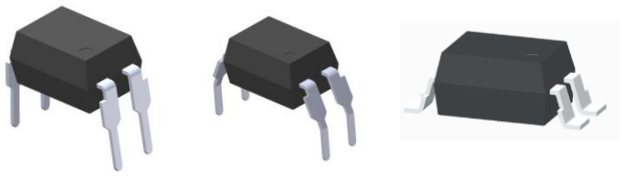
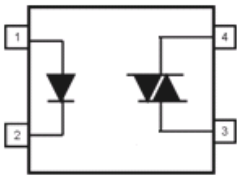
DATASHEET

4 PIN DIP RANDOM-PHASE TRIAC DRIVER PHOTOCOUPLER
ELT302X, ELT305X Series



Schematic



Pin Configuration
1. Anode
2. Cathode
3. Terminal
4. Terminal

Features:

- Compliance Halogens Free
  (Br < 900 ppm, Cl < 900 ppm, Br+Cl < 1500 ppm)
- Peak breakdown voltage
  - 400V: ELT302X
  - 600V: ELT305X
- High isolation voltage between input and output (Viso=5000 V rms)
- Compact dual-in-line package
- The product itself will remain within RoHS compliant version
- Compliance with EU REACH
- UL and cUL approved(No. E214129)
- VDE approved (No. 40028391)
- SEMKO approved
- NEMKO approved
- DEMKO approved
- FIMKO approved
- CQC approved

Description

The ELT302X and ELT305X series of devices each consist of a GaAs infrared emitting diode optically coupled to a monolithic silicon random phase photo Triac.

They are designed for interfacing between electronic controls and power triacs to control resistive and inductive loads for 115 to 240 VAC operations.

Applications

- Solenoid/valve controls
- Lamp ballasts
- Static AC power switch
- Interfacing microprocessors to 115 to 240Vac peripherals
- Incandescent lamp dimmers
- Temperature controls
- Motor controls

Absolute Maximum Ratings (Ta=25℃)

Parameter			Symbol	Rating	Unit
Input	Forward current		I_F	60	mA
	Reverse voltage		V_R	6	V
	Power dissipation		P_D	100	mW
	Derating factor (above T_a = 85°C)			3.8	mW /°C
Output	Off-state Output Terminal Voltage	ELT302X	V_{DRM}	400	V
		ELT305X		600	
	Peak Repetitive Surge Current		I_{TSM}	1	A
	Power dissipation		P_C	300	mW
	Derating factor (above T_a = 85°C)			7.4	mW/℃
Total power dissipation			P_{TOT}	330	mW
Isolation voltage *1			V_{ISO}	5000	Vrms
Operating temperature			T_{OPR}	-55 to 100	℃
Storage temperature			T_{STG}	-55 to 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	-	1.18	1.5	V	I_F = 10mA
Reverse Leakage current	I_R	-	-	10	μA	V_R = 6V

Output

Parameter		Symbol	Min.	Typ.*	Max.	Unit	Condition
Peak Blocking Current		I_{DRM}	-	-	100	nA	V_{DRM} = Rated V_{DRM} I_F = 0mA
Peak On-state Voltage		V_{TM}	-	-	2.5	V	I_{TM}=100mA peak, I_F=Rated I_{FT}
Critical Rate of Rise off-state Voltage	ELT302X	dv/dt	-	100	-	V/μs	V_{PEAK} =Rated V_{DRM}, I_F=0 (Fig. 8)
	ELT305X		1000	-	-		V_{PEAK} =400V, I_F=0 (Fig. 8)

Transfer Characteristics

Parameter		Symbol	Min.	Typ.*	Max.	Unit	Condition
LED Trigger Current	ELT3021 ELT3051	I_{FT}	-	-	15	mA	Main terminal Voltage=3V
	ELT3022 ELT3052		-	-	10		
	ELT3023 ELT3053		-	-	5		
Holding Current		I_H	-	250	-	μA	

