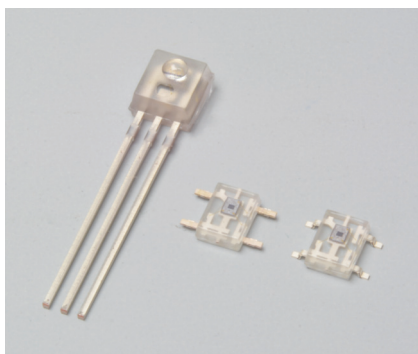


Low-voltage operation photo IC



S7610-10

S12558-01DT

S12558-02DT

High reliability photo IC operable at 2.2 V

The S7610-10, S12558-01DT and S12558-02DT are photo ICs comprised of a photodiode, amplifier, schmitt trigger circuit and output transistor, all integrated onto a single chip and molded with clear resin into a miniature package. An optical encoder resistant to tough environmental conditions can be configured by combining the S7610-10, S12558-01DT or S12558-02DT with infrared LED L6895-10 (made by Hamamatsu).

Features

- Low voltage operation (2.2 V)
- Open collector output
- "L" level output at light input

Applications

- Rotary encoders, etc.

Absolute maximum ratings (Ta=25 °C)

Parameter	Symbol	S7610-10	S12558-01DT S12558-02DT	Unit
Supply voltage	Vcc	-0.5 to +7		V
Output voltage	Vo	-0.5 to +7		V
Low level output current	Io	8		mA
Power dissipation*1	P	250		mW
Operating temperature	Topr	-30 to +85	-25 to +80	°C
Storage temperature	Tstg	-40 to +90	-30 to +85	°C
Reflow soldering conditions*2 (JEDEC MSL 5a)	Tsol	Peak temperature 240 °C max., 1 time (see page 8)		-

*1: Power dissipation decreases at a rate of 3.3 mW/°C above Ta=25 °C .

*2: S12558-01DT/-02DT

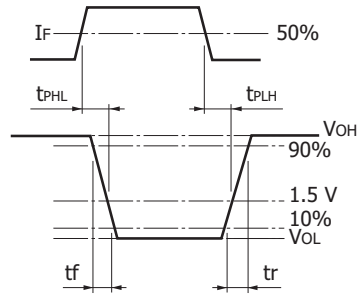
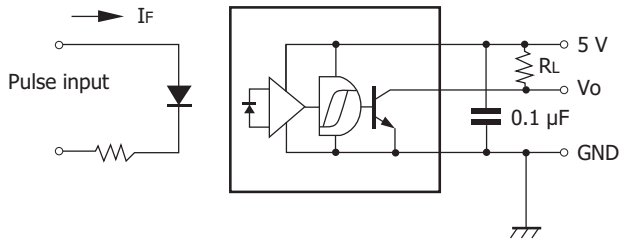
Note: Exceeding the absolute maximum ratings even momentarily may cause a drop in product quality. Always be sure to use the product within the absolute maximum ratings.

Electrical and optical characteristics (Ta=25 °C, Vcc=5 V, unless otherwise noted, light source: λp=890 nm LED)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Supply voltage	Vcc		2.2	-	7.0	V
Low level output voltage	VOL	IoL=4 mA, E=0.4 μW/mm ²	-	0.05	0.4	V
High level output current	IOH	E=0 μW/mm ² , Vo=5 V	-	-	10	μA
Current consumption	Icc		-	1.3	3	mA
H→L threshold illuminance	EHL	RL=1.2 kΩ	-	0.10	0.25	μW/mm ²
S7610-10			-	1.0	2.0	
S12558-01DT/-02DT						
Hysteresis	Hys	ELH/EHL	0.75	0.85	0.95	-
L→H propagation delay time	tPLH	*3	-	4	15	μs
H→L propagation delay time	tPHL		-	1.5	10	μs
Peak sensitivity wavelength	λp		-	850	-	nm
Rise time	tr	*3	-	0.07	1	μs
Fall time	tf		-	0.03	1	μs

