SiC MODULES FOR EVERY POWER LEVEL

> *"The drop-in feature of Cree's new all-SiC power modules allows us to achieve 99 percent efficiency while reducing the power module count by a factor of 2.5 in our existing HF induction heating systems."*
>
> *—John K. Langelid, R&D Manager, EFD Induction*

Six-Pack Evaluation Board

45mm Family

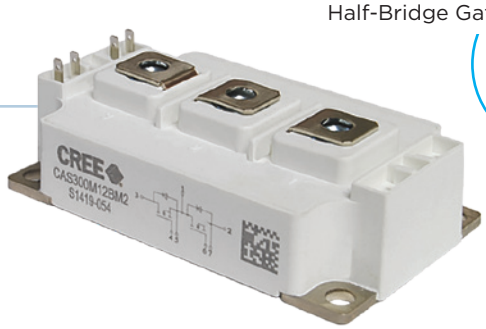
Compatible with EconoPack™ 2
1200V / 10–50kW

Our award winning all-SiC family of modules in an industry standard 45mm footprint allows engineers to take advantage of the benefits of SiC (such as 5x lower switching losses) without significant redesign. Increase the power rating of your 3-phase inverters while reducing power losses. A Cree®-designed six-pack evaluation board is available for purchase, or download the full reference design.

Half-Bridge Gate Driver

62mm Family

Compatible with SEMITRANS® 3
1200V, 1700V / 40–3000kW



All SiC half-bridge modules bring SiC into the megawatt class of applications in a commonly-used 62mm package that is easy to implement and evaluate in existing systems. With 5-7x lower switching losses than equivalent IGBT modules, applications such as induction heating, central solar inverters and AFE motor drives can achieve higher power density and efficiencies up to 99 percent. Supporting SiC commercial gate drivers are available for purchase, or download Cree's reference design to implement your own solution.

CREE® POWER PRODUCT SELECTOR GUIDE

Silicon Carbide Power Modules

Part Number	V_{DSS} (V)	$R_{DS(ON)}$ (T_J=25°C) (mΩ) Typ	Max	$R_{DS(ON)}$ (T_J=150°C) (mΩ) Typ	Max	E_{SW} Total (mJ) (T_J=150°C)	I_D (T_C=90°C) (A) (Continuous)	Package Type
CCS050M12CM2	1200	25	34	43	63	1.7	59	45 x 108
CCS020M12CM2	1200	80	98	150	208	0.48	20	45 x 108
CAS120M12BM2	1200	13	16	23	30	2.1	138	62 x 106
CAS300M12BM2	1200	5	5.7	8.6	9.8	12	285	62 x 106
CAS300M17BM2	1700	8	10	16.2	20	23.7	225	62 x 106

Silicon Carbide MOSFET

Part Number	V_{DSS} (V)	$R_{DS(ON)}$ (T_J=25°C) (mΩ) Typ	Max	$R_{DS(ON)}$ (T_J=150°C) (mΩ) Typ	Max	E_{SW} Total (µJ) (T_J=150°C)	I_D (T_C=100°C) (A) (Continuous)	Package Type
NEW C3M0065090J	900	65		90			25	7L D2PAK
NEW C3M0065090B	900	65		90			25	TO-220-3
NEW C3M0065090D	900	65		90			25	TO-247-3
C2M0025120D	1200	25	34	43	63	1700	60	TO-247-3
C2M0040120D	1200	40	52	84	100	1400	40	TO-247-3
C2M0080120D	1200	80	98	150	208	400	20	TO-247-3
C2M0160120D	1200	160	196	290	400	140	11	TO-247-3
C2M0280120D	1200	280	370	530	650	70	6	TO-247-3
C2M1000170D	1700	1000	1400	2100	3200	15	3	TO-247-3

