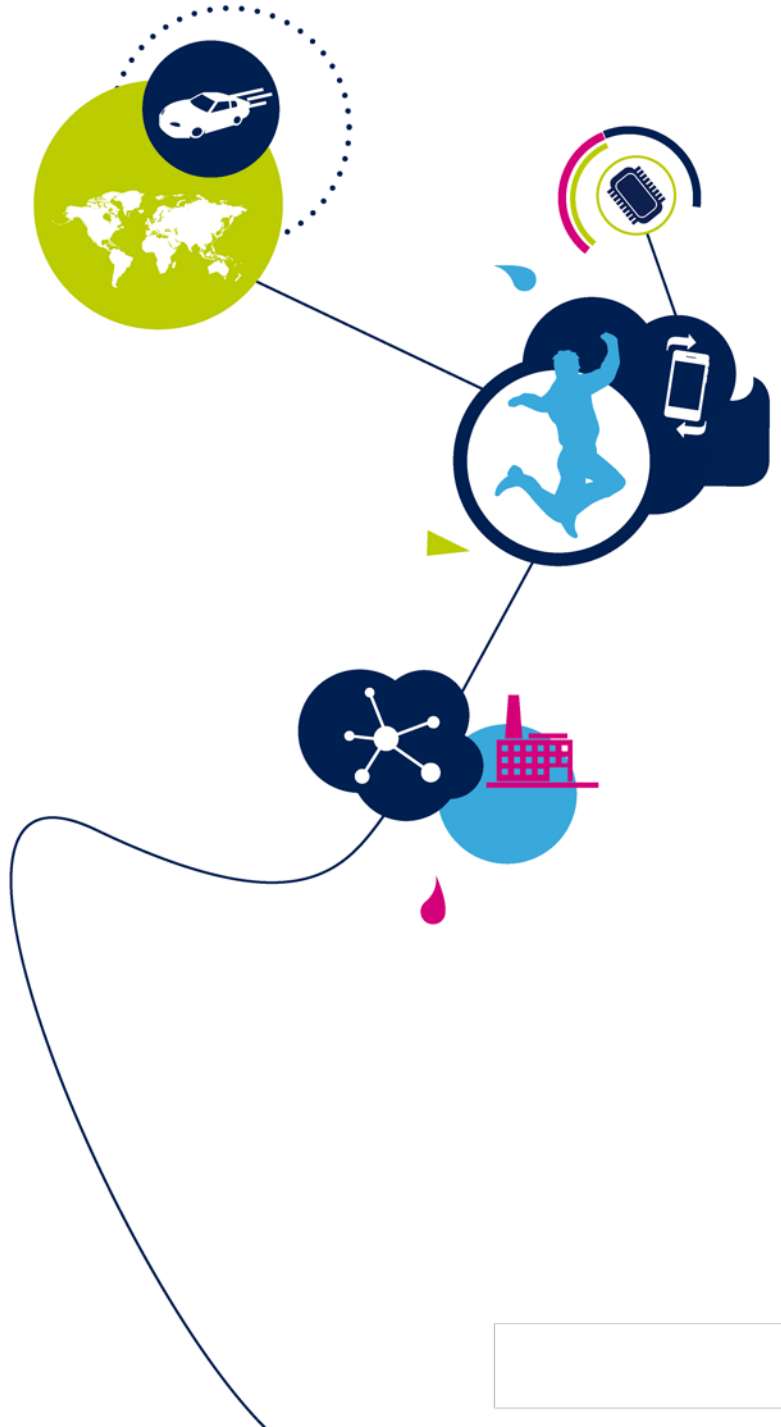
650V & 1200V Silicon Carbide (SiC) Diodes

Discrete & Filters Division (DFD)

Automotive & Discrete Group (ADG)



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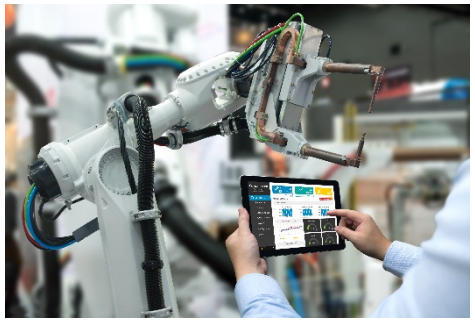
SiC Diodes

Address Very Demanding Markets

Smart Industry



Factory Automation
Uninterruptible Power Supply
Renewable Energy

Smart Driving

On-board
Chargers

Smart Home & City

Telecom Base station
Servers

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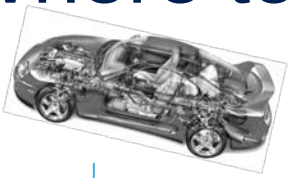
SiC Diodes

Where to Place SiC Diodes?

