

San'an Gen3 1200V SiC Schottky Barrier Diodes

Optimal Selection of High Efficiency and Compact System

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San'an Semiconductor silicon carbide Schottky barrier diodes (SiC SBDs) fully exert the advantages of silicon carbide (SiC) compared to silicon. SiC SBDs can withstand higher voltage without breaking down and support higher temperature than silicon-based devices, and do not have reverse charge recovery. San'an's generation 3rd (G3) 1200V SiC SBD adopted advanced San'an's G3 SiC SBD fabrication technologies. Due to its perfect performance parameters (Forward voltage V_F ; Thermal resistance $R_{th(j-c)}$), the diode has lower conduction loss and more effective heat dissipation capability, contributing to a more efficient and compact system design. San'an's G3 1200V SiC SBDs are RoHS compliant and can be used in industrial applications, and some products have qualified with AEC-Q101 standard for EV applications.

FEATURES	BENEFITS
<ul style="list-style-type: none"> High-reliability MPS structure Thin-wafer Platform Zero Reverse Recovery Lower V_F Ultra High Switching Speed Optimized Thermal Management RoHS Certified 	<ul style="list-style-type: none"> ✓ Improved System Level Efficiency ✓ Enables High Power Density Designs ✓ Reduced Cooling Requirements ✓ Enhanced System Reliability ✓ Provided High-speed Switching ✓ Preferred Replacement for the Generation 2nd (G2) 1200V SiC SBD

The G3 1200V SiC SBD adopts San'an's thin-wafer platform, as shown in Figure 1 to Figure 3. The G3 device decreases the wafer thickness by more than half, and this technology greatly optimized the V_F and heat dissipation capability of the device, and reduced the $R_{th(j-c)}$ by about 17%.

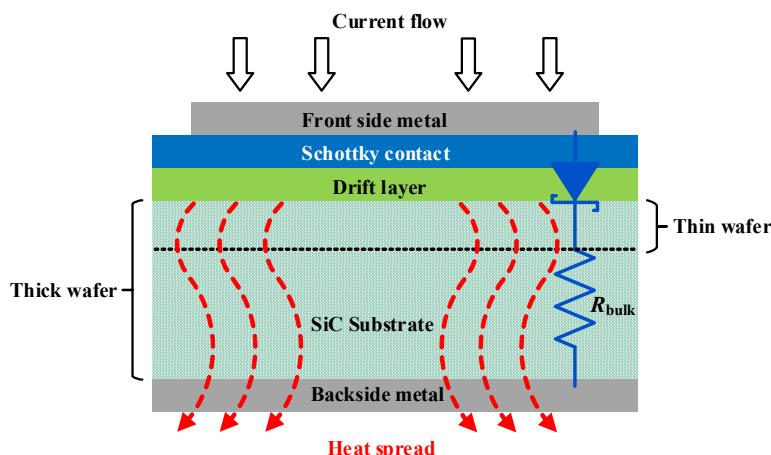
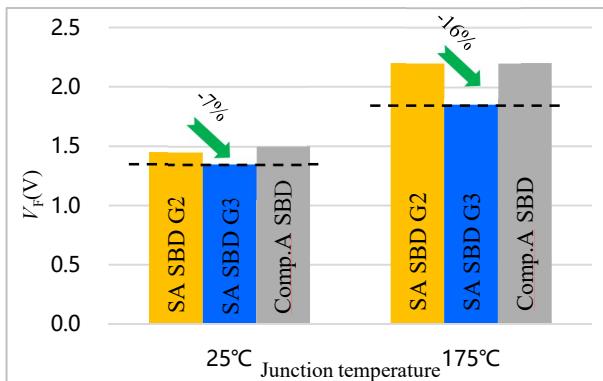
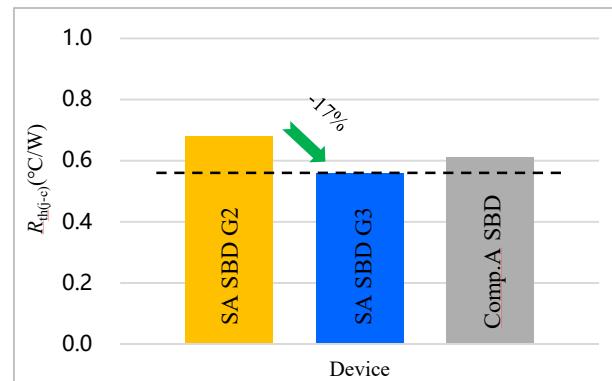


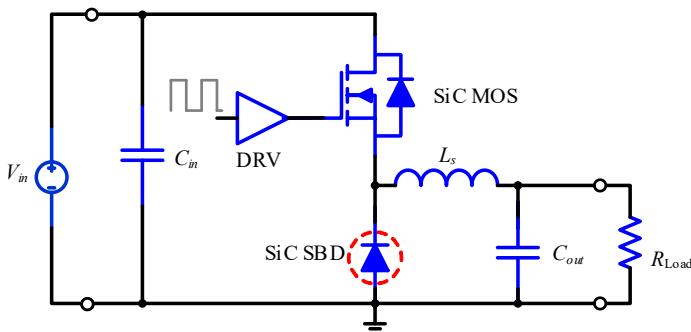
Fig 1: Schematic diagram of SiC SBD with thick wafer and thin wafer



Fig 2: Comparison of V_F (1200V 20A SiC SBD)Fig 3: Comparison of $R_{th(j-c)}$ (1200V 20A SiC SBD)

The equivalent substrate resistance (R_{bulk}) of SiC substrate will generate a voltage drop when the diode conducts, which is a critical part affecting the V_F of the diode. Thinner SiC substrate thickness stands for smaller internal resistance of the diode and lower forward voltage drop.

