

Failure Analysis Report



TI Information - Selective Disclosure

Device Analysis Services

FA QEM-CCR-1907-01258

ACTION-0317446

Customer:	WORLD PEACE (DSTR)	Assy Site:	
Customer Tracking ID:		Fab Site:	
Customer Part ID:		Technology:	LBC7
Customer Contact:	Sam Shyu	Analyst:	Eric Yeh
Device Type:	TPS25200DRVR	TI Contact:	Wendy Huang
		Qty Submitted:	2
Flow Type:	Customer Return	Date Submitted:	2019-08-06
Reviewer:	Kevin Liu	Approval:	Kevin Liu

Summary	
Failure Analysis	Results
Customer Reported Failure Mode	Issue type: Electrical Issue type details: Pin 6 with Pin 5 low impedance. Pin 1 with Pin 5 low impedance. Other details: Two Failed parts the Pin 6 with Pin 5 low impedance . Have one part the Pin 1 with Pin 5 same is low impedance.
TI Failure Description	Unit#1-#2: pin1 (OUT) and pin6 (IN) short to pin5 (GND).
What effect does the defect or damage cause?	Short failure between fail pins.
Where and what is the defect/damage?	Electrically Induced Physical Damage (EIPD) in the form of burnt out damage and fused metallization were observed on unit#1.
Did the identified physical defect/damage explain the TI reported failure mode?	YES.

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TI Unit #	Cust. Unit #	Lot Trace Code	Symbolization	Wafer Fab Lot #	Assembly Lot #
1					
2					

- Customer Reported Problem Description:**

Issue type: Electrical | Issue type details: Pin 6 with Pin 5 low impedance. Pin 1 with Pin 5 low impedance. | Other details: Two Failed parts the Pin 6 with Pin 5 low impedance . Have one part the Pin 1 with Pin 5 same is low impedance.

- TI Problem Description:**

Unit#1-#2: pin1 (OUT) and pin6 (IN) short to pin5 (GND).

- Package Analysis:**

- External Package Examination:**

The failing units were inspected optically. No anomalies were observed.

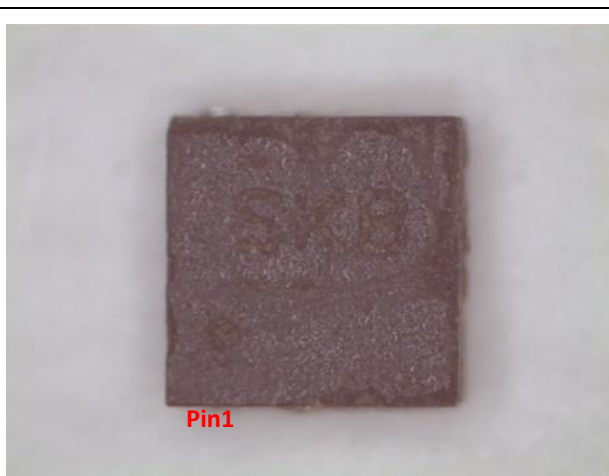


Figure 1. Unit#1.
Optical image of the top of the device.
No anomaly was observed.

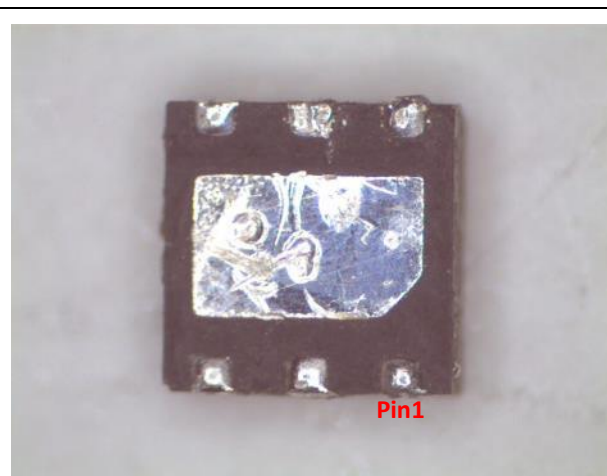


Figure 2. Unit#1.
Optical image of the bottom of the device.
No anomaly was observed.

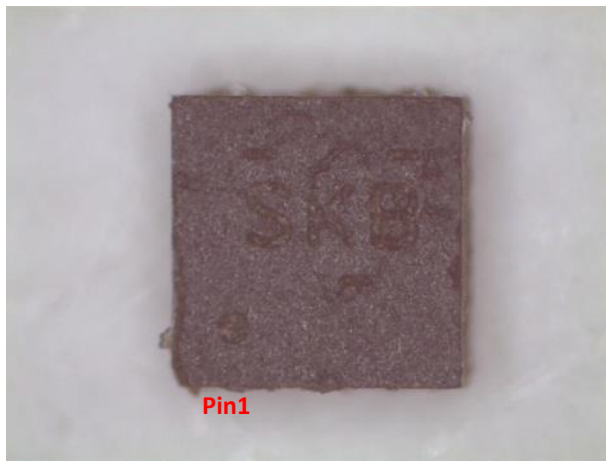


Figure 3. Unit#2.

