PTM-40X-B
PTM-40X-BP

Projection
Blue and BluePump LED

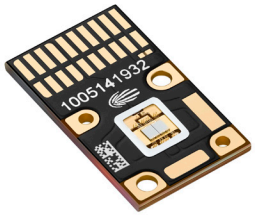


Table of Contents

Features

- Blue and BluePump LED with 4.0 mm^2 emitting area designed for display or other high performance applications.
- Complement with PTM-40X Red Amber and Converted Green for best projection brightness and color gamut
- Dominant wavelength: Blue 453 nm , BluePump 448 nm
- LED die precision mounted on Ultra low thermal resistance MC-PCB package.
- Thermistor pad allows option for precise thermal management
- Supports up to 12 A for highest brightness.
- Chipset array in series enabling lower drive current
- Windowless package allows for closer collection optics and brighter system solutions.
- LED emitting area optimized for micro-display diagonal sizes ranging from 0.45" to 0.55"
- Environmentally friendly: RoHS and REACH compliant

Applications

- Specifically engineered for ultra portable ("Pico") front projectors, head-up projection displays, and hybrid projectors
- Suitable for DLP™, LCoS and HTPS /3LCD microdisplays

PDS-003122 Rev C © 2024 Luminus Device, Inc. - All Rights Reserved
Luminus Devices, Inc. • T 408.708.7000 • www.luminus.com
1145 Sonora Court • Sunnyvale, CA 94086

Ordering Information

Part Number Nomenclature

PTM — 40X — ## — L34 — ###

Product Family	Chip Area & Technology	Color	Package Configuration [1]	Bin kit [2]
PTM: Projection Technology Multi-Die	40: 4.0 mm^2 X: Isolated	B: Blue BP: Blue Pump	L34: No Connector 1.52mm thick core board 27 mm x 15.5 mm Windowless (See Mechanical Drawing section)	Refer to Bin kit Order Codes

Note 1: Ordering part numbers represent bin kits (group of bins that are shippable for a given ordering part number)
Note 2: See Bin Kit and Flux / Power bin definitions on page 3

Ordering Part Numbers

Color	Bin kit Ordering Code [3]	Radiometric Flux		Wavelength Bin	Ordering Part Numbers
		Minimum Flux Bin	Minimum Flux/Power		
B	EPD	4D	12.5	B1, B2	PTM-40X-B-L34-EPD
	EPE	4E	13.3	B1, B2	PTM-40X-B-L34-EPE
BP	EPE	4E	13.3	B0, B1	PTM-40X-BP-L34-EPE
	EPF	4F	14.2	B0, B1	PTM-40X-BP-L34-EPF

Note 1: Ordering Part number is default to L34 package configuration.
Note 2: A Bin Kit represents a group of individual flux or power bins that are shippable for a given ordering part number. Individual flux bins are not orderable. EXAMPLE: PTM-40X-B-L34-EPD is comprised of Flux Bins 4D, 4E, 4F, 4G, 4H and 4J.

PDS-003122 Rev C © 2024 Luminus Device, Inc. - All Rights Reserved
Luminus Devices, Inc. • T 408.708.7000 • www.luminus.com
1145 Sonora Court • Sunnyvale, CA 94086

Binning Structure

Radiometric Flux Bins

Bin	Minimum Power (W)	Maximum Power (W)
4D	12.5	13.3
4E	13.3	14.2
4F	14.2	15.5
4G	15.5	17.0
4H	17.0	18.4
4J	18.4	19.9

Dominant Wavelength Bins

Bin	Minimum Dominant Wavelength (nm)	Maximum Dominant Wavelength (nm)
B0	441	447
B1	447	450
B2	450	460

Note 1: Test condition at drive current 8.0 A, 20 ms single pulse at T_C = 25°C.

Note 2: Luminus maintains a test measurement accuracy for LED flux and power of +/-6%.

Note 3: Wavelength bins are not orderable. Wavelength bins are displayed in product label.

PDS-003122 Rev C © 2024 Luminus Device, Inc. - All Rights Reserved
Luminus Devices, Inc. • T 408.708.7000 • www.luminus.com
1145 Sonora Court • Sunnyvale, CA 94086

Optical & Electrical Characteristics

Optical and Electrical Characteristics at 8.0 A, 20ms single pulse, 25°C

General Characteristics		Symbol	Blue	Blue Pump	Unit
Active Emitting Area	typ		4.03	4.03	mm^2
Total LED Array Dimensions	typ		2.7 x 1.55	2.7 x 1.55	mm x mm
Characteristics at Recommended Test Drive Current , I_f [1, 2]					
Test Pulse Duration			20	20	msec
Test Peak Drive Current [1]	typ	I_F	8.0	8.0	A
Peak Luminuous Flux [1]	typ	Φ_v	490	400	lm
Peak Radiometric Flux [1]	typ	Φ_r	18.3	18.9	W
Dominant Wavelength	min	λ_{dmin}	447	441	nm
	typ	λ_d	453	448	
	max	λ_{dmax}	460	450	
Peak Wavelength	typ	λ_P	445	439	
FWHM- Spectral bandwidth at 50% of Φ_r	typ		21	21	
Chromaticity Coordinates [2]	typ	x	0.15	0.16	CIE x
	typ	y	0.02	0.02	CIE y
Forward Voltage	min	$V_{F\,min}$	6.8	6.8	V
	typ	V_F	7.0	7.0	
	max	$V_{F\,max}$	8.0	8.0	
Real thermal resistance [3] (junction - board)	typ	$R_{th\ J\text{-}B\ real}$	1.10	1.10	°C/W
Electrical thermal resistance [3] (junction - board)	typ	$R_{th\ J\text{-}B}$	0.75	0.75	°C/W

Note 1: All ratings are based on testing conditions with a constant heat sink temperature T_{hs} =T_b= 25°C.

