

Littelfuse SiC Product Catalog

CONVERT. CONTROL. PROTECT. A COMPREHENSIVE
SiC SOLUTION FOR INDUSTRIAL APPLICATIONS

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Silicon Carbide – Ready for Industrial Scale

Silicon Carbide (SiC) is a wide bandgap semiconductor material that offers significantly higher critical electric field strength, high saturation velocity and thermal conductivity compared to conventional silicon. These material advantages enable higher efficiency, increased power density, faster switching operation, and more compact system designs. SiC power technology has now reached full maturity, making it a key enabler for systems such as renewable energy generation, EV charging infrastructure, energy storage, industrial power supplies, and data centers.

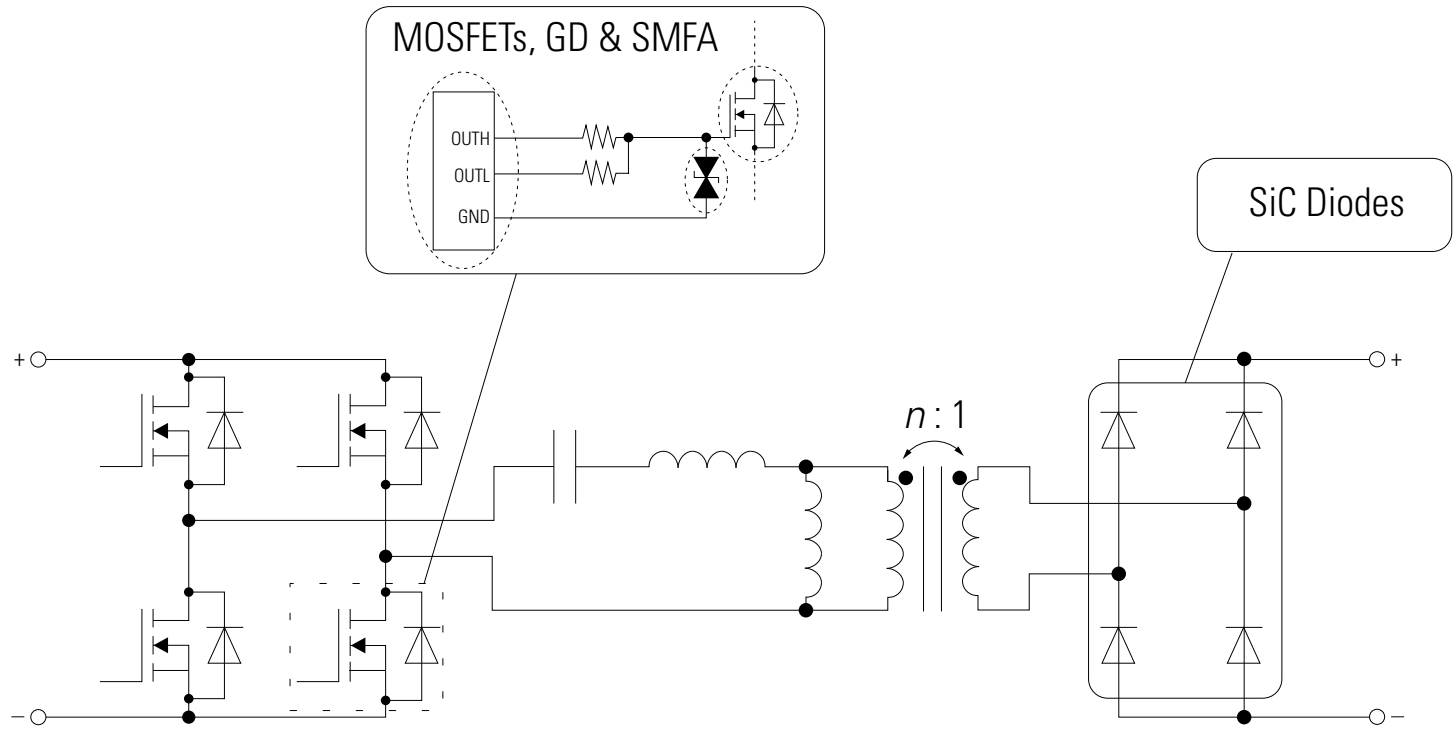
A Complete Littelfuse SiC Power Solution

Littelfuse offers a comprehensive SiC power portfolio that combines high performance SiC MOSFETs and Schottky diodes with gate drivers and dedicated protection devices. Together, these elements help simplify power stage design, enhance system robustness, and support faster development cycles. This catalogue presents Littelfuse’s SiC offerings with a solution oriented perspective, enabling designers to build efficient, reliable, and scalable power systems.

Why Littelfuse

Littelfuse combines power semiconductor expertise with decades of leadership in circuit and system protection. From advanced SiC devices in standard discrete and innovative isolated packages to gate drivers and protection solutions, Littelfuse supports key elements of the power conversion chain. Backed by global manufacturing, proven quality, and long term product roadmaps, Littelfuse is a trusted partner for reliable, industrial grade SiC power solutions. Figure 1 illustrates a representative full bridge LLC DC - DC converter implementation using Littelfuse SiC MOSFETs, SiC Schottky diodes, gate drivers, and SMFA asymmetric TVS gate protection devices.

Figure 1. Littelfuse full SiC solution for LLC Converter



Note: GD : Gate Driver.

