



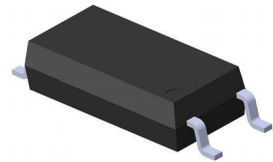
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5 PIN LONG CREEPAGE SOP PHOTOTRANSISTOR PHOTOCOUPLER

EL111X-G Series

Features:

- Free halogens compliant
- 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 5 Pin SOP with a 2.0 mm profile
- 8mm long creepage distance
- Pb free and RoHS compliant.
- CUL approval (No. E214129)
- VDE approval (No. 40028391)
- SEMKO approved (pending)
- NEMKO approved (pending)
- DEMKO approved (pending)
- FIMKO approved (pending)



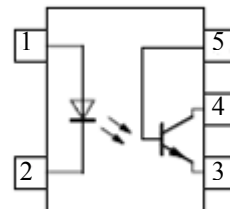
Description

The EL111X-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 5-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

Schematic



Pin Configuration

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



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EL111X-G Series

Absolute Maximum Ratings ($T_a=25^{\circ}\text{C}$)

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	$^{\circ}\text{C}$
Storage temperature		T_{STG}	-55 ~ +125	$^{\circ}\text{C}$
Soldering temperature ^{*2}		T_{SOL}	260	$^{\circ}\text{C}$

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.



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5 PIN LONG CREEPAGE SOP PHOTOTRANSISTOR PHOTOCOUPLER

EL111X-G Series

Electrical Characteristics ($T_a=25^{\circ}\text{C}$ unless specified otherwise)

Input

Parameter	Symbol	Min.	Typ.*	Max.	Unit	Condition
Forward voltage	V_F	-	-	1.5	V	$I_F = 50\text{mA}$
Reverse current	I_R	-	-	10	μA	$V_R = 6\text{V}$
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 ($T_a=25^{\circ}\text{C}$ unless specified otherwise)

Parameter	Symbol	Min.	Typ.*	Max.	Unit	Condition		
Current Transfer ratio	EL1110	CTR	50	-	600	%	$I_F = 5\text{mA}, V_{CE} = 5\text{V}$	
	EL1116		100	-	300			
	EL1117		80	-	160			
	EL1118		130	-	260			
	EL1119		200	-	400			
	EL1112	CTR	63	-	125	%	$I_F = 10\text{mA}, V_{CE} = 5\text{V}$	
	EL1113		100	-	200			
	EL1114		160	-	320			
	EL1112		22	-	-			$I_F = 1\text{mA}, V_{CE} = 5\text{V}$
	EL1113		34	-	-			
	EL1114		56	-	-			
	Collector-Emitter saturation voltage	$V_{CE(sat)}$	-	-	0.4	V	$I_F = 10\text{mA}, I_C = 1\text{mA}$	
Isolation resistance	R_{IO}	5×10^{10}	-	-	Ω	$V_{IO} = 500\text{Vdc}, 40\sim 60\% \text{ R.H.}$		
Floating capacitance	C_{IO}	-	-	1.0	pF	$V_{IO} = 0, f = 1\text{MHz}$		



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EL111X-G Series

Transfer Characteristics ($T_a=25^\circ\text{C}$ unless specified otherwise)

