



**MSpower**  
—— MS POWER GmbH ——



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# Chapter 01

## 01 Group Framework

### *Geographic Organization Structure*

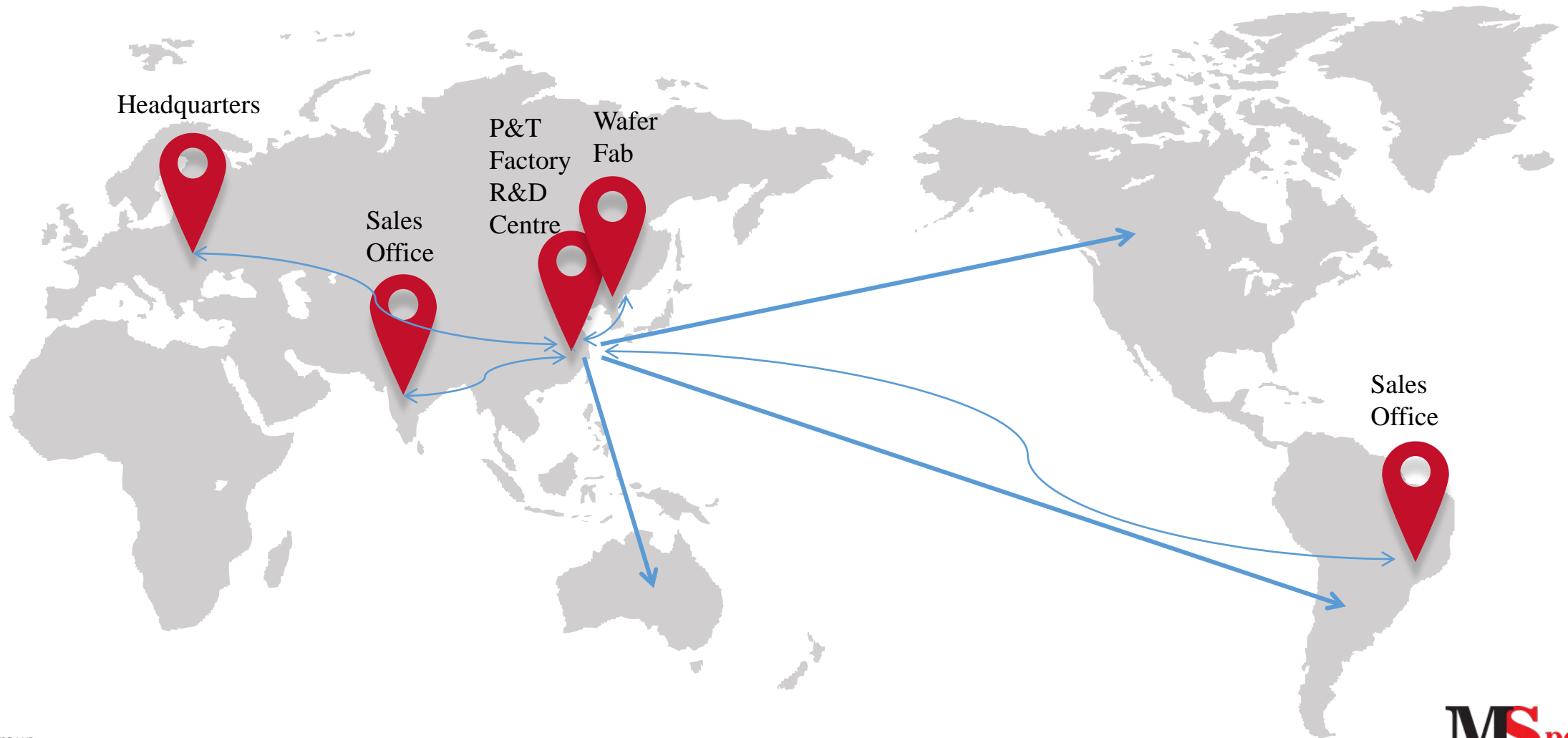
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# Geographic Organization Structure



