EVERLIGHT ELETCRONICS CO., LTD

Technical Data Sheet
Photocoupler

EL357

Features:

- Current transfer ratio
  (CTR:MIN.50% at I_F =5mA ,V_{CE} =5V)
- Isolation voltage between input and output
  (E357: V_{iso}=3750 V_{rms})
- Subminiature type
  (The volume is small than that of conventional
  DIP type by as far as 30%)
- Mini-flat package
  EL357:1-channel type
- Pb free
- The product itself will remain within RoHS compliant version.

Description

The EL357 contains a gallium arsenic infrared emitting diode optically coupled to a phototransistor. It is packaged in a 4-pin SMD package

Applications

- Hybrid substrates that require high density mounting
- Programmable controllers
- System appliances, measuring instruments
- Telecommunication
- Electric home appliances, such as fan heaters, etc.
- Signal transmission between circuits of different potentials
  and impedances

Device Selection Guide

Part No.	Chip Material	
	IR	PT
EL357	GaAs	Silicon

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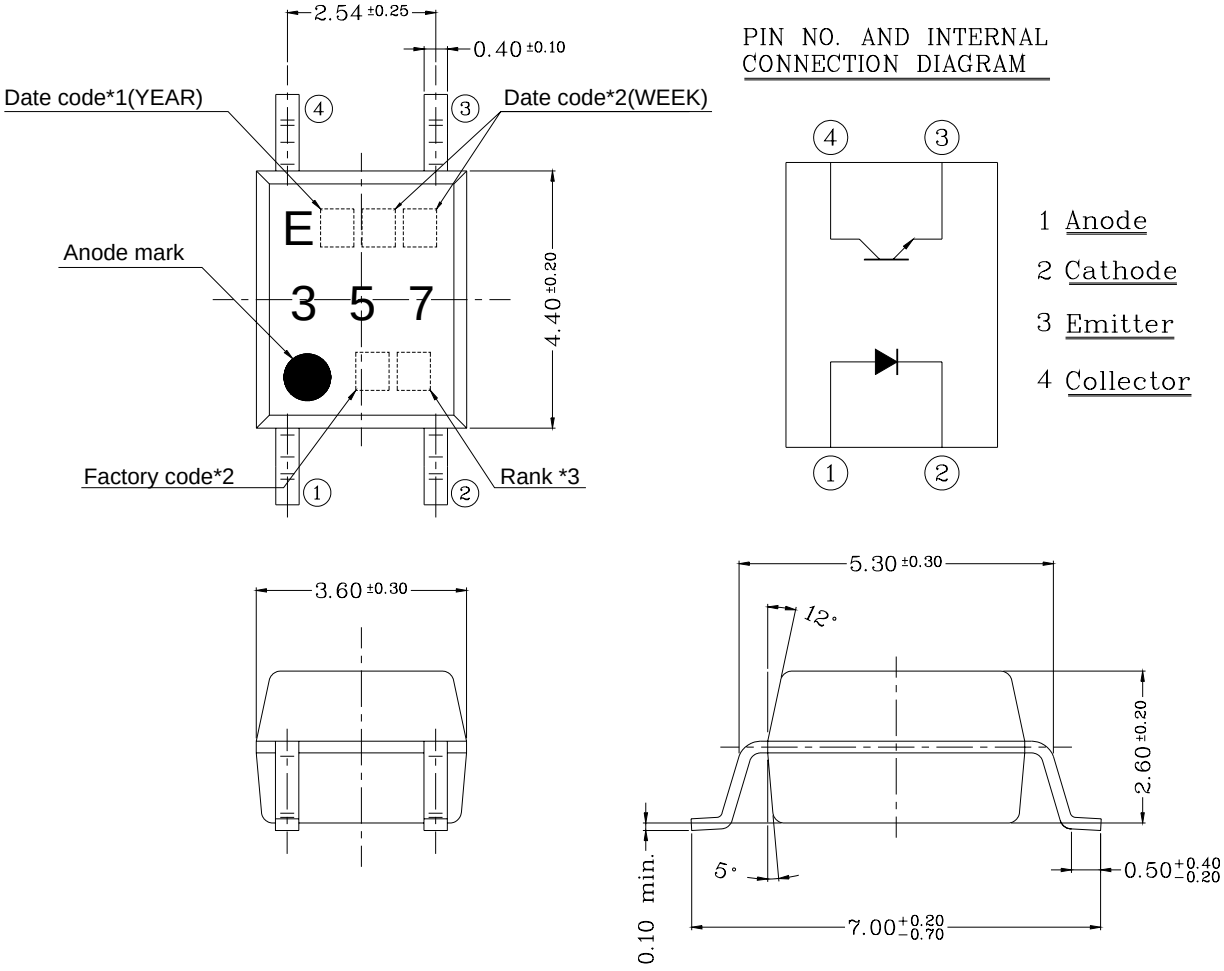
Package Dimensions