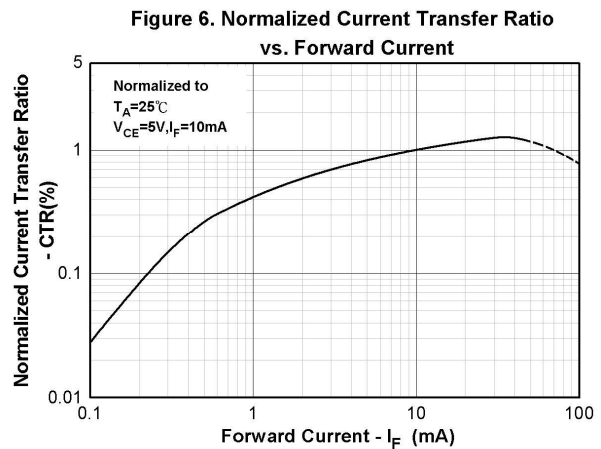
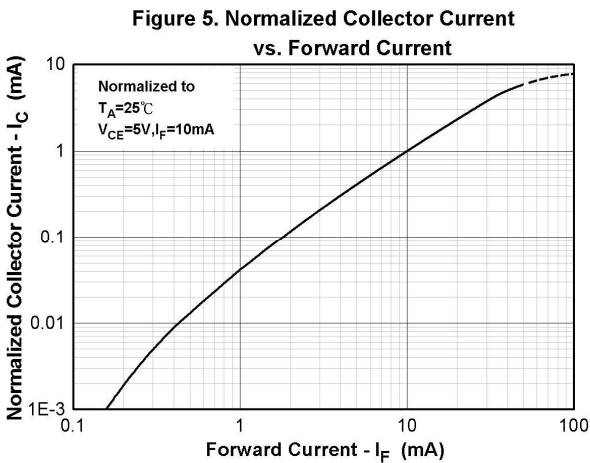
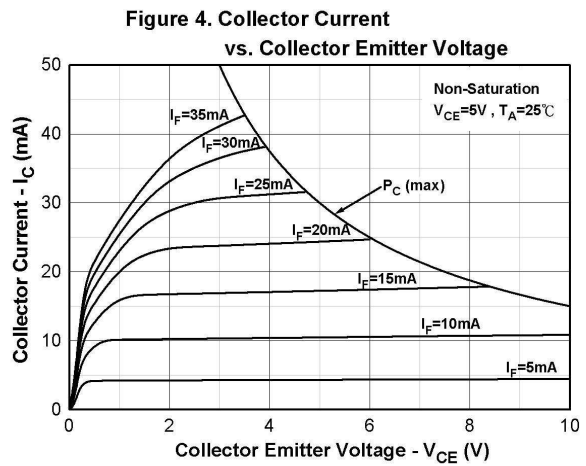
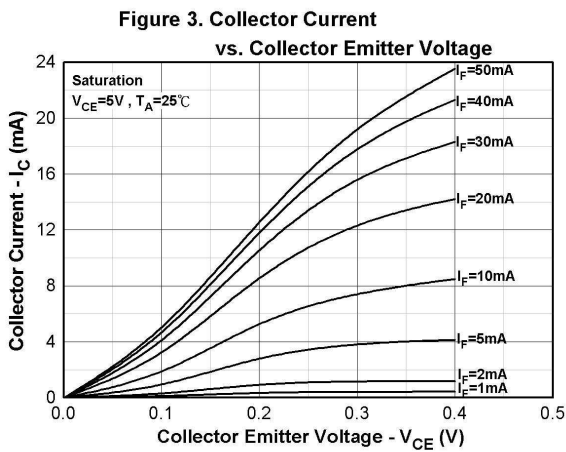
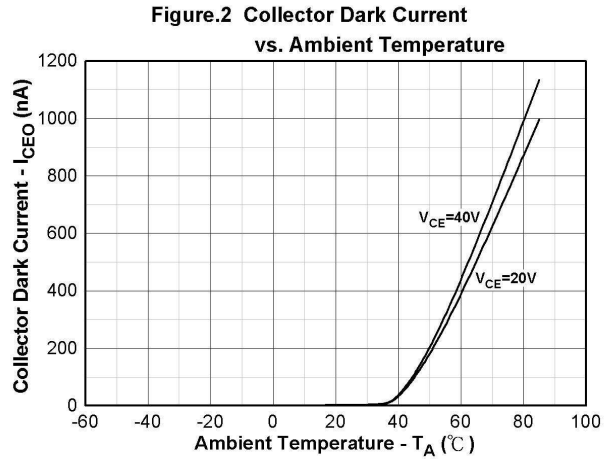
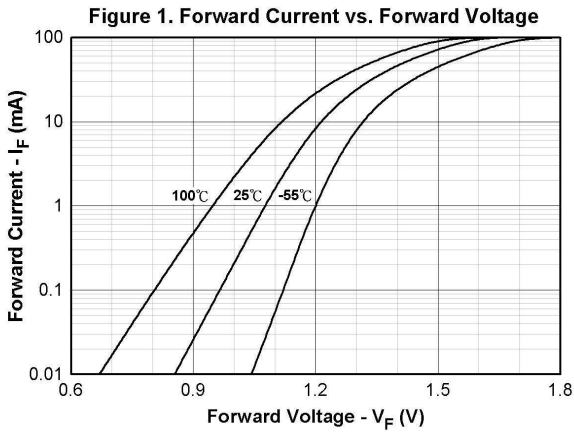
Turn on time	Ton	-	4	-	μs	$V_{CE} = 5\text{V}, I_C = 5\text{mA},$ $R_L = 100\Omega$
Turn off time	Toff	-	3	-		
Rise time	t_r	-	2	18	μs	$V_{CE} = 5\text{V}, I_C = 5\text{mA},$ $R_L = 100\Omega$
Fall time	t_f	-	3	18	μs	

