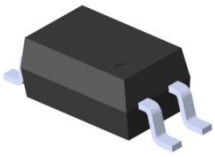
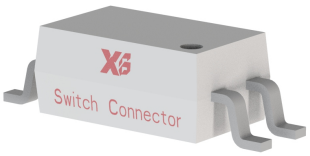
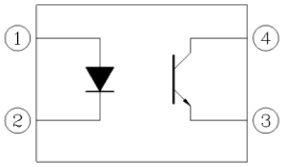
4 PIN SSOP PHOTOTRANSISTOR PHOTOCOUPLER
EL3H7U-G Series

Preliminary





Schematic



Features:

- Halogens free
  (Br <900 ppm ,Cl <900 ppm , Br+Cl < 1500 ppm)
- Current transfer ratio
  (CTR: 100~560% at I_F =0.5mA, V_{CE} =5V)
- Operating temperature -40 °C ~125°C
- High isolation voltage between input and output (Viso=3750 V rms)
- Compact 4 Pin SSOP with a 2.0 mm profile
- Compliance with EU REACH
- UL and cUL approved (No. E214129)
- VDE approved (No. 132249)
- SEMKO approved
- NEMKO approved
- DEMKO approved
- FIMKO approved
- CQC approved

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

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

Description

The EL3H7U-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 small outline SMD package.

Applications

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

Absolute Maximum Ratings (T_A=25℃) *1

Parameter		Symbol	Rating	Unit
Input	Forward current	I_F	20	mA
	Reverse voltage	V_R	5	V
	Power dissipation	P_D	40	mW
Output	Collector current	I_C	30	mA
	Collector-Emitter voltage	V_{CEO}	60	V
	Emitter-Collector voltage	V_{ECO}	5	V
	Power dissipation	P_C	150	mW
Total Power Dissipation		P_{TOT}	200	mW
Isolation Voltage*2		V_{ISO}	3750	Vrms
Operating temperature		T_{OPR}	-40 ~ +125	˚C
Storage temperature		T_{STG}	-40 ~ +150	˚C
Soldering Temperature*3		T_{SOL}	260	˚C

Notes:

*1 Stresses in excess of the absolute maximum ratings can cause permanent damage to the device. Functional operation of the device is not implied at these or any other conditions in excess of those given in the operational sections of this document. Exposure to absolute maximum ratings for extended periods of the time can adversely affect reliability. The absolute maximum Ratings are stress only T_A=25ºC unless otherwise specified.

*2 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.

*3 For 10 seconds

Electro-Optical Characteristics (T_A=25℃ unless specified otherwise)

Input

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Forward voltage	V_F	-	1.3	1.7	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 (T_A=25°C unless specified otherwise)

Parameter		Symbo	Min	Typ.	Max.	Unit	Condition
Current Transfer ratio	EL3H7U	CTR	50	-	600	%	I_F = 0.5mA ,V_{CE} = 5V
	EL3H7UA		100	-	200	%	
	EL3H7UB		150	-	300	%	
	EL3H7UC		200	-	400	%	
Collector-Emitter saturation voltage		$V_{CE(sat)}$	-	-	0.4	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
Rise time		t_r	-	8	-	μs	V_{CE} = 2V, I_C = 2mA, R_L = 100Ω
Fall time		t_f	-	10	-	μs	

