



Pb-free
HEAT

STANLEY

KU163C

Reflector Sensor

Features

Function	Reflector Sensor (Analog Output)
Product features	<ul style="list-style-type: none">Outer Dimension : 3.1 x 1.9 x 1.1mm (L x W x H)Compact Small Package of Surface MountIntegrated IRED and PhototransistorLead-free soldering compatibleRoHS compliant
Die materials (Emitter)	GaAs
Die materials (Detector)	Si
Assembly method	Auto pick & place machine (Auto Mounter)
Soldering methods	Reflow soldering, and manual soldering ※Please refer to Soldering Conditions about soldering.
Taping and reel	2,500pcs per reel in a 8mm width tape. (Standard) Reel diameter: ϕ 180mm

Recommended Applications

- Cameras, DSC (Lenz Controller, Film Detection, Tape-end Detection)
- MO, DVD (Pick-up Controller, Disk Detection)
- Other General Applications for Controller (Object Detection, Code Reader)

Absolute Maximum Ratings

Item	Symbol	Absolute Maximum Ratings	Unit
Operating Temperature	T_{opr}	-30~+85	°C
Storage Temperature	T_{stg}	-40~+100	°C
LED $T_a = 25^\circ\text{C}$	Power Dissipation	P_d	75
	Forward Current	I_F	20
	Derating *1	ΔI_F	0.17
	Pulse Forward Current *2	I_{FRM}	300
	Pulse Forward Current Derating *1	ΔI_{FRM}	4
	Reverse Voltage	V_R	5
Phototransistor $T_a = 25^\circ\text{C}$	Collector Dissipation	P_c	75
	Collector-Emitter Voltage	V_{CEO}	20
	Emitter-Collector Voltage	V_{ECO}	5
	Collector Current	I_c	20

※1 $T_a=25^\circ\text{C}$ or higher※2 I_{FRM} Measurement condition : Pulse Width \leq 0.1ms, Duty \leq 1/100

Electro-Optical Characteristics

(Ta=25°C)

Item		Conditions	Symbol	Characteristics		Unit
Input	Forward Voltage			MIN.	0.9	
	Reverse Current	$V_R = 5\text{V}$	I_R	TYP.	1.1	μA
	Peak Wavelength	$I_F = 20\text{mA}$	λ_p	MAX.	1.5	
Output	Dark Current	$V_{CEO} = 10\text{V}$	I_{CEO}	MAX.	0.1	μA
	Peak Sensitivity Wavelength	-	λ_p	TYP.	850	
Coupling Characteristics	Photo Current	$V_{CE} = 5\text{V}$, $I_F = 5\text{mA}$, $d = 1\text{mm}$	I_c	MIN.	115	μA
				TYP.	200	
				MAX.	425	
	Leak Current	$V_{CE} = 5\text{V}$, $I_F = 5\text{mA}$, No Reflector	I_{LEAK}	MAX.	2	μA
	Rise Time/Fall Time	$V_{CE} = 10\text{V}$, $R_L = 100\Omega$, $I_F = 5\text{mA}$	t_r/t_f	TYP.	10/10	μs

fig.1 Photo Current

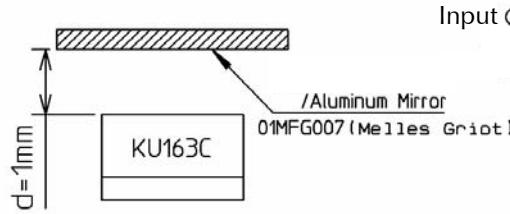
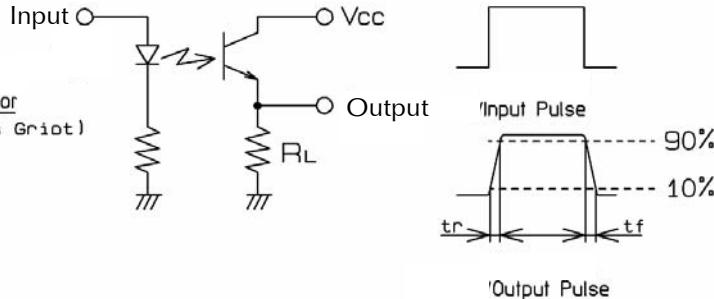


