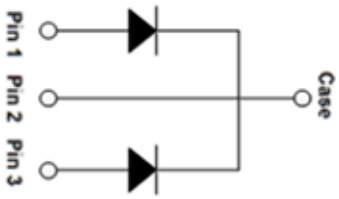
3rd Generation 650V/20A SiC Schottky Barrier Diode

Features

- AEC-Q101 qualified
- Revolutionary semiconductor material - Silicon Carbide (SiC)
- No reverse recovery
- High-speed switching performance
- Temperature-independent switching behavior
- System cost / size savings due to reduced cooling requirements
- Junction temperature range from -55℃ to 175℃
- RoHS compliant



Package Type: TO-247-3L

Potential Applications

- DC/DC converter for EV/HEV
- On board charger (OBC)

AEC-Q101

Description

The ADS065J020G3 SiC Schottky Barrier Diode (SBD) has been developed using Sanan's advanced 3rd generation SiC SBD technology with the highest performance and reliability. It registers higher efficiency, higher operation temperature and lower loss and can be operated at higher frequency than Si-based solutions. As to the Schottky structure, it shows no recovery at turn-off and allows a low leakage current with reverse voltage up to 650V. It can contribute to system miniaturization and achieve lightweight system design. Using RoHS compliant components and being AEC-Q101 qualified, it is qualified for use in automotive application.

Product Specifications

Device	V_{RRM}	I_F (135℃)	V_F (25℃)	Q_C	Marking
ADS065J020G3	650V	30A**	1.30V	29nC*	DS065020G3

Note: * per leg, ** per device

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Table 1. Maximum Ratings

(Tc = 25℃, unless otherwise specified)

Parameter	Symbol	Value	Unit	Test conditions
Repetitive peak reverse voltage	V_{RRM}	650	V	T_C = 25℃
Surge peak reverse voltage	V_{RSM}	650		T_C = 25℃
DC reverse voltage	V_{DC}	650		T_C = 25℃
Continuous forward current	I_F	30*/60**	A	T_C = 25℃
		15*/30**		T_C = 135℃
		10*/20**		T_C = 153℃
Surge non-repetitive forward current	I_{FSM}	80*	A	T_C = 25℃, t_p = 10ms, half sine pulse
Non-repetitive peak forward current	$I_{F,Max}$	500*	A	T_C = 25℃, t_p = 10μs, pulse
Surge repetitive forward current	I_{FRM}	54*	A	T_C = 25℃, t_p = 10ms, half sine wave D = 0.1
Power dissipation	P_{tot}	119*	W	T_C = 25℃
i^2t value	$\int i^2dt$	32*	A^2s	T_C = 25℃, t_p = 10ms
Operating junction temperature	T_j	-55~175	℃	
Storage temperature	T_{stg}	-55~175	℃	
Mounting torque	M	1	Nm	M3 screw

Note: * per leg, ** per device

Table 2. Thermal Resistance

Parameter	Symbol	Values			Unit	Test condition
		Min.	Typ.	Max.		
Thermal resistance from junction to case	$R_{th(j-c)}$	/	1.26*/0.63**	/	℃/W	

Note: * per leg, ** per device

Table 3. Static Electrical Characteristics (Per Leg)

(T_j = 25℃, unless otherwise specified)

Parameter	Symbol	Values			Unit	Test conditions
		Min.	Typ.	Max.		
DC blocking voltage	V_{DC}	650	/	/	V	I_R = 100 μA
Forward voltage	V_F	/	1.30	1.50	V	I_F = 10A, T_j = 25℃
		/	1.55	1.80		I_F = 10A, T_j = 175℃
Reverse current	I_R	/	1	30	μA	V_R = 650V, T_j = 25℃
		/	3	80		V_R = 650V, T_j = 175℃

Table 4. Dynamic Electrical Characteristics (Per Leg)

(T_j = 25℃, unless otherwise specified)

Parameter	Symbol	Values			Unit	Test conditions
		Min.	Typ.	Max.		
Total capacitance	C	/	556	/	pF	V_R = 0V, f = 1MHz
		/	55	/		V_R = 200V, f = 1MHz
		/	45	/		V_R = 400V, f = 1MHz
Total capacitive charge	Q_C	/	29	/	nC	V_R = 400V
Capacitance stored energy	E_C	/	4.3	/	μJ	V_R = 400V