Note 2: CIE 1931 chromaticity diagram coordinates, normalized to X+Y+Z=1.

Note3: Thermal resistance values are based on modeled results correlated to measured $R_{th\ J\text{-}hs}$ data using Forward Voltage sensitivity parametric method, compliant with JEDEC Standards JESD51-14

PDS-003122 Rev C © 2024 Luminus Device, Inc. - All Rights Reserved
Luminus Devices, Inc. • T 408.708.7000 • www.luminus.com
1145 Sonora Court • Sunnyvale, CA 94086

Optical & Electrical Characteristics

Absolute Maximum Ratings

	Symbol	Blue & Blue Pump	Unit
Absolute Maximum Reverse Drive Current (CW or Pulsed)[1]		0, Reverse Current Operation not allowed	mA
Absolute Minimum Current (CW or Pulsed)[1]		200	
Absolute Maximum Current (CW) [2]		10.0	A
Absolute Maximum Current (Pulsed) [2,3] (frequency > 240Hz, duty cycle <70%)		12.0	
Absolute Maximum Surge Current [2,3] (Frequency > 240 Hz, duty cycle =10%, t=1ms)		13.0	
Absolute Maximum Junction Temperature [4]	T_{jmax}	150	°C
Storage Temperature Range		-40 / +100	
ESD sensitivity ANSI/ESDA/JEDEC JS-001 (HBM, Class 3A)	V_{ESD}	4000	V

Note 1: Product performance and lifetime data is specified at recommended forward drive currents. Sustained operation at or near absolute minimum currents may result in a reduction of device performance and device lifetime compared to recommended forward currents.

Note 2: Sustained operation above maximum currents is not recommended and will result in a reduction of device lifetime compared to specified maximum forward drive currents. Device lifetimes will depend on junction temperature

Note 3: In pulsed operation, rise time from 10 to 90% of forward current should be larger than 0.5 microseconds.

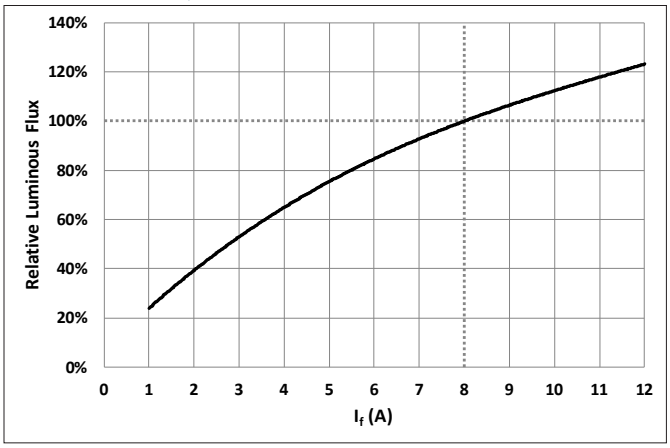
Note 4: Sustained operation at or above Maximum Operating Junction Temperature (T_{jmax}) will result in significant reduction in device lifetime.

PDS-003122 Rev C © 2024 Luminus Device, Inc. - All Rights Reserved
Luminus Devices, Inc. • T 408.708.7000 • www.luminus.com
1145 Sonora Court • Sunnyvale, CA 94086

Optical and Electrical Characteristics

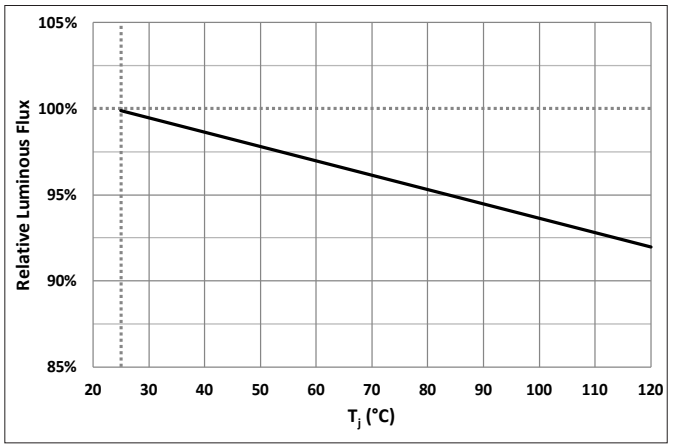
Relative Luminous Flux vs. Forward Current

