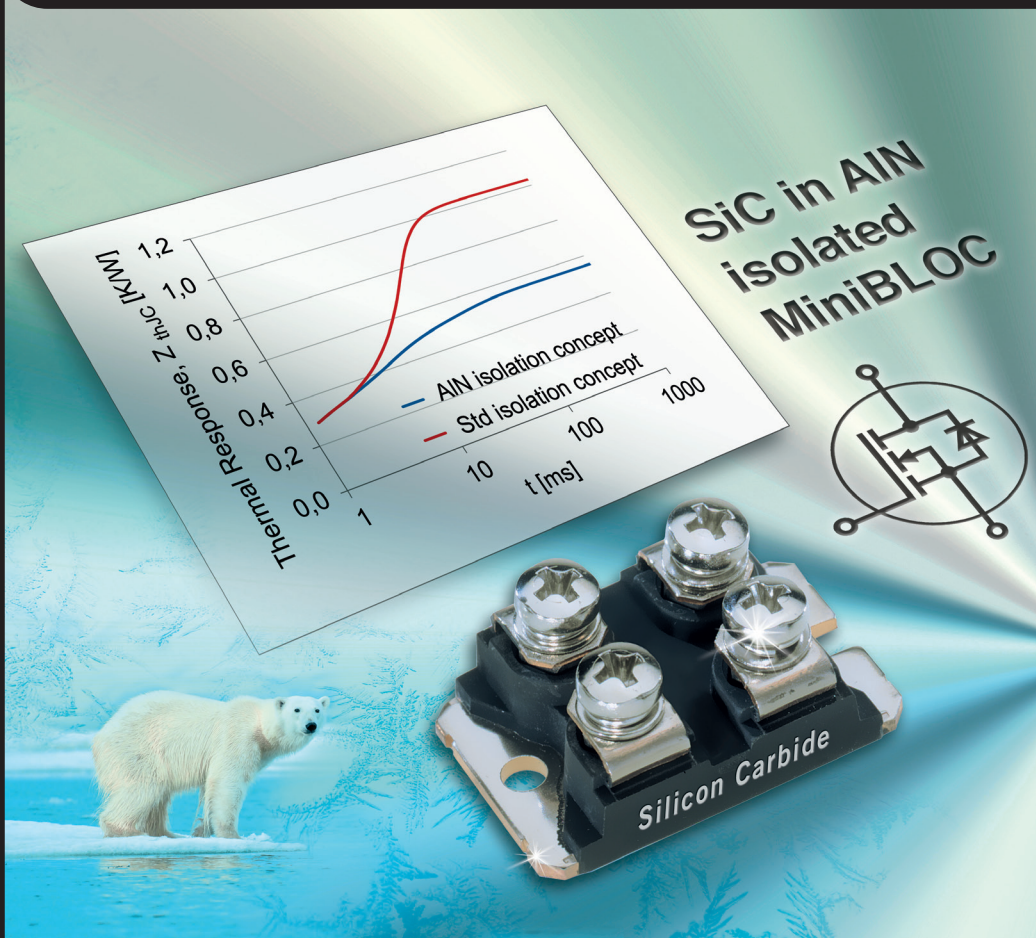


New

IXYS Silicon Carbide solutions in MiniBLOC package

THE "COOL" SOLUTION!

May 2016



Overview:

Silicon Carbide is known as a semiconductor material offering very fast switching, very low on state and switching losses and increased power density. These features can be used achieving smaller and more efficient converters following the trend to higher bus voltages. Examples among others are high efficient DC-DC converters, solar inverters, UPS systems or supercharger solutions.

IXYS meets this market demand by offering both N channel enhancement SiC Mosfet (normally off) with 1200V and 1700V blocking voltage and SiC Schottky diodes in MiniBLOC (SOT-227) package featuring 3kV isolation to heat sink and an low thermal impedance. This "cool" solution is based on unique thermal design high thermal conductivity AlN ceramic isolation. Further features are very low gate charge for easy drive, a fast body diode, low input and output capacities and a positive temperature coefficient facilitating paralleling for higher power.

