POWERMASTER SEMICONDUCTOR

Masters of Power Solution

eSiC Diode Selection Guide 2024

Advanced Power Master Semiconductor's Silicon Carbide Technology

Advantage of eSiC Diode over Si Diode

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Features

- Low forward voltage
- High surge current capability
- No reverse recovery current
- 175°C Max junction temperature
- Switching behavior independent of temp. and current

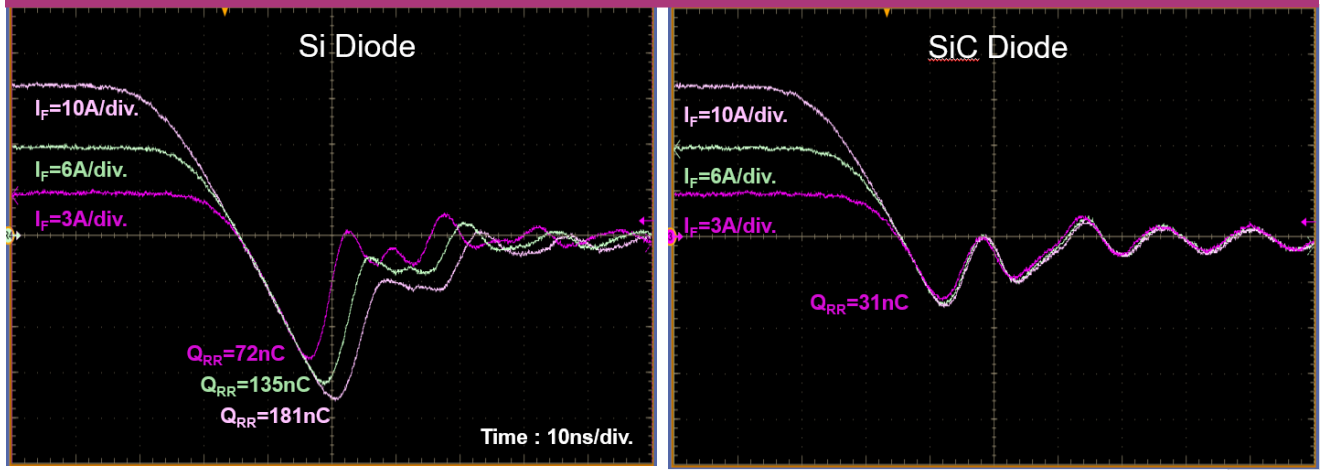
Advantages

- Low Conducution loss
- High reliability capability
- Significant reduction of MOSFET or IGBT turn on loss
- Less Power loss at high temperature