Electrical Characteristic Diagrams

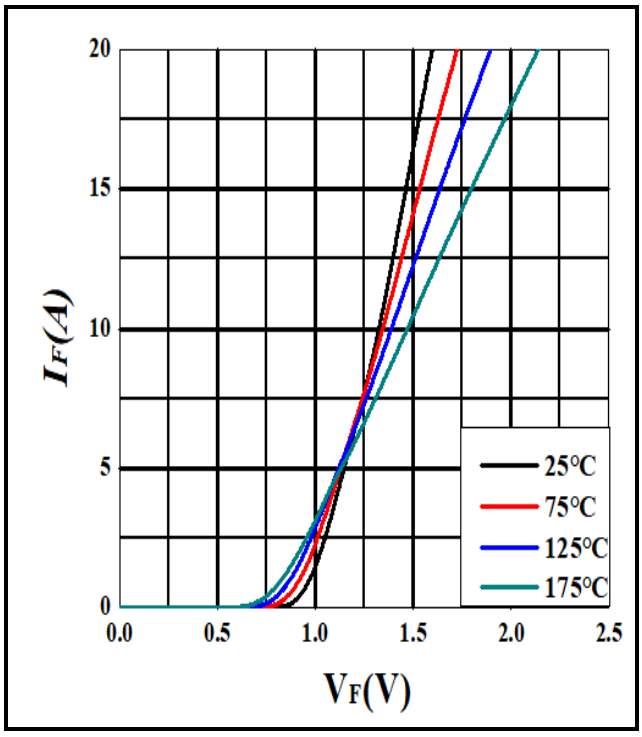


Figure 1. Forward characteristics

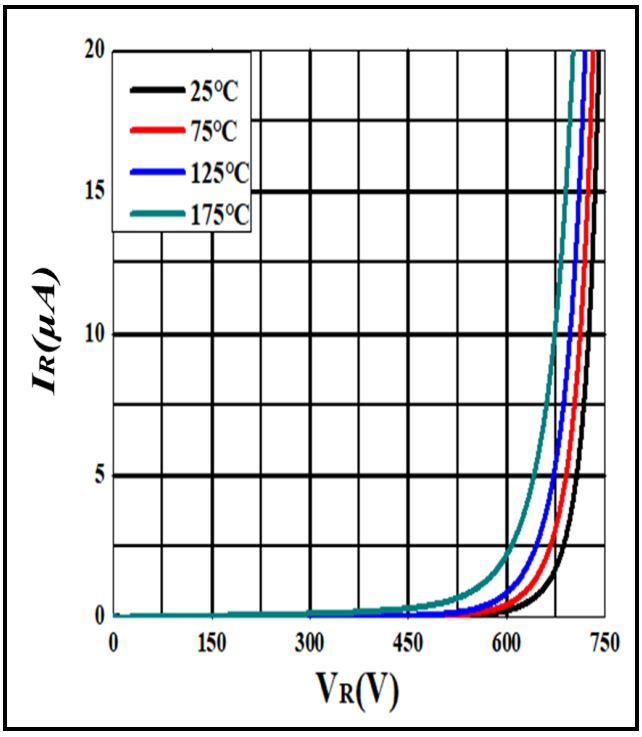


Figure 2. Reverse characteristics

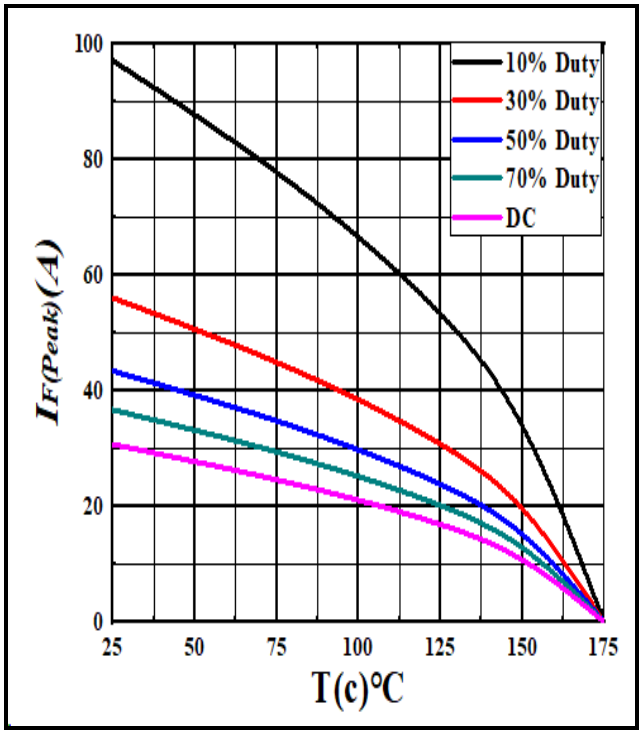


Figure 3. Current derating

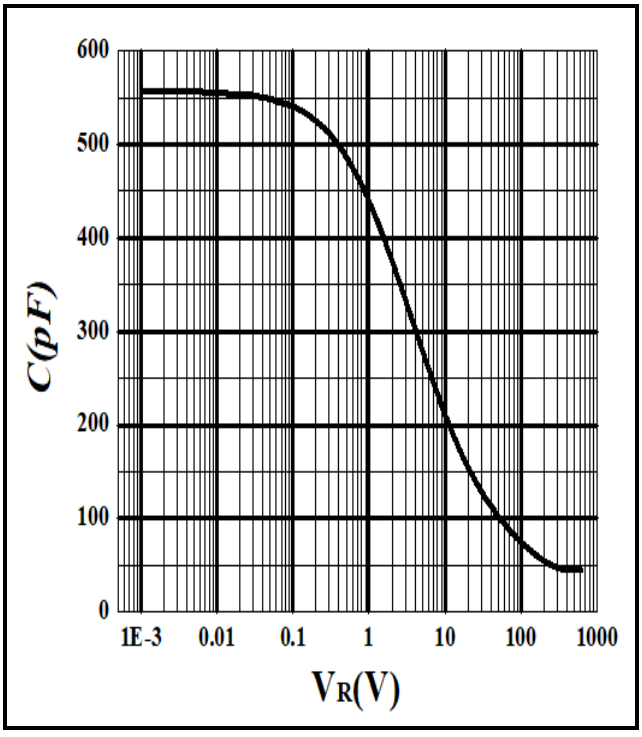


Figure 4. Capacitance vs. reverse voltage

