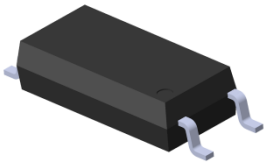
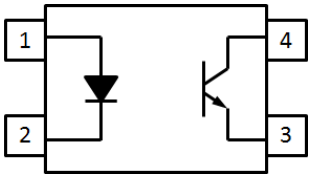
DATASHEET

4 PIN LONG CREEPAGE SOP PHOTOTRANSISTOR PHOTOCOUPLER EV101U-G Series

Preliminary



Schematic



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

Features:

- Halogens free
  (Br <900 ppm ,Cl <900 ppm , Br+Cl < 1500 ppm)
- Compliance with EU REACH
- Pb free and RoHS compliant
- Current transfer ratio
  (CTR: 50~400% at I_F =0.5mA, V_{CE} =5V)
- Operating temperature -40 °C ~125°C
- High isolation voltage between input and output (Viso=5000 V rms)
- UL and cUL approved (No. E214129)
- VDE approved (No. 40028391)
- Qualified to AEC-Q101 test guidelines
- SEMKO approved
- NEMKO approved
- DEMKO approved
- FIMKO approved
- CQC approved

This is a preliminary specification intended for design purposes and subject to change without prior notice.

Description

The EV101U-G series devices consist of an infrared emitting diode, optically coupled to a phototransistor detector encapsulated with green compound.

They are packaged in a 4-pin SOP package

Applications

- DC-DC Converters
- Programmable controllers
- Telecommunication equipments
- Signal transmission between circuits of different potentials and impedances

Absolute Maximum Ratings (Ta=25℃)

Parameter		Symbol	Rating	Unit
Input	Forward current	I_F	50	mA
	Reverse voltage	V_R	5	V
	Power dissipation	P_D	70	mW
Output	Power dissipation	P_C	150	mW
	Collector current	I_C	30	mA
	Collector-Emitter voltage	V_{CEO}	60	V
	Emitter-Collector voltage	V_{ECO}	5	V
Total Power Dissipation		P_{TOT}	200	mW
Isolation Voltage*1		V_{ISO}	5000	Vrms
Operating temperature		T_{OPR}	-40 ~ +125	˚C
Storage temperature		T_{STG}	-40 ~ +150	˚C
Soldering Temperature*2		T_{SOL}	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℃ unless specified otherwise)

Input

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Forward voltage	V_F	-	1.3	1.6	V	I_F = 1mA
Reverse current	I_R	-	-	10	μA	V_R = 5V
Input capacitance	C_{in}	-	30	250	pF	V = 0, f = 1kHz

Output

Parameter	Symbol	Min	Typ.	Max.	Unit	Condition
Collector-Emitter dark current	I_{CEO}	-	-	100	nA	V_{CE} = 20V, I_F = 0mA
Collector-Emitter breakdown voltage	BV_{CEO}	60	-	-	V	I_C = 0.1mA
Emitter-Collector breakdown voltage	BV_{ECO}	5	-	-	V	I_E = 0.1mA

Transfer Characteristics (Ta=25°C unless specified otherwise)

Parameter		Symbol	Min	Typ.	Max.	Unit	Condition
Current Transfer Ratio	EV101U	CTR	50	-	600	%	I_F = 0.5mA ,V_{CE} = 5V
	EV101UA		100	-	200	%	
	EV101UB		150	-	300	%	
	EV101UC		200	-	400	%	
Collector Emitter saturation voltage		$V_{CE(sat)}$	-	-	0.35	V	I_F = 3mA ,I_C = 1.6mA
Isolation resistance		R_{IO}	5×10^{10}	-	-	Ω	V_{IO} = 500Vdc, 40~60% R.H.
Floating capacitance		C_{IO}	-	0.3	1.0	pF	V_{IO} = 0, f = 1MHz
Turn-on time		t_{on}	-	1	-	μs	V_{CC} = 5V, I_F = 16mA, R_L = 1.9KΩ
Turn-off time		t_{off}		50	-	μs	