Notes:

1. Rank shall be or shall not be marked
2. Factory code shall be marked (T: Taiwan / C: China)
3. Year date code
4. 2-digit work week
5. All dimensions are in millimeters
6. Specifications are subject to change without notice

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Absolute Maximum Ratings (Ta=25°C)

Parameter		Symbol	Rating	Unit
Input	Forward Current	I_F	50	mA
	Reverse Voltage	V_R	6	V
	Power Dissipation	P	70	mW
Output	Collector Power Dissipation	P_C	150	mW
	Collector Current	I_C	50	mA
	Collector-Emitter Voltage	V_{CEO}	35	V
	Emitter-Collector Voltage	V_{ECO}	6	V
Total Power Dissipation		Ptot	200	mW
*1 Isolation Voltage		Viso	3750	V rms
Operating Temperature		Topr	-55~+100	°C
Storage Temperature		Tstg	-55~+125	°C
*2 Soldering Temperature		Tsol	260	°C

*1 AC for 1 minute, R.H= 40~ 60%RH

-Isolation voltage shall be measured using the following method.

(1) Short between anode and cathode on the primary side and between collector, emitter and base on the secondary side.

(2) The isolation voltage tester with zero-cross circuit shall be used.

(3) The waveform of applied voltage shall be a sine wave

*2 For 10 seconds

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Electro-Optical Characteristics (Ta=25°C)

Parameter		Symbol	Min.	Typ.	Max.	Unit	Condition
Input	Forward	V_F	-	1.2	1.4	V	I_F=20mA
	Reverse Current	I_R	-	-	10	uA	V_R=4V
	Terminal	Ct	-	30	250	pF	V=0,f=1kHz
Output	*Collector Dark current*	I_{CEO}	-	-	100	nA	V_{CE}=20V
	Collector-Emitter breakdown voltage	BV_{CEO}	35	-	-	V	Ic=0.1mA
Transfer Characteristics	Current Transfer ratio	CTR	50	-	600	%	I_F=5mA ,V_{CE}=5V
	Collector-Emitter saturation voltage	$V_{CE(sat)}$	-	0.1	0.2	V	I_F=20mA ,Ic=1 mA
	Isolation resistance	R_{ISO}	5×10^{10}	10^{11}	-	**Ω**	DC500V,40~60%R.H
	Floation capacitance	Cf	-	0.6	1.0	pF	V=0, f=1MHz
	Cut-off frequency	fc	-	80	-	kHz	V_{CE}=5V, I_C=2 mA R_L=100Ω, -3dB
	Rise time	t_r	-	4	18	us	V_{CE}=2V I_C=2mA,R_L=100Ω
	Fall time	t_f	-	3	18	us	

Supplement

Rank Table of Current Transfer Ratio CTR

Model No.	Rank mark	CTR (%)	Condition
EL357		50 to 600	I_F = 5 mA V_{CE} = 5 V T_a = 25°C
EL357	L	50 to 100	
EL357	A	80 to 160	
EL357	B	130 to 260	
EL357	C	200 to 400	
EL357	D	300 to 600	
EL357	Y	150 to 300	

