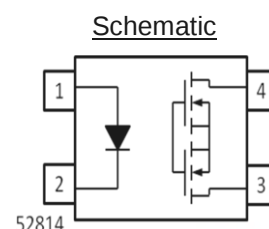
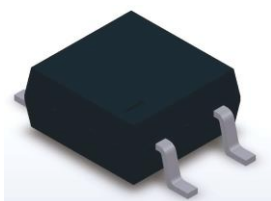


4PIN MINI FLAT PACKAGE SOLID STATE RELAY ELM4XXA(BMS) SERIES



Features

- Compliance Halogen Free(Br < 900ppm, Cl < 900ppm, Br+Cl < 1500ppm)
- Normally open signal pole signal throw relay
- Small 4pin SOP package in the 400V & 600V load voltage series
- Lower operation current
- Low-level off state leakage current
- Low on resistance
- Compliance with EU REACH
- Pb free and RoHS compliant
- UL and cUL (approved)
- VDE (approved)
- SEMKO (approved)
- NEMKO (approved)
- FIMKO (approved)
- CQC (approved)
- Qualified to AEC-Q101 test guidelines

Pin Configuration

- 1,LED Anode
- 2,LED Cathode
- 3, MOSFET
- 4, MOSFET

Description

The ELM4XXA(BMS) is solid state relays containing an AlGaAs infrared LEDs on the light emitting side (input side) optically coupled to a high voltage output detector circuit. The detector consists of a photovoltaic diode array and MOSFETs on the output side. The single channel configuration is equivalent to 1 form A EMR. The devices in a 4-pin small outline SMD package

Applications

- Exchange equipment
- Measurement and testing equipment
- FA/OA equipment
- Industrial controls
- Security

Absolute Maximum Ratings ($T_A=25^{\circ}\text{C}$, unless otherwise specified)

	Parameter	Symbol	Rating		Unit
			ELM440A	ELM460A	
Input	Forward Current	I_F	50		mA
	Reverse Voltage	V_R	5		V
	Peak Forward Current* ¹	I_{FP}	1		A
	Power Dissipation	P_{in}	75		mW
Output	Break Down Voltage* ²	V_L	400	600	V
	Continuous Load Current* ²	I_L	120	50	mA
	Pulse Load Current* ³	I_{LPeak}	0.3	0.15	A
	Power Dissipation	P_{out}	500		mW
Total Power Dissipation		P_T	550		mW
Isolation Voltage* ⁴		V_{iso}	3750		Vrms
Storage Temperature		T_{STG}	-40 to 150		$^{\circ}\text{C}$
Operating Temperature		T_{OPR}	-40 to 125		$^{\circ}\text{C}$
Soldering Temperature* ⁵		T_{SOL}	260		$^{\circ}\text{C}$

Notes:

*1. $f=100\text{Hz}$, Duty Cycle = 0.1%

*2. Indicate the peak AC and DC values

*3. A connection: 100ms (1 shot), $V_L = \text{DC or Peak AC}$

*4. 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.

*5. For 10 seconds

Electro-Optical Characteristics ($T_A=25^{\circ}\text{C}$)

	Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Input	Forward Voltage	V_F	$I_F = 10\text{mA}$	-	1.18	1.5	V
	Reverse Current	I_R	$V_R = 5\text{V}$	-	-	1	μA
Output	Off State leakage Current	I_{leak}	$I_F = 0\text{mA}$, $V_L = \text{Max.}$	-	-	1	μA
	On Resistance	$R_{d(\text{ON})}$	$I_F = 10\text{mA}$, $I_L = \text{Max.}$ $t = 1\text{s}$	-	20	30	Ω
					40	70	
	Output Capacitance	C_{out}	$V_L = 0\text{V}$, $f = 1\text{MHz}$	-	45	-	pF
					30		
	Transfer Characteristics						
Transfer Characteristics	LED turn on Current	$I_{F(\text{on})}$	$I_L = \text{Max.}$	-	1	5	mA
	LED turn off current	$I_{F(\text{off})}$	$I_L = 1\mu\text{A}$	0.2	0.6	-	mA
	Turn On Time	T_{on}	$I_F = 10\text{mA}$, $I_L = \text{MAX.}$ $R_L = 200\Omega$	-	0.1	0.5	ms
	Turn Off Time	T_{off}			0.2		ms
	Isolation Resistance	R_{I-O}	$V_{I-O} = 500\text{V DC}$	5×10^{10}	-	-	Ω
	Isolation Capacitance	C_{I-O}	$V = 0\text{V}$, $f = 1\text{MHz}$	-	1.5	-	pF

