



TTM Co., Ltd.

Company Introduction

TOP THERMAL MANAGEMENT

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About TTM



Top Thermal Management

1. Corporate Overview

TTM Overview

CEO	Eugene Choi
Established	November 14, 2003
Capital	1.35Mil. USD
Location	TK1 / TD1 / TU1
E-Mail	ttm@coolttm.com
Webpage	www.coolttm.com

TK1
Research Division
TEL : 82-31-888-9255
FAX : 82-31-888-9268

TD1
Manufacturing Facility
TEL : 82-42-935-3755
FAX : 82-42-935-3752





About TTM

2. Corporate Policy

Top Thermal Management



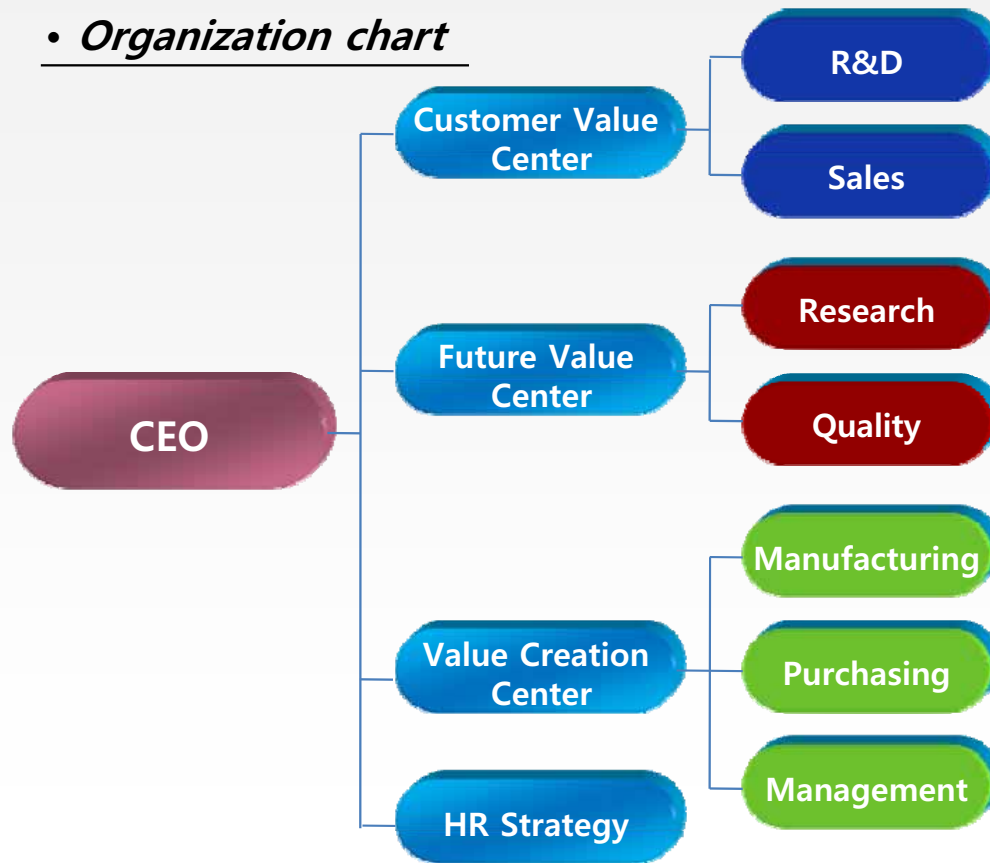


About TTM

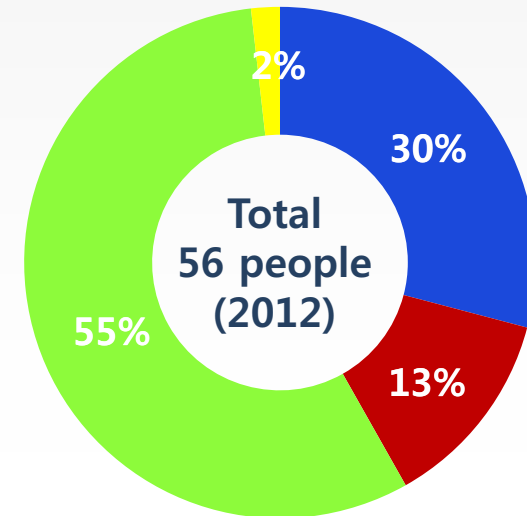
3. Organization Structure

TTM Organization

• Organization chart



• Manpower Distribution





About TTM

4. History

TTM History

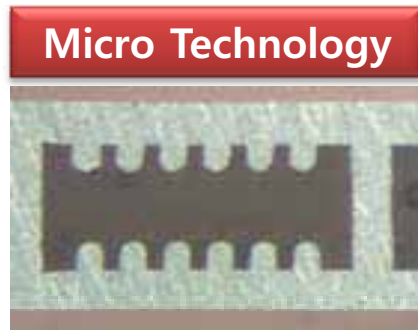
2011	<p>Completion of the new Extention building at TD1 Established branch office in California, USA</p>
2010	<p>Registered with Samsung Electronics as a 1st Supplier Obtained the TS16949 certification Established facility building in DAEJEON(Launching Vacuum Brazing Business) Relocated to advance institutes of convergence technology in SUWON</p>
