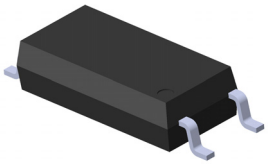
4 PIN LONG CREEPAGE SOP PHOTOTRANSISTOR PHOTOCOUPLER

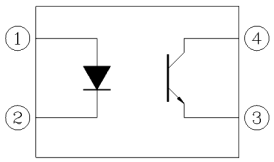
EL101X-G Series

Features:

- Free halogens compliant
- Current transfer ratio
  (CTR: 50~600% at I_F =5mA, V_{CE} =5V)
  (CTR: 63~320% at I_F =10mA, V_{CE} =5V)
- High isolation voltage between input and output (Viso=5000 V rms)
- Compact 4 Pin SOP with a 2.0 mm profile
- 8mm long creepage distance
- Pb free and RoHS compliant.
- CUL approved (No. E214129)
- VDE approved (No. 40028391)
- SEMKO approved
- NEMKO approved
- DEMKO approved
- FIMKO approved



Schematic



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

Description

The EL101X-G series devices consist of an infrared emitting diode, optically coupled to a phototransistor detector. Compound use free halogens and Sb_2O_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 (T_a=25°C)

Parameter		Symbol	Rating	Unit
Input	Forward current	I_F	60	mA
	Peak forward current (1us, pulse)	I_{FP}	1.5	A
	Reverse voltage	V_R	6	V
	Power dissipation	P_D	100	mW
Output	Power dissipation	P_C	150	mW
	Collector current	I_C	50	mA
	Collector-Emitter voltage	V_{CEO}	80	V
	Emitter-Collector voltage	V_{ECO}	7	V
Total power dissipation		P_{TOT}	250	mW
Isolation voltage *1		V_{ISO}	5000	V rms
Operating temperature		T_{OPR}	-55 ~ +110	°C
Storage temperature		T_{STG}	-55 ~ +125	°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.

Electrical Characteristics (T_a=25°C unless specified otherwise)

Input

Parameter	Symbol	Min.	Typ.*	Max.	Unit	Condition
Forward voltage	V_F	-	1.45	1.5	V	I_F = 50mA
Reverse current	I_R	-	-	10	μA	V_R = 6V
Input capacitance	C_{in}	-	50	-	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}	80	-	-	V	I_C = 0.1mA
Emitter-Collector breakdown voltage	BV_{ECO}	7	-	-	V	I_E = 0.1mA

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

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

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

Turn on time	Ton	-	4	-	μs	V_{CE} = 5V, I_C = 5mA, R_L = 100Ω
Turn off time	Toff	-	3	-		
Rise time	t_r	-	2	18	μs	V_{CE} = 5V, I_C = 5mA, R_L = 100Ω
Fall time	t_f	-	3	18	μs	