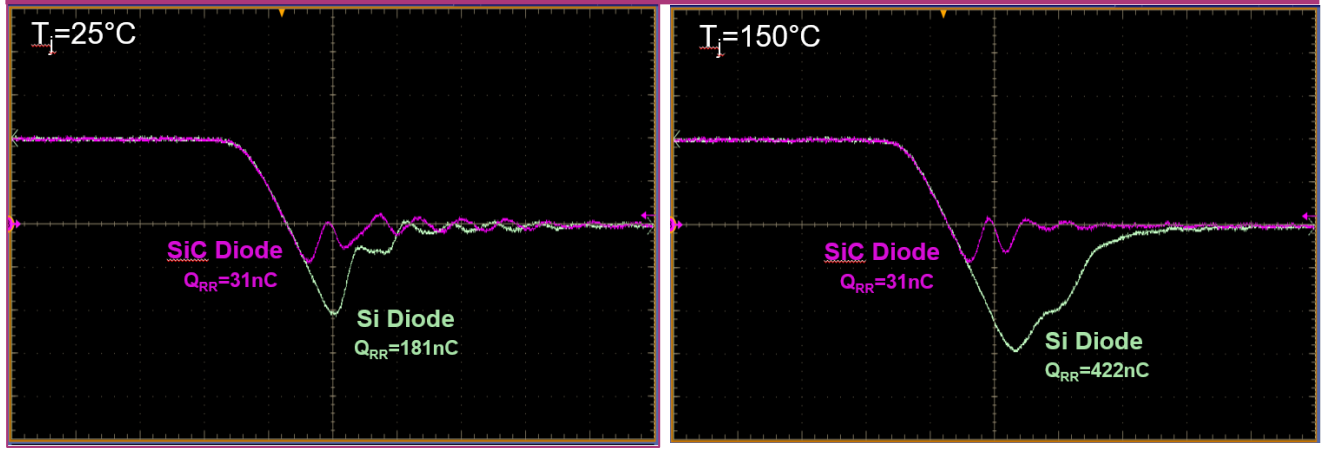
System Benefits

- Higher system efficiency (CCM PFC) than Si diodes
- High Performance/Cost Ratio
- High reliability capability
- Suitable for wide range of applications
- Ruduction of EMI
- Reduction of cooling requirements

Independent of current



Independent of temperature



Product Strategy : *e*SiC Diode

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650V SiC Diode

4 / 6 / 8 / 10 / 12 / 16 / 20 / 30 / 40A
Low V_F *: Die (7 Parts) / Package (23 Parts)*
Low Q_C *: Die (6 Parts) / Package (18 Parts)*


TV&LED lighting


xEV (OBC/DC-DC)

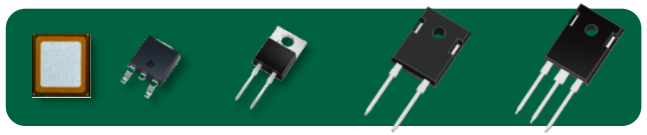

Server / Telecom


Solar Inverter


EV Charging Pole


Industrial Motors

1200V SiC Diode



5 / 8 / 10 / 15 / 20 / 30 / 40 / 60A
Die : 8 Parts / Package : 21 Parts


Solar Inverter


xEV (3Φ OBC)


EV Charging Pole


UPS


Industrial Motors

1700V SiC Diode

10 / 25A
Die : 2 Parts / Package : 2 Parts


Solar Inverter


EV Charging Pole

Product Differentiation | **Low V_F** for low frequency application | **Low Q_C** for high frequency application

eSiC Diode

Smaller but Robust Products

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Key Features

- Low forward voltage
- High surge current capability
- No reverse recovery current
- 175°C Max junction temperature

Key Benefits

- Low Conduction loss
- High reliability capability
- Significant reduction of MOSFET or IGBT turn on loss
- Less Power loss at high temperature