Silicon Carbide Bare Die MOSFET

Part Number	V_{DSS} (V)	$R_{DS(ON)}$ (T_J=25°C) (mΩ) Typ	Max	$R_{DS(ON)}$ (T_J=150°C) (mΩ) Typ	Max	E_{SW} Total (µJ) (T_J=150°C)	I_D (T_C=100°C) (A) (Continuous)	Die Size (mm)
CPM2-1200-0025B	1200	25	34	43	63	1700	60	4.04 x 6.44
CPM2-1200-0040B	1200	40	52	84	100	1400	40	3.10 x 5.90
CPM2-1200-0080B	1200	80	98	150	208	400	20	3.10 x 3.36
CPM2-1200-0160B	1200	160	196	290	400	140	11	2.39 x 2.63

Cree Z-Rec® SiC Schottky Diodes

Part Number	V_{RRM} (V)	I_F (A) (rated)	I_F (A) (T_C=135°C)	V_F (T_J=25°C) Typ	Max	V_F (T_J=175°C) Typ	Max	Q_c (nC)	Package Type
CSD01060A	600	1	2	1.6	1.8	2	2.4	3.3[2]	TO-220-2
CSD01060E	600	1	2	1.6	1.8	2	2.4	3.3[2]	DPAK
C3D1P7060Q	600	1.7	3	1.5	1.7	1.8	2.4	4.4[1]	QFN 3.3
C3D02060A	600	2	4	1.5	1.7	1.8	2.4	4.8[2]	TO-220-2
C3D02060E	600	2	4	1.5	1.7	1.8	2.4	4.8[2]	DPAK
C3D02060F	600	2	1.8	1.5	1.7	1.8	2.4	4.8[2]	Full-Pak
C3D03060A	600	3	5.5	1.5	1.7	1.8	2.4	6.7[2]	TO-220-2
C3D03060E	600	3	5.5	1.5	1.7	1.8	2.4	6.7[2]	DPAK
C3D03060F	600	3	2.2	1.5	1.7	1.8	2.4	6.7[2]	Full-Pak
C3D04060A	600	4	7.5	1.5	1.7	1.8	2.4	8.5[2]	TO-220-2
C3D04060E	600	4	7.5	1.5	1.7	1.8	2.4	8.5[2]	DPAK
C3D04060F	600	4	2.6	1.5	1.7	1.8	2.4	8.5[2]	Full-Pak
C3D06060A	600	6	8.5	1.6	1.8	1.9	2.4	16[2]	TO-220-2
C3D06060G	600	6	9.5	1.6	1.8	1.9	2.4	16[2]	D²PAK
C3D06060F	600	6	3.3	1.6	1.8	1.9	2.4	16[2]	Full-Pak
C3D08060A	600	8	11	1.6	1.8	1.9	2.4	21[2]	TO-220-2
C3D08060G	600	8	11	1.6	1.8	1.9	2.4	21[2]	D²PAK
C3D10060A	600	10	14	1.5	1.8	2	2.4	25[2]	TO-220-2
C3D10060G	600	10	14	1.5	1.8	2	2.4	25[2]	D²PAK
C3D16060D	600	16	22	1.6	1.8	1.9	2.4	42[2]	TO-247-3
C3D20060D	600	20	28	1.5	1.8	2	2.4	50[2]	TO-247-3
C3D02065E	650	2	4	1.5	1.8	1.8	2.4	4.8[2]	DPAK
C3D03065E	650	3	5.5	1.5	1.8	1.8	2.4	6.7[2]	DPAK
C3D04065A	650	4	7.5	1.5	1.8	1.8	2.4	8.5[2]	TO-220-2
C3D04065E	650	4	7.5	1.5	1.8	1.8	2.4	8.5[2]	DPAK

Cree Z-Rec® SiC Schottky Diodes (cont.)