2009	<p>Acquired INNO-Biz Company Acquired INTEL validation (NANOTIM PCM25) "Leader of Technology Startups" Awards received(SMBA) "Best Venture enterprise" Awards received(CVA)</p>
2008	<p>Registered the special company for the parts and the material from Korea government Approved as 1st Tier Supplier of Qimonda</p>
2007	<p>Certified partner of OSRAM's LLFY for APAC Receive the "Venture Design Award" from the KIDP</p>
2006	<p>Attracted a venture capital investment Accredited a "Clean Workplace" from the MOEL</p>
2005	<p>Received certification for "New Technology" from the MEST Acquired ISO9001,ISO14001 Acquired Korean good technology mark (KT Mark)</p>
2004	<p>Authenticated venture company with innovative technology by Korean government Selected as the "Center of Excellence" by UGS Foundation of TTM Co., Ltd. Research & Development Center</p>
2003	<p>TTM Co., Ltd. Established</p>



Technology & Products

Top Thermal Management

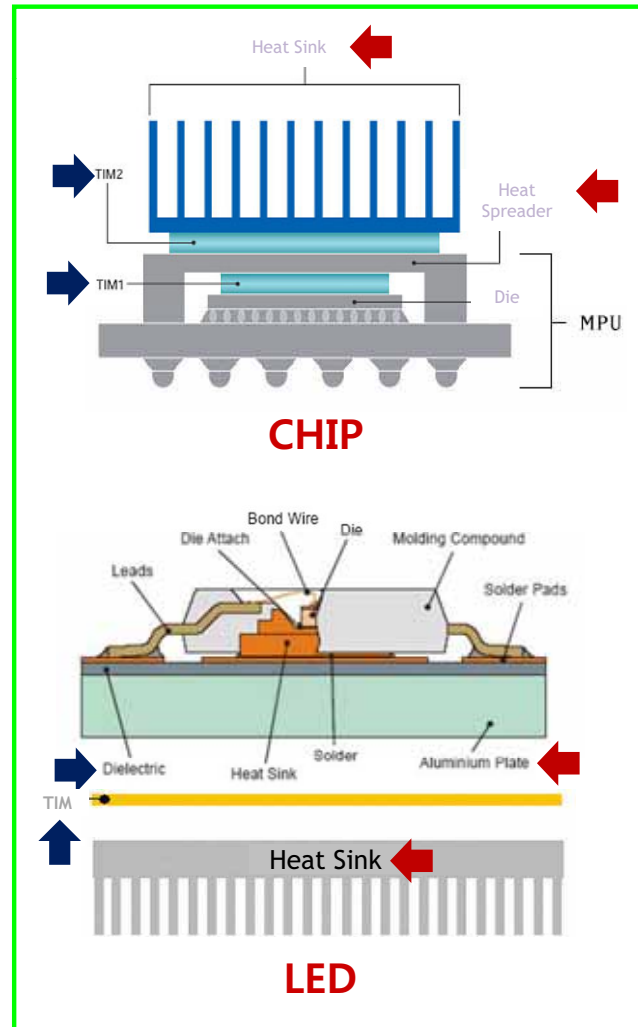
1. Core Technology



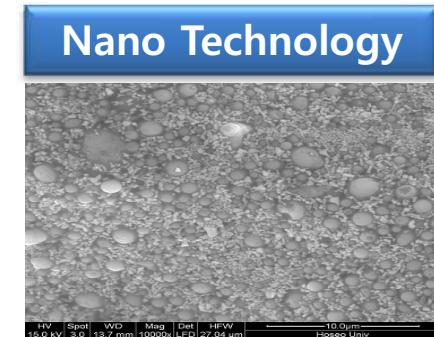
- Flat Heat Transmitter**
- Micro Channel Technology
 - Vacuum Technology
 - Cold Welding Technology