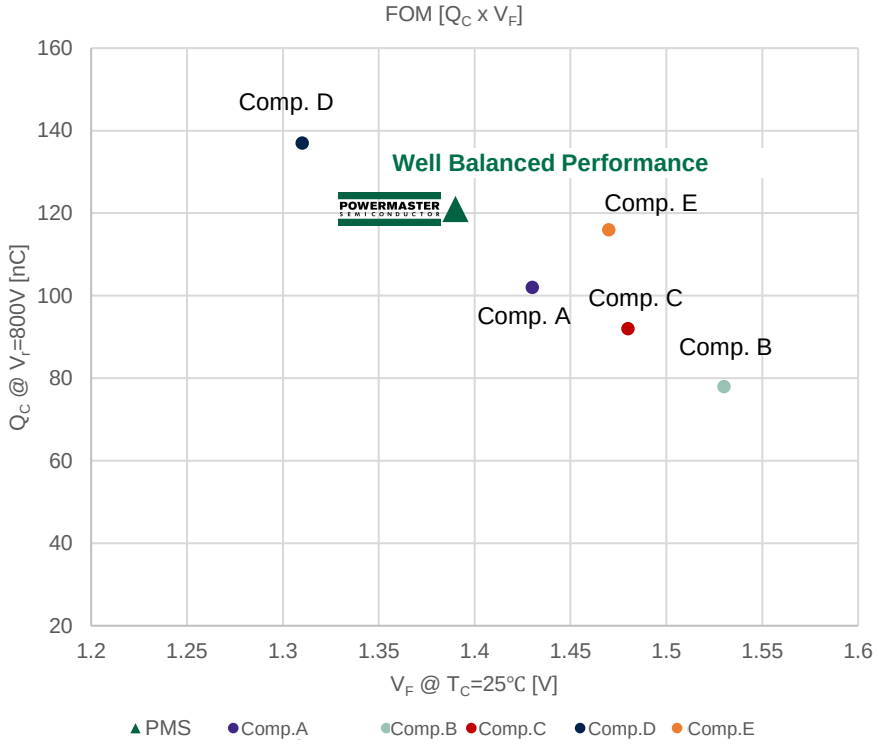
Applications

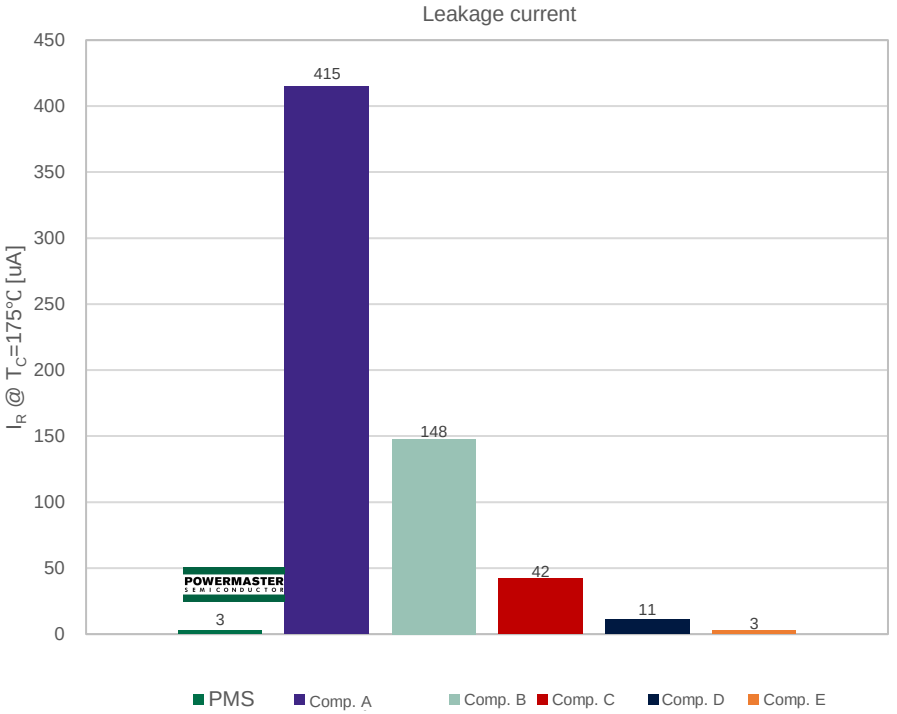

Solar Inverter


EV Charging Station


Server / Telecom Power


TV / LED Lighting





Improved Stability for Surge Current (MPS Technology)