Part Number	V_{RRM} (V)	I_F (A) (rated)	I_F (A) (T_C=135°C)	$V_{F\ (T_J=25°C)}$ Typ	$V_{F\ (T_J=25°C)}$ Max	$V_{F\ (T_J=175°C)}$ Typ	$V_{F\ (T_J=175°C)}$ Max	Q_c (nC)	Package Type
C3D06065A	650	6	8.5	1.6	1.8	1.9	2.4	16[2]	TO-220-2
C3D06065E	650	6	8.5	1.6	1.8	1.9	2.4	16[2]	DPAK
C3D06065I	650	6	8.5	1.6	1.8	1.9	2.4	16[2]	TO-220-Iso
C3D08065A	650	8	11	1.6	1.8	1.9	2.4	21[2]	TO-220-2
C3D08065E	650	8	11	1.6	1.8	1.9	2.4	21[2]	DPAK
C3D08065I	650	8	7	1.5	1.8	2	2.4	21[2]	TO-220-Iso
C3D10065A	650	10	14	1.5	1.8	2	2.4	25[2]	TO-220-2
C3D10065E	650	10	14	1.5	1.8	2	2.4	25[2]	DPAK
C3D10065I	650	10	8.5	1.5	1.8	2	2.4	25[2]	TO-220-Iso
C3D16065D	650	16	22	1.6	1.8	1.9	2.4	42[2]	TO-247-3
CVFD20065A	650	20	26	1.35	1.45	1.65	1.8	62[1]	TO-220-2
C3D20065D	650	20	28	1.5	1.8	2	2.4	50[2]	TO-247-3
C5D50065D	650	50	50	1.5	1.8	1.8	2.2	110[1]	TO-247-3
C4D02120A	1200	2	6	1.4	1.8	1.9	3.0	11[3]	TO-220-2
C4D02120E	1200	2	7	1.4	1.8	1.9	3.0	11[3]	DPAK
C4D05120A	1200	5	8	1.4	1.8	1.9	3	28[3]	TO-220-2
C4D05120E	1200	5	9	1.4	1.8	1.9	3	28[3]	DPAK
C4D08120A	1200	8	11	1.5	1.8	2.2	3	37[3]	TO-220-2
C4D08120E	1200	8	12	1.5	1.8	2.2	3	37[3]	DPAK
C4D10120A	1200	10	14	1.5	1.8	2.2	3	51[3]	TO-220-2
C4D10120D	1200	10	18	1.4	1.8	1.9	3	56[3]	TO-247-3
C4D10120E	1200	10	16	1.5	1.8	2.2	3	51[3]	DPAK
C4D15120A	1200	15	20	1.6	1.8	2.3	3	78[3]	TO-220-2
C4D20120A	1200	20	25.5	1.5	1.8	2.2	3	99[3]	TO-220-2
C4D20120D	1200	20	33	1.5	1.8	2.2	3	102[3]	TO-247-3
C4D30120D	1200	30	43	1.5	1.8	2.2	3	156[3]	TO-247-3
C4D40120D	1200	40	54	1.5	1.8	2.2	3	198[3]	TO-247-3
C3D10170H	1700	10	14.5	1.7	2	3	3.5	76[5]	TO-247-2
C3D25170H	1700	25	26	1.8	2.5	3.2	4	182[5]	TO-247-2

