

LCB TTSD CoD blue IB

TOPLED®

TOPLED, SMT LED with integrated reflector. With our great experience in SMT LED we are able to offer a high quality product for all kind of applications.



Applications

- Cluster, Button Backlighting

Features:

- Package: white PLCC-2 package, colored diffused silicone resin
- Chip technology: ThinGaN
- Typ. Radiation: 120° (Lambertian emitter)
- Color: Cx = 0.2, Cy = 0.3 acc. to CIE 1931 (● color on demand blue)
- Corrosion Robustness Class: 3B
- ESD: 2 kV acc. to ANSI/ESDA/JEDEC JS-001 (HBM)

Ordering Information

Type	Luminous Intensity ¹⁾ $I_F = 10 \text{ mA}$ I_v	Ordering Code
LCB TTSD-T2V1-2J8L	355 ... 900 mcd	Q65111A1160

Maximum Ratings

Parameter	Symbol		Values
Operating Temperature	T_{op}	min.	-40 °C
		max.	110 °C
Storage Temperature	T_{stg}	min.	-40 °C
		max.	110 °C
Junction Temperature	T_j	max.	125 °C
Forward Current	I_F	min.	1 mA
$T_s = 25\text{ °C}$		max.	30 mA
Surge Current	I_{FS}	max.	200 mA
$t \leq 10\text{ }\mu\text{s}$; $D = 0.005$; $T_s = 25\text{ °C}$			
Reverse voltage ²⁾	V_R	max.	5 V
$T_s = 25\text{ °C}$			
ESD withstand voltage	V_{ESD}		2 kV
acc. to ANSI/ESDA/JEDEC JS-001 (HBM)			

Characteristics

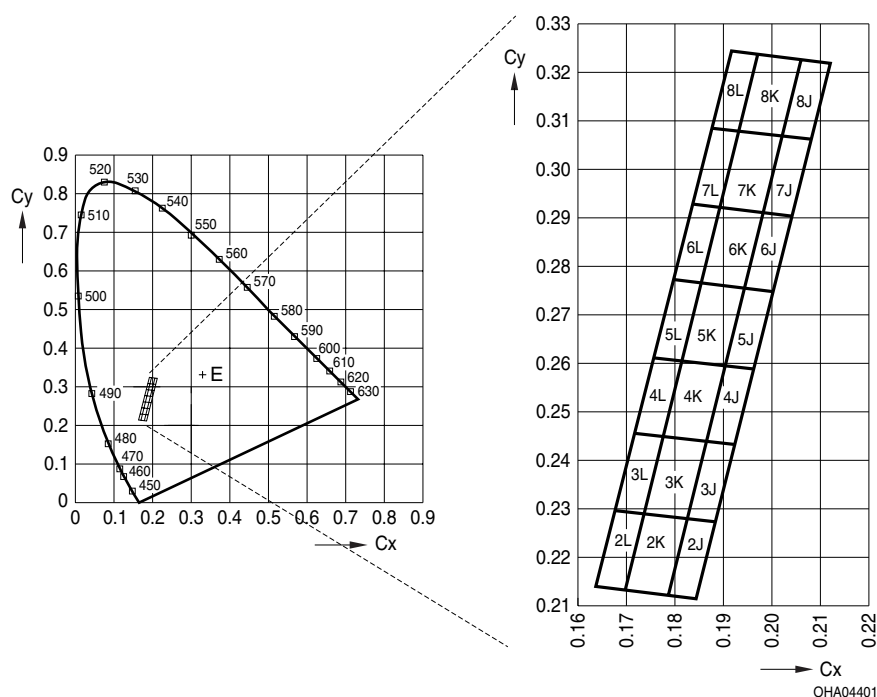
$I_F = 10 \text{ mA}$; $T_s = 25 \text{ °C}$

Parameter	Symbol		Values
Chromaticity Coordinate ³⁾	C _x	typ.	0.2
	C _y	typ.	0.3
Viewing angle at 50 % I_v	2 ϕ	typ.	120 °
Forward Voltage ⁴⁾	V _F	min.	2.65 V
$I_F = 10 \text{ mA}$		typ.	3.00 V
		max.	3.40 V
Reverse current ²⁾	I _R	typ.	0.01 μA
V _R = 5 V		max.	10 μA
Real thermal resistance junction/ambient ^{5), 6)}	R _{thJA real}	max.	340 K / W
Real thermal resistance junction/solderpoint ⁵⁾	R _{thJS real}	max.	180 K / W

Brightness Groups

Group	Luminous Intensity ¹⁾ $I_F = 10 \text{ mA}$ min. I_v	Luminous Intensity ¹⁾ $I_F = 10 \text{ mA}$ max. I_v	Luminous Flux ⁷⁾ $I_F = 10 \text{ mA}$ typ. Φ_v
T2	355 mcd	450 mcd	1210 mlm
U1	450 mcd	560 mcd	1520 mlm
U2	560 mcd	710 mcd	1910 mlm
V1	710 mcd	900 mcd	2420 mlm

Chromaticity Coordinate Groups ³⁾



Color Chromaticity Groups ³⁾

Group	Cx	Cy	Group	Cx	Cy	Group	Cx	Cy
2J	0.1823	0.2280	3K	0.1775	0.2447	4L	0.1756	0.2611
	0.1882	0.2273		0.1862	0.2437		0.1814	0.2605
	0.1842	0.2116		0.1823	0.2280		0.1775	0.2447
	0.1784	0.2122		0.1735	0.2290		0.1716	0.2454
2K	0.1735	0.2290	3L	0.1716	0.2454	5J	0.1941	0.2753
	0.1823	0.2280		0.1775	0.2447		0.2000	0.2746
	0.1784	0.2122		0.1735	0.2290		0.1960	0.2588
	0.1696	0.2132		0.1677	0.2296		0.1902	0.2595
2L	0.1677	0.2296	4J	0.1902	0.2595	5K	0.1853	0.2762
	0.1735	0.2290		0.1960	0.2588		0.1941	0.2753
	0.1696	0.2132		0.1921	0.2431		0.1902	0.2595
	0.1637	0.2139		0.1862	0.2437		0.1814	0.2605
3J	0.1862	0.2437	4K	0.1814	0.2605	5L	0.1795	0.2769
	0.1921	0.2431		0.1902	0.2595		0.1853	0.2762
	0.1882	0.2273		0.1862	0.2437		0.1814	0.2605
	0.1823	0.2280		0.1775	0.2447		0.1756	0.2611