Applications

- Power Supplies
- High frequency inverter
- Inductive welding
- Inductive hardening
- Solar inverters

Package

- MiniBLOC (SOT-227B)
- UL recognized
- 3000 V AC isolation voltage
- Aluminum nitride isolation for optimized thermal performance
- Advanced power cycling

Silicon Carbide Mosfet

Product	V _{DS} / V	R _{DS(ON)} typ / mΩ
IXFN 50N120SiC	1200	40
IXFN 50N120SK *	1200	40
IXFN 70N120SK *	1200	25
IXFN 90N170SK *	1700	25

Dual Silicon Carbide Diode

Product	V _{RS} / V	I _{DAV} / A
DCG 85X1200NA	1200	2 x 43
DCG 100X1200NA	1200	2 x 49
DCG 130X1200NA	1200	2 x 64

* Kelvin source gate connection

Silicon Carbide IXYS Package Power

FAST AND RELIABLE

May 2016



Overview:

IXYS offers Silicon Carbide solutions based on IXYS own ISOPLUS technology with DCB (Direct Copper Bonded) substrates and transfer molded packages like ISOPLUS i4 or SMPD. These packages allow for dense layouts with the benefit of reduced current loops and low stray inductance.

The result is a superior switching performance compared to existing discrete SiC solutions thus addressing the potentials for ultra fast switching Silicon Carbide semiconductors. Furthermore ISOPLUS packages offer a low thermal resistance while providing integrated isolation up to 3000V and very high thermal and power cycling capability.

Depending on customer's demand pure Silicon Carbide solutions like MCB40P1200LB (SiC phase leg) or DCG20B1200LB (SiC rectifier full bridge) or "Hybrid" solutions of fast Mosfets and Silicon Carbide diodes like MKH17RP650DCGLB (double boost PFC) can be used and gives the designer the choice to select the right product in terms of efficiency and price.

Customer specific products can be generated upon request.

Features

- Very fast switching
- Highest efficiency
- Highest power density

Isoplus Packages

- Low stray inductance
- Low coupling capacity
- Low thermal impedance
- Excellent reliability

Applications

- Solar inverters
- High voltage DC/DC converters
- Motor drives
- Switch mode power supplies
- PFC
- UPS
- Battery chargers
- Induction heating

Silicon Carbide Mosfet

Product	V _{DS} / V	R _{DS(ON)} typ / mΩ	Package	Circuit
MCB 60I1200TZ	1200	25	TO-268 HV	single switch
MCB 40P1200LB	1200	25	ISOPLUS SMPD	phase leg

Boost with Silicon Carbide Diode

Product	V _{DS} / V	R _{DS(ON)} typ / mΩ	Package	Circuit
MKH 17RP650DCGLB	600	110	ISOPLUS SMPD	dual boost
MKE 11R600DCGFC	600	150	ISOPLUS i4-PAC	single boost

Silicon Carbide Diode

Product	V _{RS} / V	I _{DAV} / A	Package	Circuit
FBS 10-06SC	600	6.6	ISOPLUS i4-PAC	full bridge
FBS 16-06SC	600	11	ISOPLUS i4-PAC	full bridge
DCG 20B650LB	650	20	ISOPLUS SMPD	full bridge
FBS 10-12SC	1200	10	ISOPLUS i4-PAC	full bridge
DCG 20B1200LB	1200	20	ISOPLUS SMPD	full bridge