Fig. 1 Forward Current vs. Ambient Temperature

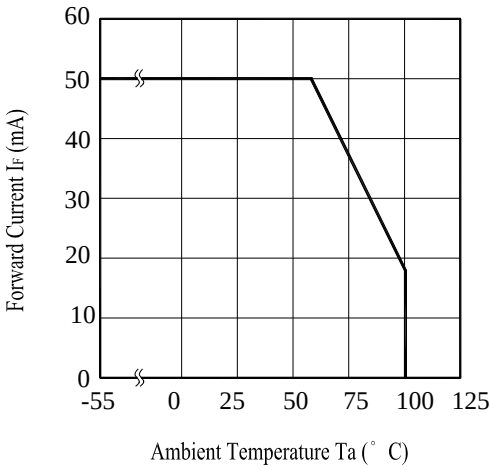


Fig. 2 Collecter Power Dissipation vs. Ambient Temperature

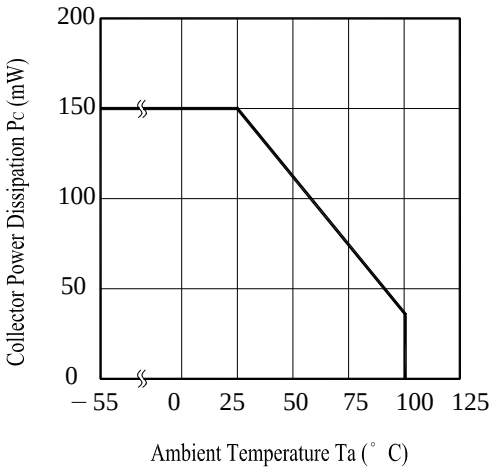


Fig. 3

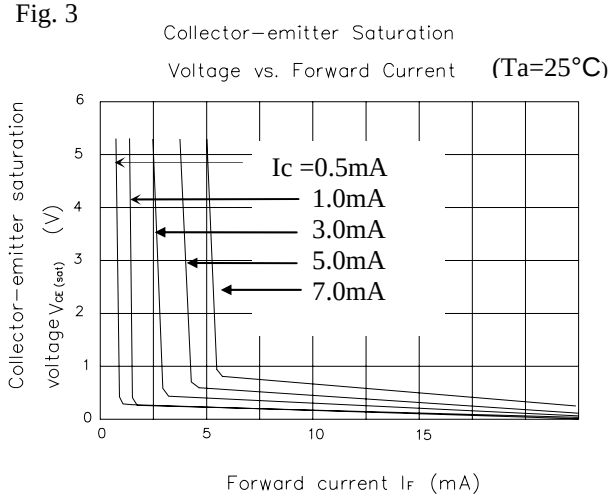


Fig.4

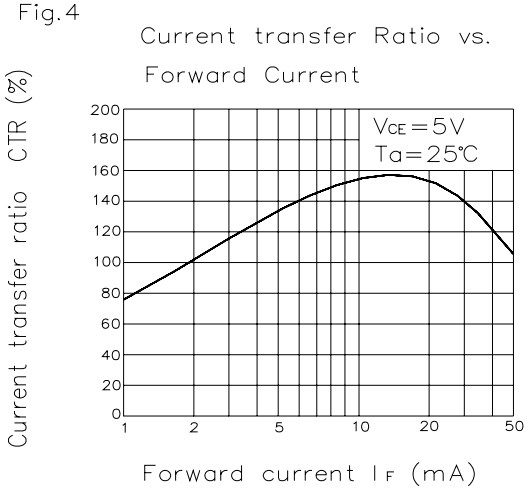


Fig.5 Forward Current vs. Forward Voltage Voltage

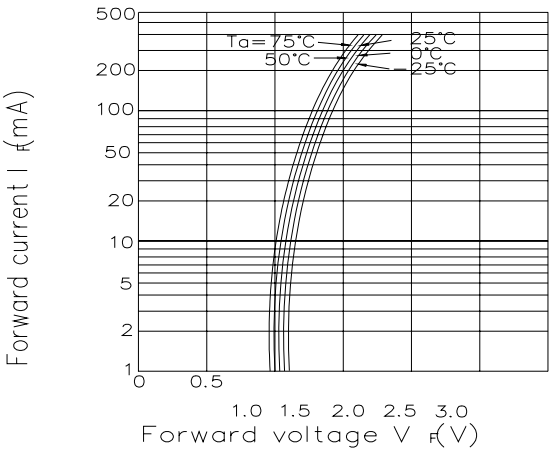


Fig.6

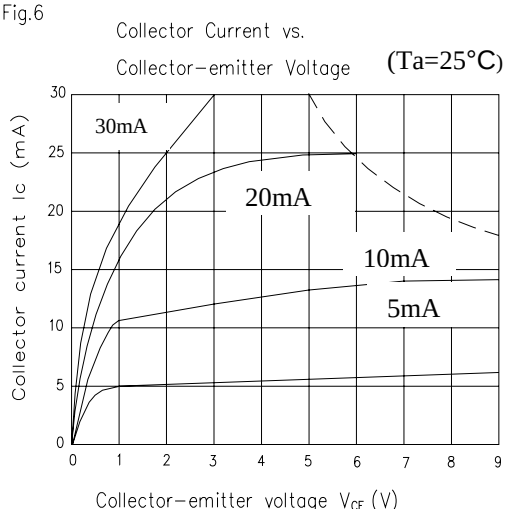


Fig.7

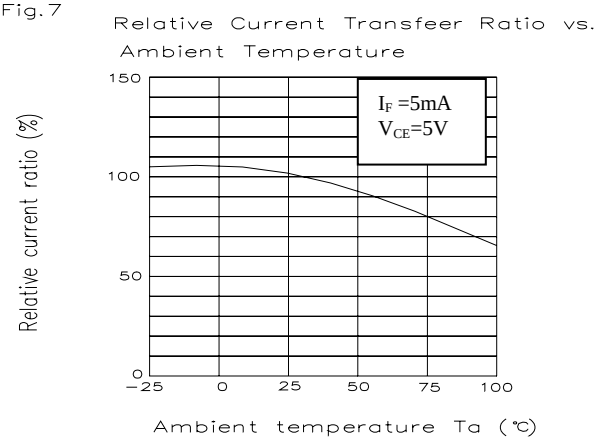


Fig.8

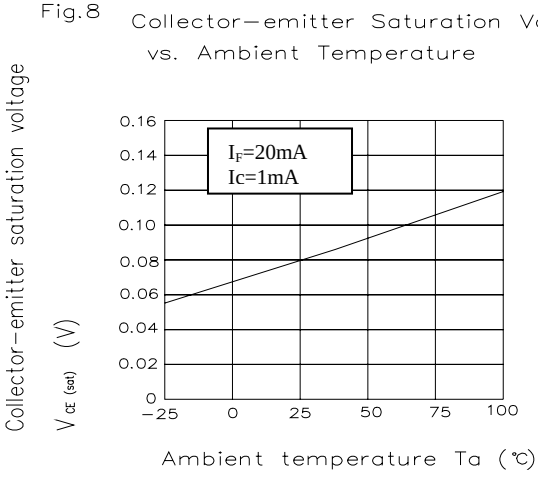


Fig.9

Collector Dark Current vs. Ambient Temperature

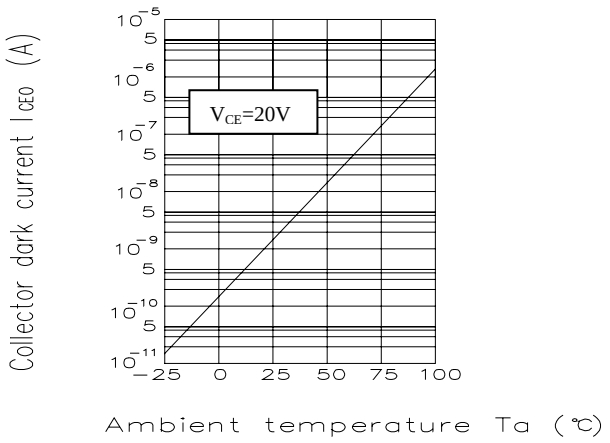


Fig.10

Response Time vs. Load Resistance

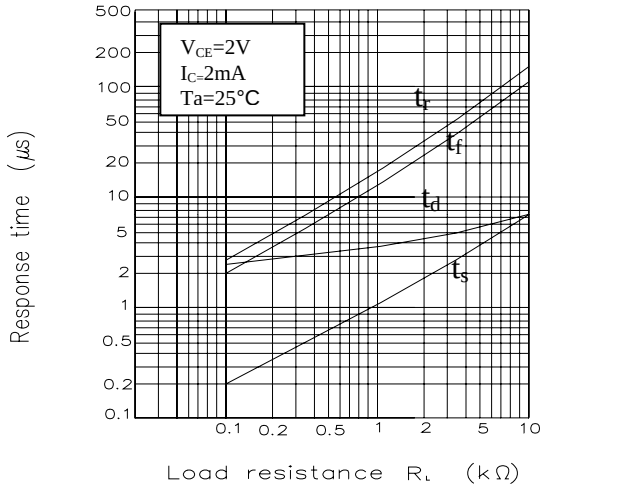
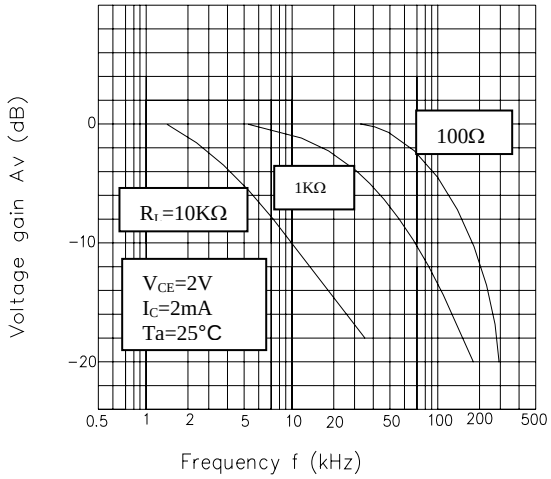
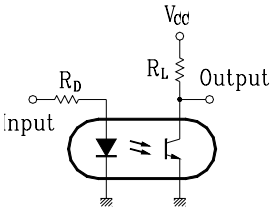
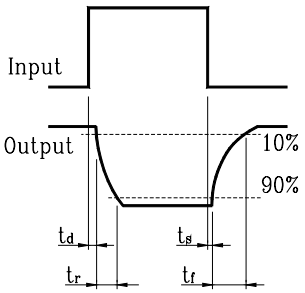


Fig.11

Frequency Response