* Typical values at T_A= 25°C

Typical Electro-Optical Characteristics Curves*

Figure 1. Forward Current vs Forward Voltage

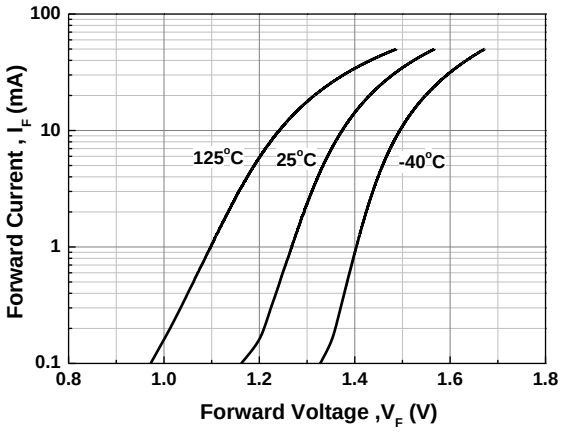


Figure 2. Collector Current vs Forward Current

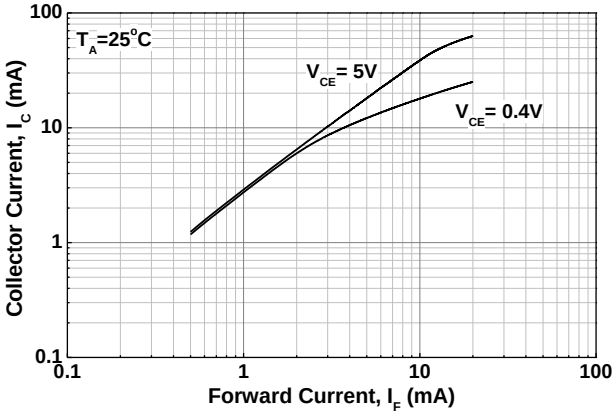


Figure 3. Normalized Current Transfer Ratio vs Forward Current

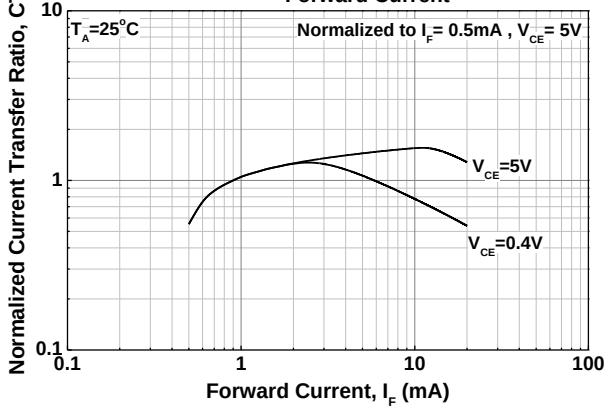


Figure 4. Collector Current vs Collector-Emitter Voltage

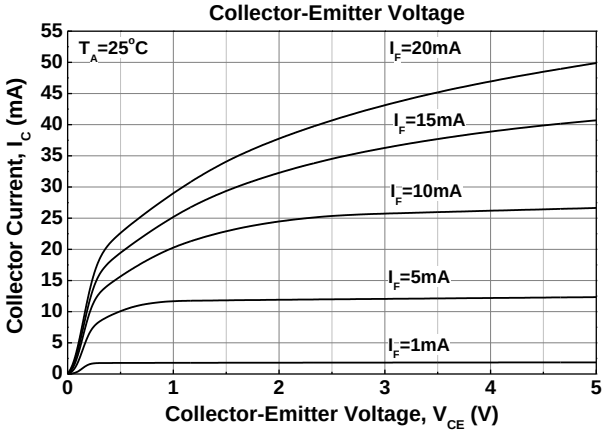


Figure 5. Collector Current vs Collector-Emitter Voltage

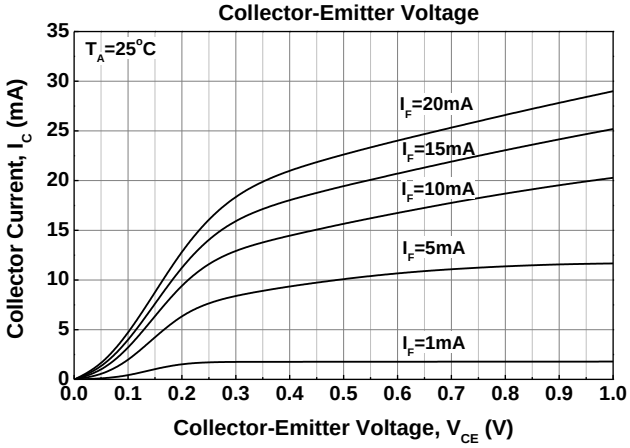