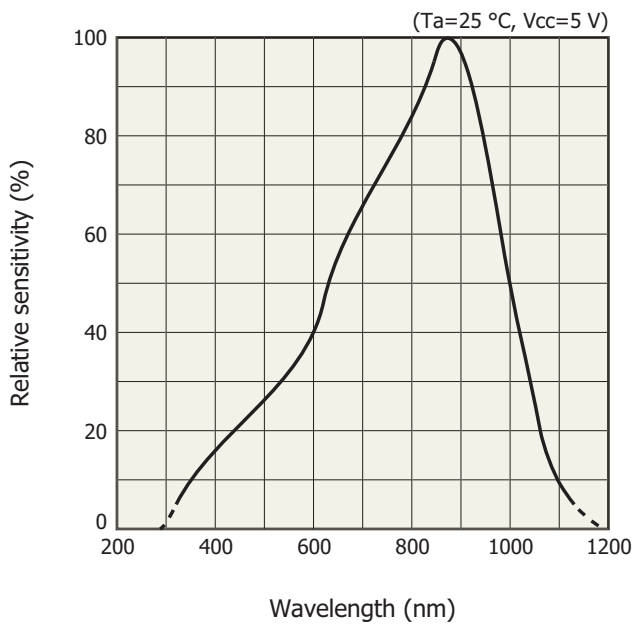
*3: E0=0 μW/mm², E1=0.4 μW/mm², RL=1.2 kΩ, CL=10 pF (S7610-10)
E0=0 μW/mm², E1=4 μW/mm², RL=1.2 kΩ, CL=10 pF (S12558-01DT/-02DT)
CL includes probe capacitance.

Response time measurement circuit



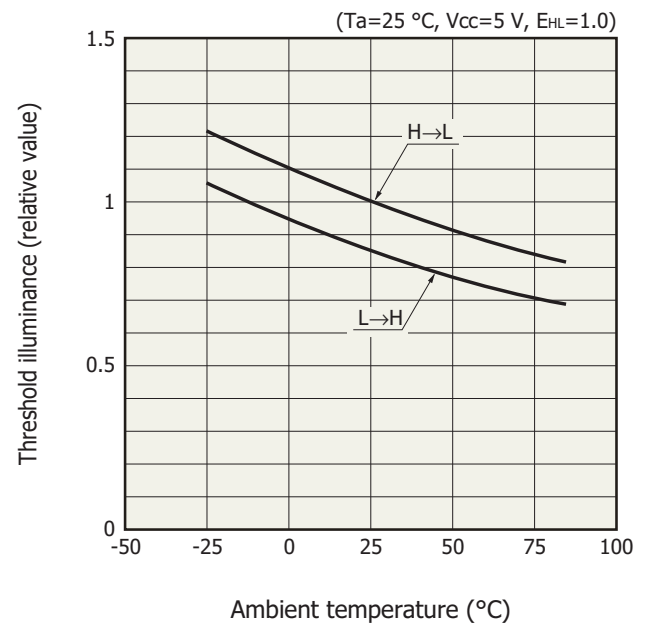
KPIC0038EB

Spectral response (typical example)



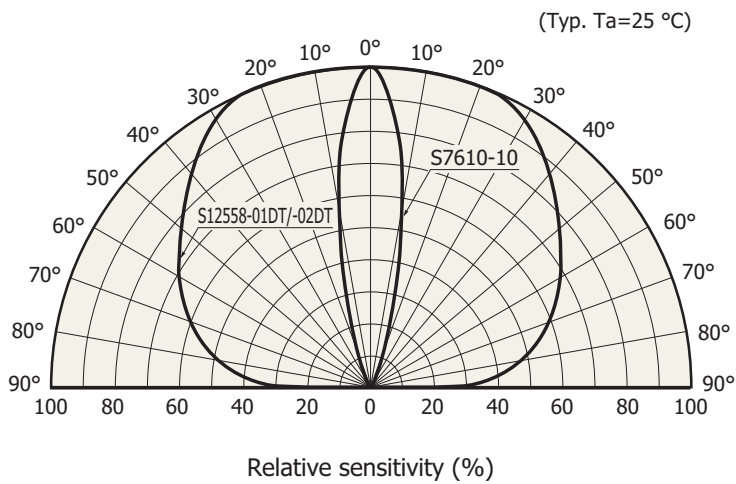
KPIC0181EB

Threshold illuminance vs. ambient temperature (typical example)