Typical Electro-Optical Characteristics Curves

Figure 1. Load current vs Ambient temperature

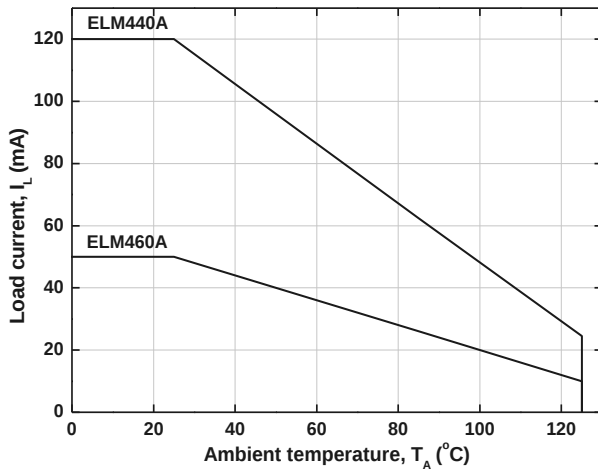


Figure 2. On Resistance vs Ambient Temperature

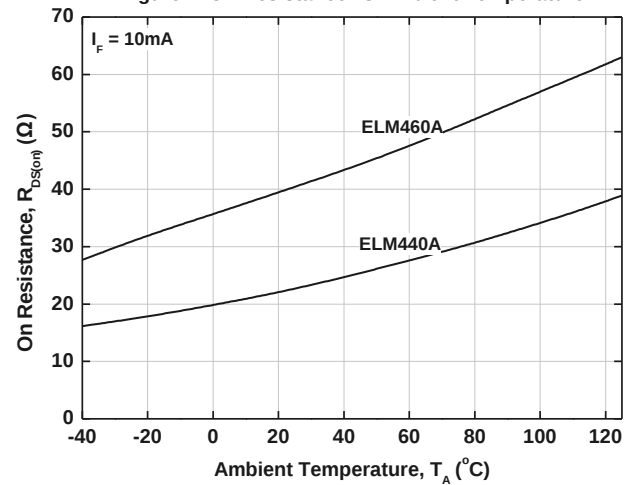


Figure 3. Switching Time vs Ambient Temperature

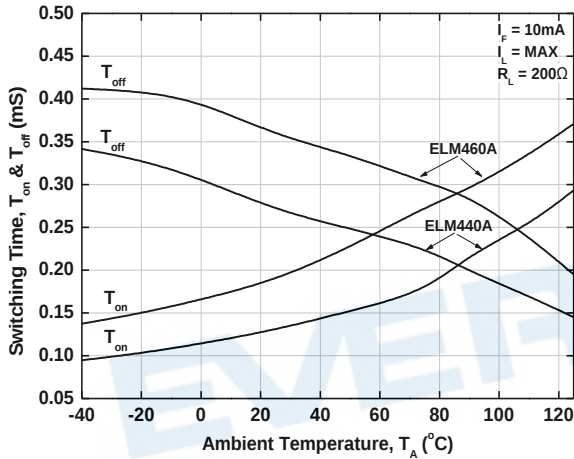


Figure 4. Switching time vs LED forward current