New Silicon Carbide MOSFETs in Standard Discrete Packages



Introduction

Littelfuse introduces its latest Silicon Carbide MOSFETs series. Available in standard discrete THT and SMT packages.

Applications

- Energy storage systems
- Renewable energy systems
- Switched-mode power supplies
- Industrial process power supplies
- Servers and data centers

Features

- 650 V & 1200 V blocking voltage with $R_{DS(on)}$ ranges from 8.5 m Ω to 160 m Ω
- SiC MOSFET technology with $V_{GS(off)} = -3.5$ V to -2 V and $V_{GS(on)} = 15$ V to 18 V
- Low gate charge and low capacitance
- Ultra-fast intrinsic body diode
- Kelvin source connection
- Stable $R_{DS(on)}$ across the junction temperature range

Benefits

- High blocking voltage and low conduction losses
- Compatible with commercial gate drivers
- High switching speed with low losses
- Suitable for hard-switching
- Optimized gate control
- Enables predictable conduction losses over temperature, simplifying thermal design and improving system reliability



Part Number	Features	Voltage Class	$R_{DS(on)}$	I_{D25}	Package	Availability
IXSH20N120L2KHV	Kelvin source	1200 V	160 m Ω	20 A	TO247-4L	Released
IXSH40N120L2KHV	Kelvin source	1200 V	80 m Ω	40 A	TO247-4L	Released
IXSH65N120L2KHV	Kelvin source	1200 V	40 m Ω	65 A	TO247-4L	Released
IXSH80N120L2KHV	Kelvin source	1200 V	30 m Ω	80 A	TO247-4L	Released
IXSA20N120L2-7	Kelvin source	1200 V	160 m Ω	20 A	TO263-7L	Released
IXSA40N120L2-7	Kelvin source	1200 V	80 m Ω	40 A	TO263-7L	Released
IXSA65N120L2-7	Kelvin source	1200 V	40 m Ω	65 A	TO263-7L	Released
IXSA80N120L2-7	Kelvin source	1200 V	30 m Ω	80 A	TO263-7L	Released
IXSH150N120L3KHV	Kelvin source	1200 V	13 m Ω	150 A	TO247-4L	Released
IXSH110N120L3KHV	Kelvin source	1200 V	18 m Ω	110 A	TO247-4L	Released
IXSH100N120L3KHV	Kelvin source	1200 V	21 m Ω	100 A	TO247-4L	Released
IXSH65N120L3KHV	Kelvin source	1200 V	35 m Ω	65 A	TO247-4L	Released
IXSH50N120L3KHV	Kelvin source	1200 V	55 m Ω	50 A	TO247-4L	Released
IXSH100N65L2KHV	Kelvin source	650 V	25 m Ω	100 A	TO247-4L	Released
IXSH60N65L2KHV	Kelvin source	650 V	40 m Ω	60 A	TO247-4L	Released
IXSA110N65L2-7TR	Kelvin source	650 V	25 m Ω	110 A	TO263-7L	Released
IXSA60N65L2-7TR	Kelvin source	650 V	40 m Ω	60 A	TO263-7L	Released
IXSA40N65L2-7TR	Kelvin source	650 V	60 m Ω	40 A	TO263-7L	Released
IXSG110N65L2K	Kelvin source	650 V	25 m Ω	110 A	TOLL	Released
IXSG60N65L2K	Kelvin source	650 V	40 m Ω	60 A	TOLL	Released
IXSG40N65L2K	Kelvin source	650 V	60 m Ω	40 A	TOLL	Released
IXSQD240N75L3-TR	Kelvin Source, TSC ¹	750 V	8.5 m Ω	240 A	QDPAK	Sampling / Release Q1'2027
IXSQD65N120L3-TR	Kelvin Source, TSC	1200 V	35 m Ω	65 A	QDPAK	Sampling / Release Q3'2026
IXSQD150N120L3-TR	Kelvin Source, TSC	1200 V	13 m Ω	150 A	QDPAK	Sampling / Release Q4'2026
IXSQD110N120L3-TR	Kelvin Source, TSC	1200 V	18 m Ω	110 A	QDPAK	Sampling / Release Q4'2026

Note1: TSC - Top Side Cooling.

New Silicon Carbide MOSFETs in Littelfuse Isolated Packages in Discrete and Half Bridge Configuration



Introduction

Littelfuse introduces the latest SiC MOSFETs in its proprietary high-performance, ceramic - based isolated packages available in single-switch and half-bridge configurations.