MTRAN®

- MTRAN® BASIC
- MTRAN® MEMORY
- MTRAN® CPU
- MTRAN® RHP
- MTRAN® PCB
- MTRAN® BRAZMAG



MTRAN → NANOTIM →



- Thermal Interface Material**
- Nano Dispersion Technology
 - Sheet Forming Technology

NANOTIM®

- NANOTIM® TGS
- NANOTIM® SPS
- NANOTIM® PCM



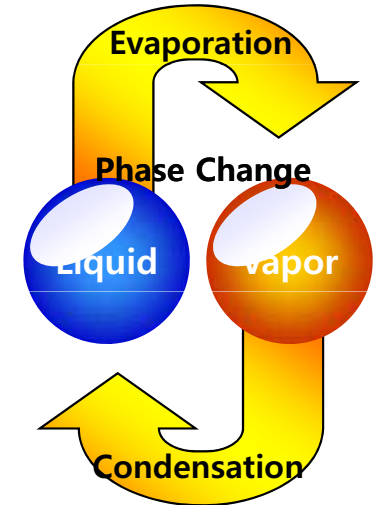
Technology & Products

Top Thermal Management

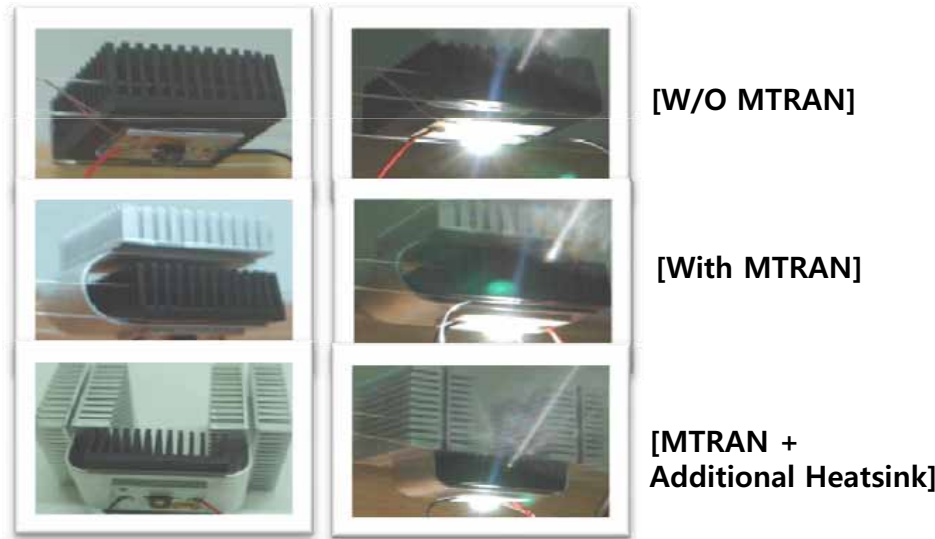
2. MTRAN Series

Heatpipe Mechanism

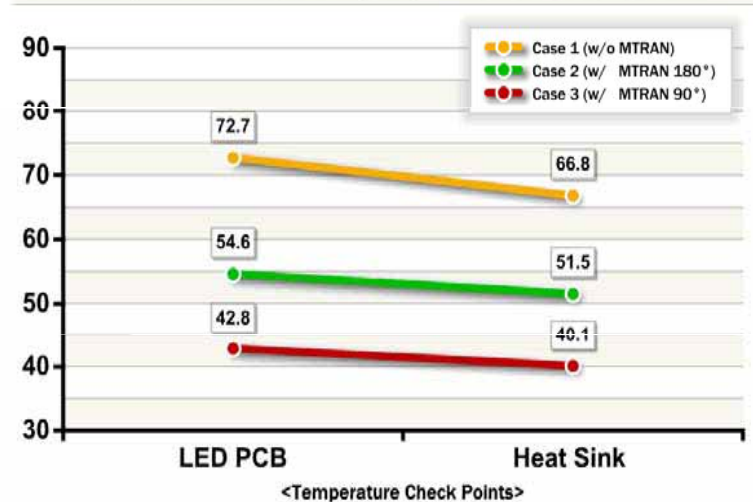
- Phase Change Technology : Conduction & Convection Heat Transfer Mechanism
- Working Process :
 1. Heat applied to the evaporator section by an external heat source is conducted through the MTRAN® wall.
 2. Working fluids are vaporized then, working fluids through the vapor section to the condenser section.
 3. Then releasing its latent heat of vaporization to the external cooler module of condenser section.
 4. And working fluids return to the evaporator section in the liquid phase by the capillary pressure or gravitational force.