* Typical values at $T_a = 25^\circ\text{C}$

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EL111X-G Series

Typical Performance Curves



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Figure 7. Normalized Current Transfer Ratio vs. Ambient Temperature

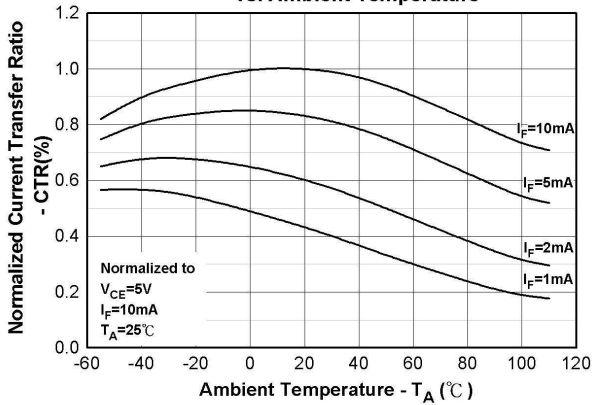


Figure 8. Normalized Current Transfer Ratio vs. Ambient Temperature

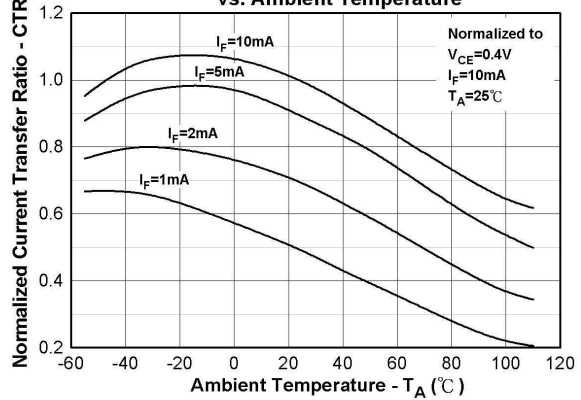


Figure 9. Turn on/off Time vs. Collector Current

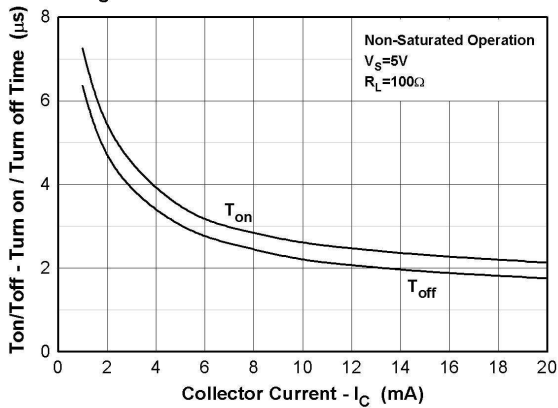


Figure 10. Turn on/off Time vs. Forward Current

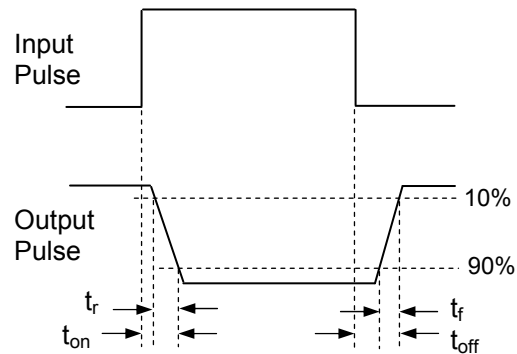
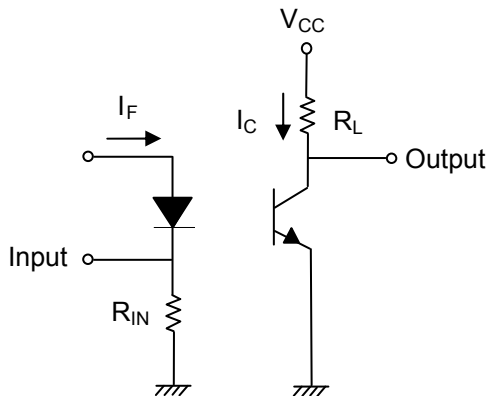
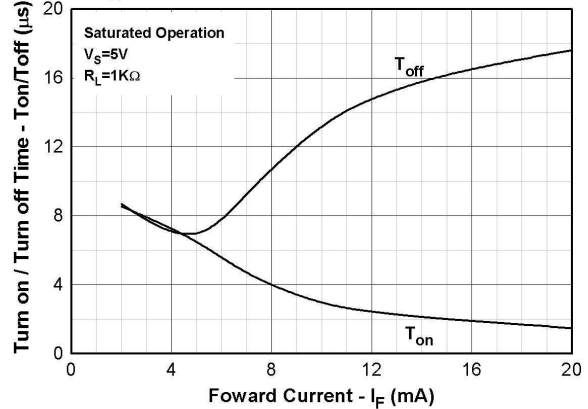


Figure 11. Switching Time Test Circuit & Waveforms



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EL111X-G Series

Order Information

Part Number

EL111X(Y)-VG

Note

EL111 = 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)