Silicon Carbide Power MOSFETs



Part Type	V _{DSS}	I _{DM} T _C = 25°C	I _{DM} T _C = 80°C	R _{DS(on)} T _C = 25°C	C _{iss} typ	Q _s typ	R _{th(j-c)}	Fig. No.	Package style Outline drawings on pages O-31...O-54	
◇ under development ➤ New	V	A	A	mΩ (typ)	pF	nC	K/W			
◇ IXFN 130N90SK ¹⁾	900	136	109	10	4500	68	0.42	X027a	X016a ISOPLUS247™ 	
◇ IXFN 27N120SK ¹⁾	1200	27	21.5	80	950	62	1.10			
IXFN 50N120SiC		47	35	40	1900	100	0.55			
IXFN 50N120SK ¹⁾		48	38	40	1895	115	0.60			
◇ MCB 40I1200TZ		60	45	40	1895	115	0.40			
IXFN 70N120SK ¹⁾	1200	68	55	25	2790	160	0.45			X019a
MCB 60I1200TZ		90	70	25	2790	160	0.27			X027a
◇ IXFN 45N170SK ¹⁾	1700	47	35	45	3670	188	0.40	X027a	X016c ISO247™ 	
◇ IXFN 90N170SK ¹⁾		90	67	23	7340	376	0.22	X019a		
Phase Leg										
◇ MCB 20P1200LB	1200	22	17.5	80	950	62	1.60	X030a	X024a ISOPLUS 14-PAC™ 	
◇ MCB 25P1200TLB *		32	25.5	80	950	62	0.75			
◇ MCB 30P1200LB		37	29.5	40	1895	115	1.00			
◇ MCB 40P1200LB		58	43	25	2790	160	0.60			
◇ MCB 60P1200TLB *		77	62	25	2790	161	0.35			

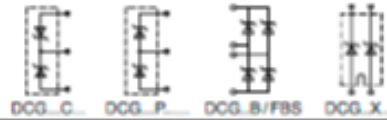
¹⁾ Kelvin source gate connection; * NTC added

SIC MOSFET 6-pack

Part Type	V _{DSS}	I _{DM} T _C = 25°C	I _{DM} T _C = 80°C	R _{DS(on)} T _C = 25°C	C _{iss} typ	Q _s typ	R _{th(j-c)}	Fig. No.
◇ under development	V	A	A	mΩ (typ)	pF	nC	K/W	
◇ MMCB 20WO1200TMI	1200	22	17.5	80	950	62	1.6	X109

Silicon Carbide Schottky Diodes

No reverse recovery



Type	V _{RRM}	I _{FSM} per diode	I _{RRM} d = 0.5	@ T _C	V _F typ., T _{vj} = 175°C	@ I _F	R _{th(j-c)}	Fig. No.	
◇ Under development ➤ New	V	A	A	°C	V	A	K/W		
Dual									
➤ DCG 45X1200NA	1200	30	2x 22	80	2.20	20	1.10	X027a	
➤ DCG 85X1200NA		59	2x 43	80	2.20	40	0.57		
➤ DCG 100X1200NA		66	2x 49	80	2.25	50	0.51		
➤ DCG 130X1200NA		88	2x 64	80	2.30	60	0.39		
Common Cathode									
◇ DCG 20C1200HR	1200	13	2x 10	80	2.20	10	3.0	X016c	
◇ DCG 35C1200HR		23	2x 17	80	2.20	20	1.8		
Phase Leg									
◇ DCG 10P1200HR	2x 1200	13	10	80	2.20	10	3.0	X016c	
◇ DCG 17P1200HR		23	17	80	2.20	20	1.8		
Full Bridge									
➤ DCG 20B650LB	650	16	10.5	80	2.0	10	2.1	X030a	
FBS 10-12SC	1200		4.5	80	2.6	5	7.0	X024a	
◇ DCG 20B1200LB		12.5	9.2	80	2.0	20	3.3	X030a	

Double Boost

Type	Circuit and Technology	V _{DSS} max	I _{DM} T _C = 80°C	R _{DS(on)} max	I _{FSM} Boost Diode	Fig. No.
➤ New		V	A	Ω	A	
➤ MKH 17RP650DCGLB	Superjunction ¹⁾ MOSFET C + SiC	650	2 x 16	0.11	2 x 16	X030a

¹⁾ Powered by Infineon CoolMOS™ superjunction bare die C6

X019a TO-268AAHV



X024a ISOPLUS 14-PAC™



X027a SOT-227B
miniBLOC



X030a SMPD-B



X109 MiniPack 2B