Effectiveness of Heatpipe



5W LED(The Diamond Dragon) Thermal Test Results





Technology & Products

2. MTRAN Series

Feature

- ❖ MEMS Technology Applied
- ❖ Working Fluid : Acetone
- ❖ Thermal performance
 Horizontality: 5W~100W (180°)
 Verticality: ~220W (90°)
- ❖ Light weight, excellent uniformity
- ❖ Ultra-slim & flat HEATPIPE
- ❖ Custom sizes available
- ❖ RoHS compliant

General Dimension

Part Number	Thickness [mm]	Width [mm]	Length [mm]	
			Min.	Max.
TMT-10050A Series	1.0	50	60	200
TMT-12020B Series	1.2	20		
TMT-12023A Series	1.2	23		
TMT-15050A Series	1.5	50		300
TMT-16030C Series	1.6	30		
TMT-20040A Series	2.0	40		
TMT-20050A Series	2.0	50		
TMT-25050A Series	2.5	50		400
TMT-25085A Series	2.5	85		
TMT-30025A Series	3.0	25		
TMT-40050A Series	4.0	50	200	
TMR-00060A Series	6.0	6.0		





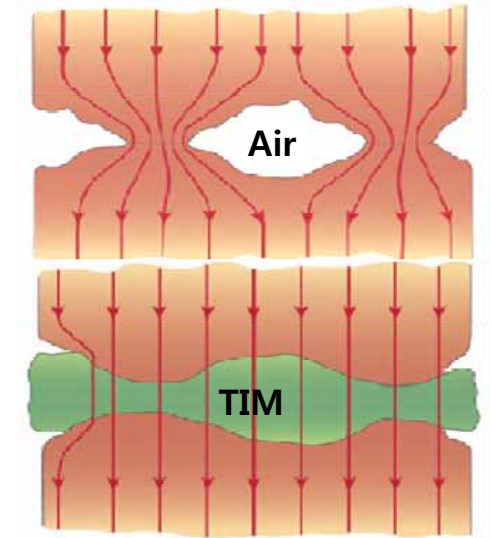
Technology & Products

Top Thermal Management

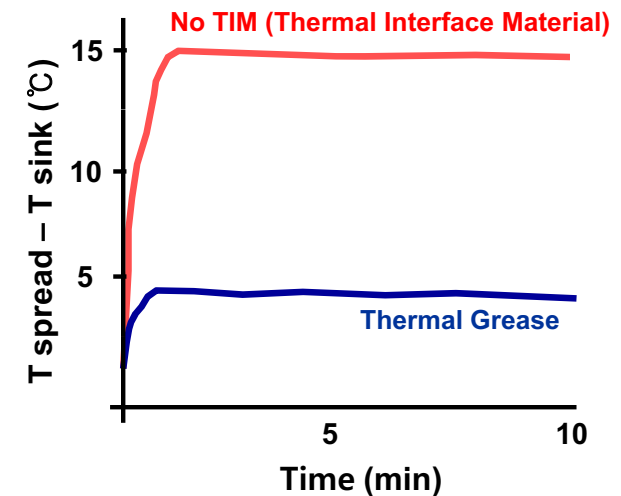
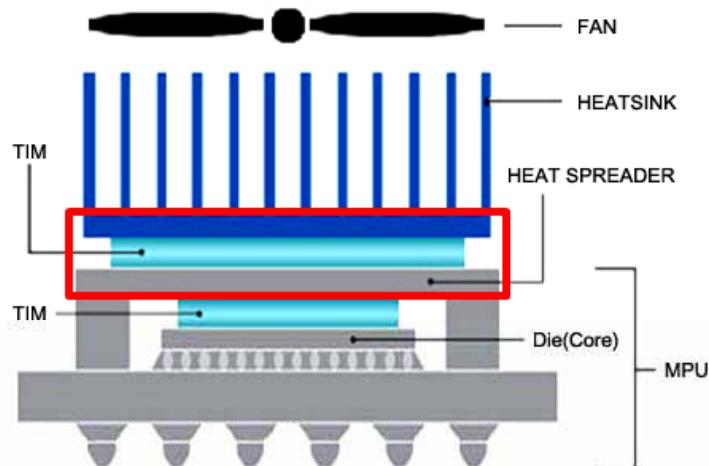
3. NANOTIM Series