High reliable products with high performances and robustness

Different solutions which can cover a wide range of applications



Automotive

Telecom power

Power Supply

PC power

InSiC

UPS

Server power

Motor drive

Lighting

Industrial

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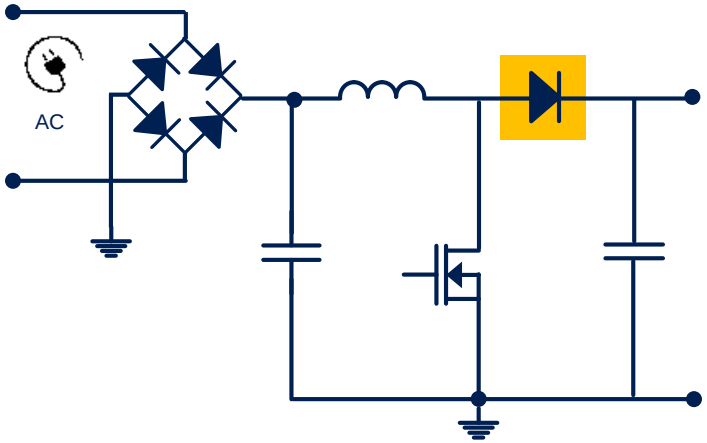
Typical Circuits

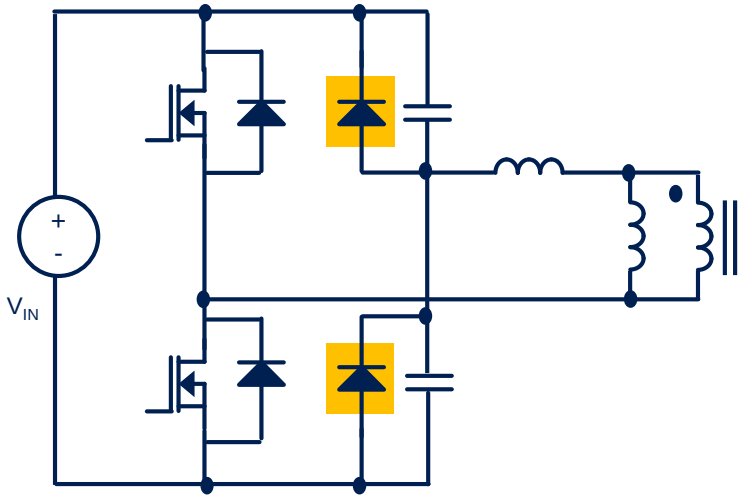
650 V SiC Diodes

PFC Boost Diode



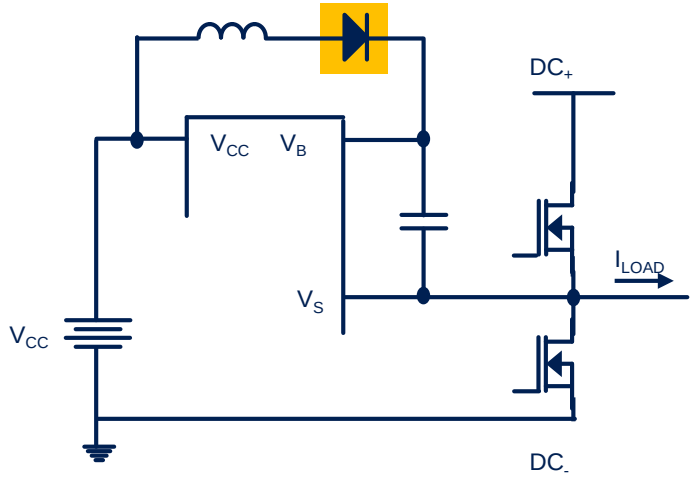
Single, Interleaved, Bridgeless,
Totem-Pole Configurations