* Typical values at T_a = 25°C

Typical Performance Curves

Figure 1. Forward Current vs. Forward Voltage

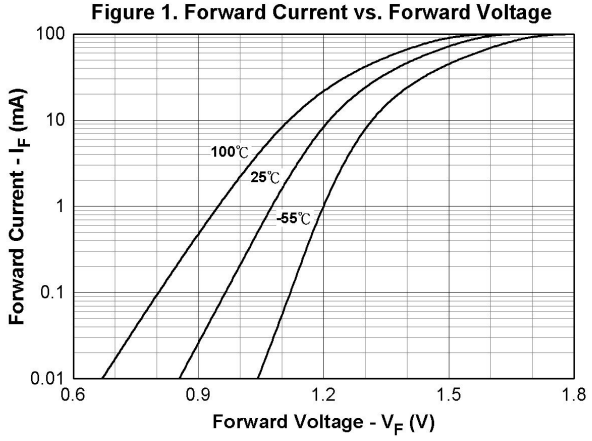


Figure.2 Collector Dark Current vs. Ambient Temperature

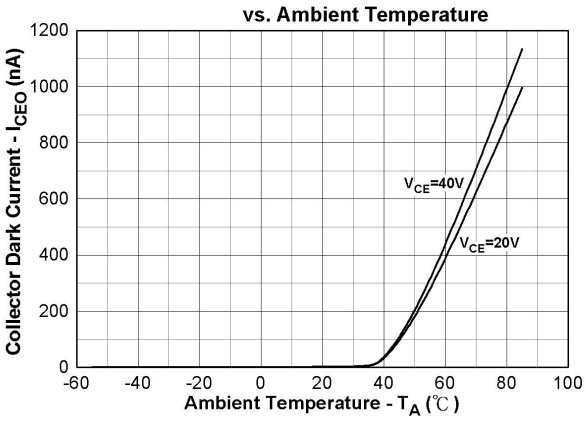


Figure 3. Collector Current vs. Collector Emitter Voltage

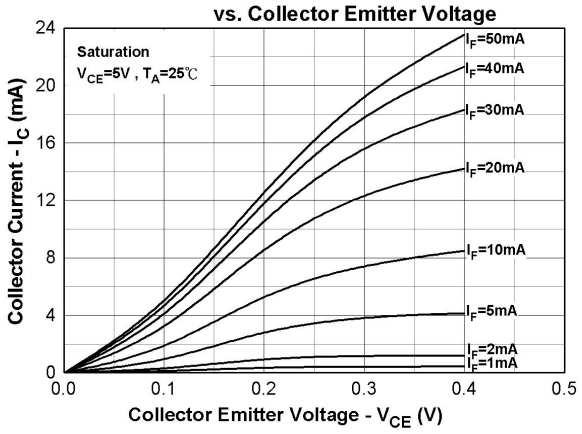


Figure 4. Collector Current vs. Collector Emitter Voltage

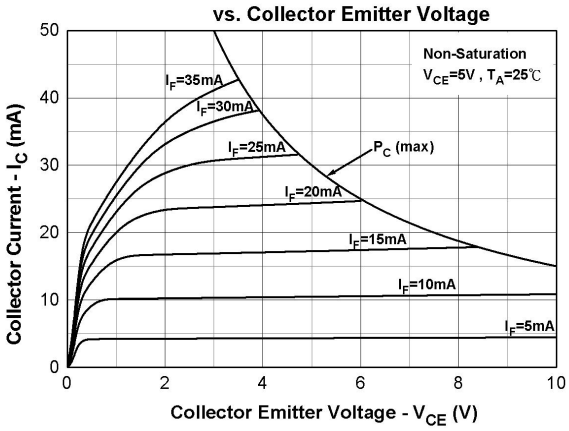


Figure 5. Normalized Collector Current vs. Forward Current

