MIDLED (SFH 46xx, SFH 36xx).
Application Note

Introduction
OSRAM MIDLEDs are high powered devices in very small SMT packages.
The devices are produced using MID (Molded Interconnected Device) Technology. They are manufactured using dual component molding with the surface being partially metalized.
An integrated reflector yields high radiant intensity without the use of lenses.
The die is casted with silicone to ensure high temperature stability.
The package can be placed as either toplooker or sidelooker

This application note describes the handling of MIDLED s (silicone casted devices) and describes their unique radiation characteristics.

Silicone casting
Handling of silicone casted devices
During processing, mechanical stress on the surface should be minimized as much as possible. Sharp objects of all types should not be used to pierce the sealing compound.Mechanical stress can change the optical quality of the surface and therefore change the optical parameters of the device. For further details, please consult our general application note on handling of silicon casted devices:
http://catalog.osram-os.com/media/_en/Graphics/00017040_0.pdf

- **Delamination effects of silicone casted devices**
  In some cases, delamination at the silicone – reflector interface can be observed.
  A thorough investigation of this effect proves that the delamination does not cause any measurable changes in the radiation characteristics and in the radiant intensity (for emitters) or sensitivity (for detectors). Also effects on degradation and quality performance can be ruled out.
  These tests are summarised in a customer information package which can be obtained from OSRAM OS.

Radiation characteristics
The MIDLEDs feature very stable radiation characteristics due to an optimized reflector and die. Compared to lensed packages, the MIDLEDs are much less sensitive to offsets of the die position within the reflector. A special design of the reflector yields an emission angle of +-20deg, while the package height is kept at a

low 1.6mm. Fig. 2 shows the illumination of the integrated reflector.

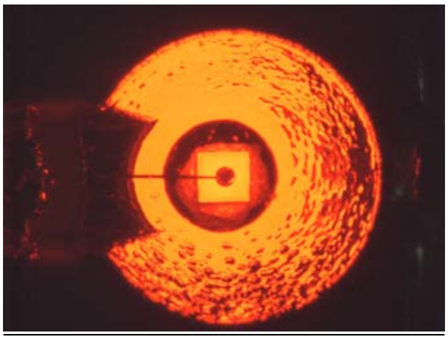

Fig. 2. Image of the MIDLED reflector with red LED.

- **Near- and farfield**
  In certain applications it is necessary to determine whether the operation distance is in the near- or farfield of the IRED. In the farfield the irradiance Ee at a distance r from the IRED is given by $Ee = Ie/r^2$ (Ie: radiant intensity). In the nearfield, however, the radiant distribution is different and the above equation is not valid. IREDs are commonly characterised in the farfield, hence for short operation distances the nearfield characteristics of the IRED need to be determined. In lensed packages, farfield conditions are reached at a distance of about 30mm, while for MIDLEDs farfield conditions are valid already from a distance of ~8mm. Designers of setups with short operations distances benefit from this effect, since they can base their calculations on the Ie datasheet values without taking nearfield effects into account. Fig. 3 illustrates the transistion from near- to farfield for a lensed device and a MIDLED.

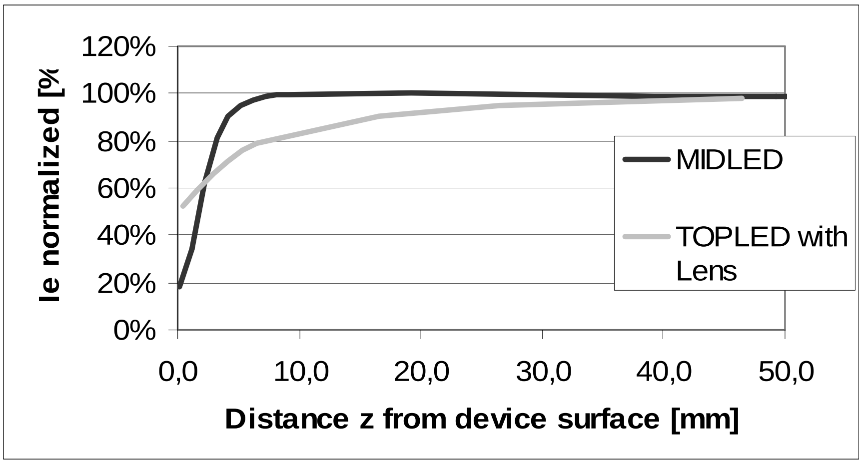

Fig 3: The deviation of simulated radiant intensity (Ie) values from the farfield values relative to the distance z to the package. Compared to lensed packages, farfield conditions are reached at 8mm for the MIDLED.