PTM-40X-RA

Projection Red Amber LED

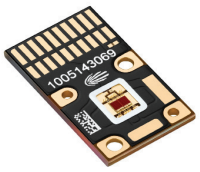

Table of Contents

Features:

- Red Amber LED with 4.0mm^2 emitting area designed for display or other high performance applications.
- Complement with PTM-40X Converted Green, Blue and Blue Pump for best projection brightness and color gamut
- Dominant wavelength: Red-Amber 613 nm
- LED die precision mounted on Ultra low thermal resistance MC-PCB package.
- Thermistor pad allows option for precise thermal management
- Supports up to 8A 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

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Ordering Information

Part Number Nomenclature

PTM — 40X — RA — 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	RA: Red Amber	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]	Luminous Flux		Wavelength Bin	Ordering Part Numbers
		Minimum Flux Bin	Minimum Flux/Power		
RA	MPM	1M	1530	R1, R2	PTM-40X-RA-L34-MPM
	MPN	1N	1620	R1, R2	PTM-40X-RA-L34-MPN

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-RA-L34-MPM is comprised of Flux Bins 1M, 1N, 1P, 1Q, 1R and 1S.

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Binning Structure

Flux Bins

Bin	Minimum Flux (lm)	Maximum Flux (lm)
1M	1530	1620
1N	1620	1730
1P	1730	1830
1Q	1830	1950
1R	1950	2050
1S	2050	2180

Dominant Wavelength Bins

Bin	Minimum Dominant Wavelength (nm)	Maximum Dominant Wavelength (nm)
R1	609	616
R2	616	620

Note 1: Test condition at drive current 8.0 A, 20ms 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 order able. Wavelength bins are displayed in product label.

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Optical & Electrical Characteristics

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

General Characteristics		Symbol	Red Amber	Unit
Active Emitting Area	typ		4.03	mm^2
Total LED Array Dimensions	typ		2.7 x 1.55	mm x mm
Characteristics at Recommended Test Drive Current , I_f [1, 2]				
Test Pulse Duration			20	msec
Test Peak Drive Current [1]	typ	I_F	8.0	A
Peak Luminuous Flux [1]	typ	Φ_v	1930	lm
Peak Radiometric Flux [1]	typ	Φ_r	7.2	W
Dominant Wavelength	min	λ_{dmin}	609	nm
	typ	λ_d	613	
	max	λ_{dmax}	620	
Peak Wavelength	typ	λ_P	622	
FWHM- Spectral bandwidth at 50% of Φ_r	typ		20	
Chromaticity Coordinates [2]	typ	x	0.67	CIE x
	typ	y	0.32	CIE y
Forward Voltage	min	$V_{F\,min}$	6.00	V
	typ	V_F	7.10	
	max	$V_{F\,max}$	8.00	
Real thermal resistance [3] (junction - board)	typ	$R_{th\ J\text{-}B\ real}$	1.10	°C/W
Electrical thermal resistance [3] (junction - board)	typ	$R_{th\ J\text{-}B}$	0.98	°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

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Optical & Electrical Characteristics

Absolute Maximum Ratings

	Symbol	Red Amber	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]		6.0	A
Absolute Maximum Current (Pulsed) [2,3] (frequency > 240Hz, duty cycle <70%)		8.0	
Absolute Maximum Surge Current [2,3] (Frequency > 240 Hz, duty cycle =10%, t=1ms)		9.0	
Absolute Maximum Junction Temperature [4]	T_{jmax}	110	°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 (Tjmax) will result in significant reduction in device lifetime.

