

UNITED STATES DISTRICT COURT
for the
EASTERN DISTRICT OF TEXAS

SINOTECHNIX, LLC

Plaintiff

v.

**SAMSUNG ELECTRONICS CO., LTD.,
et al.**

Defendant

Civil Action No. 2:24-cv-00544-JRG-RSP

**SUBPOENA TO PRODUCE DOCUMENTS, INFORMATION, OR OBJECTS
OR TO PERMIT INSPECTION OF PREMISES IN A CIVIL ACTION**

To: **OSRAM SYLVANIA Inc. 275 W Main St, Hillsboro, NH 03244
c/o CORPORATE CREATIONS NETWORK INC. 3 Executive Park Drive 201A, Bedford, NH, 03110**

(Name of person to whom this subpoena is directed)

☒ **Production: YOU ARE COMMANDED** to produce at the time, date, and place set forth below the following documents, electronically stored information, or objects, and to permit inspection, copying, testing, or sampling of the material: See Attachments A-C

Place: TransPerfect
100 High Street, #502
Boston, MA 02110

Date and Time:

04/25/2025 5:00 pm

☐ **Inspection of Premises: YOU ARE COMMANDED** to permit entry onto the designated premises, land, or other property possessed or controlled by you at the time, date, and location set forth below, so that the requesting party may inspect, measure, survey, photograph, test, or sample the property or any designated object or operation on it.

Place:

Date and Time:

The following provisions of Fed. R. Civ. P. 45 are attached – Rule 45(c), relating to the place of compliance; Rule 45(d), relating to your protection as a person subject to a subpoena; and Rule 45(e) and (g), relating to your duty to respond to this subpoena and the potential consequences of not doing so.

Date: 04/14/2025

CLERK OF COURT

OR

Signature of Clerk or Deputy Clerk

/s/ Asim Zaidi

Attorney's signature

The name, address, e-mail address, and telephone number of the attorney representing *(name of party)* Samsung Electronics Co., Ltd. and Samsung Electronics America, Inc., who issues or requests this subpoena, are:
Asim Zaidi, Desmarais LLP - 230 Park Ave, New York, NY 10169 - (212) 808-1044 - AZaidi@DLLP.com

Notice to the person who issues or requests this subpoena

If this subpoena commands the production of documents, electronically stored information, or tangible things or the inspection of premises before trial, a notice and a copy of the subpoena must be served on each party in this case before it is served on the person to whom it is directed. Fed. R. Civ. P. 45(a)(4).

Civil Action No. 2:24-cv-00544-JRG-RSP

PROOF OF SERVICE

(This section should not be filed with the court unless required by Fed. R. Civ. P. 45.)

I received this subpoena for *(name of individual and title, if any)* _____
on *(date)* _____.

☐ I served the subpoena by delivering a copy to the named person as follows: _____

_____ on *(date)* _____; or

☐ I returned the subpoena unexecuted because: _____

Unless the subpoena was issued on behalf of the United States, or one of its officers or agents, I have also
tendered to the witness the fees for one day's attendance, and the mileage allowed by law, in the amount of
\$ _____.

My fees are \$ _____ for travel and \$ _____ for services, for a total of \$ 0.00.

I declare under penalty of perjury that this information is true.

Date: _____

Server's signature

Printed name and title

Server's address

Additional information regarding attempted service, etc.:

Federal Rule of Civil Procedure 45 (c), (d), (e), and (g) (Effective 12/1/13)**(c) Place of Compliance.**

(1) For a Trial, Hearing, or Deposition. A subpoena may command a person to attend a trial, hearing, or deposition only as follows:

- (A) within 100 miles of where the person resides, is employed, or regularly transacts business in person; or
- (B) within the state where the person resides, is employed, or regularly transacts business in person, if the person
 - (i) is a party or a party's officer; or
 - (ii) is commanded to attend a trial and would not incur substantial expense.

(2) For Other Discovery. A subpoena may command:

- (A) production of documents, electronically stored information, or tangible things at a place within 100 miles of where the person resides, is employed, or regularly transacts business in person; and
- (B) inspection of premises at the premises to be inspected.

(d) Protecting a Person Subject to a Subpoena; Enforcement.

(1) Avoiding Undue Burden or Expense; Sanctions. A party or attorney responsible for issuing and serving a subpoena must take reasonable steps to avoid imposing undue burden or expense on a person subject to the subpoena. The court for the district where compliance is required must enforce this duty and impose an appropriate sanction—which may include lost earnings and reasonable attorney's fees—on a party or attorney who fails to comply.

(2) Command to Produce Materials or Permit Inspection.

(A) *Appearance Not Required.* A person commanded to produce documents, electronically stored information, or tangible things, or to permit the inspection of premises, need not appear in person at the place of production or inspection unless also commanded to appear for a deposition, hearing, or trial.

(B) *Objections.* A person commanded to produce documents or tangible things or to permit inspection may serve on the party or attorney designated in the subpoena a written objection to inspecting, copying, testing, or sampling any or all of the materials or to inspecting the premises—or to producing electronically stored information in the form or forms requested. The objection must be served before the earlier of the time specified for compliance or 14 days after the subpoena is served. If an objection is made, the following rules apply:

- (i) At any time, on notice to the commanded person, the serving party may move the court for the district where compliance is required for an order compelling production or inspection.
- (ii) These acts may be required only as directed in the order, and the order must protect a person who is neither a party nor a party's officer from significant expense resulting from compliance.

(3) Quashing or Modifying a Subpoena.

(A) *When Required.* On timely motion, the court for the district where compliance is required must quash or modify a subpoena that:

- (i) fails to allow a reasonable time to comply;
- (ii) requires a person to comply beyond the geographical limits specified in Rule 45(c);
- (iii) requires disclosure of privileged or other protected matter, if no exception or waiver applies; or
- (iv) subjects a person to undue burden.

(B) *When Permitted.* To protect a person subject to or affected by a subpoena, the court for the district where compliance is required may, on motion, quash or modify the subpoena if it requires:

- (i) disclosing a trade secret or other confidential research, development, or commercial information; or

(ii) disclosing an unretained expert's opinion or information that does not describe specific occurrences in dispute and results from the expert's study that was not requested by a party.

(C) *Specifying Conditions as an Alternative.* In the circumstances described in Rule 45(d)(3)(B), the court may, instead of quashing or modifying a subpoena, order appearance or production under specified conditions if the serving party:

- (i) shows a substantial need for the testimony or material that cannot be otherwise met without undue hardship; and
- (ii) ensures that the subpoenaed person will be reasonably compensated.

(e) Duties in Responding to a Subpoena.

(1) Producing Documents or Electronically Stored Information. These procedures apply to producing documents or electronically stored information:

(A) *Documents.* A person responding to a subpoena to produce documents must produce them as they are kept in the ordinary course of business or must organize and label them to correspond to the categories in the demand.

(B) *Form for Producing Electronically Stored Information Not Specified.* If a subpoena does not specify a form for producing electronically stored information, the person responding must produce it in a form or forms in which it is ordinarily maintained or in a reasonably usable form or forms.

(C) *Electronically Stored Information Produced in Only One Form.* The person responding need not produce the same electronically stored information in more than one form.

(D) *Inaccessible Electronically Stored Information.* The person responding need not provide discovery of electronically stored information from sources that the person identifies as not reasonably accessible because of undue burden or cost. On motion to compel discovery or for a protective order, the person responding must show that the information is not reasonably accessible because of undue burden or cost. If that showing is made, the court may nonetheless order discovery from such sources if the requesting party shows good cause, considering the limitations of Rule 26(b)(2)(C). The court may specify conditions for the discovery.

(2) Claiming Privilege or Protection.

(A) *Information Withheld.* A person withholding subpoenaed information under a claim that it is privileged or subject to protection as trial-preparation material must:

- (i) expressly make the claim; and
- (ii) describe the nature of the withheld documents, communications, or tangible things in a manner that, without revealing information itself privileged or protected, will enable the parties to assess the claim.