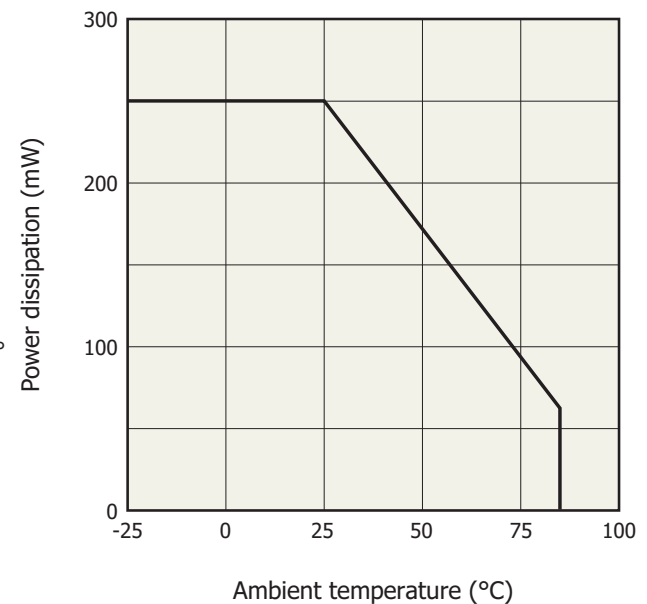
KPIC0029EB

Directivity



KPIC0182EC

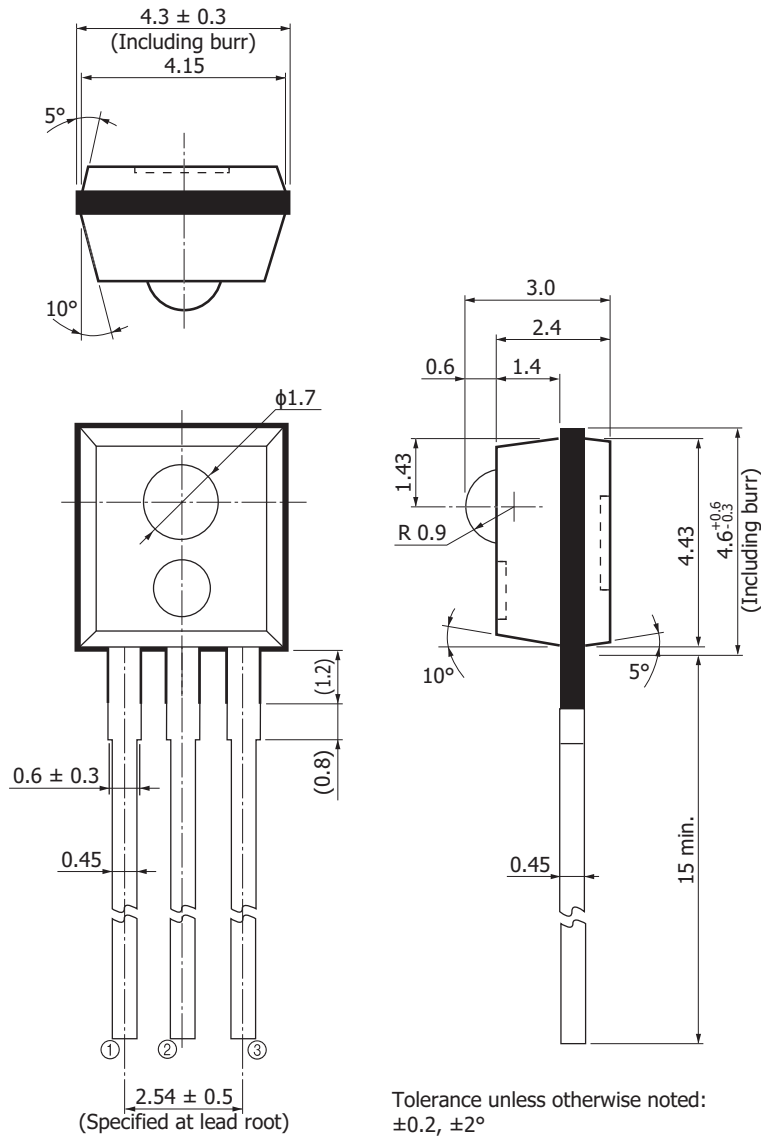
Power dissipation vs. ambient temperature (typical example)