RELIABILITY PLAN

- **The reliability of products shall be satisfied with items listed below.**

  Confidence level : 90 % , LTPD : 10 %

Classification	Test Item	Description & Condition	(Acc.) Sample	Failure Criteria	Reference Standard
Endurance test	**Operation Life ***	**Ta = 25 ± 3°C** **IR: If = 50 mA** **Pt: Pc = 130 mW (Vf=1.4v) , 1000 hrs**	**0 / 22**		**MIL-S-750 : 1026** **MIL-S-883 : 1005** **JIS C 7021 : B-1**
	High Temperature / High Humidity Reverse Bias (H3TRB)	**Ta = 85 ± 3°C , Humi. = 85 % rh** **Pt: 80% * Vce (max rating) , 1000 hrs**	**0 / 22**	**CTR shift > 1.2** **Vf > U* 1.0** **Ir > U * 1.0** **Vce(sat) >U*1.0** **Bvceo < L*1.0** **Bveco < L*1.0**	**JIS C 7021 : B-11**
	High Temperature Reverse Bias (HTRB)	**Ta = 105 ± 3°C** **Pt: 100% * Vce (Max rating) ,** **1000 hrs**	**0 / 22**		**JIS C 7021 : B-8**
	Low Temperature Storage	**Ta = -50 ± 3°C , 1000 hrs**	**0 / 22**		**JIS C 7021 : B-12**