(B) *Information Produced.* If information produced in response to a subpoena is subject to a claim of privilege or of protection as trial-preparation material, the person making the claim may notify any party that received the information of the claim and the basis for it. After being notified, a party must promptly return, sequester, or destroy the specified information and any copies it has; must not use or disclose the information until the claim is resolved; must take reasonable steps to retrieve the information if the party disclosed it before being notified; and may promptly present the information under seal to the court for the district where compliance is required for a determination of the claim. The person who produced the information must preserve the information until the claim is resolved.

(g) Contempt.

The court for the district where compliance is required—and also, after a motion is transferred, the issuing court—may hold in contempt a person who, having been served, fails without adequate excuse to obey the subpoena or an order related to it.

UNITED STATES DISTRICT COURT
for the
EASTERN DISTRICT OF TEXAS

SINOTECHNIX, LLC

Plaintiff

v.

SAMSUNG ELECTRONICS CO., LTD.,
et al.

Defendant

Civil Action No. 2:24-cv-00544-JRG-RSP

SUBPOENA TO TESTIFY AT A DEPOSITION IN A CIVIL ACTION

To: OSRAM SYLVANIA Inc. 275 W Main St, Hillsboro, NH 03244
c/o CORPORATE CREATIONS NETWORK INC. 3 Executive Park Drive 201A, Bedford, NH, 03110

(Name of person to whom this subpoena is directed)

☒ **Testimony:** YOU ARE COMMANDED to appear at the time, date, and place set forth below to testify at a deposition to be taken in this civil action. If you are an organization, you must promptly confer in good faith with the party serving this subpoena about the following matters, or those set forth in an attachment, and you must designate one or more officers, directors, or managing agents, or designate other persons who consent to testify on your behalf about these matters: Documents and topics described in concurrent Subpoena to Product Documents, Information or Objects

Place: TransPerfect 100 High Street, #502 Boston, MA 02110	Date and Time: 05/05/2025 9:00 am
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The deposition will be recorded by this method: Audio, Video, Stenographic

☐ **Production:** You, or your representatives, must also bring with you to the deposition the following documents, electronically stored information, or objects, and must permit inspection, copying, testing, or sampling of the material:

The following provisions of Fed. R. Civ. P. 45 are attached – Rule 45(c), relating to the place of compliance; Rule 45(d), relating to your protection as a person subject to a subpoena; and Rule 45(e) and (g), relating to your duty to respond to this subpoena and the potential consequences of not doing so.

Date: 04/14/2025

CLERK OF COURT

OR

/s/ Asim Zaidi

Signature of Clerk or Deputy Clerk

Attorney's signature

The name, address, e-mail address, and telephone number of the attorney representing *(name of party)* Samsung Electronics Co., Ltd. and Samsung Electronics America, Inc., who issues or requests this subpoena, are:
Asim Zaidi, Desmarais LLP - 230 Park Ave, New York, NY 10169 - (212) 808-1044 - AZaidi@DLLP.com

Notice to the person who issues or requests this subpoena

If this subpoena commands the production of documents, electronically stored information, or tangible things before trial, a notice and a copy of the subpoena must be served on each party in this case before it is served on the person to whom it is directed. Fed. R. Civ. P. 45(a)(4).

Civil Action No. 2:24-cv-00544-JRG-RSP

PROOF OF SERVICE

(This section should not be filed with the court unless required by Fed. R. Civ. P. 45.)

I received this subpoena for *(name of individual and title, if any)* _____
on *(date)* _____ .

☐ I served the subpoena by delivering a copy to the named individual as follows: _____

_____ on *(date)* _____ ; or

☐ I returned the subpoena unexecuted because: _____
_____ .

Unless the subpoena was issued on behalf of the United States, or one of its officers or agents, I have also
tendered to the witness the fees for one day's attendance, and the mileage allowed by law, in the amount of
\$ _____ .

My fees are \$ _____ for travel and \$ _____ for services, for a total of \$ 0.00 .

I declare under penalty of perjury that this information is true.

Date: _____

Server's signature

Printed name and title

Server's address

Additional information regarding attempted service, etc.:

Federal Rule of Civil Procedure 45 (c), (d), (e), and (g) (Effective 12/1/13)

(c) Place of Compliance.

(1) For a Trial, Hearing, or Deposition. A subpoena may command a person to attend a trial, hearing, or deposition only as follows:

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- (B) within the state where the person resides, is employed, or regularly transacts business in person, if the person
 - (i) is a party or a party's officer; or
 - (ii) is commanded to attend a trial and would not incur substantial expense.

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- (i) At any time, on notice to the commanded person, the serving party may move the court for the district where compliance is required for an order compelling production or inspection.
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- (i) fails to allow a reasonable time to comply;
 - (ii) requires a person to comply beyond the geographical limits specified in Rule 45(c);
 - (iii) requires disclosure of privileged or other protected matter, if no exception or waiver applies; or
 - (iv) subjects a person to undue burden.
- (B) *When Permitted.* To protect a person subject to or affected by a subpoena, the court for the district where compliance is required may, on motion, quash or modify the subpoena if it requires:

(i) disclosing a trade secret or other confidential research, development, or commercial information; or

(ii) disclosing an unretained expert's opinion or information that does not describe specific occurrences in dispute and results from the expert's study that was not requested by a party.

(C) *Specifying Conditions as an Alternative.* In the circumstances described in Rule 45(d)(3)(B), the court may, instead of quashing or modifying a subpoena, order appearance or production under specified conditions if the serving party:

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(B) *Information Produced.* If information produced in response to a subpoena is subject to a claim of privilege or of protection as trial-preparation material, the person making the claim may notify any party that received the information of the claim and the basis for it. After being notified, a party must promptly return, sequester, or destroy the specified information and any copies it has; must not use or disclose the information until the claim is resolved; must take reasonable steps to retrieve the information if the party disclosed it before being notified; and may promptly present the information under seal to the court for the district where compliance is required for a determination of the claim. The person who produced the information must preserve the information until the claim is resolved.

(g) Contempt.

The court for the district where compliance is required—and also, after a motion is transferred, the issuing court—may hold in contempt a person who, having been served, fails without adequate excuse to obey the subpoena or an order related to it.

Attachment A

Attachment A

Pursuant to Rules 34 and 45 of the Federal Rules of Civil Procedure, You are required to produce the documents requested below for inspection and copying. The requested documents are to be produced on or before April 25, 2025 at 5:00pm at 100 High St #502, Boston, MA 02110 or at such other time and place as may be agreed by counsel. A copy of the Protective Order entered in this action for the protection of any requested proprietary, confidential, or commercially sensitive information is attached hereto as Attachment B.

DEFINITIONS AND INSTRUCTIONS

1. As used herein, “You” and “Your” means Osram Sylvania Inc., and all of its predecessors (merged, acquired, or otherwise), successors, subsidiaries, parents, sisters, divisions, departments, partnerships, and affiliates thereof, and all officers, directors, principals, agents, employees, attorneys, and other persons acting on its behalf.

2. As used herein, “Samsung” means Samsung Electronics Co. Ltd. and all of its predecessors (merged, acquired, or otherwise), successors, subsidiaries, parents, sisters, divisions, departments, partnerships, and affiliates thereof, and all officers, directors, principals, agents, employees, attorneys, and other persons acting on its behalf.

3. As used herein, “Seoul Semiconductor” means Seoul Semiconductor Co., Ltd. and its predecessor or successor entities, and any of its subsidiaries, divisions, affiliates, and any present and former agents, employees, partners, attorneys, representatives, and any other person or entity acting in concert with Seoul Semiconductor Co., Ltd., on behalf of Seoul Semiconductor Co., Ltd., or within the control of Seoul Semiconductor Co., Ltd, including, but not limited to, Seoul Optodevice Co. Ltd. and Seoul Viosys Co. Ltd.

4. As used herein, “Related Publication(s),” as applied to a publication, means the identified publication and any publications concerning the same or related subject matter; and, as

applied to a patent or patent application or publication, further includes all patents in the same family or otherwise sharing a priority relationship including provisionals, continuations, continuations-in-part, divisionals, and foreign counterparts.

5. As used herein, “Relevant Publication(s)” include the publications included in Attachment C; all publications (including patents and patent applications or publications in any jurisdiction) describing any Relevant Product(s) or Similar Products; and any Related Publication(s). *See* Attachment C.