Optical image of the top of the device.

No anomaly was observed.

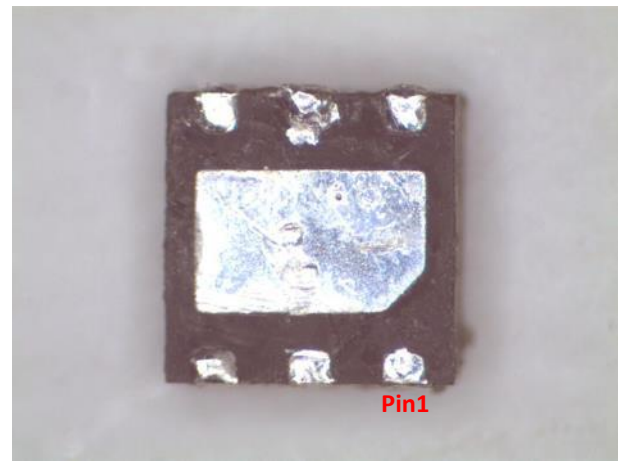


Figure 4. Unit#2.

Optical image of the bottom of the device.

No anomaly was observed.

- X-Ray Analysis:**

The failing units were inspected by X-ray. No anomalies were observed.

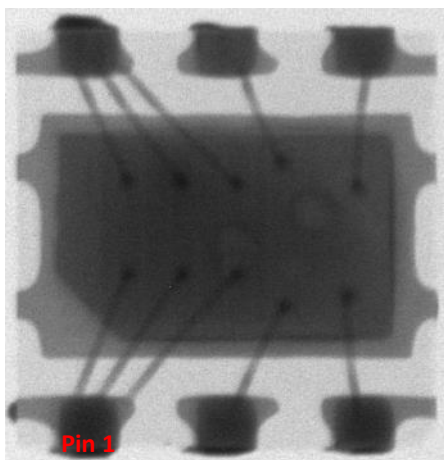


Figure 5. Unit#1.

Top view X-ray image of the device.

No anomaly was observed.

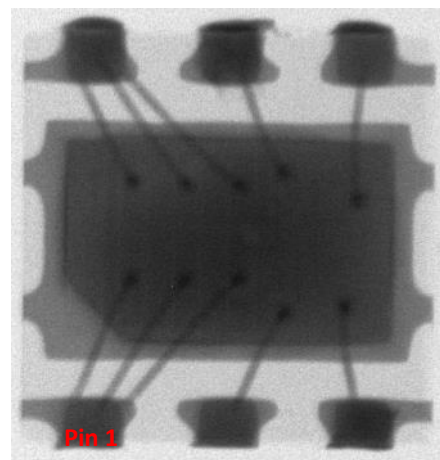


Figure 6. Unit#2.

Top view X-ray image of the device.

No anomaly was observed.

- Electrical Characterization:**

Measurement result for returned units through curve tracer was as below:

Unit#1-#2: pin1 (OUT) and pin6 (IN) short to pin5 (GND).

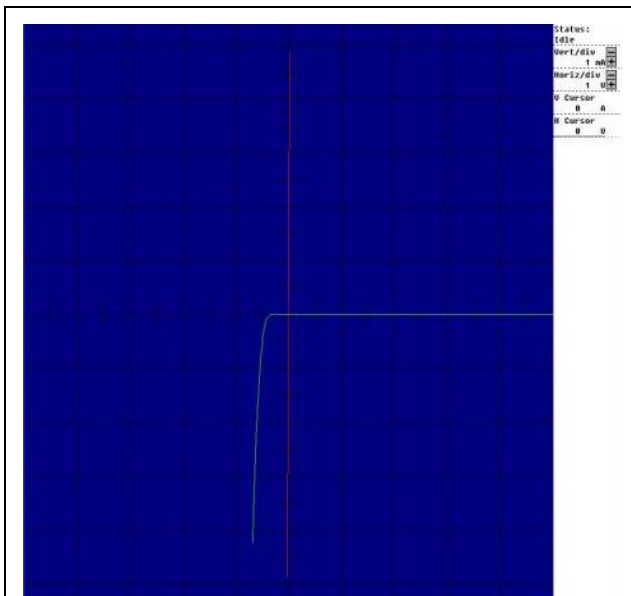


Figure 7. Unit#1.

IV curve revealed pin1 shorted to pin5 (GND).

The green curve indicated a correlation unit.

