

Wolfspeed® Product/Process Change Notification

PCN Number: PCN-00144
PCN Type: Informational

PCN Issue Date: October 24, 2024

PCN Title

Adding Process Control Monitors (PCMs) to All Wolfspeed North Carolina Facility (NCF) and Mohawk Valley Facility (MVF) Schottky Die Wafers

Description of the Change

As Wolfspeed expands its Schottky products portfolio, this informational notification is to inform Wolfspeed’s customers that Process Control Monitors (PCMs) will be added to all North Carolina and Mohawk Valley Facilities Schottky wafers. All product die will be unchanged. This document simply raises awareness that the wafer layout and appearance of fiducial/PCM die will shift, which may cause issues with automated equipment calibrated to previous fiducial die locations.

Previously, every Schottky wafer contained five nonsellable fiducial die as shown in Figure 1 (a). Fiducials with a “target” symbol in the center of the die were used for alignment purposes, particularly at the final probe step. With the change described here, the nonsellable fiducials will be converted to nonsellable PCMs. The general layout of a PCM die is shown in Figure 1 (b). This layout will vary between products because as die size changes, the test structures will be rearranged for the best use of space. Wafers will continue to have five PCM sites per wafer, but these may be shifted slightly from previous fiducial locations and may contain up to 4 die per site.

Please note this PCN is a revision to PCN-00099 issued on March 22, 2024 (see Revision History on page 12).

(a)



(b)

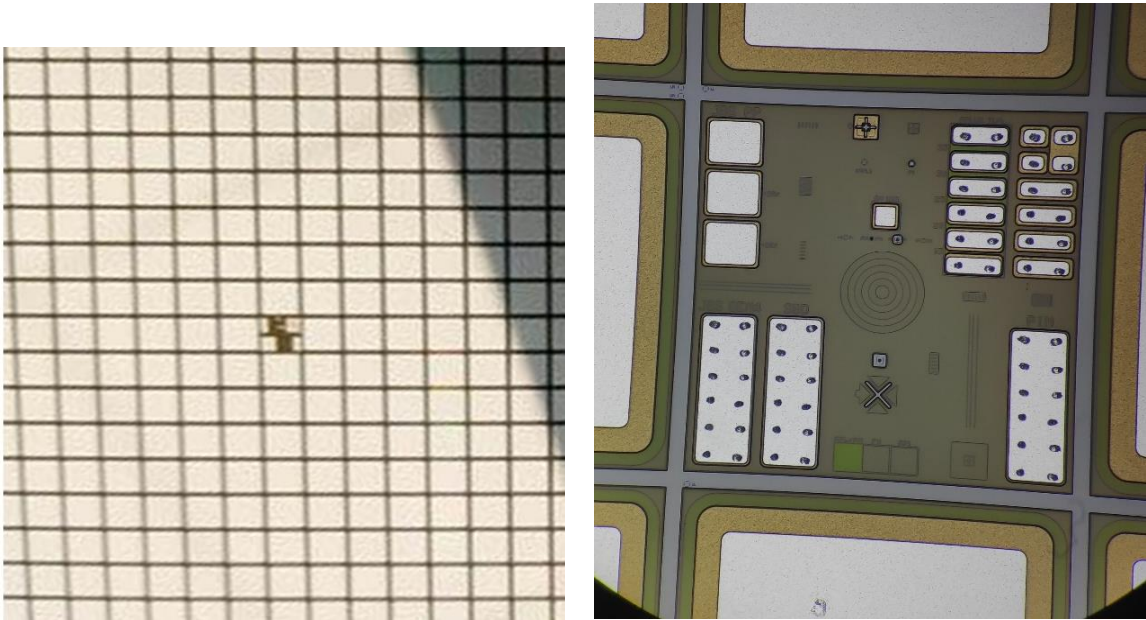
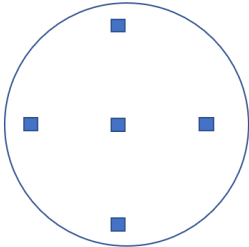


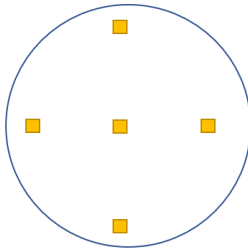
Figure 1. Examples of (a) a Current Fiducial Die and (b) a PCM Die.

