Handling Procedures to Avoid Trapped Charges

AN54886/D

APPLICATION NOTE ABSTRACT

This application note provides guidelines on preventing the generation of trapped charges.

INTRODUCTION

Image sensor products can be sensitive to electrical charges transferred from external electrical fields and stored in the pixel array (“trapped charge”). The trapped charge can create unwanted optical effects, which appear as random dark spots in the image, typically several pixels in diameter.

Improper handling of the image sensor generates trapped charges. Improper handling includes any operation that creates an electrostatic charge, for example, wiping the cover glass with non-ESD protective wipes.

This application note discusses specific procedures to minimize creation of trapped charges. Refer to Application Note AN52561, Image Sensor Handling Best Practices, for general handling procedure recommendations.

Prevention of Trap Charge

Trapped charges can be avoided by proper handling of the sensor. onsemi ensures proper handling throughout the manufacturing, testing, and shipping processes, and maintains testing procedures to ensure that image sensor products do not exhibit trapped charges when shipped. It is equally important for the customer to implement proper handling in receiving, testing, and board and system manufacturing operations at customer sites. The following guidelines should be observed when handling image sensors.

- Follow ESD protocols defined in JESD625. The handling protocols must be periodically tested to validate their effectiveness.
- Handle image sensor devices while wearing a grounded wrist strap and ESD protective gloves.
- Maintain a proper anti static environment where image sensor devices are handled. This environment includes grounded conductive surfaces and ionized air streams, as determined by ESD auditing.
- Limit physical contact with the sensor cover glass. Such contact can induce an electro static charge. All contact with the device must be done while wearing a grounded wrist strap.
- Do not use any protective tape to cover the glass. The application or removal of the tape can induce electrostatic charge.
- An electrostatic charge can be induced when cleaning the device; therefore, if cleaning of the glass lid is necessary, consider the following:
- Always wear ESD protective nitrile gloves (recommended NiProtect CC529) when handling image sensors.
- If possible, remove particles on top of the glass by blowing with an ionized N2 gun. If N2 is not available, use an ionized clean dry air gun. Ensure that the appropriate point of use filtering system is in place to prevent particle contamination from the ionizing gun.
- If the above procedure does not remove the particle, use an ESD protective wipe (type S1091PRT from Puritech or RTMKC002 from distributor Hans J. Michael GMBH) to do a local cleaning with isopropyl alcohol (IPA), either extra pure or VLSI grade. Wet the wipe

- In the event that onsemi accepts return of devices exhibiting trapped charges, onsemi reserves the right, at onsemi