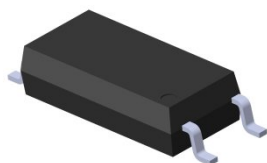




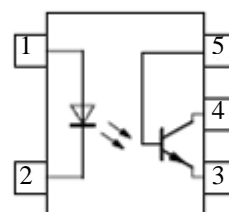
**THE DATASHEET OF
EL1110(TA)-G**



5 PIN LONG CREEPAGE SOP PHOTOTRANSISTOR PHOTOCOUPLER EL111X-G Series



Schematic



Pin Configuration

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

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.
- UL approved (No. E214129)
- VDE approved (No. 40028391)
- SEMKO approved
- NEMKO approved
- DEMKO approved
- FIMKO approved

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

Absolute Maximum Ratings (Ta=25)

	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
	Power dissipation	P_C	150	mW
Output	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 to 110	°C
	Storage Temperature	T_{STG}	-55 to 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 & 5 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	-	-	1.5	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

Parameter	Symbol	Min	Typ.	Max.	Unit	Condition		
Current Transfer ratio	EL1110	50	-	600				
	EL1116	100	-	300				
	EL1117	80	-	160			%	$I_F = 5\text{mA}, V_{CE} = 5\text{V}$
	EL1118	130	-	260				
	EL1119	200	-	400				
	EL1112	63	-	125				
	EL1113	100	-	200				
	EL1114	160	-	320			%	$I_F = 10\text{mA}, V_{CE} = 5\text{V}$
	EL1112	22	-	-				
	EL1113	34	-	-			$I_F = 1\text{mA}, V_{CE} = 5\text{V}$	
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	$V_{IO} = 0, f = 1\text{MHz}$		

Transfer Characteristics

Parameter	Symbol	Min	Typ.	Max.	Unit	Condition
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		

* Typical values at T_a = 25°C

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Typical Electro-Optical Characteristics Curves