fig.2 Response Speed





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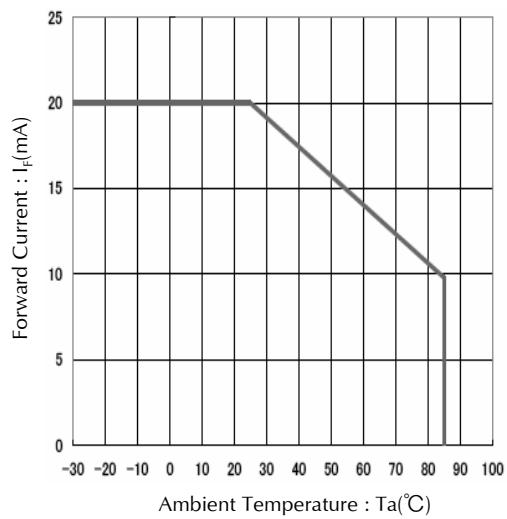
KU163C
Reflector Sensor

Photo Current Rank

Ranks	Photo Current I_C (μA)		Conditions
	MIN.	MAX.	
B	115	162	
C	146	206	
D	185	262	
E	236	334	
F	300	425	

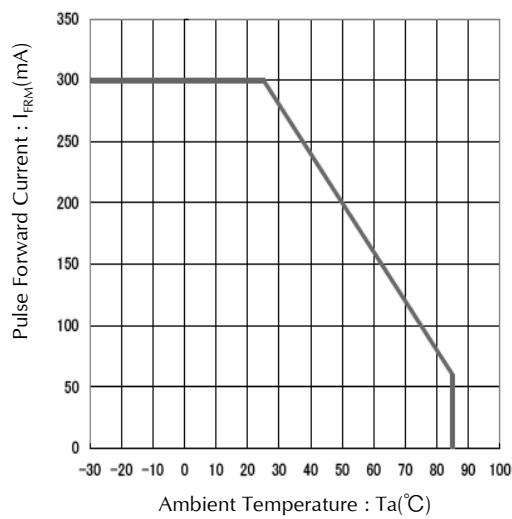
Technical Data

Ambient Temperature vs. Forward Current

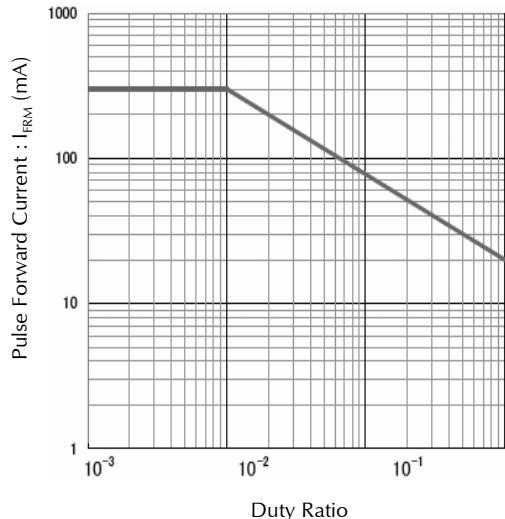


Ambient Temperature vs. Pulse Forward Current

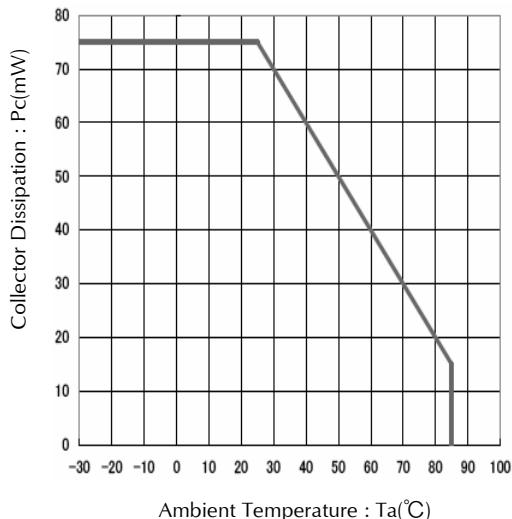
Condition : $t_w \leq 100 \mu s$, Duty $\leq 1/100$