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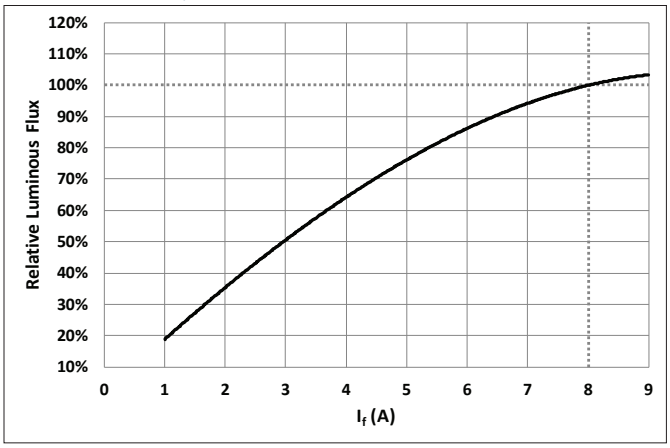
Optical and Electrical Characteristics

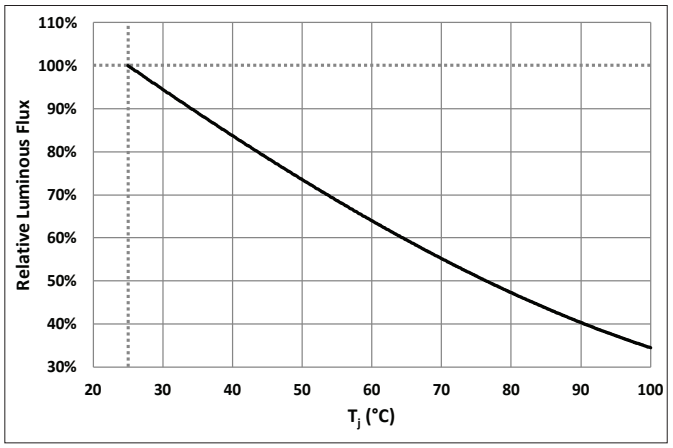
Relative Luminous Flux vs. Forward Current

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



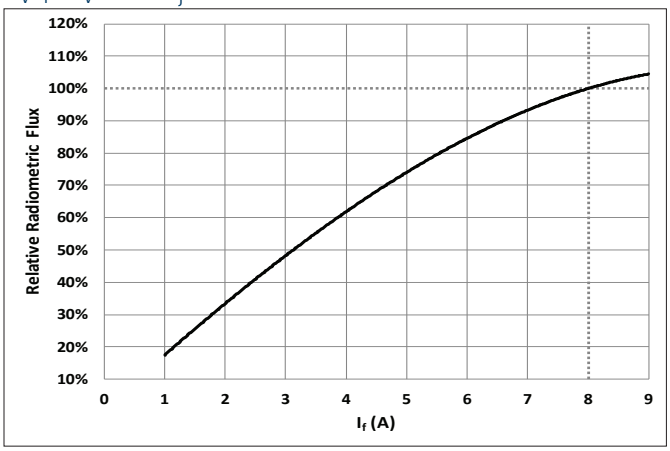
Relative Luminous Flux vs. Temperature

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



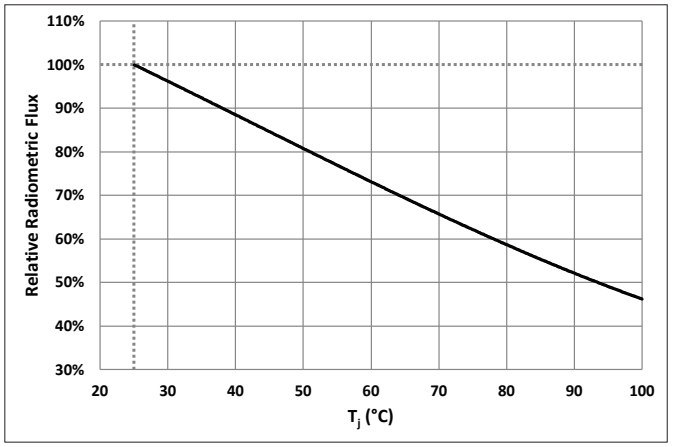
Relative Radiometric Flux vs. Forward Current