* Typical values at T_a = 25°C

Typical Electro-Optical Characteristics Curves

Figure 1. Forward Current vs Forward Voltage

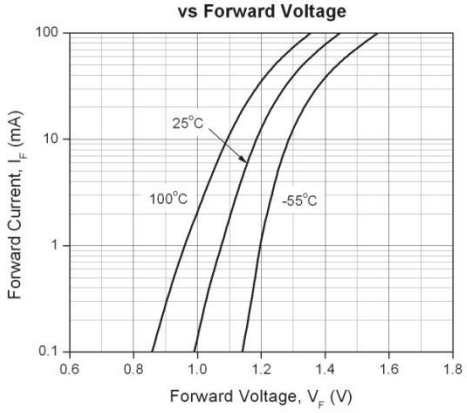


Figure 2. On-State Characteristics

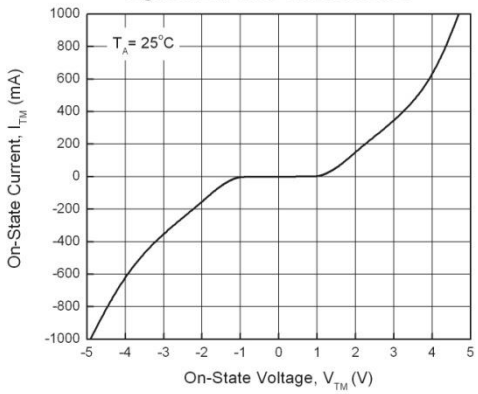


Figure 3. Holding Current vs. Ambient Temperature

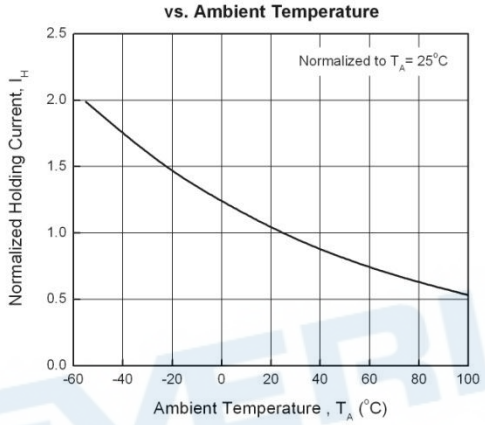


Figure 4. LED Current Required to Trigger vs. LED Pulse Width

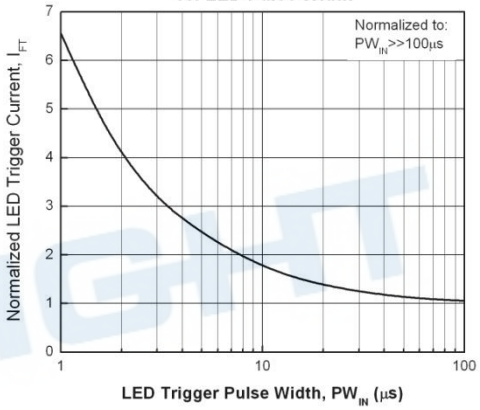


Figure 5. Leakage Current vs. Ambient Temperature

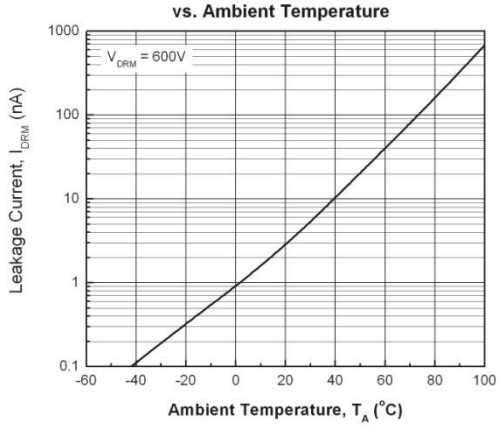
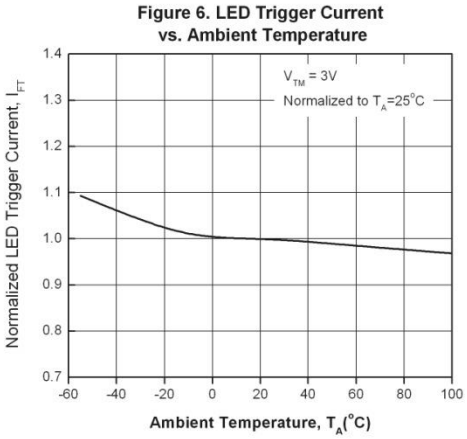