$\Phi_V(I_f)/\Phi_V(8.0\ A)$, T_j= 25°C, Pulse duration 20 ms



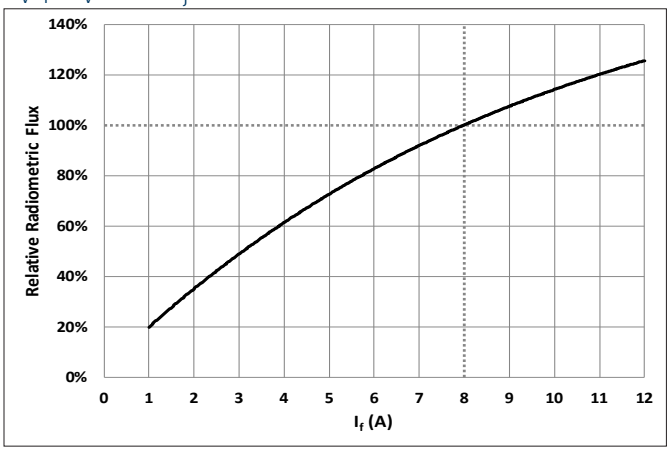
Relative Luminous Flux vs. Temperature

$\Phi_V(I_f)/\Phi_V(25°C)$, I_f = 8.0 A, Pulse duration 20 ms



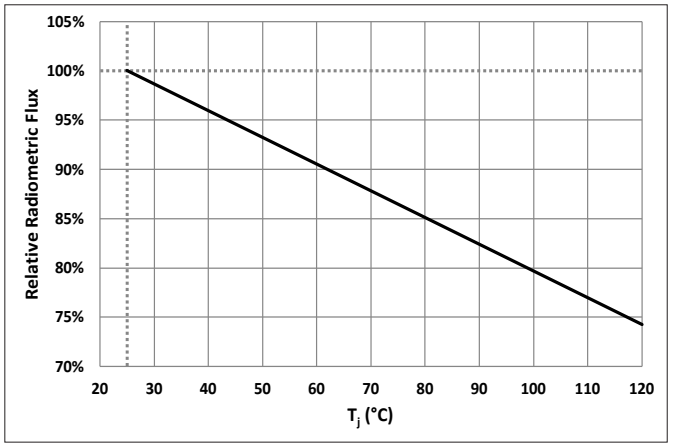
Relative Radiometric Flux vs. Forward Current

$\Phi_V(I_f)/\Phi_V(8.0\ A)$, T_j= 25°C, Pulse duration 20 ms



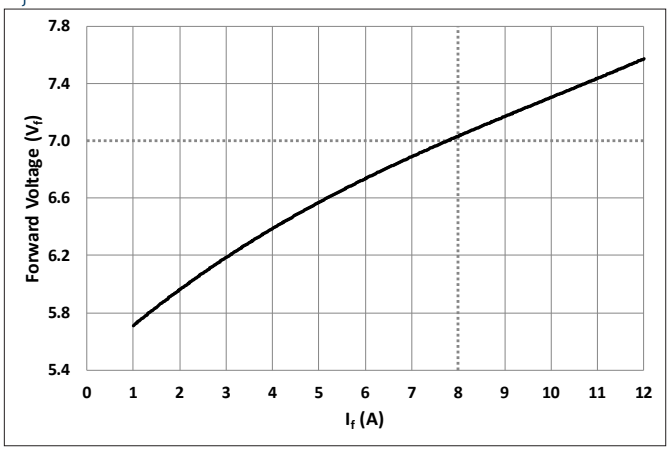
Relative Radiometric Flux vs. Temperature

$\Phi_V(I_f)/\Phi_V(25°C)$, I_f =8.0 A, Pulse duration 20 ms



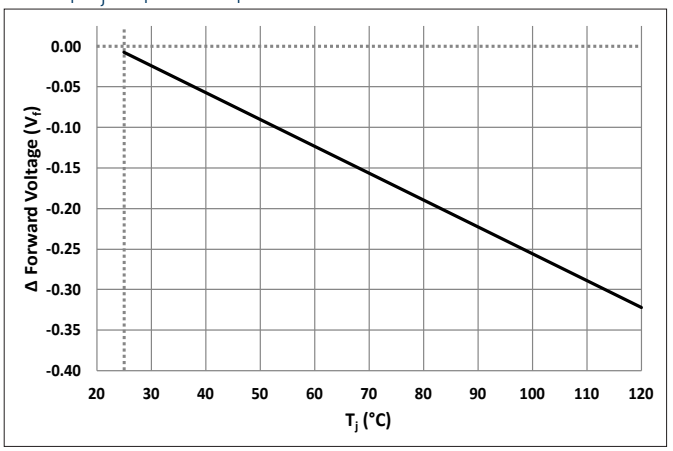
Forward Voltage vs. Forward Current

T_j= 25°C, Pulse duration 20 ms



Relative Forward Voltage vs. Temperature

$\Delta V = V_f(T_j) - V_f(25°C)$, I_f = 8.0 A, Pulse duration 20 ms

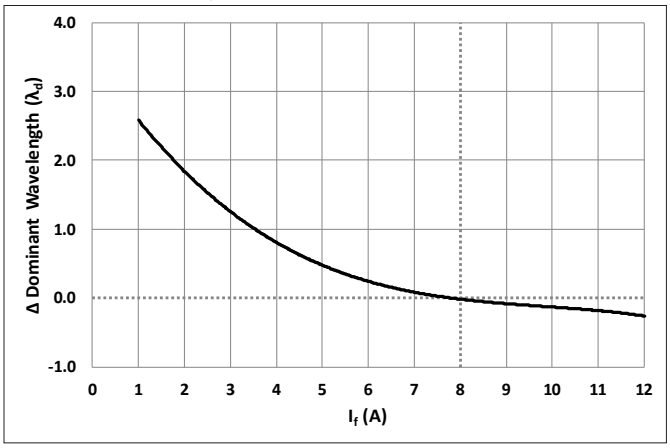


PDS-003122 Rev C © 2024 Luminus Device, Inc. - All Rights Reserved
Luminus Devices, Inc. • T 408.708.7000 • www.luminus.com
1145 Sonora Court • Sunnyvale, CA 94086