Applications

- Energy storage systems
- Renewable energy systems
- Switched-mode power supplies
- Industrial process power supplies
- Motor drives

Features

- Flexible gate voltage range (15 – 18 V) and 0 V recommended turn-off gate voltage
- 1200 V blocking voltage with low on-state resistance
- Low gate charge and low input capacitance
- Multichip integration in top side cooled isolated package

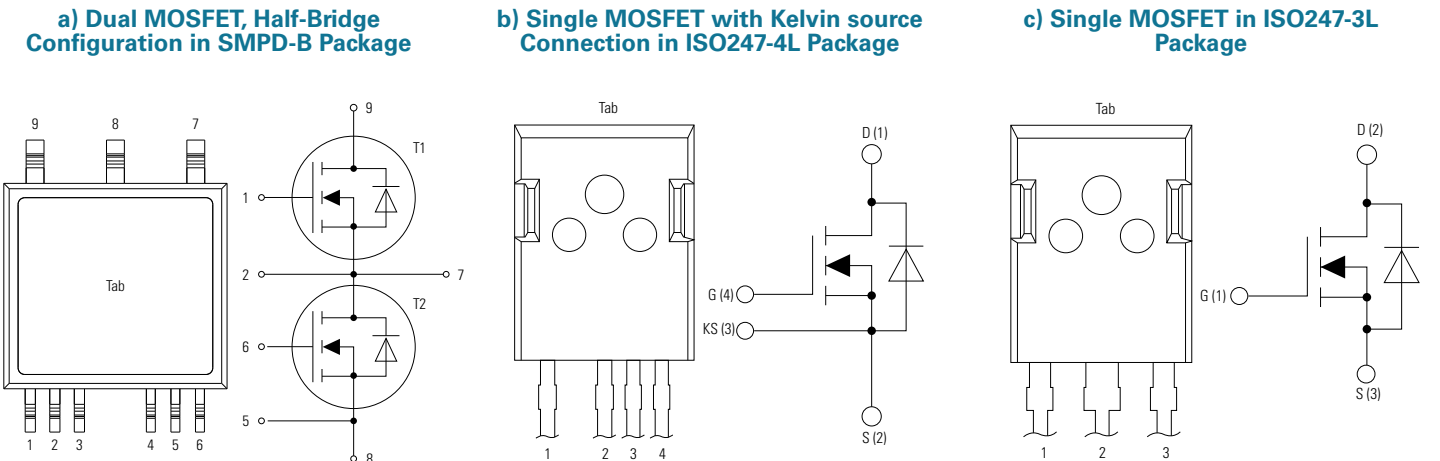
Benefits

- Low gate drive power requirements and simplified gate control
- Low conduction losses and reduced heat dissipation
- Supports high-speed switching with reduced gate drive losses
- Reduces the number of discrete components and thermal management efforts

Isolated Packages

- High-performance ceramic based isolated package improves overall thermal resistance $R_{th(j-s)}$ and power handling capability
- Isolation voltage 2500 V AC (RMS), for 1 minute
- Reduced EMI attributed to the small chip-to-heatsink stray capacitance
- SMPD advanced top-side-cooled packaging simplifies thermal management
- SMPD package reduces effective power loop inductance, improving EMI performance in fast switching SiC application
- ISO247 packages are compatible with standard TO-247 package footprint
- Isolated package improves $R_{th(j-s)}$ up to 50 % compared to standard discretes
- Simplified isolation strategy and reduced overall BOM cost

Figure 2. Pinout Configurations for Isolated Packages



New Silicon Carbide MOSFETs in Littelfuse Isolated Package



SiC MOSFETs in Discrete Isolated Package (ISO247)

Part Number	Features	Voltage Class	R _{DS(on)}	I _{D25}	Package	Availability
IXSJ80N120R1	Isolated	1200 V	18 mΩ	80 A	ISO247-3L	Released
IXSJ43N120R1	Isolated	1200 V	36 mΩ	43 A	ISO247-3L	Released
IXSJ25N120R1	Isolated	1200 V	62 mΩ	25 A	ISO247-3L	Released
IXSJ80N120R1K	Isolated, Kelvin source	1200 V	18 mΩ	80 A	ISO247-4L	Released
IXSJ43N120R1K	Isolated, Kelvin source	1200 V	36 mΩ	43 A	ISO247-4L	Released
IXSJ25N120R1K	Isolated, Kelvin source	1200 V	62 mΩ	25 A	ISO247-4L	Released

Half-Bridge in Isolated SMPD-B Package

Part Number	Features	Voltage Class	R _{Ds(on)}	I _{D25}	Package	Availability
MCR19P1200LB	Half Bridge, Isolated, TSC	1200 V	62 mΩ	25 A	SMPD-B	Sampling / Releasing Now
MCR19P1200TLB	Half Bridge, w/ NTC, isolated, TSC	1200 V	62 mΩ	25 A	SMPD-B	Sampling / Release Q3 2026
MCR29P1200LB	Half Bridge, TSC	1200 V	36 mΩ	43 A	SMPD-B	Sampling / Releasing Now
MCR29P1200TLB	Half Bridge, w/ NTC, Isolated, TSC	1200 V	36 mΩ	43 A	SMPD-B	Sampling / Releasing Now
MCR59P1200LB	Half Bridge, Isolated, TSC	1200 V	18 mΩ	80 A	SMPD-B	Sampling / Releasing Now
MCR59P1200TLB	Half Bridge, w/ NTC, Isolated, TSC	1200 V	18 mΩ	80 A	SMPD-B	Sampling / Releasing Now

Littelfuse High-Performance Ceramic Isolated Package

Littelfuse’s high-performance, ceramic-based isolated packaging technology eliminates the need for external isolation materials by integrating a thermally efficient substrate, enabling improved heat dissipation, reduced junction-to-heatsink thermal resistance, and enhanced current and power handling capability, while simplifying system assembly and thermal design. The advanced SMPD isolated package further optimizes electrical and thermal performance through low parasitic inductance, integrated isolation, and compact design. These features enable faster switching, lower power losses, improved reliability, and stable operation under high-power and high-frequency conditions.