The only Wolfspeed process difference for wafers with PCMs is that photolithography and metrology tools are aligned to the structures printed in the PCM die rather than in the streets as done previously. For products with one PCM die at each PCM site, the PCMs will have the same test structures and always look identical (see Figure 2). For products with more than one PCM die at each site, they will have different test structures from each other. PCM sites will be identical in their orientation and color among all wafers and all batches of the same product. PCMs may or may not have probe marks within the electrical test structures (the large rectangles) or probe marks across the center like a product die. In the photo, probe marks are in the electrical structures.

Product with 1 PCM die per PCM site – Every PCM on every wafer is identical. No change in color or orientation between wafers of the same product



Other product with 1 PCM die per PCM site – Every PCM on every wafer is identical. No change in color or orientation between wafers of the same product



Product with 3 PCM die per PCM site – PCM die of different colors in the cartoon contain different structures and may differ in color or orientation. PCM die of the same color in the cartoon are identical, with no change in color or orientation between wafers

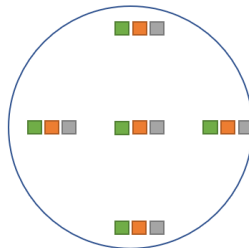


Figure 2. Examples of Identical PCM Die and Different PCM Die.

Benefit of the Change

This change supports Wolfspeed's continuous improvement of the quality and reliability of products. This PCM enhancement will result in increased visibility into the layers of the device to assist with troubleshooting electrical behavior. In addition, Critical Dimensions (CDs) are not currently taken on any Schottky devices, and the introduction of a dedicated structure would enable this new data stream.

Affected Products

Table 1 lists the products affected by this Informational PCN. Note that this notification will not change the discontinuance timeline for any Schottky parts set for product discontinuance described in PDN-00001. Parts with limited remaining production runs will still have PCMs added.

Table 1. Affected Products List.

| Wolfspeed Part Number | | | | |
|-----------------------|---------------------|---------------------|---------------------|---------------------|
| Gen 1 | Gen 2 | Gen 3 | Gen 4 | Gen 6 |
| CPWR-0600-S001B-FA6 | CPW2-0600-S006B | CPW3-0600-S002B-FA6 | CPW4-1200-S002BH | CPW6-0650-Z004A6 |
| CPWR-0600-S001BH | CPW2-0600-S006B-FA6 | CPW3-0600-S002BH | CPW4-1200-S005BH | CPW6-0650-Z006A6 |
| | CPW2-0600-S006B-FR6 | CPW3-0600-S003BH | CPW4-1200-S005B-FA6 | CPW6-0650-Z008A6 |
| | CPW2-0650-S006B | CPW3-0650-S002BH | CPW4-1200-D005B | CPW6-0650-Z010A6 |
| | CPW2-0650-S006B-FA6 | CPW3-0650-S003BH | CPW4-1200-S008B-FA6 | CPW6-0650-Z020A6 |
| | CPW2-0650-S006B-FR6 | CPW3-0600-S004B | CPW4-1200-S008BH | CPW6-0650-Z050A6 |
| | CPW2-0600-S008B | CPW3-0600-S004B-FA6 | CPW4-1200-S010B | CPW6-1200-Z050A |
| | CPW2-0600-S008B-FA6 | CPW3-0600-S004B-FR6 | CPW4-1200-S010B-FA6 | CPW6-1200-Z050A-FU6 |
| | CPW2-0600-S008B-FR6 | CPW3-0650-S004B | CPW4-1200-S010B-FR6 | CPW6-1200-Z050AH |
| | CPW2-0650-S008B | CPW3-0650-S004B-FA6 | CPW4-1200-S015B | CPW6-1700-Z005A |
| | CPW2-0650-S008B-FA6 | CPW3-0650-S004B-FR6 | CPW4-1200-S015B-FA6 | CPW6-1700-Z010A |
| | CPW2-0650-S008B-FR6 | | CPW4-1200-S015B-FR6 | CPW6-1700-Z010A6 |
| | CPW2-0600-S010B | | CPW4-1200-S020B | CPW6-1700-Z025A |
| | CPW2-0600-S010B-FA6 | | CPW4-1200-S020B-FA6 | CPW6-1700-Z050A |
| | CPW2-0600-S010B-FR6 | | CPW4-1200-S020B-FR6 | CPW6-1700-Z050A-FA6 |
| | CPW2-0650-S010B | | CPW4-1200-S030BH | CPW6-1700-Z050A-FG6 |
| | CPW2-0650-S010B-FA6 | | CPW4-1200-S040BH | CPW6-1700-Z050A-FS6 |
| | CPW2-0650-S010B-FR6 | | | CPW6-1700-Z050A-FU6 |
| | CPW2-0650-S012B-FA6 | | | CPW6-1700-Z050A-FY6 |
| | CPW2-0650-S016B-FA6 | | | |
| | CPW2-0650-S016BH | | | |

Anticipated Impact

No customer action is required. There is no change to product form, fit, function, or reliability. For those customers who have relied on fiducial locations in the past for tool alignment, please take note of the wafer layout changes for each product listed in Table 2.