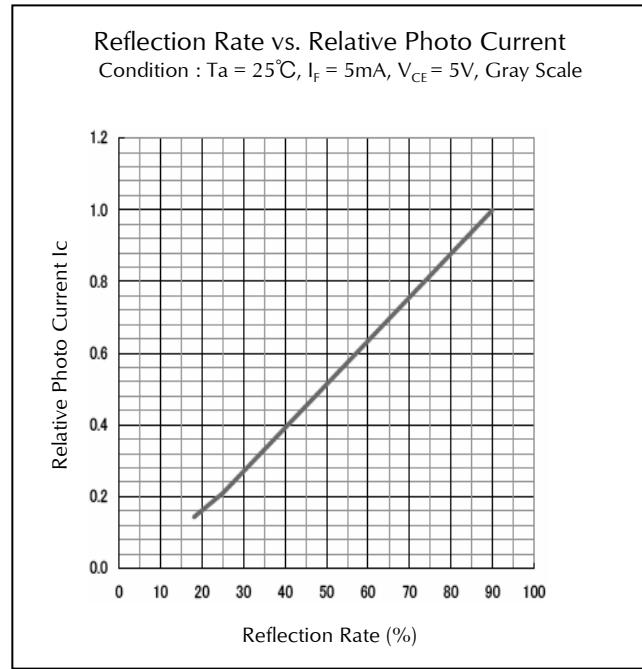
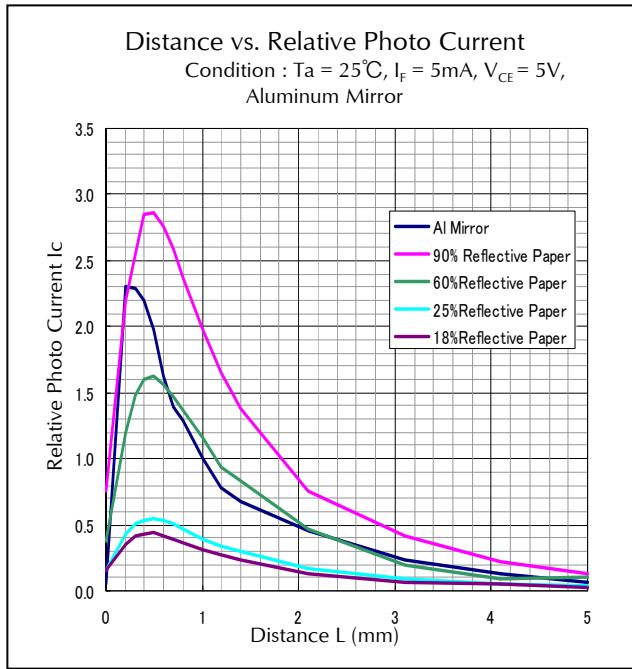
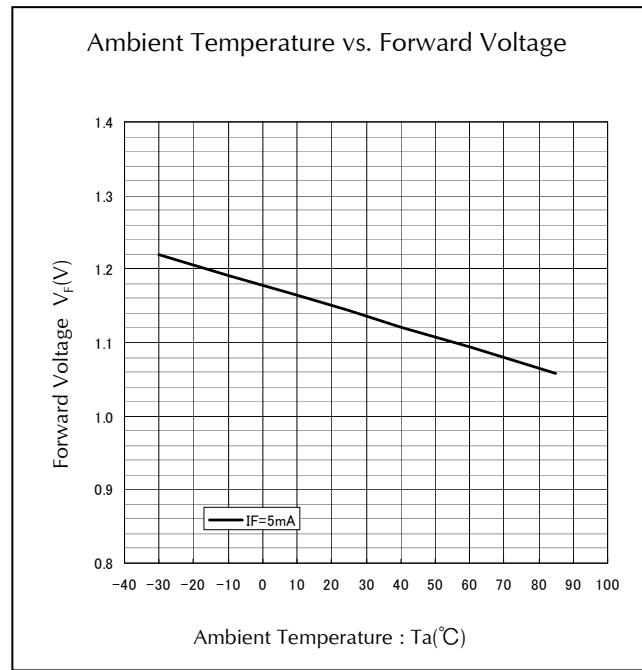
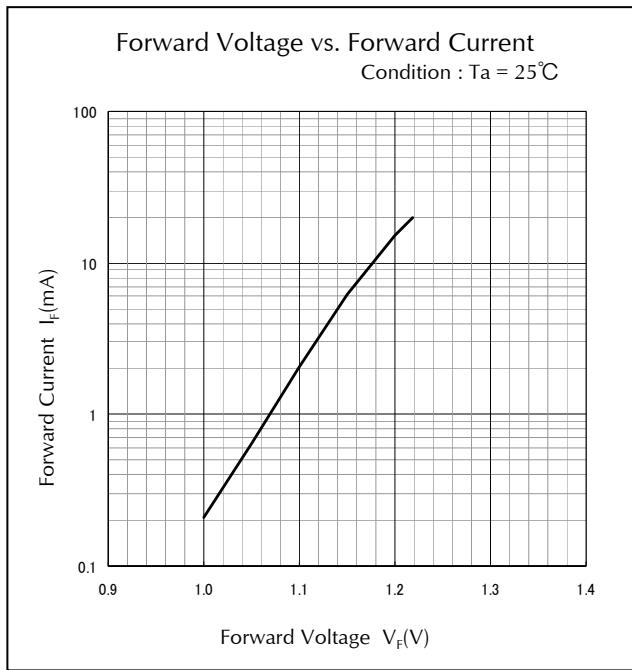
Duty Ratio vs. Pulse Forward Current
Condition : $T_a = 25^\circ C$, $t_w \leq 100 \mu s$