# Chapter 02

01 Group Framework

02 MS Power Manufacturing Facilities

*Wafer Fab – In-house Chip Production*

*Packaging Fab – World-Class Soldering Technology*

*High Power Testing Center*

03 Product and Applications

04 Quality in Consistency and Reliability

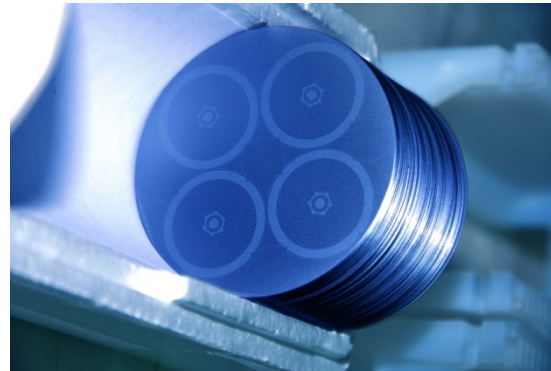
05 International Presence



# Wafer Fab – In-house Chip Production



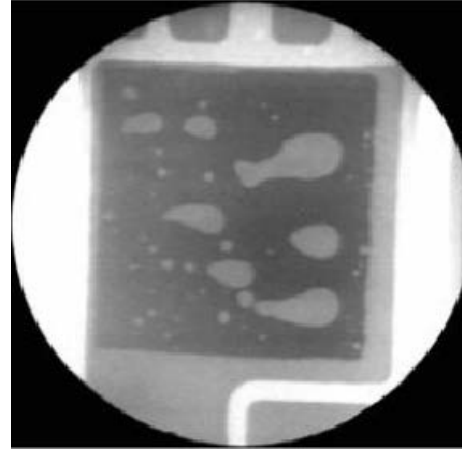
Employee ~ 150  
Floor Space 3000 m<sup>2</sup>  
Bi-Polar Technology  
Silicon Processing  
R&D  
Production Capacity 30-40K wafers per Month



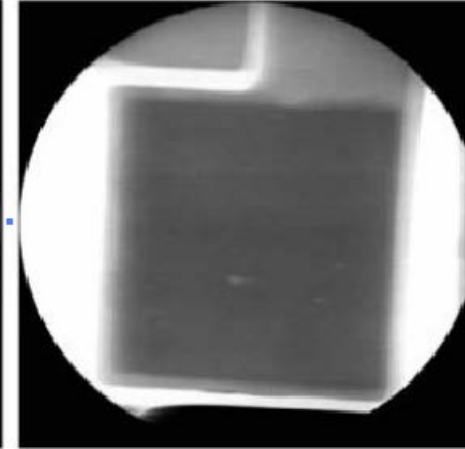
**Major Equipments**  
Fully Automatic Diffusion Furnaces  
Diffusion Depth and Lifetime Tester  
KARL SUSS Mask Aligner  
Semicore MARK50 Evaporation System  
Ultrasonic Void Scanning System  
Customized Vacuum Sintering System

# Packaging Fab – World-Class Soldering Technology

## Typical Advantage from Vacuum Soldering

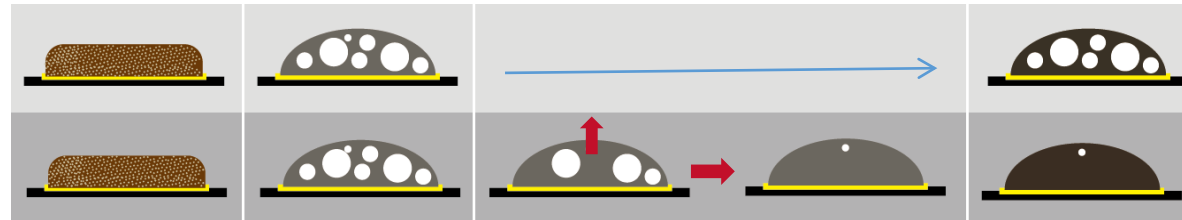


Solder voids in conventional soldering



Solder voids in vacuum soldering

- Reduced voids during soldering
- Finer structure
- Less oxidation
- Better distribution due to increase in wetting capability.



Conventional  
reflow  
Vacuum  
reflow

# High Power Testing Center



## Facility

1000M<sup>2</sup> Testing Center (Class 100K Clean Room)

