



A CREE COMPANY

Transforming Power with Industry-Leading SiC Expertise and Capacity

Expanded Assortment of Silicon Carbide Bare Die, MOSFETs,
Schottky Diodes, Power Modules and Reference Designs



New Product Introductions

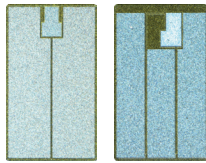
Wolfspeed continues to expand its industry-leading SiC Power portfolio with new high power bare die, discretes and modules.

1200V MOSFET LINE EXTENSION INCLUDING BARE DIE, DISCRETE COMPONENTS, AND HALF BRIDGE POWER MODULES

With the launch of our 1200V 13m Ω , 16 m Ω , 21m Ω , and 32m Ω SiC MOSFET bare die and discrete devices, Wolfspeed has the most powerful MOSFETs and broadest portfolio in the industry. They are the at the core of our C3M 1200V SiC discrete MOSFETs and power modules, optimized for high power industrial applications. The innovative design of our new XM3 Power Module platform delivers high power density in a footprint designed to optimize SiC performance.

650V GENERATION 6 SCHOTTKY DIODES

Wolfspeed's 6th Generation (C6D) 650V Schottky diodes feature the industry's lowest voltage drop over temperature (1.23V@25°C, 1.45V@150°C), enabling the low conduction losses required for high power density and efficiency. When paired with our C3M MOSFETs, designers can achieve industry-leading performance in even the simplest power supply topologies.



13m Ω AND 16m Ω 1200V MOSFET BARE DIE

Wolfspeed invented the SiC MOSFET and continues to lead the industry with the introduction of our 13m Ω and 16 m Ω 1200V MOSFET bare die products. Able to drive 149A, these devices enable designers to deliver maximum power density and achieve previously unachievable size and weight reductions in their products.



C3M 1200V MOSFET LINE EXTENSION

Wolfspeed's leadership in SiC MOSFET technology continues with the expansion of our 1200V 3rd Generation (C3M) portfolio, offering a broad range of on-resistance ratings that enable designers to choose the right part for their applications. The C3M family further simplifies the system by reducing the gate drive voltage to +15V, and also enables superior switching performance through our packages that feature a Kelvin connection.



XM3 HIGH DENSITY POWER MODULE

Wolfspeed has developed the XM3 power module platform to maximize the benefits of SiC, while keeping the module and system design robust, simple, and cost effective. With half the weight and volume of a standard 62 mm module, the XM3 power module maximizes power density while minimizing loop inductance and enabling simple power bussing. The XM3's SiC optimized packaging enables 175°C continuous junction operation, with a high reliability Silicon Nitride (Si3N4) power substrate to ensure mechanical robustness under extreme conditions. The XM3 is a perfect fit for demanding applications such as EV chargers, UPS, and traction drives.



6TH GENERATION (C6D) 650 V SCHOTTKY DIODES

Wolfspeed's field-proven diode technology, with over 6 trillion hours in operation, continues to lead the industry with our sixth generation of our 650V diodes. With the lowest V_F across temperature in the industry, the Gen 6 family enables power designers to achieve the highest possible efficiency in their systems. Footprint compatibility with our Gen 3 devices enables an instant upgrade to an existing design.

New System Reference Designs

Wolfspeed introduces three new reference designs that can be used for simulations or as drop-in design solutions.

BUCK BOOST EVALUATION KIT

The KIT-CRD-3DD12P buck-boost evaluation kit is optimized to demonstrate the high-speed switching capability of Wolfspeed's discrete MOSFETs and diodes. Designers can quickly evaluate the performance of 4-lead and 3-lead TO-247 package MOSFETs, as well as diodes in TO-247 and TO-220 packages. The kit contains everything needed including a heatsink, thermal interface, inductor, and other hardware as well as two Wolfspeed C3M MOSFETs to allow the user to begin testing within minutes of unpackaging the kit.