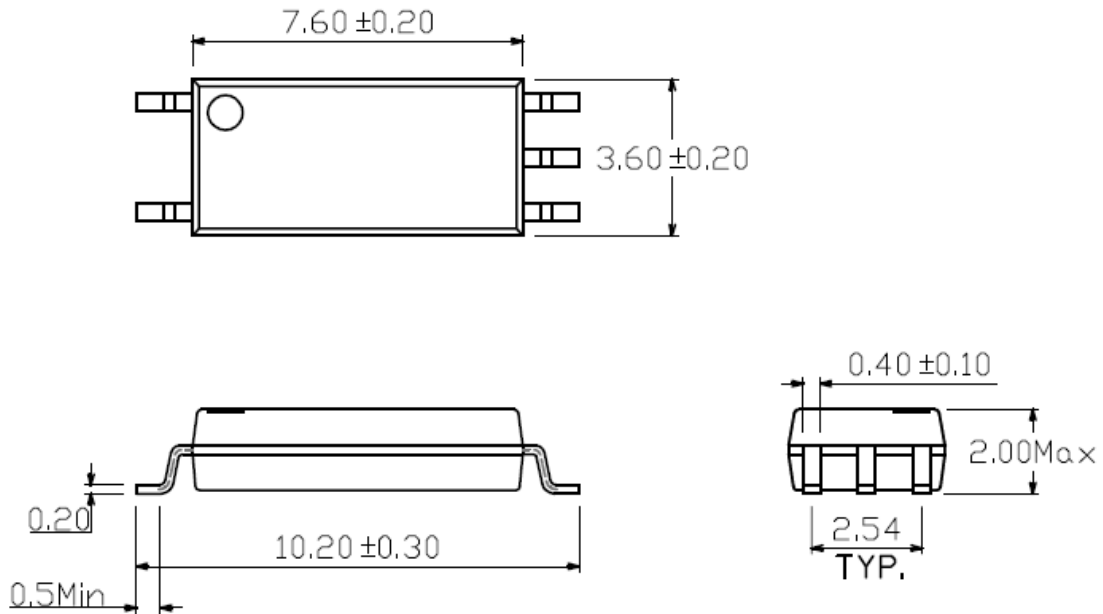
G = Halogens free

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

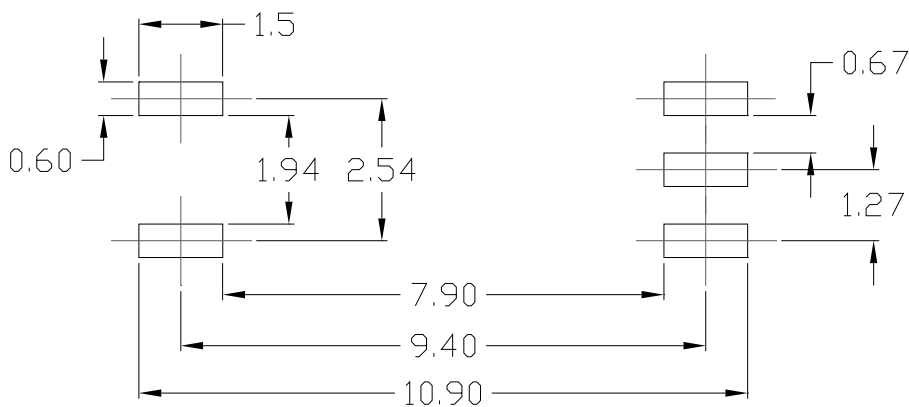
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EL111X-G Series

Package Drawing
(Dimensions in mm)



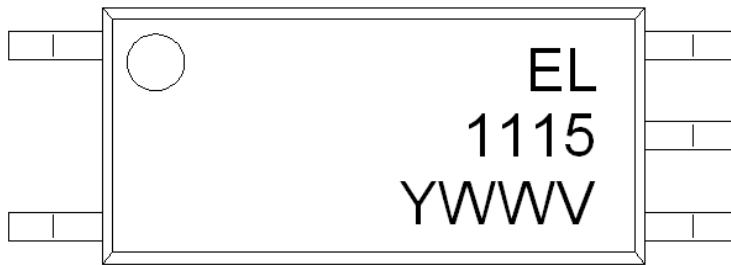
Recommended pad layout for surface mount leadform



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EL111X-G Series

Device Marking



Notes

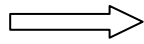
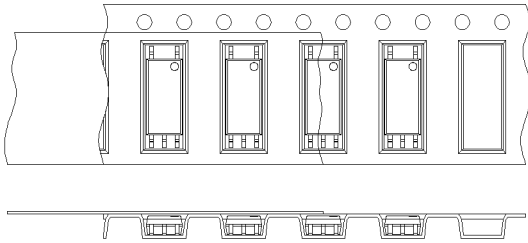
EL	denotes Everlight
1115	denotes Device Number
Y	denotes 1 digit Year code
WW	denotes 2 digit Week code
V	denotes VDE (optional)

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EL111X-G Series

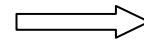
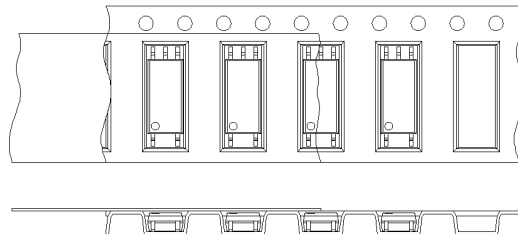
Tape & Reel Packing Specifications