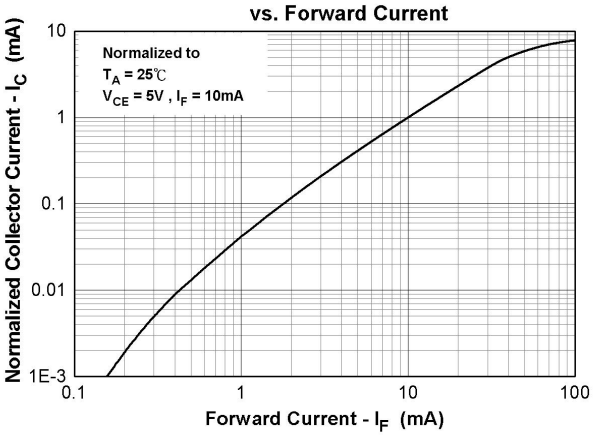


Figure 6. Normalized Current Transfer Ratio vs. Forward Current

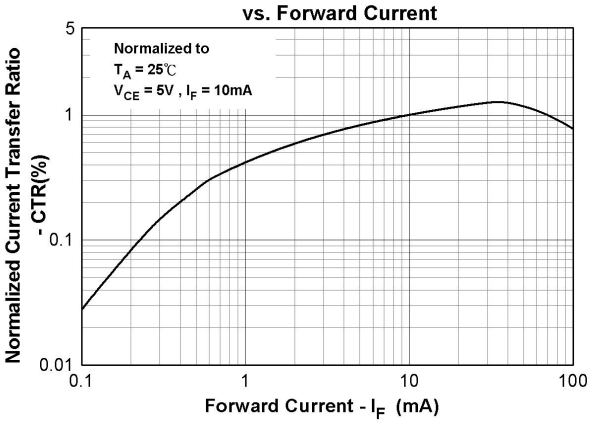


Figure 7. Normalized Current Transfer Ratio vs. Ambient Temperature

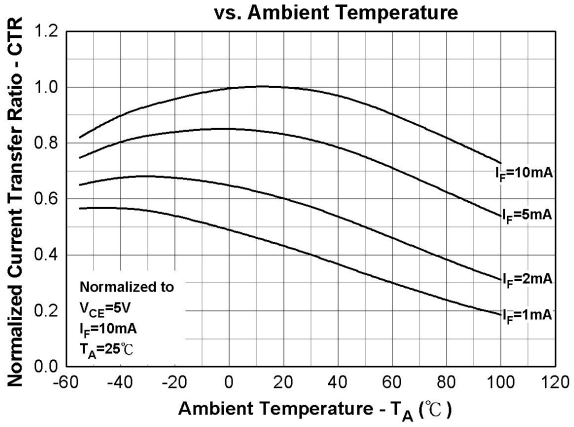


Figure 8. Normalized Current Transfer Ratio vs. Ambient Temperature

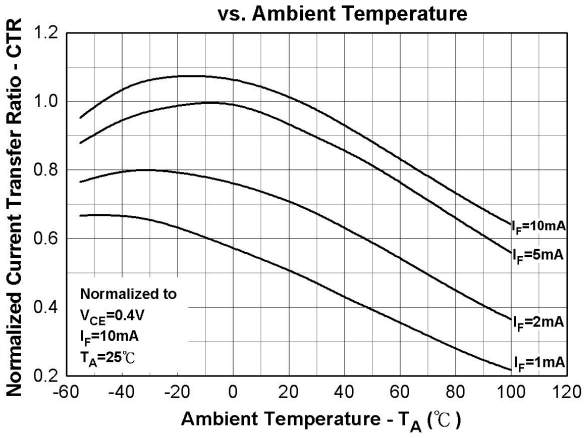


Figure 9. Turn on/off Time vs. Collector Current

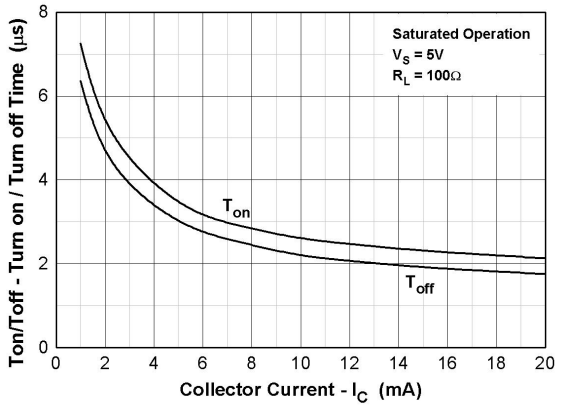
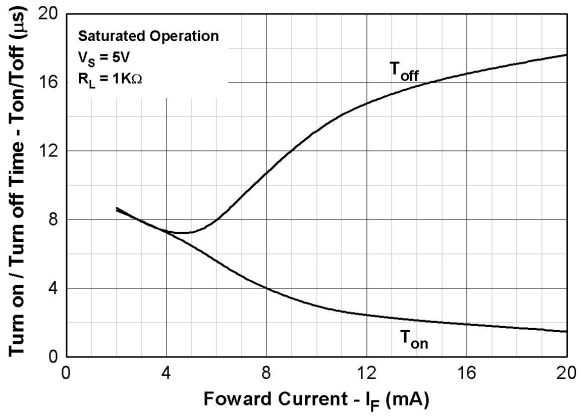