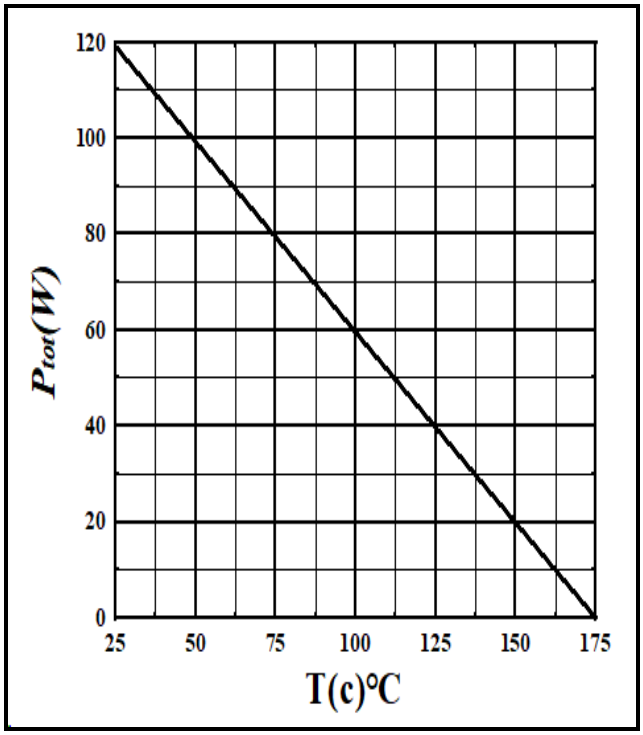


Figure 5. Power derating

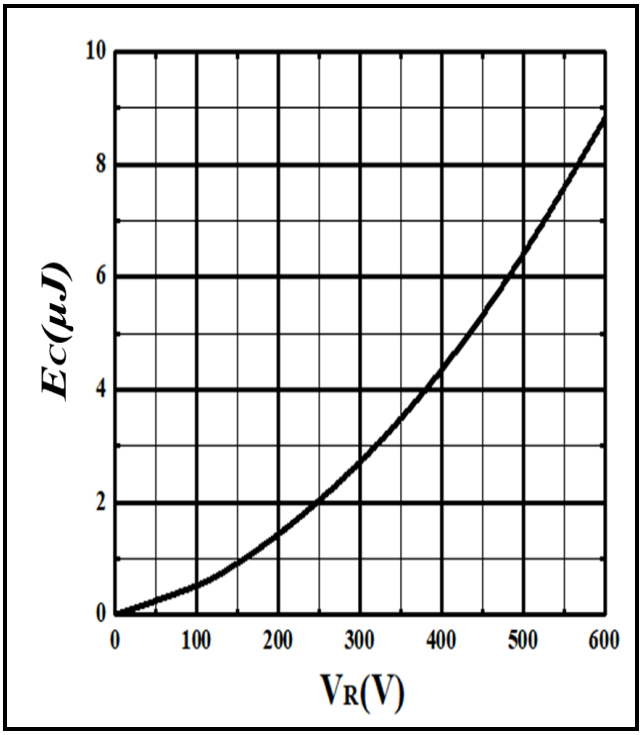


Figure 6. Capacitance stored energy

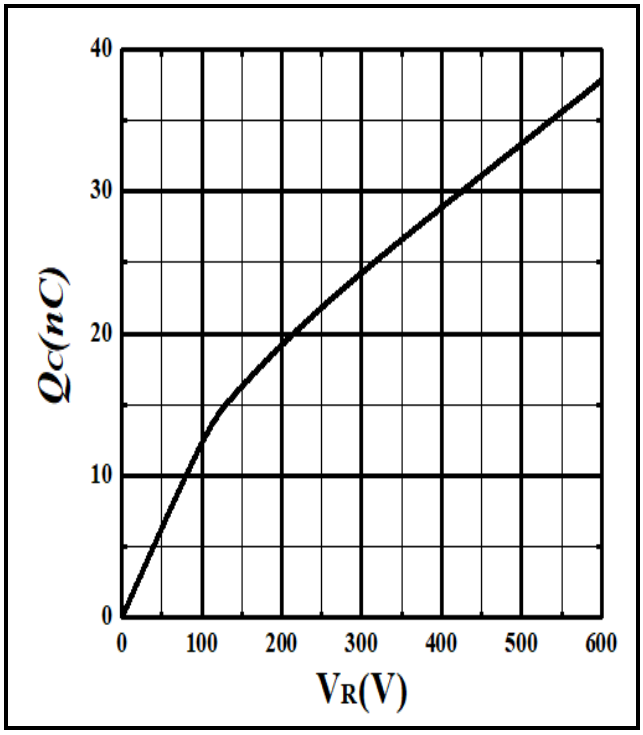


Figure 7. Total capacitance charge vs. reverse voltage

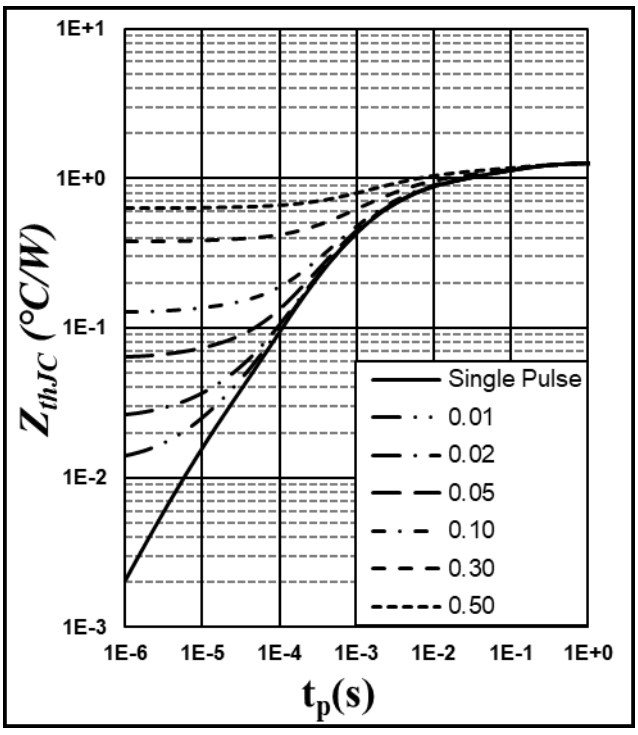
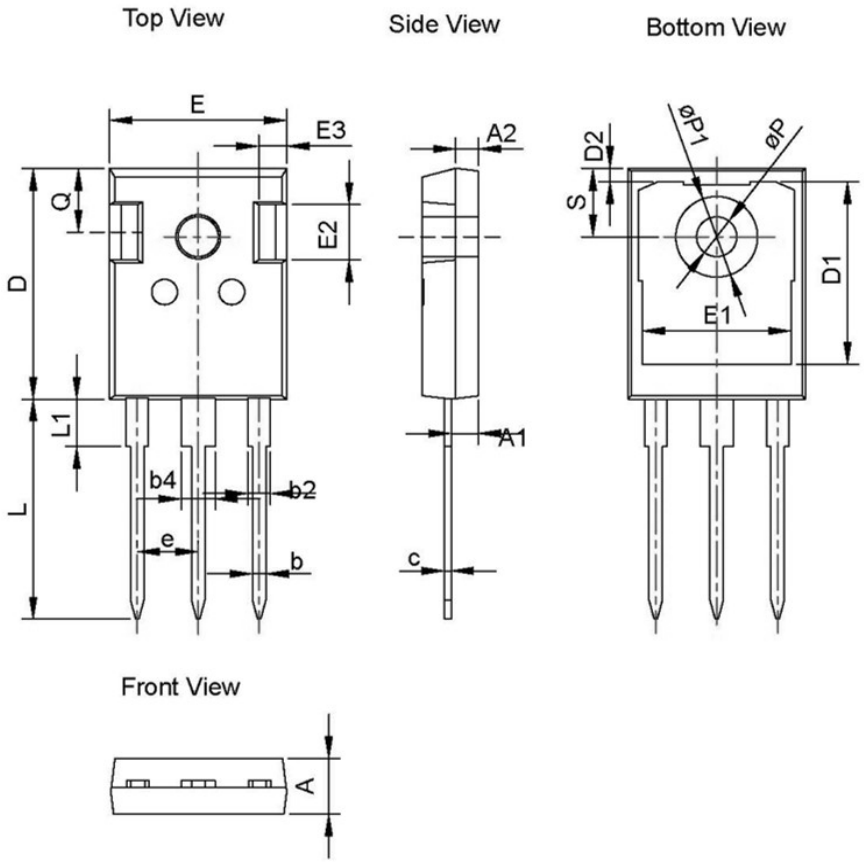


Figure 8. Transient Thermal Impedance (Junction-Case)

