# **Thermal Management Solutions** for LED Assembly



High performance cooling – for a new generation of high-intensity LEDs



#### **Cooling off an LED**



**Durability of interface:** Especially in external applications of LEDs, durability of the thermal interface is important to support efficiency in different environmental conditions. 3M products have shown excellent durability through accelerated aging tests.

## Advanced designs drive need for more efficient cooling

- High speed/multi-function components 
  More heat generated
- Smaller enclosures ⇒ No room for heat to dissipate

#### The evolution of LED technology



### An emerging need for thermal management

Today's high intensity LEDs are opening up new opportunities for cost savings and reduced power consumption; however, they also generate more heat than conventional LEDs. It's important to remember that the higher the temperature at which LEDs operate, the less efficient they become – making improved thermal management essential for optimal performance. That's where 3M can help.

3M<sup>¬</sup> Thermal Interface Materials provide efficient thermal transfer for long-term reliability and performance optimization in applications using high brightness LEDs. 3M Thermal Interface Materials have a proven track record of durability and high thermal performance in a variety of environmental conditions to meet the demanding needs of applications today and in the future. 3M provides a full selection of products to meet customers' process and performance requirements, including thermally conductive pads, adhesives, and greases.

#### 3M<sup>™</sup> Thermal Interface Materials

Product	3M ID #	Description	Features
3M <sup>™</sup> Thermally Conductive Interface Pads	5570 (1.3 W/m-K) 5589H (Softer) 5590H (Higher thermal conductivity)	Acrylic pads, 0.5 mm and thicker. <b>Note:</b> 5589H is not available for 0.5 mm.	High thermal conductivity Excellent gap filling Die cut to size and shape No Silicone oil breeding/contamination
	5515-20 5515-25 (S version is also available)	Silicone pad, thin and higher K	Higher thermal conductivity (3 W/m-K) Thin thickness (0.2 mm - 0.25 mm) S version: One side is laminated with thin film for better handling and converting
3M <sup>™</sup> Thermally Conductive Interface Tapes	8904-02 8904-025 8904-05	Acrylic adhesive tapes with thin PET carrier	Higher thermal conductivity (1.5 W/m-K) Reworkable UL 94 V-0
3M <sup>™</sup> Thermally Conductive Interface Tapes	8805 8810 8815 8820	Acrylic double-sided tapes, 0.5 mm and thinner	High adhesion Die cut to size and shape Excellent wet-out
3M <sup>™</sup> Thermally Conductive Epoxy Adhesives	TC-2810 TC-2707	Epoxy adhesives	Ultra-thin bond line Higher thermal conductivity than tape Higher shear, peel strength than tape

Note: For applications using a thermal pad, the 3M Acrylic Thermal pads are slightly tacky on one side for generally acceptable assembly adhesion in many applications. If higher adhesion is desired, 3M suggests the testing of the 3M<sup>-</sup> Acrylic Adhesive Transfer Tape 9461.

The tack adhesion strength of the 3M Thermal Pads is sufficient for holding the product in place for assembly and use, etc. in many applications. The end use design of the LED Structure/Thermal Pad/Heat Sink does require an added mechanical means of assembly to ensure long term mechanical integrity and thermal performance.

3M also offers a line of silicone based thermal pads ranging in thermal conductivity from 1.0 W/m-K to 4.9 W/m-K. Please contact 3M for additional product information and inquire about 3M<sup>-</sup> Thermally Conductive Interface Pads 5591(S),5592(S),5595(S),5516(S) and 5519(S).

Some products may not be available in your country or region. Please contact your local 3M representative for product support.

Technical Information: The technical information, recommendations and other statements contained in this document are based upon tests or experience that 3M believes are reliable, but the accuracy or completeness of such information is not guaranteed.

Product Use: Many factors beyond 3M's control and uniquely within user's knowledge and control can affect the use and performance of a 3M product in a particular application. Given the variety of factors that can affect the use and performance of a 3M product, user is solely responsible for evaluating the 3M product and determining whether it is fit for a particular purpose and suitable for user's method of application.

Warranty, Limited Remedy, and Disclaimer: Unless an additional warranty is specifically stated on the applicable 3M product packaging or product literature, 3M warrants that each 3M product meets the applicable 3M product specification at the time 3M ships the product. 3M MAKES NO OTHER WARRANTIES OR CONDITIONS, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OR CONDITION OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR ANY IMPLIED WARRANTY OR CONDITION, CUSTOM OR USAGE OF TRADE. If the 3M product does not conform to this warranty, then the sole and exclusive remedy is, at 3M's option, replacement of the 3M product or refund of the purchase price.

Limitation of Liability: Except where prohibited by law, 3M will not be liable for any loss or damage arising from the 3M product, whether direct, indirect, special, incidental or consequential, regardless of the legal theory asserted, including warranty, contract, negligence or strict liability.



Electronics Materials Solutions Division 3M Center, Building 225-3S-06 St. Paul, MN 55144-1000 www.3M.com/electronics 1-800-251-8634

Please recycle. Printed in USA. © 3M 2014. All rights reserved. Issued: 4/14 9799HB 60-5002-0485-8

3M is trademark of 3M Company. Used under license by 3M subsidiaries and affiliates.