KPIC0049EA

Dimensional outlines (unit: mm)

S7610-10

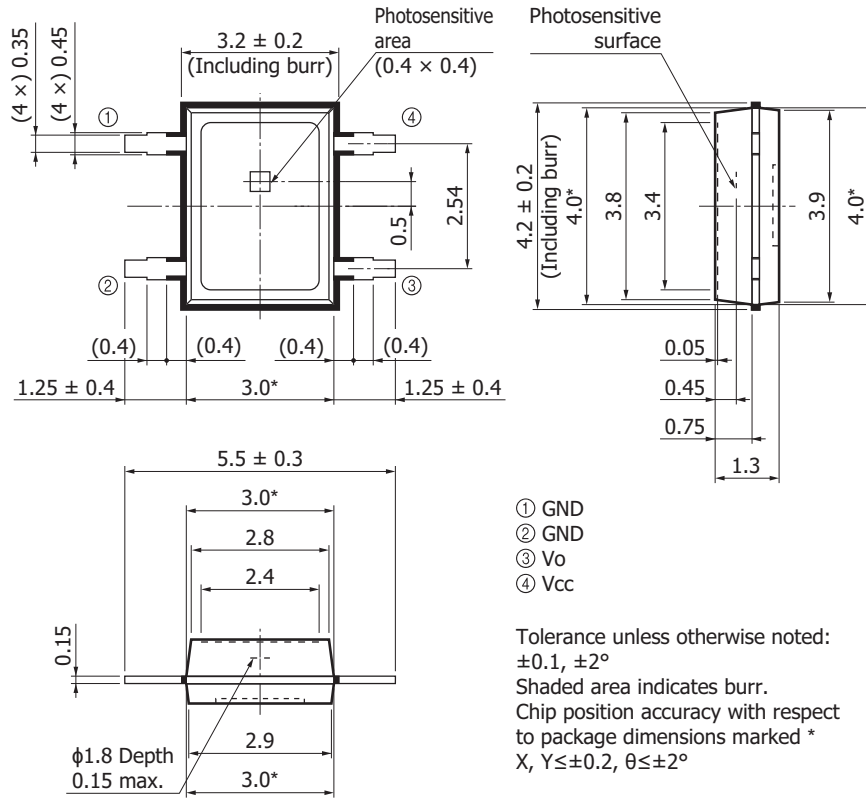


Tolerance unless otherwise noted:
 ± 0.2 , $\pm 2^\circ$
 Shaded area indicates burr.
 Values in parentheses are reference values.