Table 2. Change in the Coordinates from Current Fiducial Die to PCM Die.

| Wolfspeed Part Numbers | Current Fiducial Coordinates | | New PCM Coordinates | |
|--|------------------------------|----|---------------------|----|
| | X | Y | X | Y |
| CPW2-0600-S006B CPW2-0600-S006B-FA6 CPW2-0600-S006B-FR6 CPW2-0650-S006B CPW2-0650-S006B-FA6 CPW2-0650-S006B-FR6 | 4 | 45 | 12 | 44 |
| | | | 13 | 44 |
| | | | 14 | 44 |
| | 47 | 4 | 48 | 13 |
| | | | 49 | 13 |
| | | | 50 | 13 |
| | 47 | 45 | 48 | 44 |
| | | | 49 | 44 |
| | | | 50 | 44 |
| | 47 | 88 | 48 | 85 |
| | | | 49 | 85 |
| | | | 50 | 85 |
| | 91 | 45 | 72 | 44 |
| | | | 73 | 44 |
| | | | 74 | 44 |
| CPW2-0600-S008B CPW2-0600-S008B-FA6 CPW2-0600-S008B-FR6 CPW2-0650-S008B CPW2-0650-S008B-FA6 CPW2-0650-S008B-FR6 | 3 | 40 | 15 | 39 |
| | | | 16 | 39 |
| | 41 | 4 | 37 | 8 |
| | | | 38 | 8 |
| | 41 | 40 | 37 | 39 |
| | | | 38 | 39 |
| | 41 | 78 | 37 | 70 |
| | | | 38 | 70 |
| | 80 | 40 | 70 | 39 |
| | | | 71 | 39 |
| CPW2-0600-S010B CPW2-0600-S010B-FA6 CPW2-0600-S010B-FR6 CPW2-0650-S010B CPW2-0650-S010B-FA6 CPW2-0650-S010B-FR6 | 3 | 37 | 9 | 37 |
| | 38 | 3 | 33 | 12 |
| | 38 | 37 | 33 | 37 |
| | 38 | 72 | 33 | 62 |
| | 74 | 37 | 57 | 37 |
| | | | | |

| Wolfspeed Part Numbers | Current Fiducial Coordinates | | New PCM Coordinates | |
|--|------------------------------|-----|---------------------|-----|
| | X | Y | X | Y |
| CPW3-0600-S004B CPW3-0600-S004B-FA6 CPW3-0600-S004B-FR6 CPW3-0650-S004B CPW3-0650-S004B-FA6 CPW3-0650-S004B-FR6 | 3 | 62 | 17 | 61 |
| | | | 18 | 61 |
| | | | 19 | 61 |
| | | | 20 | 61 |
| | 64 | 4 | 65 | 12 |
| | | | 66 | 12 |
| | | | 67 | 12 |
| | | | 68 | 12 |
| | 64 | 62 | 65 | 61 |
| | | | 66 | 61 |
| | | | 67 | 61 |
| | | | 68 | 61 |
| | 64 | 123 | 65 | 110 |
| | | | 66 | 110 |
| | | | 67 | 110 |
| | | | 68 | 110 |
| | 126 | 62 | 113 | 61 |
| | | | 114 | 61 |
| | | | 115 | 61 |
| | | | 116 | 61 |
| CPW4-1200-S010B CPW4-1200-S010B-FA6 CPW4-1200-S010B-FR6 | 4 | 32 | 6 | 32 |
| | 33 | 4 | 30 | 7 |
| | 33 | 32 | 30 | 32 |
| | 33 | 61 | 30 | 57 |
| | 63 | 32 | 54 | 32 |
| CPW4-1200-S015B CPW4-1200-S015B-FA6 CPW4-1200-S015B-FR6 | 2 | 27 | 7 | 27 |
| | 27 | 3 | 28 | 8 |
| | 27 | 27 | 28 | 27 |
| | 27 | 52 | 28 | 46 |
| | 53 | 27 | 49 | 27 |
| CPW4-1200-S020B CPW4-1200-S020B-FA6 CPW4-1200-S020B-FR6 | 3 | 24 | 10 | 23 |
| | 24 | 3 | 22 | 6 |
| | 24 | 24 | 22 | 23 |
| | 24 | 45 | 22 | 40 |
| | 46 | 24 | 40 | 23 |