For more information about the performance benefits using Littelfuse Isolated packages:



High performance Ceramic based Advanced Isolated Discrete Package for SiC Mosfet Devices



An Advanced Isolated Package to Keep the SiC MOSFET Chip up to 75°C Cooler

New Silicon Carbide Schottky Diodes



Introduction

Littelfuse introduces a new SiC Schottky barrier diode family. Available in single and common-cathode configurations, these diodes come in standard through-hole and SMT packages. These diodes are optimized for use with SiC MOSFETs in PFC, LLC and hard-switching stages.

Applications

- Energy storage systems
- Power factor correction
- Switched-mode power supplies
- Solar inverters
- UPS

Features

- High surge current capability
- Extremely fast, temperature - independent switching behavior
- Virtually zero reverse recovery current
- Low forward voltage
- Maximum virtual junction temperature of 175 °C

Benefits

- Improved operational reliability under transient events
- Suitable for high frequency switching applications
- Reduced cooling efforts and improved system power density
- Improved system efficiency and reducing conduction losses
- Safe operation in high-temperature environments



Part Number	Voltage Class	I _F	Package	Configuration	Availability
DCK10I1200HA	1200 V	10 A	TO247-2L	Single	Released
DCK15I1200HA	1200 V	15 A	TO247-2L	Single	Released
DCK20I1200HA	1200 V	20 A	TO247-2L	Single	Released
DCK30I1200HA	1200 V	30 A	TO247-2L	Single	Released
DCK40I1200HA	1200 V	40 A	TO247-2L	Single	Released
DCK10I1200PA	1200 V	10 A	TO220-2L	Single	Released
DCK10I1200UZ	1200 V	10 A	TO252-2L	Single	Released
DCK20C1200HB	1200 V	20 A	TO247-3L	Common Cathode	Released
DCK30C1200HB	1200 V	30 A	TO247-3L	Common Cathode	Released
DCK40C1200HB	1200 V	40 A	TO247-3L	Common Cathode	Released
DCK20I1200PC	1200V	20 A	TO263-2L	Single	Released
DCK10I650PA	650 V	10 A	TO220-2L	Single	Released
DCK10I650HA	650 V	10 A	TO247-2L	Single	Released
DCK20I650HA	650 V	20 A	TO247-2L	Single	Released
DCK20C650HB	650 V	20 A	TO247-3L	Common Cathode	Released
DCK20I650PC	650 V	20 A	TO263-2L	Single	Sampling / Release Q3’2026
DCK40C650HB	650 V	40 A	TO247-3L	Common Cathode	Sampling / Release Q3’2026
DCK60C650HB	650 V	60 A	TO247-3L	Common Cathode	Sampling / Release Q3’2026
DCK40C650PC	650 V	40 A	TO263-2L	Common Cathode	Sampling / Release Q3’2026

Introduction

Dedicated gate protection is critical for reliable long-term operation of SiC MOSFETs operating at high dV/dt. The SMFA Series are asymmetrical TVS diodes designed specifically to protect SiC MOSFETs gates from overvoltage events. Compared with silicon devices, SiC MOSFETs have lower negative gate voltage withstand capability, making asymmetrical protection using two separate TVS diodes, as shown in Figure 3, a common design choice. Littelfuse now offers the SMFA asymmetrical, bidirectional TVS diodes in a single package, reducing the parasitic effects and PCB area needed for fast-switching SiC applications.

Applications

- AI / Data center server power supplies
- High-efficiency power for EVI
- High-reliability semiconductor / industrial power supplies

Features

- Single component SiC MOSFET gate protection with asymmetrical gate voltage protection
- Low clamping voltage for negative gate drive, $V_C < 8\text{ V @ }2\text{ A}$ (10/1000 μs)
- Variety of positive standoff voltages, $V_{BR} 15 \sim 20\text{ V}$ compatible with popular SiC MOSFETs
- Stable capacitance over wide range of operating frequency (2 MHz) compatible with SiC MOSFET applications
- Compact, 1mm low profile, SOD123-FL package

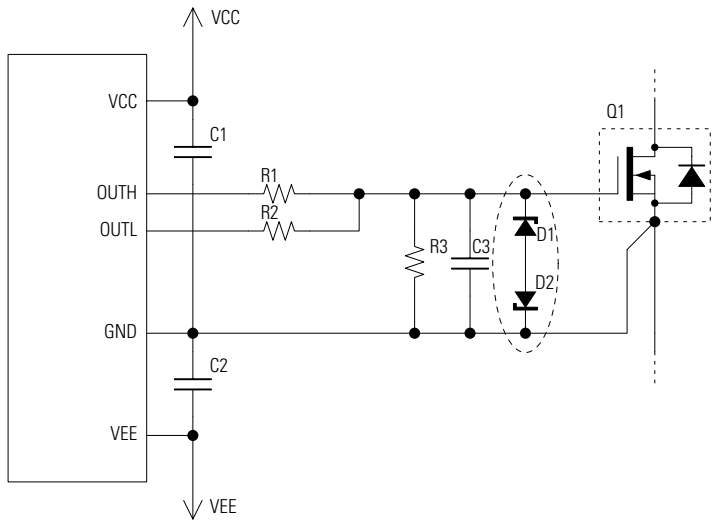
Benefits

- Reduced part-count
- Reduced PCB-space
- Lower complexity, paired with higher reliability
- Precisely defined voltage levels