## Hardware

Static Testing Equipments

Dynamic Testing Equipments

Reliability Testing Equipments



# Chapter 03

01 Group Framework

02 MS Power Manufacturing Facilities

**03 Product and Applications**

*Product Portfolio*

*Capsule Diode and Thyristor*

*Stud Diode and Thyristor*

*Power Modules*

*Three-Phase Bridge Rectifiers*

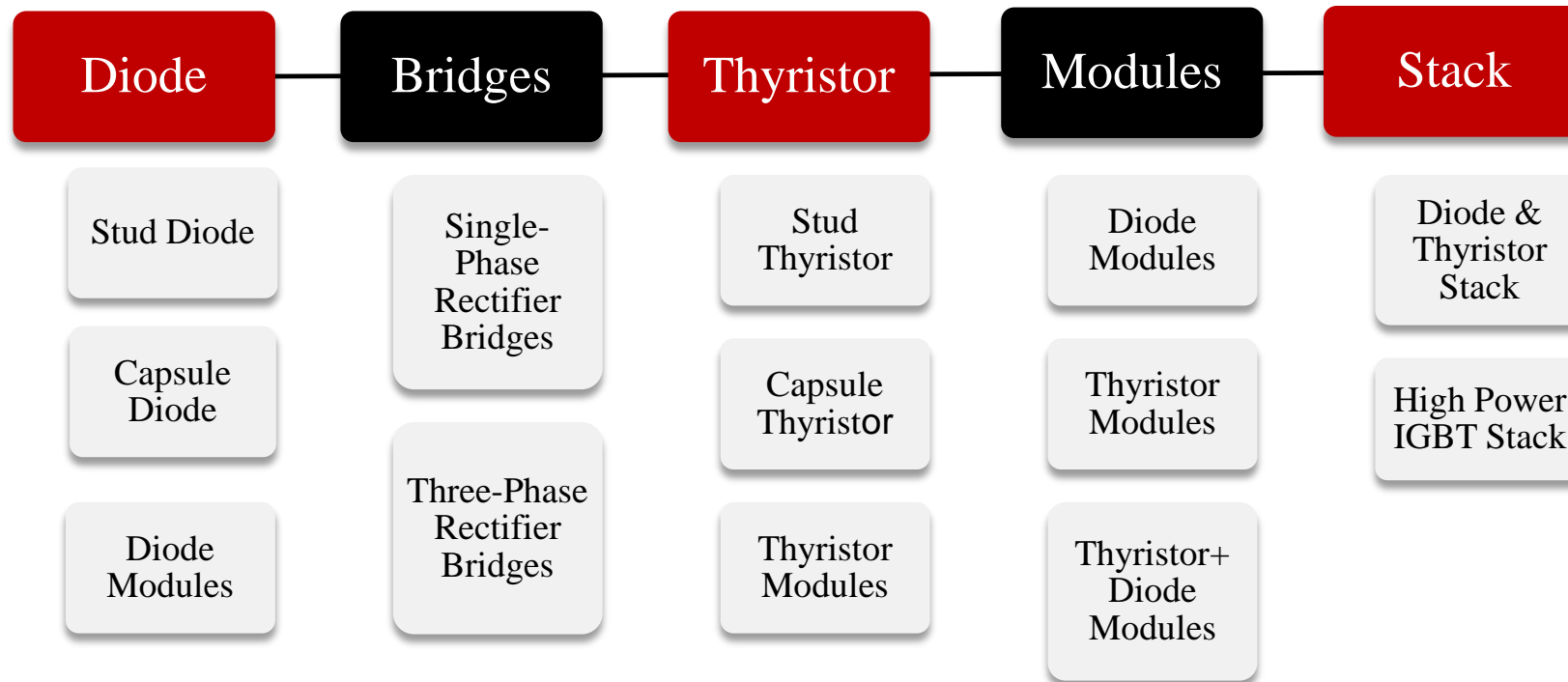
*Diode and Thyristor Stack*

*High Power IGBT Stack*

04 Quality in Consistency and Reliability

05 International Presence

# Product Portfolio



# Capsule Diode and Thyristor



## Typical Applications

- Drives
- Soft Starter
- Battery Charger
- Welding Machine
- Railway Rectifier
- Induction Furnace
- Rectifiers



# Stud Diode and Thyristor



## Typical Applications

- DC Drive
- Alternators
- Battery Charger
- Welding Machine
- Railway Rectifier





# Power Modules

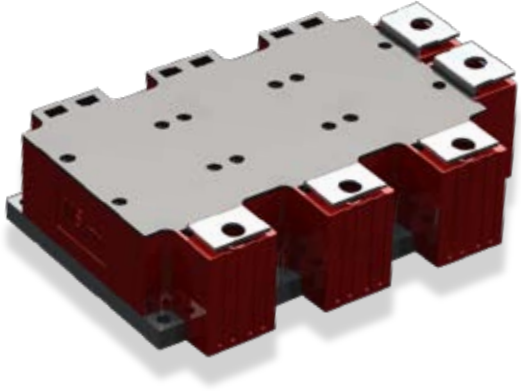


## Typical Applications

- Rectifier Equipment
- Inverter
- Battery Charger
- Telecommunication
- Welding Machine
- Power Factor Correction



# Three-Phase Bridge Rectifiers



## Typical Applications

- UPS, Industrial Power controller
- Input Rectifiers for PWM Inverter
- Battery DC Power Supply
- High-frequency Switching Power Supply
- Welding Application
- Medium Voltage Drive
- Electronic Regulator Cum Rectifier Unit
- Up to 500 Ampere Current Rating
- 800V to 2600V Reverse Voltage Rating