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



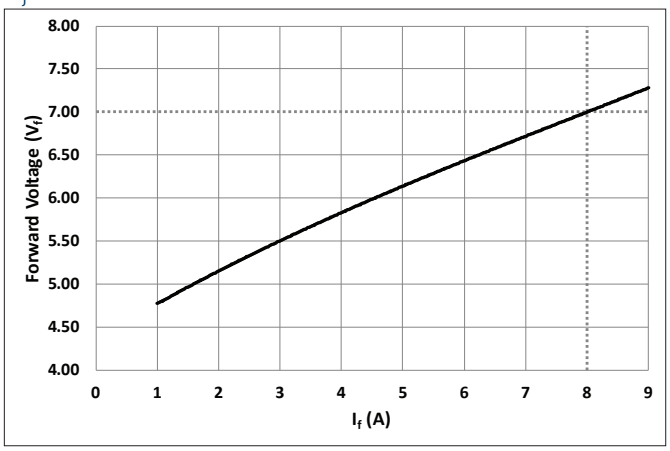
Relative Radiometric Flux vs. Temperature

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



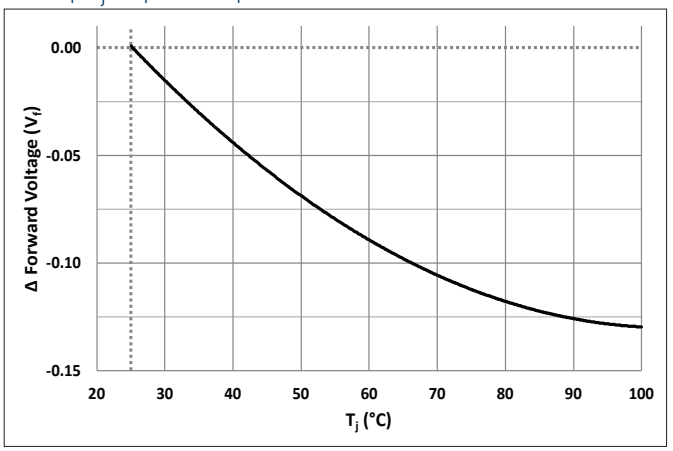
Forward Voltage vs. Forward Current

T_j= 25°C, Pulse duration 20ms



Relative Forward Voltage vs. Temperature

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



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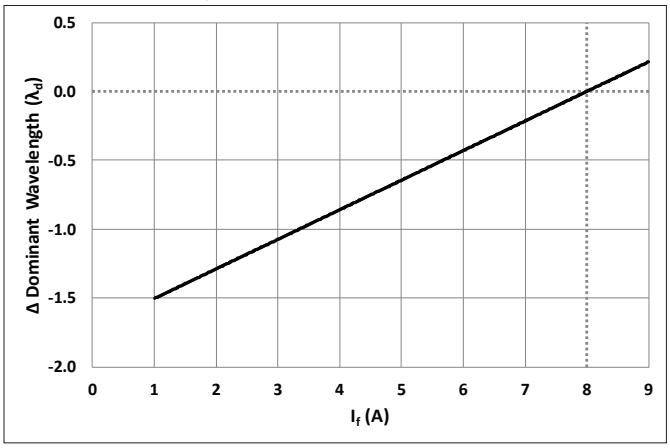
Optical and Electrical Characteristics

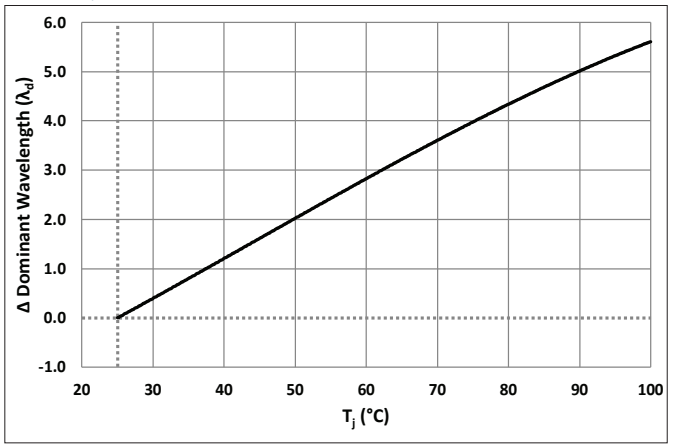
Dominant Wavelength Shift vs. Forward Current