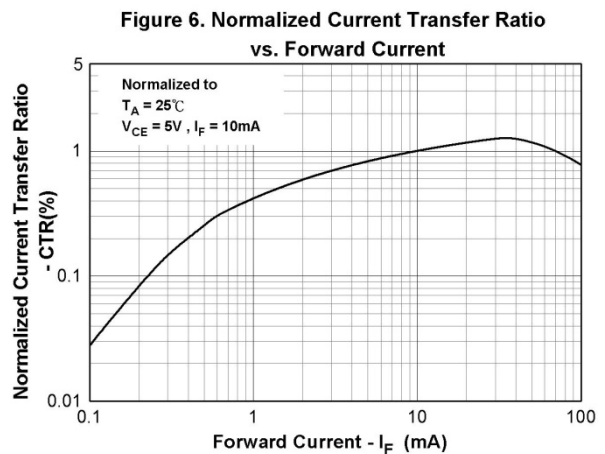
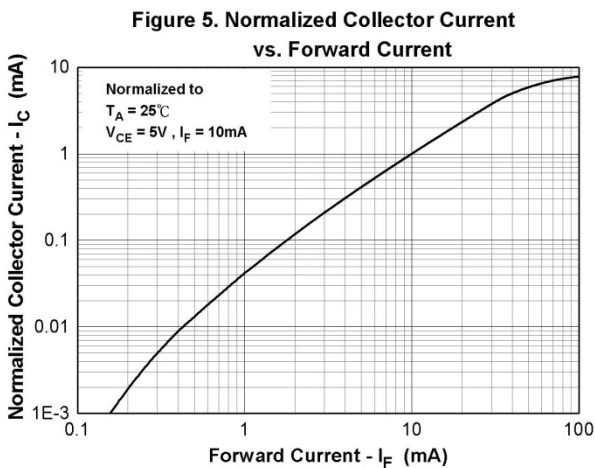
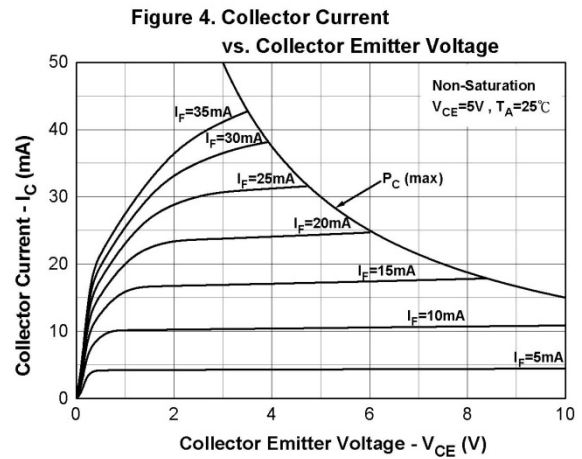
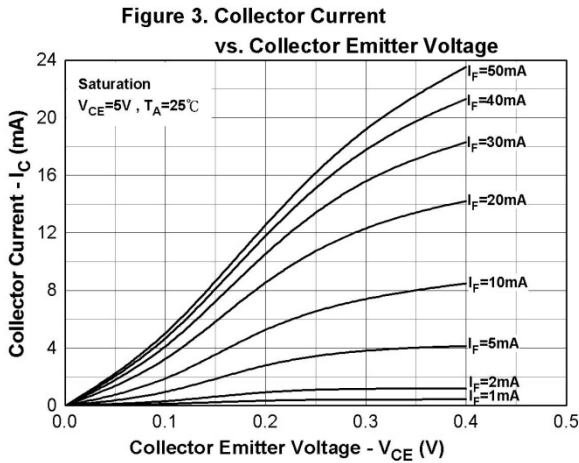
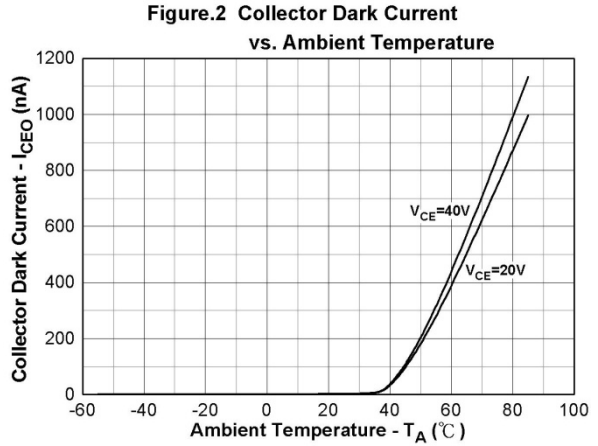
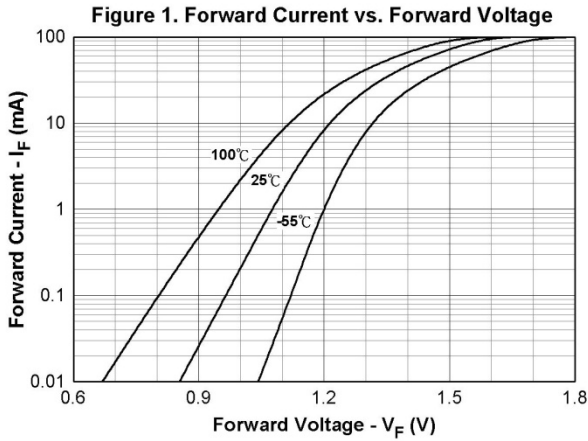