6. As used herein, “Similar Product(s),” as applied to a product, means the identified product and any products having similar structure, function, and/or manufacturing process.

7. As used herein, “Relevant Product(s)” refers to the Osram Power TOPLED family, including Power TOPLED, Hyper TOPLED, Multi TOPLED, Power TOPLED with Lens and model numbers LA E63B, LA E65B, and LA E655, SideLED family, a Dragon / Golden Dragon family, any other similar white LED, any products described in the Relevant Publications, and any Similar Products.

8. As used herein, “Relevant Date(s)” include November 12, 2004, and December 3, 2007.

9. As used herein, “and” and “or” shall be construed conjunctively and disjunctively, so as to acquire the broadest possible meaning.

10. As used herein, “any” and “all” shall be construed to mean “each and every,” so as to acquire the broadest possible meaning.

11. As used herein, “each” and “every” mean “each and every.”

12. As used herein, “include” and “including” shall be construed to mean “without limitation,” so as to acquire the broadest possible meaning.

13. As used herein, “document” has the same broad meaning as in Rule 34 of the Federal Rules of Civil Procedure. The term “document” also encompasses tangible things.

14. As used herein, “person” means any natural person or any business, legal, or governmental entity or association.

15. As used herein, “related” or “relating” to any given subject means, without limitation, identifying, describing, discussing, concerning, assessing, stating, reflecting, constituting, containing, embodying, tending to support or refute, or referring directly or indirectly to, in any way, the particular subject matter identified.

16. As used herein, “identify” as applied to an event means to provide a description of the event, the date of the event, the location of the event, and the individuals and entities participating in the event.

17. As used herein, the singular of any word shall include the plural, and the plural shall include the singular.

18. Pursuant to the requests herein, You are to produce any and all relevant documents within the Your possession, custody, or control, including documents located in the files of any and all of Your past and present association members, subsidiaries, parents, sisters, partnerships, directors, officers, agents, representatives, employees, attorneys, and accountants.

19. Produce each document in its entirety, without deletions, redactions, or exclusions, regardless of whether you deem part of a document outside of the scope of the requests.

20. Produce documents that identify the file or other source in which each document responsive to these requests is found or keep a record of such information.

21. Documents from any single file should be produced in the same order as they were found in such file, including any labels, files, folders, and/or containers in which such documents

are located or with which such documents are associated. If copies of documents are produced in lieu of the originals, such copies should be legible and bound or stapled in the same manner as the originals.

22. All documents that constitute electronically stored information, with that term having the meaning ascribed to it by the Federal Rules of Civil Procedure, shall be produced in an intelligible format.

23. If a document once existed, but has been lost, destroyed, erased, or otherwise is no longer in your possession, identify the document and state the details concerning the loss or destruction of such document, including the name and address of the present custodian of any such document known to You.

24. If, after conducting a reasonable investigation, a full answer cannot be provided for any request for the production of documents, state that such is the case and answer to the fullest extent possible, stating what responsive documents or information are available, what documents or information cannot be provided, and what efforts were made to obtain the unavailable documents or information.

25. If any of the documents requested herein are no longer in Your possession, custody, or control, identify for each such document the date, the type of the document, any senders and recipients, and any persons receiving any copies of each such document, and provide a summary of each such document's pertinent contents.

26. If any document responsive to these requests has been destroyed, describe the contents of the document, identify the location of any copies of the document, and the date of destruction of the document.

27. If any document is withheld on a claim of attorney/client privilege or work product immunity, provide a detailed privilege log that describes the nature and basis for your claim and the subject matter of the document withheld, in a manner sufficient to disclose facts upon which You rely in asserting your claim and to identify the grounds and reasons for withholding the document. Such description should, at a minimum, include the date of the withheld document, an identification of each and every author of the document, an identification of each and every person who received the document, an identification of each and every person from whom the document was received, a description of the subject of the document, and further information relating to the document sufficient to explain the claim of privilege or immunity and to permit the adjudication of the propriety of that claim.

28. The document requests herein shall be deemed continuing, and it is requested that You provide supplemental responses and production as additional information or documents become available, in accordance with Rule 26(e) of the Federal Rules of Civil Procedure.

29. If a document is in a language other than English and an English translation exists, provide both documents.

DOCUMENT REQUESTS

1. Documents, including but not limited to diagrams, cross-sections, and specifications, sufficient to show the structure operation, material composition, manufacturing process, and supplier information of the Relevant Product(s) and all Similar Products.

2. Documents sufficient to show the structure, function, configuration, operation, material composition, manufacturing process, and supplier information for all light emitting diodes (LEDs) contained in the Relevant Product(s) or any Similar Products prior to the Relevant Date(s).

3. Documents sufficient to show the structure and function of displays or display modules (including backlights) using the Relevant Product(s) or any Similar Products; including any diffusers, reflectors, LEDs or other light sources, light guides, LCD panels, and air gaps prior to the Relevant Date(s).
4. Documents sufficient to show the manufacturing process for the Relevant Products including the forming of semiconductor layers, the photoresist process (including shape and dimensions), and any baking or etching processes (including temperatures) prior to the Relevant Date(s).
5. Documents, including but not limited to process flows, sufficient to show the manufacturing process concerning the Relevant Product(s) and all Similar Products.
6. Documents sufficient to show the operation and functionality of the Relevant Product(s) and all Similar Products.
7. Documents sufficient to identify any suppliers for the Relevant Product(s) or any Similar Products.
8. Documents sufficient to identify any customers for the Relevant Products or any Similar Products.
9. Documents sufficient to show the package structure of Relevant Products or any Similar Products, including any lead frames, resins/encapsulants, and LED chips
10. Documents sufficient to show the date on which each of the Relevant Product(s) or any Similar Products (or products that use and/or include the Relevant Product(s) or any Similar Products) were first sold, on sale, offered for sale, in public use, or otherwise available to the public in the United States (including, for example, product catalogs, announcements, invoices, and sales records).

11. Relevant Publication(s) and Related Publications.
12. Documents sufficient to show public availability of the Relevant Publication(s) and all Related Publications prior to each Relevant Date.
13. Physical samples of each Relevant Product and any Similar Products.
14. Documents describing any communication between You and Seoul Semiconductor relating to any of Your products with an LED or lens (including the Relevant Product(s) and any Similar Products) before the Relevant Date(s), including but not limited to any discussion, negotiation, and final agreement for the demonstration, exhibition, or sale of any such product to Seoul Semiconductor.
15. Documents sufficient to establish authenticity (within the meaning of Fed. R. Evid. 901) of each document You produce in response to this subpoena.

Attachment C

Attachment C-1

OSRAM LA E63B

Datasheet

Discontinued

Published by **ams-OSRAM AG**

Tobelbader Strasse 30, 8141 Premstaetten, Austria

Phone +43 3136 500-0

ams-osram.com

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Ex. 2007, Page 17

Power TOPLED® Lens

LA E63B

PowerTOPLED with lens, a powerful member of the TOPLED family. Thanks to their high luminous efficacy, the LEDs are ideal for rear light clusters and indicators on vehicles and for display panels for traffic control systems.