# Diode and Thyristor Stack



## Typical Applications

- Power Converter Equipment
- Inverter
- Battery Chargers
- Welding Machine
- Drives



*Design as per customer requirements.*

# High Power IGBT Stack



## Typical Applications

- Wind Power Generation
- Solar Power Generation

*Design as per customer requirements.*





# Chapter 04

01 Group Framework

02 MS Power Manufacturing Facilities

03 Product and Applications

04 Quality in Consistency and Reliability

*Precise German Engineering*

*Authentication Standard*

*Quality Assurance - Static and Fast Switching Testing*

*Quality Assurance - Full Dynamic Simulation Testing*

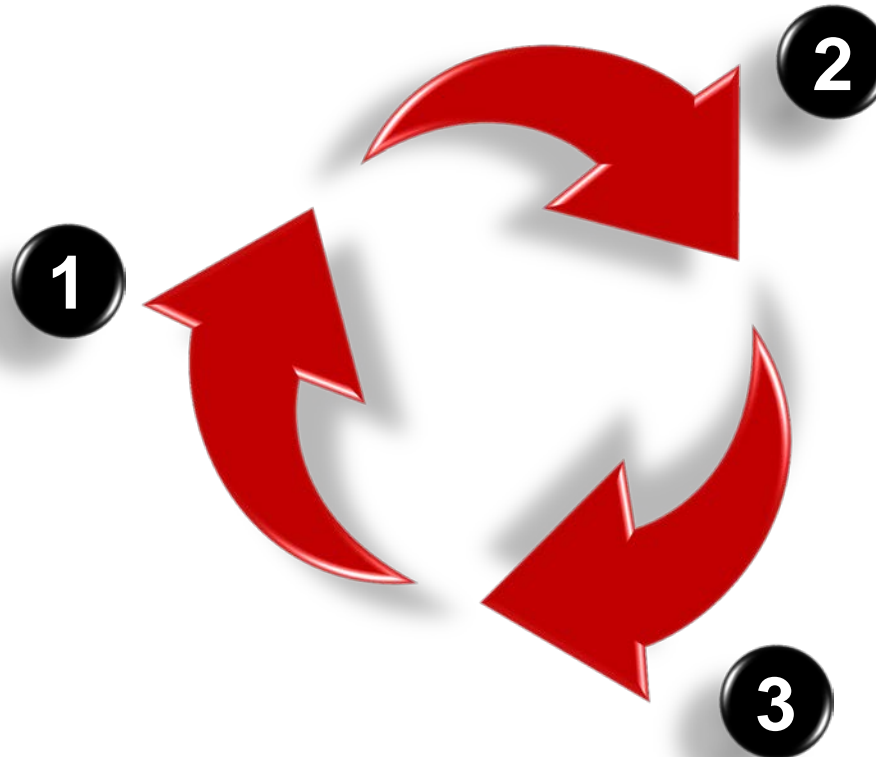
*Quality Assurance - Reliability Testing*

05 International Presence

# Precise German Engineering



- In-house silicon processing capability
- Smooth production and delivery
- World-class high reliability testing center



- World - class engineering team
- Complete solution to industry
- Proactive quality management



- ISO 9001:2015
- IEC-146 IEC-60747
- SAP ERP system

# Authentication Standard

Diode and Diode Stack  
are tested and  
Authenticated  
as per IEC 146 - 1973  
standard

Thyristor and Thyristor  
stacks are tested and  
Authenticated  
as per IEC 60747 -  
standard

