

# SiC COMPANION SOLUTIONS

**Microchip** Next generation SiC MOSFETs offer superior dynamic and thermal performance over conventional Si MOSFETs and IGBTs. These devices offer low capacitance and gate charge, fast switching speed, fast and reliable body diode and stable operation at high junction temperatures of 175 deg C. These features enable high efficiency with low switching and conduction losses and eliminates the need for external freewheeling diode which lowers BOM cost and circuit board space. AEC-Q101 qualified products are also available.



Microchip's AgileSwitch® family of digital programmable gate drivers, develops transformative technology that dramatically improves the performance and efficiency of electric vehicle and renewable energy applications. AgileSwitch drivers can be fully customized to meet the needs and demands of virtually any customer application. Unlock the full potential of Microchip SiC modules with AgileSwitch gate driver products.



62CA1  
Adapter Board



2ASC-12A1HP  
Driver Core



62EM1-00001  
Plug and Play Driver



ASDAK-2ASC12A1HP-62  
Accelerated Dev Kit



2ASC-12A1HP Core +  
SP6CA1 Adapter Board +  
Microchip SP6LI module

Package	Voltage	Driver Cores		Plug and Play	Adapter Boards				Accelerated Dev Kit	
		2ASC-12A1HP 10A / 150kHz	2ASC-17A1HP 20A / 100kHz	62EM1-00001 20A / 200kHz	62CA1	62CA4	SP6CA1	SP6CA3	ASDAK-2ASC	ASDAK-MSCSM
D3	700V, 1200V	•		•	•				•	
SP1	700V, 1200V	•								
SP1	1700V		•							
SP3F	700V, 1200V	•								
SP4	700V	•								
SP6	700V, 1200V	•		•	•				•	
SP6LI	700V, 1200V	•						•	•	•
SP6LI	1700V		•					•		•
SP6P	700V, 1200V	•								

**ASDAK-MSCSM kits include:**

- 1x 2ASC-12A1HP 1200V Cores
- 1x SP6CA1 SP6LI mod. Adapt. Bd
- 1x SP6LI module
- 1x 62CA1 Device programmer kit
- 1x AgileSwitch Intell Config. Tool Software

**ASDAK-2ASC kits include:**

- 3x 2ASC-12A1HP 1200V Cores
- 1x 62CA1 1200V D3/SP6 mod. Adapt. Bd.
- 1x 62CA1 Device programmer kit
- 1x AgileSwitch Intell Config. Tool Software

**Driver Cores include:**

- Microchip Prog. gate driver IC
- Software Config +/- Vgs
- Pat. Augmented Switch
- Pat. Short-Cir Protec.
- Advan. Mon./Fault Report
- Gate resistors/bias circuitry

**Adapter Boards include:**

- Direct low-Ind. conn. to module
- Mount. conn. for 2ASC driver core
- 20-pin input conn.
- Parall main/sec driver conn
- Gate resistors/bias circuitry



62x108  
(D3)



41x52  
(SP1)



43x73  
(SP3F)



41x93  
(SP4)



62x108  
(SP6)



62x108  
(SP6P)



62x108  
(SP6LI)

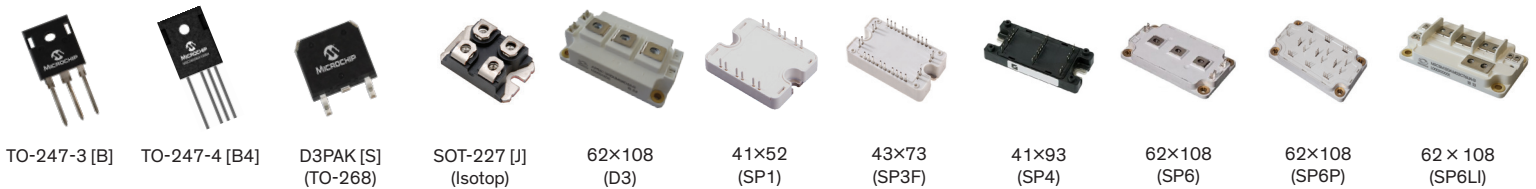
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## ADI Isolated Gate Driver Product Features

Isolated gate drivers provide electrical isolation as well as strong gate drive capability, which is often required for safety and robustness in many system architectures. The isolated gate driver portfolio from Analog Devices offers designers performance and reliability advantages over optocouplers or pulse transformers by utilizing ADI's proven iCoupler® technology. The isolated gate driver family offers the advantage of a maximum propagation delay of 50 ns, less than 5 ns channel-to-channel matching, up to 150kV/use Common Mode Transient Immunity (CMTI), and output voltages to cover all SiC and GaN drive levels.