Figure 10. Turn on/off Time vs. Forward Current



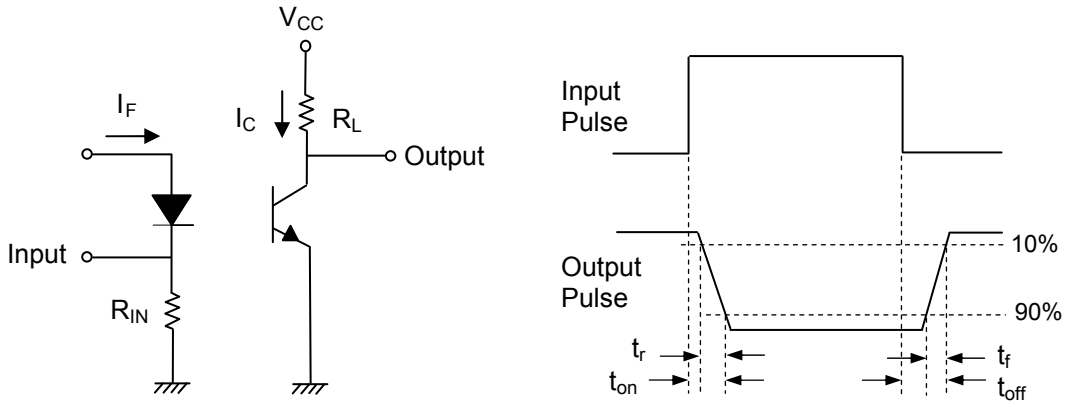


Figure 10. Switching Time Test Circuit & Waveforms

Order Information

Part Number

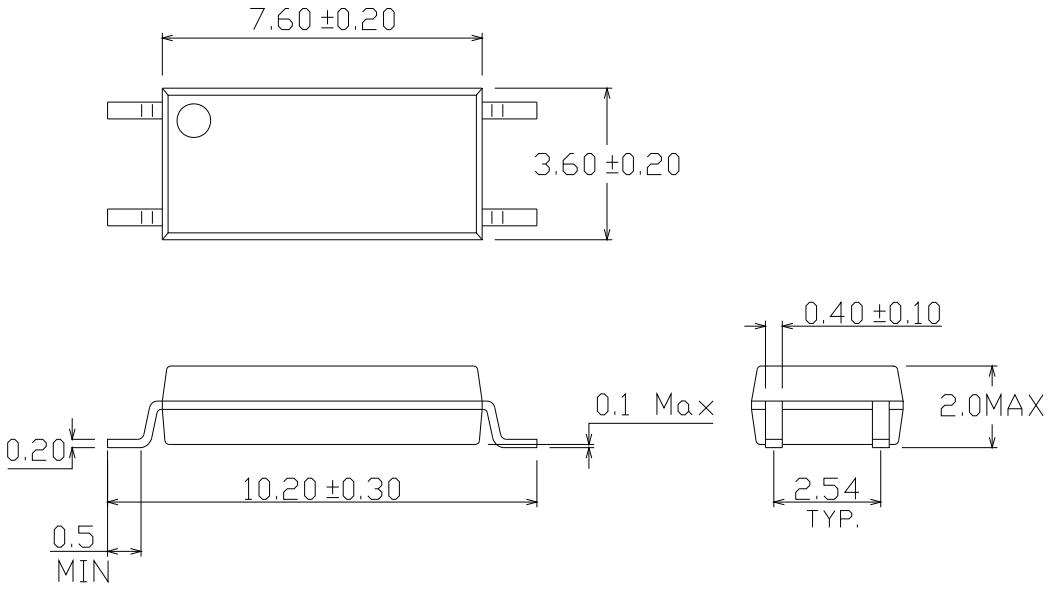
EL101X(Y)-VG

Note
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

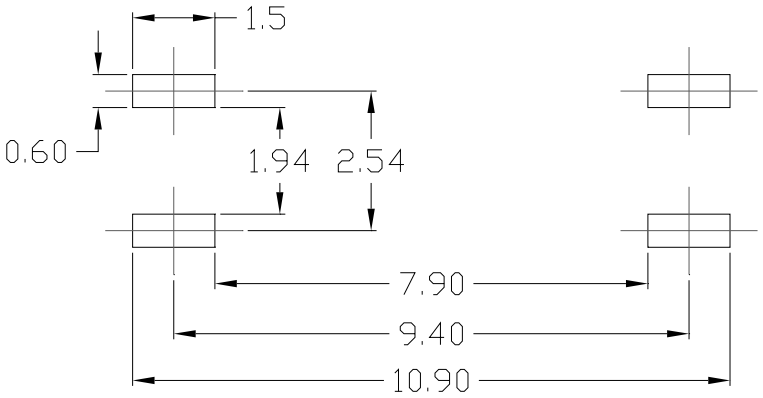
Option	Description	Packing quantity
None	Standard SMD option	100 units per tube
-V	Standard SMD option + VDE	100 units per tube
(TA)	TA Tape & reel option	2000 units per reel
(TB)	TB Tape & reel option	2000 units per reel
(TA)-V	TA Tape & reel option + VDE	2000 units per reel
(TB)-V	TB Tape & reel option + VDE	2000 units per reel

Package Drawing

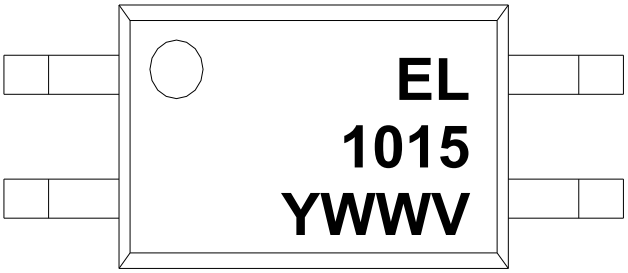
(Dimensions in mm)