	High Temperature Storage	**Ta = 125 ± 3°C , 1000 hrs**	**0 / 22**	**L :Low Spec.Limit**	**JIS C 7021 : B-10** **MIL-S-883 : 1008**
	Auto clave	**P = 15 PSIG , Ta = 121 °C ,** **Humi. = 100 % rh , 48 hrs**	**0 / 22**	**U : Up Spec. Limit**	**JESD 22-A102-B**
Environmental Test	**Temperature Cycling (Air to Air)**	**125°C ~ - 55 °C** **30 ~ 30 min , 100 cycles**	**0 / 22**		**MIL-S-883 :1010** **JIS C 7021 : A-4**
	Thermal Shock (Liquid to Liquid)	**125 ~ - 55°C** **t (dwell) = 5 min** **t (trans.) = 10 sec , 100 cycles**	**0 / 22**		**MIL-S-202 : 107D** **MIL-S-750 : 1051** **MIL-S-883 :1011**
	Solder Resistance	**Ta = 260 ± 3°C** **t (dwell) = 10 ± 1 sec**	**0 / 22**		**MIL-S-750 : 2031** **JIS C 7021 : A-1**
	Solder Ability	**Ta = 230 ± 3 °C** **t (dwell) = 5 ± 1 sec**	**0 / 22**		**MIL-S-883 : 2003** **JIS C 7021 : A-2**