- ① GND
- ② Vo
- ③ Vcc

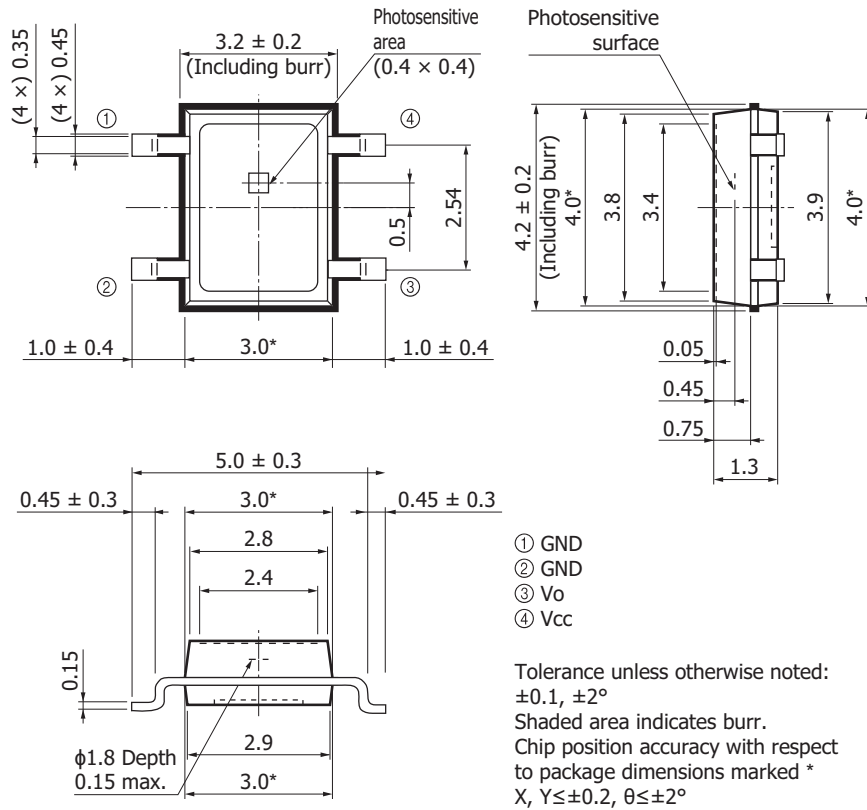
KPICA0044ED

S12558-01DT



KP1CA0093EA

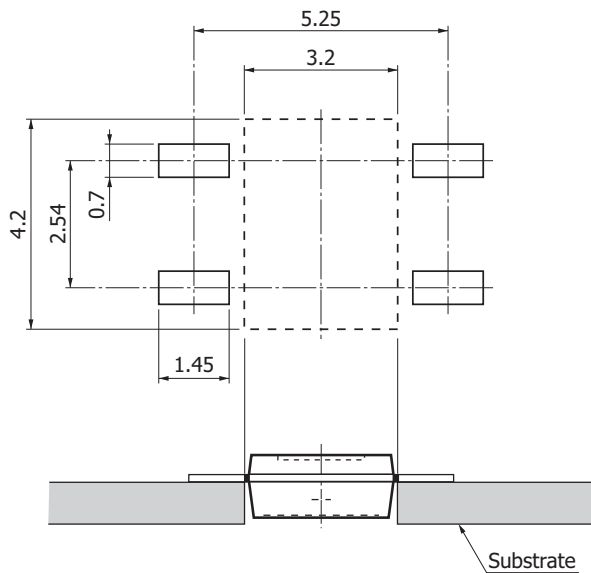
S12558-02DT



KPIC0110EA

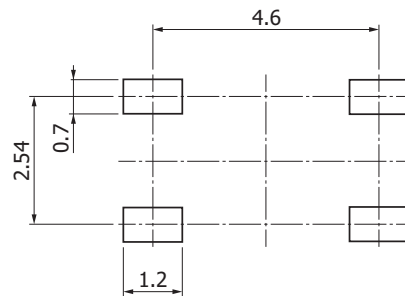
Recommended land patterns (unit: mm)