FEATURES:

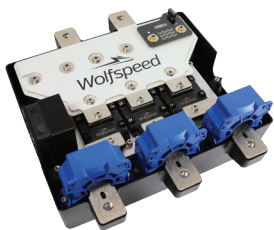
- Includes footprints for both 3 and 4-lead TO-247 packages allowing for easy comparison
- Includes SMA connectors for capturing clean V_{GS} waveforms
- MOSFET and diode footprints included in both top and bottom positions
- No additional capacitors needed to run in boost or buck converter topologies

SUPPORTED TOPOLOGIES:

- Synchronous boost converter
- Synchronous buck converter
- Non-synchronous boost converter
- Non-synchronous buck converter
- Half-bridge
- Full bridge (requires 2 kits)

300 KW THREE-PHASE INVERTER FEATURING THE NEW XM3 HALF-BRIDGE POWER MODULE

The 300 kW three-phase inverter demonstrates system-level power density and efficiency obtained by using Wolfspeed's new XM3 module platform. The XM3 is optimized for SiC MOSFETs in a high-density, low-inductance footprint, which can reduce system losses and simplify overall design for low-loss, high-frequency operation. The three-phase inverter has >2x the power density of comparable Si based designs and >98% efficiency.



INCLUDES:

- CAB450M12XM3: 1200 V, 450 A Half-Bridge XM3 Modules
- CGD12HBXMP: XM3 Evaluation Gate Driver
- Optimized laminated bussing for reduced power loop inductance
- DC-link capacitors
- Sensors and control hardware

APPLICATIONS:

- Motor and traction drives
- Grid-tied distributed generation
- High-efficiency converters



E-Series™ SiC MOSFETs and Diodes

Wolfspeed's E-Series is a family of robust SiC semiconductor devices for the Electric Vehicle (EV) and renewable energy markets that delivers the highest available power density and durability for on-board automotive power conversion systems, off-board chargers, solar inverters and other outdoor applications. The E-Series is the first commercially available family of SiC MOSFETs and diodes to be AEC-Q101 qualified and PPAP capable.



E-Series MOSFETs

FEATURES

- AEC-Q101 Qualified and PPAP capable
- Third Generation SiC MOSFET technology
- Fast intrinsic diode with low reverse recovery (Q_{rr})

APPLICATIONS

- EV battery chargers
- PV inverters
- High voltage DC/DC converters

Part Number	V_{DSmax}	$R_{ds(on)25^\circ}$	Package
E3M0065090D	900V	65m Ω	TO-247-3
E3M0120090D	900V	120m Ω	TO-247-3
E3M0280090D	900V	280m Ω	TO-247-3

E-Series Diodes

FEATURES

- AEC-Q101 Qualified and PPAP capable
- HV-H3TRB tested (85°C, 85% RH, 80% V_{RRM})
- Zero reverse recovery

APPLICATIONS

- Boost diode in on-board chargers or PV inverters
- Output rectifiers in on-board DC/DC converters
- Free-wheeling diodes in vehicle traction inverters
- Off-board chargers

Status	Part Number	V_{RRM}	$I_{F,Rated}$	Package
Available	E4D20120A	1200V	20A	TO-220-2
Available	E4D10120A	1200V	10A	TO-220-2
Available	EPW4-1200-S020A	1200V	20A	Bare die
Available	EPW4-1200-S010A	1200V	10A	Bare die

Wolfspeed SiC MOSFETs

Wolfspeed is the industry leader in SiC MOSFETs with the broadest portfolio of commercially released products. The C3M product family is the most advanced and reliable MOSFET available in the market today and has rapidly become a key building block for new power conversion systems with higher efficiency and less wasted heat, becoming more robust, smaller in size, and lighter in weight.

KEY FEATURES OF THE C3M MOSFET TECHNOLOGY:

- Easier to drive (+15V gate drive)
- Stable R_{ds(on)} over temperature
- Rugged body diode (no need for external diode)
- Avalanche ruggedness
- Available in new package options with separate **Kelvin** source pin