Option TA



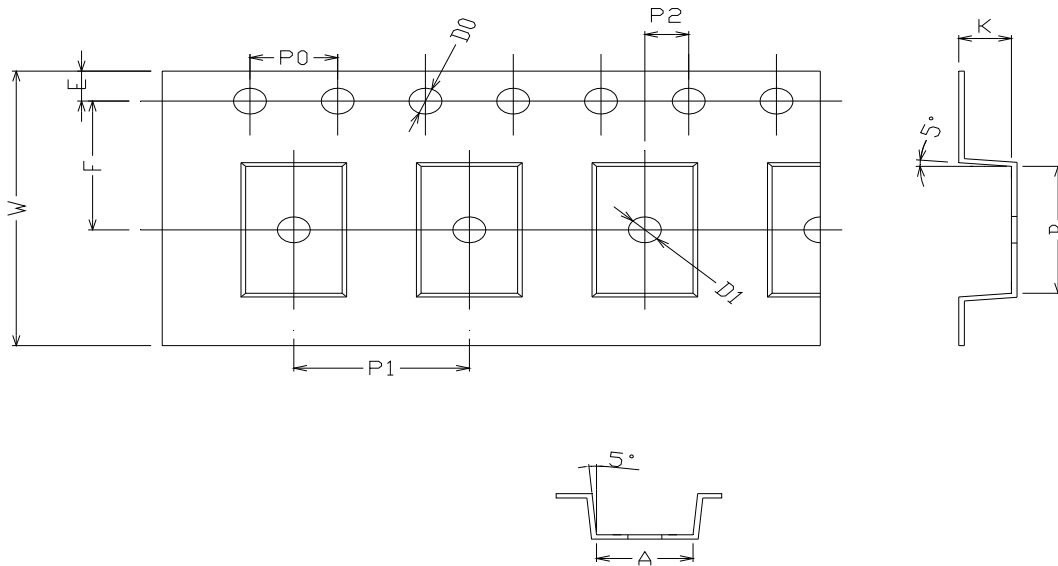
Direction of feed from reel

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	1.75 ± 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

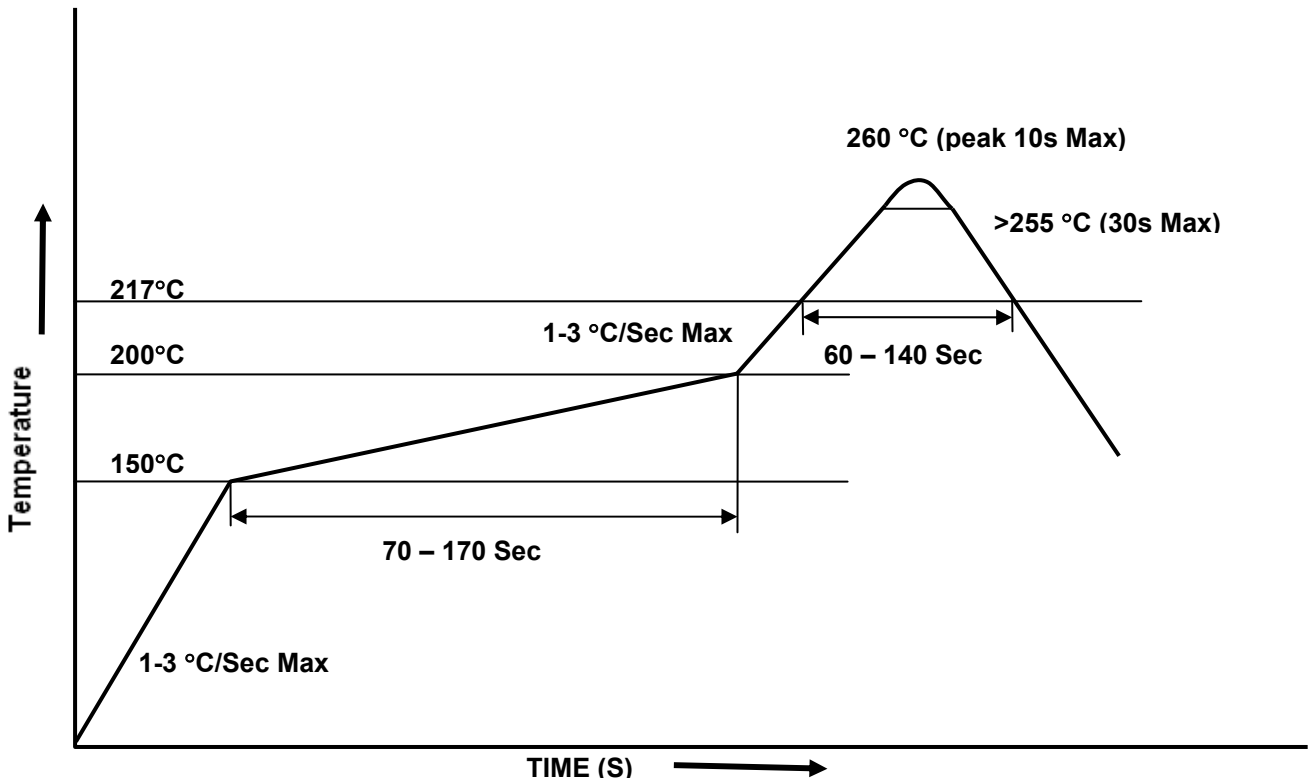


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Solder Reflow Temperature Profile





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