

# GORE® Thermal Insulation

FOR MOBILE DEVICES



THE BEST THERMAL INSULATOR FOR MOBILE DEVICES

INTRODUCING GORE® THERMAL INSULATION

*Together, improving life*



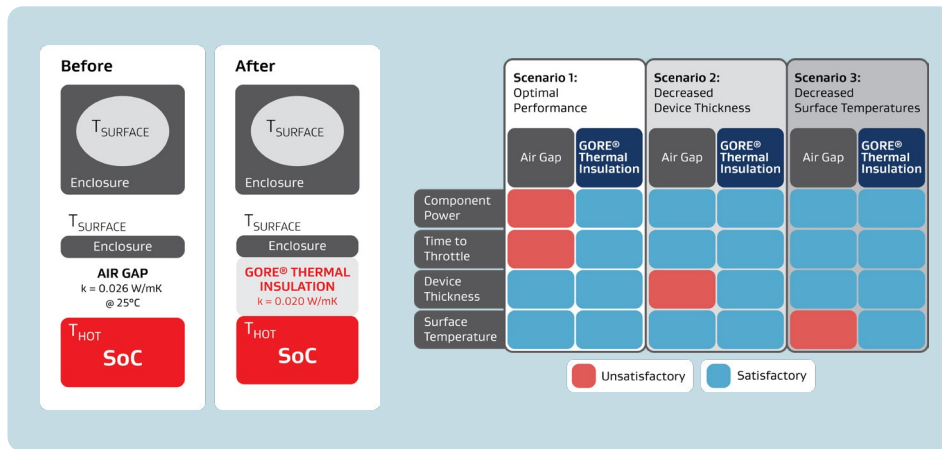
# Introducing the Best Thermal Insulator for Mobile Devices

Improve performance, reduce hot spots

Thermal challenges in smartphones and mobile devices are increasing due to demand for greater functionality and smaller device sizes which place multiple heat sources in close proximity to each other. This generates greater heat flux close to the surface which can exceed surface temperature specifications and impact device performance.

GORE® Thermal Insulation is a new tool in the thermal management toolbox with significantly lower thermal conductivity than air that can be used to reduce hot spots and lower surface temperatures. This enables designers to increase the time that components operate at higher levels before throttling performance due to thermal constraints.

## GORE® Thermal Insulation usage scenarios



### Scenario 1. Optimal performance

As shown in the illustration above for designs within thermal limits, components can operate longer at ideal performance rates before needing to throttle to maintain surface temperatures.

### Scenario 2. Decreased device thickness

The opportunity for thinner devices is achieved by shrinking the gap between the SoC and enclosure while achieving equal or lower surface temperatures compared to air.

### Scenario 3. Decreased surface temperatures

GORE® Thermal Insulation is ideal for SoCs where surface temperatures often go above limits. With thermal conductivity of 0.020 W/mK, it's superior to air (0.026 W/mK @ 25 °C) as an insulator.

Figure 1: GORE® Thermal Insulation for SoC

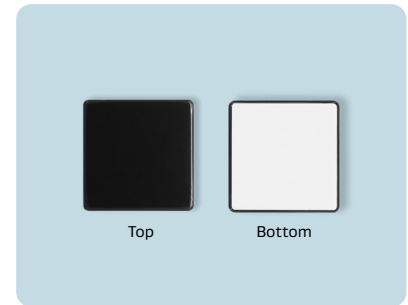
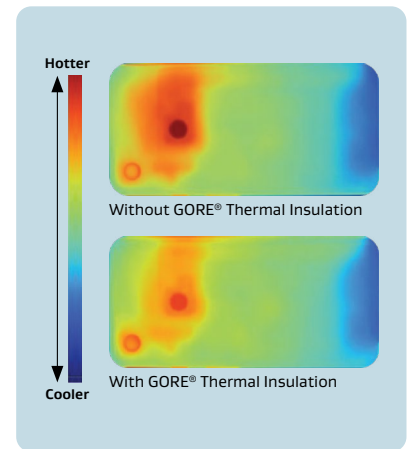


Figure 2: GORE® Thermal Insulation significantly reduces hot spots temperature and size



## Why use GORE® Thermal Insulation instead of air?



### SUPERIOR THERMAL CONDUCTIVITY

at 0.020 W/mK reduces heat flow by 23% compared to an air gap at 25 °C (0.026 W/mK)



### HIGHER DEVICE PERFORMANCE

by delaying need to throttle to minimize heat generation



### THINNER PRODUCT DESIGNS

by replacing an air gap of a specific size with thinner insulation while maintaining performance



### REDUCED SURFACE TEMPERATURES

of 1-7 °C based on power and insulation thickness



### MORE STABLE THERMAL CONDUCTIVITY

compared to air when temperature changes



### EASY INTEGRATION

with graphite or heat pipes solutions to optimize performance

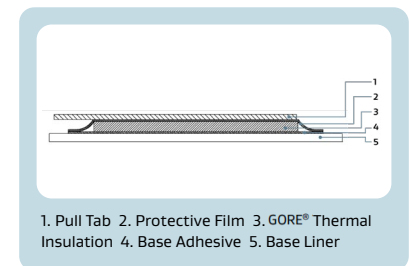


### ELECTRICALLY INSULATED MATERIAL

provides a physical barrier without creating electrical short circuits or EMI/RF problems

GORE® Thermal Insulation reduces surface “hot spots” and enables enhanced device performance for a better user experience.

Figure 3: GORE® Thermal Insulation cross section



1. Pull Tab 2. Protective Film 3. GORE® Thermal Insulation 4. Base Adhesive 5. Base Liner

## Powerful new tool in the thermal management tool box to solve problems quickly

- **GREATER FLEXIBILITY** can be added late in the development cycle when redesign isn't an option
- **EASY TO INSTALL INSULATION** offered in 4 thicknesses and customized shapes
- **DEVELOPMENT SUPPORT** Gore engineers help optimize thermal performance and integration

## GORE® Thermal Insulation material data\*

Characteristic				
Thermal conductivity (k) <sup>a</sup>	0.020 W/m•K			
Specific heat capacity <sup>b</sup>	1.8 J/g °C			
Bulk density	0.37 g/cc			
Compression @ 100 kPa (14.5 psi)	6%			
Operating temperature <sup>c</sup>	-40°C to 100 °C			
Protective cover film	Black PET			
Adhesive type	Acrylic			
RoHS <sup>d</sup>	Meets threshold requirements			
Insulation thickness available <sup>e</sup>	0.12 mm	0.28 mm	0.38 mm	0.54 mm
Adhesive encapsulation width (minimum) <sup>f</sup>	1 mm	1 mm	1 mm	1.5 mm
Max part size	100 mm x 200 mm			

<sup>a</sup> nominal conductivity value based on a modified version of ASTM C518.

<sup>b</sup> nominal heat capacity measured according to ASTM E2716 Method B at 75 °C.

<sup>c</sup> alternate adhesives required to exceed 100 °C.

<sup>d</sup> to the best of our knowledge, the part numbers listed above do not have any restricted substances above the maximum concentration values listed in RoHS Directive 2011/65/EU and meets the substance restrictions of Article 4 of RoHS Recast including Commission Delegated Directive 2015/863.

<sup>e</sup> nominal thickness based on reported values of thickness of each component of the stack up.

<sup>f</sup> nominal minimum width.

\*All values based on nominal characteristic and do not represent the specification and tolerance.

# GORE® Thermal Insulation

## W. L. Gore & Associates

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