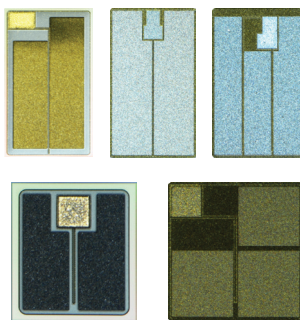
MOSFET PACKAGES



DISCRETE

Part Number	Blocking Voltage (V)	R _{ds(on)} (mΩ)	Current Rating at 25°C (A)	Package
C3M0030090K	900	30	63	TO-247-4
C3M0065090J	900	65	35	TO-263-7
C3M0065090D	900	65	36	TO-247-3
E3M0120090D	900	120	23	TO-247-3
C3M0120090J	900	120	22	TO-263-7
C3M0120090D	900	120	23	TO-247-3
C3M0280090J	900	280	11	TO-263-7
C3M0280090D	900	280	11.5	TO-247-3
E3M0280090D	900	280	11.5	TO-247-3
C3M0065100K	1000	65	35	TO-247-4
C3M0065100J	1000	65	35	TO-263-7
C3M0120100K	1000	120	22	TO-247-4
C3M0120100J	1000	120	22	TO-263-7
C3M0016120K	1200	16	100	TO-247-4
C3M0021120K	1200	21	75	TO-247-4
C2M0025120D	1200	25	90	TO-247-3
C3M0032120D	1200	32	50	TO-247-4
C2M0040120D	1200	40	60	TO-247-3
C3M0075120K	1200	75	30	TO-247-4
C2M0080120D	1200	80	36	TO-247-3
C2M0160120D	1200	160	19	TO-247-3
C2M0280120D	1200	280	10	TO-247-3
C3M0016120K	1200	16	112	TO-247-4
C2M0045170D	1700	45	72	TO-247-3
C2M0045170P	1700	45	72	TO-247-4 Plus
C2M0080170P	1700	80	40	TO-247-4 Plus
C2M1000170D	1700	1000	5	TO-247-3
C2M1000170J	1700	1000	5.3	TO-263-7

MOSFET BARE DIE



BARE DIE

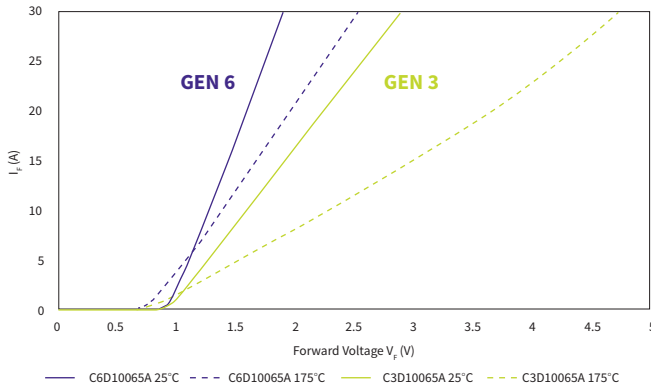
EPM3-0900-0010E	900	10	196	Bare Die
CPM3-0900-0010A	900	10	196	Bare Die
CPM3-0900-0030A	900	30	66	Bare Die
CPM3-0900-0065B	900	65	38	Bare Die
CPM2-1700-0045B	1700	45	72	Bare Die
CPM3-1200-0013A	1200	13	149	Bare Die
CPM3-1200-0016A	1200	16	112	Bare Die
CPM3-1200-0021A	1200	21	100	Bare Die
CPM3-1200-0032A	1200	32	63	Bare Die
CPM3-1200-0075A	1200	75	30	Bare Die

For more information, type the part number of interest after "wolfspeed.com/" in your web browser.

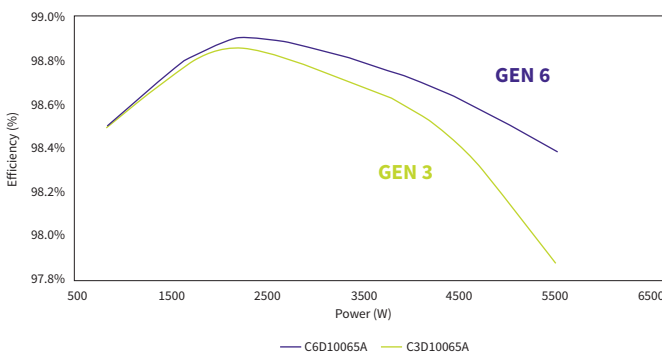
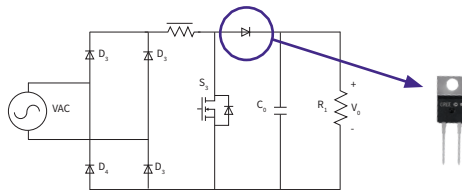
Wolfspeed's New 6th Generation (C6D) Schottky Diodes

