MITSUBISHI ELECTRIC
Changes for the Better

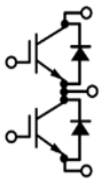
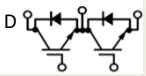
T-Series IGBT Modules – Standard-Type

The new Mitsubishi Electric 7th Generation Standard-Type IGBTs for 650V, 1200V and 1700V have been developed for the purpose of highest power density inverters and best-in-class thermal behavior.
The new 7th Generation CSTBT™ and diode chip set provides high efficiency by reducing both dynamic and static losses. The innovative TMS packaging technology provides very low thermal impedance, low package inductance and high thermal cycling capacity. The new Mitsubishi Standard-Type modules facilitate a high performance and reliability and compact inverter design.
The well established 34mm and 62mm package styles greatly simplify the design of medium power inverters for various applications like industrial drives, wind power, solar power and UPS. The newly introduced 48mm package for 300A and 400A rated currents enables a more compact inverter size than with comparable modules in 62mm outline.

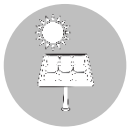
Product Advantages

- Low-loss 7th generation CSTBT™
- Low package inductance
- High Reliability
- Low internal electrical resistance
- High thermal conductivity
- Compact size
- Highest power density
- Wide power range
- Light weight
- 2000V class for $1500V_{DC}$

User benefits	Achieved by
Extended module life time	• High thermal cycling capability by new TMS-Technology • Extended power cycle life-time by ΔTj swing reduction with lowest Rth(j-c)
Reduction of assembly costs	• PC-TIM option for pre-applied thermal interface material • production lot-independent paralleling capability
High power density	• Low loss 7th gen. Chipset • Lowest thermal resistance Rth(j-c) by TMS-Technology
Scalability of power classes	• full power rating line-up of 650V, 1200V and 1700V modules

Circuit	Topology	Package	Size	650V	1200V	1700V	2000V
2-in-1 IGBT	D 		34 x 94 mm²	CM100DY-24T	CM100DY-24T	CM75DY-34T	
				CM150DY-24T	CM150DY-24T		
				CM200DY-24T			
			48 x 94 mm²	CM300DY-24T	CM200DY-24T	CM150DY-24T	
				CM400DY-24T	CM300DY-24T	CM200DY-24T	
			62 x 108 mm²		CM450DY-24T		CM200DY-40T
					CM600DY-24T		CM400DY-40TA
2-in-1 AC-Switch	C1 				CM450C1Y-24T		
					CM600C1Y-24T		
2-in-1 Diode	D 					RM600DY-34S	
						RM800DY-34S	
2-in-1 IGBT	D 		80 x 110 mm²				CM400DY-40T (no TMS and PC-TIM)

Industrial


Solar

Wind

Power Transmission

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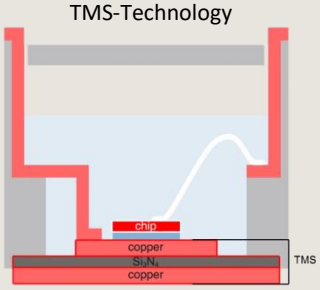
TMS (Thick-Metal-Substrate)-Technology

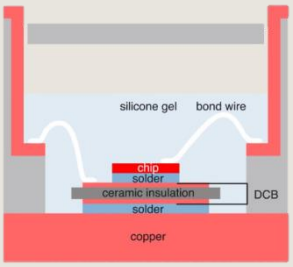
new

The newly introduced TMS-Technology is a packaging technology developed for realizing low inductance and very high thermal conductivity. Instead of the conventional package structure with several ceramic subtrates soldered to a copper baseplate, the Thick-Metal-Substrate contains a high thermal conductive **silicon nitride ceramic** with thick copper layers brazed directly to the top and bottom sides.
The **thick copper layer** underneath the IGBT chip provides low lead resistance and thus allows a higher current density. At the same time, it enables a better heat spreading directly next to the chip. This, in combination with the elimination of the substrate solder, means that both the thermal resistance and temperature cycling capacity are improved.
The **symmetrically stacked structure** of the TMS- Technology prevents the typical bending of baseplates in operation. This improves the thermal interface between the module and the heatsink.
Finally the total thermal resistance from junction to heatsink is reduced by more than half compared to conventional modules.

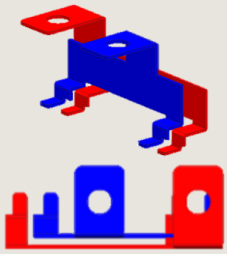
TMS-Technology



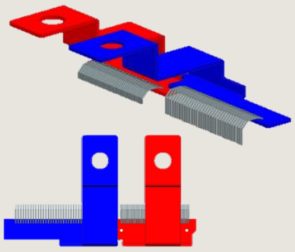
Conventional Technology



7th Generation main terminal Connection Technology



Conventional Technology



The TMS contains **one common substrate** instead of multi substrate arrangements as used in conventional modules. This expands the effective mounting area for chips and by eliminating wire bond interconnections - the internal stray inductance and lead resistance are reduced.

The main terminals are connected to the TMS by laminated internal bus bar with **increased laminated area** and **ultrasonic bonding**. This reduces the package inductance by 30% and contributes to low lead resistance .

User friendly assembly by PC-TIM

The Standard-Type of 7th Generation IGBT modules is also available with Pre-applied Phase Change Thermal Interface Material (PC-TIM).
The structure and consistency of Mitsubishi PC-TIM compliments the advantages of TMS-technology and removes the need for applying thermal grease. By PC-TIM a very low thermal contact resistance is achieved.
This feature enables a highly reliable mounting process even in harsh environments and easy maintenance in the field.

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