TIM (Thermal Interface Material)

- ❖ Thermal Interface Material (aka TIM) is used to fill the gap between heat sources and heat sinks in order to increase thermal performance & thermal transfer efficiency
 - ❖ Contact rate of Heatsink & Heat source → less than 5%
- Thermal Conductivity for Air : 0.024 W/Mk, and copper : 400 W/mK



Effectiveness of TIM





Technology & Products

3. NANOTIM Series



◆ NANOTIM TGS

- ❖ TGS Series have superior wetting properties, and so completely fills microscopic surface of the components, resulting in very low thermal resistance.
- ❖ RoHS Compliance, Halogen Free, and UL-94 V0



◆ NANOTIM PCM

- ❖ PCM25 changes solid to paste status like thermal grease at 45 degree C in order to fill the all gap between heat source and heat sinks
- ❖ RoHS Compliance, Halogen Free, and UL-94 V0



◆ NANOTIM SPS

- ❖ SPS have the natural tack on both sides of the material allows for good compliance to mating surfaces of components
- ❖ RoHS Compliance, Halogen Free, and UL-94 V0



Technology & Products

Top Thermal Management

3. NANOTIM Series

Feature

Items	Unit	PCM25		TGS			SPS			
		PCM25	PCM25-SP	C200	A300	A700	155N	155S	307N	408S
Color	-	Gray	Gray	White	Gray	Gray	Gray	Gray	Gray	Gray
Thickness	mm	0.15~0.25	-	-	-	-	1.0~10	0.25 ~ 1.0	0.25 ~ 10	0.25 ~ 0.5
Reinforcement	-	-	-	-	-	-	-	Glass Fiber	-	Glass Fiber
Thermal Conductivity	W/m·K	4	3	1.7	4	7	1.5	1.5	3.0	4.0
Phase Change Temperature	°C	45	45	-	-	-	-	-	-	-
RoHS	-	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D
Halogen	-	Free	Free	Free	Free	Free	Free	Free	Free	Free

Material

Advantages

TTM Products

Phase Change

Conforms to surface irregularity, No cure, easy handling, film form
 Low thermal resistance

PCM25

Thermal Grease

High bulk thermal conductivity, No cure, conforms to surface irregularity
 Low thermal resistance

TGS

Silicone Pad

Good handability, film form, Provide surface protection

SPS

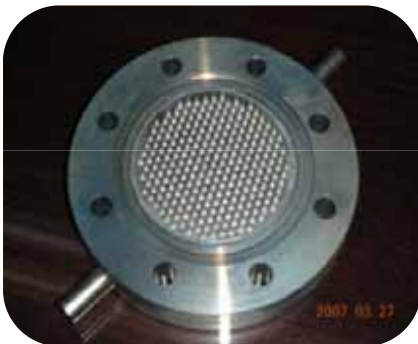
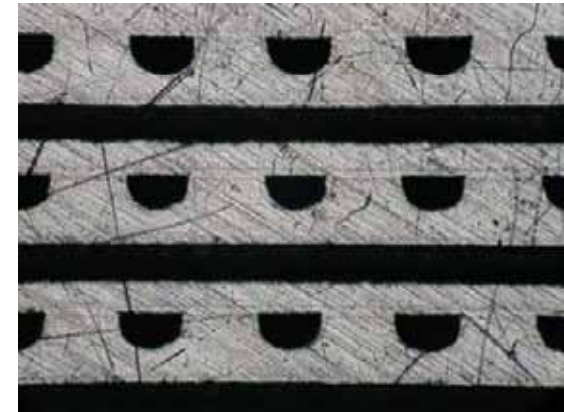