* Typical values at Ta= 25°C

Typical Electro-Optical Characteristics Curves

Figure 1. Forward Current vs Forward Voltage

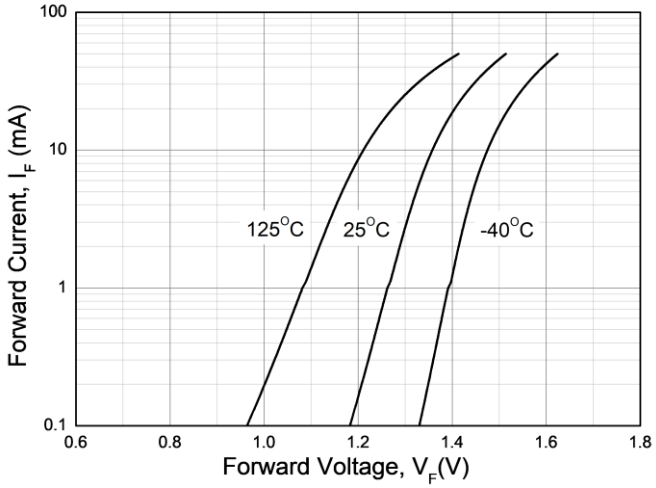


Figure 2. Collector Current vs. Forward Current

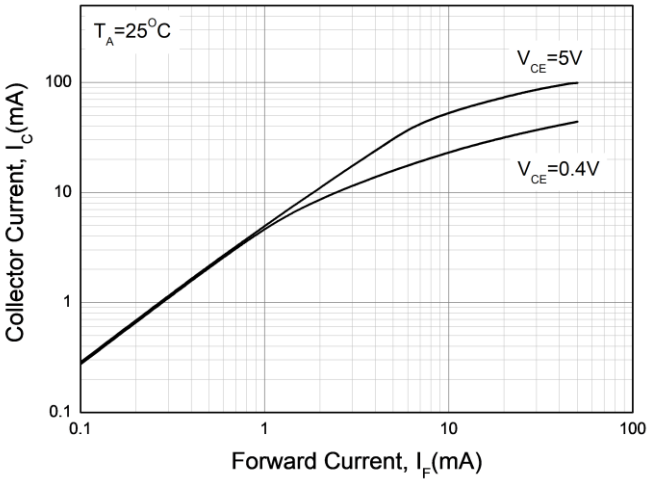


Figure 3. Normalized Current Transfer Ratio vs. Forward Current

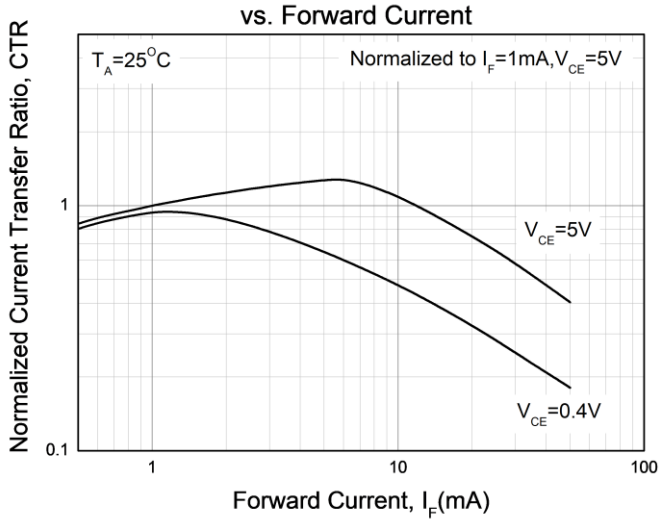