Figure 7. Normalized Current Transfer Ratio vs. Ambient Temperature

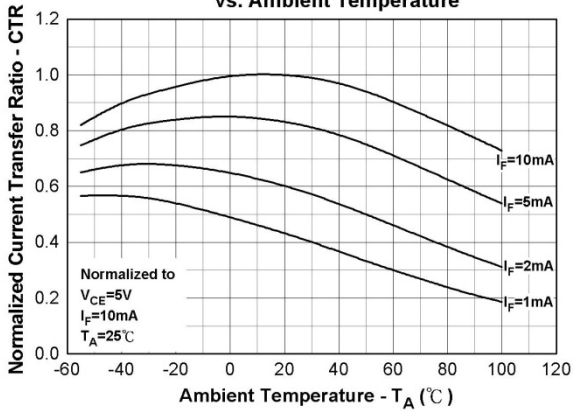


Figure 8. Normalized Current Transfer Ratio vs. Ambient Temperature

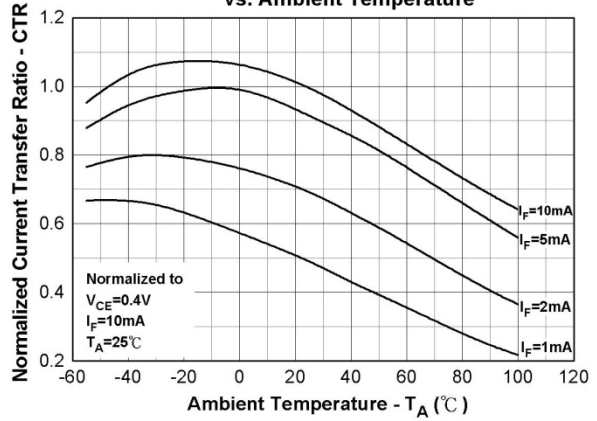


Figure 9. Turn on/off Time vs. Collector Current

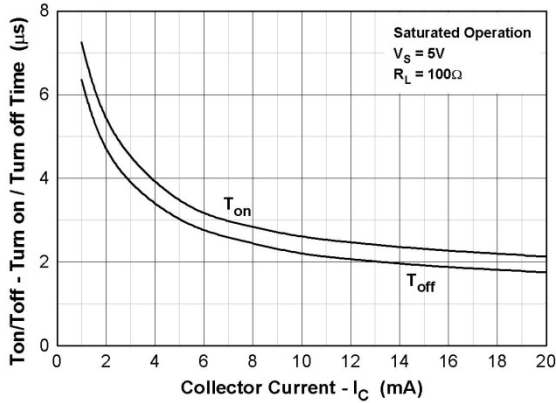


Figure 10. Turn on/off Time vs. Forward Current

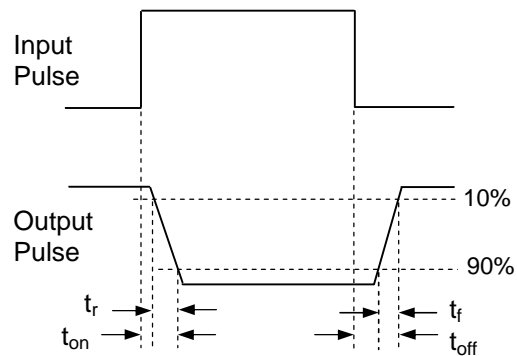
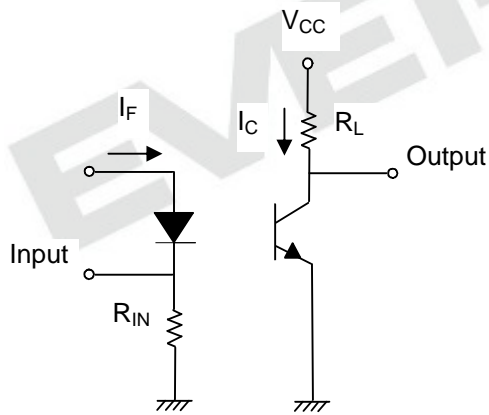
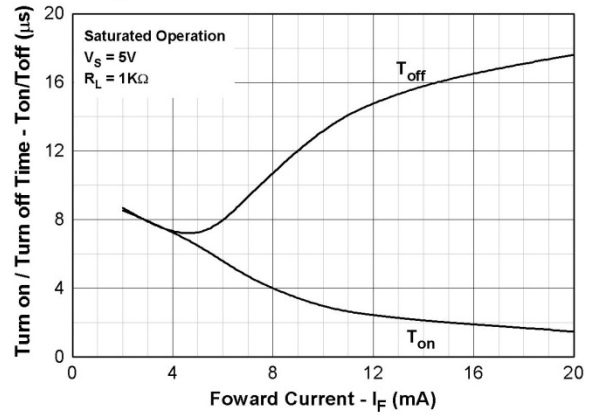