Ambient Temperature vs. Collector Dissipation

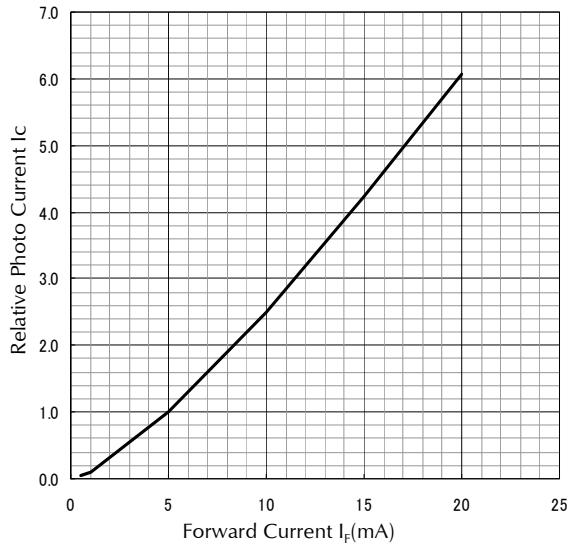


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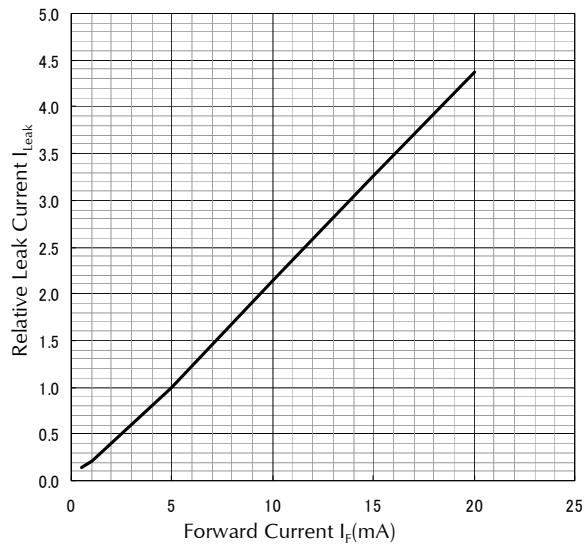