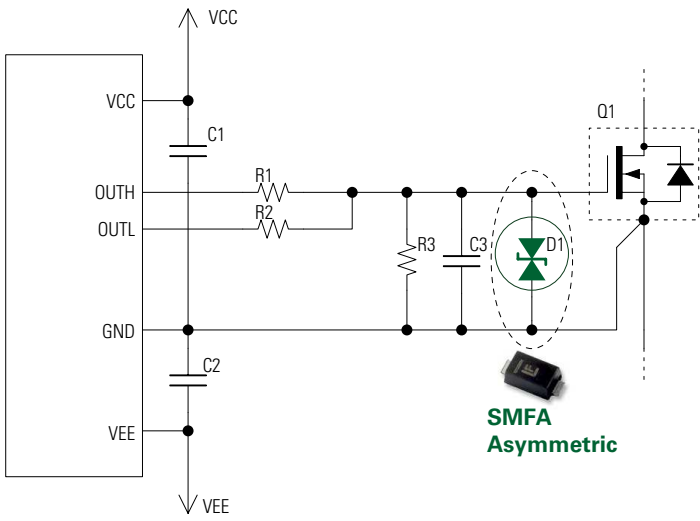


Figure 3. Standard gate protection with two separate TVS diodes vs. one Asymmetric SMFA Series TVS Diode