Optical and Electrical Characteristics

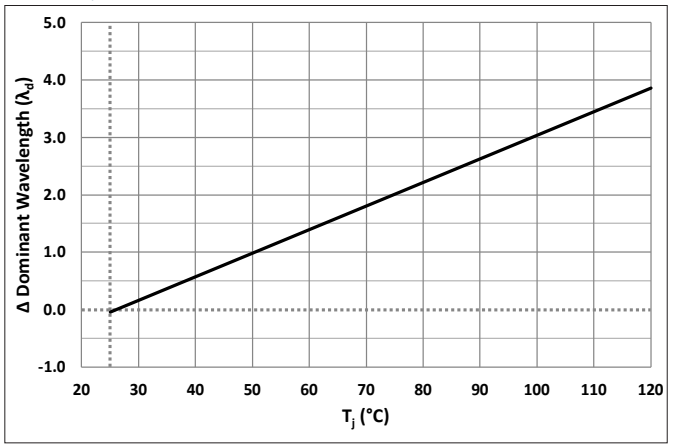
Dominant Wavelength Shift vs. Forward Current

$\Delta\lambda = \lambda(I_f) - \lambda(8.0\ A)$, $T_j = 25°C$, Pulse duration 20 ms



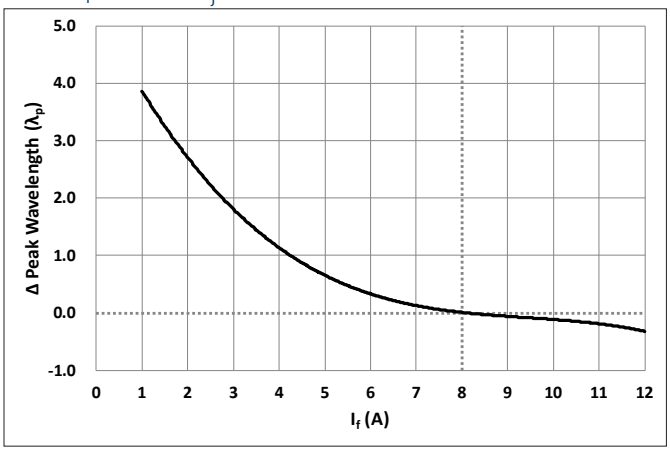
Dominant Wavelength Shift vs. Temperature

$\Delta\lambda = \lambda(T_j) - \lambda(25°C)$, $I_f = 8.0$ A, Pulse duration 20 ms



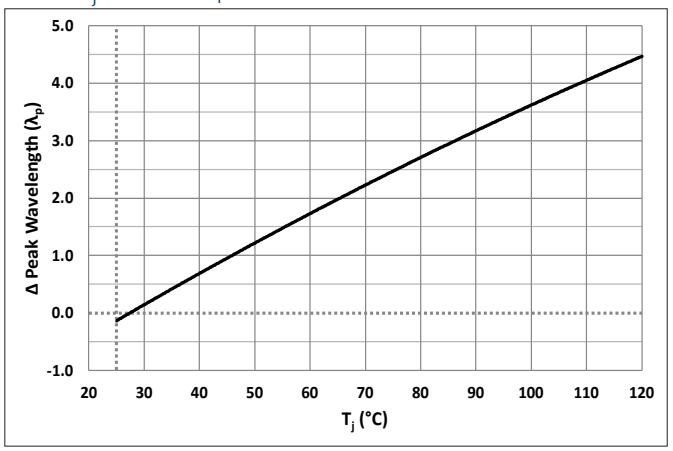
Peak Wavelength Shift vs. Forward Current

$\Delta\lambda = \lambda(I_f) - \lambda(8.0\ A)$, $T_j = 25°C$, Pulse duration 20 ms



Peak Wavelength Shift vs. Temperature

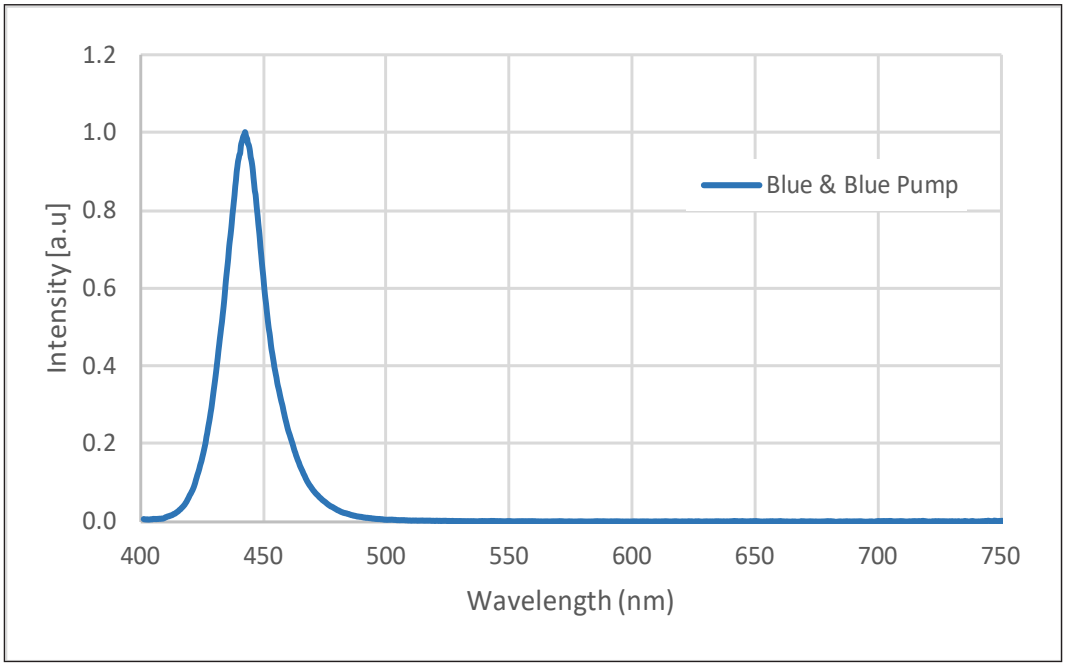
$\Delta\lambda = \lambda(T_j) - \lambda(25°C)$, $I_f = 8.0$ A, Pulse duration 20 ms