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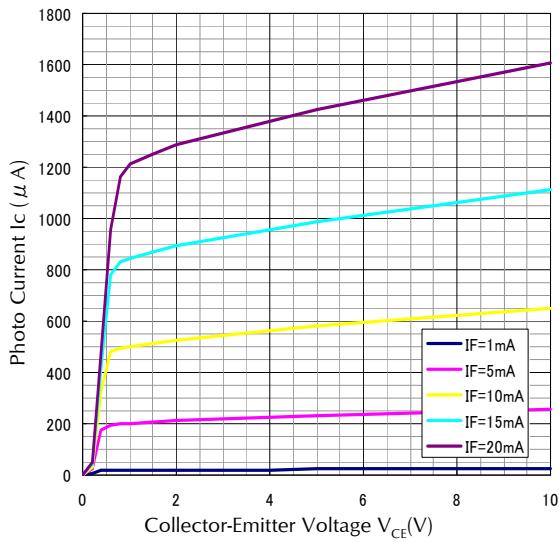
Forward Current vs. Relative Photo Current
Condition : $T_a = 25^\circ\text{C}$, $V_{CE} = 5\text{V}$, $d = 1\text{mm}$, Aluminum Mirror



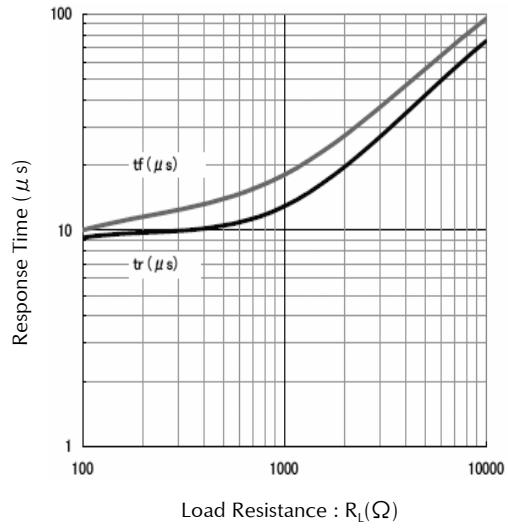
Forward Current vs. Relative Leak Current
Condition : $T_a = 25^\circ\text{C}$, $V_{CE} = 5\text{V}$



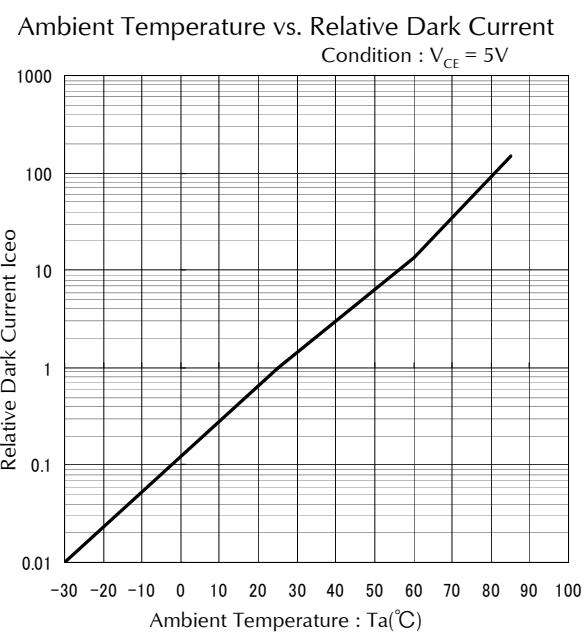
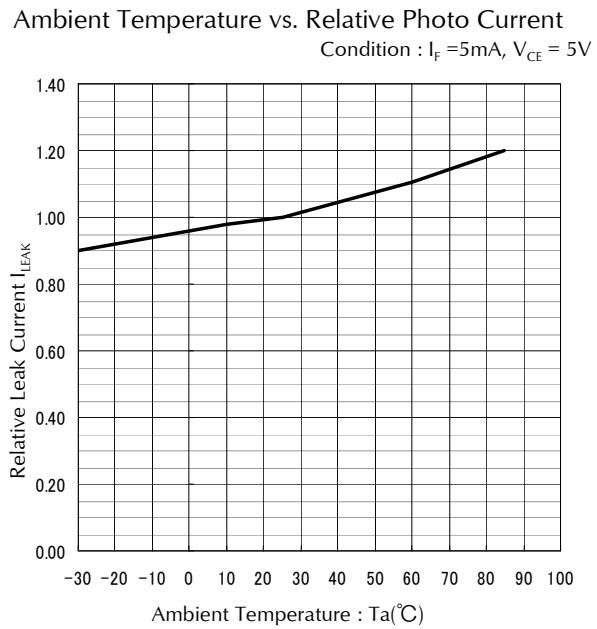
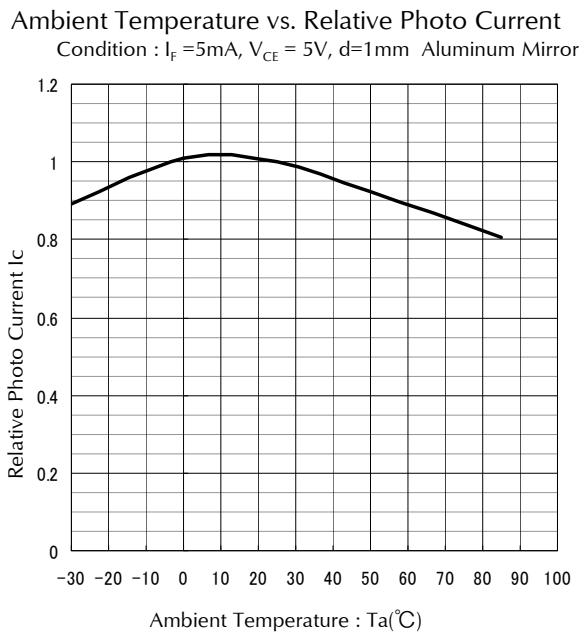
Collector-Emitter Voltage vs. Photo Current
Condition : $T_a = 25^\circ\text{C}$, $d = 1\text{mm}$, Aluminum Mirror



