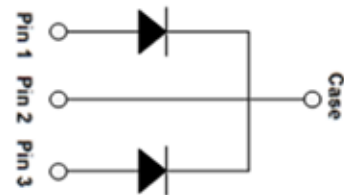


# 3<sup>rd</sup> Generation 650V/40A SiC Schottky Barrier Diode

## Features

- 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°C to 175°C
- RoHS compliant



Package Type: TO-247-3L

## Potential Applications

- Industrial power supplies: Industrial UPS
- Battery chargers
- Solar inverters
- Switch mode power supplies



## Description

The SDS065J040G3 SiC Schottky Barrier Diode (SBD) has been developed using Sanan’s advanced 3<sup>rd</sup> 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, it is qualified for use in industrial application.

## Product Specifications

Device	V <sub>RRM</sub>	I <sub>F</sub> (135°C)	V <sub>F</sub> (25°C)	Q <sub>c</sub>	Marking
SDS065J040G3	650V	50A**	1.35V	55nC*	DS065040G3

Note: \* per leg, \*\* per device

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**Table 1. Maximum Ratings**

(T<sub>c</sub> = 25°C, unless otherwise specified)

Parameter	Symbol	Value	Unit	Test conditions
Repetitive peak reverse voltage	V <sub>RRM</sub>	650	V	T <sub>C</sub> = 25°C
Surge peak reverse voltage	V <sub>RSM</sub>	650		T <sub>C</sub> = 25°C
DC reverse voltage	V <sub>DC</sub>	650		T <sub>C</sub> = 25°C
Continuous forward current	I <sub>F</sub>	51*/102**	A	T <sub>C</sub> = 25°C
		25*/50**		T <sub>C</sub> = 135°C
		20*/40**		T <sub>C</sub> = 150°C
Surge non-repetitive forward current	I <sub>FSM</sub>	140*	A	T <sub>C</sub> = 25°C, t <sub>p</sub> = 10ms, half sine pulse
<b>Non-repetitive peak forward current</b>	<b>I<sub>F,Max</sub></b>	<b>900*</b>	<b>A</b>	<b>T<sub>C</sub> = 25°C, t<sub>p</sub> = 10μs, pulse</b>
Surge repetitive forward current	I <sub>FRM</sub>	96*	A	T <sub>C</sub> = 25°C, t <sub>p</sub> = 10ms, half sine wave D = 0.1
Power dissipation	P <sub>tot</sub>	178*	W	T <sub>C</sub> = 25°C
i <sup>2</sup> t value	∫i <sup>2</sup> dt	98*	A <sup>2</sup> s	T <sub>C</sub> = 25°C, t <sub>p</sub> = 10ms
Operating junction temperature	T <sub>j</sub>	-55~175	°C	
Storage temperature	T <sub>stg</sub>	-55~175	°C	
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 <sub>th(j-c)</sub>	/	0.84*/0.42**	/	°C/W	

Note: \* per leg, \*\* per device

**Table 3. Static Electrical Characteristics (Per Leg)**

(T<sub>j</sub> = 25°C, unless otherwise specified)

Parameter	Symbol	Values			Unit	Test conditions
		Min.	Typ.	Max.		
DC blocking voltage	V <sub>DC</sub>	650	/	/	V	I <sub>R</sub> = 100 μA
Forward voltage	V <sub>F</sub>	/	1.35	1.50	V	I <sub>F</sub> = 20A, T <sub>j</sub> = 25°C
		/	1.70	1.90		I <sub>F</sub> = 20A, T <sub>j</sub> = 175°C
Reverse current	I <sub>R</sub>	/	2	40	μA	V <sub>R</sub> = 650V, T <sub>j</sub> = 25°C
		/	10	100		V <sub>R</sub> = 650V, T <sub>j</sub> = 175°C

**Table 4. Dynamic Electrical Characteristics (Per Leg)**

(T<sub>j</sub> = 25°C, unless otherwise specified)