This image represents unit#2, too.

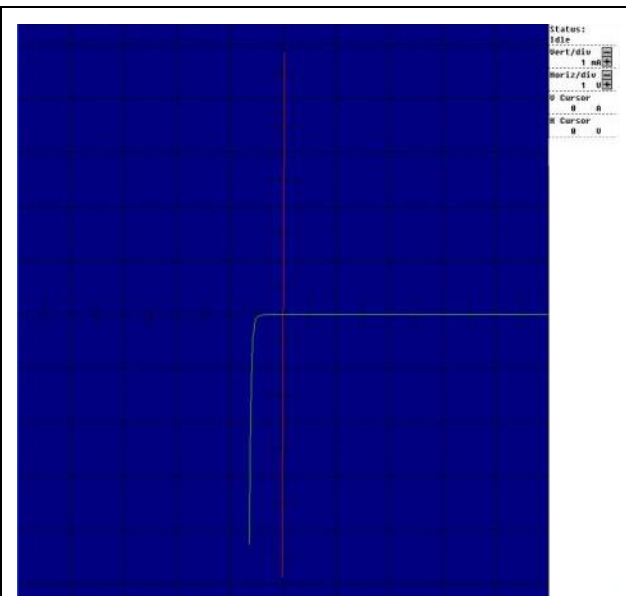


Figure 8. Unit#2.

IV curve revealed pin6 shorted to pin5 (GND).

The green curve indicated a correlation unit.

This image represents unit#2, too.

- De-capsulation:**

Unit#1 was de-capsulated by laser ablation system followed by mixed acid fuming nitric acid 98%: sulfuric acid 96% = 2:1 on hotplate at 90 degree C.

- Internal Optical Inspection:**

Optical inspection of the de-capsulated unit#1 revealed Electrically Induced Physical Damage (EIPD) in the form of burnt out damage and fused metallization were observed.

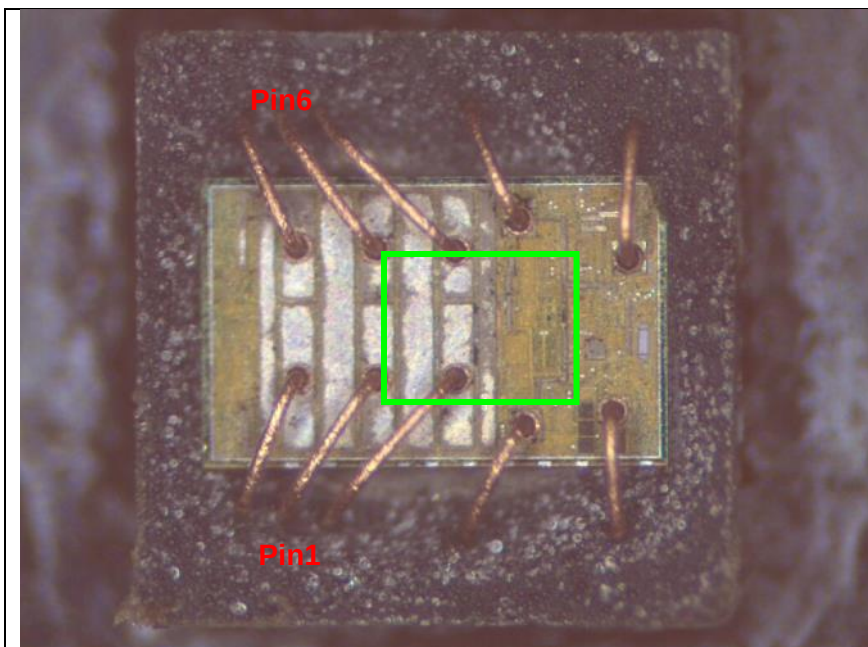


Figure 9: Unit#1.

Optical image of the die overview after de-capsulation.

Electrically Induced Physical Damage (EIPD) was observed in the green box.

See below for detail.