Clamping Diode



Primary or Secondary Side
Half or Full Bridge Phase Shift

Bootstrap Diode

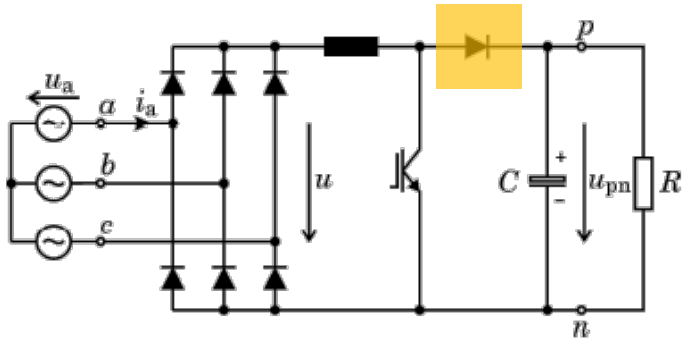


Floating Supply at High or
Low Side Driver

Typical Topologies

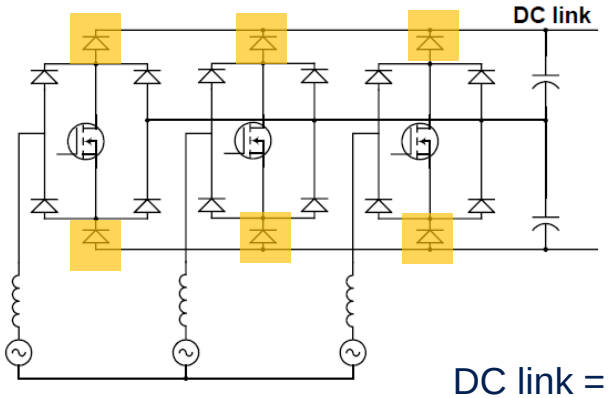
1200 V SiC Diodes

Standard three phase PFC



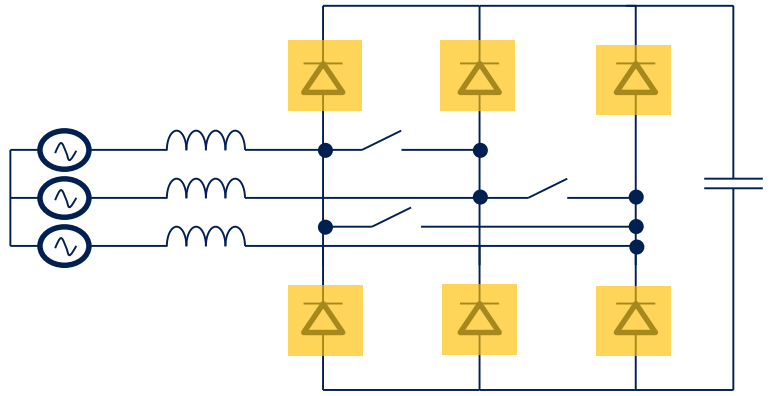
V_{BOOST} = 800 V

Vienna Topology



DC link = 800 V

3-phase PFC mixed voltage 3 levels

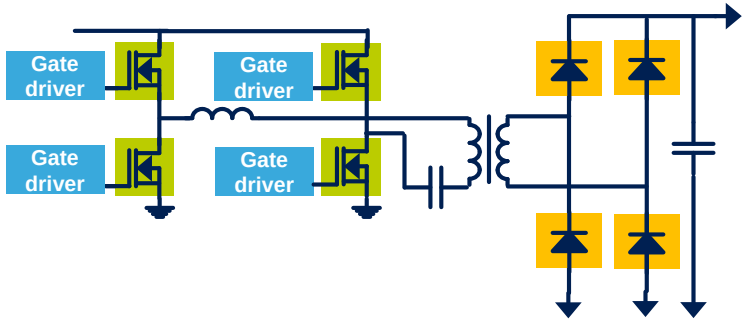


V_{DC} = 800 V

Typical Topologies

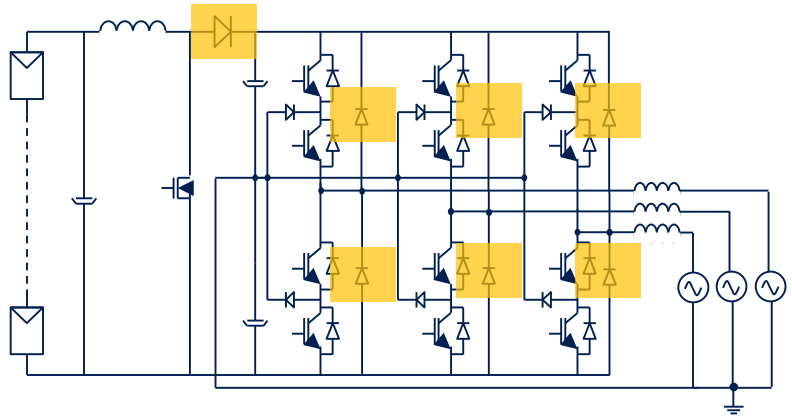
1200 V SiC Diodes

Phase-shift full bridge DC/DC



V_{BATT} = 200 to 500 V

3-phase solar inverters



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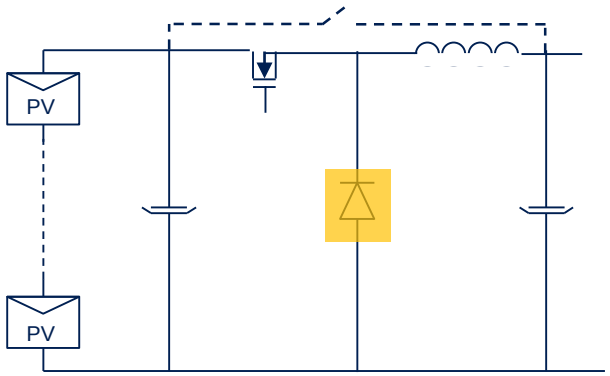
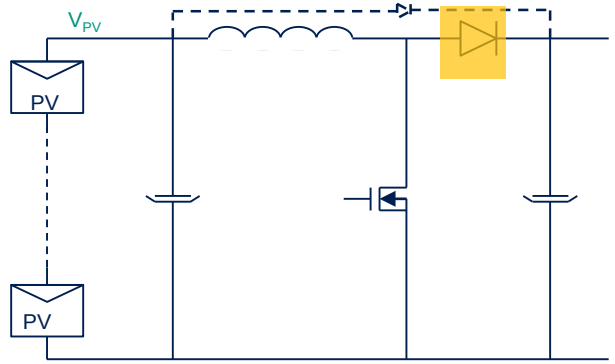
Typical Topologies

1200 V SiC Diodes

Transformerless Buck



Transformerless Boost



Low Forward Voltage SiC Diodes

STPSCxx065

Root Part number	$I_{F(AV)}$	V_F [V] max (per diode)		I_{FSM} [A] (per diode)		I_R [µA] (per diode)	Q_{cj} [nC] (per diode)	Packages						Samples	Qualification
		I_0													
		25°C	150°C	10µs 25°C	10ms 125°C	Vr=650V 150°C	V_R=400V	DO-220	DO-220I	DO-247	TO-247	TO-247 LL	D2PAK		
SiC New low V_F series 650V															
STPSC8065	8 A	1.45	1.65	200	38	750	28							√	√
STPSC10065	10 A			210	39	900	34							√	√
STPSC12065	12 A			220	40	1000	36							√	√
STPSC20065	20 A			400	70	2000	62							√	√
NEW **STPSC20065CWL**	2 x 10A			210	39	900	34							√	√
STPSC40065C	2 x 20 A			400	70	2000	62							√	√

In mass production
New
Under development

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Low Forward Voltage SiC Diodes