S12558-01DT



KPIC0239EB

S12558-02DT



KPIC0191EA

Standard packing specifications

S7610-10

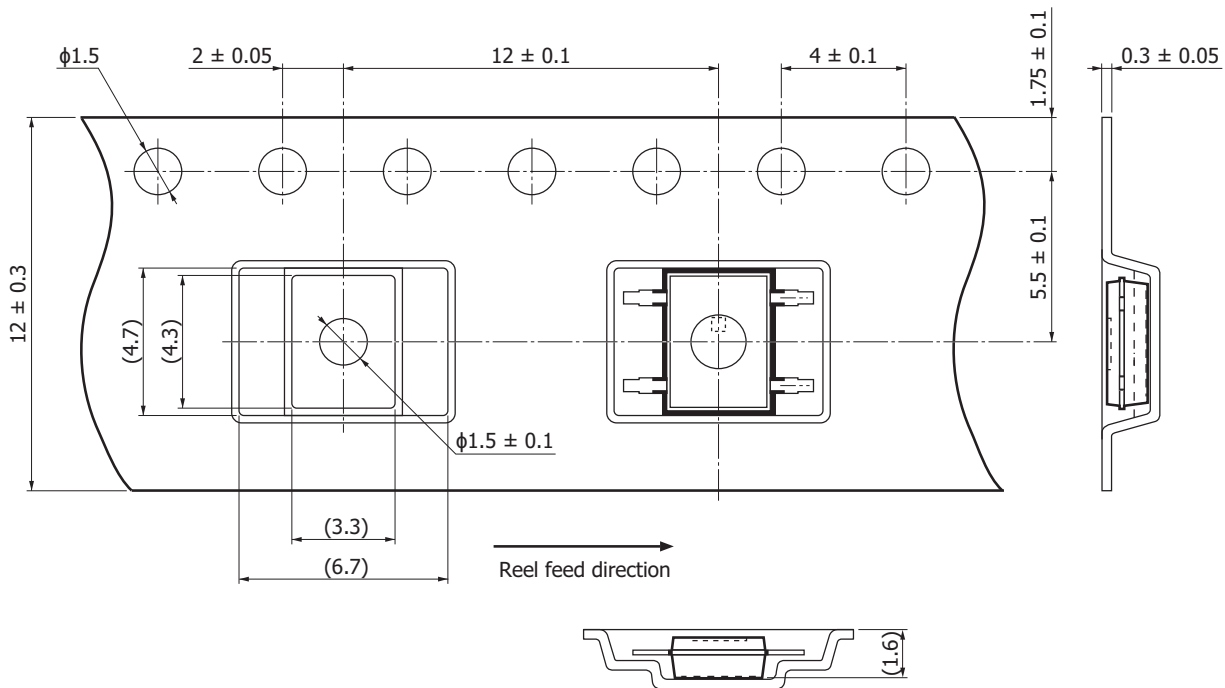
- Packing type
Polyethylene bag (antistatic type)
500 pcs/bag

S12558-01DT

- Reel (conforms to JEITA ET-7200)

Dimensions	Hub diameter	Tape width	Material	Electrostatic characteristics
254 mm	80 mm	12 mm	PS	Conductive

- Embossed tape (unit: mm, material: PS, electrically conductive)



KPIC00240EB

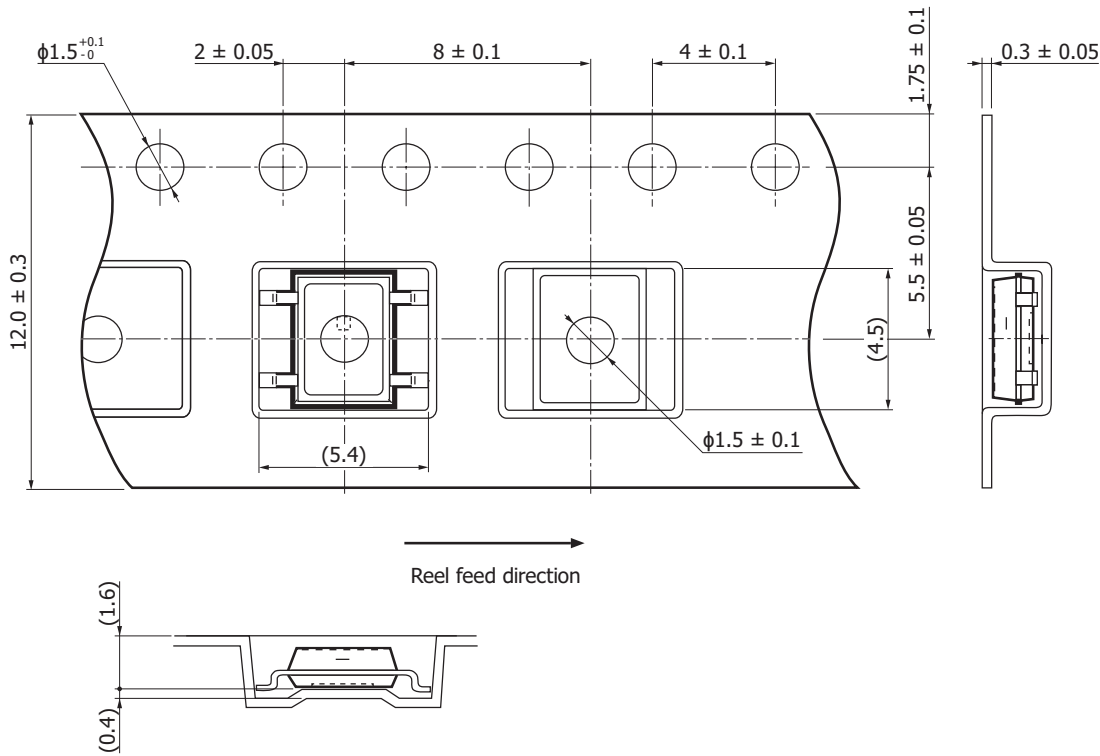
- Packing quantity
1500 pcs/reel
- Packing type
Reel and desiccant in moisture-proof packaging (vacuum-sealed)