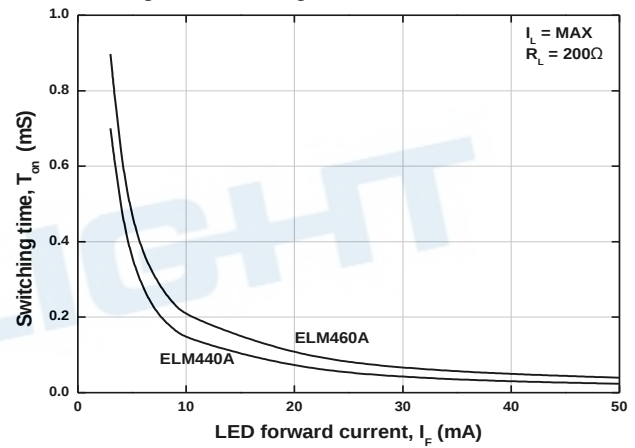


Figure 5. Switching time vs LED forward current

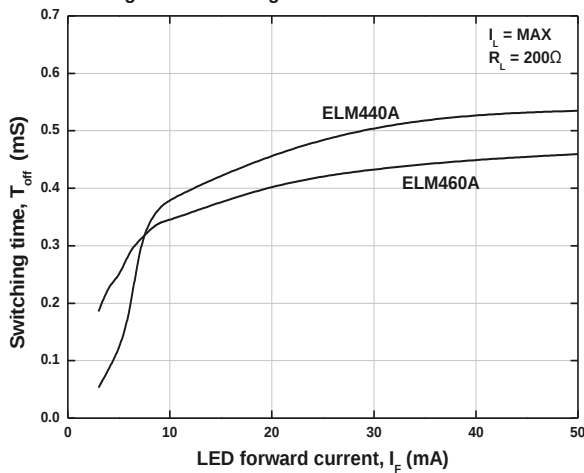


Figure 6. Normalized LED Operate on Current vs Ambient Temperature

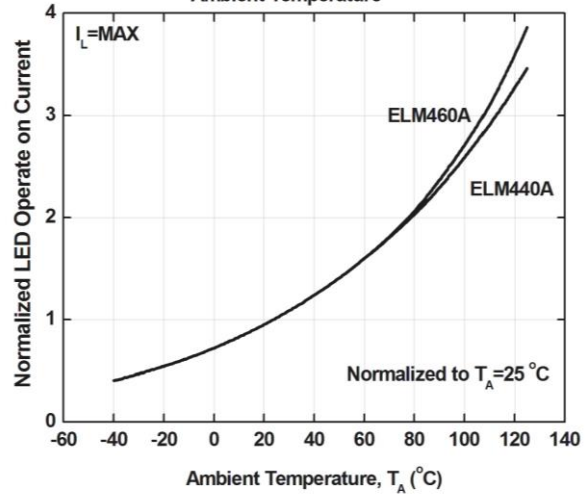


Figure 7. Normalized LED Operate off Current vs Ambient Temperature

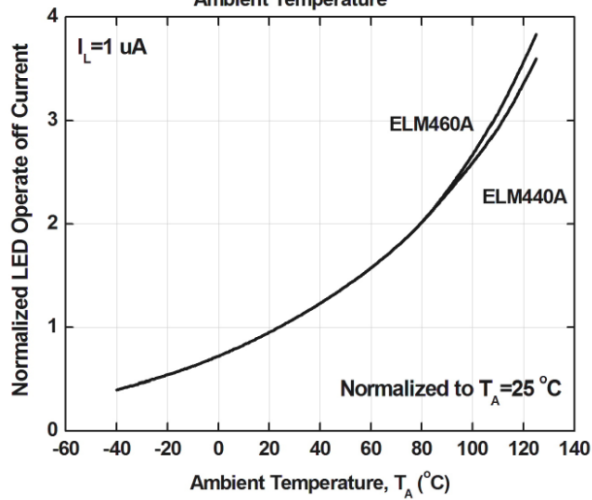