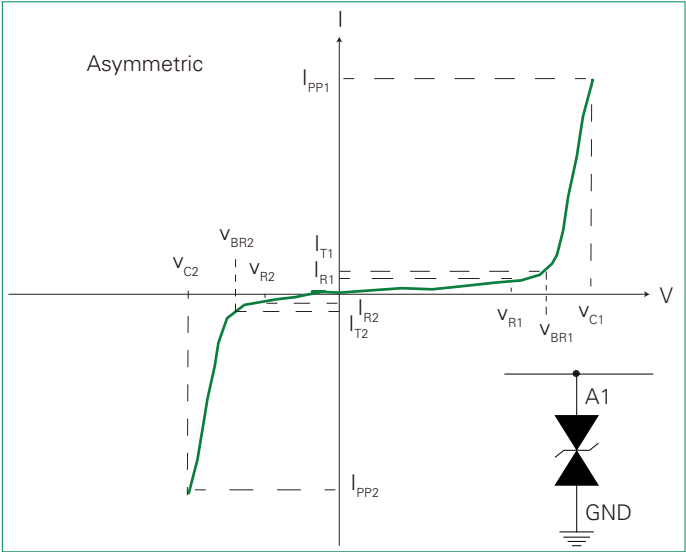
a) Gate Protection Using 2 TVS Diodes



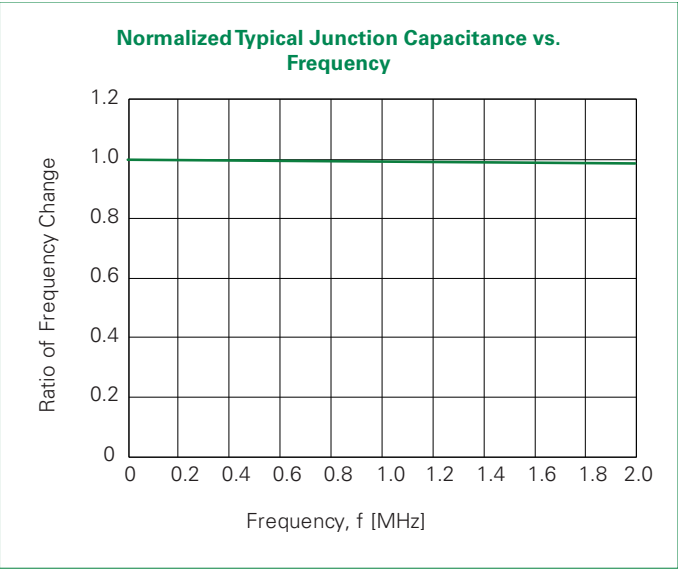
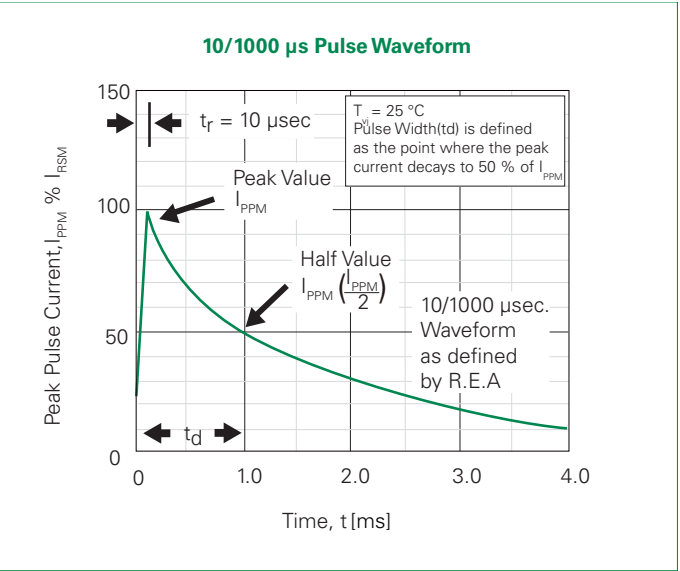
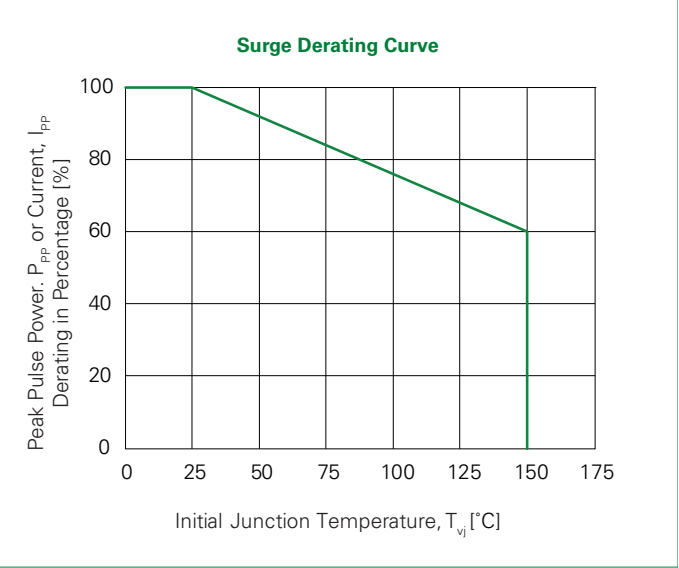
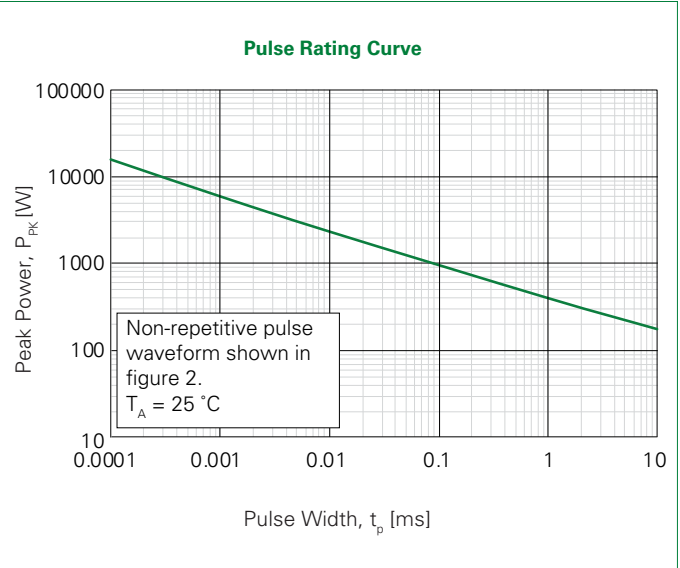
b) Gate Protection Using 1 SMFA Series TVS Diode



Curve Characteristics



Symbol	Characteristic Name	Explanation
P_{PPM}	Peak Pulse Power Dissipation ($I_{PP} \times V_C$)	Max power dissipation
V_{R1} / V_{R2}	Stand-off Voltage	Maximum voltage that can be applied to the TVS without operation
V_{BR1} / V_{BR2}	Breakdown Voltage	Maximum voltage that flows though the TVS at a specified test current (I_T)
V_{C1} / V_{C2}	Clamping Voltage	Peak voltage measured across the TVS at a specified I_{PPM} (peak impulse current)
I_{R1} / I_{R2}	Reverse Leakage Current	Current measured at V_R



SMFA Series Asymmetric TVS Diodes for SiC MOSFET Gate Protection



SMFA-series product portfolio

Part Number	Marking	A1  A2										
		Maximum Reverse Leakage $I_{R1} @ V_{R1}$ (μA)	Stand-off Voltage V_{R1} (V)	Breakdown Voltage V_{BR} (Volts) @ I_{T1}			Typical Clamping Voltage $V_{C3} @ I_{PP3}$ (V)	Typical Peak Pulse Current I_{PP3} (A)	Maximum Clamping Voltage $V_{C1} @ I_{PP1}$ (V)	Maximum Peak Pulse Current I_{PP1} (A)	Test Current I_{T1} (mA)	Junction Capacitance Typ @ 1 MHz, 0 V Bias (pF)
				Min.	Nom.	Max.						
SMFA1505CA	FM	1	15	16.7	17.6	18.5	18.57	2	24.05	16.63	1	565
SMFA1805CA	FT	1	18	20.0	21.1	22.1	24.47	2	28.73	13.92	1	515
SMFA1905CA	FU	1	19	21.1	22.2	23.3	25.55	2	30.29	13.21	1	485
SMFA2005CA	FV	1	20	22.2	23.4	24.5	26.40	2	31.85	12.56	1	440