Group	Cx	Cy	Group	Cx	Cy	Group	Cx	Cy
6J	0.1980	0.2910	7J	0.2020	0.3068	8J	0.2059	0.3225
	0.2039	0.2904		0.2078	0.3061		0.2118	0.3219
	0.2000	0.2746		0.2039	0.2904		0.2078	0.3061
	0.1941	0.2753		0.1980	0.2910		0.2020	0.3068
6K	0.1893	0.2920	7K	0.1932	0.3078	8K	0.1971	0.3235
	0.1980	0.2910		0.2020	0.3068		0.2059	0.3225
	0.1941	0.2753		0.1980	0.2910		0.2020	0.3068
	0.1853	0.2762		0.1893	0.2920		0.1932	0.3078
6L	0.1834	0.2926	7L	0.1874	0.3084	8L	0.1913	0.3242
	0.1893	0.2920		0.1932	0.3078		0.1971	0.3235
	0.1853	0.2762		0.1893	0.2920		0.1932	0.3078
	0.1795	0.2769		0.1834	0.2926		0.1874	0.3084

Group Name on Label

Example: T2-2J

Brightness

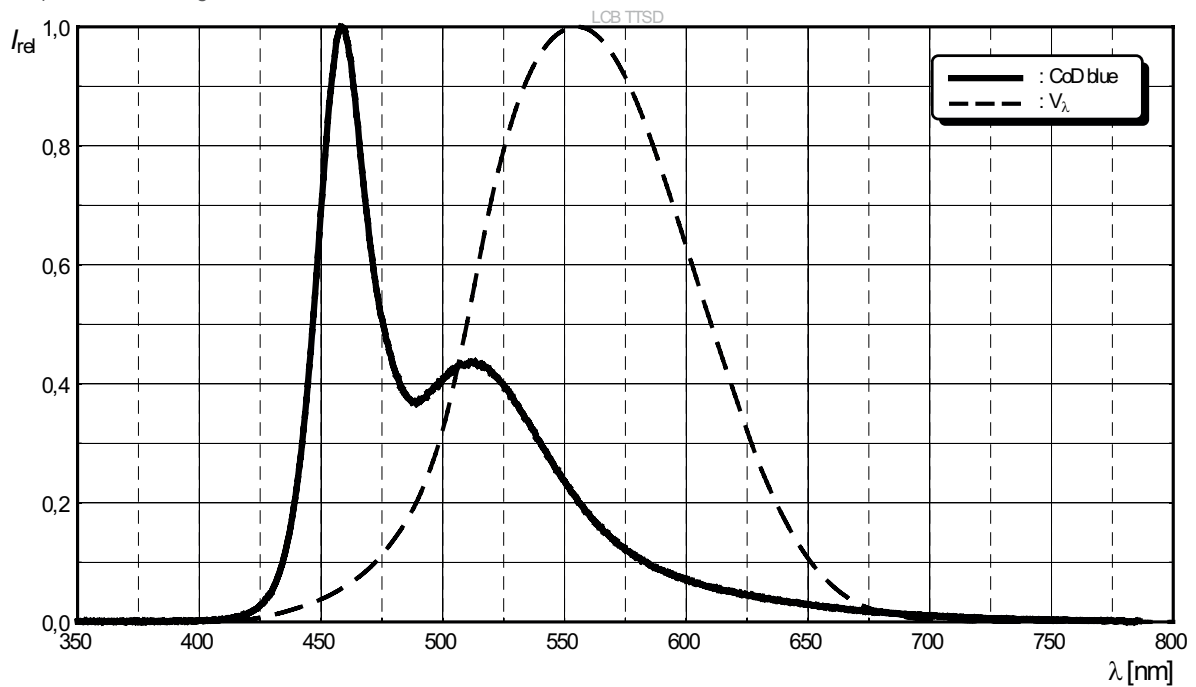
Color Chromaticity

T2

2J

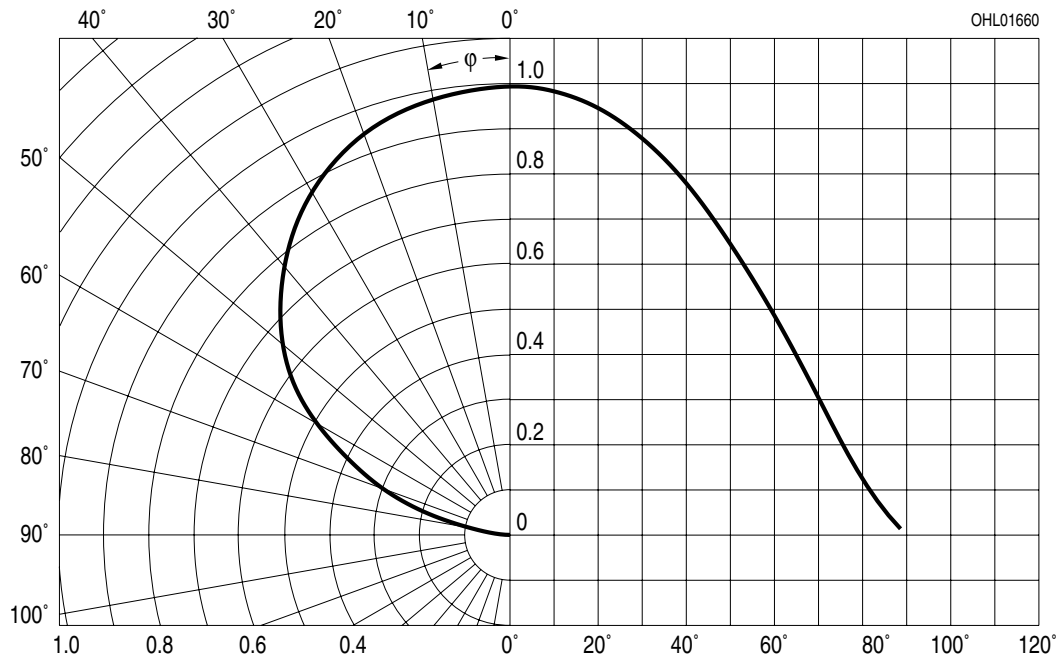
Relative Spectral Emission ⁷⁾

$$I_{\text{rel}} = f(\lambda); I_F = 10 \text{ mA}; T_S = 25 \text{ °C}$$



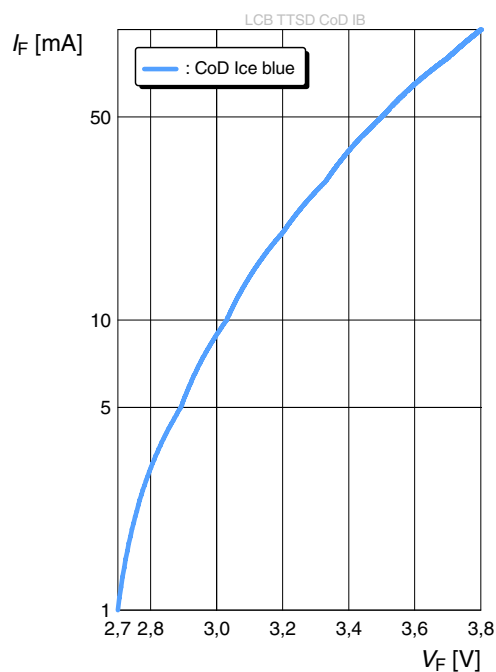
Radiation Characteristics ⁷⁾

$$I_{\text{rel}} = f(\phi); T_S = 25 \text{ °C}$$

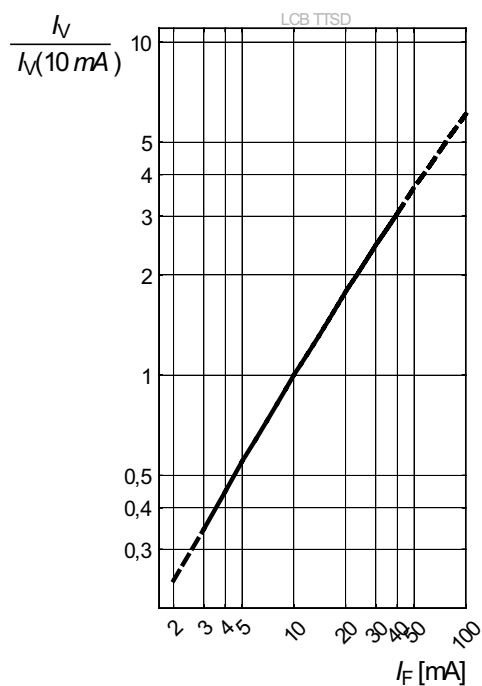


Forward current ⁷⁾

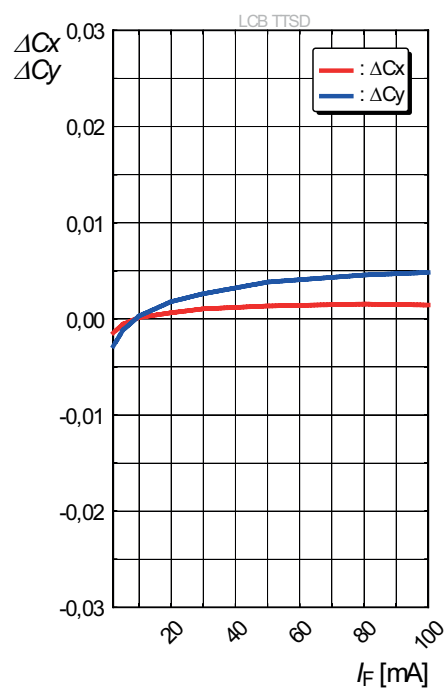
$$I_F = f(V_F); T_S = 25^\circ\text{C}$$