Figure 8. LED Dropout Voltage vs Ambient Temperature

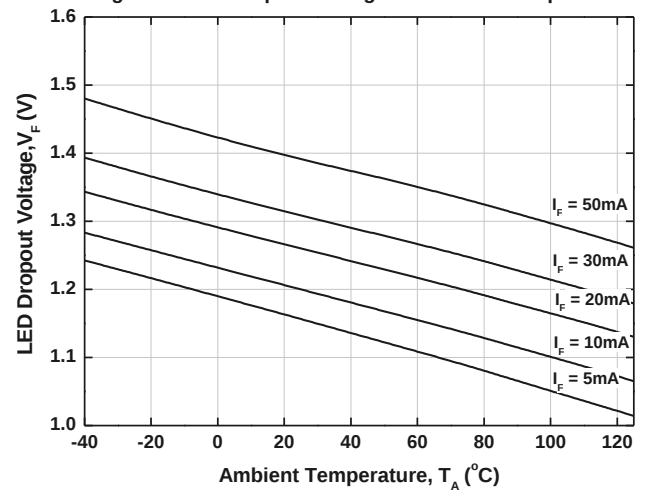


Figure 9. Load voltage vs Load current

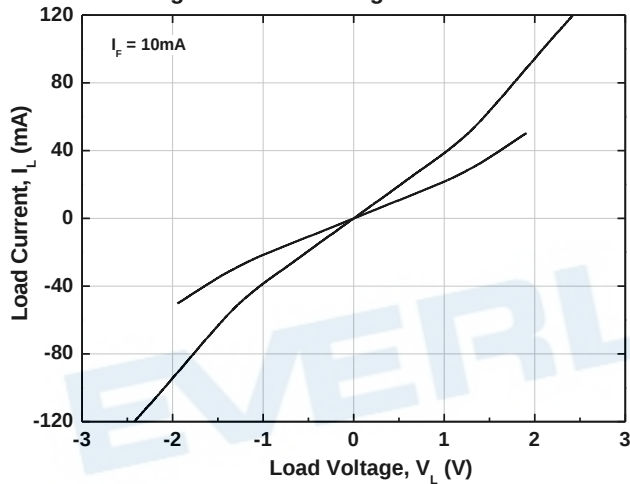


Figure 10. Off state leakage Current vs Load voltage

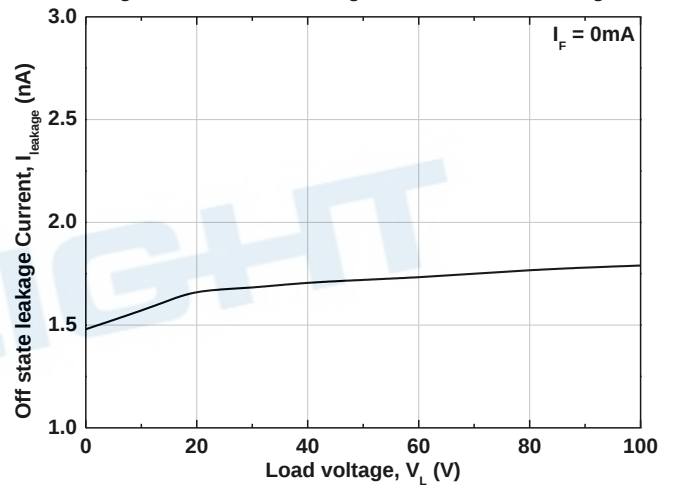
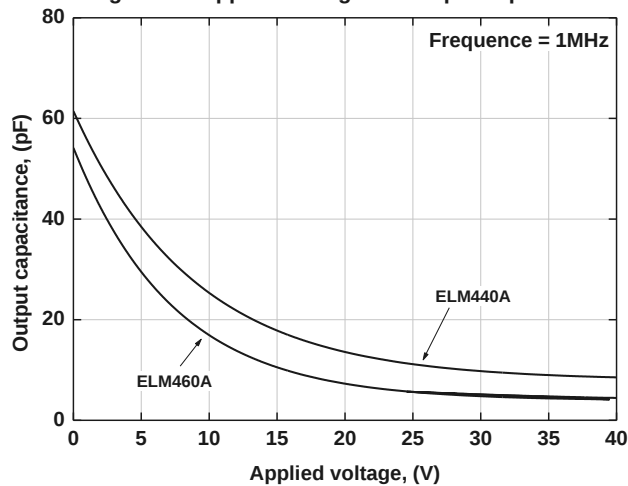
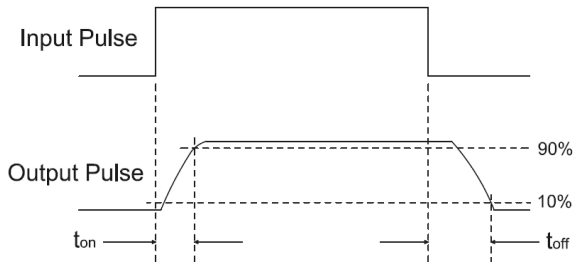