Wolfspeed's new 6th generation (C6D) SiC Schottky diode family is based on Wolfspeed's innovative, robust and reliable 150 mm Silicon Carbide (SiC) wafer technology. The latest C6D technology offers the lowest forward voltage drop ($V_F = 1.27\text{ V @ }25^\circ\text{C}$), which significantly reduces conduction losses. This reduction enables extremely high system level efficiency and power density in the most demanding power conversion applications, such as Power Factor Correction (PFC) and High Voltage DC/DC Converters.

LOW FORWARD VOLTAGE (V_F) WITH IMPROVED THERMAL STABILITY



IMPROVED SYSTEM LEVEL EFFICIENCY



WOLFSPEED C6D SiC SCHOTTKY DIODE PORTFOLIO

Part Number	V_{RRM}	IF	V_F	Package Options
C6D04065A	650V	4A	1.27 V	TO-220-2
C6D06065A	650V	6A	1.27V	TO-220-2
C6D08065A	650V	8A	1.27 V	TO-220-2
C6D10065A	650V	10A	1.27 V	TO-220-2

Key Features

- Low $V_F = 1.27\text{ V @ }25^\circ\text{C}$
- Positive Temperature Co-efficient
- Zero Reverse Recovery
- Robust MPS Technology
- Low Figure of Merit ($Q_c \times V_F$)
- Wide range of T_j (-55°C to 175°C)
- Standard TO-220 package

Key Benefits

- Improved System Level Efficiency
- High Surge Current Capability
- High Frequency Operation
- Direct Drop in Replacement of C3D
- Easy Parallel Operation
- Reduced Heat Sink Requirements

Applications

- Server/Telecom
- UPS
- Medical
- Consumer Electronics
- PC
- Solar

Wolfspeed SiC Schottky Diodes

Wolfspeed has the broadest portfolio of SiC Schottky diodes, with more than six trillion field hours and nearly 20 years of experience. Our diodes feature the MPS (Merged PiN Schottky) design, which is more robust and reliable than standard Schottky barrier diodes, and can be easily paralleled for increased design flexibility.

Part Number	Blocking Voltage (V)	Current Rating (A)	Package
CSD01060A	600	1	TO-220-2
CSD01060E	600	1	TO-252-2
C3D1P7060Q	600	1.7	QFN
C3D02060A	600	2	TO-220-2
C3D02060F	600	2	TO-220-F2
C3D02060E	600	2	TO-252-2
C3D03060A	600	3	TO-220-2
C3D03060F	600	3	TO-220-F2
C3D03060E	600	3	TO-252-2
C3D04060A	600	4	TO-220-2
C3D04060F	600	4	TO-220-F2
C3D04060E	600	4	TO-252-2
C3D06060A	600	6	TO-220-2
C3D06060F	600	6	TO-220-F2
C3D06060G	600	6	TO-263-2
C3D08060A	600	8	TO-220-2
C3D08060G	600	8	TO-263-2
C3D10060A	600	10	TO-220-2
C3D10060G	600	10	TO-263-2
C3D16060D	600	16	TO-247-3
C3D20060D	600	20	TO-247-3
C3D02065E	650	2	TO-252-2
C3D03065E	650	3	TO-252-2
C3D04065A	650	4	TO-220-2
C3D04065E	650	4	TO-252-2
C3D06065I	650	6	TO-220 Iso
C3D06065A	650	6	TO-220-2
C3D06065E	650	6	TO-252-2
C3D08065I	650	8	TO-220 Iso
C3D08065A	650	8	TO-220-2
C3D08065E	650	8	TO-252-2
C3D10065I	650	10	TO-220 Iso
C3D10065A	650	10	TO-220-2
C3D10065E	650	10	TO-252-2
C3D12065A	650	12	TO-220-2
C3D16065A	650	16	TO-220-2
C3D16065D	650	16	TO-247-3
CVFD20065A	650	20	TO-220-2
C3D20065D	650	20	TO-247-3
C3D20065D1	650	20	TO-247-3
C3D30065D	650	30	TO-247-3
C5D50065D	650	50	TO-247-3
C6D10065A	650	10	TO-220-2
C6D08065A	650	8	TO-220-2
C6D06065A	650	6	TO-220-2
C6D04065A	650V	4	TO-220-2