Parameter	Symbol	Values			Unit	Test conditions
		Min.	Typ.	Max.		
Total capacitance	C	/	1018	/	pF	V <sub>R</sub> = 0V, f = 1MHz
		/	104	/		V <sub>R</sub> = 200V, f = 1MHz
		/	89	/		V <sub>R</sub> = 400V, f = 1MHz
Total capacitive charge	Q <sub>C</sub>	/	55	/	nC	V <sub>R</sub> = 400V
Capacitance stored energy	E <sub>C</sub>	/	8.3	/	μJ	V <sub>R</sub> = 400V

**Electrical Characteristic Diagrams (Per Leg)**

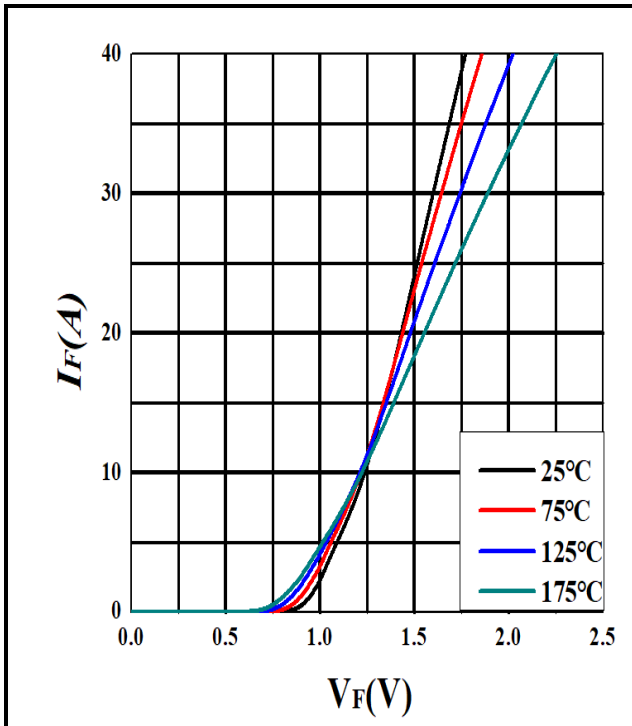


Figure 1. Forward characteristics

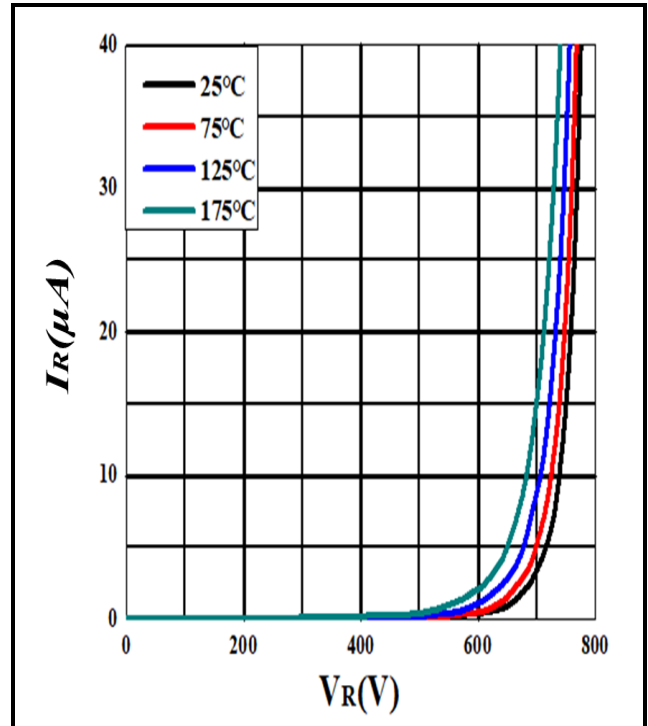


Figure 2. Reverse characteristics