Applications

- Automotive Aftermarket
- Static Signaling

Features

- Package: white PLCC-4 package, colorless clear resin
- Chip technology: InGaAlP
- Typ. Radiation: 30°
- Color: $\lambda_{\text{dom}} = 617 \text{ nm}$ (● amber)
- Corrosion Robustness Class: 3B
- Qualifications: AEC-Q102 Qualified
- ESD: 2 kV acc. to ANSI/ESDA/JEDEC JS-001 (HBM, Class 2)

Ordering Information

Type	Partial Flux ¹⁾ I _F = 50 mA E _v	Ordering Code
LA E63B-CBEA-24-1	3550 ... 9000 lx	Q65110A2337

Discontinued

Maximum Ratings

Parameter	Symbol		Values
Operating Temperature	T_{op}	min.	-40 °C
		max.	100 °C
Storage Temperature	T_{stg}	min.	-40 °C
		max.	100 °C
Junction Temperature	T_j	max.	125 °C
Forward current $T_s = 25\text{ °C}$	I_F	max.	70 mA
Surge current $t \leq 10\text{ }\mu\text{s}$; $D = 0.005$; $T_s = 25\text{ °C}$	I_{FS}	max.	100 mA
Reverse voltage ²⁾ $T_s = 25\text{ °C}$	V_R	max.	12 V
ESD withstand voltage acc. to ANSI/ESDA/JEDEC JS-001 (HBM, Class 2)	V_{ESD}		2 kV

Characteristics

$I_F = 50 \text{ mA}$; $T_S = 25^\circ \text{C}$

Parameter	Symbol		Values
Peak Wavelength	λ_{peak}	typ.	624 nm
Dominant Wavelength ³⁾ $I_F = 50 \text{ mA}$	λ_{dom}	min. typ. max.	612 nm 617 nm 624 nm
Spectral Bandwidth at 50% $I_{\text{rel,max}}$	$\Delta\lambda$	typ.	18 nm
Viewing angle at 50% I_V	2ϕ	typ.	30°
Forward Voltage ⁴⁾ $I_F = 50 \text{ mA}$	V_F	min. typ. max.	1.90 V 2.20 V 2.50 V
Reverse current ²⁾ $V_R = 12 \text{ V}$	I_R	typ. max.	0.01 μA 10 μA
Temperature Coefficient of Peak Wavelength $-10^\circ\text{C} \leq T \leq 100^\circ\text{C}$	$\text{TC}_{\lambda_{\text{peak}}}$	typ.	0.15 nm / K
Temperature Coefficient of Dominant Wavelength $-10^\circ\text{C} \leq T \leq 100^\circ\text{C}$	$\text{TC}_{\lambda_{\text{dom}}}$	typ.	0.07 nm / K
Temperature Coefficient of Forward Voltage $-10^\circ\text{C} \leq T \leq 100^\circ\text{C}$	TC_{V_F}	typ.	-3.7 mV / K
Real thermal resistance junction/solderpoint ⁵⁾	$R_{\text{thJS real}}$	typ. max.	110 K / W 130 K / W

Brightness Groups

Group	Partial Flux ¹⁾ $I_F = 50 \text{ mA}$ min. E_v	Partial Flux ¹⁾ $I_F = 50 \text{ mA}$ max. E_v	Luminous Flux ⁶⁾ $I_F = 50 \text{ mA}$ typ. Φ_v
CB	3550 lx	4500 lx	1890 mlm
DA	4500 lx	5600 lx	2370 mlm
DB	5600 lx	7100 lx	2980 mlm
EA	7100 lx	9000 lx	3780 mlm

Forward Voltage Groups

Group	Forward Voltage ⁴⁾ $I_F = 50 \text{ mA}$ min. V_F	Forward Voltage ⁴⁾ $I_F = 50 \text{ mA}$ max. V_F
3A	1.90 V	2.05 V
3B	2.05 V	2.20 V
4A	2.20 V	2.35 V
4B	2.35 V	2.50 V

Wavelength Groups

Group	Dominant Wavelength ³⁾ $I_F = 50 \text{ mA}$ min. λ_{dom}	Dominant Wavelength ³⁾ $I_F = 50 \text{ mA}$ max. λ_{dom}
2	612 nm	616 nm
3	616 nm	620 nm
4	620 nm	624 nm