600V & 650V DISCRETE

Part Number	Blocking Voltage (V)	Current Rating (A)	Package
CPWR-0600-S001B	600	1	Bare Die
CPW3-0600-S002B	600	2	Bare Die
CPW3-0600-S003B	600	3	Bare Die
CPW3-0600-S004B	600	4	Bare Die
CPW2-0600-S006B	600	6	Bare Die
CPW2-0600-S008B	600	8	Bare Die
CPW2-0600-S010B	600	10	Bare Die
CPW3-0650-S004B	650	4	Bare Die
CPW2-0650-S006B	650	6	Bare Die
CPW2-0650-S008B	650	8	Bare Die
CPW2-0650-S010B	650	10	Bare Die
CPW2-0650-S012B	650	12	Bare Die
CPW2-0650-S016B	650	16	Bare Die
CPW5-0650-Z030B	650	30	Bare Die
CPW5-0650-Z050B	650	50	Bare Die

600V & 650V BARE DIE

C4D02120A	1200	2	TO-220-2
C4D02120E	1200	2	TO-252-2
C2D05120A	1200	5	TO-220-2
C4D05120A	1200	5	TO-220-2
C4D05120E	1200	5	TO-252-2
C4D08120A	1200	8	TO-220-2
C4D08120E	1200	8	TO-252-2
C4D10120A	1200	10	TO-220-2
C4D10120D	1200	10	TO-247-3
C4D10120E	1200	10	TO-252-2
C4D10120H	1200	10	TO-247-2
C4D15120A	1200	15	TO-220-2
C4D15120D	1200	15	TO-247-3
C4D15120H	1200	15	TO-247-2
C4D20120A	1200	20	TO-220-2
C4D20120D	1200	20	TO-247-3
C4D20120H	1200	20	TO-247-2
C4D30120D	1200	30	TO-247-3
C4D40120D	1200	40	TO-247-3

1200V DISCRETE

CPW4-1200-S002B	1200	2	Bare Die
CPW4-1200-S005B	1200	5	Bare Die
CPW4-1200-S008B	1200	8	Bare Die
CPW4-1200-S010B	1200	10	Bare Die
CPW4-1200-S015B	1200	15	Bare Die
CPW4-1200-S020B	1200	20	Bare Die
CPW2-1200-S050B	1200	50	Bare Die
CPW5-1200-Z050B	1200	50	Bare Die

1200V BARE DIE

C5D10170H	1700	5	TO-247-2
C5D10170H	1700	10	TO-247-2
C5D25170H	1700	25	TO-247-2

1700V DISCRETE

CPW5-1700-S005A	1700	5	Bare Die
CPW5-1700-S010A	1700	10	Bare Die
CPW5-1700-S025A	1700	25	Bare Die
CPW5-1700-Z050B	1700	50	Bare Die

1700V BARE DIE

E4D20120A	1200V	20A	TO-220-2
E4D10120A	1200V	10A	TO-220-2
EPW4-1200-S020A	1200V	20A	Bare die
EPW4-1200-S010A	1200V	10A	Bare die

E-SERIES

Wolfspeed SiC Modules, Gate Driver Boards and Reference Designs

SiC MODULES

Wolfspeed power modules enable best-in-class performance with the latest SiC chip sets and minimized package parasitics. These modules come in both well-known industrial housings, as well as SiC-optimized footprints, along with full supporting design collateral and gate driver boards.