Figure 4. Collector Current vs. Collector Emitter Voltage

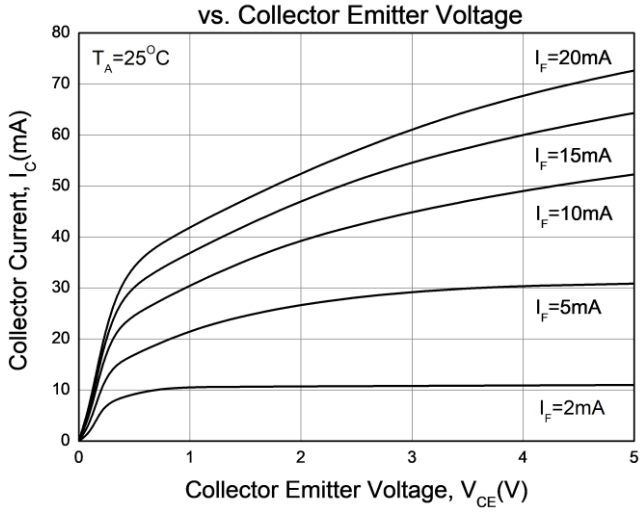


Figure 5. Collector Current vs. Collector Emitter Voltage

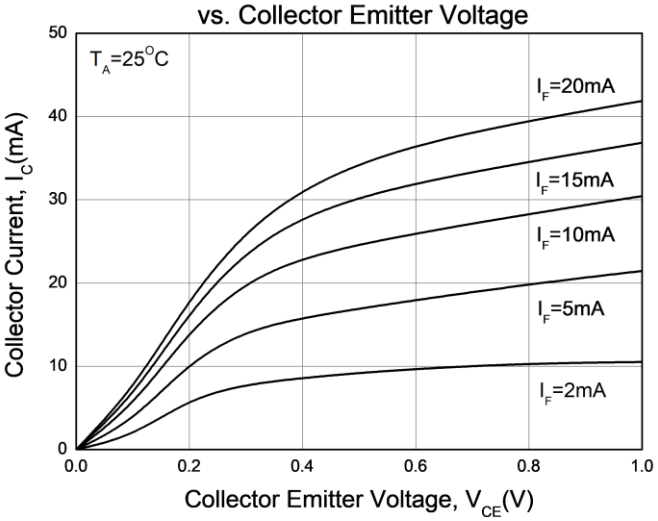


Figure 6. Collector Current vs. Ambiemt Temperature

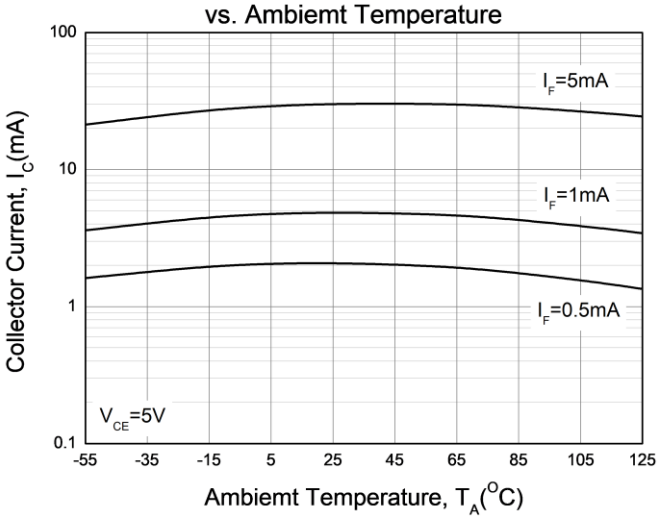


Figure 7. Current Transfer Ratio vs. Ambiemt Temperature