Figure 11. Applied voltage VS Output capacitance



Turn on/Turn off Time



Order Information

Part Number

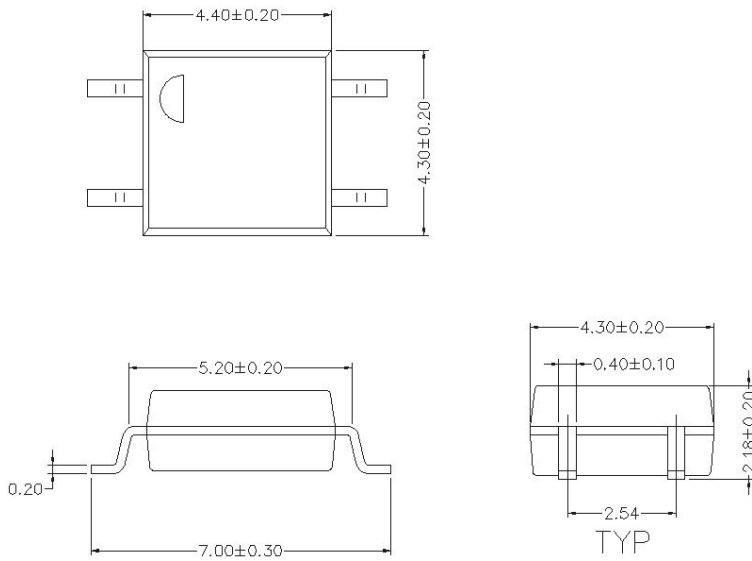
ELM4XXA(X)(BMS)-VG

Note:

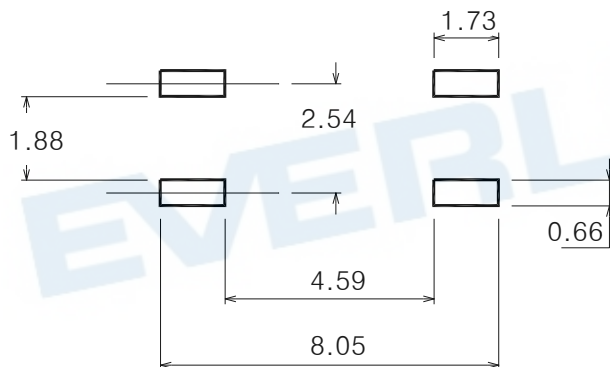
4XXA = Part No.(440A:400V 460A:600V)
X = Tape and reel option (TA, TB or none)
BMS = Customer code
V = VDE (option)
G = Halogen free