Part Number	Marking	A1  A2										
		Maximum Reverse Leakage $I_{R2} @ V_{R2}$ (μA)	Stand-off Voltage V_{R2} (V)	Breakdown Voltage V_{BR}			Typical Clamping Voltage $V_{C4} @ I_{PP4}$ (V)	Typical Peak Pulse Current I_{PP4} (A)	Maximum Clamping Voltage $V_{C2} @ I_{PP2}$ (V)	Maximum Peak Pulse Current I_{PP2} (A)	Test Current I_{T2} (mA)	Junction Capacitance Typ @ 1 MHz, 0 V Bias (pF)
				Min.	Nom.	Max.						
SMFA1505CA	FM	400	5.5	6.82	7.15	7.48	7.85	2	10.5	33.0	10	565
SMFA1805CA	FT	400	5.5	6.82	7.15	7.48	7.85	2	10.5	33.0	10	515
SMFA1905CA	FU	400	5.5	6.82	7.15	7.48	7.85	2	10.5	33.0	10	485
SMFA2005CA	FV	400	5.5	6.82	7.15	7.48	7.85	2	10.5	33.0	10	440

The SMFA asymmetric TVS solution integrates bidirectional protection in a single compact device, enabling precise gate voltage clamping, reduced component count, simplified PCB layout, and enhanced system reliability in high-efficiency SiC applications.

For more information about the performance benefits using Littelfuse TVS solutions:



SMFA Asymmetric TVS Diode Datasheet



Efficient SiC MOSFET Gate Protection Using TVS Diodes Application Note

Optimized Gate Drive for Littelfuse SiC Power MOSFETs

Introduction

Littelfuse SiC MOSFET gate drivers are designed to unlock the full performance of Littelfuse 650 V and 1200 V SiC MOSFETs by enabling fast, clean, and reliable switching. With optimized drive strength and robust protection features, these gate drivers seamlessly complement Littelfuse’s SiC solutions for high efficiency power conversion applications.

Applications

- EV chargers and DC fast charging stations
- Industrial inverters and motor drives
- Power supplies, UPS, and data center power
- PFC, AC/DC, and DC/DC converters

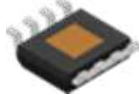
Features

- High peak source and sink current capability for fast SiC switching
- TTL/CMOS compatible input logic for easy MCU/DSP interfacing
- Integrated protection features including UVLO, DESAT, and thermal shutdown
- Support for negative gate bias to improve dV/dt immunity (selected devices)
- Compact, thermally enhanced packages for high power density designs

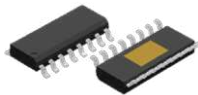
Benefits

- Maximizes SiC MOSFET performance by reducing switching losses and voltage ringing
- Improves system robustness with built-in protection against fault conditions
- Simplifies gate drive design by minimizing external components and bias supplies
- Enables high switching frequencies, supporting smaller passives and higher efficiency
- Seamless compatibility with Littelfuse 650 V and 1200 V SiC MOSFET families

IXD704



IX4352NE



IX3407B



Parameter	IXD704	IX4352NE	IX3407B
Gate Driver Type	Low-side, Dual Channel	Low-side with Charge Pump	Isolated, single channel
Peak Source / Sink Current	±4 A per channel (±8 A paralleled)	±9 A	±7 A
Supply Voltage Range	+14 V to +35 V	+13 V to +25 V (–10 V neg. bias)	+13 V to +35 V
Negative Gate Bias	No	Yes, integrated charge pump (down to –10 V)	Via external supply
Logic Input Compatibility	TTL / CMOS	TTL / CMOS	TTL / CMOS
Enable Function	Yes (independent per channel)	No	No
Under-Voltage Lockout (UVLO)	Yes (9.5 V / 12.5 V)	Yes (~10 V)	Yes
Propagation Delay (typ.)	28 ns / 28 ns (ton / toff), ‘2ns matching’	70 ns / 65 ns	154 ns / 162 ns (ton / toff)
Rise / Fall Time (typ.)	9 ns / 8 ns	10 ns / 10 ns	10 ns / 10 ns
Protection Features	UVLO, Latch-up Protection	DESAT, UVLO, TSD, Fault Output	Internal isolation, UVLO, ASD
Operating Junction Temperature	–40 °C to +150 °C	–40 °C to +125 °C	–50 °C to +150 °C
Package Options	SOIC-8, SOIC-8 EP, DFN-8 EP	16-pin Narrow SOIC EP	SOIC-8