Part Number	Status	Blocking Voltage (V)	Current (A)	Rds(on) (mOhm)	Footprint	Features
CAB450M12XM3	Available	1200	450	2.6	Optimized XM3	Conduction-Optimized, Third Generation MOSFETs
CAB400M12XM3	Fall 2019	1200	400	3.2	Optimized XM3	Frequency-Optimized, Third Generation MOSFETs
WAB400M12BM3	Fall 2019	1200	400	3.7	Standard 62 mm	THB-80 Rated, Third Generation MOSFETs
WAB300M12BM3	Fall 2019	1200	360	4.5	Standard 62 mm	THB-80 Rated, Third Generation MOSFETs
CAS325M12HM2	Available	1200	440	3.7	Optimized 62 mm	High-Performance, Second Generation MOSFETs + SBDs
CAS300M12BM2	Available	1200	420	5	Standard 62 mm	Second Generation MOSFETs + SBDs
CAS120M12BM2	Available	1200	190	13	Standard 62 mm	Second Generation MOSFETs + SBDs
CCS050M12CM2	Available	1200	85	25	Standard 45 mm	Second Generation MOSFETs + SBDs
CCS020M12CM2	Available	1200	45	80	Standard 45 mm	Second Generation MOSFETs + SBDs
CAS300M17BM2	Available	1700	325	8	Standard 62 mm	Second Generation MOSFETs + SBDs

EVALUATION GATE DRIVER TOOLS

Plug and play references designs made to support rapid evaluation of Wolfspeed SiC products.

Part Number	Status	Channels	Voltage Class (V)	Output Peak Current (A)	Designed for
CGD12HBXMP	Available	2	1200	10	CAB450M12XM3, CAB400M12XM3
CGD15HB62LP	Available	2	1500	14	CAS325M12HM2
CGD15HB62P1	Available	2	1200	9	CAS300M12BM2, CAS120M12BM2
CGD15FB45P1	Available	6	1200	9	CCS050M12CM2, CCS020M12CM2
CRD-001	Available	N/A	1700	9	C2M Discrete MOSFETs (VGS = 20 V)
CGD15SG00D2	Available	N/A	1700	9	C3M Discrete MOSFETs (VGS = 15 V)
CGD1200HB2P-BM2	Coming Soon	2	1200	10	CAS300M12BM2, CAS120M12BM2
CGD1700HB2P-BM2	Coming Soon	2	1700	10	CAS300M17BM2
CGD1200HB2P-BM3	Coming Soon	2	1200	10	WAB400M12BM3, WAB300M12BM3
CGD12HB00D	Available	2	N/A	N/A	All Drivers with Differential Signals

REFERENCE DESIGNS

Wolfspeed also offers electrical LTspice and PLECS models as well as a new online simulation tool to help you get started. Learn more at wolfspeed.com/power/tools-and-support.

Part Number	Description	Voltage Class (V)	Optimized for	Avail for Purchase
KIT-CRD-3DD12P	Buck Boost Evaluation Kit	1200	C3M0075120K	Yes
KIT8020-CRD-8FF1217P-1	C2M SiC MOSFET and Diode Evaluation Kit	1200	TO-247-3 MOSFETs & Diodes	Yes
KIT8020-CRD-5FF0917P-2	C3M SiC MOSFET and Diode Evaluation Kit	1200	TO-247-4 MOSFETs & Diodes	Yes
CRD-02AD09N	2.2 kW Totem Pole PFC Converter with C3M0065090J	900	TO-263-7 MOSFETs	On Request
CRD-15DD17P	Wide Input Voltage Range (300 VDC - 1200 VDC) 15 W Flyback Auxiliary Power Supply Board	1700	C2M1000170J	Yes
CRD-60DD12N	60 kW SiC DC/DC Boost Converter	1200	C3M0075120K	On Request
CRD300DA12E-XM3	300 kW Inverter Kit for Conduction-Optimized XM3	1200	CAB450M12XM3	Upon Request
CRD250DA12E-XM3	250 kW Inverter Kit for Frequency-Optimized XM3	1200	CAB400M12XM3	Fall 2019
KIT-CRD-CIL12N-XM3	Dynamic Performance Evaluation Board for the XM3 Module	1200	XM3 Platform	No, Design Files Available
KIT-CRD-CIL12N-BM	Dynamic Performance Evaluation Board for the BM2 and BM3 Module	1200	BM2 & BM3 Platform	Coming Soon