Automotive Grade - STPSCxx065-Y

Root Part number	$I_{F(AV)}$	V_F [V] max (per diode) I_0		I_{FSM} [A] (per diode)		I_R [µA] (per diode)	Q_{cj} [nC] (per diode)	Package									Samples	Qualification
		25°C	150°C	10µs 25°C	10ms 125°C	Vr=650V 150°C	V_R=400V	TO-220AC	TO-220AB	DO-220I	DO-247	TO-247	D2PAK HV	D²PAK	DPAK	I²PAK		
SiC auto 650V																		
STPSC8065-Y	8 A	1.45	1.65	200	38	750	28										√	√
STPSC10065-Y	10A			210	39	900	34										√	√
NEW **STPSC12065-Y**	12 A			220	40	1000	36										√	√
STPSC20065-Y	20 A			400	70	2000	62										√	√
STPSC40065CWY	2x20A			400	70	2000	62										√	√

In mass production
New
Under development

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High Surge Capability SiC Diodes

STPSCxxxH065

Root Part number	$I_{F(AV)}$	V_F [V] max (per diode)		I_{FSM} [A] (per diode)		I_R [µA] max (per diode)	Q_{cj} [nC] (per diode)	Package						Samples	Qualification
		I_0						PowerFLAT8x8	DPAK	D²PAK	TO-220	DO-220I	TO-247		
		25°C	150°C	10µs 25°C	10ms 125°C	V_R=650V 150°C	V_R=400V								
SiC H version 650V															
NEW **STPSC2H065**	2 A	1.55	1.95	140	18	84	7.9							√	√
NEW **STPSC4H065DLF**	4 A			400	35	170	14.3							√	√
NEW **STPSC6H065DLF**	6 A			600	52	250	19.9							√	√
NEW **STPSC8H065DLF**	8 A			800	69	335	26							√	√

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In mass production
New
Under development

High Surge Capability SiC Diodes

STPSCxxxH065

Root Part number	$I_{F(AV)}$	V_F [V] max (per diode)		I_{FSM} [A] (per diode)		I_R [µA] max (per diode)	Q_{cj} [nC] (per diode)	Package						Samples	Qualification
		I_0						PowerFLAT8x8	DPAK	D²PAK	TO-220	DO-220I	TO-247		
		25°C	150°C	10µs 25°C	10ms 125°C	V_R=650V 150°C	V_R=400V								
SiC H version 650V															
STPSC4H065	4 A	1.75	2.5	200	35	170	12.5							√	√
STPSC6H065	6 A			400	52	250	18							√	√
STPSC8H065	8 A			420	69	335	23.5							√	√
STPSC10H065	10 A			470	80	425	28.5							√	√
STPSC12H065	12 A			400	90	500	36							√	√
NEW **STPSC16H065CT/AW**	16 A			800	105	560	41							√	√
STPSC8H065C	2 x 4 A	1.75	2.5	200	35	170	12.5							√	√
STPSC12H065C	2 x 6 A			400	52	250	18							√	√
STPSC16H065C	2 x 8 A			420	69	335	23.5							√	√
STPSC20H065C	2 x 10 A			470	80	425	28.5							√	√

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In mass production
New
Under development

High Surge Capability SiC Diodes

Automotive Grade: STPSCxxH065 -Y

Root Part number	$I_{F(AV)}$	V_F [V] max (per diode) I_0		I_{FSM} [A] (per diode)		I_R [µA] (per diode)	Q_{cj} [nC] (per diode)	Package								Samples	Qualification
		25°C	150°C	10µs 25°C	10ms 125°C	Vr=650V 150°C	V_R=400V	TO-220AC	TO-220AB	DO-220I	DO-247	TO-247	D2PAK HV	D²PAK	DPAK		
SiC auto 650V																	
NEW **STPSC2H065BY**	2 A	1.55	1.95	140	18	84	7.9									√	√
STPSC6H065BY	6 A	1.65	2.05	400	52	250	18									√	√
STPSC8H065BY/G2Y	8 A	1.65	2.05	420	69	335	23.5									√	√
STPSC10H065-Y	10 A	1.75	2.5	470	80	425	28.5									√	√
STPSC10H065BY	10 A	1.65	2.05	470	80	425	28.5									√	√
STPSC12H065-Y	12 A	1.75	2.5	400	90	500	36									√	√
STPSC20H065C-Y	2 x 10 A	1.75	2.5	470	80	425	28.5									√	√

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In mass production
New
Under development