Group Name on Label

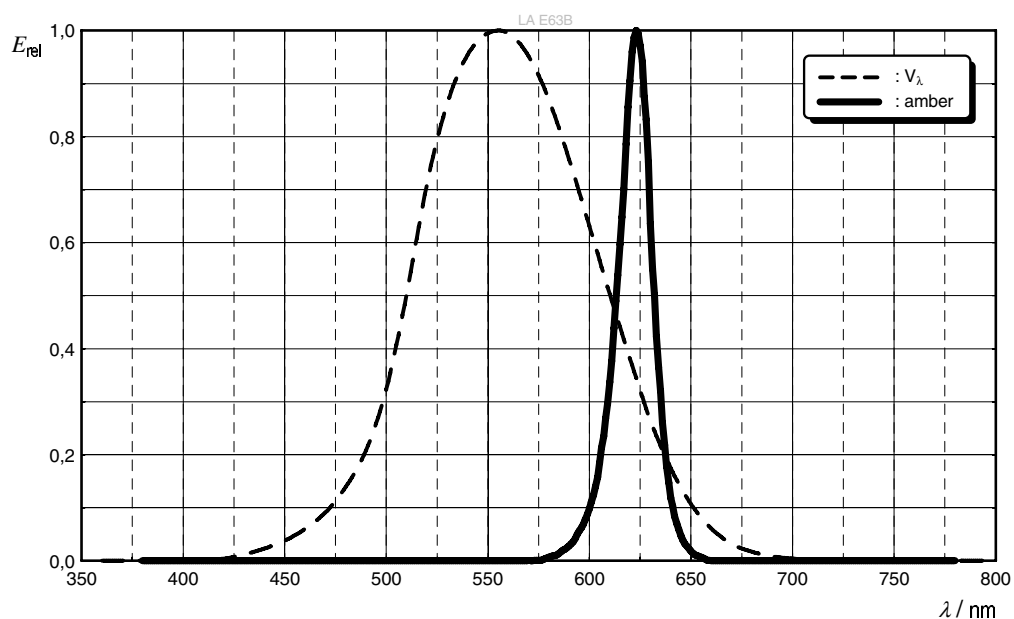
Example: CB-2-3A

Brightness	Wavelength	Forward Voltage
CB	2	3A

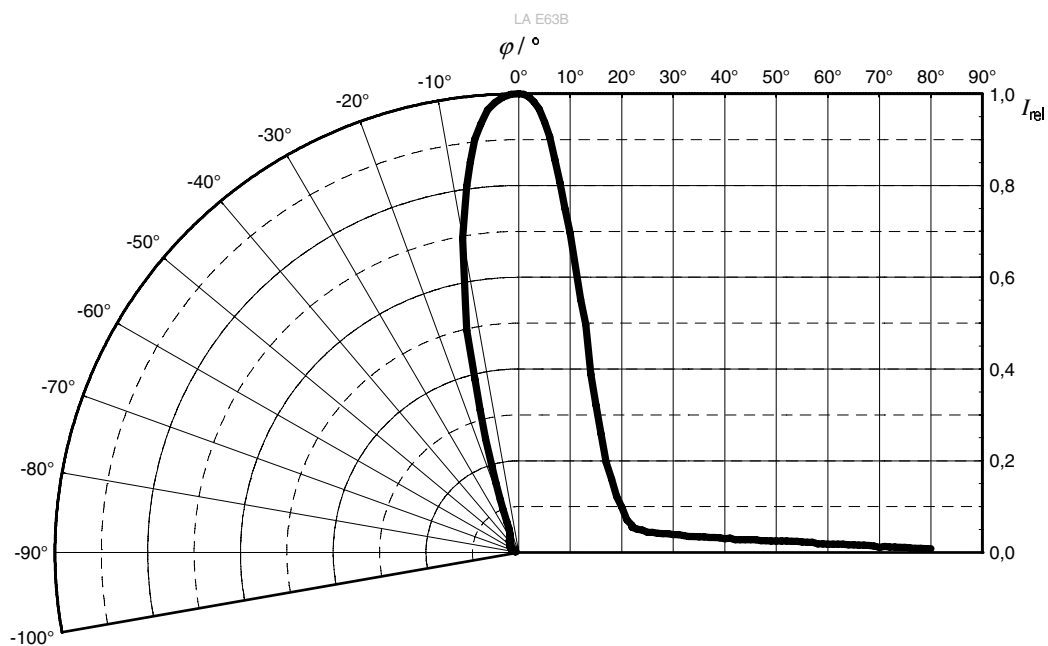
Discontinued

Relative Spectral Emission ⁶⁾

$$E_{\text{rel}} = f(\lambda); I_F = 50 \text{ mA}; T_S = 25 \text{ °C}$$

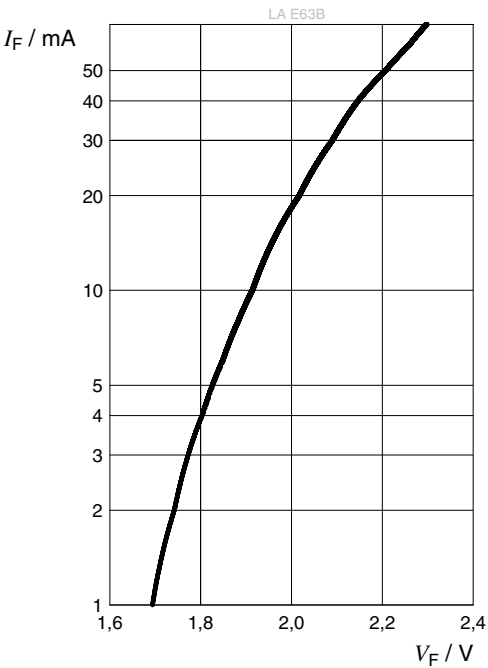
Radiation Characteristics ⁶⁾

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



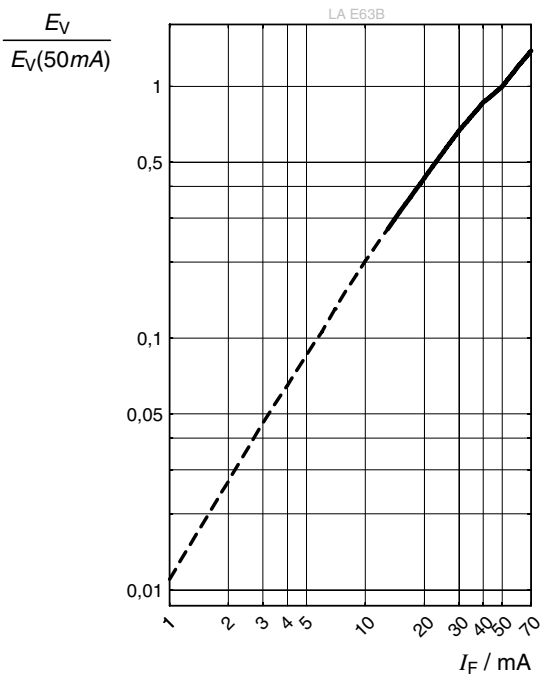
Forward current ^{6), 7)}

$I_F = f(V_F); T_S = 25\text{ °C}$



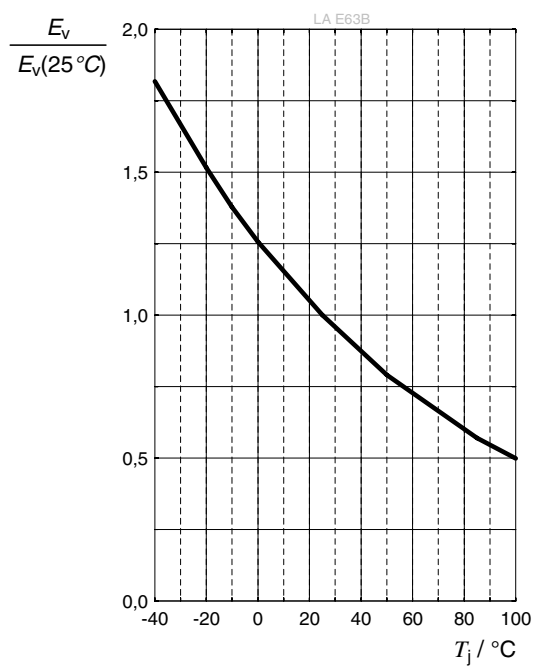
Relative Illuminance ^{6), 7)}

$E_V/E_V(50\text{ mA}) = f(I_F); T_S = 25\text{ °C}$



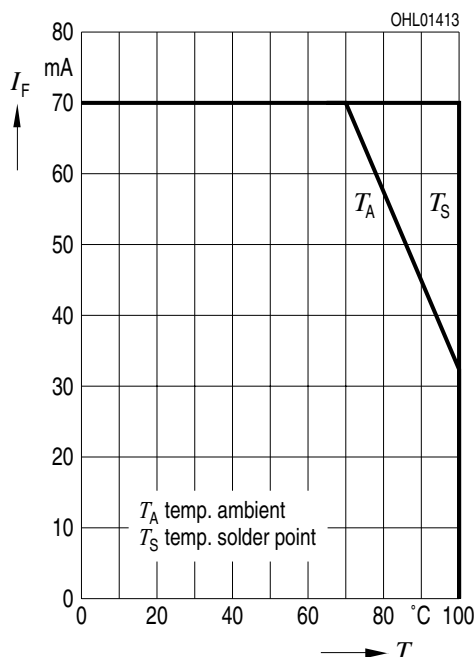
Relative Illuminance ⁶⁾

$$E_V/E_V(25\text{ °C}) = f(T_j); I_F = 50\text{ mA}$$



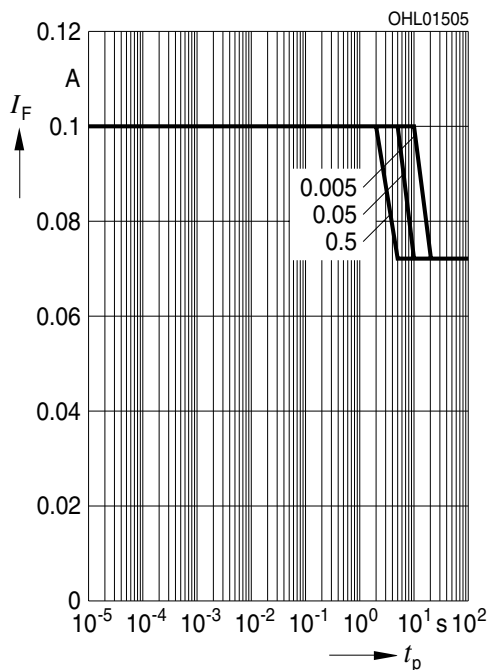
Max. Permissible Forward Current

$$I_F = f(T)$$



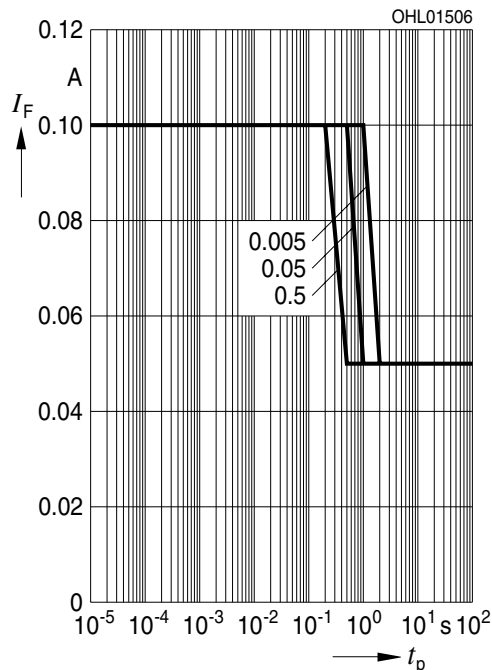
Permissible Pulse Handling Capability

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

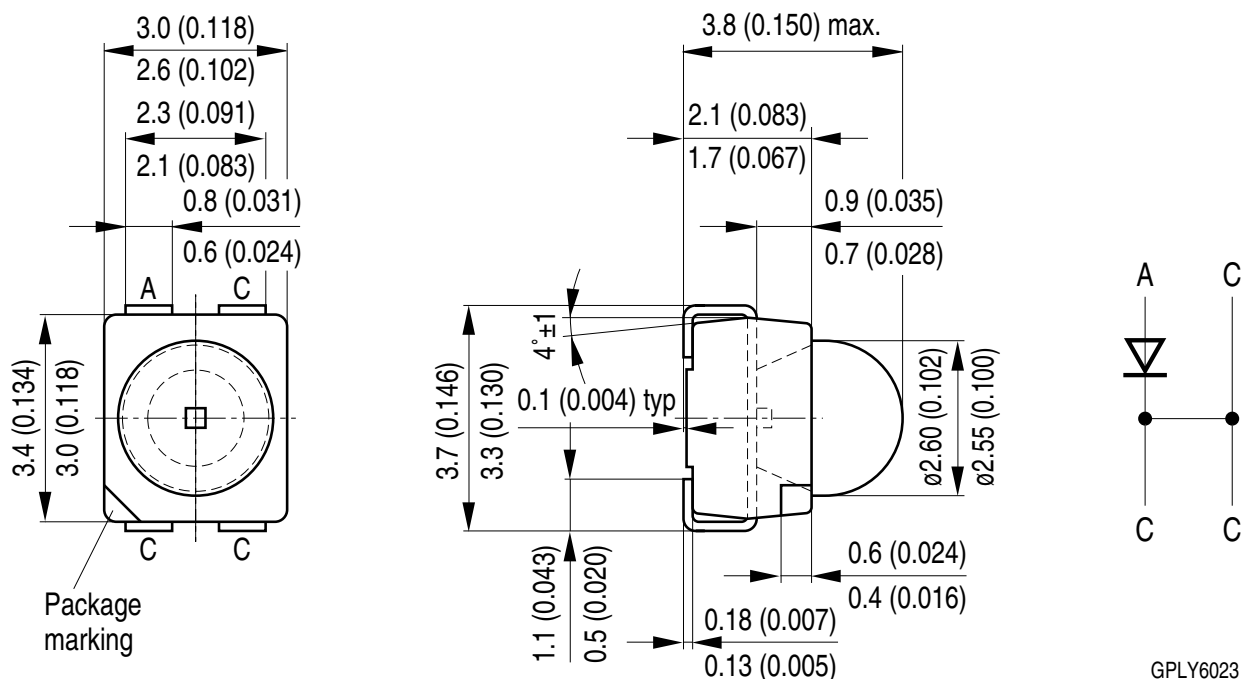


Permissible Pulse Handling Capability

