

### **Wolfspeed® Product/Process Change Notification**

| PCN Number: | PCN-00017 | PCN Issue Date: | 06/21/2022 |
|-------------|-----------|-----------------|------------|
| PCN Type:   | Major     |                 |            |

#### **PCN Title**

Change from 100-mm to 150-mm Wafers for the Manufacturing of 1700 V SiC MOSFET Devices

# **Description of the Changes**

#### 1. Die Size and Metallization:

1700 V SiC MOSFET devices are currently manufactured on 100-mm diameter SiC wafers. A change of wafer diameter from 100 mm to 150 mm will take place as part of the transition and improvement at Wolfspeed.

Along with the change to 150-mm wafers, the back-side metal will be changed from silver (Ag) to gold (Au) as shown in Figure 1. The top-side metal will be changed from aluminum (Al) to an aluminum-copper (Al-Cu) alloy (see Figure 2).



Figure 1. (a) 100-mm Wafer Back-Side Metal Design; (b) 150-mm Wafer Back-Side Metal Design.

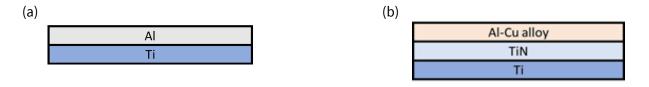


Figure 2. (a) 100-mm Wafer Top-Side Metal Design; (b) 150-mm Wafer Top-Side Metal Design.

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### 2. Change to Package Bill of Material:

A change to the package mold compound and gate/kelvin wire-bond dimension will be introduced as part of this PCN. The changes to the package are summarized in Table 1 and Table 2. The selection of the improved mold compound and the larger gate/Kelvin wire dimensions improve the devices thermo-mechanical ruggedness during temperature cycling events.

**Table 1.** New Package BOM.

| Part Number | Wire Bond         | Mold Compound        |
|-------------|-------------------|----------------------|
| C2M0045170D | Source: 10 mil Al | Sumitomo             |
|             | Gate: 8 mil Al    |                      |
| C2M0045170P | Source: 10 mil Al | Sumitomo (no change) |
|             | Gate: 8 mil Al    |                      |
|             | Kelvin: 10 mil Al |                      |

Table 2. Old Package BOM.

| Part Number | Wire Bond         | Mold Compound |
|-------------|-------------------|---------------|
| C2M0045170D | Source: 10 mil Al | Henkel        |
|             | Gate: 5 mil Al    |               |
| C2M0045170P | Source: 10 mil Al | Sumitomo      |
|             | Gate: 5 mil Al    |               |
|             | Kelvin: 5 mil Al  |               |

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#### 3. Change to Datasheets:

A full product characterization and datasheet update accompanies this PCN. The datasheet revision history is summarized in Table 3 below.

Table 3. Datasheet Revision.

| Part Number | Existing Datasheet Revision | New Datasheet Revision |
|-------------|-----------------------------|------------------------|
| C2M0045170D | Rev 06-2016                 | Rev. 1 May 2022        |
| C2M0045170P | Rev 04-2018                 | Rev. 2 May 2022        |

The summary of datasheet changes is listed below.

Thermal Impedance (R<sub>th</sub>):

- Thermal impedance is re-measured using the latest measurement equipment and technique to provide improved measurement accuracy.
- Max R<sub>th</sub> = updated to 0.37 °C/W (from 0.24 °C/W).

Maximum Power Dissipation (P<sub>D</sub>):

- P<sub>D</sub> value depends on the measured maximum thermal impedance.
- P<sub>D</sub> = Updated to 338 W from 520 W.

Typical Internal Gate Resistance (Rgint):

• Updated to 1.3  $\Omega$  (from 1.7  $\Omega$ ). Slight change is due to 150-mm wafer diameter change.

# **Benefit of the Change**

The qualification of 150-mm wafers is necessary for Wolfspeed to increase its production capacity to meet market demand and customer expectation. The changes to the package BOM improve package robustness.

#### **Affected Products**

Table 4 lists the expected products affected by this Major PCN on the date this PCN is issued. The list may be altered due to market dynamics or technological innovations. Updates on Table 4 can be provided by your Wolfspeed contact.

Table 4. Affected Product list.

| Part Number |  |
|-------------|--|
| C2M0045170D |  |
| C2M0045170P |  |

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### **Qualification Status and Plan**

All processes at Wolfspeed's facilities are qualified through the internal Process Change Review Board (PCRB). The tests for the affected products included in Table 4 have been performed to meet or exceed the test parameters listed in the existing qualification reports.

### **Anticipated Impact**

There is no change to the electrical function or reliability of the listed products. An updated product datasheet is generated as part of the release.

### **Key Implementation Date**

Table 5 provides the estimated dates for key PCN milestones based on the information available on the date this PCN is issued. Any updates to these dates can be provided by your Wolfspeed contact.

**Table 5.** Estimated Key PCN dates

| Task                      | Date*                      |
|---------------------------|----------------------------|
| Qualification Report Date | June 30 <sup>th</sup> 2022 |
| Sample Availability       | June 15 <sup>th</sup> 2022 |
| First Ship Date           | August 15 2022             |

<sup>\*</sup> Specific product schedules should be discussed with Wolfspeed sales and marketing representatives.

# **Customer Acknowledgement**

Customer is requested to acknowledge this notification within 30 days from its issue date by signing this PCN, scanning it into a pdf file, and emailing the file and any feedback to Wolfspeed at PCN@wolfspeed.com. Note that Wolfspeed references the JEDEC J-STD-046 guidelines for its PCNs. In accordance with J-STD-046, this change is deemed acceptable to the customer if no acknowledgement is received within 30 days from the PCN issue date.

| Name:               | Title: _ |         |
|---------------------|----------|---------|
| Phone:              | _ Email: |         |
| Customer Comment:   |          |         |
| Customer Signature: |          | _ Date: |

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## **Contact Information**

If you have any questions regarding this Major PCN, please refer to the contact information listed in Table 6.

**Table 6.** PCN Contact.

| Wolfspeed Contact:             | PCN Admin              |
|--------------------------------|------------------------|
| Wolfspeed Contact E-Mail:      | PCN@wolfspeed.com      |
| <b>Wolfspeed Contact Phone</b> | 1.844.200.WOLF         |
| Address:                       | 4425 Silicon Dr.       |
|                                | Durham, NC 27703 - USA |

# **Revision History**

| Date          | Revision | Description     |
|---------------|----------|-----------------|
| June 21, 2022 | 0        | Initial release |

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