		Basic				Protecting			Programmable	
		AC	AC	AC	AC	AC	AC	AC	AQ	AQ
Package	Voltage	ADuM4120	ADuM4121	ADuM4122	ADuM4221	ADuM4135	ADuM4136	ADuM4146	ADuM4137	ADuM4138
D3	700V, 1200V					G	G		G	G
SP1	700V, 1200V, 1700V					G	G	V	G	G
SP3F	700V, 1200V					G	G		G	G
SP4	700V					G	G		G	G
SP6	700V, 1200V					G	G		G	G
SP6LI	700V, 1200V, 1700V					G	G	V	G	G
SP6P	700V, 1200V					G	G		G	G
B	700V, 1200V, 1700V	G	G	G	H	P	P	V	P	P
B4	700V, 1200V, 1700V	G	G	G	H	P	P	V	P	P
S	700V, 1200V, 1700V	G	G	G	H	P	P	V	P	P
J	1200V	G	G	G	H	P	P		P	P

AC- Auto Capable

AQ- Auto Qualified

G- General Recommendation

H- Preferred for Half-Bridge Config

P- Preferred for paralleling Devices

V- Use with 1700V Devices

### BASIC

- Low Pin Count
- Small Footprint
- Low Delay
- High CMTI
- Typical applications:
  - OBC, DC / DC

### PROTECTING

- Low Delay
- High CMTI
- Bipolar Supplies
- Integrated Protection
- Error Reporting (flag)
- Typical applications:
  - Traction Inverter
  - Industrial / Energy Systems

### PROGRAMMABLE

- Low Delay
- High CMTI
- Bipolar Supplies
- Integrated Protection/Monitoring
- Status Reporting (Flag + SPI)
- Fly-back Controller
- SPI Configurable
- Typical applications:
  - Traction Inverter
  - High Performance Industrial / Energy Systems



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## RECOM High-isolation 2W DC/DC Converters for SiC Gate Drivers

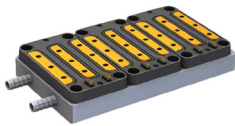
Switching SiC MOSFETs requires turn-on and turn-off voltages that are uncommon for other IGBT or MOSFET applications. RECOM provides high-isolation DC-DC converters with both single and dual asymmetric outputs to match the recommended gate drive levels of various SiC MOSFETs for optimized switching.



Series	Power (W)	Vin (V)	Nr. of Outputs	Vout 1 (V)	Vout 2 (V)	Mounting Type
RKZ-xx2005	2.0	5.0, 12.0, 15.0, 24.0	2	20.0	-5.0	THT
RxxP21503	2.0	12.0, 15.0, 24.0	2	15.0	-3.0	THT
RxxP22005	2.0	5.0, 12.0, 15.0, 24.0	2	20.0	-5.0	THT
RxxP215S	2.0	5.0, 12.0, 15.0, 24.0	1	15.0	-	THT
RxxP215S/R	2.0	5.0, 12.0, 15.0, 24.0	1	15.0	-	THT
RxxP22005D	+20/-5	5, 12, 15, 24	2	Yes	-5.0	THT

## 4000-series Cold Plates for Microchip Modules

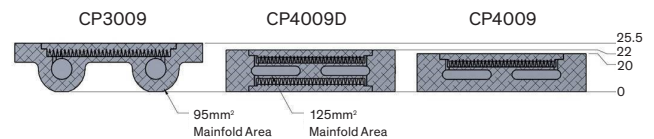
Wieland-Microcool 4000 series Friction Stir Welded coldplates have been optimized specifically for the high heat flux of silicon carbide power modules. The Micro Deformation Technology (MDT™) inside allows for the very low thermal resistance, low pressure drop and balanced parallel flow. The new 4000 series coldplates are thinner and can have cooling on both sides. Custom designs, internal nickel plating, fitting options, and MDT™ pin fin density options are all available with no tooling and quick lead times.