Optimized Gate Drive for Littelfuse SiC Power MOSFETs

Figure 4. IX3407B Typical Application Circuit

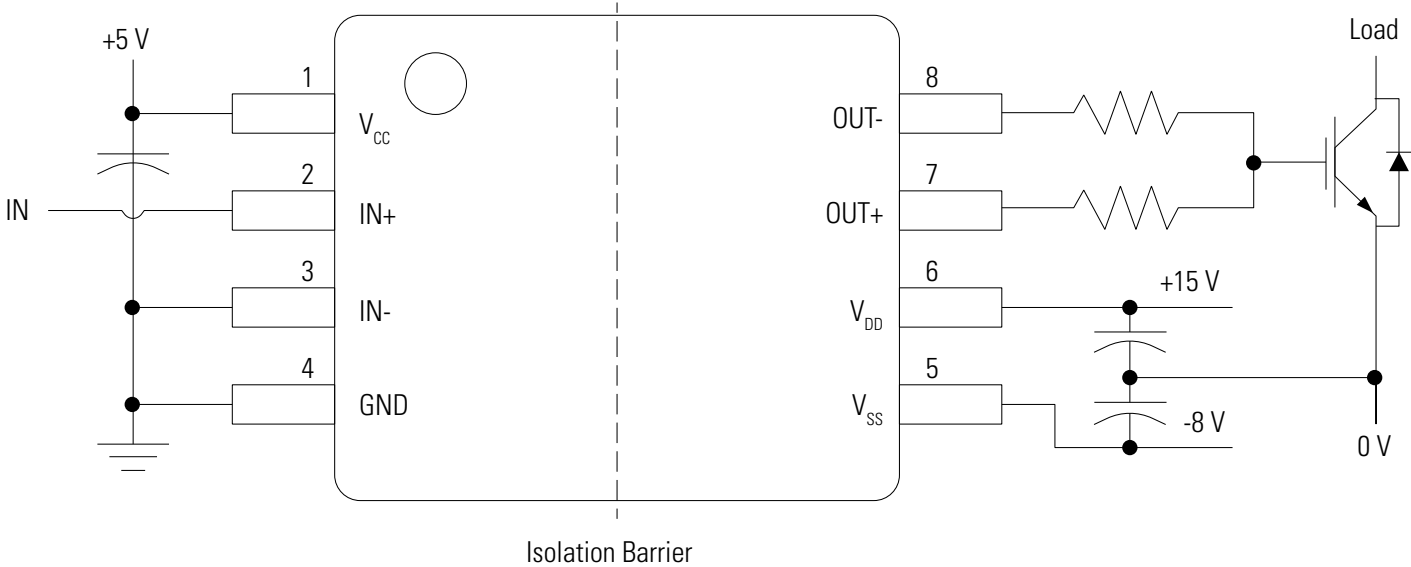
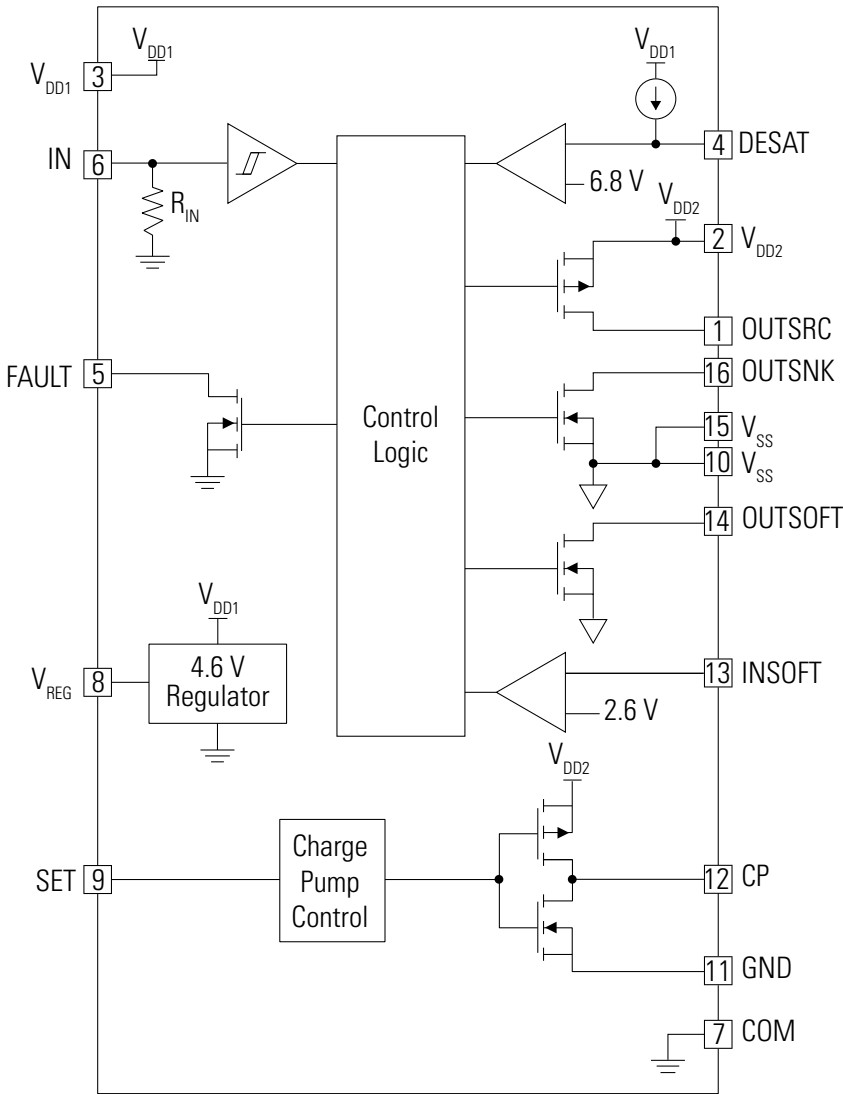


Figure 5. IX4352NE Functional Block Diagram



Optimized Gate Drive for Littelfuse SiC Power MOSFETs

To support rapid design-in and validation of Littelfuse gate drivers, dedicated evaluation boards and accompanying application notes are available. These resources provide practical guidance on circuit implementation, protection features, and performance optimization under realistic operating conditions, enabling engineers to accelerate development and de-risk system integration.

For more information
about the eval board
application notes:



LEB-0022 IX3407B Gate Driver
Evaluation Board



LEB-0023 IX4352NE Gate Driver
Evaluation Board