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



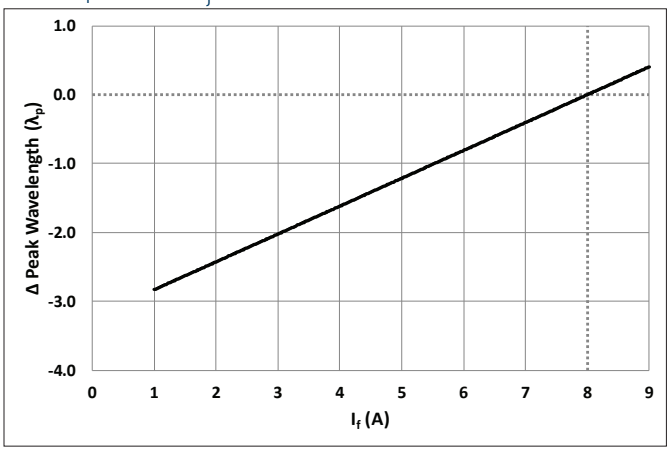
Dominant Wavelength Shift vs. Temperature

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



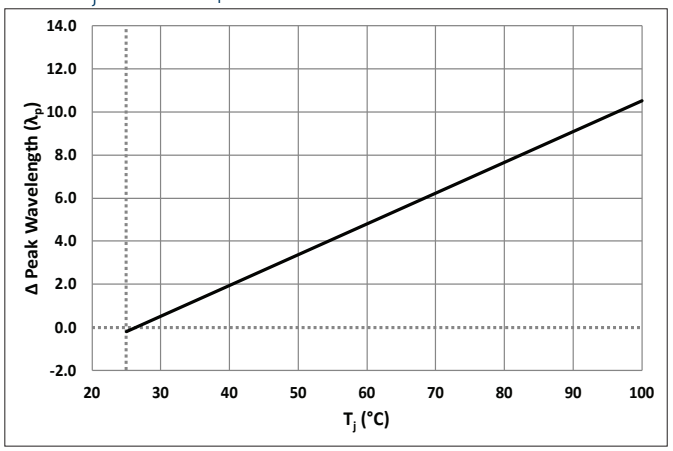
Peak Wavelength Shift vs. Forward Current