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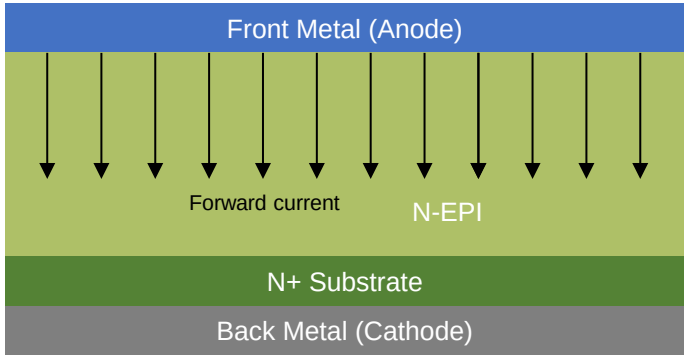
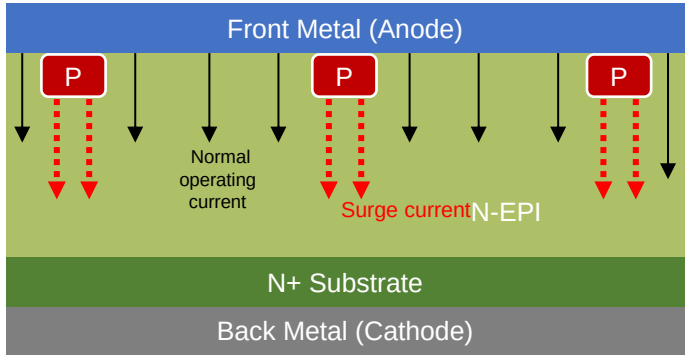
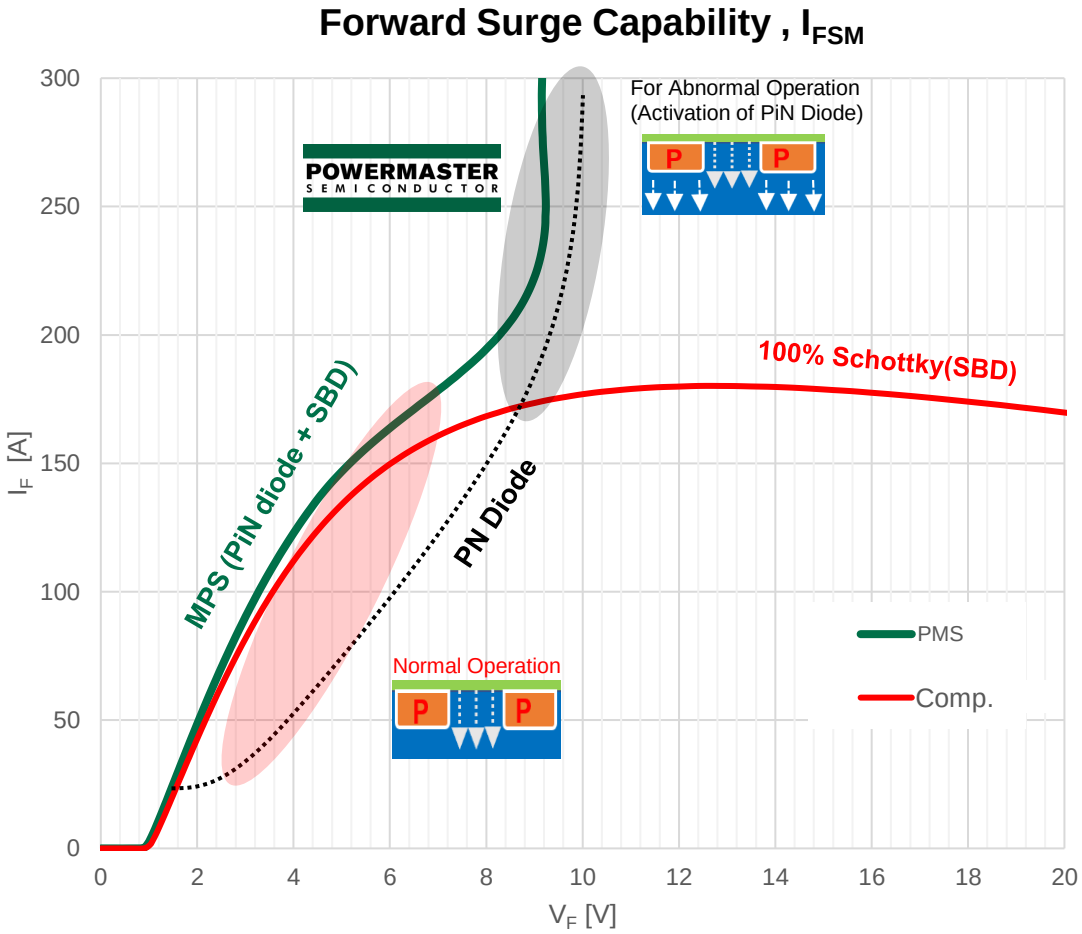