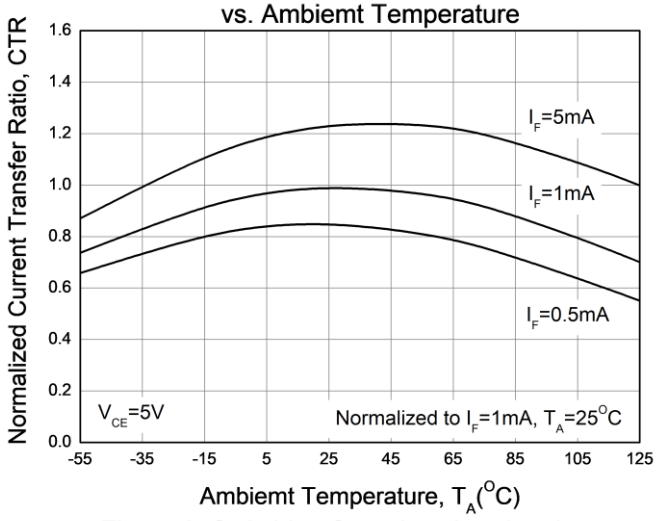


Figure 8. Collector Dark Current vs. Ambiemt Temperature

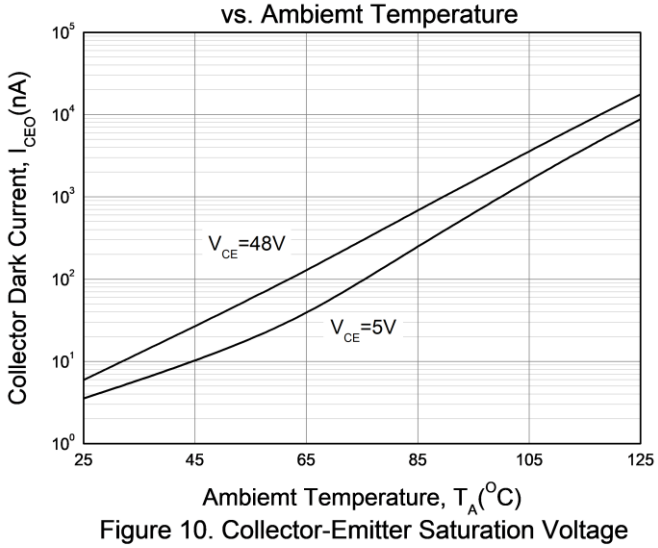


Figure 9. Switching Speed vs. Load resistance

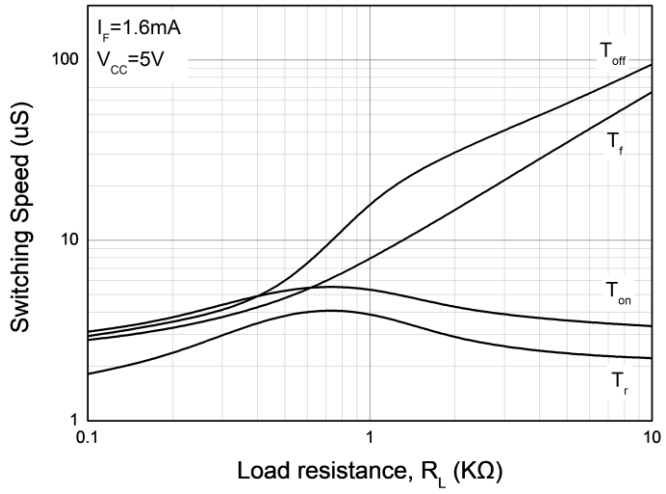


Figure 10. Collector-Emitter Saturation Voltage vs. Ambiemt Temperature

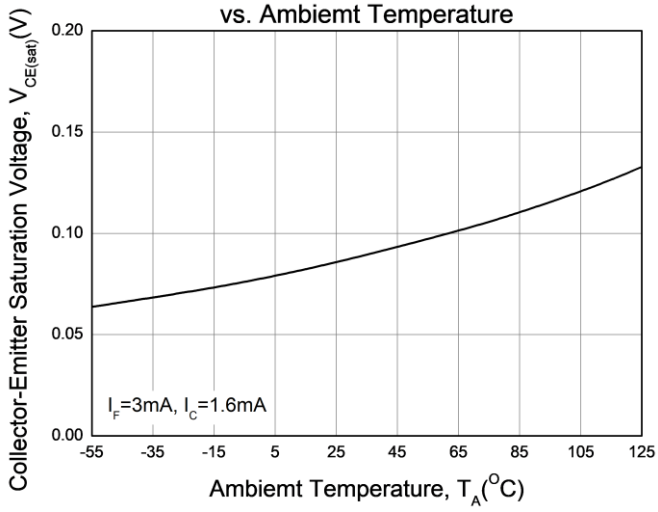
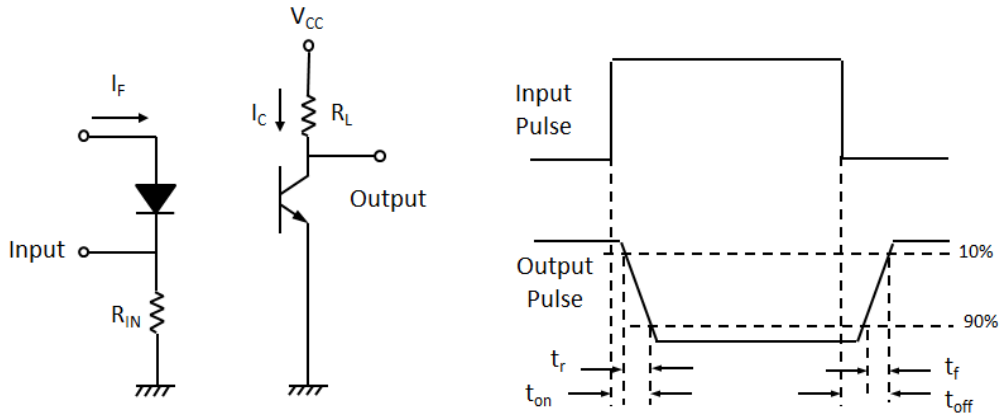


