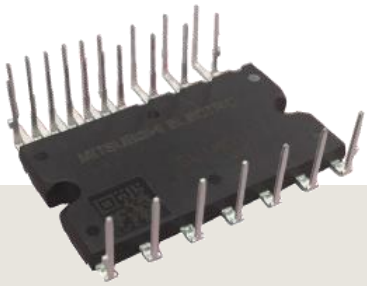
MITSUBISHI ELECTRIC
Changes for the Better



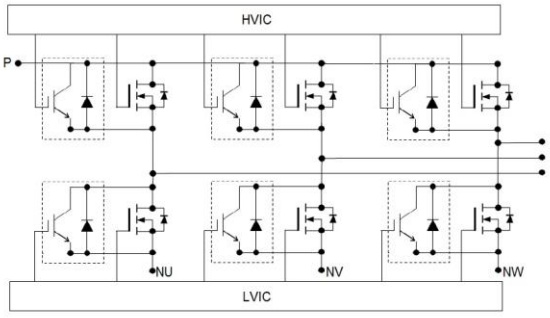
Hybrid SiC SLIMDIP™ with Reverse Conducting IGBT and SiC MOSFET for Distinct Partial Load Efficiency

Mitsubishi Electric has developed a new Hybrid SiC SLIM package Intelligent Power Module (Hybrid SiC SLIMDIP™) for Consumer Goods and Low Power Industrial Drive Applications. Power chips, drive and protection circuits are all integrated into the module, which makes it a simple choice for AC100-200V class motor inverter control. Hybrid SiC SLIMDIP™ utilizes RC-IGBT and SiC MOSFET in parallel connection, which applies MITSUBISHI's latest 2nd generation RC-IGBT and 2nd Gen.A planar SiC MOSFET chips respectively. By virtue of integrating these power chips, Hybrid SiC SLIMDIP™ is especially suitable for cost vs. performance optimized inverter-based home appliances and low power industrial drives demanding higher energy efficiency especially at partial load operation compared to MITSUBISHI's conventional SLIMDIP™.

Product Advantages

- Improved conduction losses especially for partial load operation
- Smaller package (30% smaller than Super Mini DIPIPM Package)
- Integrated bootstrap diodes eliminate the need for external diodes, simplifying design & PCB layout
- Dedicated protection functions: short circuit, over temperature, supply under voltage lockout
- LVIC temperature available as analog voltage output
- Robust package for high temperature operation, $T_{C,max}$ of 115°C for switching operation
- UL recognized, isolation voltage V_{iso} = 2000V AC RMS

Items	SLIMDIP™	Hybrid SiC SLIMDIP™
Power Chip	RC-IGBT	RC-IGBT + SiC MOSFET
Tj max / Tc max	150°C / 115°C	←
Protection	SC, UV, OT, VOT	←
Package	SLIM (18.8mmx32.8mm)	←
N-side Terminal	Open	←
Terminal shape	Standard and Short	←

Circuit	Circuit Diagram	Package	Product Name	Application
6 in 1		18.8mm X 32.8mm	PSH15SG1G6	Air Conditioner Pumps Fans Small AC Drives