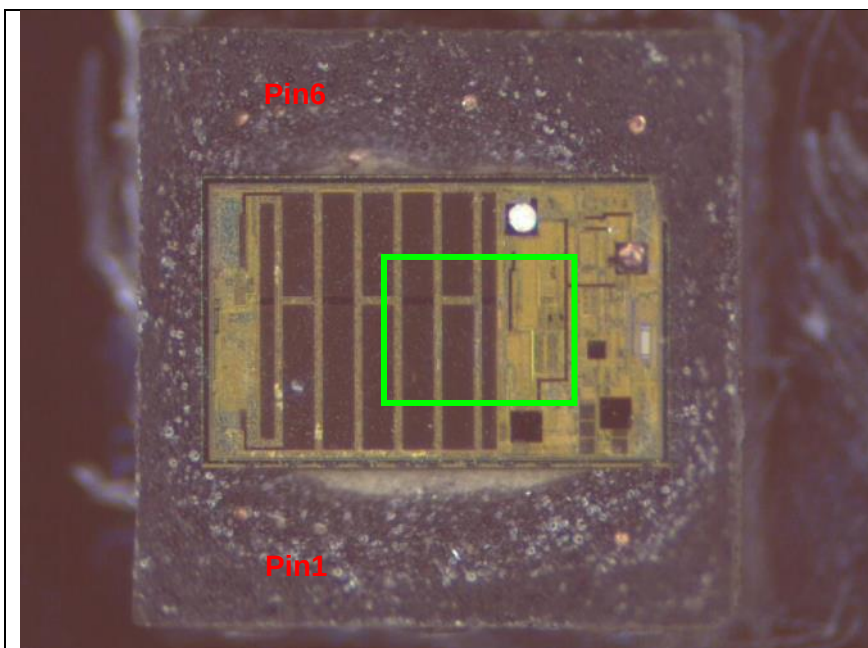


Figure 10: Unit#1.

The same area as in figure 9 after bonding wire, BOAC removal.

Electrically Induced Physical Damage (EIPD) was observed in the green box.

See below for detail.

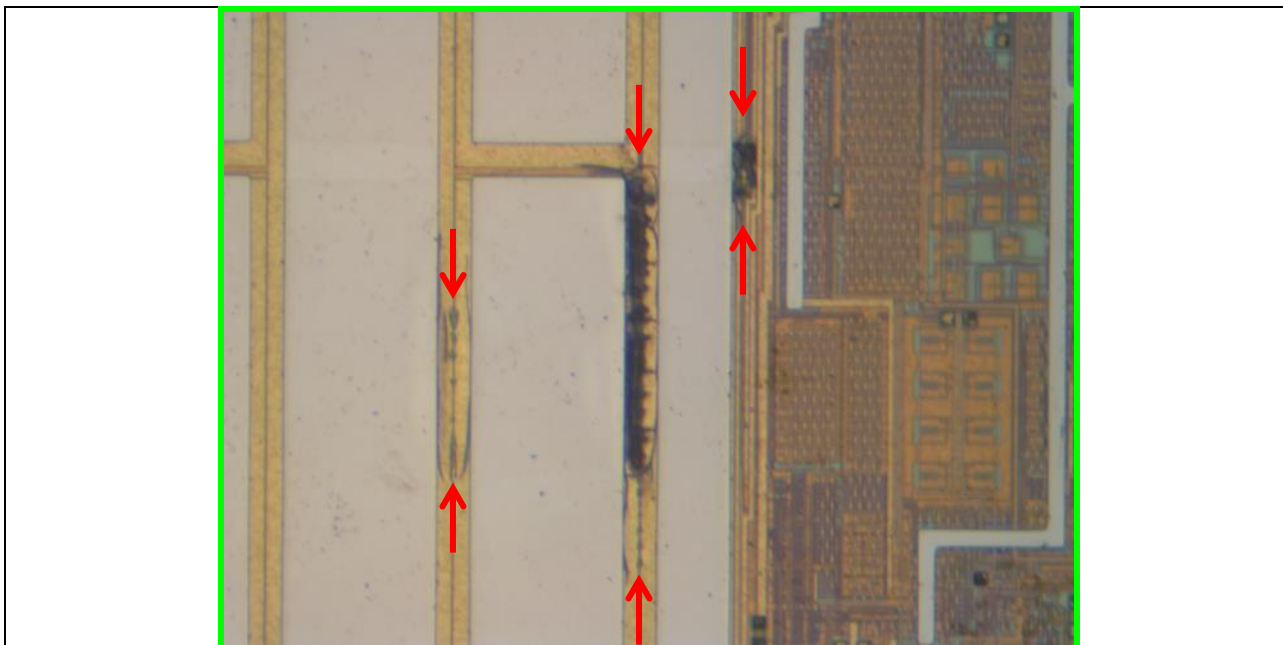


Figure 11: Unit#1.

Zoom in view of green box in figure 10.

Burnt out damage and fused metallization were observed, indicated by the red arrows.

- **Physical Mechanism ID:**

Electrically Induced Physical Damage (EIPD) in the form of burnt out damage and fused metallization were observed on unit#1.

- **Observation:**

Unit#1 failed due to the Electrically Induced Physical Damage (EIPD) observed.

By similarity of the failure modes, it is most probable that unit #02 failed due to the same failure mechanism

Note 1: Due to digital image capture, the magnification is not calibrated nor is the aspect ratio maintained. Not all tools provide a means recorded in the image for calibrating the measurements. When a calibration marker is supplied in the image, the measurements may be calibrated in the direction of the marker.