| Wolfspeed Part Numbers | Current Fiducial Coordinates | | New PCM Coordinates | |
|---|------------------------------|-----|---------------------|-----|
| | X | Y | X | Y |
| CPWR-0600-S001B-FA6 CPWR-0600-S001BH | 4 | 82 | 24 | 82 |
| | | | 25 | 82 |
| | 86 | 3 | 74 | 18 |
| | | | 75 | 18 |
| | 86 | 82 | 74 | 82 |
| | | | 75 | 82 |
| | 86 | 164 | 74 | 146 |
| | | | 75 | 146 |
| | 169 | 82 | 149 | 82 |
| | | | 150 | 82 |
| CPW2-0650-S012B-FA6 | 4 | 34 | 11 | 34 |
| | 35 | 5 | 31 | 8 |
| | 35 | 34 | 31 | 34 |
| | 35 | 65 | 31 | 60 |
| | 67 | 34 | 61 | 34 |
| CPW2-0650-S016B-FA6 CPW2-0650-S016BH | 1 | 29 | 9 | 30 |
| | 29 | 1 | 27 | 10 |
| | 29 | 29 | 27 | 30 |
| | 29 | 57 | 27 | 50 |
| | 57 | 29 | 54 | 30 |
| CPW3-0600-S002B-FA6 CPW3-0600-S002BH CPW3-0650-S002BH | 4 | 104 | 19 | 100 |
| | | | 20 | 100 |
| | 68 | 3 | 59 | 20 |
| | | | 60 | 20 |
| | 68 | 104 | 59 | 100 |
| | | | 60 | 100 |
| | 68 | 208 | 59 | 180 |
| | | | 60 | 180 |
| | 133 | 104 | 119 | 100 |
| | | | 120 | 100 |
| CPW3-0600-S003BH CPW3-0650-S003BH | 4 | 76 | 19 | 73 |
| | | | 20 | 73 |
| | 68 | 4 | 59 | 21 |
| | | | 60 | 21 |
| | 68 | 76 | 59 | 73 |
| | | | 60 | 73 |
| | 68 | 150 | 59 | 141 |

| Wolfspeed Part Numbers | Current Fiducial Coordinates | | New PCM Coordinates | |
|--|------------------------------|-----|---------------------|-----|
| | X | Y | X | Y |
| | | | 60 | 141 |
| | 133 | 76 | 119 | 73 |
| | | | 120 | 73 |
| CPW4-1200-S002BH | 4 | 61 | 19 | 60 |
| | | | 20 | 60 |
| | | | 21 | 60 |
| | | | 22 | 60 |
| | 63 | 4 | 55 | 12 |
| | | | 56 | 12 |
| | | | 57 | 12 |
| | | | 58 | 12 |
| | 63 | 61 | 55 | 60 |
| | | | 56 | 60 |
| | | | 57 | 60 |
| | | | 58 | 60 |
| | 63 | 120 | 55 | 108 |
| | | | 56 | 108 |
| | | | 57 | 108 |
| | | | 58 | 108 |
| | 123 | 61 | 109 | 60 |
| | | | 110 | 60 |
| | | | 111 | 60 |
| | | | 112 | 60 |
| CPW4-1200-D005B CPW4-1200-S005B-FA6 CPW4-1200-S005BH | 3 | 43 | 12 | 42 |
| | 44 | 4 | 38 | 10 |
| | 44 | 43 | 38 | 42 |
| | 44 | 84 | 38 | 74 |
| | 86 | 43 | 77 | 42 |
| CPW4-1200-S008B-FA6 CPW4-1200-S008BH | 4 | 36 | 10 | 36 |
| | 37 | 4 | 32 | 8 |
| | 37 | 36 | 32 | 36 |
| | 37 | 69 | 32 | 64 |
| | 71 | 36 | 65 | 36 |
| CPW4-1200-S030BH | 4 | 20 | 6 | 20 |
| | 20 | 4 | 21 | 3 |
| | 20 | 20 | 21 | 20 |
| | 20 | 36 | 21 | 33 |