S12558-02DT

■ Reel (conforms to JEITA ET-7200)

Dimensions	Hub diameter	Tape width	Material	Electrostatic characteristics
254 mm	80 mm	12 mm	PS	Conductive

■ Embossed tape (unit: mm, material: PS, electrically conductive)



KPIC0337EA

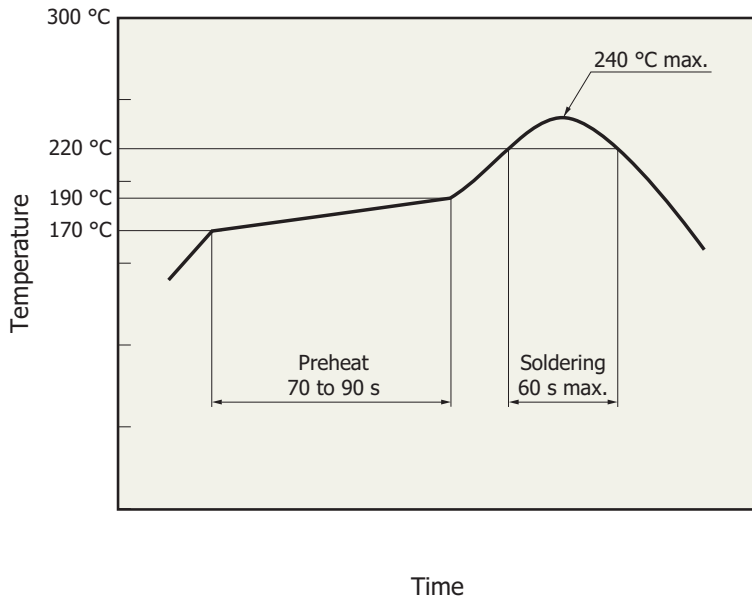
■ Packing quantity

2000 pcs/reel

■ Packing type

Reel and desiccant in moisture-proof packaging (vacuum-sealed)

Recommended reflow soldering conditions (S12558-01DT/-02DT)



KPIC00194EA

- The S12558-01DT/-02DT support lead-free soldering. After unpacking, store it in an environment at a temperature of 30 °C or less and a humidity of 60% or less, and perform soldering within 24 hours.
- The effect that the product receives during reflow soldering varies depending on the circuit board and reflow oven that are used. When setting the reflow soldering conditions, check for any problems by testing out the reflow soldering methods in advance.

Related information

www.hamamatsu.com/sp/ssd/doc_en.html

Precautions

- Notice
- Metal, ceramic, plastic package products
- Surface mount type products

Information described in this material is current as of January 2021.

Product specifications are subject to change without prior notice due to improvements or other reasons. This document has been carefully prepared and the information contained is believed to be accurate. In rare cases, however, there may be inaccuracies such as text errors. Before using these products, always contact us for the delivery specification sheet to check the latest specifications.

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