**Relative Luminous Intensity** ^{7), 8)}

$$I_V/I_V(10\text{ mA}) = f(I_F); T_S = 25^\circ\text{C}$$

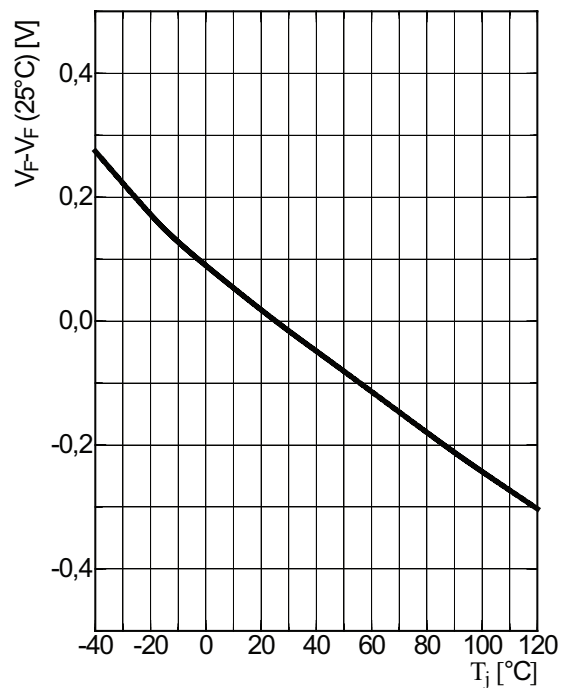
**Chromaticity Coordinate Shift** ⁷⁾

$$C_x, C_y = f(I_F); T_S = 25^\circ\text{C}$$



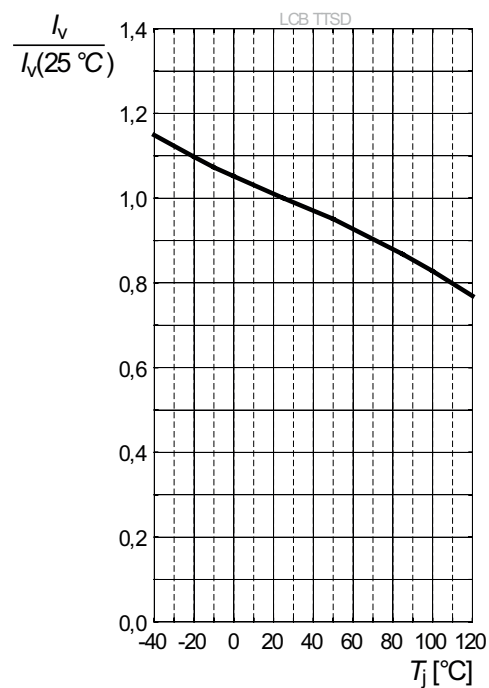
Forward Voltage ⁷⁾

$$\Delta V_F = V_F - V_F(25^\circ\text{C}) = f(T_j); I_F = 10 \text{ mA}$$



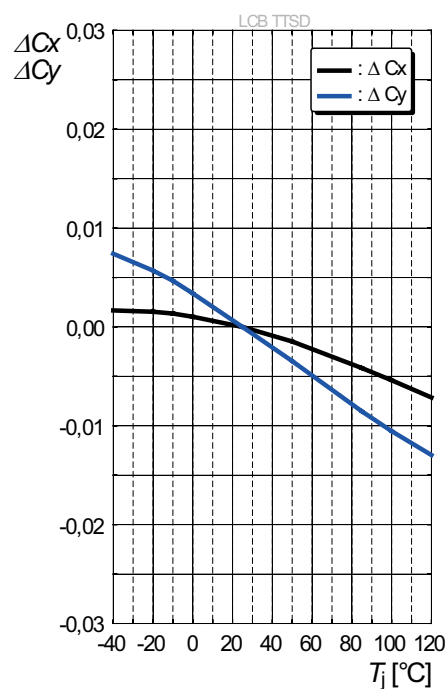
Relative Luminous Intensity ⁷⁾

$$I_V / I_V(25^\circ\text{C}) = f(T_j); I_F = 10 \text{ mA}$$



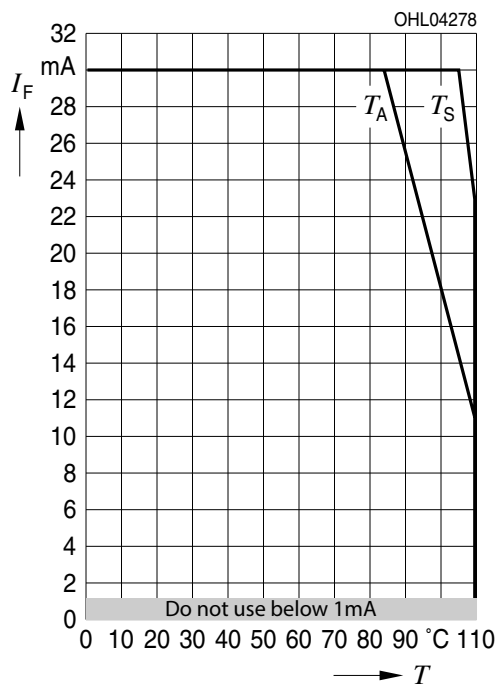
Chromaticity Coordinate Shift ⁷⁾

$$\Delta C_x, \Delta C_y = f(T_j); I_F = 10 \text{ mA}$$



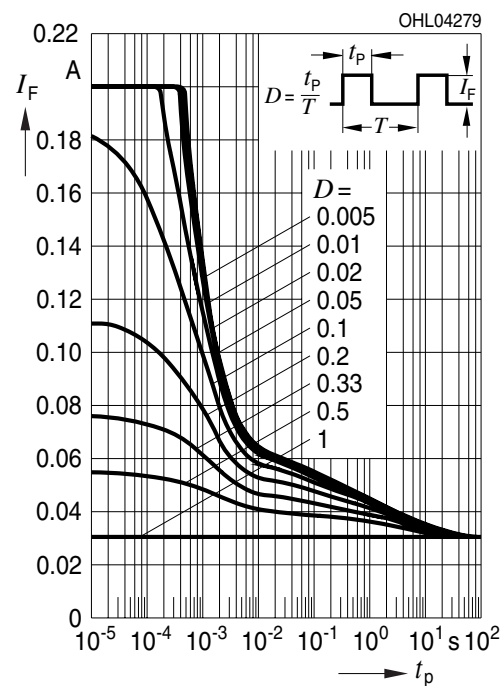
Max. Permissible Forward Current

$$I_F = f(T)$$