Figure 6.Collector Current vs Ambient Temperature

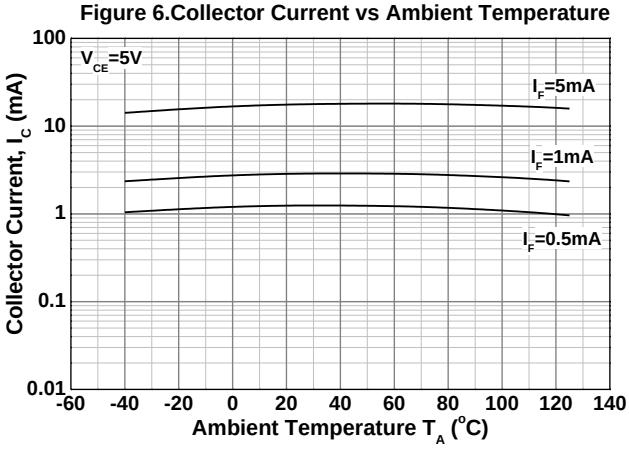


Figure 7.Normalized Current Transfer Ratio vs Ambient Temperature

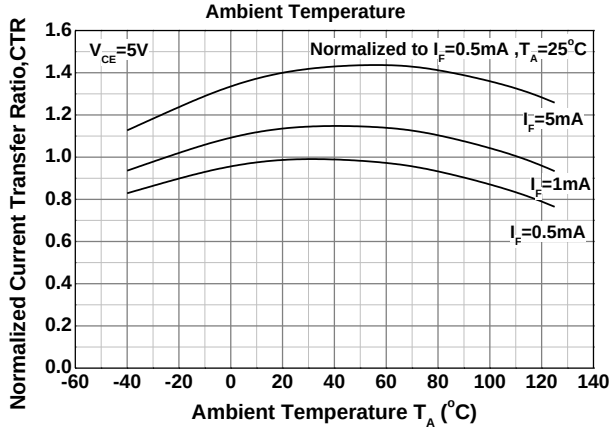


Figure 8. Dark Current vs Ambient Temperature

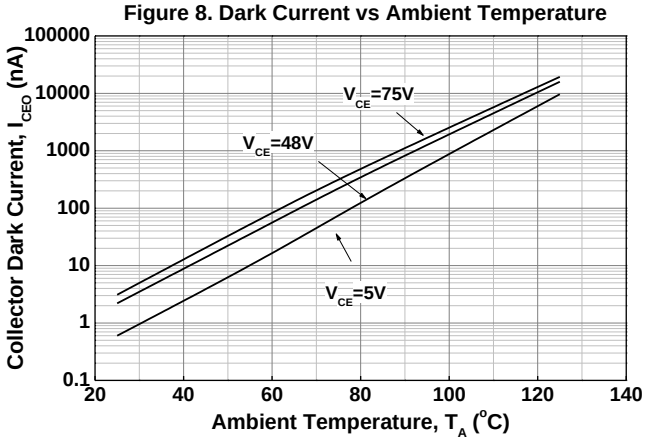


Figure 9. Switching Time vs Load Resistance

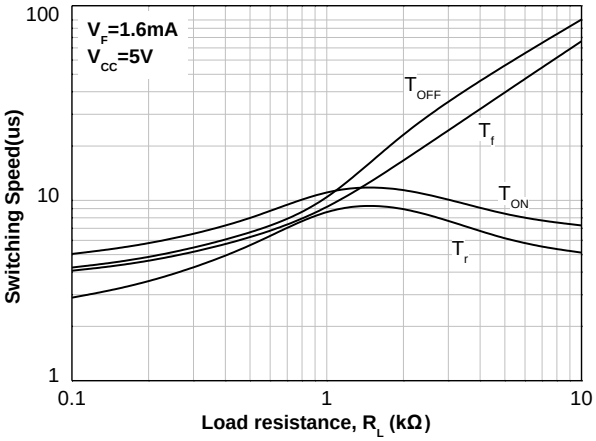
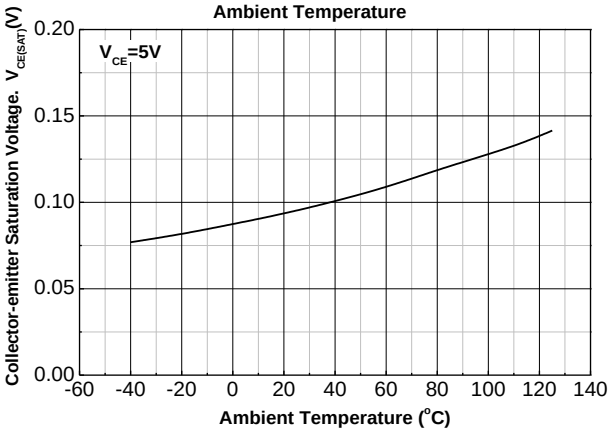


Figure 10. Collector-emitter Saturation Voltage vs Ambient Temperature



*Please be aware that all datas in the graph are just for reference and not for guaranteed by production test.