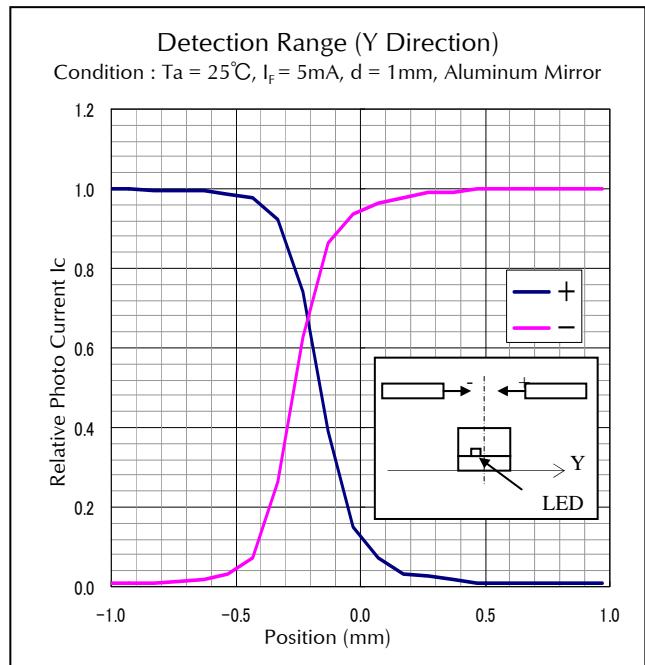
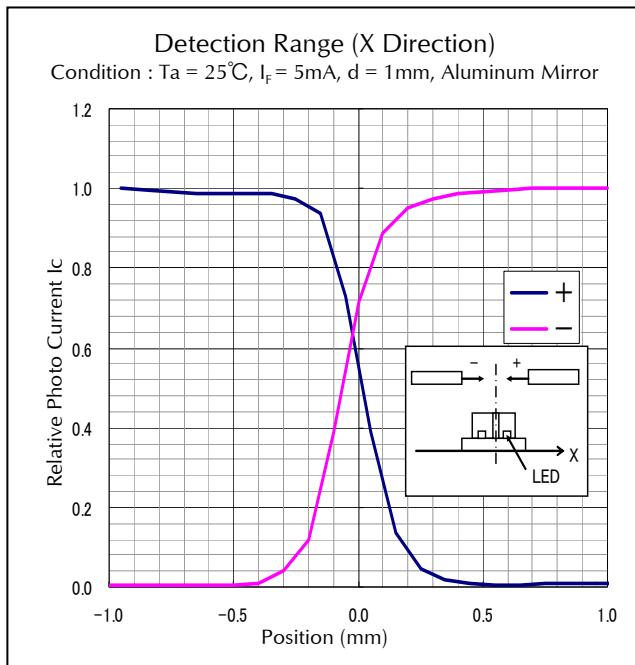
Load Resistance vs. Response Time
Condition : $T_a = 25^\circ\text{C}$, $I_F = 5\text{mA}$, $V_{CE} = 5\text{V}$, $d = 1\text{mm}$,
Aluminum Mirror