Figure 6. LED Trigger Current vs. Ambient Temperature



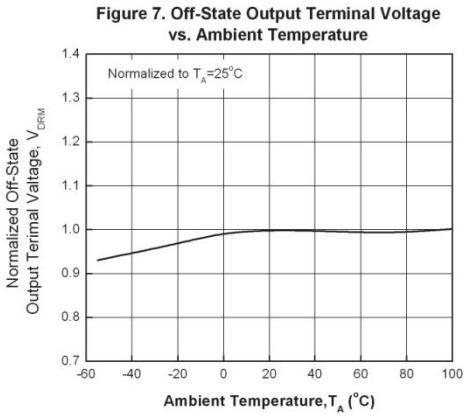
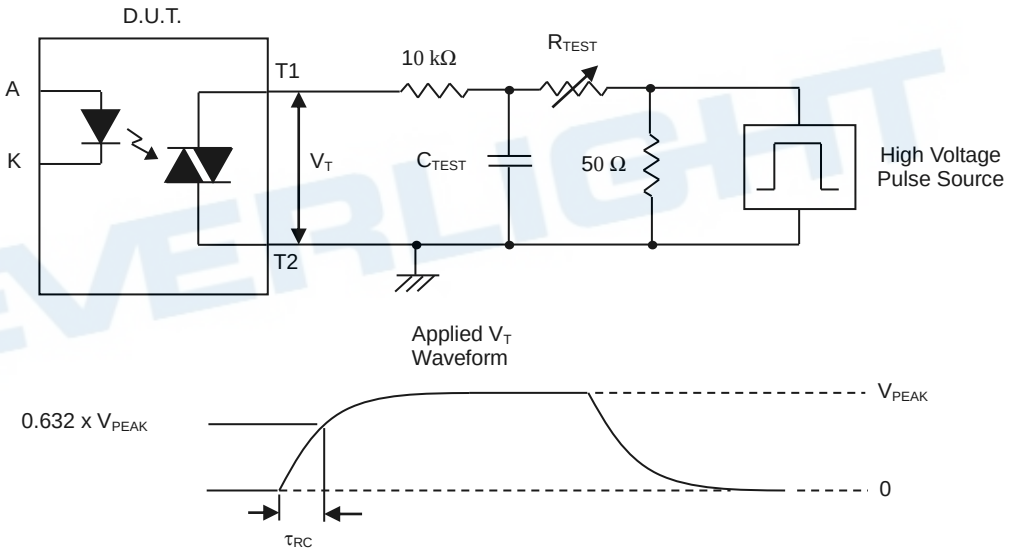


Figure 8. Static dv/dt Test Circuit & Waveform



Measurement Method

The high voltage pulse is set to the required V_{PEAK} value and applied to the D.U.T. output side through the RC circuit above. LED current is not applied. The waveform V_T is monitored using a x100 scope probe. By varying R_{TEST}, the dv/dt (slope) is increased, until the D.U.T. is observed to trigger (waveform collapses). The dv/dt is then decreased until the D.U.T. stops triggering. At this point, τ_{RC} is recorded and the dv/dt calculated.

$$dv/dt = \frac{0.632 \times V_{PEAK}}{\tau_{RC}}$$

For example, V_{PEAK} = 400V for EL302X series. The dv/dt value is calculated as follows:

$$dv/dt = \frac{0.63 \times 400}{\tau_{RC}} = \frac{252}{\tau_{RC}}$$

Order Information

Part Number

ELT302XY(Z)-V
or **ELT305XY(Z)-V**

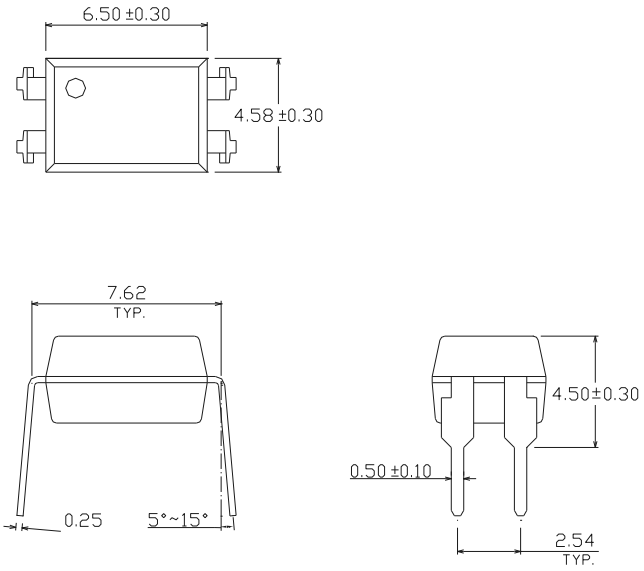
Note

X = Part No. (1, 2 or 3)
Y = Lead form option (S1, M or none)
Z = Tape and reel option (TU, TD or none).
V = VDE safety approved (optional)