| Wolfspeed Part Numbers | Current Fiducial Coordinates | | New PCM Coordinates | |
|------------------------|------------------------------|-----|---------------------|-----|
| | X | Y | X | Y |
| | 37 | 20 | 36 | 20 |
| CPW4-1200-S040BH | 4 | 17 | 3 | 16 |
| | 17 | 3 | 18 | 3 |
| | 17 | 17 | 18 | 16 |
| | 17 | 30 | 18 | 29 |
| | 31 | 17 | 28 | 16 |
| CPW6-0650-Z004A6 | 3 | 57 | 13 | 58 |
| | | | 14 | 58 |
| | 60 | 8 | 61 | 7 |
| | | | 62 | 7 |
| | 60 | 57 | 61 | 58 |
| | | | 62 | 58 |
| | 60 | 114 | 61 | 109 |
| | | | 62 | 109 |
| | 118 | 57 | 109 | 58 |
| CPW6-0650-Z006A6 | | | 110 | 58 |
| | 4 | 49 | 8 | 49 |
| | 51 | 4 | 53 | 11 |
| | 51 | 49 | 53 | 49 |
| | 51 | 96 | 53 | 87 |
| CPW6-0650-Z008A6 | 99 | 49 | 98 | 49 |
| | 3 | 44 | 8 | 44 |
| | 45 | 3 | 47 | 7 |
| | 45 | 44 | 47 | 44 |
| | 45 | 86 | 47 | 81 |
| CPW6-0650-Z010A6 | 88 | 44 | 73 | 44 |
| | 3 | 40 | 13 | 39 |
| | 41 | 3 | 37 | 7 |
| | 41 | 40 | 37 | 39 |
| | 41 | 78 | 37 | 71 |
| CPW6-0650-Z020A6 | 80 | 40 | 73 | 39 |
| | 3 | 29 | 5 | 30 |
| | 30 | 3 | 32 | 8 |
| | 30 | 29 | 32 | 30 |
| | 30 | 56 | 32 | 52 |
| CPW6-0650-Z050A6 | 58 | 29 | 50 | 30 |
| | 4 | 20 | 3 | 20 |

| Wolfspeed Part Numbers | Current Fiducial Coordinates | | New PCM Coordinates | |
|--|------------------------------|----|---------------------|----|
| | X | Y | X | Y |
| | 20 | 4 | 21 | 3 |
| | 20 | 20 | 21 | 20 |
| | 20 | 36 | 21 | 37 |
| | 37 | 20 | 33 | 20 |
| CPW6-1200-Z050A CPW6-1200-Z050A-FU6 CPW6-1200-Z050AH | 2 | 14 | 4 | 15 |
| | 14 | 1 | 16 | 5 |
| | 14 | 14 | 16 | 15 |
| | 14 | 26 | 16 | 25 |
| | 27 | 14 | 28 | 15 |
| CPW6-1700-Z005A | 3 | 32 | 7 | 32 |
| | 32 | 5 | 34 | 6 |
| | 32 | 32 | 34 | 32 |
| | 32 | 55 | 34 | 63 |
| | 62 | 32 | 61 | 32 |
| CPW6-1700-Z010A CPW6-1700-Z010A6 | 5 | 24 | 5 | 24 |
| | 25 | 3 | 26 | 5 |
| | 25 | 24 | 26 | 24 |
| | 25 | 44 | 26 | 43 |
| | 47 | 24 | 47 | 24 |
| CPW6-1700-Z025A | 3 | 16 | 8 | 17 |
| | 16 | 3 | 18 | 4 |
| | 16 | 16 | 18 | 17 |
| | 16 | 31 | 18 | 30 |
| | 30 | 16 | 28 | 17 |
| CPW6-1700-Z050A | 4 | 12 | 4 | 12 |
| CPW6-1700-Z050A-FA6 | 13 | 3 | 13 | 3 |
| CPW6-1700-Z050A-FG6 | 13 | 12 | 13 | 12 |
| CPW6-1700-Z050A-FS6 | 13 | 21 | 13 | 21 |
| CPW6-1700-Z050A-FU6 | 19 | 12 | 19 | 12 |
| CPW6-1700-Z050A-FY6 | | | | |

Implementation Date

Table 3 provides the estimated dates for key PCN milestones based on the information available on the date this PCN is issued. Customers are requested to acknowledge this PCN notification within 30 days from its issue date by emailing the file and any feedback to Wolfspeed at PCN@wolfspeed.com. Note that after the first projected ship date, customers will no longer receive older parts and will receive only what is currently available listed in Table 1; any update to these dates can be provided by your Wolfspeed contact. Every effort will be made to ship wafers of the old and new parts in separate packages during the transition.