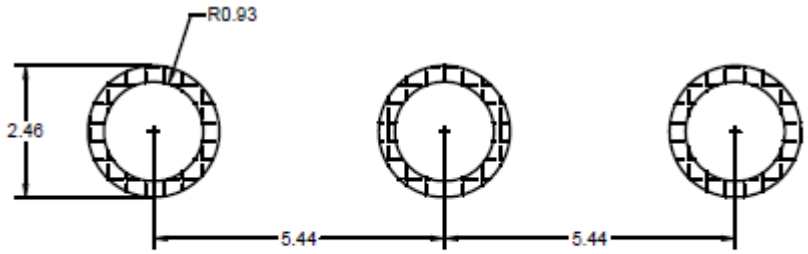
Package Information



Dimension unit: [mm]			
Symbol	Min	Nom	Max
A	4.80	5.00	5.20
A1	2.21	2.41	2.61
A2	1.85	2.00	2.15
b	1.11	1.21	1.36
b2	1.91	2.01	2.21
b4	2.91	3.01	3.21
c	0.51	0.60	0.75
D	20.70	21.00	21.30
D1	16.25	16.55	16.85
D2	1.00	1.20	1.35
E	15.50	15.80	16.10
E1	13.00	13.30	13.60
E2	4.80	5.00	5.20
E3	2.30	2.50	2.70
e	5.44 BSC		
L	19.62	19.92	20.22
L1	-	-	4.30
øP	3.40	3.60	3.80
øP1	-	-	7.30
Q	5.40	5.80	6.20
S	6.20 BSC		

Recommended Solder Pad Layout

Note: All dimensions are in mm



TO-247-3L

Ordering Information

Part number	ADS065J020G3-ASATH
Package	TO-247-3L
Unit quantity	300 EA
Packing type	Tube

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