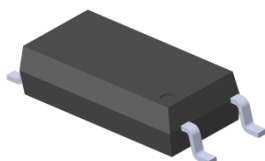




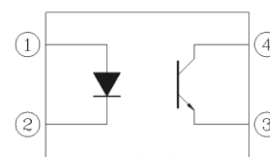
**THE DATASHEET OF  
EL1010(TA)-VG**



## 4 PIN LONG CREEPAGE SOP PHOTOTRANSISTOR PHOTOCOUPLER EL101X-G Series



Schematic



Pin Configuration

1. Anode
2. Cathode
3. Emitter
4. Collector

### Features:

- Compliance Halogen Free  
(Br < 900 ppm, Cl < 900 ppm, Br + Cl < 1500 ppm)
- Current transfer ratio  
(CTR: 50~600% at  $I_F = 5\text{mA}$ ,  $V_{CE} = 5\text{V}$ )  
(CTR: 63~320% at  $I_F = 10\text{mA}$ ,  $V_{CE} = 5\text{V}$ )
- High isolation voltage between input and output (Viso =5000 V rms )
- Compact 4 Pin SOP with a 2.0 mm profile
- Compliance with EU REACH
- 8mm long creepage distance
- The product itself will remain within RoHS compliant version
- UL and cUL approved (No. E214129)
- VDE approved (No. 40028391)
- SEMKO approved
- NEMKO approved
- DEMKO approved
- FIMKO approved
- CQC approved

### Description

The EL101X-G series devices consist of an infrared emitting diode, optically coupled to a phototransistor detector.

Compound use free halogens and  $\text{Sb}_2\text{O}_3$ .

They are packaged in a 4-pin SOP package

### Applications

- Programmable controllers
- System appliances, measuring instruments
- Telecommunication equipments
- Home appliances, such as fan heaters, etc.
- Signal transmission between circuits of different potentials and impedances

**Absolute Maximum Ratings (Ta=25°C)**

	Parameter	Symbol	Rating	Unit
Input	Forward current	I <sub>F</sub>	60	mA
	Peak forward current (1us, pulse)	I <sub>FP</sub>	1.5	A
	Reverse voltage	V <sub>R</sub>	6	V
	Power dissipation	P <sub>D</sub>	100	mW
Output	Power dissipation	P <sub>C</sub>	150	mW
	Collector current	I <sub>C</sub>	50	mA
	Collector-Emitter voltage	V <sub>CEO</sub>	80	V
	Emitter-Collector voltage	V <sub>ECO</sub>	7	V
Total Power Dissipation		P <sub>TOT</sub>	250	mW
Isolation Voltage* <sup>1</sup>		V <sub>ISO</sub>	5000	V <sub>rms</sub>
Operating Temperature		T <sub>OPR</sub>	-55 to 110	°C
Storage Temperature		T <sub>STG</sub>	-55 to 125	°C
Soldering Temperature* <sup>2</sup>		T <sub>SOL</sub>	260	°C

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°C unless specified otherwise)**

**Input**

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Forward Voltage	$V_F$	-	1.45	1.5	V	$I_F = 50\text{mA}$
Reverse current	$I_R$	-	-	10	$\mu\text{A}$	$V_R = 6\text{V}$
Input capacitance	$C_{in}$	-	50	-	pF	$V = 0, f = 1\text{kHz}$

**Output**

Parameter	Symbol	Min	Typ.	Max.	Unit	Condition
Collector-Emitter dark current	$I_{CEO}$	-	-	100	nA	$V_{CE} = 20\text{V}, I_F = 0\text{mA}$
Collector-Emitter breakdown voltage	$BV_{CEO}$	80	-	-	V	$I_C = 0.1\text{mA}$
Emitter-Collector breakdown voltage	$BV_{ECO}$	7	-	-	V	$I_E = 0.1\text{mA}$