Figure 11. Switching Time Test Circuit & Waveforms



Order Information

Part Number

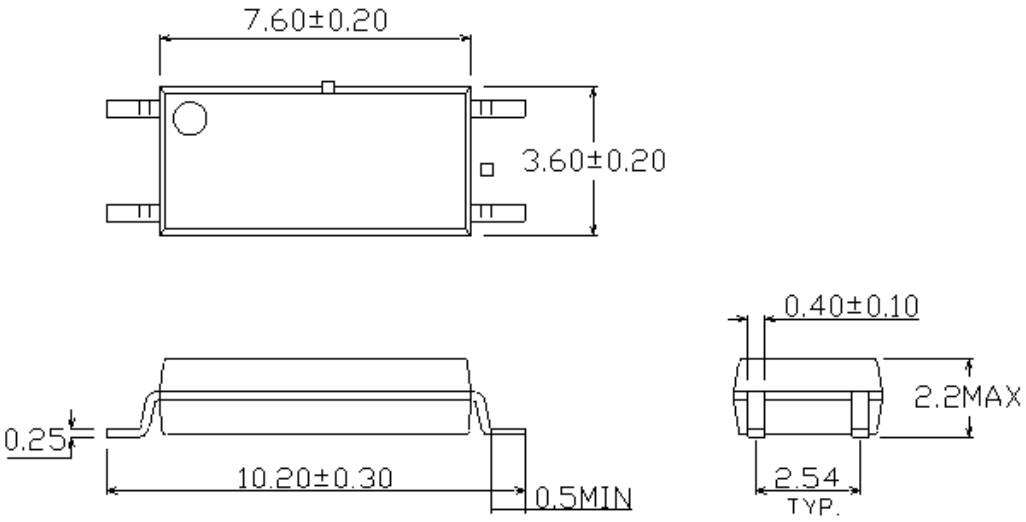
EV101U(X)(Y)-VG

Notes

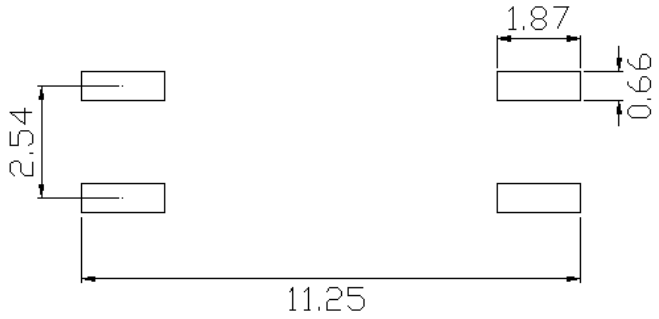
X = CTR Rank (A, B, C or none)
Y = Tape and reel option (TA, TB or none).
V = VDE (optional)
G = Halogens free

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)

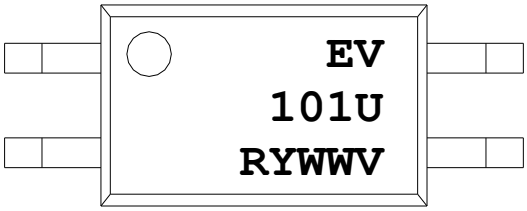


Recommended pad layout for surface mount leadform



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

Device Marking

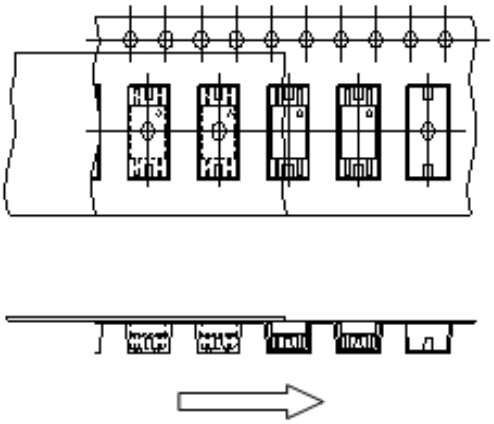


Notes

EV	denotes EVERLIGHT
101U	denotes Device Number
R	denotes CTR Rank (A, B ,C or none)
Y	denotes 1 digit Year code
WW	denotes 2 digit Week code
V	denotes VDE (optional)