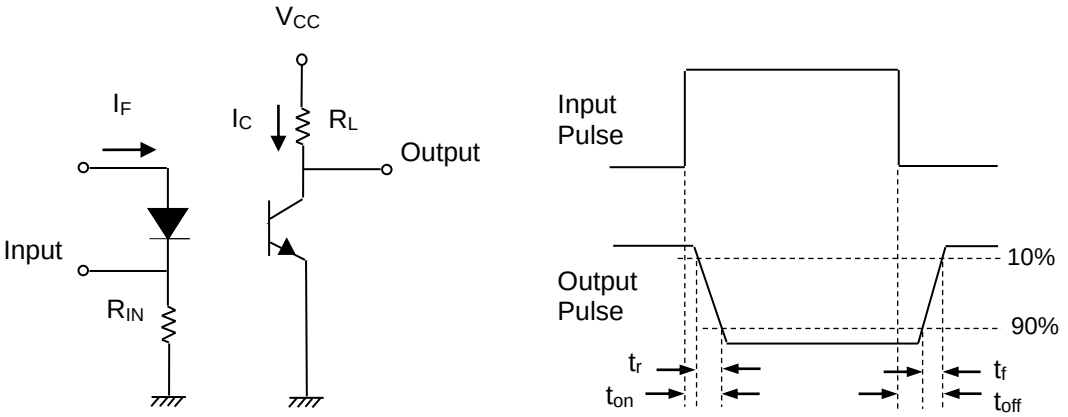


Figure 13. Switching Time Test Circuit & Waveforms

Order Information

Part Number

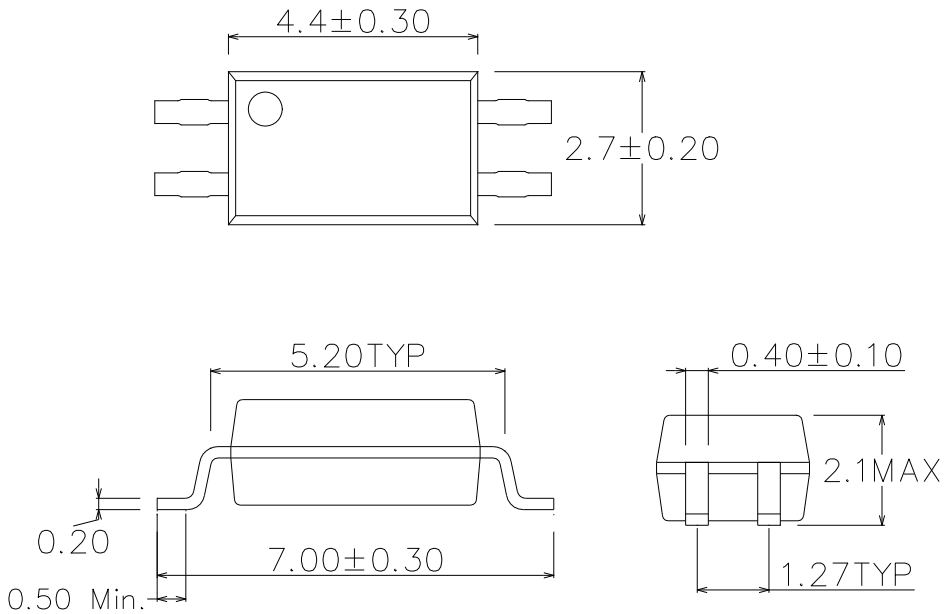
EL3H7U(X)(Y)-VG

Note

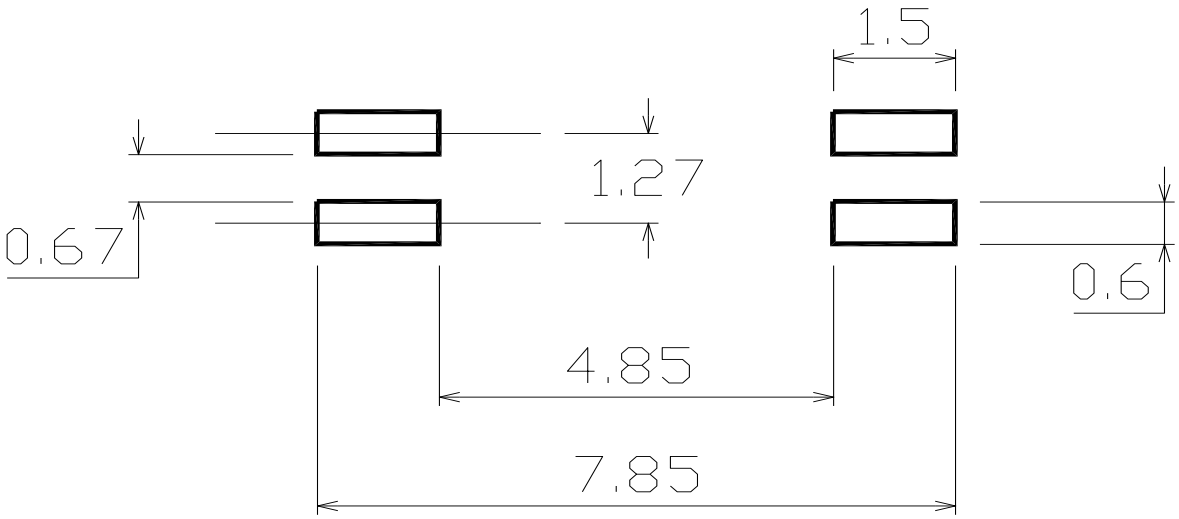
X = CTR Rank (A, B , C or none)
Y = Tape and reel option (TA, TB or none)
V = VDE (optional)
G = Halogens free

Option	Description	Packing quantity
(TA)	TA Tape & reel option	5000 units per reel
(TB)	TB Tape & reel option	5000 units per reel
(TA)-V	TA Tape & reel option + VDE	5000 units per reel
(TB)-V	TB Tape & reel option + VDE	5000 units per reel

Package Dimension (Dimensions in mm)



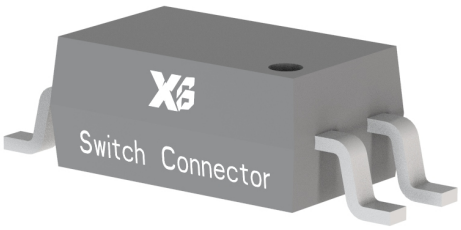
Recommended pad layout for surface mount leadform



Device Marking

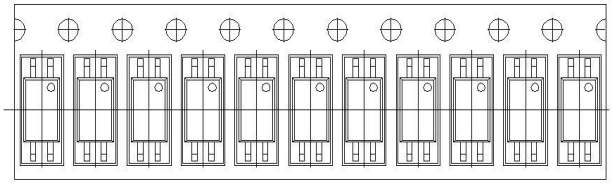
Notes

EL denotes XI BNANG
3H7U denotes Device Number
A denotes CTR Rank
Y denotes 1 digit Year code WW denotes 2 digit Week code
V denotes VDE (optional)