**Transfer Characteristics**

Parameter	Symbol	Min	Typ.	Max.	Unit	Condition
Current Transfer ratio	EL1010	50	-	600	%	$I_F = 5\text{mA}, V_{CE} = 5\text{V}$
	EL1017	80	-	160		
	EL1018	130	-	260		
	EL1019	200	-	400		
	EL1012	63	-	125	%	$I_F = 10\text{mA}, V_{CE} = 5\text{V}$
	EL1013	100	-	200		
	EL1014	160	-	320		
	EL1012	22	-	-		
	EL1013	34	-	-		
	EL1014	56	-	-		
Collector-Emitter saturation voltage	$V_{CE(sat)}$	-	-	0.3	V	$I_F = 10\text{mA}, I_C = 1\text{mA}$
Isolation resistance	$R_{IO}$	$5 \times 10^{10}$	-	-	$\Omega$	$V_{IO} = 500\text{Vdc}, 40\sim 60\% \text{ R.H.}$
Floating capacitance	$C_{IO}$	-	-	1.0	pF	$V_{IO} = 0, f = 1\text{MHz}$

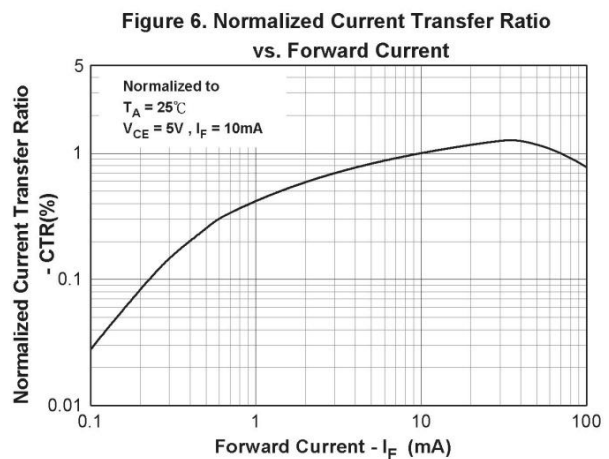
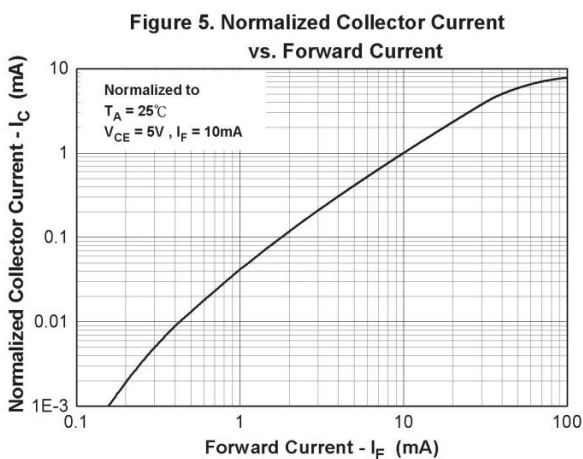
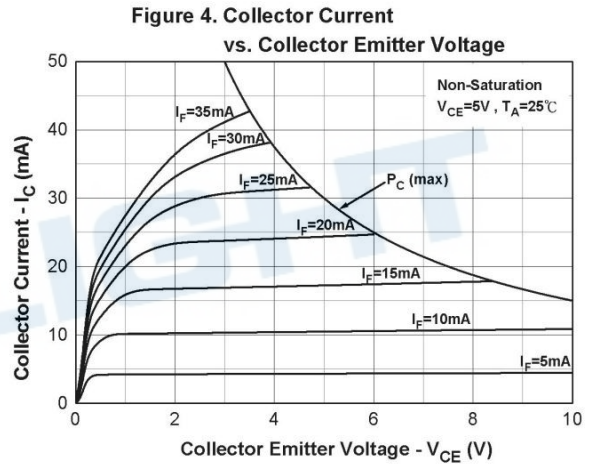
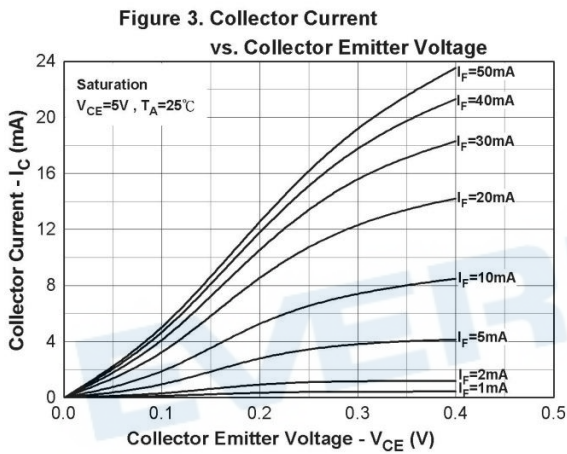
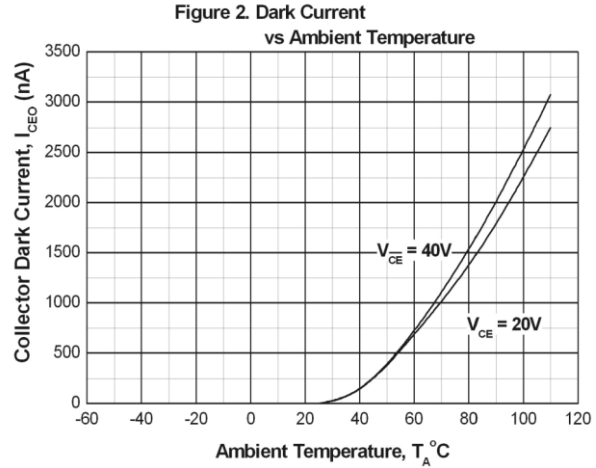
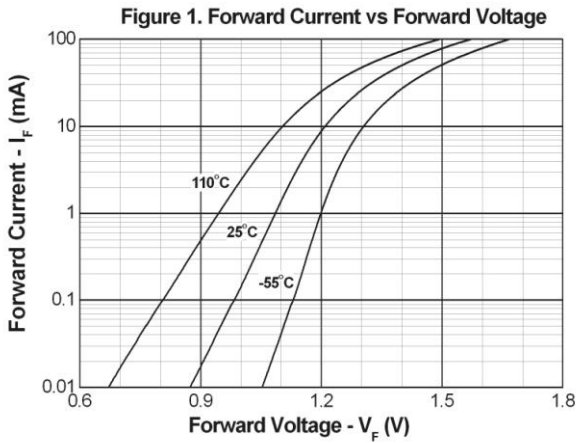
**Transfer Characteristics**

