

PRODUCT CHANGE NOTICE

1. TITLE Case Outline Lead Finish, Ceramic LCC style		2. DOCUMENT NUMBER FV5-C-12-006
		3. DATE August 27, 2012
4. MANUFACTURER AND ADDRESS International Rectifier 205 Crawford Street Leominster, MA 01453		5. MANUFACTURER PART NUMBER NA / LCC package types shown below
		6. BASE PART NA
		7. NATIONAL STOCK NUMBER (NSN) NA
8. CAGE 69210	9. EFFECTIVE DATE August 31, 2012	10. GOVERNMENT NUMBER NA
11. POINT OF CONTACT Manufacturer's Representative or Customer Service Representative (978) 534-5776		12. DRAWING NUMBER NA
		13. SPECIFICATION NUMBER MIL-PRF-19500
14. PRODUCT CHANGE <p>This GIDEP PCN is to announce a change in the typical Ceramic LCC case outline lead finish. The lead finish for the LCC-28, LCC-18, LCC-6, and LCC-4 style packages will be changed from gold (Au) plating to hot solder dip (SnPb coating). International Rectifier is adding the extra solder dip step (lead finish) to its LCC packaged products as part of its finishing operations. See section below for process details.</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>LCC-28 (U6)</p> </div> <div style="text-align: center;">  <p>LCC-20 (U5)</p> </div> <div style="text-align: center;">  <p>LCC-6 (UA, UAC)</p> </div> <div style="text-align: center;">  <p>LCC-4 (UB, UBN, UBC, UBCN)</p> </div> </div> <p>Solder Dip Process Discussion: Parts described above will be hot solder dipped in 63 Sn / 37 Pb solder using an automated system. Solder dipping gold-plated leads is a common practice in industry. During this process, the gold is dissolved in the solder bath which allows the solder to adhere to the base metal (nickel). The gold content of the solder bath is carefully monitored to ensure that it never exceeds 0.2% gold in order to prevent gold embrittlement in the solder joints. Solderability is then performed in accordance with MIL-STD-750 requirements to test the leads.</p> <p>Solder Dip Operation: The parts will be dipped using a Corfin LRT-2000 (or similar). The parts are picked up from a tray by a vacuum tool, taken to a preheating station where they are heated for 10 seconds. They are then swept into the solder bath at an angle, allowed to dwell for approximately 3 seconds, swept out, and taken to the drop off station. The solder temperature is maintained at 260C.</p> <p>LCC Construction Note: The gold finish specification of the leads is 25 – 50 microinches The solder coating is a minimum thickness of 200 microinches</p> <p>(continued)</p>		
		16. APPROVING GOVERNMENT ACTIVITY
17. GIDEP REPRESENTATIVE Paul Hebert	18. SIGNATURE 	19. DATE August 27, 2012

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14. PRODUCT CHANGE (continued)

Reason for Change:

International Rectifier is experiencing solderability failures with their LCC-28, LCC-18, LCC-6, and LCC-4 style packages due to non-wetting in the lead castellation when tested in accordance with MIL-STD-750, TM2026 which invokes IPC/EIA J-STD-002, Category 3, Test B methods. The solder fails to wet at least two thirds of the way up the castellation, as required by J-STD-002. The failed leads often exhibit a visible nickel oxide (white or blue residue), which is usually concentrated in the castellation. (See figure 1 herein for exhibit). The nickel oxide is not removed by the RMA type flux specified in the solderability test method and inhibits wetting of the solder to the gold lead.

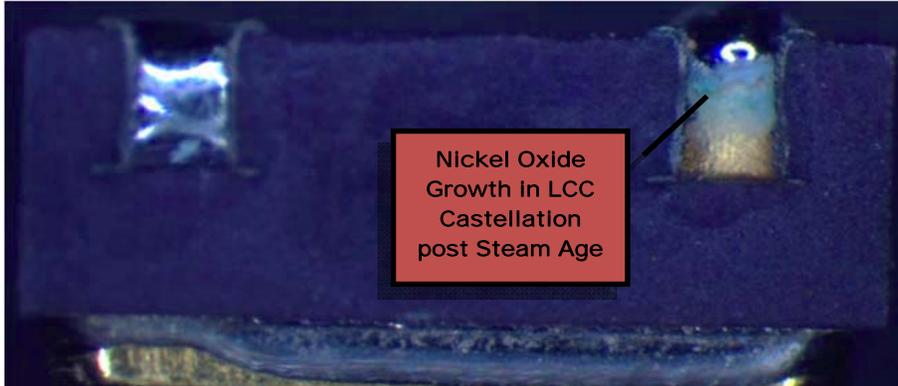


Figure 1 – Residue in Castellation, post steam age and solderability

Analysis:

The LCC leads have exposed Nickel and Tungsten (LCC package base metals) at the castellation edges, which is inherent with the package design due to singulation. Before any steam aging is performed, the LCC package castellation does solder and wet properly (even with no use of flux). However when performing solderability testing on the gold leads, the exposed base metals can oxidize during steam age and contaminate the castellation lead surface, leading to non-wetting of the gold surface.

Actions:

While International Rectifier has not received any reports of solderability failure from the field, we are taking this improvement action of pre-tinning the parts before delivery to effectively prevent the growth of oxides in the field or during long term storage. The problem described herein is not new and not just specific to International Rectifier, but is common to the user community of the LCC package styles.