Figure 11. Switching Time Test Circuit & Waveforms

Order Information

Part Number

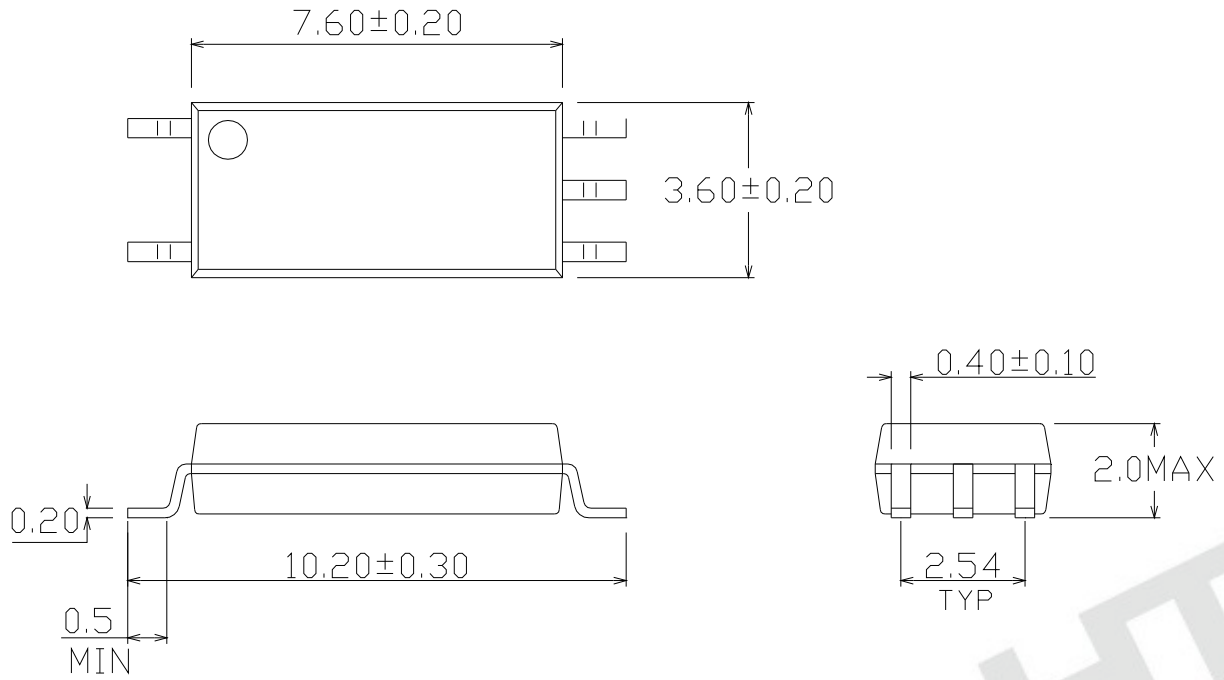
EL111X(Y)-VG

Note

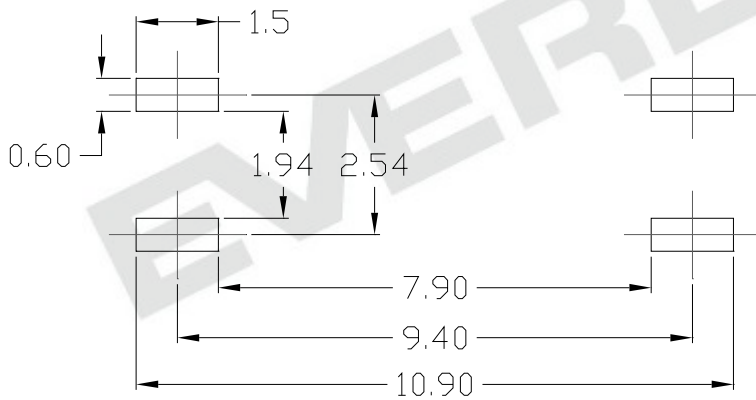
EL111 = Part No.
X = CTR Rank (0, 2, 3, 4, 6, 7, 8 or 9)
Y = Tape and reel option (TA, TB or none).
V = VDE safety (optional)
G = Halogens free

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

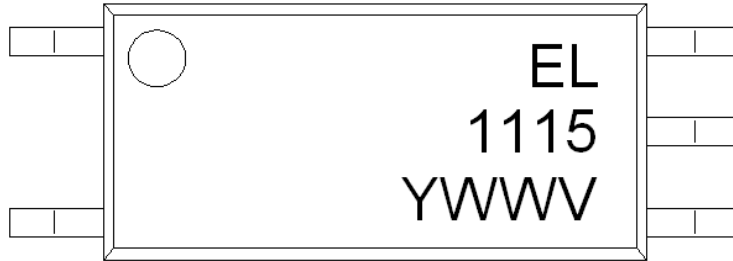
Package Dimension (Dimensions in mm)