Parameter	Symbol	Min	Typ. *	Max.	Unit	Condition
Turn on time	Ton	-	4	-	μs	V <sub>CE</sub> = 5V, I <sub>C</sub> = 5mA, R <sub>L</sub> = 100Ω
Turn off time	Toff	-	3	-		
Rise time	t <sub>r</sub>	-	-	18	μs	V <sub>CE</sub> = 5V, I <sub>C</sub> = 5mA, R <sub>L</sub> = 100Ω
Fall time	t <sub>f</sub>	-	-	18		

\* Typical values at T<sub>a</sub> = 25°C

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Typical Electro-Optical Characteristics Curves



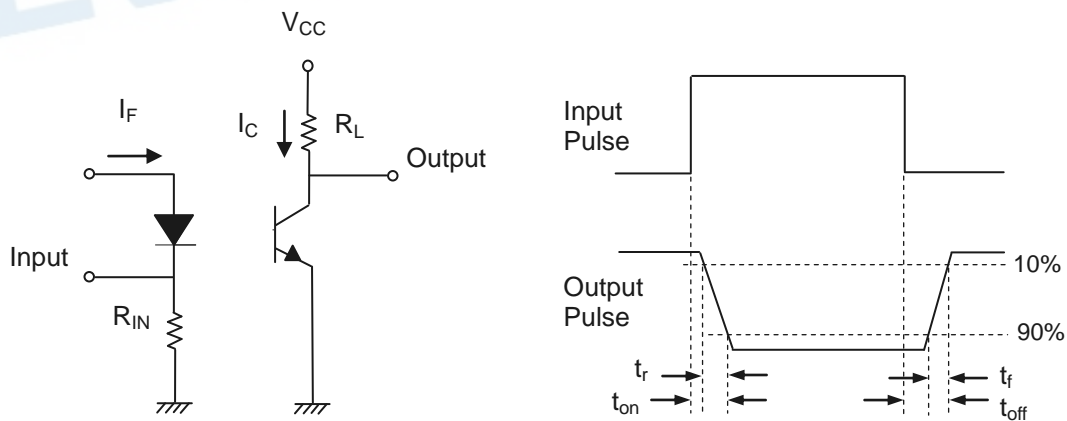
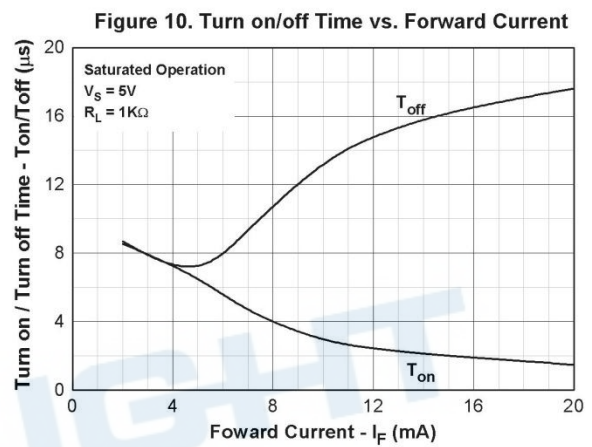
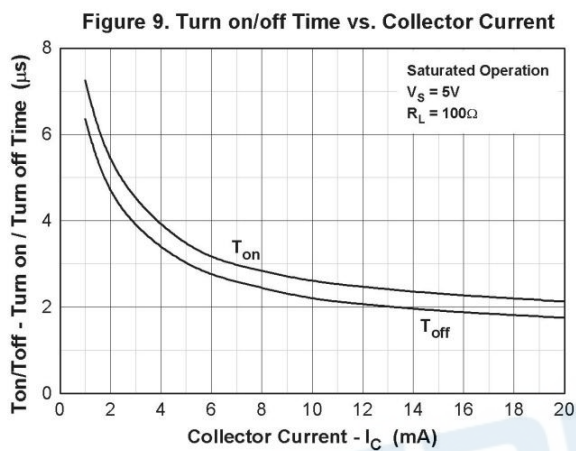
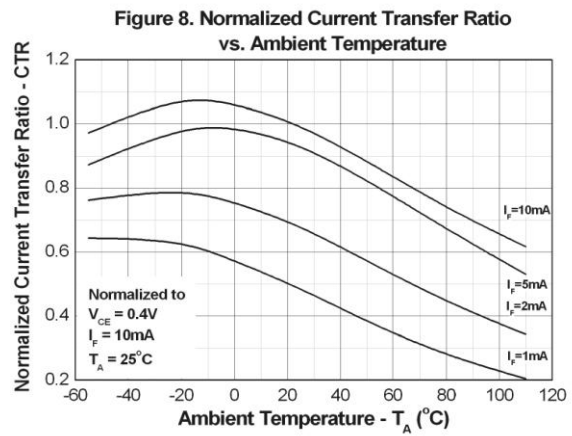
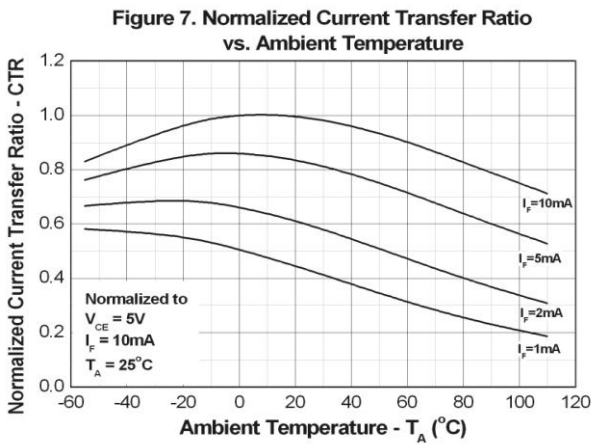