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



Dimensional Drawing ⁸⁾

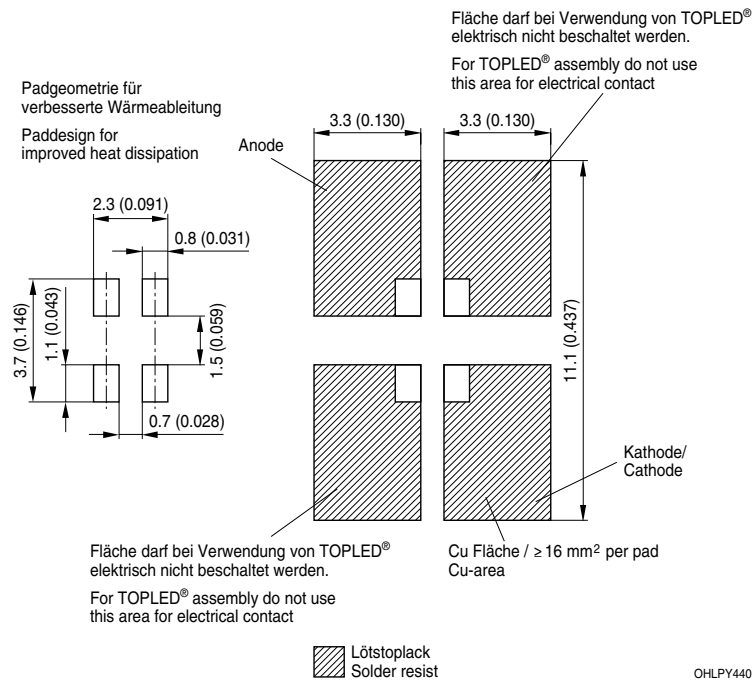


Further Information:

Approximate Weight: 38.0 mg

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

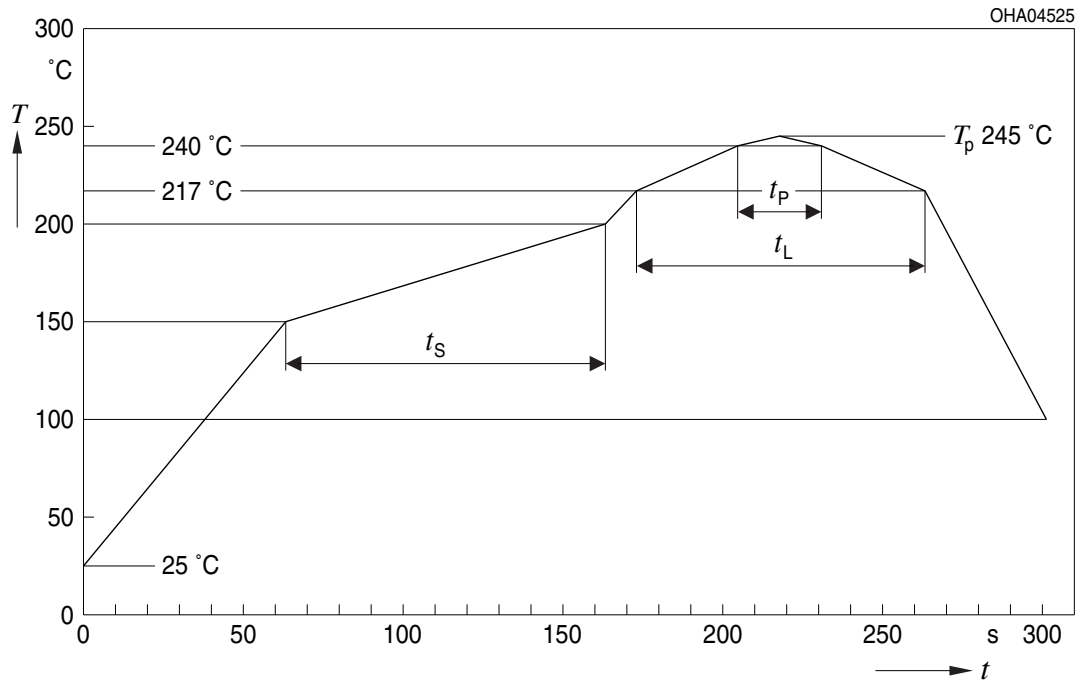
Recommended Solder Pad ⁸⁾



For superior solder joint connectivity results we recommend soldering under standard nitrogen atmosphere. Package not suitable for any kind of wet cleaning or ultrasonic cleaning.

Reflow Soldering Profile

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

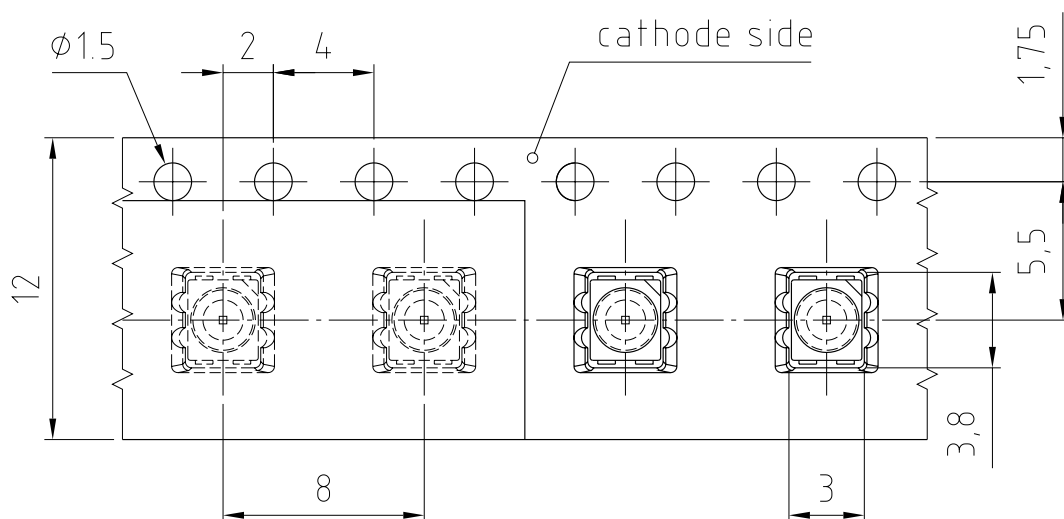


Profile Feature	Symbol	Pb-Free (SnAgCu) Assembly			Unit
		Minimum	Recommendation	Maximum	
Ramp-up rate to preheat ^{*)} 25 °C to 150 °C			2	3	K/s
Time t_s T_{Smin} to T_{Smax}	t_s	60	100	120	s
Ramp-up rate to peak ^{*)} T_{Smax} to T_p			2	3	K/s
Liquidus temperature	T_L		217		$^{\circ}\text{C}$
Time above liquidus temperature	t_L		80	100	s
Peak temperature	T_p		245	250	$^{\circ}\text{C}$
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	4	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

