

# PHOTOTRANSISTOR ST-1MLAR2/ST-1MLBR2

**SIVAGO**<sup>®</sup>  
SEMICONDUCTOR

The ST-1MLAR2 and 1MLBR2 is a high sensitivity NPN silicon phototransistor mounted in a TO-18 Type header with black epoxy encapsulation. With daylight filter the phototransistor is sensitive only to infrared rays.

## Features

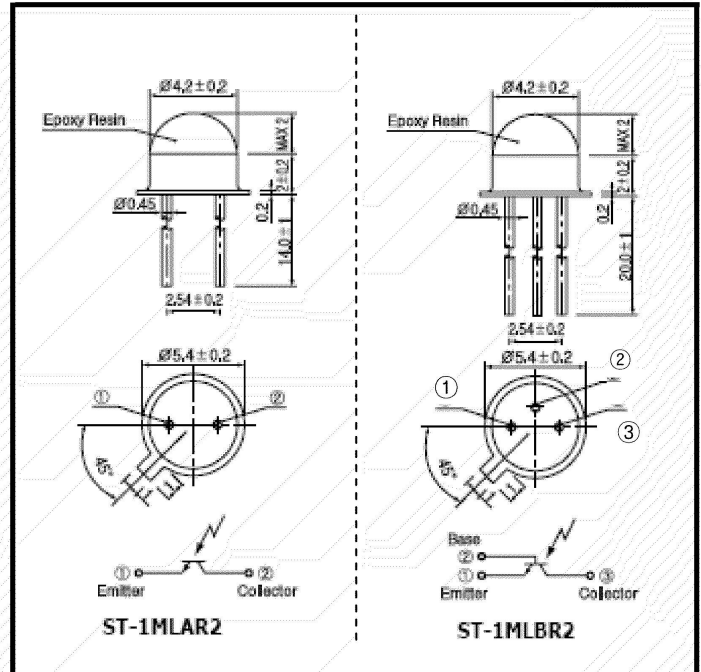
- Wide angular response
- Relatively low-cost against metal can package
- Low profile package
- With daylight filter

## Applications

- Remote control sensors
- Card readers
- Optical switches

## Dimensions

[Unit : mm]



## Absolute Maximum Ratings

[T<sub>A</sub> = 25°C]

Parameter	Symbol	Rating	Unit
C-E Voltage	V <sub>CEO</sub>	40	V
E-C Voltage	V <sub>ECO</sub>	4	V
Collector current	I <sub>C</sub>	30	mA
Collector power dissipation	P <sub>C</sub>	100	mW
Operating temp	T <sub>opr.</sub>	-25~+90	°C
Storage temp	T <sub>stg.</sub>	-30~+100	°C
Soldering temp *1	T <sub>sol</sub>	260	°C

\*1. For MAX.5 seconds at the position of 2mm from the package

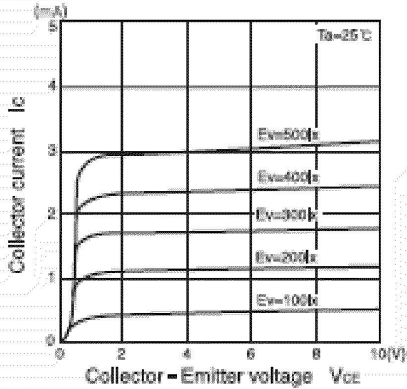
## Electro-Optical Characteristics

[T<sub>A</sub> = 25°C]