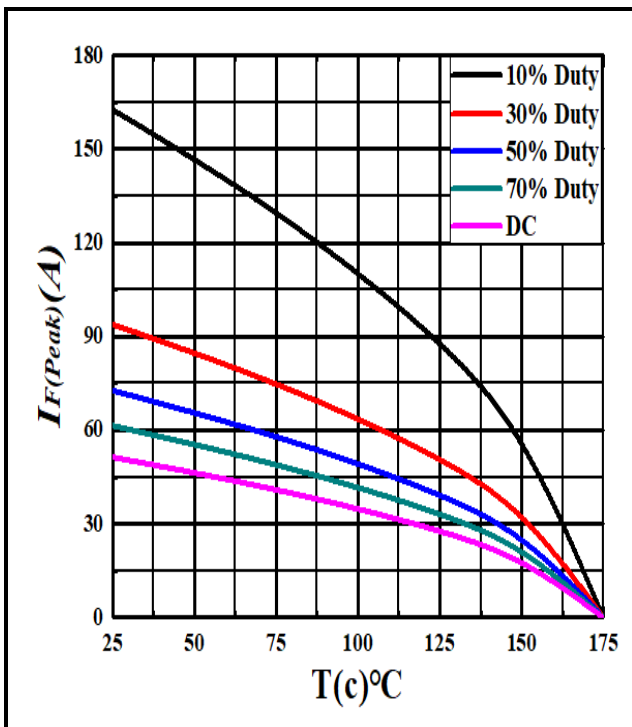


Figure 3. Current derating

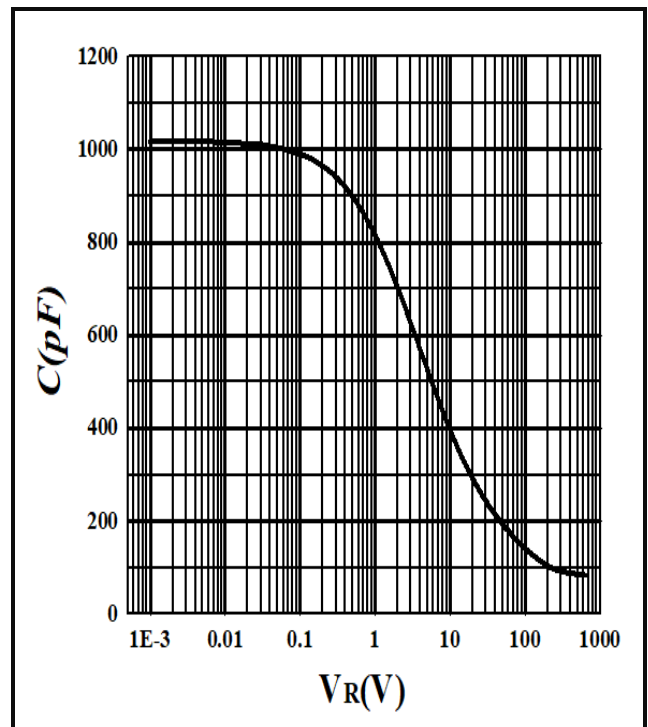


Figure 4. Capacitance vs. reverse voltage

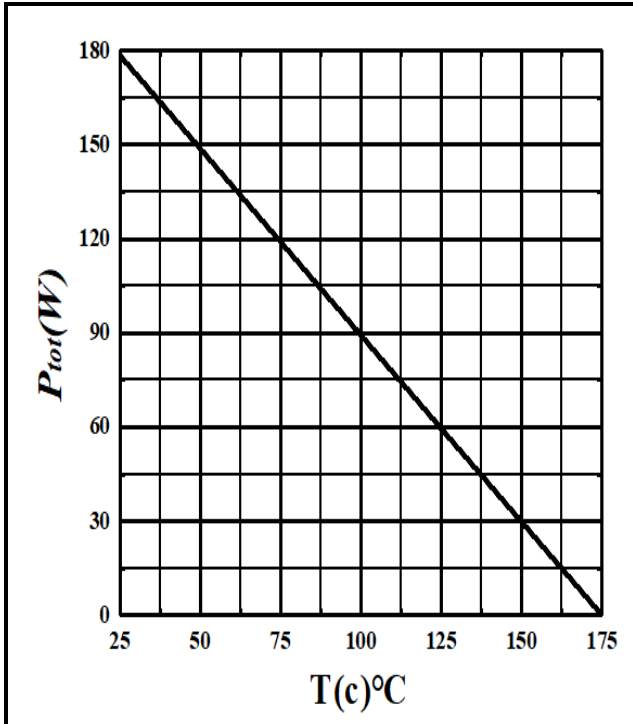


Figure 5. Power derating

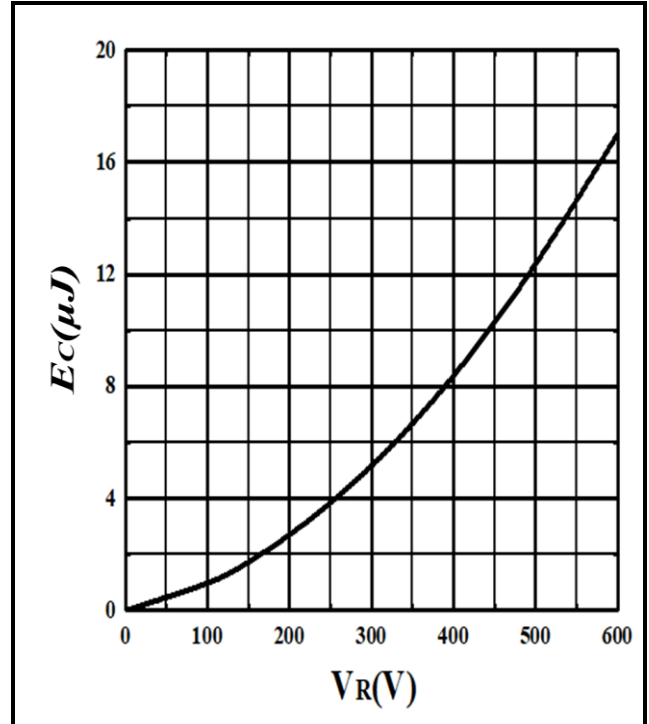