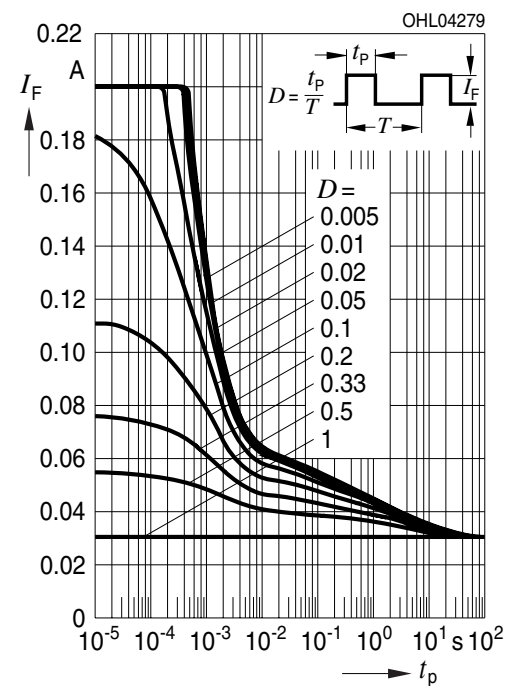
Permissible Pulse Handling Capability

$$I_F = f(t_p); D: \text{Duty cycle}; T_S = 25^\circ\text{C}$$

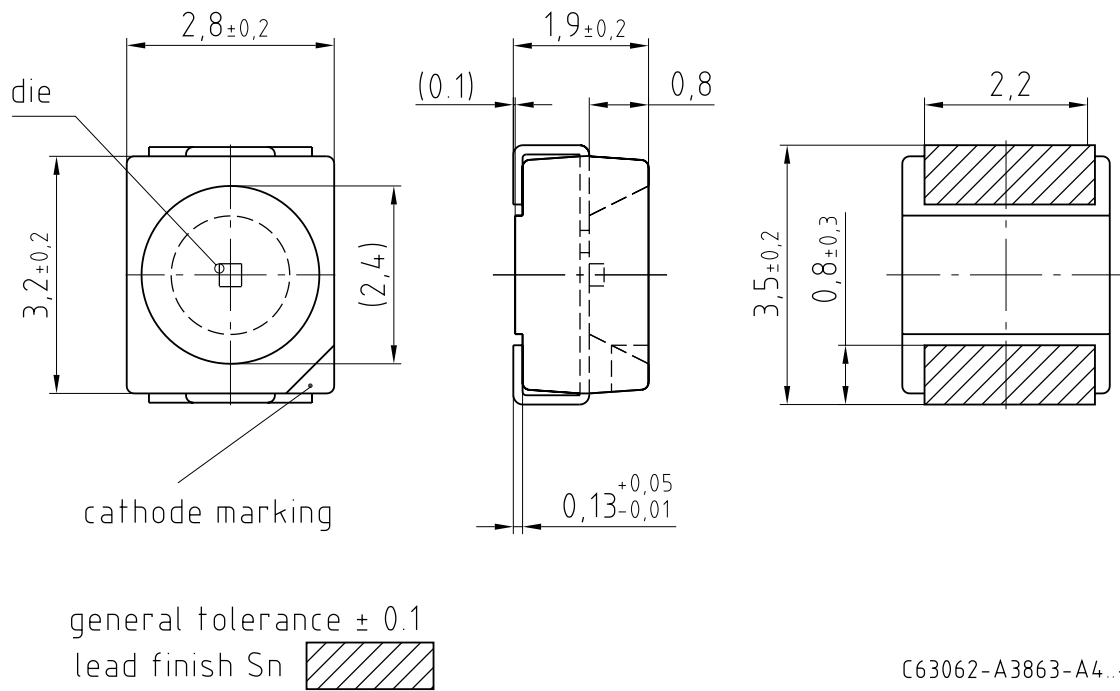


Permissible Pulse Handling Capability

$$I_F = f(t_p); D: \text{Duty cycle}; T_S = 85^\circ\text{C}$$



Dimensional Drawing ⁹⁾

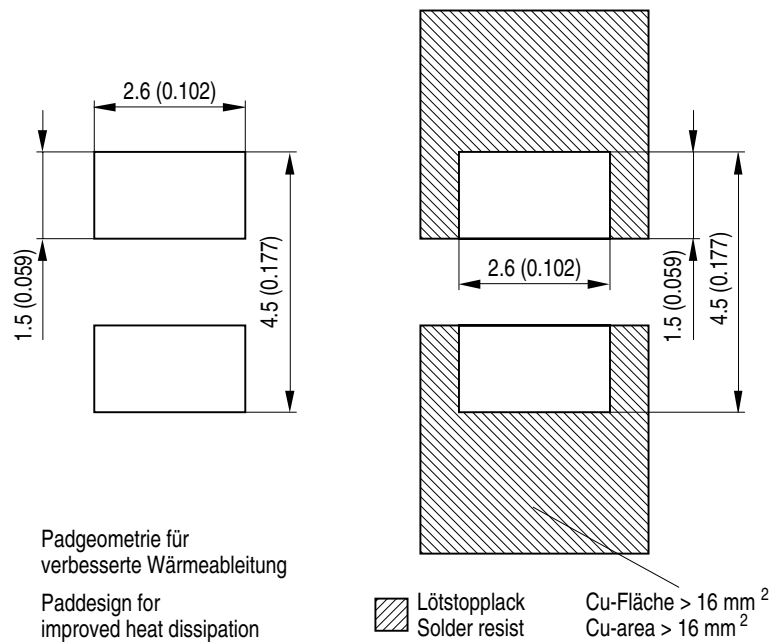


C63062-A3863-A4...-02

Approximate Weight: 32.0 mg

Corrosion test: Class: 3B
Test condition: 40°C / 90 % RH / 15 ppm H₂S / 14 days (stricter then IEC 60068-2-43)

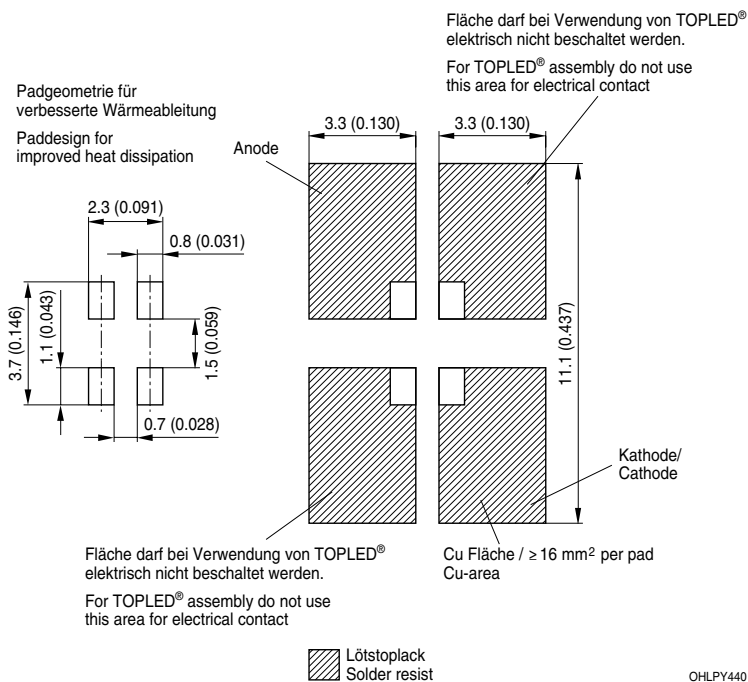
Recommended Solder Pad ⁹⁾



OHLPY970

For superior solder joint connectivity results we recommend soldering under standard nitrogen atmosphere. Package not suitable for ultra sonic cleaning.