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



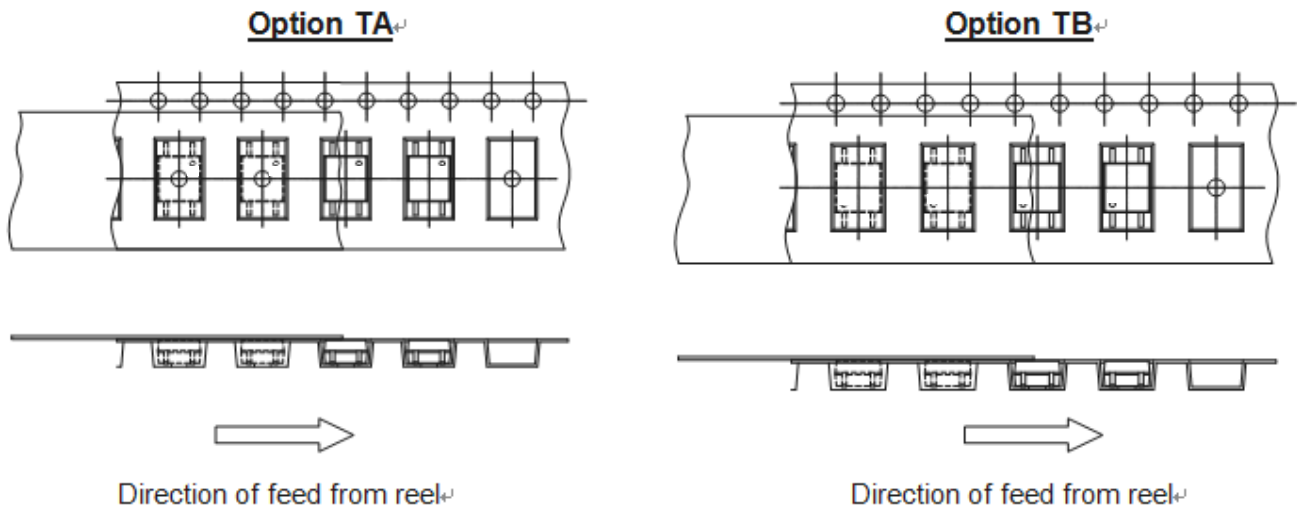
Device Marking



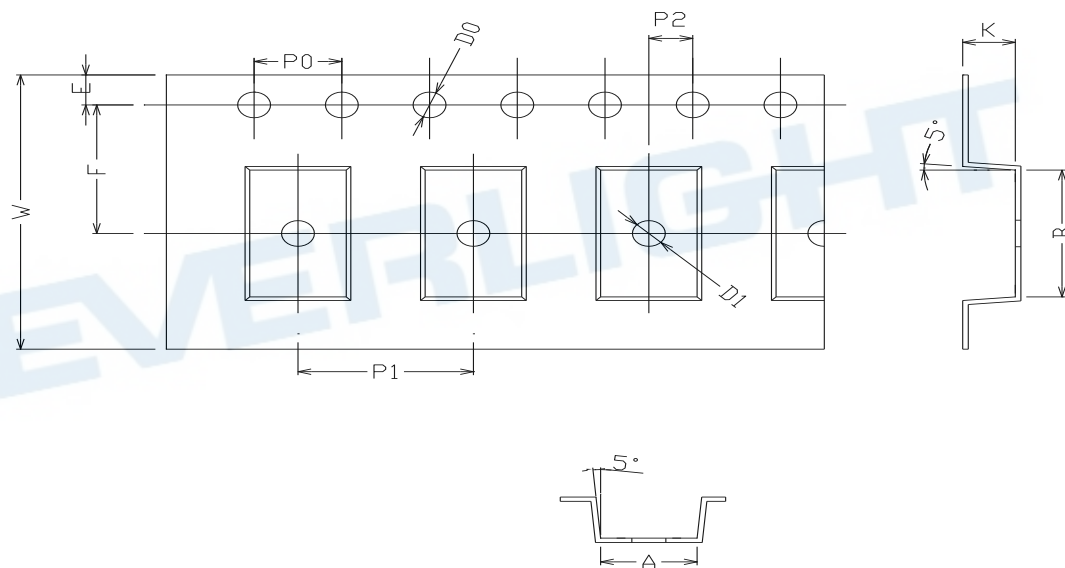
Notes

- EL denotes Everlight
- M440A denotes Part Number
- Y denotes 1 digit Year code
- WW denotes 2 digit Week code
- V denotes VDE approved (optional)

Tape & Reel Packing Specifications



Tape dimensions

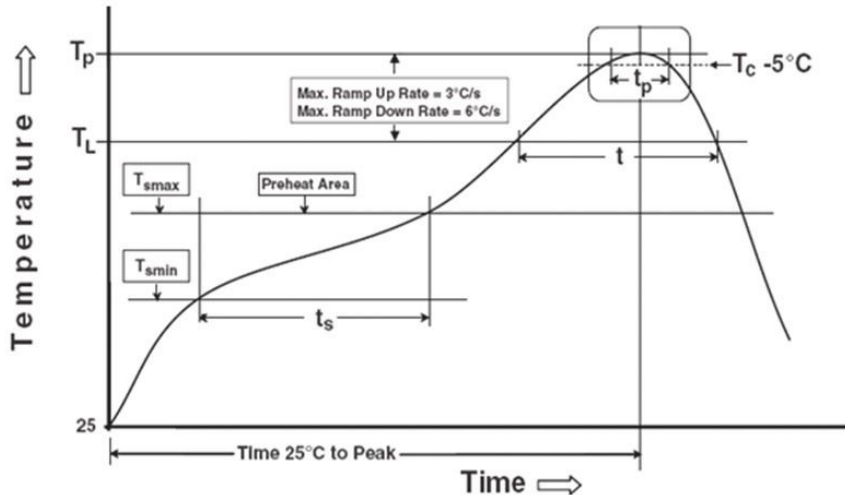


Dimension No.	A	B	Do	D1	E	F
Dimension (mm)	4.4 ± 0.1	7.4 ± 0.1	1.5 + 0.1/-0	1.5 ± 0.1	1.75± 0.1	7.5 ± 0.05
Dimension No.	Po	P1	P2	t	W	K
Dimension (mm)	4.0 ± 0.15	8.0 ± 0.1	2.0 ± 0.1	0.25 ± 0.03	16.0 ± 0.2	2.4± 0.1

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: $T_p - 5^\circ C$	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

1. Above specification may be changed without notice. EVERLIGHT will reserve authority on material change for above specification.
2. The graphs shown in this datasheet are representing typical data only and do not show guaranteed values.
3. When using this product, please observe the absolute maximum ratings and the instructions for use outlined in these specification sheets. EVERLIGHT assumes no responsibility for any damage resulting from use of the product which does not comply with the absolute maximum ratings and the instructions included in these specification sheets.
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