1200 V SiC Diodes

STPSCxxH12

Root Part Number	$I_{F(AV)}$	V_F [V] max Per diode $I_F = I_0$		I_{FSM} [A]		I_R [µA] max	Q_{cj} [nC] typ	Package				Production
		25°C	150°C	10µs 25°C	10ms 25°C	Vr=1200V 150°C	V_R=800V	DPAK HV	D2PAK	TO-220	TO-247 LL	
STPSCxxH12												
STPSC2H12	2 A	1.5	2.25	105	15	80	15.6					√
STPSC5H12	5 A			210	35	200	36					√
STPSC10H12	10 A			420	71	400	57					√
STPSC15H12	15 A			630	105	600	94					√
STPSC20H12	20 A			700	140	800	129					√
STPSC10H12C	2x5A	1.5	2.25	210	35	200	36					√
STPSC20H12C	2x10A			420	71	400	57					√
STPSC30H12C	2x15A			630	105	600	94					√
STPSC40H12C	2x20A			700	140	800	129					√

In mass production
New
Under development

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1200 V SiC Diodes

Automotive Grade: STPSCxxH12-Y

Root Part number	$I_{F(AV)}$	V_F [V] max Per diode $I_F = I_0$		I_{FSM} [A]		I_R [µA] max	Q_{cj} [nC] typ	Package					Samples	Qualification
		25°C	150°C	10µs 25°C	10ms 25°C	Vr=650V 150°C	V_R= 800V	TO-220	DPAK HV	D²PAK	D²PAK HV	TO-247		
STPSCxxH12-Y														
NEW **STPSC2H12-Y**	2 A	1.5	2.25	105	15	80	15.6						√	√
STPSC5H12-Y	5 A			210	35	200	36						√	√
STPSC10H12-Y	10 A			420	71	400	57						√	√
STPSC15H12DY	15 A			630	105	600	94						√	√
STPSC20H12-Y	20 A			700	140	800	129						√	√
STPSC20H12CWY	2 x 10 A			420	71	400	57						√	√

In mass production
New
Under development

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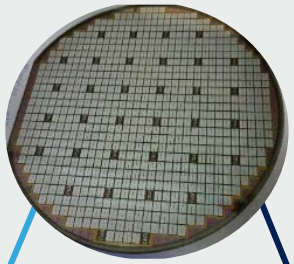
SiC Diode Technology

Increased Power Conversion Efficiency

Energy savings generated by sustainable technology

Power Losses

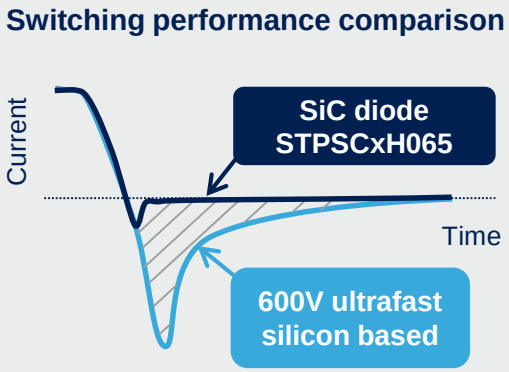


Recovery Losses

Conduction Losses

Si-based ultrafast diodes

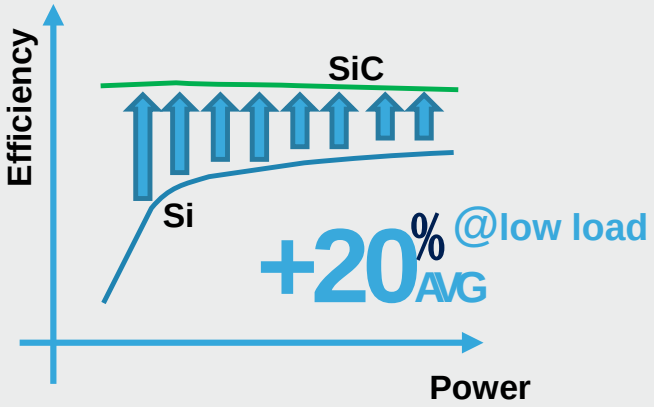
Eliminate Recovery Losses



SiC-based diodes

Reduced Dimensions

- 60%



More efficient power conversion

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SUSTAINABLE TECHNOLOGY