Pure Schottky Diode



MPS(Merged PiN Schottky) Diode



Stabilization of surge current operation by minority carrier injection

Product Differentiation by Loss Simulation

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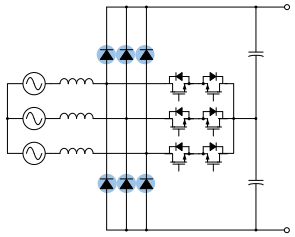
Q_C

eSiC Low V_F Version



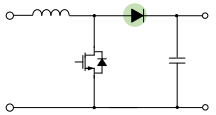
- Ideal for low frequency applications (e.g. rectifier circuits)
- PCH65S16D1 (V_F=1.3V / Q_C=61nC)
- PCW120D40D1 (V_F=1.39V / Q_C=121nC)


EV Charging Station


Solar Inverter


Industrial Motors

eSiC Low Q_C Version



- Ideal for high frequency applications (e.g. PFC circuits)
- PCH65S16D1Q (V_F=1.4V / Q_C=47nC)
- PCW120D40D1Q (V_F=1.54V / Q_C=92nC)


Telecom/Server (w.UPS)


Solar Inverter


TV&LED lighting

V_F

650V *e*SiC Diode Gen1. Portfolio

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TV / LED Lighting | Server / Telecom | Solar | UPS | EV Charger | Industrial Motor

Available now
Coming Soon

Low V_F for Low Freq. Applications

PKG / I_F	Bare Die	DPAK	D2PAK	PQFN88	TO-220F 2L	TO-220 2L	TO-247 2L	TO-247 3L
								
40A								PCW65D40D1
30A								PCW65D30D1
20A	PCO65S20D1		PCB65S20D1		PCF65S20D1	PCH65S20D1	PCA65S20D1	PCW65D20D1
16A	PCO65S16D1					PCH65S16D1		PCW65D16D1
12A	PCO65S12D1				PCF65S12D1	PCH65S12D1		
10A	PCO65S10D1	PCD65S10D1	PCB65S10D1		PCF65S10D1	PCH65S10D1		
8A	PCO65S08D1		PCB65S08D1		PCF65S08D1	PCH65S08D1		
6A	PCO65S06D1				PCF65S06D1	PCH65S06D1		
4A	PCO65S04D1				PCF65S04D1	PCH65S04D1		

Low Q_C for High Freq. Applications

50A							PCA65D50D1Q	
40A								PCW65D40D1Q
30A							PCA65S30D1Q	PCW65D30D1Q
20A	PCO65S20D1Q		PCB65S20D1Q		PCF65S20D1Q	PCH65S20D1Q	PCA65S20D1Q	PCW65D20D1Q
16A	PCO65S16D1Q					PCH65S16D1Q		PCW65D16D1Q
12A	PCO65S12D1Q		PCB65S12D1Q		PCF65S12D1Q	PCH65S12D1Q		
10A	PCO65S10D1Q				PCF65S10D1Q	PCH65S10D1Q		
8A	PCO65S08D1Q				PCF65S08D1Q	PCH65S08D1Q		
6A	PCO65S06D1Q				PCF65S06D1Q	PCH65S06D1Q		

1200V / 1700V *e*SiC Diode Gen1. Portfolio (Industrial Grade)

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Available now
Coming Soon

Solar | UPS | EV Charger | Industrial Motor

1200V *e*SiC Diode Lineup

I_F \ Package	Bare Die	D2PAK	TO-220 2L	TO-247 2L	TO-247 3L
					
60A				PCA120S60D1Q	PCW120D60D1Q
40A	PCO120S40D1			PCA120S40D1	PCW120D40D1 PCW120D40D1Q
30A	PCO120S30D1			PCA120S30D1 PCA120S30D1Q	PCW120D30D1
20A	PCO120S20D1	PCB120S20D1	PCH120S20D1	PCA120S20D1	PCW120D20D1
15A	PCO120S15D1		PCH120S15D1	PCA120S15D1	PCW120D15D1
10A	PCO120S10D1	PCB120S10D1	PCH120S10D1	PCA120S10D1	PCW120D10D1
8A	PCO120S08D1		PCH120S08D1		
5A	PCO120S05D1		PCH120S05D1		