Recommended pad layout for surface mount leadform



Device Marking

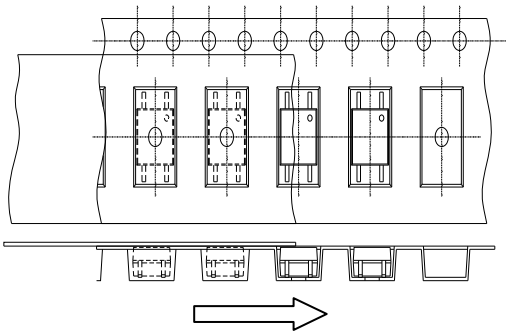


Notes

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

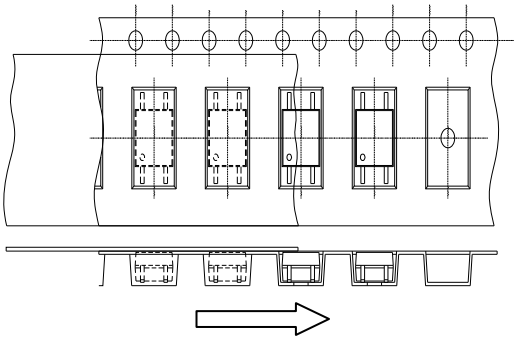
Tape & Reel Packing Specifications

Option TA



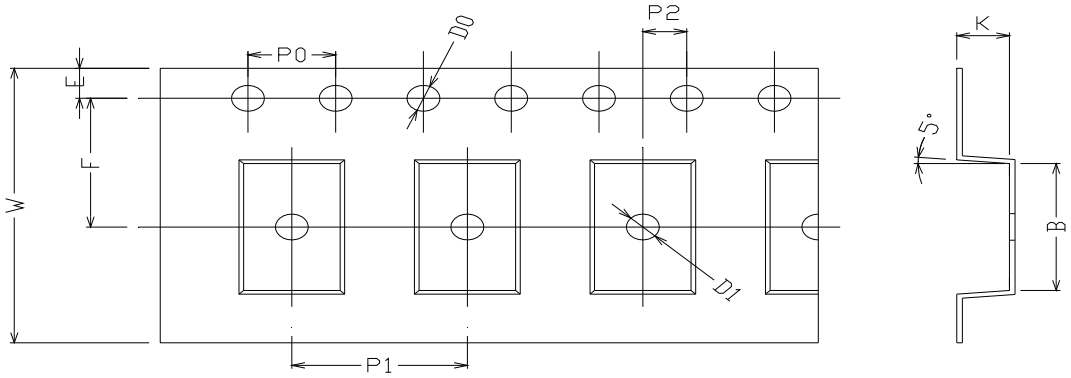
Direction of feed from reel

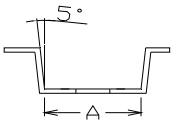
Option TB