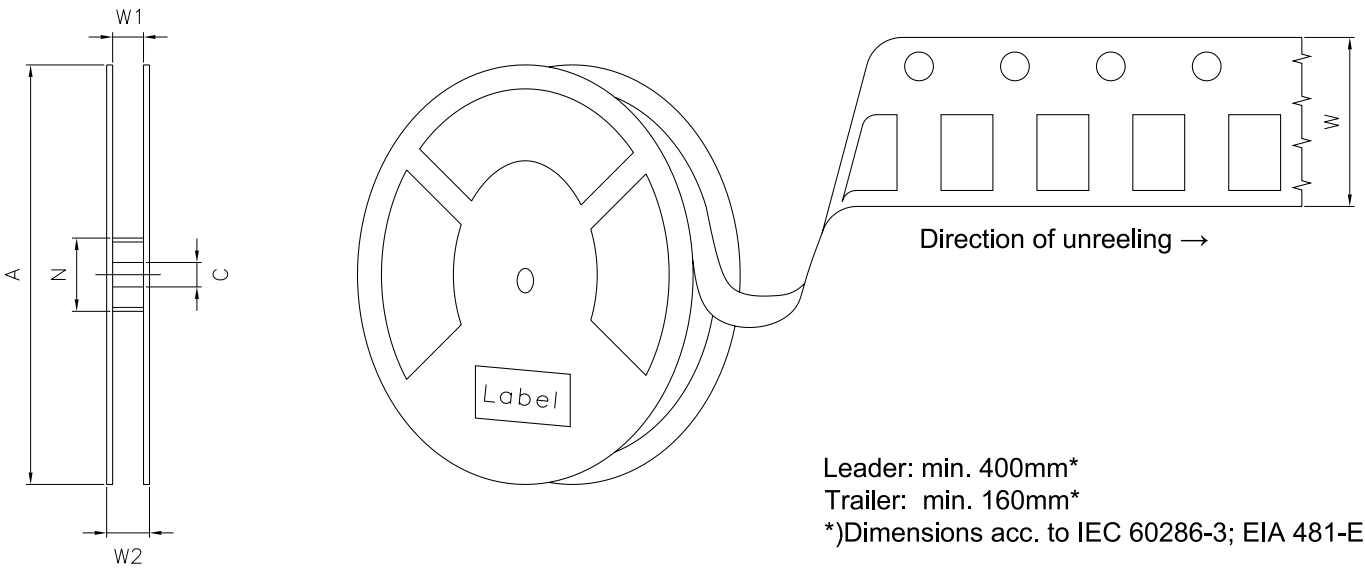
* slope calculation DT/Dt : Dt max. 5 s; fulfillment for the whole T-range

Taping ⁸⁾



C63062-A3691-B01-03

Tape and Reel ⁹⁾



Reel Dimensions

A	W	N _{min}	W ₁	W _{2max}	Pieces per PU
330 mm	12 + 0.3 / - 0.1 mm	60 mm	12.4 + 2 mm	18.4 mm	2000

Barcode-Product-Label (BPL)