Technical Data



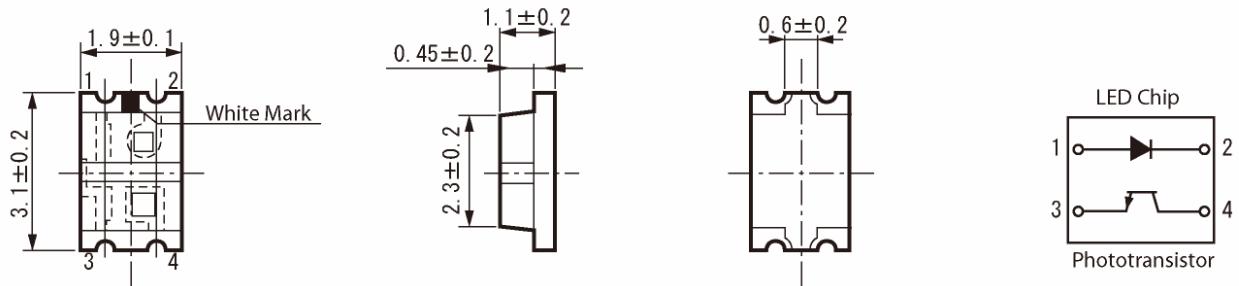
Technical Data



Package Dimensions

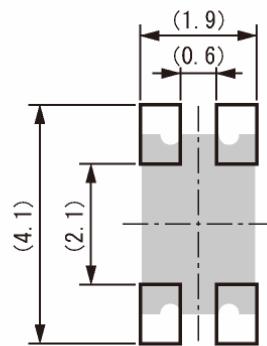
(Unit: mm)

MASS : (9.0mg)



Recommended Soldering Pattern

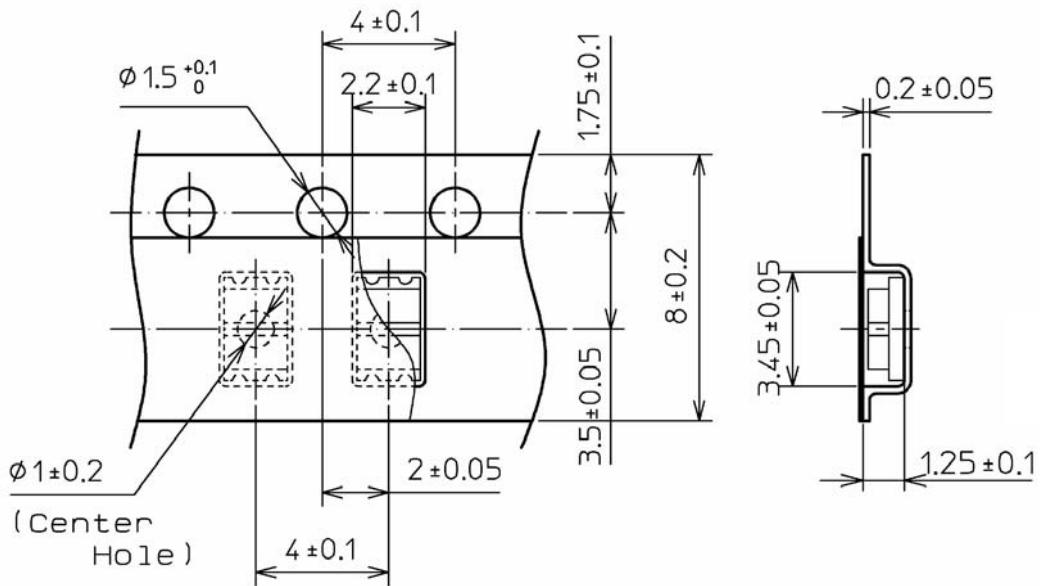
(Unit: mm)