1700V *e*SiC Diode Lineup

25A	PCO170S25D1			PCA170S25D1	
10A	PCO170S10D1			PCA170S10D1	

1200V / 1700V *e*SiC Diode Gen1. Portfolio (Automotive Grade)

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xEV

1200V *e*SiC Diode Lineup

Available now
Coming Soon

Package / I_F	TO-247 2L	TO-247 3L
		
40A	PCA120S40D1A	**PCW120D40D1A** **PCW120D40D1QA**
30A	PCA120S30D1A PCA120S30D1QA	**PCW120D30D1A**
20A	**PCA120S20D1A**	**PCW120D20D1A**
15A	**PCA120S15D1A**	**PCW120D15D1A**
10A	**PCA120S10D1A**	**PCW120D10D1A**

PMS *e*SiC Diode Product Portfolio

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Voltage / I_F		Industrial Grade							Automotive Grade						
Qualification / Package		DPAK	D2PAK	PQFN88	TO-220F 2L	TO-220 2L	TO-247 2L	TO-247 3L	DPAK	D2PAK	PQFN88	TO-220F 2L	TO-220 2L	TO-247 2L	TO-247 3L
															
650V	50A						PCA65D50D1Q								
	40A							PCW65D40D1 PCW65D40D1Q							
	30A						PCA65S30D1Q	PCW65D30D1 PCW65D30D1Q							
	20A		PCB65S20D1 PCB65S20D1Q		PCF65S20D1 PCF65S20D1Q	PCH65S20D1 PCH65S20D1Q	PCA65S20D1 PCA65S20D1Q	PCW65D20D1 PCW65D20D1Q							
	16A					PCH65S16D1 PCH65S16D1Q		PCW65D16D1 PCW65D16D1Q							
	12A		PCB65S12D1Q		PCF65S12D1 PCF65S12D1Q	PCH65S12D1 PCH65S12D1Q									
	10A	PCD65S10D1	PCB65S10D1		PCF65S10D1 PCF65S10D1Q	PCH65S10D1 PCH65S10D1Q									
	8A		PCB65S08D1		PCF65S08D1 PCF65S08D1Q	PCH65S08D1 PCH65S08D1Q									
	6A				PCF65S06D1 PCF65S06D1Q	PCH65S06D1 PCH65S06D1Q									
	4A				PCF65S04D1 PCF65S04D1Q	PCH65S04D1 PCH65S04D1Q									
1200V	60A					PCH120D60D1Q	PCA120D60D1Q								
	40A						PCA120S40D1	PCW120D40D1 PCW120D40D1Q						PCA120S40D1A	PCW120D40D1A PCW120D40D1QA
	30A						PCA120S30D1 PCA120S30D1Q	PCW120D30D1						PCA120S30D1A PCA120S30D1QA	PCW120D30D1A
	20A		PCB120S20D1			PCH120S20D1	PCA120S20D1	PCW120D20D1						PCA120S20D1A	PCW120D20D1A
	15A					PCH120S15D1	PCA120S15D1	PCW120D15D1						PCA120S15D1A	PCW120D15D1A
	10A		PCB120S10D1			PCH120S10D1	PCA120S10D1	PCW120D10D1						PCA120S10D1A	PCW120D10D1A
	8A					PCH120S08D1									
	5A					PCH120S05D1									
1700V	25A						PCA170S25D1								
	10A						PCA170S10D1								
	5A						PCA170S05D1								

Ordering System (SiC Diode)