Recommended Solder Pad ⁹⁾

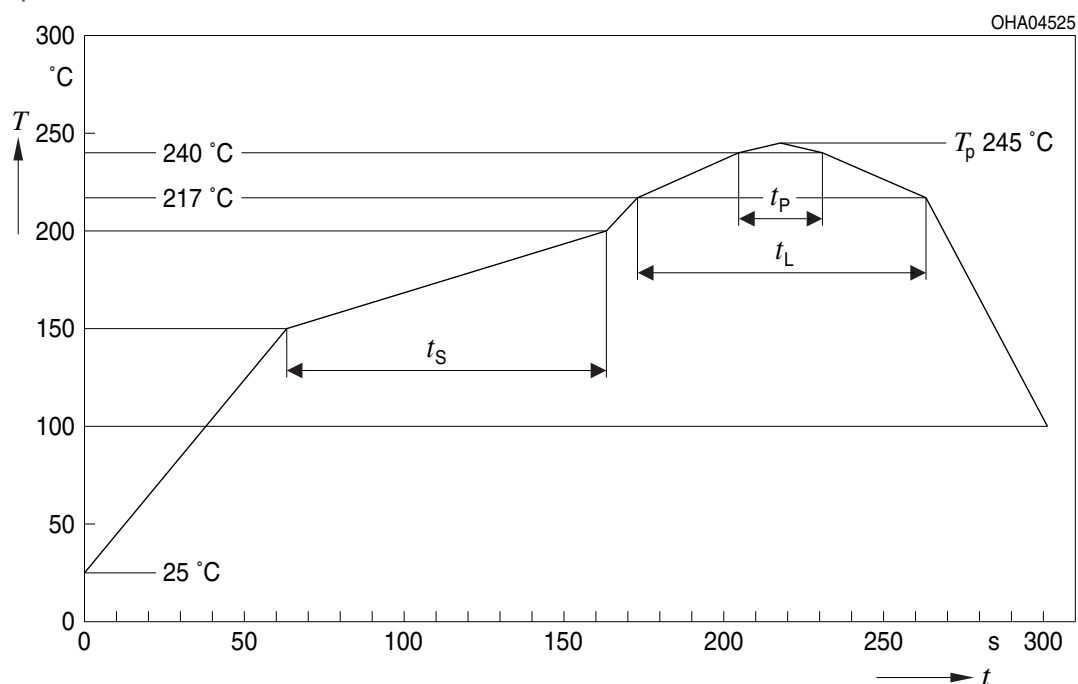


OHLPY440

For superior solder joint connectivity results we recommend soldering under standard nitrogen atmosphere. Package not suitable for ultra sonic cleaning.

Reflow Soldering Profile

Product complies to MSL Level 2 acc. to JEDEC J-STD-020E

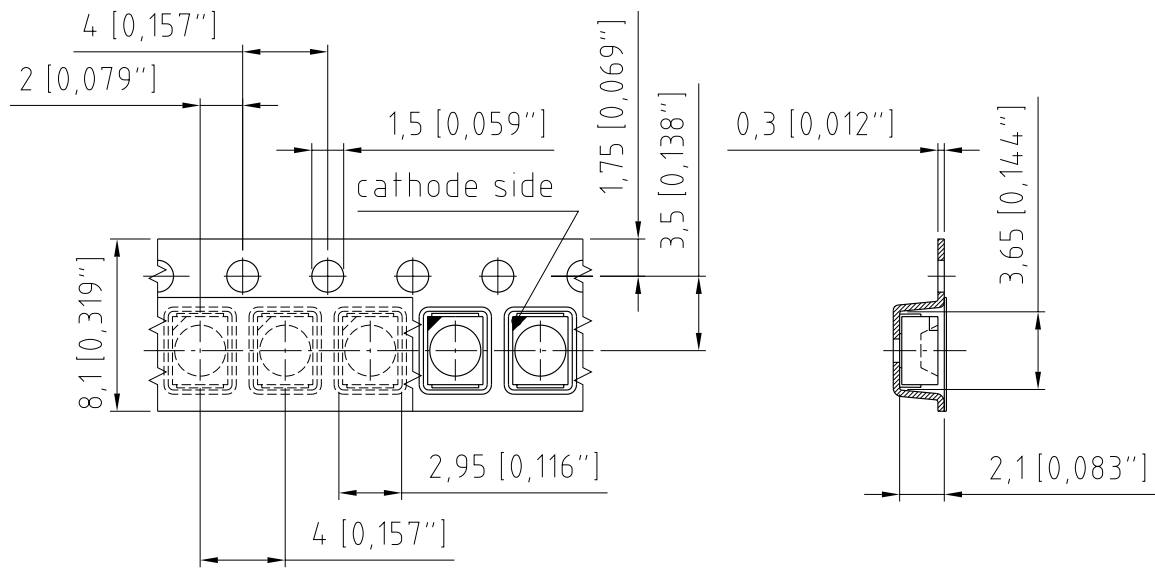


Profile Feature	Symbol	Pb-Free (SnAgCu) Assembly			Unit
		Minimum	Recommendation	Maximum	
Ramp-up rate to preheat*) 25 °C to 150 °C			2	3	K/s
Time t_s T_{Smin} to T_{Smax}	t_s	60	100	120	s
Ramp-up rate to peak*) T_{Smax} to T_p			2	3	K/s
Liquidus temperature	T_L		217		$^{\circ}\text{C}$
Time above liquidus temperature	t_L		80	100	s
Peak temperature	T_p		245	260	$^{\circ}\text{C}$
Time within 5 °C of the specified peak temperature $T_p - 5\text{ K}$	t_p	10	20	30	s
Ramp-down rate* T_p to 100 °C			3	6	K/s
Time 25 °C to T_p				480	s

All temperatures refer to the center of the package, measured on the top of the component