Table 3. Estimated Key PCN Dates *.

| Wolfspeed Part Number | Projected First Ship Date |
|-----------------------|---------------------------|
| CPWR-0600-S001B-FA6 | 12/18/2024 |
| CPWR-0600-S001BH | |
| CPW2-0650-S012B-FA6 | 11/30/2024 |
| CPW2-0650-S016B-FA6 | 12/20/2024 |
| CPW2-0650-S016BH | |
| CPW3-0600-S002B-FA6 | 12/6/2024 |
| CPW3-0600-S002BH | |
| CPW3-0600-S003BH | 12/18/2024 |
| CPW3-0600-S002B-FA6 | 12/6/2024 |
| CPW3-0600-S002BH | |
| CPW3-0600-S003BH | 12/6/2024 |
| CPW4-1200-S002BH | 12/24/2024 |
| CPW4-1200-D005B | 10/15/2024 |
| CPW4-1200-S005B-FA6 | |
| CPW4-1200-S005BH | |
| CPW4-1200-S008B-FA6 | 12/12/2024 |
| CPW4-1200-S008BH | |
| CPW4-1200-S030BH | 10/25/2024 |
| CPW4-1200-S040BH | 12/12/2024 |
| CPW6-0650-Z004A6 | 12/18/2024 |
| CPW6-0650-Z006A6 | 12/6/2024 |
| CPW6-0650-Z008A6 | 12/6/2024 |
| CPW6-0650-Z010A6 | 12/6/2024 |
| CPW6-0650-Z020A6 | 12/18/2024 |
| CPW6-0650-Z050A6 | 12/18/2024 |
| CPW6-1700-Z005A | 12/18/2024 |
| CPW6-1700-Z010A | 12/6/2024 |
| CPW6-1700-Z010A6 | |
| CPW6-1700-Z025A | 12/6/2024 |
| CPW6-1700-Z050A | 12/6/2024 |
| CPW6-1700-Z050A-FA6 | |
| CPW6-1700-Z050A-FG6 | |
| CPW6-1700-Z050A-FS6 | |
| CPW6-1700-Z050A-FU6 | |
| CPW6-1700-Z050A-FY6 | |
| CPW6-1200-Z050A | |

| Wolfspeed Part Number | Projected First Ship Date |
|-----------------------|---------------------------|
| CPW6-1200-Z050A-FU6 | 12/18/2024 |
| CPW6-1200-Z050AH | |

* Qualification report was completed on 2/28/24.

Contact Information

If you have any questions regarding this Informational PCN, please refer to the contact information listed in Table 4 below.

Table 4. PCN Contact.

| | |
|---------------------------------|--|
| Wolfspeed Contact | Anri Mikirtichev |
| Wolfspeed Contact E-Mail | Anri.Mikirtichev@wolfspeed.com |
| Wolfspeed Contact Phone | 1.844.200.WOLF |
| Address | 4600 Silicon Drive Durham, NC 27703 U.S.A. |

Revision History

| Date | Revision | Description |
|-------------------|---------------|---|
| February 28, 2024 | 0 (PCN-00099) | Initial release |
| March 22, 2024 | 1 (PCN-00099) | Additional clarity around PCM structures. Adjusted implementation dates and added images of the PCM structures instead of models as well as Table 2 examples of coordinate changes. |
| October 18, 2024 | 2 (PCN-00144) | <p>Note that this will not change the discontinuance timeline for any Schottky part set for product discontinuance described in PDN-00001 Rev 1. Parts with limited remaining production runs will still have PCMs added.</p> <p>Table 1 changes: Added Gen 1 and Gen 6 Wolfspeed products. Furthermore, additional products are also added to Gen 2, Gen 3, and Gen 4.</p> <p>Table 2 changes: Added additional products to Table 2 on change in the coordinates from current fiducial die to PCM die.</p> <p>Table 3 changes: Added first ship date for each Wolfspeed part number.</p> |