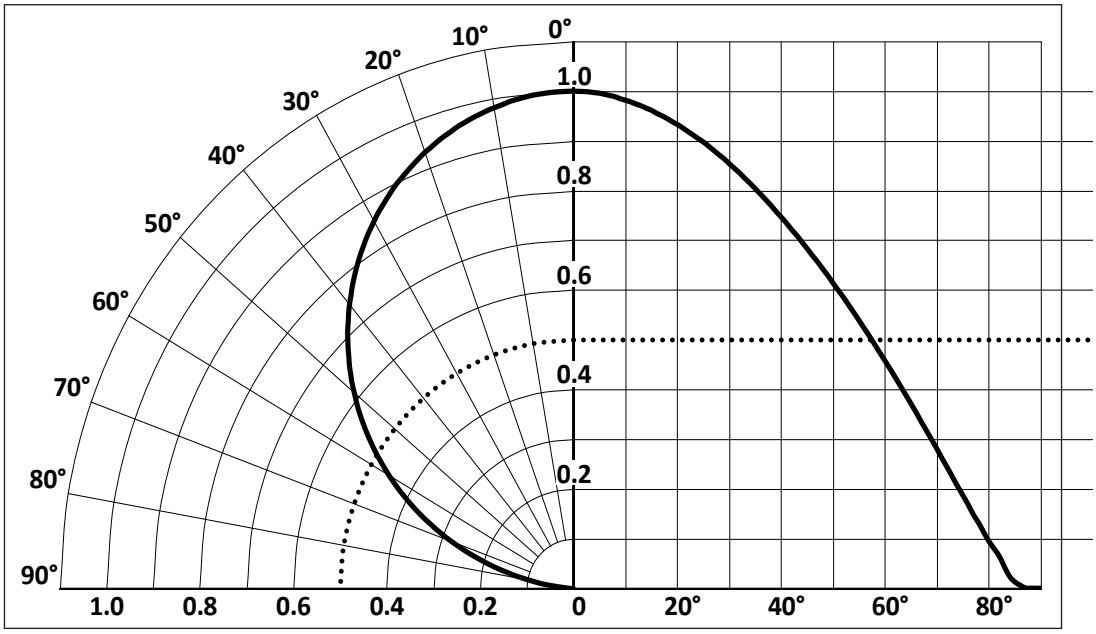
PDS-003122 Rev C © 2024 Luminus Device, Inc. - All Rights Reserved
Luminus Devices, Inc. • T 408.708.7000 • www.luminus.com
1145 Sonora Court • Sunnyvale, CA 94086

Angular Distribution and Spectrum

Typical Spectrum [1]



Typical Angular Distribution [2]



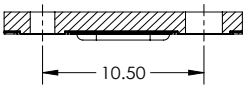
Note 1: Typical spectrum at recommended peak drive current . Please contact Luminus to obtain data in Excel format.

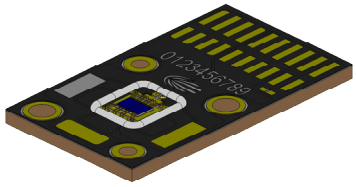
Note 2: For any specific device, slight variations may be expected.

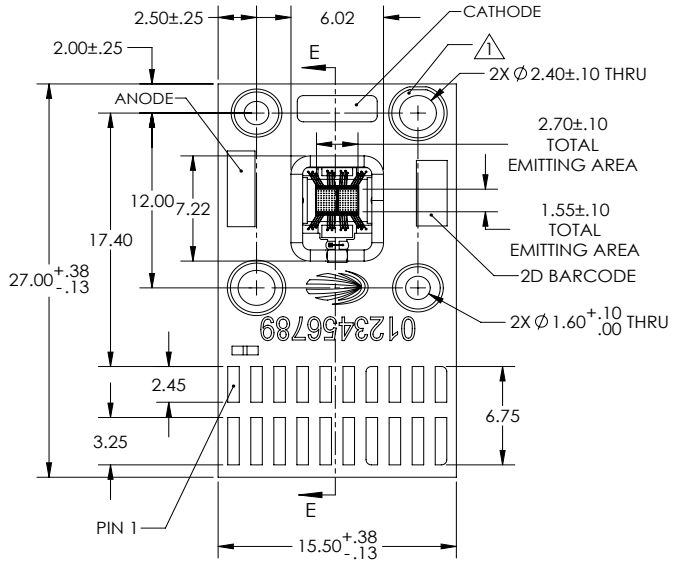
PDS-003122 Rev C © 2024 Luminus Device, Inc. - All Rights Reserved
Luminus Devices, Inc. • T 408.708.7000 • www.luminus.com
1145 Sonora Court • Sunnyvale, CA 94086