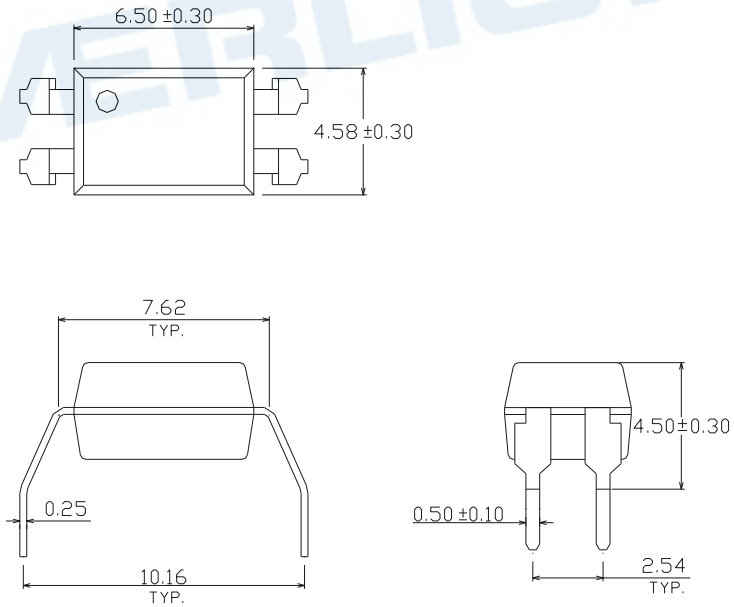
Option	Description	Packing quantity
None	Standard DIP-4	100 units per tube
M	Wide lead bend (0.4 inch spacing)	100 units per tube
S1 (TU)	Surface mount lead form (low profile) + TU tape & reel option	1500 units per reel
S1 (TD)	Surface mount lead form (low profile) + TD tape & reel option	1500 units per reel

Package Dimension (Dimensions in mm)