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



Peak Wavelength Shift vs. Temperature

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



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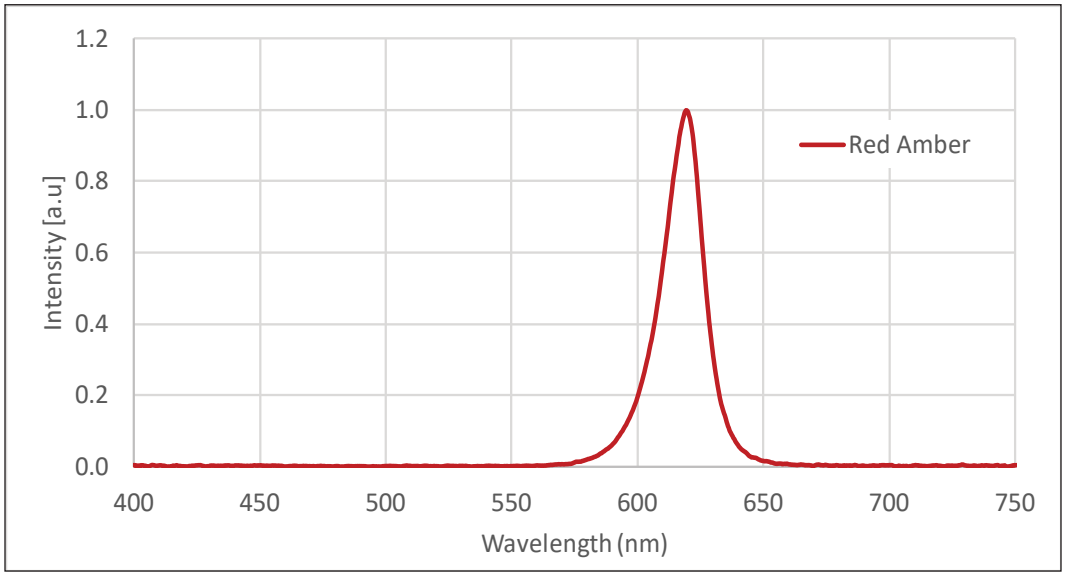
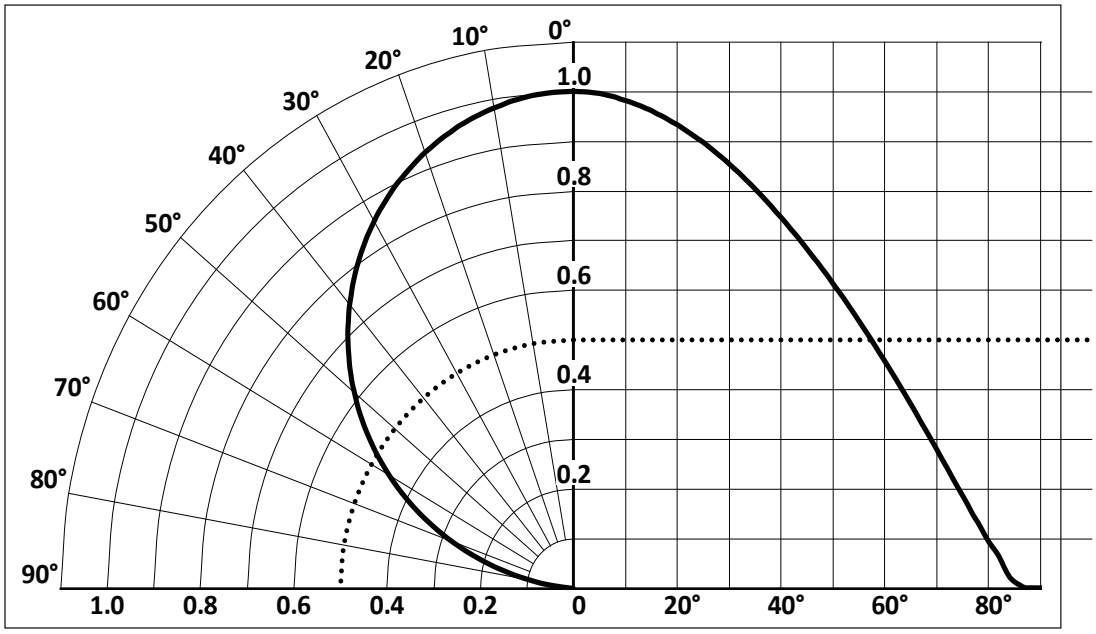
Angular Distribution and Spectrum

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.

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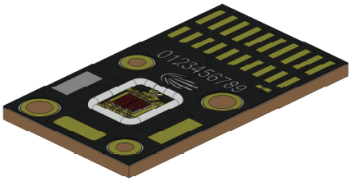
Mechanical Dimensions