Figure 11. Switching Time Test Circuit & Waveforms

## Order Information

### Part Number

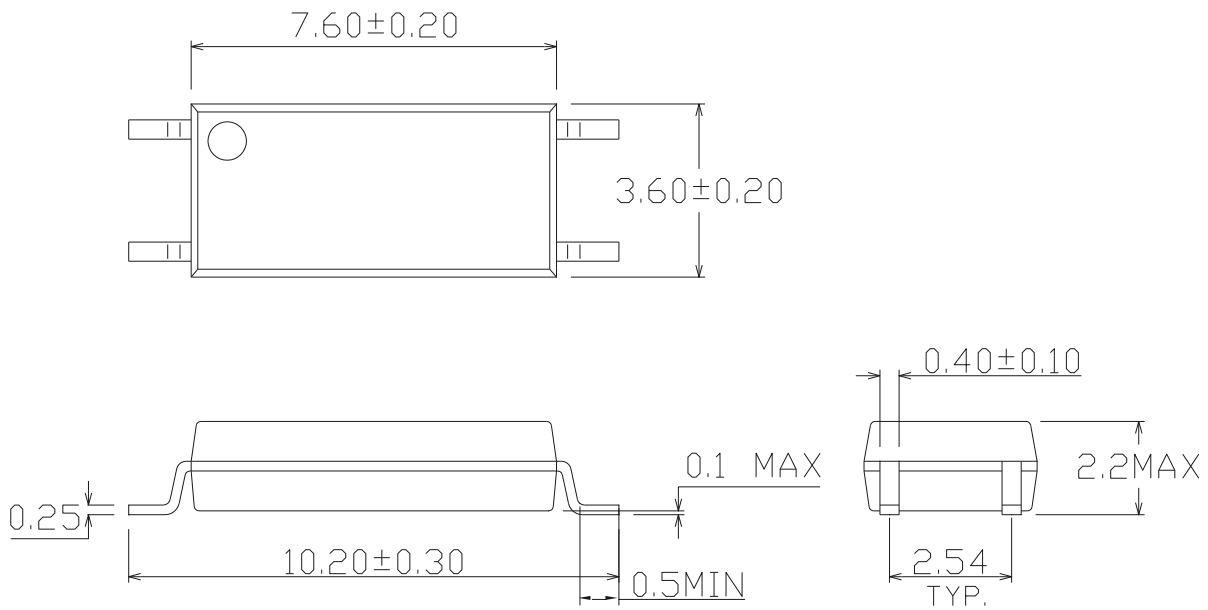
**EL101X(Y)-VG**

### Notes

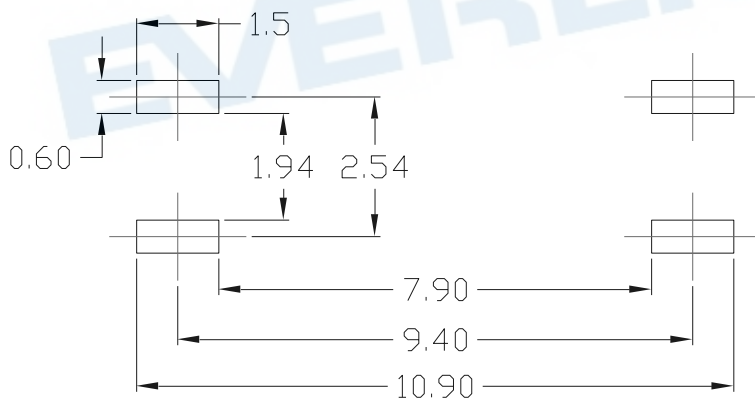
EL101 = Part No.  
X = CTR Rank (0, 2, 3, 4, 7, 8 or 9)  
Y = Tape and reel option (TA, TB or none)  
V = VDE safety (optional)  
G = Halogens free

Option	Description	Packing quantity
None	Standard SMD option	100 units per tube
-V	Standard SMD option + VDE	100 units per tube
(TA)	TA Tape & reel option	3000 units per reel
(TB)	TB Tape & reel option	3000 units per reel
(TA)-V	TA Tape & reel option + VDE	3000 units per reel
(TB)-V	TB Tape & reel option + VDE	3000 units per reel

**Package Dimension (Dimensions in mm)**



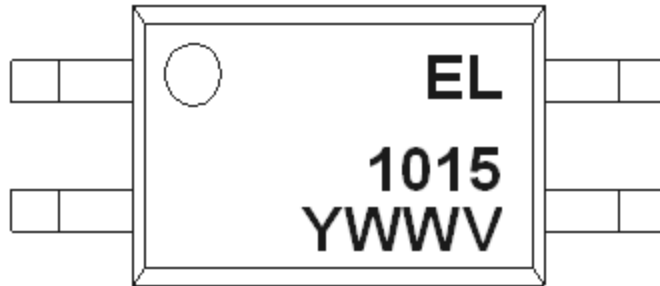
**Recommended pad layout for surface mount leadform**



**Notes**

Suggested pad dimension is just for reference only.  
 Please modify the pad dimension based on individual need.