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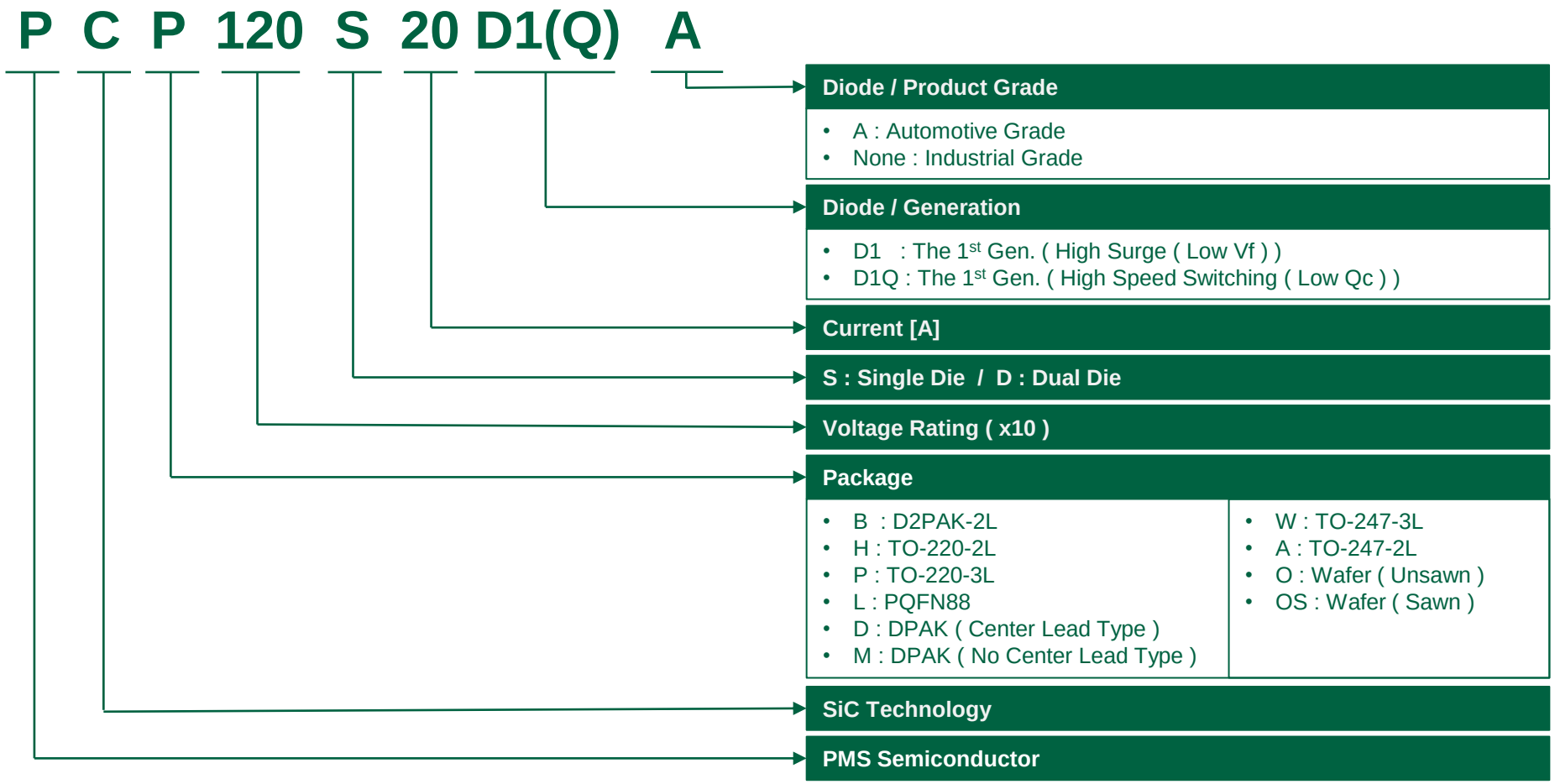

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