Direction of feed from reel

Tape dimensions

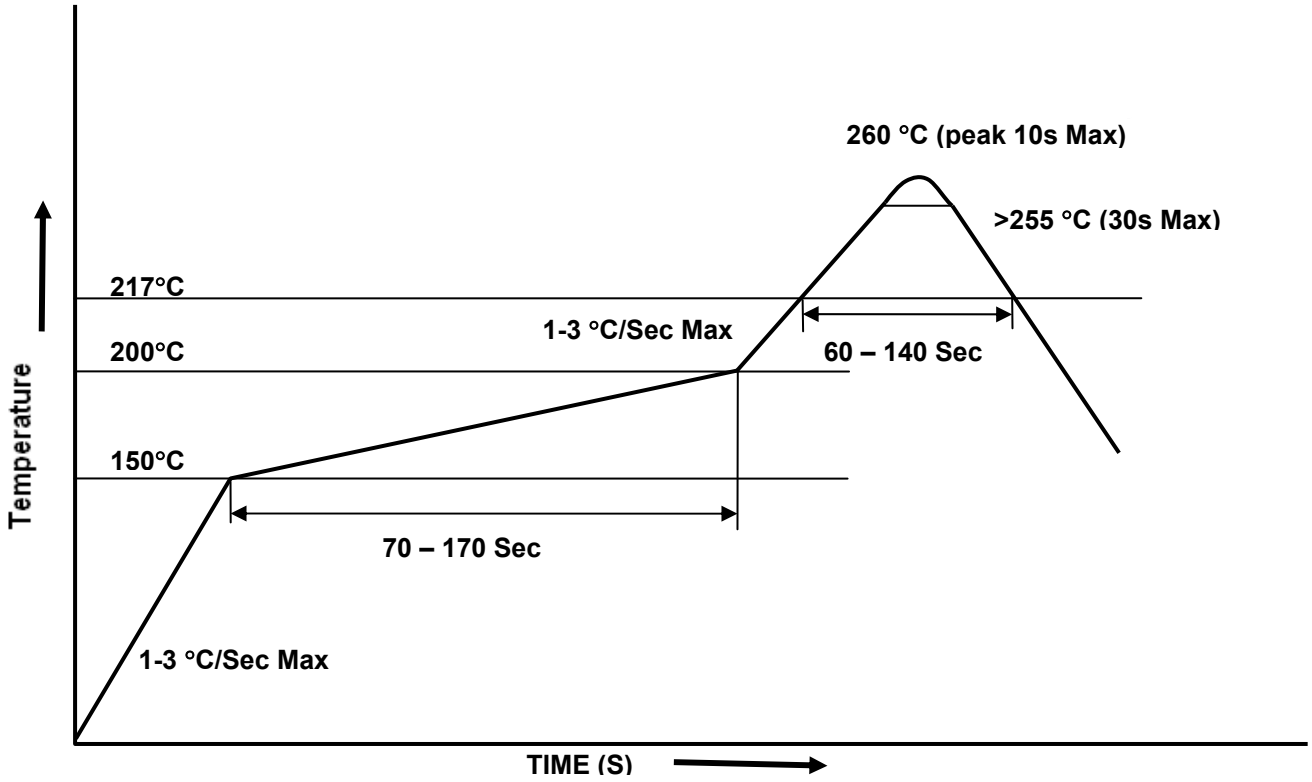




Dimension No.	A	B	Do	D1	E	F
Dimension (mm)	4.4 ± 0.1	10.5 ± 0.1	1.5 + 0.1/-0	1.5 ± 0.1	1.7 5± 0.1	7.5 ± 0.1

Dimension No.	Po	P1	P2	t	W	K
Dimension (mm)	3.8 ± 0.1	8.0 ± 0.1	2.0 ± 0.1	0.3± 0.05	16.0 ± 0.3	2.14 ± 0.1

Solder Reflow Temperature Profile



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