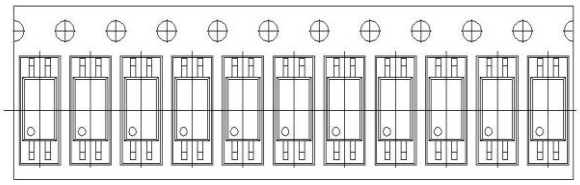
Tape & Reel Packing Specifications

Option TA



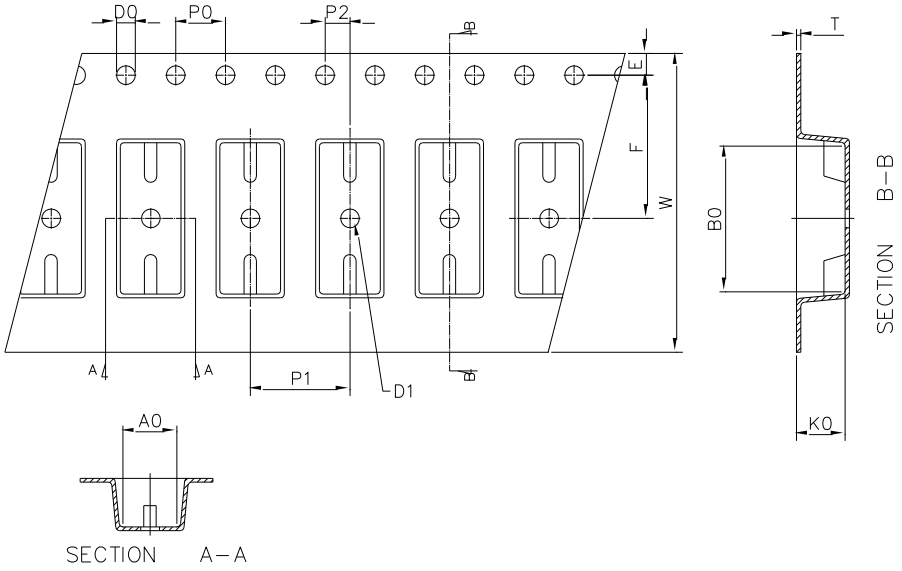
Direction of feed from reel

Option TB



Direction of feed from reel

Tape dimesions

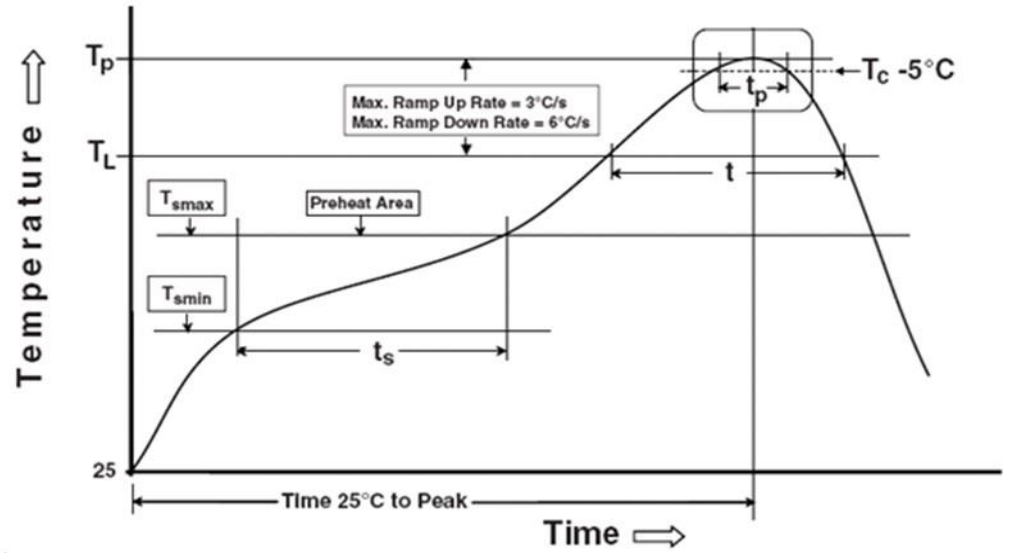


Dimension No.	**A0**	**B0**	**D0**	**D1**	**E**	**F**
Dimension (mm)	3.00 ± 0.10	7.45 ± 0.10	1.50 + 0.1/-0	1.50 ± 0.10	1.75± 0.10	5.50 ± 0.10
Dimension No.	**Po**	**P1**	**P2**	**t**	**W**	**K0**
Dimension (mm)	4.00 ± 0.15	8.00 ± 0.10	2.00 ± 0.10	0.30 ± 0.05	12.1 ± 0.2	2.45 ± 0.1

Precautions for Use

1. Soldering Condition

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



Note: 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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2. The graphs shown in this datasheet are representing typical data only and do not show guaranteed values.
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