Technology & Products

4. BRAZ MAG

Feature

- ❖ Vacuum Brazing (Never melt base metal)
- ❖ Micro Channel Heat Exchanger
- ❖ Different metals and metal-nonmetal soldering
- ❖ Next-generation automobile cooling systems (Fuel cells and Batteries, etc.)
- ❖ Space Launch Vehicle fuel injection nozzle



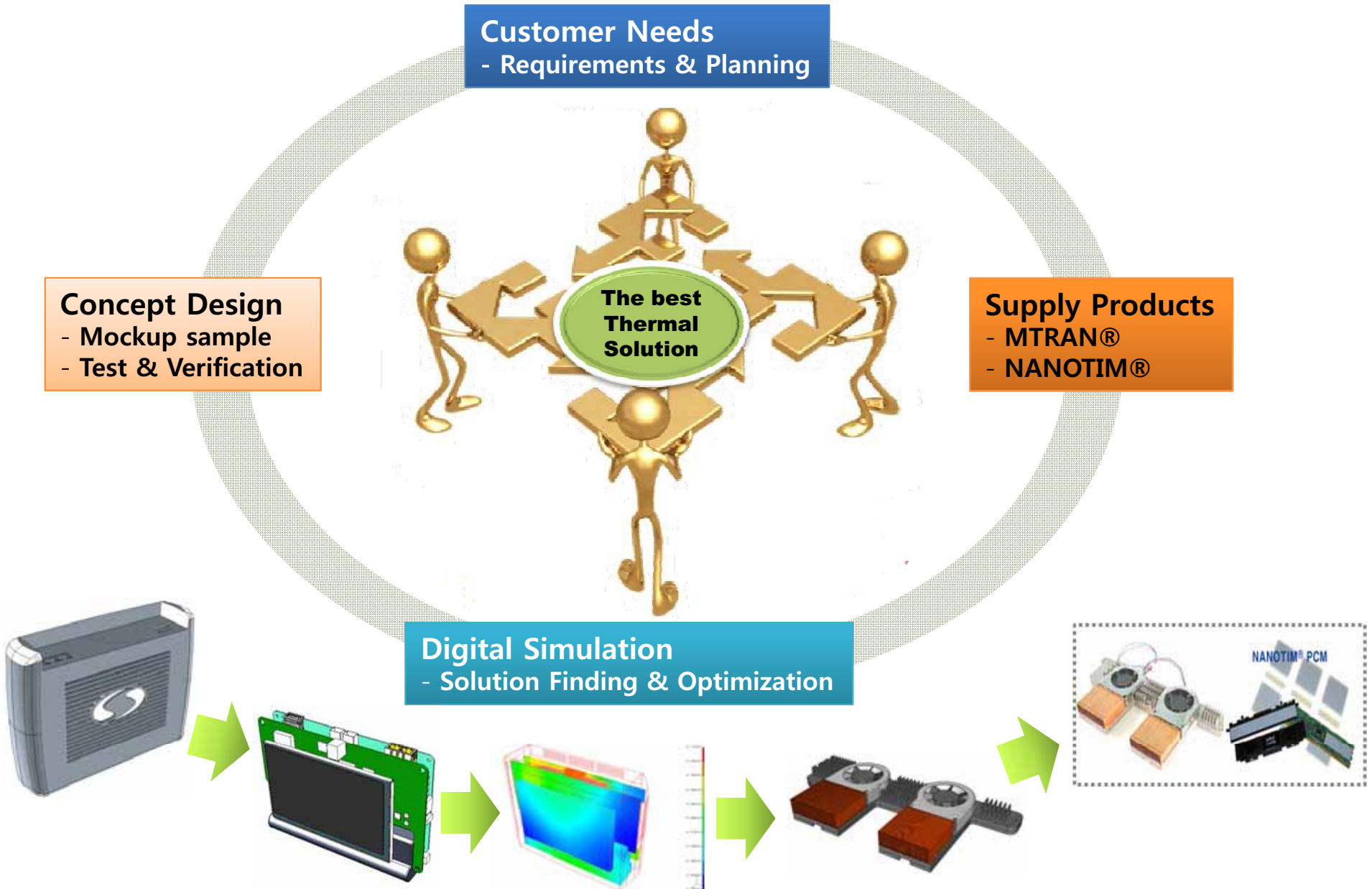
• *Micro Channel Heat Exchanger*



Technology & Products

Top Thermal Management

5. T-SOLUTION





Business & Markets

1. Current Markets

Computer & Mobile

- CPU Coolers for DT & SERVER
- Various Thermal solutions for :
 - VGA, Memory, SSD, Notebook etc...
 - Mobile Phone, Tablet PC etc...