CP4009



CP4009D



Part Number	Dimensions (mm)	Fin Spacing (mm)	Module Compatibility	# of Modules	Thermal Res @ 24L/min FR (C/W)
CP4009-STD	130 × 225 × 20	1	D3/SP6/SP6P/SP6LI	3	0.007
CP4009-XP	130 × 225 × 20	0.5	D3/SP6/SP6P/SP6LI	3	0.006
CP4009D-STD	130 × 225 × 22	1	D3/SP6/SP6P/SP6LI	6 (Double sided)	0.004
CP4009D-XP	130 × 225 × 22	0.5	D3/SP6/SP6P/SP6LI	6 (Double sided)	0.003

\* Custom sizes also available.

To find more information, access our full design support capabilities, or to purchase these products today, visit [richardsonrfpd.com](http://richardsonrfpd.com).

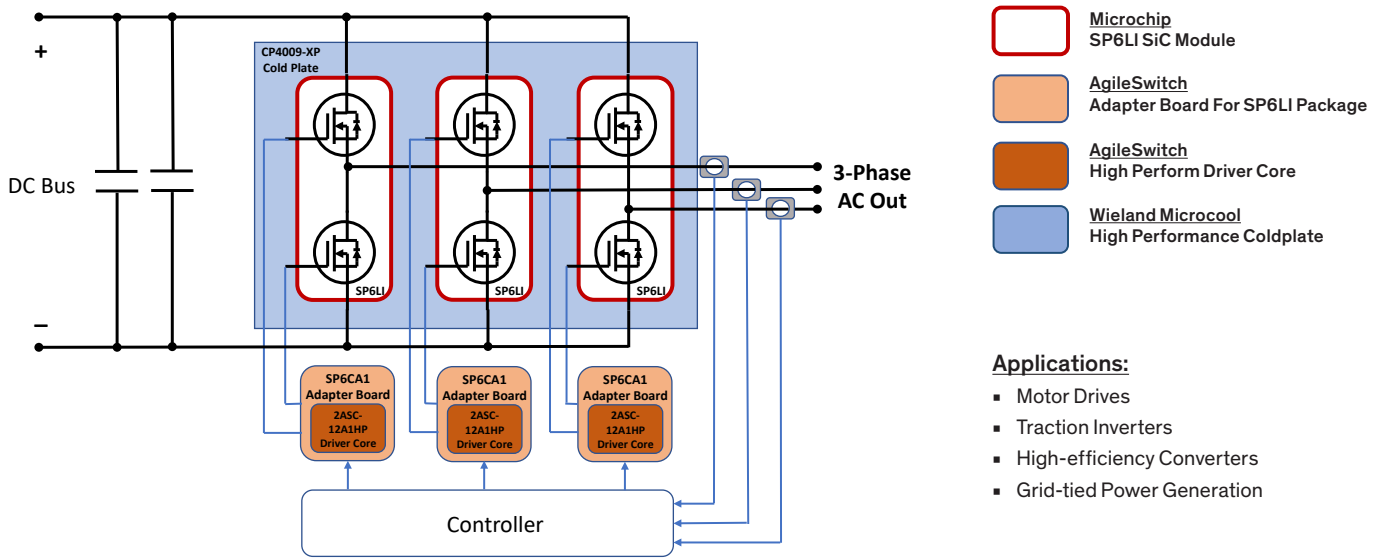


# SiC COMPANION SOLUTIONS

## Power Application Examples -

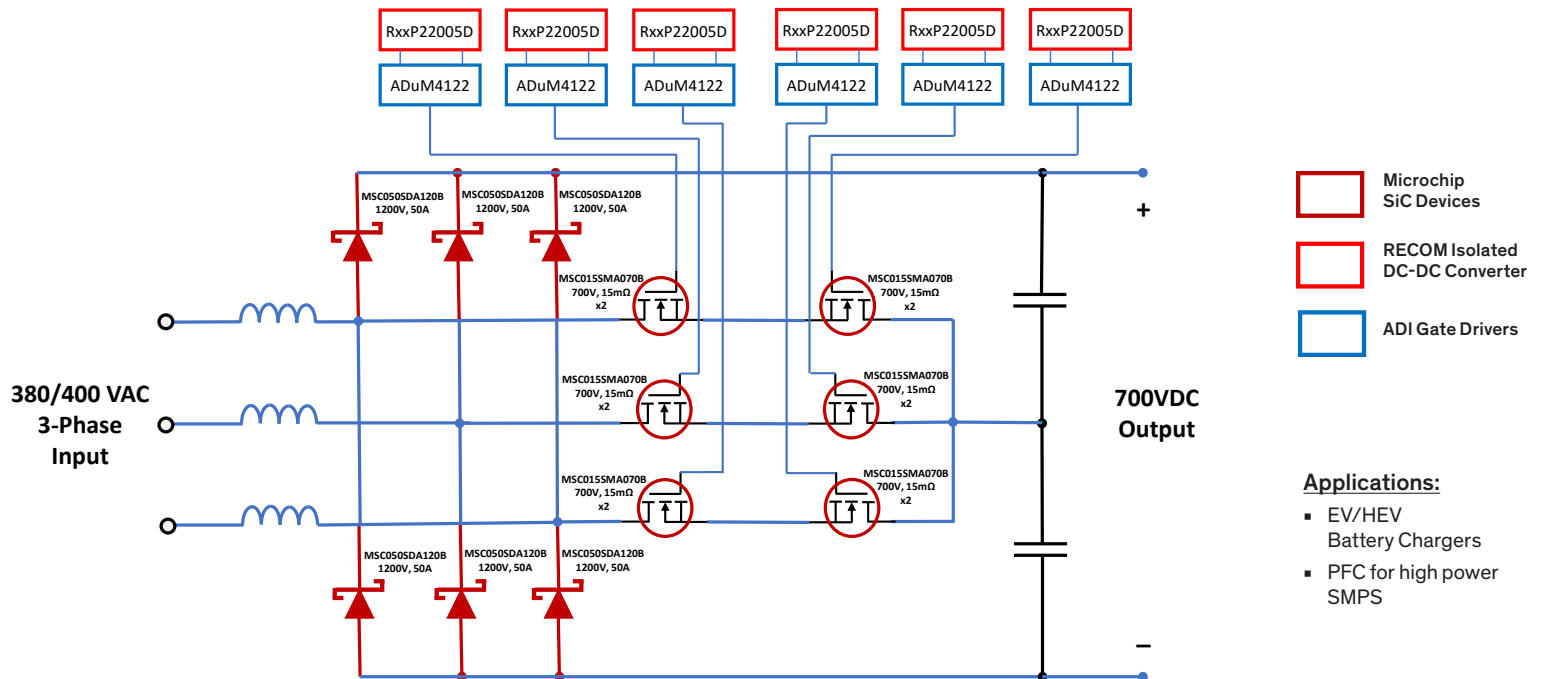
### High Power 3-Phase Inverter

Example of a high power 3-phase inverter using Microchip SiC half-bridge module in ultra low inductance SP6LI package. Greater efficiency, power density and optimization of performance is further enhanced with AgileSwitch programmable gate driver core and adapter board, featuring augmented switching technology capable of 150kHz frequency.



### 30kW Vienna Rectifier

Example of a 30kW 3-phase Vienna Power Factor Correction (PFC) design utilizing Microchip next generation SiC Schottky barrier diodes and MOSFETs. In addition to the SiC devices, ADI offers gate driver ICs with high CMTI, low prop delay and protection features that match well with SiC. RECOM high isolation DC-DC converters with asymmetric output voltages to match SiC gate drive levels, can be used with ADI drivers for a simplified and effective SiC gate drive circuit.



2/2021