## Device Marking



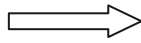
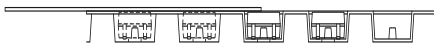
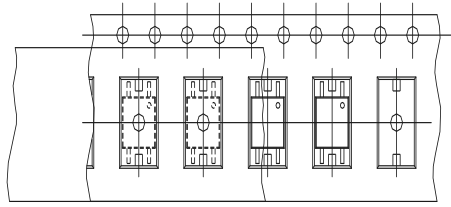
## Notes

EL	denotes Everlight
1015	denotes Device Number
Y	denotes 1 digit Year code
WW	denotes 2 digit Week code
V	denotes VDE (optional)

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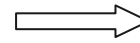
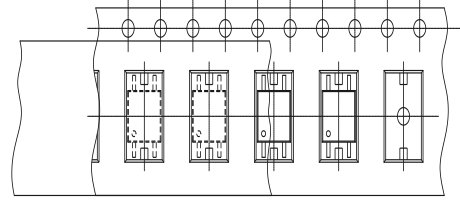
**Tape & Reel Packing Specifications**

**Option TA**



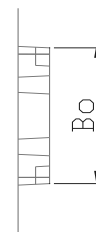
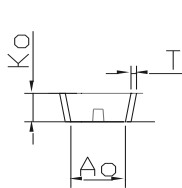
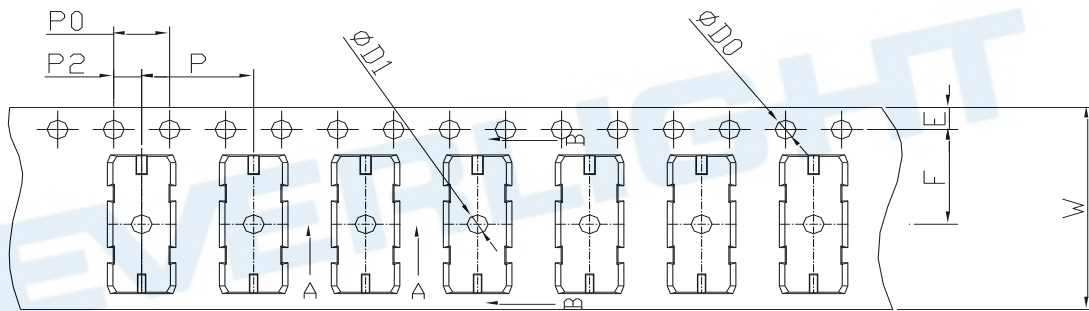
Direction of feed from reel

**Option TB**



Direction of feed from reel

**Tape dimensions**

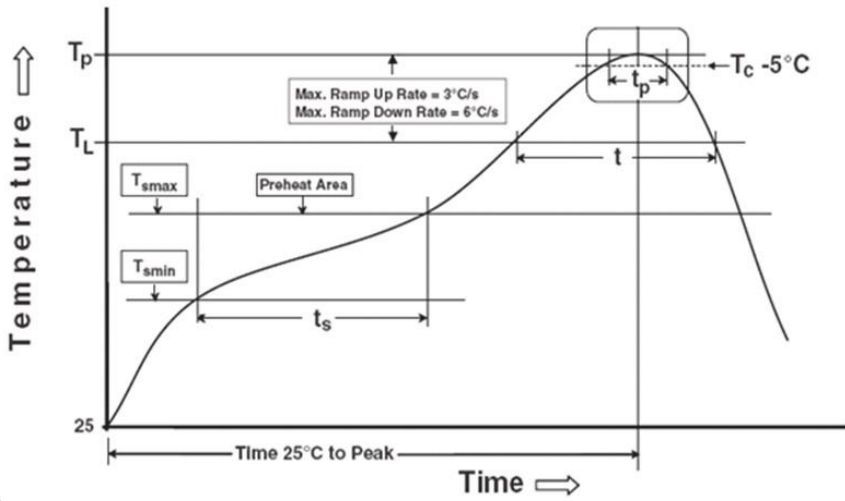


Dimension No.	<b>Ao</b>	<b>Bo</b>	<b>Do</b>	<b>D1</b>	<b>E</b>	<b>F</b>
Dimension (mm)	3.9 ± 0.10	10.82 ± 0.10	1.5 ± 0.10	1.5 ± 0.10	1.75 ± 0.10	7.5 ± 0.10
Dimension No.	<b>Po</b>	<b>P</b>	<b>P2</b>	<b>T</b>	<b>W</b>	<b>Ko</b>
Dimension (mm)	4.0 ± 0.10	8.0 ± 0.10	2.0 ± 0.10	0.4 ± 0.05	16.0 ± 0.30	2.25 ± 0.10

**Precautions for Use**

1. Soldering Condition

1.1 (A) Maximum Body Case Temperature Profile for evaluation of Reflow Profile



Notes

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: $T_p - 5^\circ\text{C}$	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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