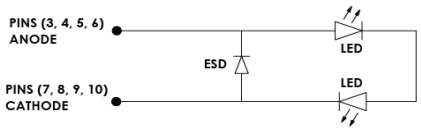
DIMENSIONS IN MILLIMETERS



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

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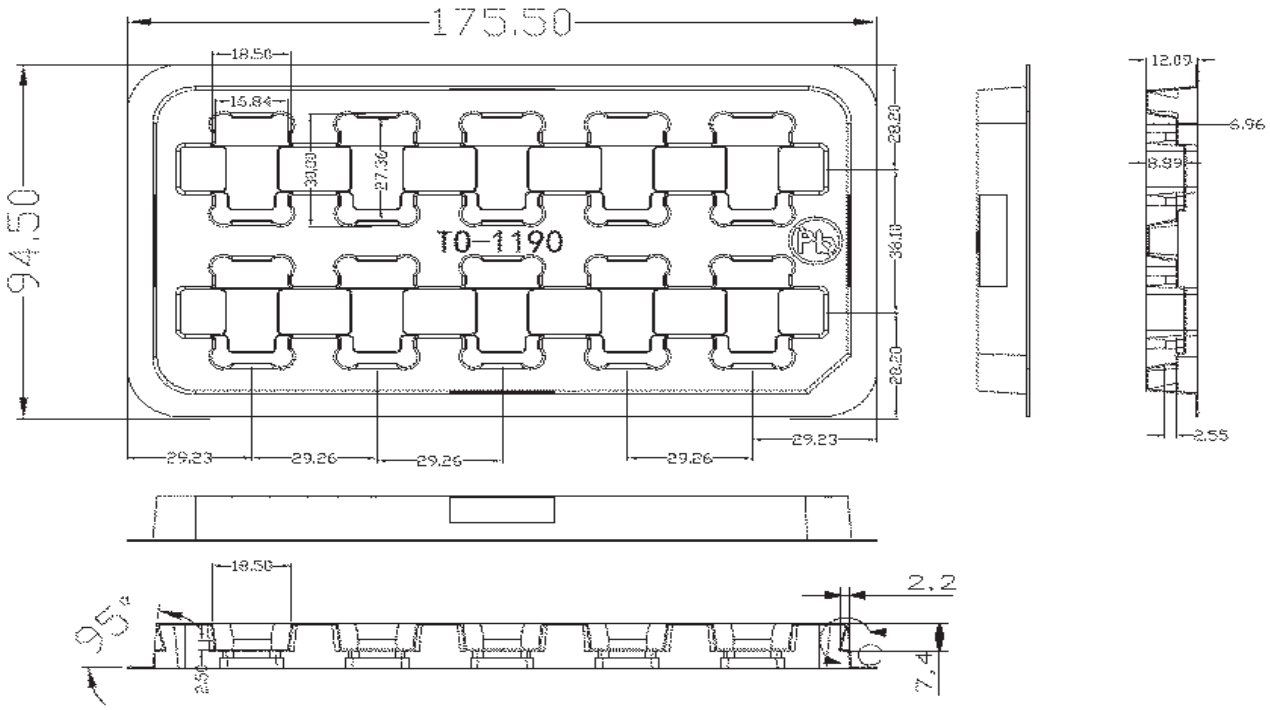
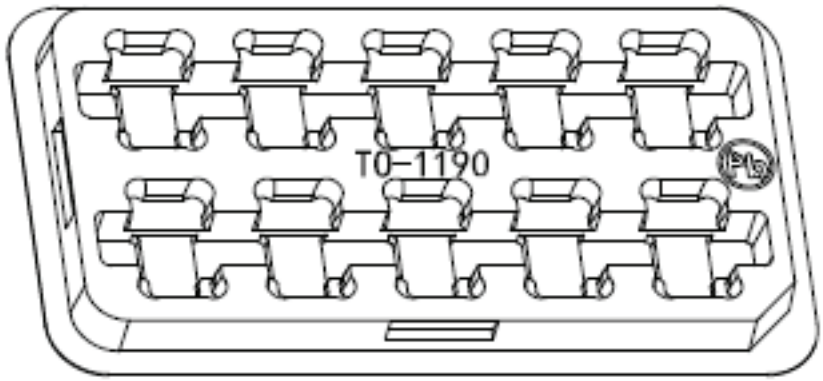
Shipping Tray Outline