Recommended pad layout for surface mount leadform



Device Marking

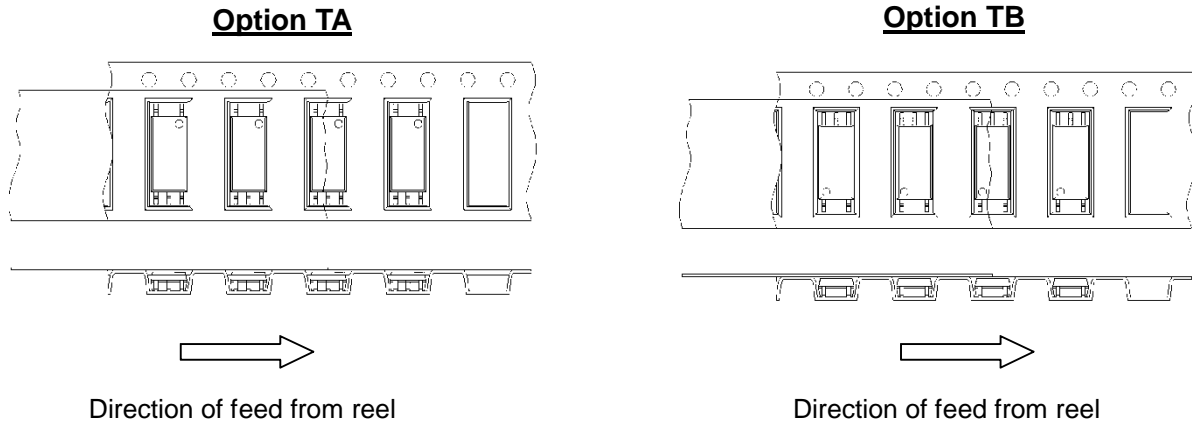


Notes

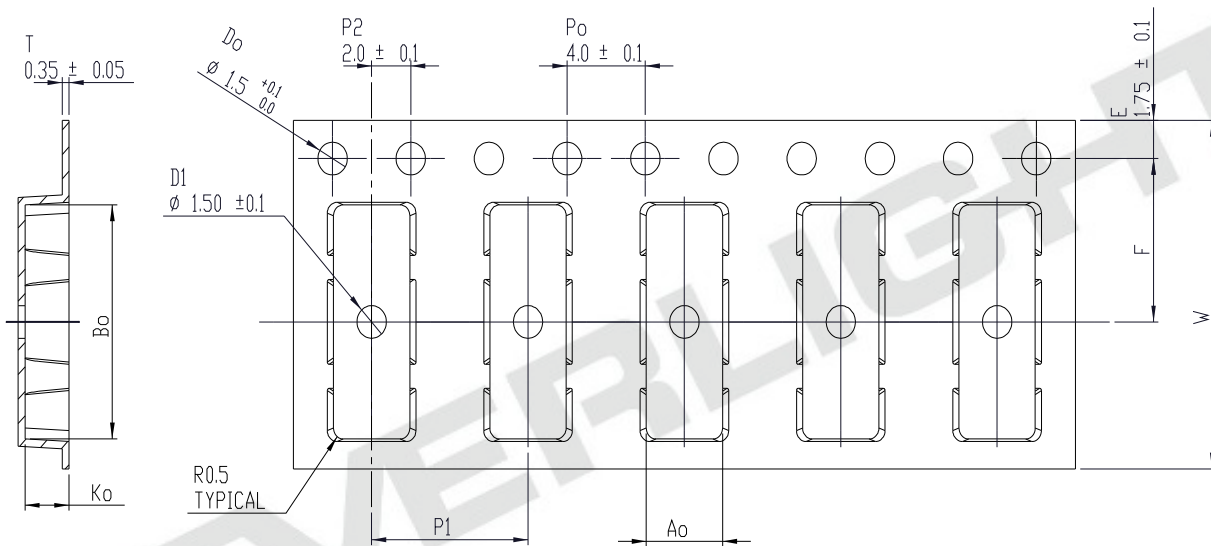
EL	denotes Everlight
1115	denotes Device Number
Y	denotes 1 digit Year code
WW	denotes 2 digit Week code
V	denotes VDE (optional)

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Tape & Reel Packing Specifications



Tape dimensions

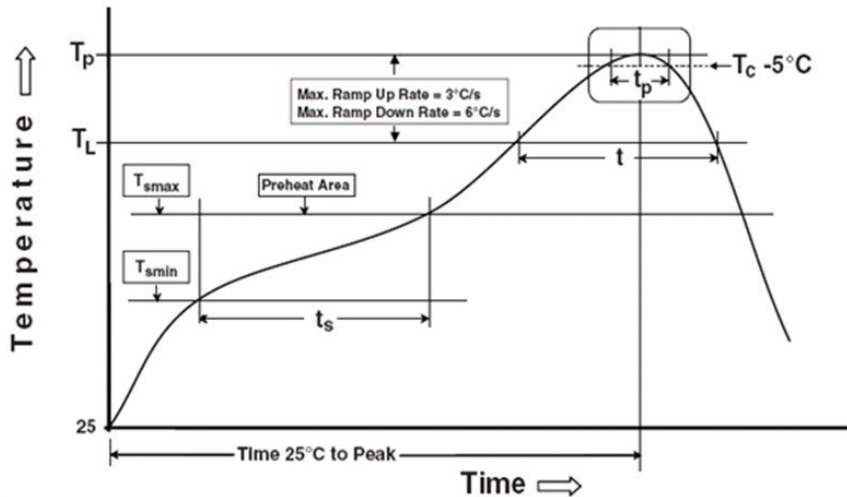


Dimension No.	Ao	Bo	Do	D1	E	F
Dimension (mm)	3.9 ± 0.10	10.75 ± 0.10	$1.5 + 0.1/-0$	1.5 ± 0.10	1.75 ± 0.10	7.5 ± 0.10
Dimension No.	Po	P1	P2	T	W	Ko
Dimension (mm)	4.0 ± 0.10	8.0 ± 0.10	2.0 ± 0.10	0.35 ± 0.05	16.0 ± 0.30	2.25 ± 0.10

Precautions for Use

1. Soldering Condition

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



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

DISCLAIMER

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