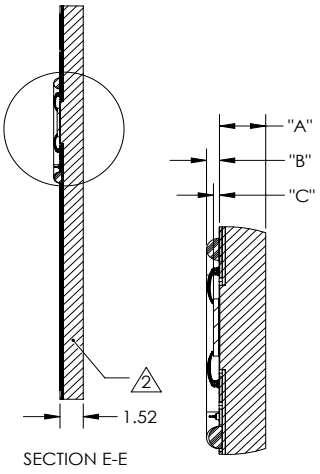
Mechanical Dimensions

DIMENSIONS IN MILLIMETERS





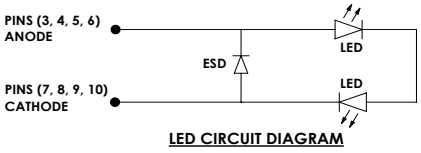




NOTES:

1. METAL SUBSTRATE PLATED AREAS AROUND HOLES ARE COPLANAR WITH CATHODE AND ANODE PADS.
2. METAL SUBSTRATE PLATED AREAS AROUND HOLES ARE ELECTRICALLY CONNECTED TO THE BACKSIDE OF COREBOARD. THEY ARE ELECTRICALLY ISOLATED FROM THE CATHODE, ANODE AND THERMISTOR.

PIN ASSIGNMENT	
THERMISTOR	1,2
ANODE (+)	3,4,5,6
CATHODE (-)	7,8,9,10



LED CIRCUIT DIAGRAM

DIMENSION NAME	DESCRIPTION	NOMINAL DIMENSION	TOLERANCE
"A"	TOP OF METAL SUBSTRATE TO BACK OF COREBOARD	1.50	±.10
"B"	TOP OF METAL SUBSTRATE TO TOP OF DAM	.42	±.04
"C"	TOP OF METAL SUBSTRATE TO TOP OF EMITTING AREA	.20	±.02

DWG-003091 REV02

Note 1: Die Tilt: 1° Maximum, Die Rotation: ±1°

Note 2: Contact within silicone dam area is prohibited

Note 3: Recommended connector: Manufacturer: Tarng-Yu; Part# TU1502WGR-10S-GO-M8-NL-A

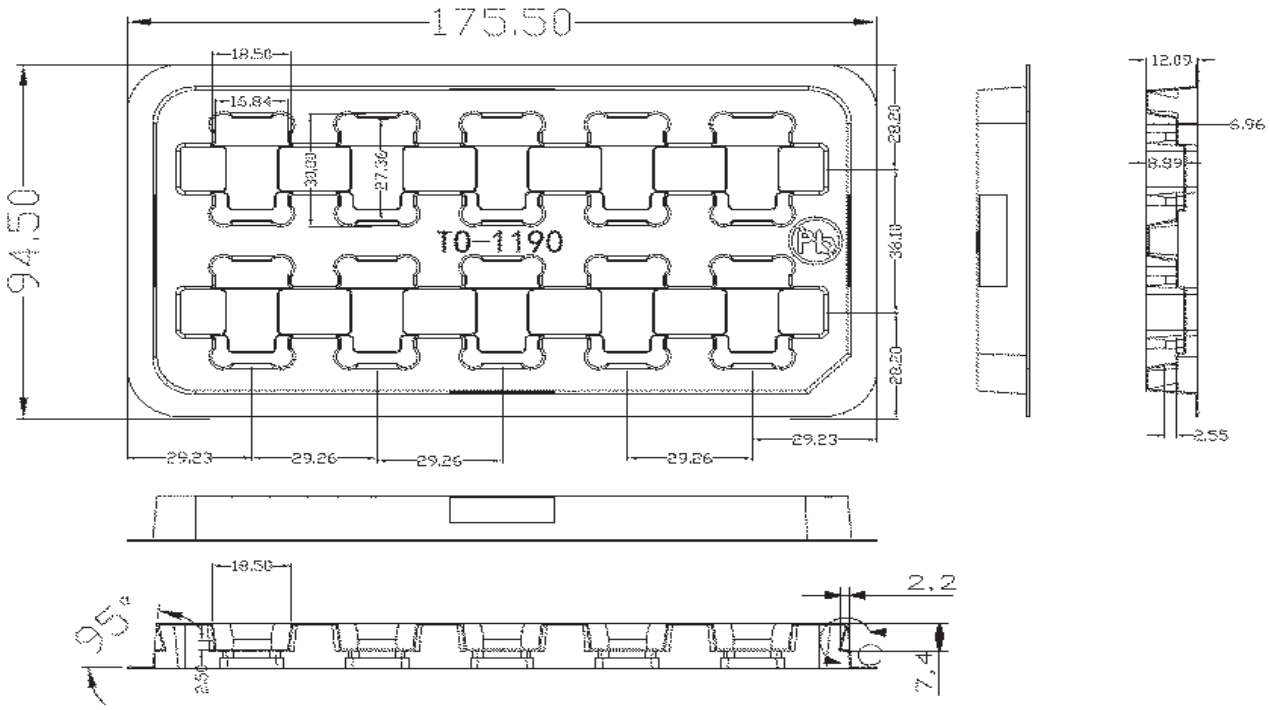
Note 4: Recommended female connector: Manufacturer: Tarng-Yu; Part# TU1502HNO-10; contact terminal part#TU1502TGO-GO