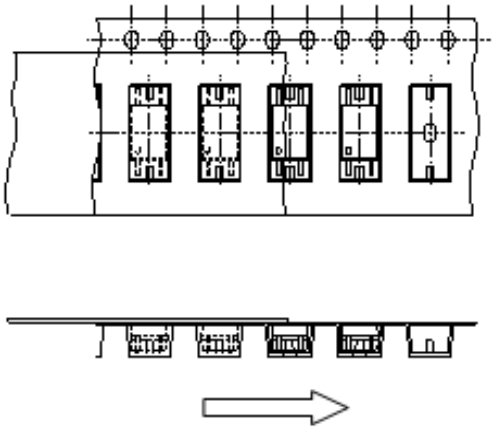
Tape & Reel Packing Specifications

Option TA



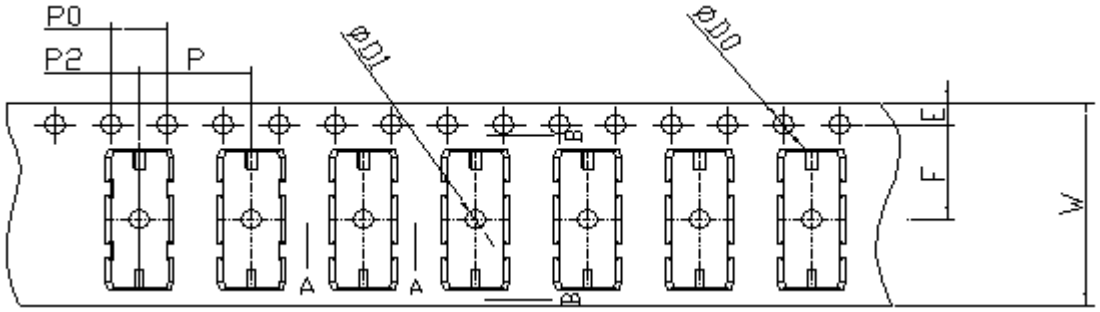
Direction of feed from reel

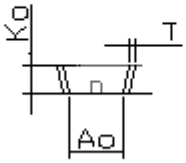
Option TB



Direction of feed from reel

Tape dimesions



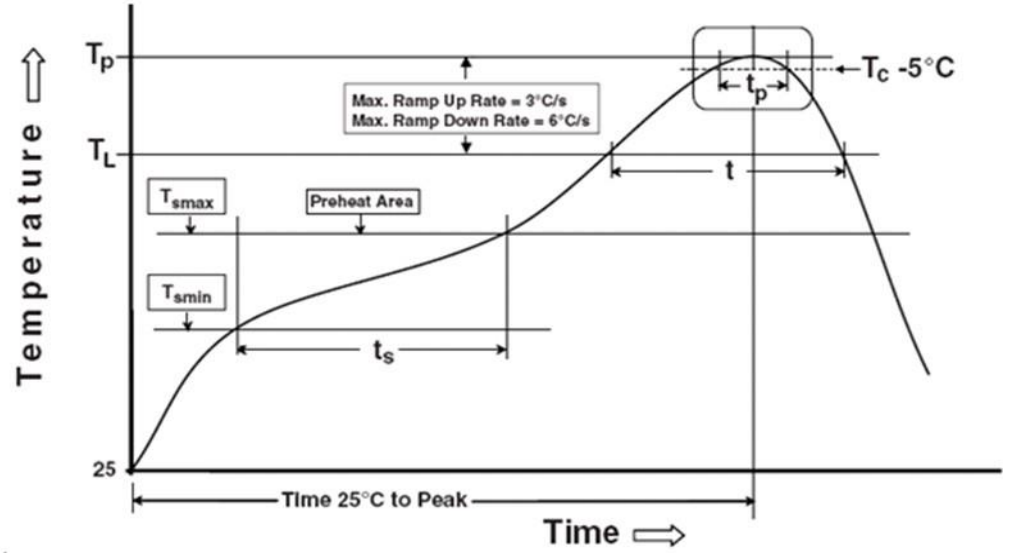


Dimension No.	**Ao**	**Bo**	**Do**	**D1**	**E**	**F**
Dimension (mm)	3.9 ± 0.10	10.82 ± 0.10	1.5 ± 0.10	1.5 ± 0.10	1.75 ± 0.10	7.5 ± 0.10
Dimension No.	**Po**	**P**	**P2**	**T**	**W**	**Ko**
Dimension (mm)	4.0 ± 0.10	8.0 ± 0.10	2.0 ± 0.10	0.4 ± 0.05	16.0 ± 0.30	2.25 ± 0.10

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°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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