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

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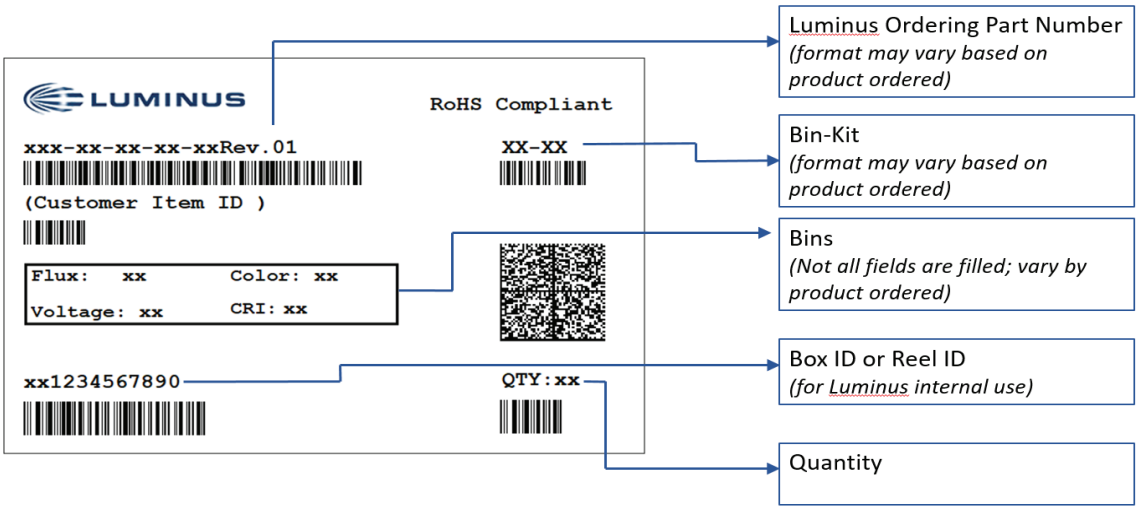
Packing and Shipping Specifications

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

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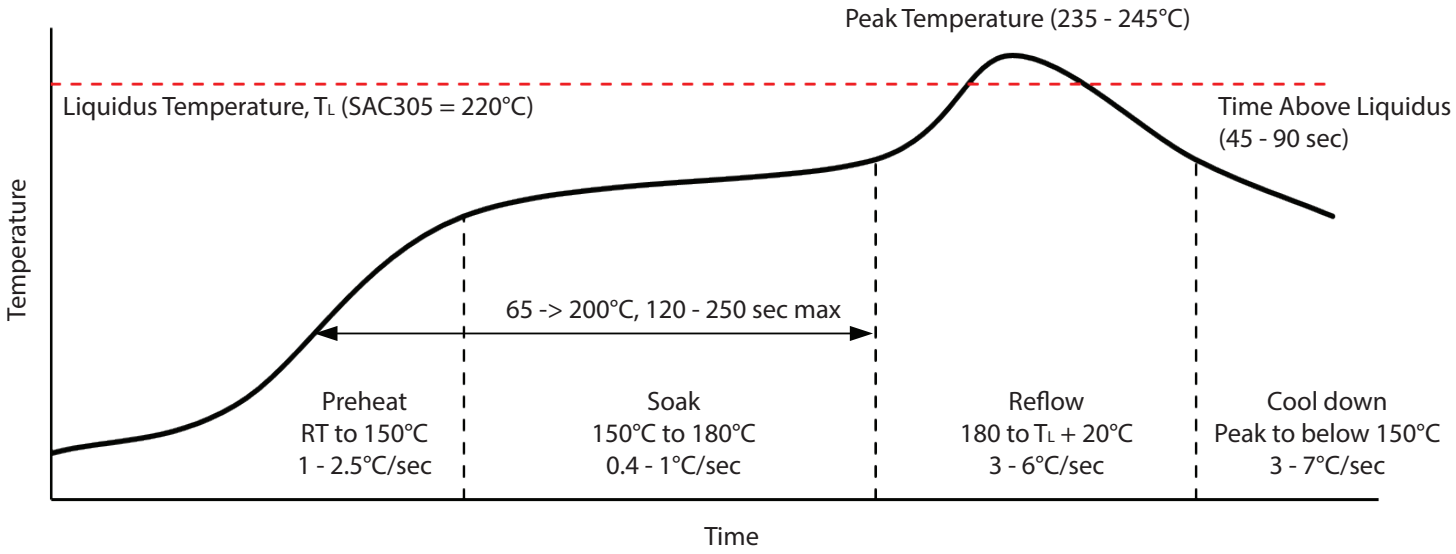
Soldering Profile



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.

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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

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History of Changes

Revision	Date	Description of Change
Rev A	09/10/2020	PTM-40X-RA single color datasheet initial draft
Rev B	02/15/2021	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

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