# Quality Assurance - Static and Fast Switching Testing

On-State Voltage and Blocking Characteristic Tester

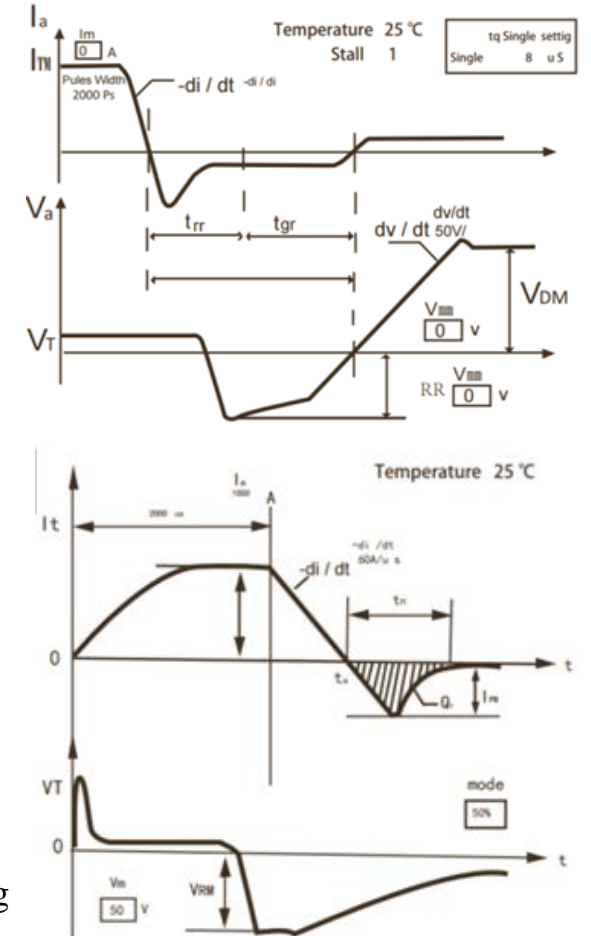


Characterisation of semiconductor devices in conduction state and in blocking voltage state at maximum specified junction temperature.

$T_q$ ,  $Q_{RR}$ ,  $Q_{RA}$ ,  $T_{RR}$  Tester



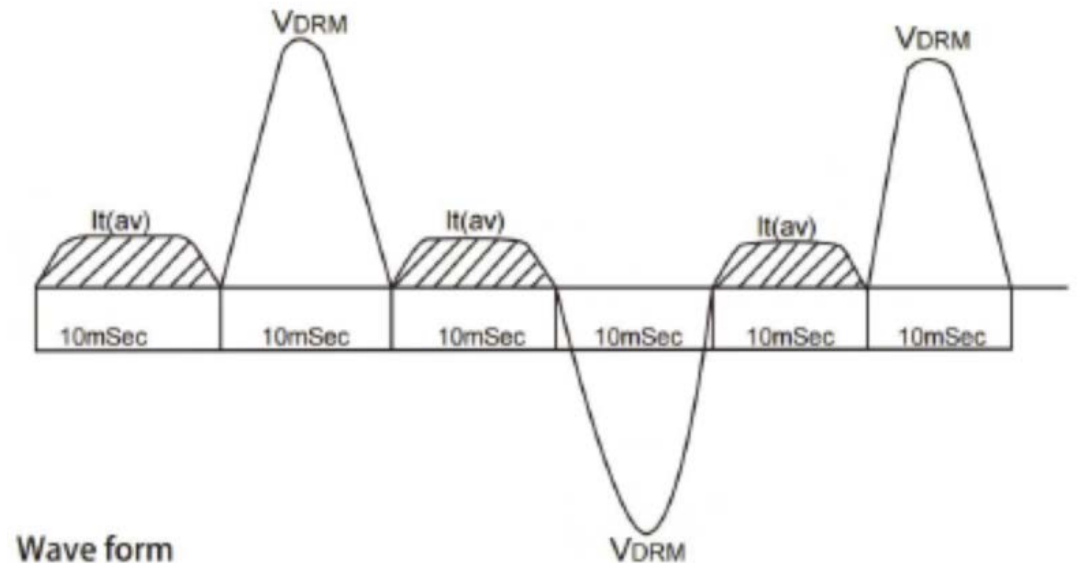
Automatic testing system for fast switching parameters like  $T_q$ ,  $Q_{RR}$ ,  $T_{RR}$  etc.





# Quality Assurance - Full Dynamic Simulation Testing

## Dynamic Tester



In-house simulation of field conditions-Rated current passed through the device and Rated V DRM /V RRM applied when device is in OFF state and observed the blocking voltage characteristic on X-Y curve tracer and record I DRM /I RRM at specified case temperature.

Significance of dynamic test: Confirmation of  $P_w$ ,  $R_{th}$  (J-C)

# Quality Assurance - Reliability Testing

HTRB Tester



Thermal Cycling Equipment



All these tests ensure that the devices leaving the factory are ready to use for the customer without doing any incoming inspection at their end. Expertise and quality control are critical factors in the delivery of high-quality components for demanding environments and applications with robust quality control processes in place for timely delivery of high quality component. MS Power comply with ISO 9001 quality management systems which provide validation of process integrity. This has assisted us to improve consistency and maximize operational efficiency.

# Chapter 05

01 Group Framework

02 MS Power Manufacturing Facilities

03 Product and Applications

04 Quality in Consistency and Reliability

05 International Presence

*Global Exhibitions and Conference*

# International Presence



**Elecrama 2016**



**PCIM Europe 2016**



**PCIM Asia 2016**



**PCIM Europe 2017**



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