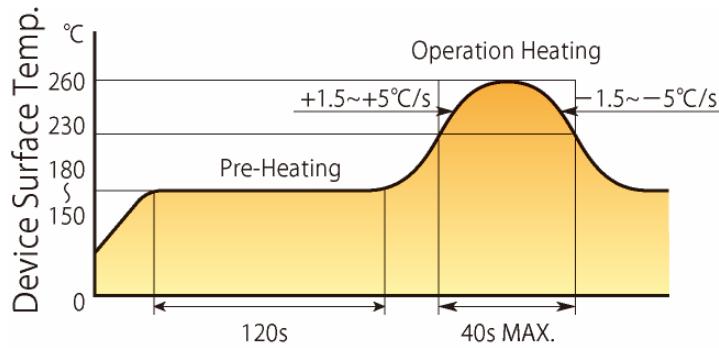
Taping Specification

(Unit: mm)

Quantity: 2,500pcs/ reel (standard)



Reflow Soldering Conditions



- 1) The above profile temperature gives the maximum temperature of the product resin surface. Please set the temperature so as to avoid exceeding this range.
- 2) Total times of reflow soldering process shall be no more than 2 times. When the second reflow soldering process is performed, intervals between the first and second reflow should be short as possible (while allowing some time for the component to return to normal temperature after the first reflow) in order to prevent the product from absorbing moisture.
- 3) Temperature fluctuation to the product during the pre-heating process shall be minimized.

Manual Soldering Conditions

(1) Please avoid the installation of the substrate with the manual soldering as much as possible.
If you do with the manual soldering, please note the following .

Iron tip temp.	350 °C		
Soldering time and frequency	3 s	(MAX.)	1 time (MAX.) (Per One Terminal)



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Reliability Testing Result

Reliability Testing Result	Applicable Standard	Testing Conditions	Duration	Failure
Room Temp. Operating Life	EIAJ ED-4701/100(101)	Ta = 25°C, LED : If = 5mA, Phototransistor : V _{CE} = 5V, There is a reflector., d = 1mm	1,000 h	0/25
Wet High Temp. Operating Life	EIAJ ED-4701/100(102)	Ta = 60°C, RH = 90%, LED : If = 5mA, Phototransistor : V _{CE} = 5V, There is a reflector., d = 1mm	1,000 h	0/25
High Temp. Operating Life	EIAJ ED-4701/100(101)	Ta = 85°C, LED : If = 5mA, Phototransistor : V _{CE} = 5V, There is a reflector., d = 1mm	1,000 h	0/25
Low Temp. Operating Life	EIAJ ED-4701/100(101)	Ta = -30°C, LED : If = 5mA, Phototransistor : V _{CE} = 5V, There is a reflector., d = 1mm	1,000 h	0/25
Thermal Shock	EIAJ ED-4701/200/(203)	-40°C(15min)~100°C(15min)	5 cycles	0/25
Resistance to Soldering Heat	EIAJ ED-4701/300(301)	(Reflow)Preheat : 150 ~ 180°C(120s Max.) Operating Heat : 230°C以上 (40s Max.) Peak : 260°C (5s Max.)	Twice	0/25

Failure Criteria

Items	Symbols	Conditions	Failure criteria
Forward Voltage	V _F	If=5mA	Testing Max.Value \geq Initial Value x 1.2
Reverse Current	I _R	V _R =5V	Testing Max.Value \geq 10 μ A x 2.5
Photo Current	I _C	If=5mA, V _{CE} =5V, d=1mm	Testing Max.Value \geq Initial Value x 1.2 Testing Min.Value \leq Initial Value x 0.8
Leak Current	I _{LEAK}	If=5mA, V _{CE} =5V, No Reflector	Testing Max.Value \geq 2 μ A x 1.2

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