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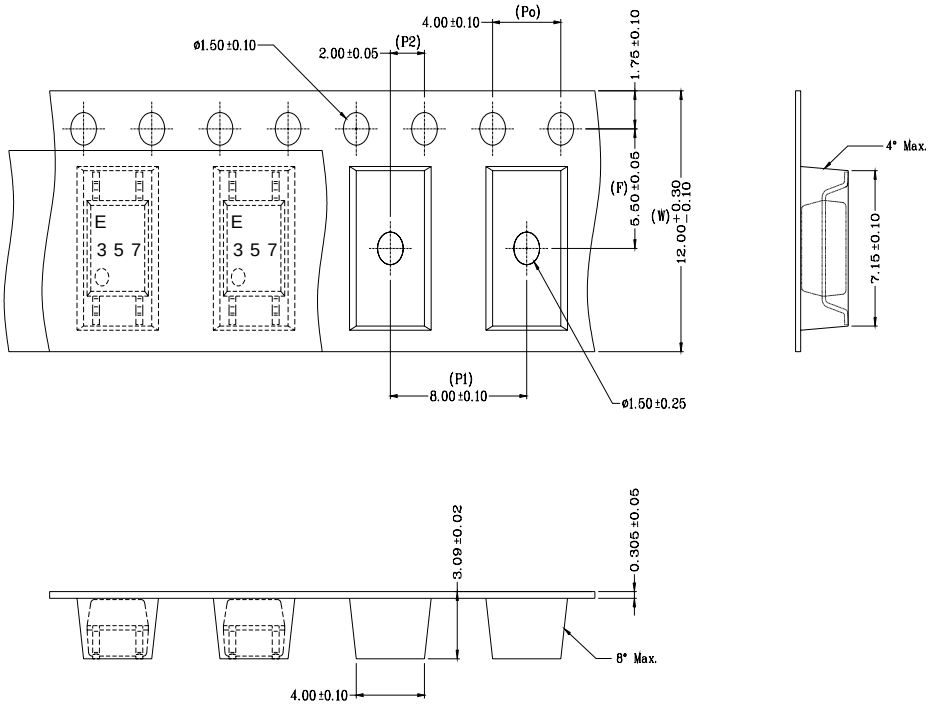
Taping Specification



- Packing Quantity
  1. 1,000 Pcs/ Per Reel
  2. 3 Reels / Inner Carton
  3. 10 Inner Cartons / Outside Carton

Label Form Specification

CPN: Customer's Production Number
P/N : Production Number
QTY: Packing Quantity
CAT: Ranks
HUE: Peak Wavelength
REF: Reference
LOT No: Lot Number
MADE IN TAIWAN: Production Place

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Notes

1. Above specification may be changed without notice. EVERLIGHT will reserve authority on material change for above specification.
2. When using this product, please observe the absolute maximum ratings and the instructions for using outlined in these specification sheets. EVERLIGHT assumes no responsibility for any damage resulting from use of the product which does not comply with the absolute maximum ratings and the instructions included in these specification sheets.
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