Display

- Thermal parts for LED, LCD TV
- Thermal solutions for BLU & DID Panel

LED Lighting

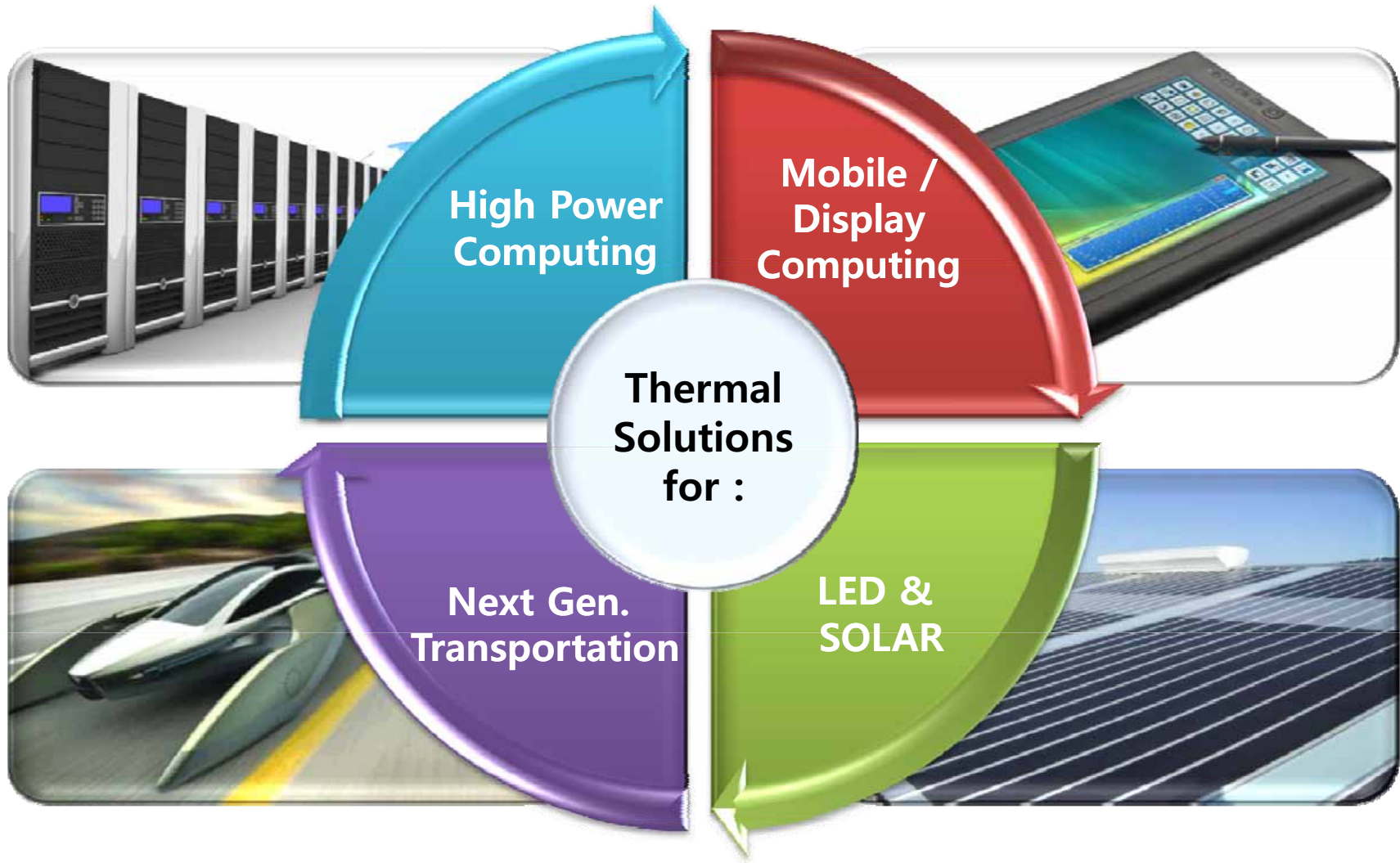
- Headlamp
- Indoor & Outdoor LED Lighting
- Specific LED Lighting





Business & Markets

2. Focus Markets





www.coolttm.com
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THANK YOU!