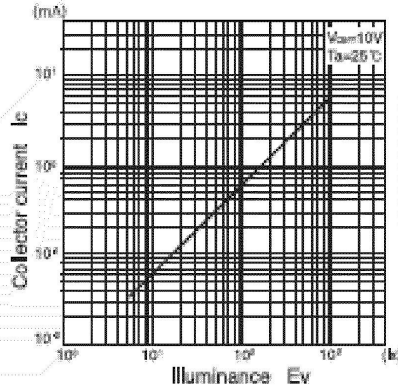
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit.
Collector dark current	I <sub>CEO</sub>	V <sub>CEO</sub> =10V	-	1	200	nA
Light current	I <sub>L</sub>	V <sub>CE</sub> =10V, 200lx <sup>2</sup>	0.5	1.2	5.0	mA
C-E saturation voltage	V <sub>CE(sat)</sub>	I <sub>C</sub> =2mA, 2,000lx <sup>2</sup>	-	0.2	0.4	V
Switching speeds	Rise time	V <sub>CC</sub> =10V, I <sub>C</sub> =5mA R <sub>L</sub> =100Ω	-	8	-	μsec
	Fall time		-	10	-	μsec
Spectral sensitivity	λ		720 ~ 1,050			nm
Peak wavelength	λ <sub>p</sub>		-	940	-	nm
Half Angle	Δθ		-	±70	-	degrees

\*2. Color temp = 2856K standard tungsten lamp

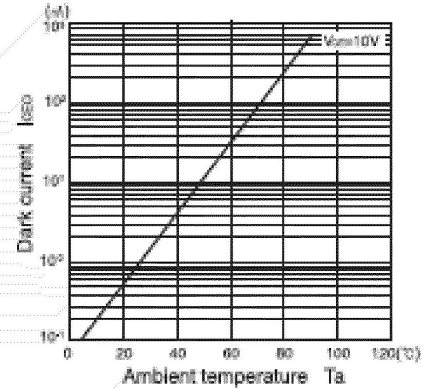
Collector current Vs. Collector - Emitter voltage



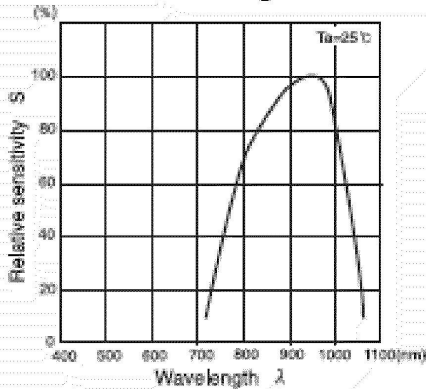
Collector current Vs. Illuminance



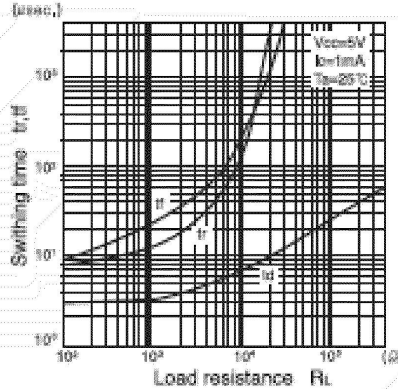
Dark current Vs. Ambient temperature



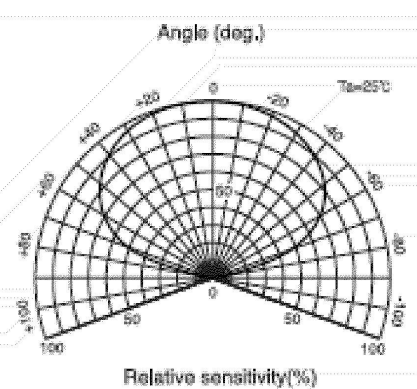
Relative sensitivity Vs. Wavelength



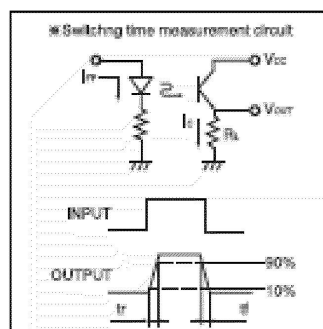
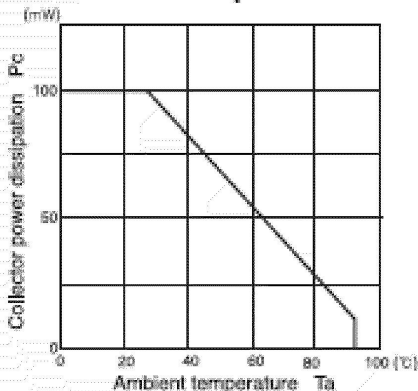
Switching time vs. Load resistance