Cree® Z-Rec® SiC Schottky diodes - Bare Die

Part Number	V_{RRM} (V)	I_F (A) (rated)	$V_{F\ (T_J=25°C)}$ Typ	$V_{F\ (T_J=25°C)}$ Max	$V_{F\ (T_J=175°C)}$ Typ	$V_{F\ (T_J=175°C)}$ Max	Q_c (nC)	Die Size (mm)
CPWR-0600-S001B	600	1	1.6	1.8	2	2.4	3.3[2]	1.07 x 0.66
CPW3-0600-S002B	600	2	1.5	1.8	1.8	2.4	4.8[2]	1.07 x 0.66
CPW3-0600-S003B	600	3	1.5	1.8	1.8	2.4	6.7[2]	1.07 x 0.92
CPW3-0600-S004B	600	4	1.5	1.8	1.8	2.4	8.5[2]	1.13 x 1.13
CPW2-0600-S006B	600	6	1.6	1.8	1.9	2.4	16[2]	1.55 x 1.55
CPW2-0600-S008B	600	8	1.6	1.8	1.9	2.4	21[2]	1.77 x 1.77
CPW2-0600-S010B	600	10	1.5	1.8	2	2.4	25[2]	1.92 x 1.92
CPW3-0650-S004B	650	4	1.5	1.8	1.8	2.4	8.5[2]	1.13 x 1.13
CPW2-0650-S006B	650	6	1.6	1.8	1.9	2.4	16[2]	1.55 x 1.55
CPW2-0650-S008B	650	8	1.6	1.8	1.9	2.4	21[2]	1.77 x 1.77
CPW2-0650-S010B	650	10	1.5	1.8	2	2.4	25[2]	1.92 x 1.92
CPW5-0650-Z030B	650	30	1.6	1.7	2.2	2.5	65[1]	2.80 x 2.80
CPW5-0650-Z050B	650	50	1.5	1.8	1.8	2.2	110[1]	3.50 x 3.50
CPW4-1200-S002B	1200	2	1.4	1.8	1.9	3	11[3]	1.18 x 1.18
CPW4-1200-S005B	1200	5	1.4	1.8	1.9	3	28[3]	1.69 x 1.69
CPW4-1200-S008B	1200	8	1.5	1.8	2.2	3	37[3]	2.00 x 2.00
CPW4-1200-S010B	1200	10	1.5	1.8	2.2	3	51[3]	2.26 x 2.26
CPW4-1200-S015B	1200	15	1.6	1.8	2.3	3	78[3]	2.70 x 2.70
CPW4-1200-S020B	1200	20	1.5	1.8	2.2	3	99[3]	3.08 x 3.08
CPW5-1200-Z050B	1200	50	1.6	1.8	2.3	2.7	246[3]	4.90 x 4.90
CPW3-1700-S010B	1700	10	1.7	2	3	3.5	96[5]	3.78 x 2.68
CPW3-1700-S025B	1700	25	1.8	2	3.2	4	170[5]	5.70 x 3.94
CPW5-1700-Z050B	1700	50	1.6	1.9	2.5	2.8	370[4]	6.00 x 6.00

[1] at V_R=400V; [2] at V_R=600V; [3] at V_R=800V; [4] at V_R=1100V; [5] at V_R=1200V

Cree SiC Modules

CAS 120 M 12 B M 2

- Switch Generation
- Switch Type
- Housing
- Voltage Rating Per Switch
- Diode Current (H = Half, M = Marked Current)
- Current Per Switch
- Three Digit Series

Cree Z-FET™ SiC MOSFETs: Bare die

CPM2-1200-0025 B

- Metal
- $R_{DS(ON)}$ (mΩ)
- Voltage Rating
- Four Digit Series

Cree Z-FET SiC MOSFETs

C2M 0080 120 D

- Package Code
- Voltage Rating
- $R_{DS(ON)}$ (mΩ)
- Three Digit Series

Cree Z-Rec SiC diodes: Bare die

CPW5-1700-Z 050 B

- Top Metal
- Amperage Rating
- Aspect Ratio (Z= Square, Y=Rectangular)
- Voltage Rating
- Four Digit Series

Cree Z-Rec SiC diodes

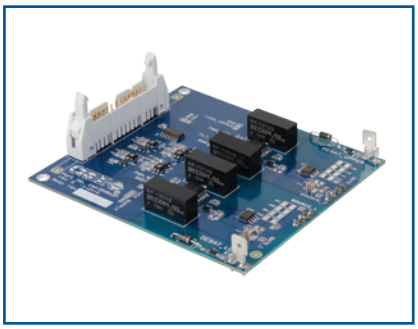
C4D 05 120 E

- Package Code
- Voltage Rating
- Amperage Rating
- Three Digit Series

Cree® SiC Reference Designs and Evaluation Boards

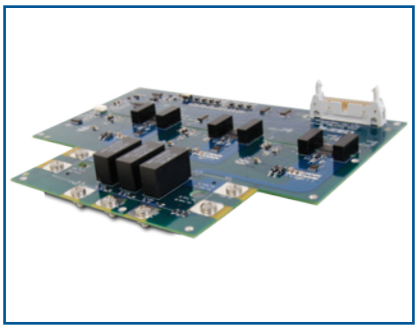
Reduce design-cycle time and create rugged and reliable system designs with these useful reference designs demonstrating proper design techniques when implementing Cree SiC products.