**OSRAM Opto
Semiconductors**

LX XXXX
BIN1: XX-XX-X-XXX-X

(6P) BATCH NO: 1234567890
RoHS Compliant

ML Temp ST
X XXX °C X

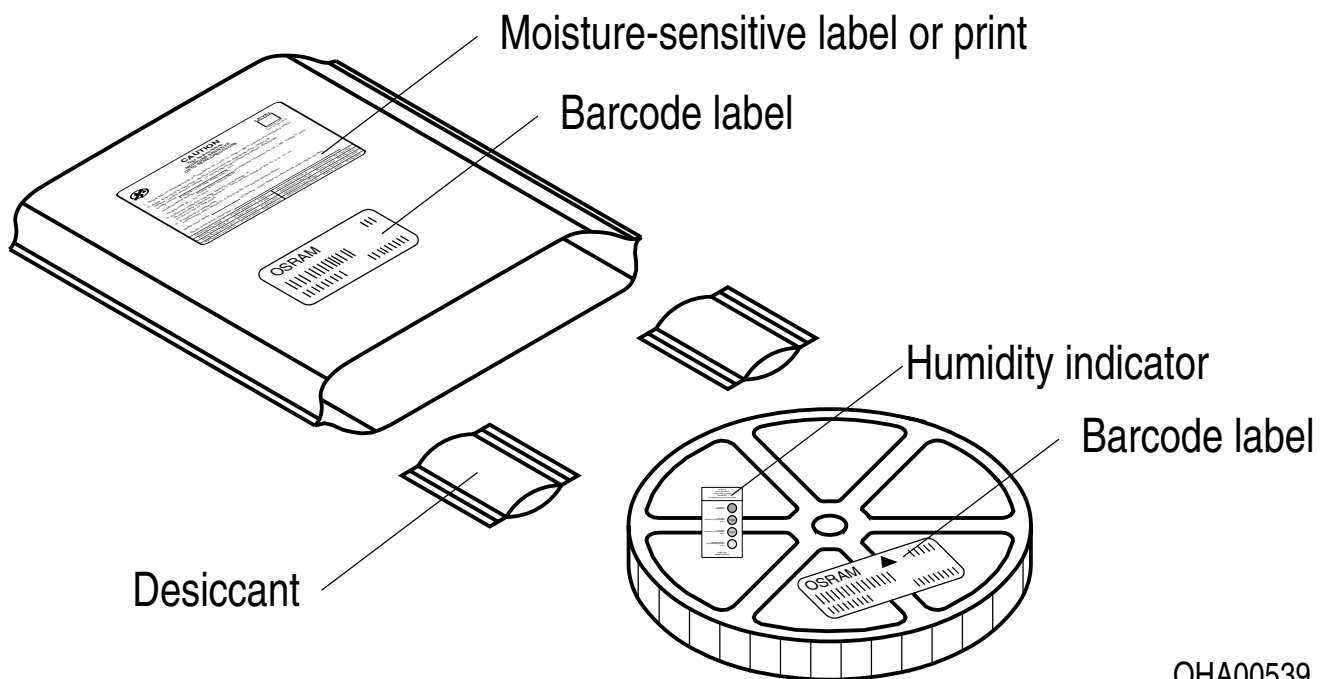
(1T) LOT NO: 1234567890 (9D) D/C: 1234

Pack: RXX
DEMY XXX
X_X123_1234.1234 X

(X) PROD NO: 123456789(Q)QTY: 9999 (G) GROUP: XX-XX-X-X

OHA04563

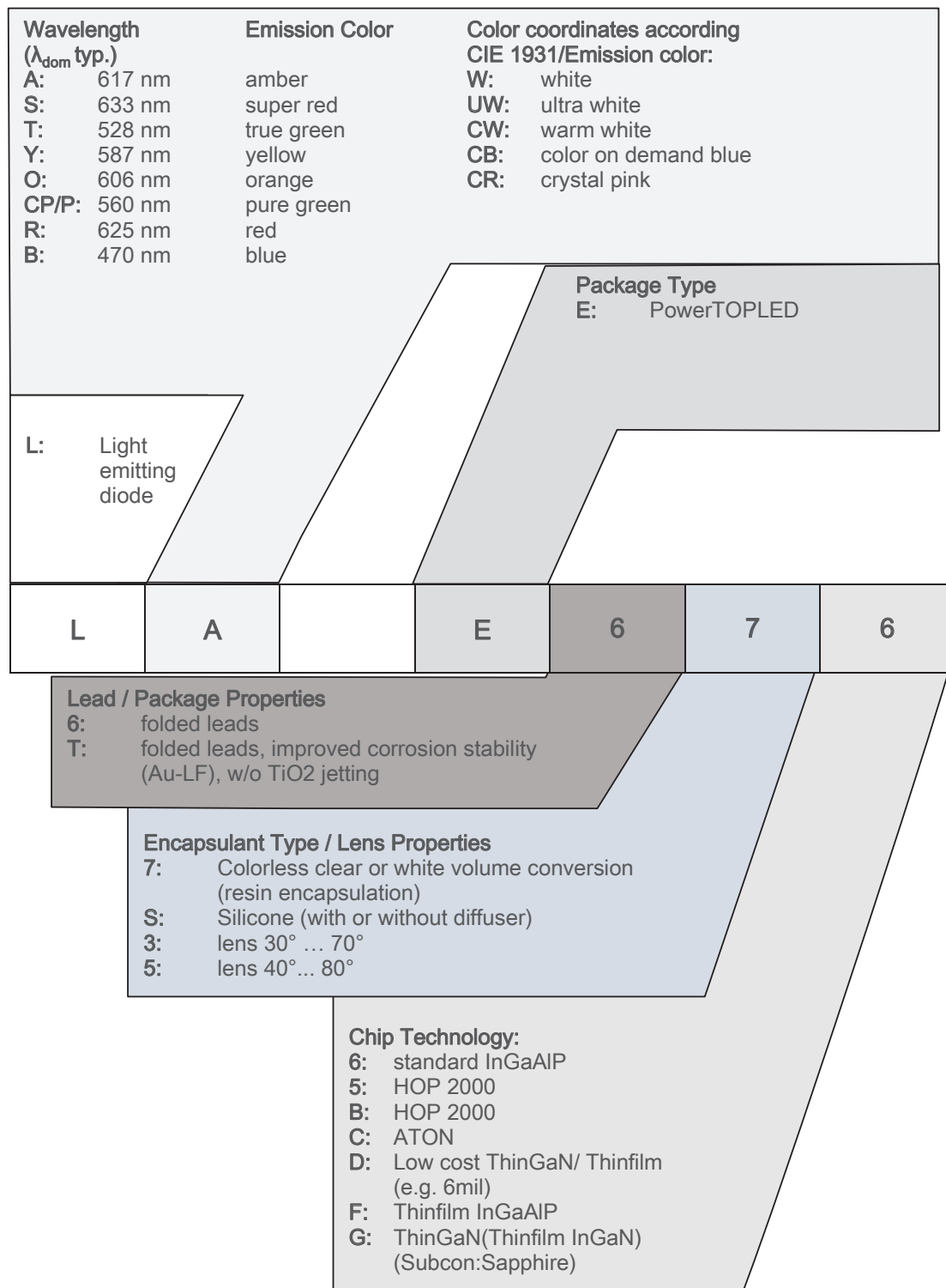
Dry Packing Process and Materials ⁸⁾



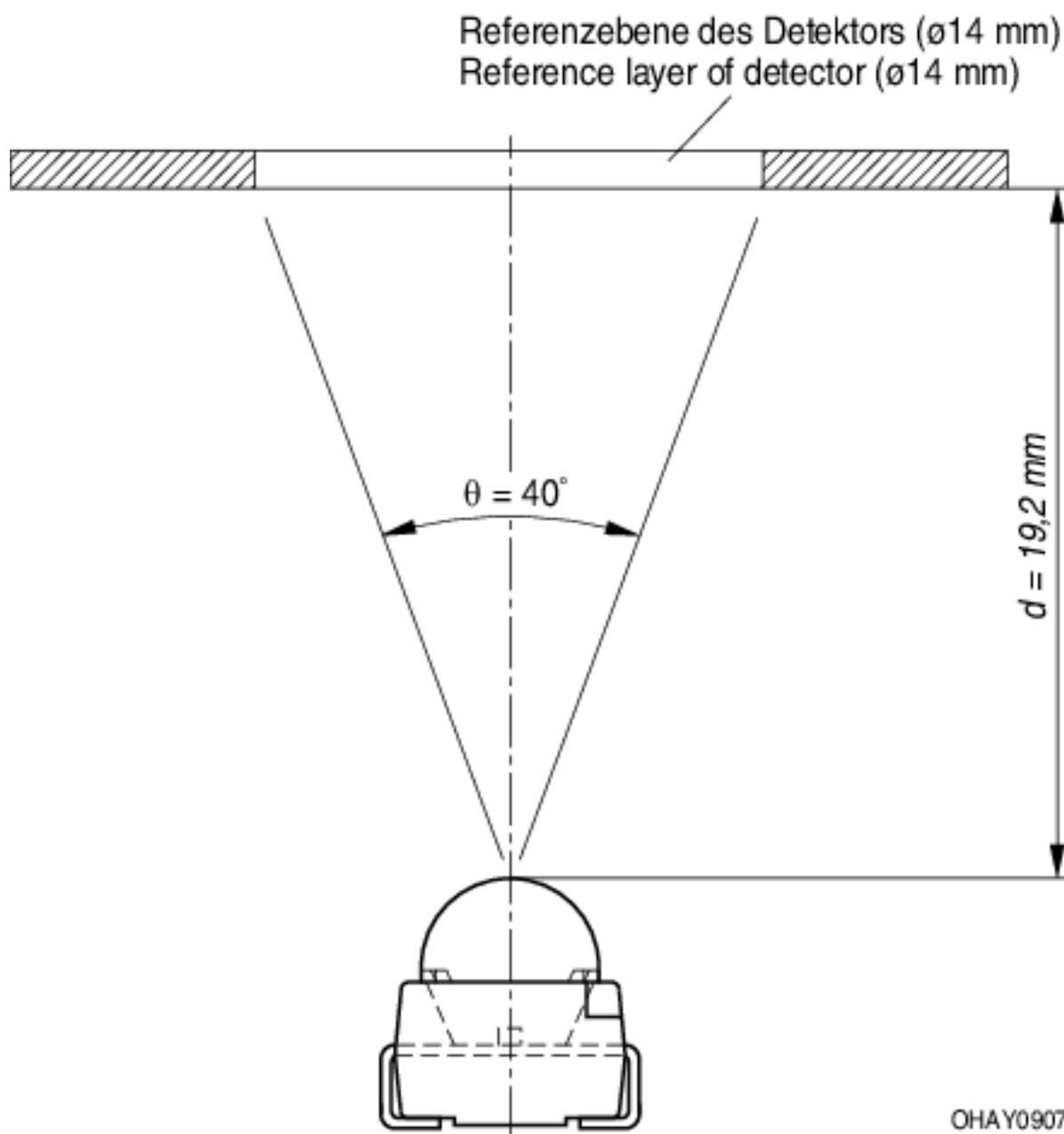
OHA00539

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

Type Designation System



Schematic test method for partial flux measurement



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 fall 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 information please visit www.osram-os.com/appnotes

Disclaimer

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 our 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 and functional safety devices/applications or medical devices/applications

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

Our products are not qualified at module and system level for such application.

In case buyer – or customer supplied by buyer – considers using our components in product safety devices/ applications or medical devices/applications, buyer and/or customer has to inform our local sales partner immediately and we and buyer and /or customer will analyze and coordinate the customer-specific request between us 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:** This product is intended to be operated applying a forward current within the specified range. Applying any continuous reverse bias or forward bias below the voltage range of light emission shall be avoided because it may cause migration which can change the electro-optical characteristics or damage the LED.
- 3) **Wavelength:** The wavelength is measured at a current pulse of typically 25 ms, with an internal reproducibility of ± 0.5 nm and an expanded uncertainty of ± 1 nm (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 ± 0.05 V and an expanded uncertainty of ± 0.1 V (acc. to GUM with a coverage factor of $k = 3$).
- 5) **Thermal Resistance:** $R_{th\ max}$ is based on statistic values (6σ).
- 6) **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.
- 7) **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.
- 8) **Tolerance of Measure:** Unless otherwise noted in drawing, tolerances are specified with ± 0.1 and dimensions are specified in mm.
- 9) **Tape and Reel:** All dimensions and tolerances are specified acc. IEC 60286-3 and specified in mm.

Revision History

Version	Date	Change
1.3	2022-07-20	New Layout Applications Discontinued

Discontinued

Discontinued



EU RoHS and China RoHS compliant product

此产品符合欧盟 RoHS 指令的要求；

按照中国的相关法规和标准，

不含有毒有害物质或元素。

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Attachment C-2

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