Home Appliance Industrial

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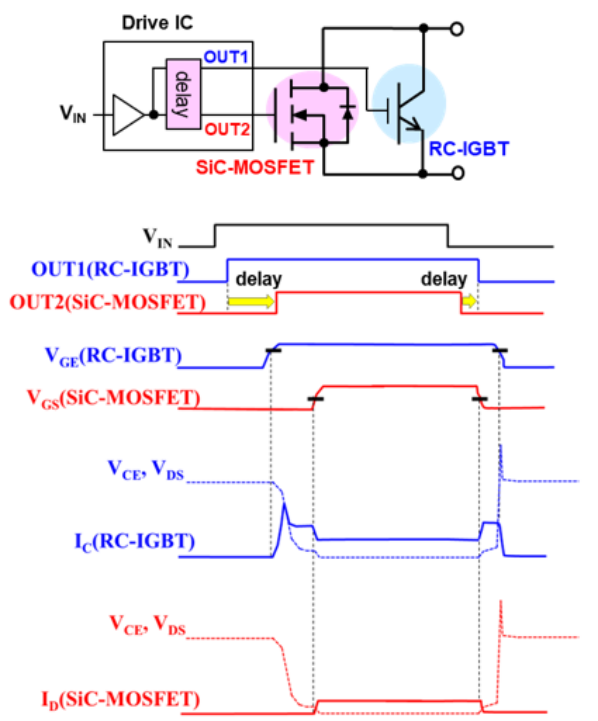
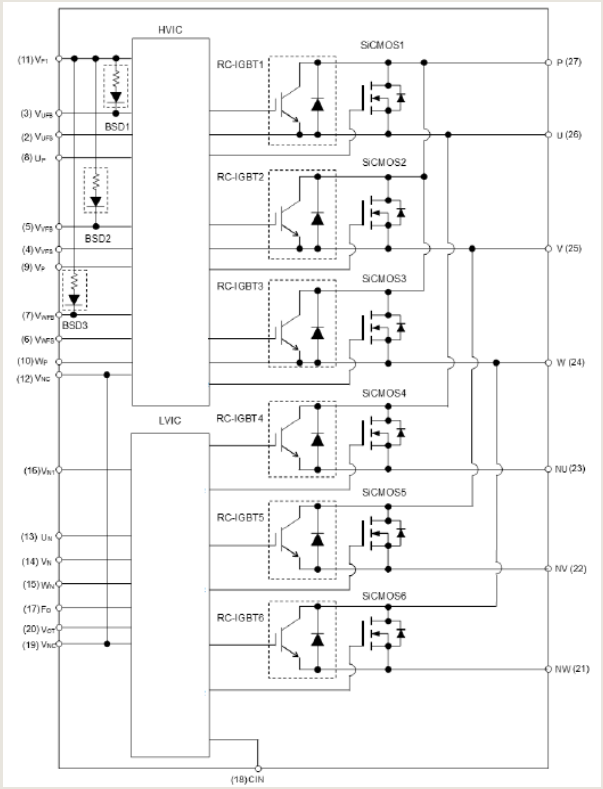
New Driver Stage

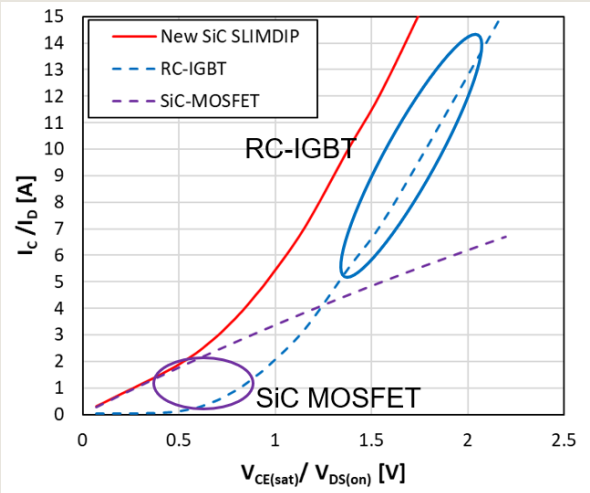
A new state of the art drive IC has been developed to enable parallel connection of the RC-IGBT chip with the SiC MOSFET chip for the Hybrid SiC SLIMDIP™ so that sequential control of the gate drive signal could be adapted. This sequential control guarantees that switching operation of the SiC MOSFET chip during switching states is avoided. Therefore, SiC MOSFET chip generates only DC loss.

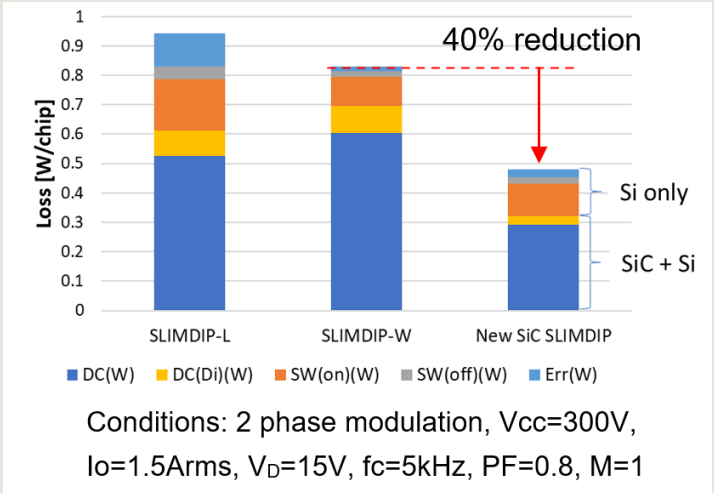




Increased Performance

Due to the reduction in DC losses with the SiC technology, the performance is significantly increased in comparison with the conventional Si technology especially within partial load operation.





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