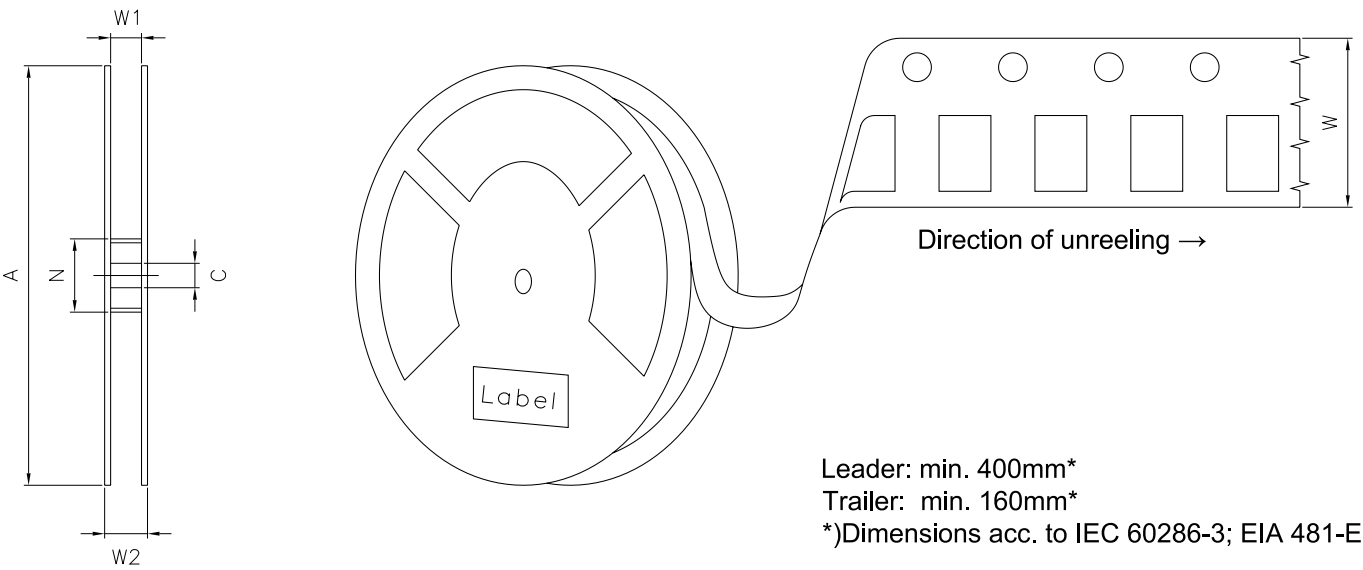
* slope calculation DT/Dt : Dt max. 5 s; fulfillment for the whole T-range

Taping ⁹⁾



C63062-A3863-B3 -02

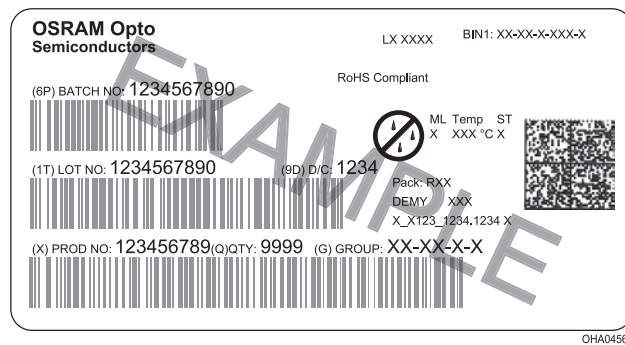
Tape and Reel ¹⁰⁾



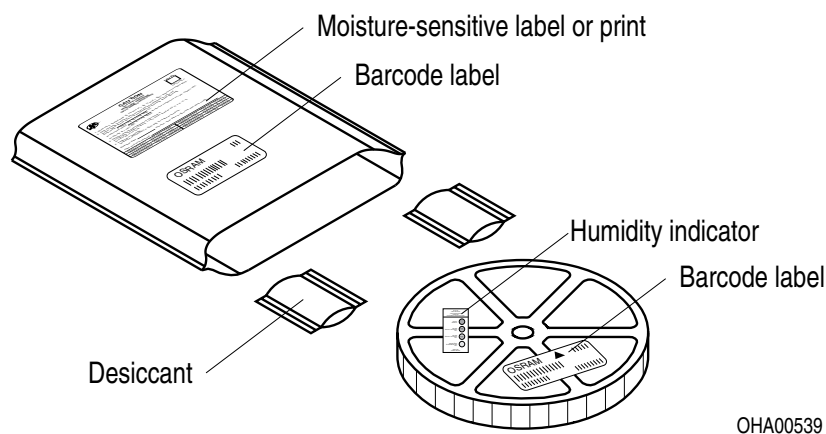
Reel dimensions [mm]

A	W	N _{min}	W ₁	W _{2 max}	Pieces per PU
180 mm	8 + 0.3 / - 0.1	60	8.4 + 2	14.4	2000

Barcode-Product-Label (BPL)

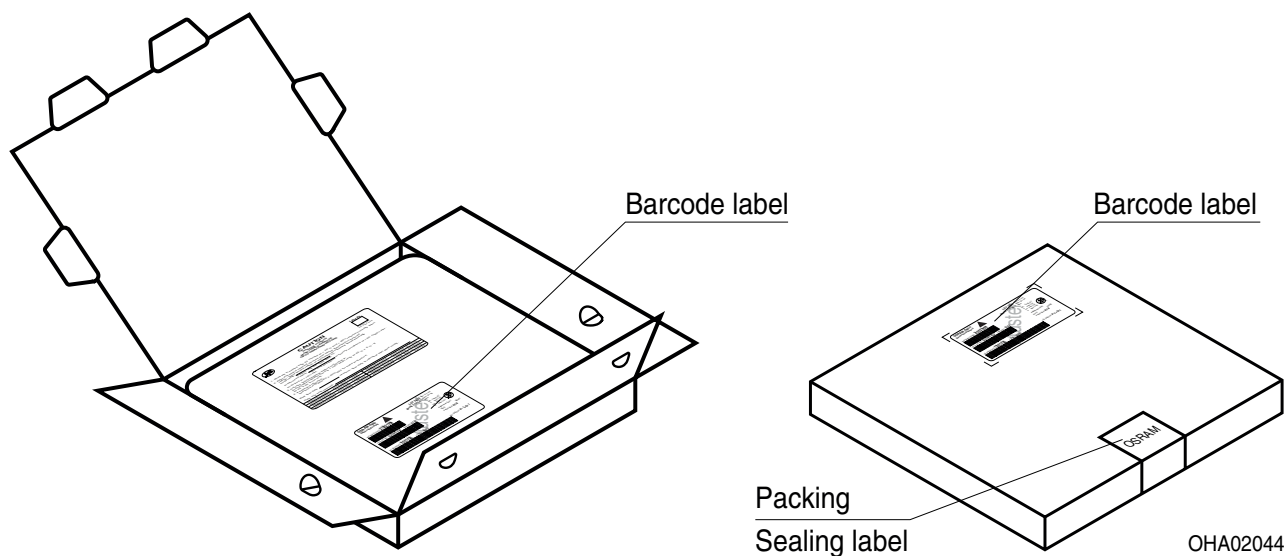


Dry Packing Process and Materials ⁹⁾



Moisture-sensitive product is packed in a dry bag containing desiccant and a humidity card according JEDEC-STD-033.