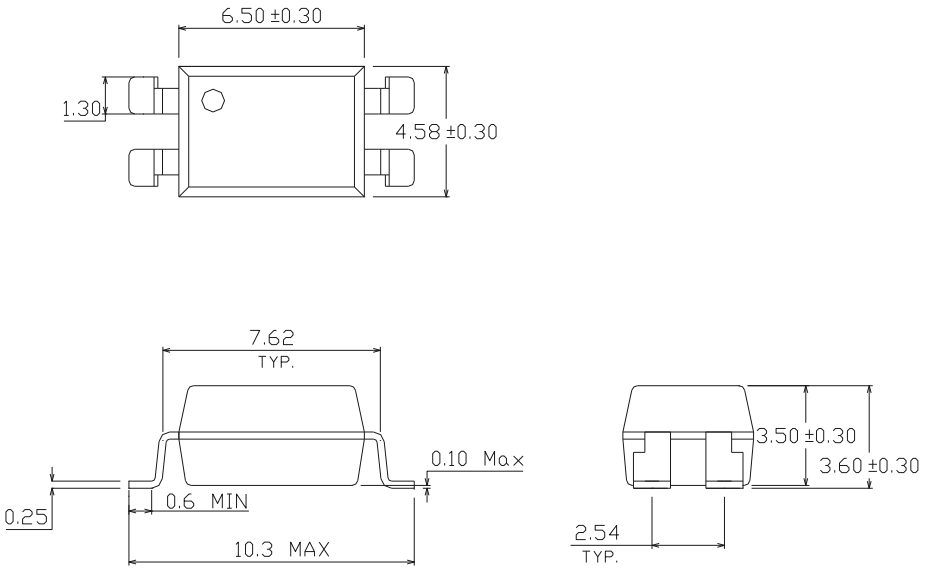
Standard DIP Type



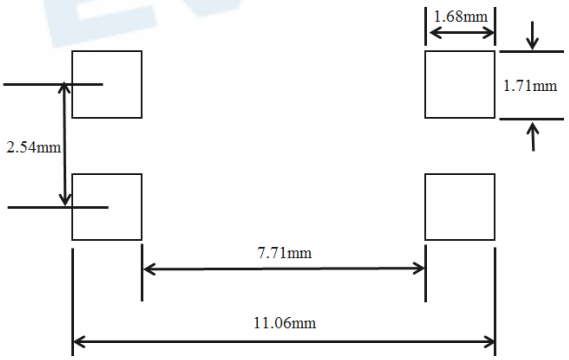
Option M Type



Option S1 Type



Recommended pad layout for surface mount leadform



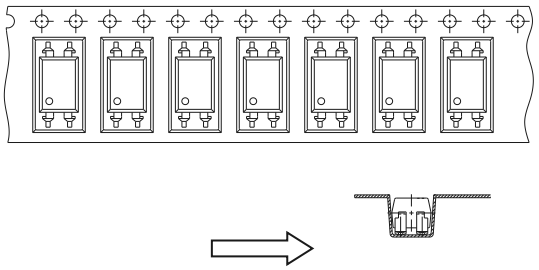
Device Marking

Notes

EL	denotes Everlight
T3053	denotes Device Number
Y	denotes 1 digit Year code
WW	denotes 2 digit Week code
V	denotes VDE option

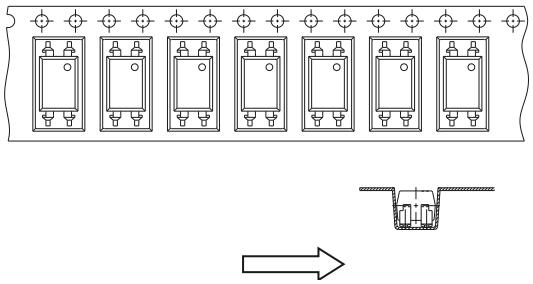
Tape & Reel Packing Specifications

Option TD



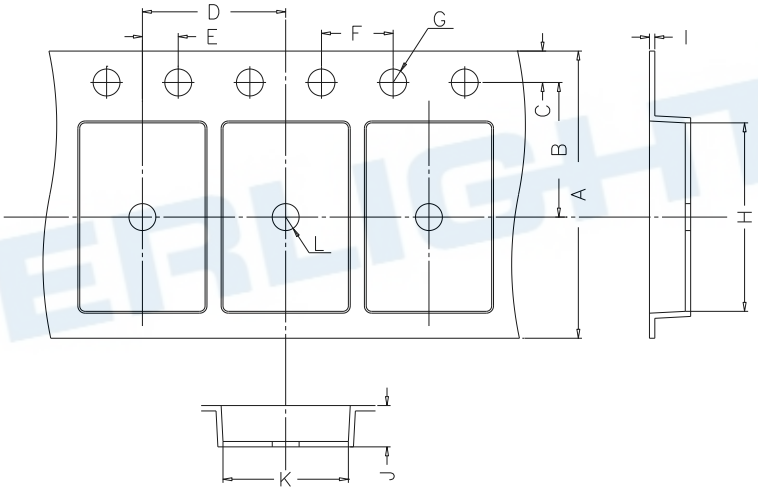
Direction of feed from reel

Option TU



Direction of feed from reel

Tape dimensions

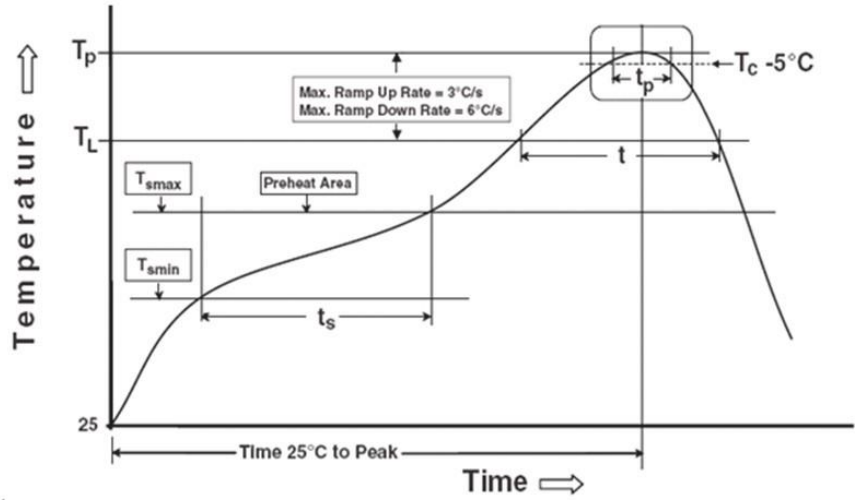


Dimension No.	A	B	C	D	E	F
Dimension(mm)	16.00±0.3	7.5±0.1	1.75±0.1	8.0±0.1	2.0±0.1	4.0±0.1
Dimension No.	G	H	I	J	K	L
Dimension(mm)	1.55±0.05	10.4±0.1	0.4±0.05	4.60±0.1	5.1±0.1	1.55±0.05

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°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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DISCLAIMER

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