The power losses generated by diode during operation accumulate in the form of thermal energy inside the chip, which needs to be promptly and effectively transferred to the outside of the device to avoid device thermal run away due to high temperatures. Reducing the thickness of the SiC substrate can shorten the path for heat to reach the device's package case, thereby reducing the $R_{th(j-c)}$ and greatly improving its heat dissipation capability. Figure 4 demonstrates the comparative test of SiC SBDs on the Buck converter, and the results are shown in Figure 5.



Buck circuit:

 $V_{in} = 800V$ $V_{out} = 160V$ $f_{sw} = 50kHz$ $T_a = 24.5^\circ C$

Fig 4: Buck topology setup to compare the performance impact of G2 and G3 SiC SBDs

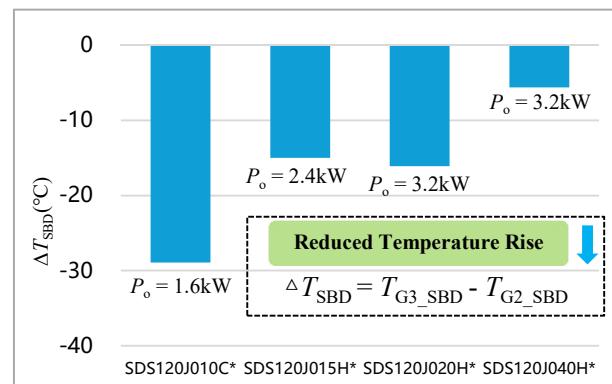
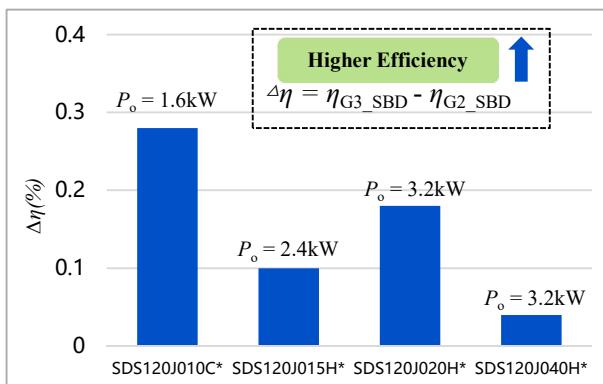


Fig 5: Comparison of efficiency (left) and temperature (right) of 1200V SiC SBD G3 and G2

The G3 SiC SBD optimizes the V_F of the diode based on the G2, minimizes its conduction loss, and enhances system power efficiency. The G3 SiC SBD has a smaller thermal resistance, immensely improving the device's heat dissipation capability, making the device more reliable and capable of supporting higher power field, and simplifying the heat dissipation design of application systems.



Sanan 1200V SiC SBD G3 Series

$I_F(A)$	TO220-2L	TO247-2L	TO247-3L	TO252-2L	TO263-2L	Baredie	SOT-227	SMBF	SAPKG
2	SDS120J002C3				SDS120J002D3				SDS120J002B3
3					SDS120J003D3				SDS120J003B3
5	SDS120J005C3				SDS120J005D3				SDS120J005B3
10	SDS120J010C3	SDS120J010H3	SDS120J010G3	SDS120J010D3	SDS120J010E3	SDS120J010B3			
15	SDS120J015C3	SDS120J015H3				SDS120J015B3			
20		SDS120J020H3	SDS120J020G3			SDS120J020B3			
27		SDS120J027H3				SDS120J027B3			
30		SDS120J030H3	SDS120J030G3			SDS120J030B3			
40		SDS120J040H3	SDS120J040G3			SDS120J040B3			
50		SDS120J050H3				SDS120J050B3			
60		SDS120J060H3	SDS120J060G3			SDS120J060B3			
60*2						SDS120J060B3			
80*2						SDS120J080A			
100*2						SDS120J100A			

Industry application

$I_F(A)$	TO220-2L	TO247-2L	TO247-3L	TO252-2L	TO263-2L	Baredie	SOT-227	SMBF	SAPKG
1						ADS120J001B3			ADS120J001B3
5						ADS120J005D3			ADS120J005B3
20	ADS120J020C3	ADS120J020H3				ADS120J020B3			ADS120J020B3
50						ADS120J050B3			ADS120J050B3

Automotive application

More Series Coming Soon...

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