Transportation Packing and Materials ⁹⁾



Dimensions of transportation box in mm

Width	Length	Height
200 ± 5 mm	195 ± 5 mm	30 ± 5 mm

Type Designation System

Wavelength ($\lambda_{\text{dom typ.}}$)		Emission Color	Color coordinates according CIE 1931/Emission color:				
A:	617 nm	amber	W:	white			
S:	633 nm	super red	UW:	ultra white			
T:	528 nm	true green	CB:	color on demand blue			
Y:	587 nm	yellow	CG:	color on demand green			
O:	606 nm	orange	CL:	color on demand lagune			
G:	570 nm	green	Package Type T: TOPLED				
P:	560 nm	pure green					
R:	625 nm	red					
B:	470 nm	blue					
H:	645 nm	hyper-red					
V:	505 nm	verde green					
L: Light emitting diode							
L	A		T	6	7	6	
Lead / Package Properties 6: folded leads 7: reverse gullwing leads T: folded leads, improved corrosion stability (Au-LF), w/o TiO2 jetting V: folded leads and UX:3 w/ improved corrosion stability (Au-LF), TiO2 jetting							
Encapsulant Type / Lens Properties 7: Colorless clear or white volume conversion (resin encapsulation) S: Silicone (with or without diffuser)							
Chip Technology: 1: TSN 3: standard InGaN 4: AlGaAs (RECLED) 5: HOP 2000 6: Standard InGaIP 9: TSN low current B: HOP 2000 C: ATON D: Low cost ThinGaN/ Thinfilm (e.g. 6mil) F: Thinfilm InGaIP G: ThinGaN(Thinfilm InGaN) (Subcon:Sapphire) K: InGaIP low current S: standard InGaN low current O: TSN							

Notes

The evaluation of eye safety occurs according to the standard IEC 62471:2006 (photo biological safety of lamps and lamp systems). Within the risk grouping system of this IEC standard, the device specified in this data sheet falls into the class **exempt group (exposure time 10000 s)**. Under real circumstances (for exposure time, conditions of the eye pupils, observation distance), it is assumed that no endangerment to the eye exists from these devices. As a matter of principle, however, it should be mentioned that intense light sources have a high secondary exposure potential due to their blinding effect. When looking at bright light sources (e.g. headlights), temporary reduction in visual acuity and afterimages can occur, leading to irritation, annoyance, visual impairment, and even accidents, depending on the situation.

Subcomponents of this device contain, in addition to other substances, metal filled materials including silver. Metal filled materials can be affected by environments that contain traces of aggressive substances. Therefore, we recommend that customers minimize device exposure to aggressive substances during storage, production, and use. Devices that showed visible discoloration when tested using the described tests above did show no performance deviations within failure limits during the stated test duration. Respective failure limits are described in the IEC60810.

For further application related informations please visit www.osram-os.com/appnotes

Disclaimer

Disclaimer

Language english will prevail in case of any discrepancies or deviations between the two language wordings.

Attention please!

The information describes the type of component and shall not be considered as assured characteristics. Terms of delivery and rights to change design reserved. Due to technical requirements components may contain dangerous substances.

For information on the types in question please contact our Sales Organization.

If printed or downloaded, please find the latest version on the OSRAM OS website.

Packing

Please use the recycling operators known to you. We can also help you – get in touch with your nearest sales office.

By agreement we will take packing material back, if it is sorted. You must bear the costs of transport. For packing material that is returned to us unsorted or which we are not obliged to accept, we shall have to invoice you for any costs incurred.

Product safety devices/applications or medical devices/applications

OSRAM OS components are not developed, constructed or tested for the application as safety relevant component or for the application in medical devices.

In case Buyer – or Customer supplied by Buyer– considers using OSRAM OS components in product safety devices/applications or medical devices/applications, Buyer and/or Customer has to inform the local sales partner of OSRAM OS immediately and OSRAM OS and Buyer and /or Customer will analyze and coordinate the customer-specific request between OSRAM OS and Buyer and/or Customer.

Glossary

- 1) **Brightness:** Brightness values are measured during a current pulse of typically 25 ms, with an internal reproducibility of $\pm 8\%$ and an expanded uncertainty of $\pm 11\%$ (acc. to GUM with a coverage factor of $k = 3$).
- 2) **Reverse Operation:** Reverse Operation of 10 hours is permissible in total. Continuous reverse operation is not allowed.
- 3) **Chromaticity coordinate groups:** Chromaticity coordinates are measured during a current pulse of typically 25 ms, with an internal reproducibility of ± 0.005 and an expanded uncertainty of ± 0.01 (acc. to GUM with a coverage factor of $k = 3$).
- 4) **Forward Voltage:** The forward voltage is measured during a current pulse of typically 8 ms, with an internal reproducibility of $\pm 0.05\text{ V}$ and an expanded uncertainty of $\pm 0.1\text{ V}$ (acc. to GUM with a coverage factor of $k = 3$).
- 5) **Thermal Resistance:** $R_{th\text{ max}}$ is based on statistic values (6σ).
- 6) **Thermal Resistance:** R_{thJA} results from mounting on PC board FR 4 (pad size 16 mm^2 per pad)
- 7) **Typical Values:** Due to the special conditions of the manufacturing processes of semiconductor devices, the typical data or calculated correlations of technical parameters can only reflect statistical figures. These do not necessarily correspond to the actual parameters of each single product, which could differ from the typical data and calculated correlations or the typical characteristic line. If requested, e.g. because of technical improvements, these typ. data will be changed without any further notice.
- 8) **Characteristic curve:** In the range where the line of the graph is broken, you must expect higher differences between single devices within one packing unit.
- 9) **Tolerance of Measure:** Unless otherwise noted in drawing, tolerances are specified with ± 0.1 and dimensions are specified in mm.
- 10) **Tape and Reel:** All dimensions and tolerances are specified acc. IEC 60286-3 and specified in mm.

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EU RoHS and China RoHS compliant product



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