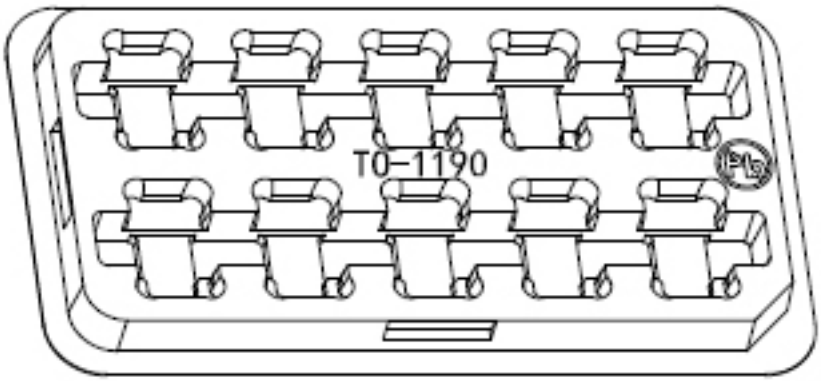
Note 5: LED coreboard backside is electrically isolated

Note 6: LED emitter and wirebond not covered, contact within the silicone dam area is prohibited

PDS-003122 Rev C © 2024 Luminus Devices, Inc. - All Rights Reserved
Luminus Devices, Inc. • T 408.708.7000 • www.luminus.com
1145 Sonora Court • Sunnyvale, CA 94086

Shipping Tray Outline





For detailed drawing of shipping tray, please refer to document TO-1190, available upon request.

PDS-003122 Rev C © 2024 Luminus Device, Inc. - All Rights Reserved
Luminus Devices, Inc. • T 408.708.7000 • www.luminus.com
1145 Sonora Court • Sunnyvale, CA 94086

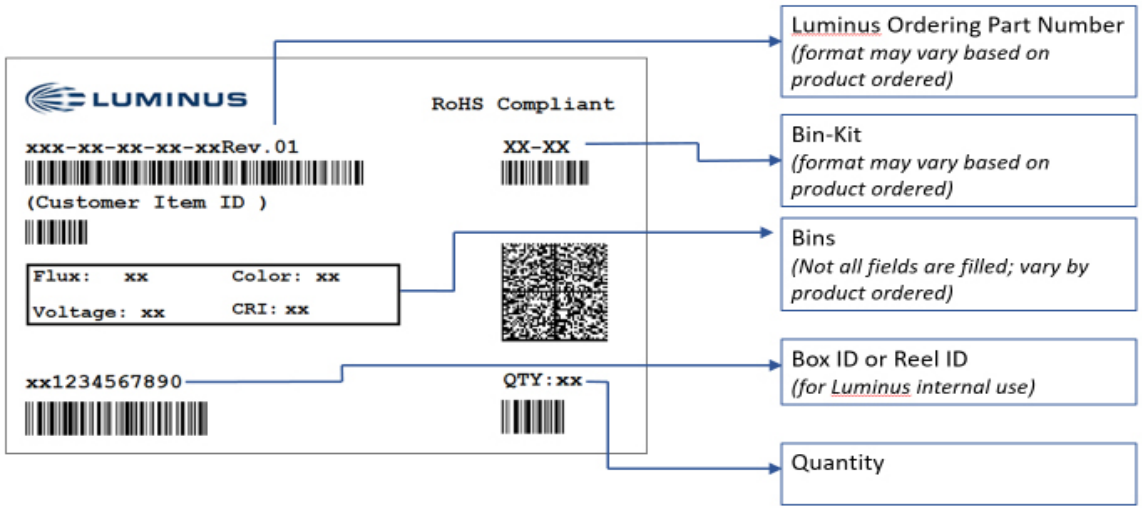
Packing and Shipping Specifications

Packing Specification

Packing Configuration	Qty /Pack	Pack Dimensions (L x W x H, mm)	Gross Weight (kg)
Stack of 5 trays with 10 devices per tray Each pack is enclosed in ESD bag	50	180 x 100 x 40	0.3

Product Label Specification

Label Fields:



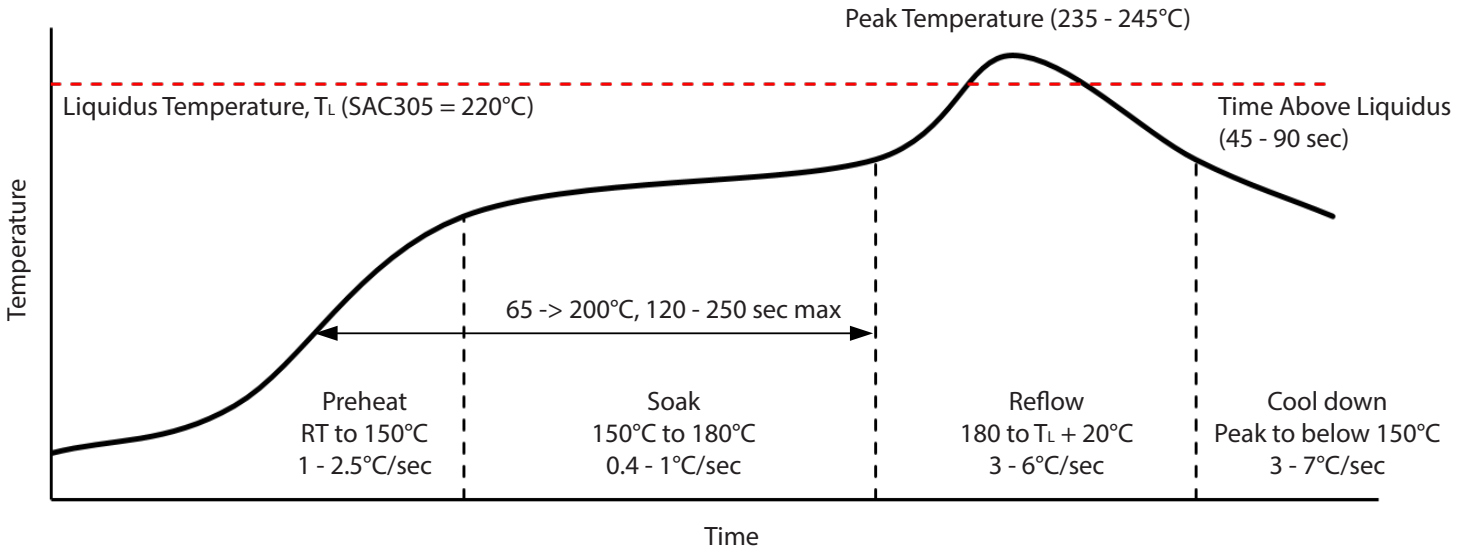
Sample label –for illustration only

Shipping Box

Shipping Box	Quantity	Material	Dimensions (L x W x H, mm)
Carton Box	1-20 packs	S4651	560 x 560 x 200

PDS-003122 Rev C © 2024 Luminus Devices, Inc. - All Rights Reserved
Luminus Devices, Inc. • **T** 408.708.7000 • www.luminus.com
1145 Sonora Court • Sunnyvale, CA 94086

Soldering Profile



SMT Rework Guideline	Manual Hotplate Reflow	Hot Air Gun Reflow
Heating Time	< 60 sec	
Hotplate Temperature	< 245°C	< 150°C

Note 1: Product complies to Moisture Sensitivity Level 1 (MSL 1).
Note 2: The numbers in the table are specific to SAC305. Luminus recommends using an SAC305 solder paste with a no-clean flux for RoHS compliant products.
Note 3: During the pick and place process, ensure the pick-up tool does not touch any die components.
Note 4: Use of a multi-zone IR reflow oven with a nitrogen blanket is recommended.
Note 5: Time-temperature profile of the reflow process showing the four functional profile zones are defined in IPC-7801. Temperature is referenced to the center of the PCB.
Note 6: Luminus recommends to use the solder paste data sheet information as a starting point in time-temperature process development.
Note 7: These are general guidelines. Consult the solder paste manufacturer's datasheet for guidelines specific to the alloy and flux combination used in your application. For more information, please refer to:
https://luminusdevices.zendesk.com/hc/en-us/articles/360060306692-How-do-I-Reflow-Solder-Luminus-SMD-Components-
Note 8: For any technical questions about soldering process, please contact Luminus at techsupport@luminus.com.
Note 9: This profile applies when attaching surface mount components.

PDS-003122 Rev C © 2024 Luminus Devices, Inc. - All Rights Reserved
Luminus Devices, Inc. • T 408.708.7000 • www.luminus.com
1145 Sonora Court • Sunnyvale, CA 94086

Notes

Static Electricity

This product is sensitive to static electricity, and care should be taken when handling them. Static electricity or surge voltage will damage the LEDs. It is recommended to wear an anti-electrostatic wristband or anti-electrostatic gloves when handling the LEDs. All devices, equipment and machinery must be properly grounded. It is recommended that measures be taken to isolate LED processing equipment from potential sources of voltage surges.

Reference: APN-002815 Electrical Stress Damage to LEDs and How to Prevent It

PDS-003122 Rev C © 2024 Luminus Devices, Inc. - All Rights Reserved
Luminus Devices, Inc. • **T** 408.708.7000 • www.luminus.com
1145 Sonora Court • Sunnyvale, CA 94086

History of Changes

Revision	Date	Description of Change
Rev A	09/21/2020	PTM-40X-B / BP single color datasheet initial draft
Rev B	02/25/2021	Add product image Add ESD sensitivity Update Rth Update characterization chart
Rev C	06/08/2023	Update data sheet format Update mechanical drawing Update parametric table spec on page 4

The products, their specifications and other information appearing in this document are subject to change by Luminus Devices without notice. Luminus Devices assumes no liability for errors that may appear in this document, and no liability otherwise arising from the application or use of the product or information contained herein. None of the information provided herein should be considered to be a representation of the fitness or suitability of the product for any particular application or as any other form of warranty. Luminus Devices' product warranties are limited to only such warranties as accompany a purchase contract or purchase order for such products. Nothing herein is to be construed as constituting an additional warranty. No information contained in this publication may be considered as a waiver by Luminus Devices of any intellectual property rights that Luminus Devices may have in such information. This product is protected by U.S. Patents 6,831,302; 7,074,631; 7,083,993; 7,084,434; 7,098,589; 7,105,861; 7,138,666; 7,166,870; 7,166,871; 7,170,100; 7,196,354; 7,211,831; 7,262,550; 7,274,043; 7,301,271; 7,341,880; 7,344,903; 7,345,416; 7,348,603; 7,388,233; 7,391,059 Patents Pending in the U.S. and other countries.

PDS-003122 Rev C © 2024 Luminus Device, Inc. - All Rights Reserved
Luminus Devices, Inc. • T 408.708.7000 • www.luminus.com
1145 Sonora Court • Sunnyvale, CA 94086