These boards are available for purchase.



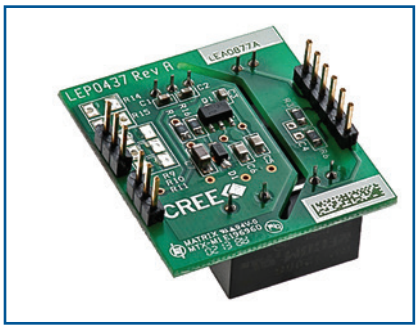
Half-Bridge Gate Driver CGD15HB62P

- Cree designed dual-channel half-bridge gate driver
- 1200V maximum
- Optimized for CAS300M12BM1
- Includes Desat and UVLO protection
- For engineering evaluation purposes
- Full reference design files available



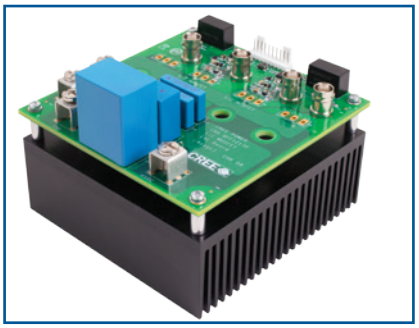
Six-Pack Evaluation Board CGD15FB45P

- Cree designed 6-Pack evaluation board
  Optimized for Cree's CCSxxxM12CM2 power modules
- 1200V maximum
- Includes Desat and UVLO
- For engineering evaluation purposes
- Full reference design files available



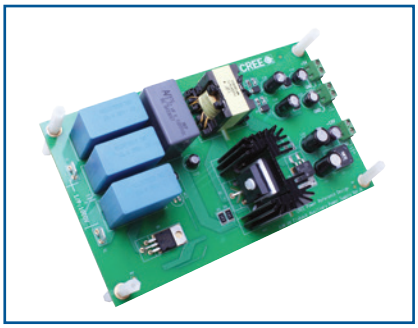
Universal Gate Driver CRD-001

- Cree designed universal gate driver for all C2M™ SiC MOSFETs
- Supports 1200V or 1700V MOSFETs
- Compatible with 1W and 2W DC-DC converters
- For engineering evaluation purposes
- Full reference design files available



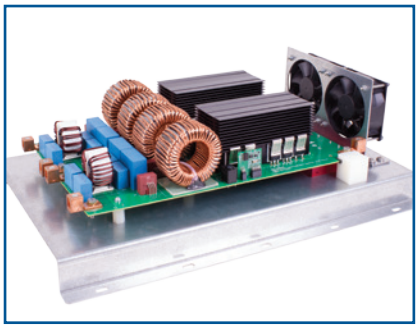
Silicon Carbide Discrete Evaluation Board KIT8020-CRD-8FF1217-1

- Universal evaluation board for SiC MOSFETs and diodes
- Includes easy access to critical test points, such as V_{GS}, V_{DS} and I_{DS}
- Provides a good layout example for properly driving MOSFETs and diodes with minimal ringing
- Reference design includes a schematic, mechanical drawing and BOM



CRD060DD12P 60W Auxiliary Power Supply with C2M™ MOSFET

- 60W single-end HV flyback design, based on Cree's 1700V, 1 Ohm MOSFET
- V_{in} = 200-1000V, V_{out} = 12V/4.5A, 5V/0.5A, -12V/0.25A
- Reference design includes BOM, schematic, transformer spec, applications note, design files, and Powerpoint® presentation
- Presentation contains efficiency calculations, thermal images, and sample waveforms



50kW Boost Converter

- SiC MOSFET-based converter for PV applications
- 4-phase interleaved
- V_{in} = 400-600V, V_{out} = 800V
- Reference design includes schematic and detailed Powerpoint presentation
- Presentation includes efficiency calculations, thermal images, and sample waveforms

CREE

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