Radiant Pattern



Collector power dissipation Vs. Ambient temperature



## Packing Quantity Specification

1. 500Pcs/1Bag,20 Bag/1Box
2. 4Boxes/1Carton

## Label Form Specification

製品名 PRODUCT	
コードNo. CODE No.	
数量 Q'TY	
ロットNo. LOT No.	
備考 REMARKS	
	

- PRODUCT: Part Number
- CODE NO.: Product Serial Number
- QTY: Packing Quantity
- LOT No: Lot Number
- REMARKS:Remarks

## Notes

### Lead Forming

1. During lead frame bending, the lead frame should be bent at a distance more than 3mm from bottom of the epoxy.

Note: Must fix lead frame and do not touch epoxy before bending to avoid Phototransistors broken.

2. Lead forming should be done before soldering.

3. Avoid stressing the Phototransistor package during leads forming. The stress to the base may damage the Phototransistor's characteristics or it may break the Phototransistors.

4. Cut the Phototransistor lead frame at room temperature. Cutting the lead frame at high temperatures may cause failure of the Phototransistors.

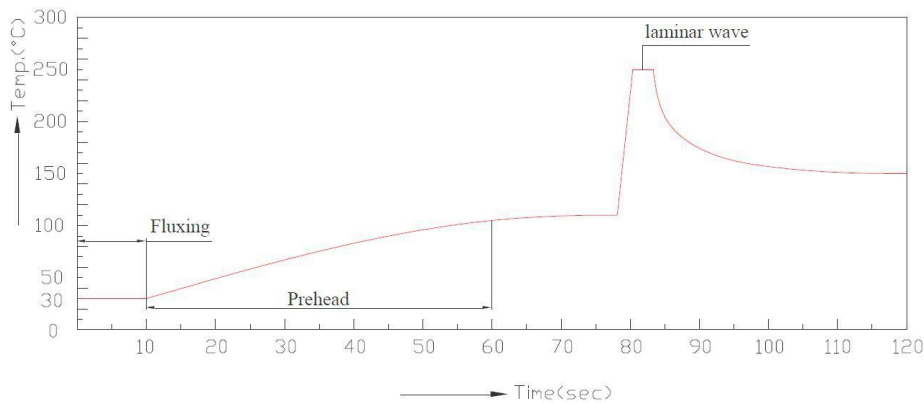
5. When mounting the Phototransistors onto a PCB, the PCB holes must be aligned exactly with the lead position of the Phototransistor. If the Phototransistors are mounted with stress at the leads, it causes deterioration of the epoxy resin and this will degrade the Phototransistors.

## Soldering

- Careful attention should be paid during soldering. When soldering, leave more than 3mm from solder joint to epoxy bulb, and soldering beyond the base of the tie bar is recommended.
- Recommended soldering conditions:

Hand Soldering		DIP Soldering	
Temp. at tip of iron	300°C Max. (30W Max.)	Preheat temp.	100°C Max. (60 sec Max.)
Soldering time	3 sec Max.	Bath temp. & time	260 Max., 5 sec Max
Distance	3mm Min.(From solder joint to epoxy bulb)	Distance	3mm Min. (From solder joint to epoxy bulb)

### 3. Recommended soldering profile



- Avoiding applying any stress to the lead frame while the Phototransistors are at high temperature particularly when soldering.
- Dip and hand soldering should not be done more than one time
- After soldering the Phototransistors, the epoxy bulb should be protected from mechanical shock or vibration until the Phototransistors return to room temperature.
- A rapid-rate process is not recommended for cooling the Phototransistors down from the peak temperature.
- Although the recommended soldering conditions are specified in the above table, dip or hand soldering at the lowest possible temperature is desirable for the Phototransistors.
- Wave soldering parameter must be set and maintain according to recommended temperature and dwell time in the solder wave.

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