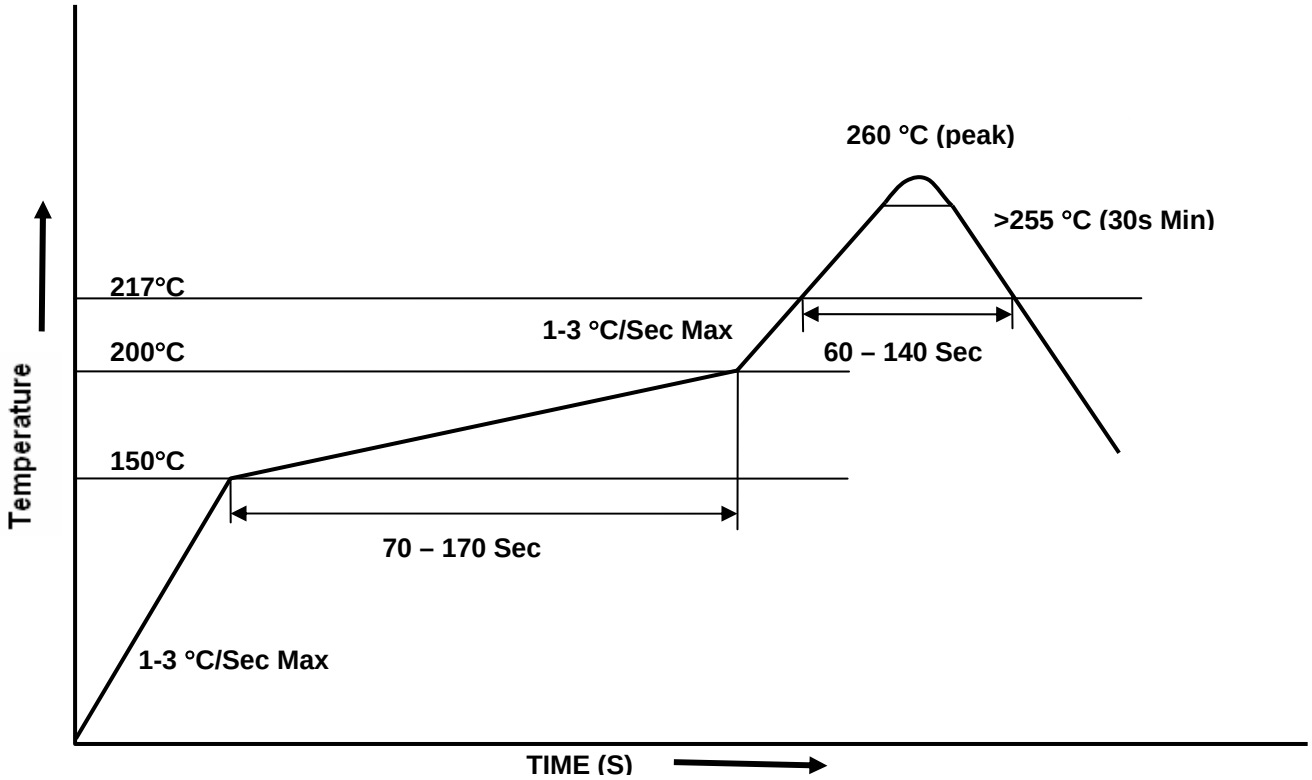
Tape dimensions



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	1.7 5± 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

Solder Reflow Temperature Profile



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