Figure 6. Capacitance stored energy

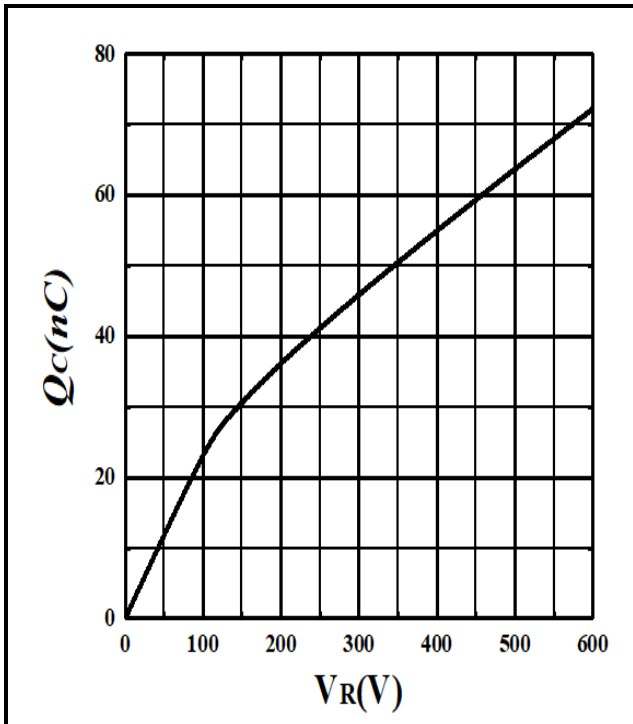


Figure 7. Total capacitance charge vs. reverse voltage

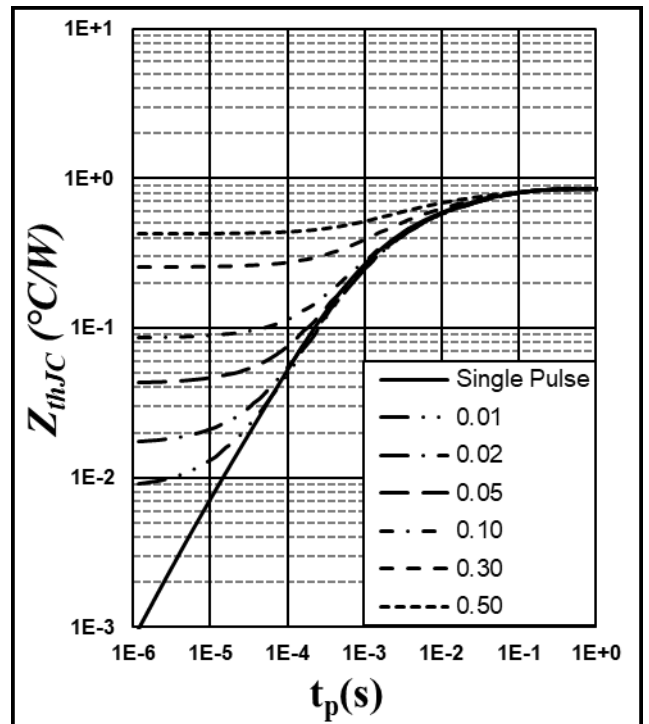
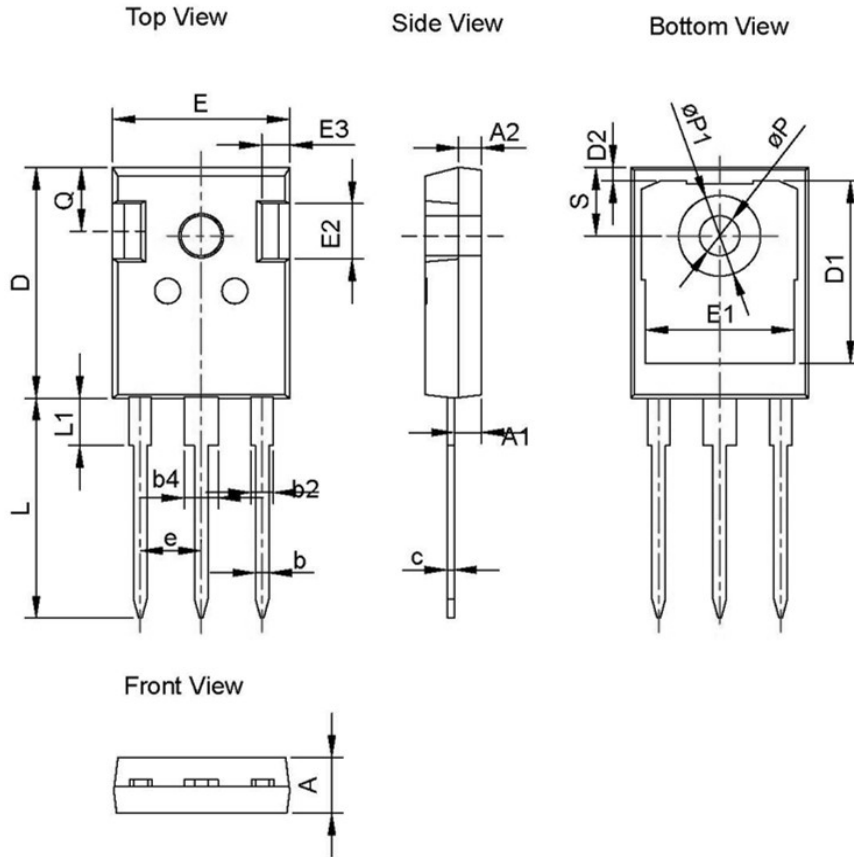


Figure 8. Transient Thermal Impedance  
(Junction-Case)

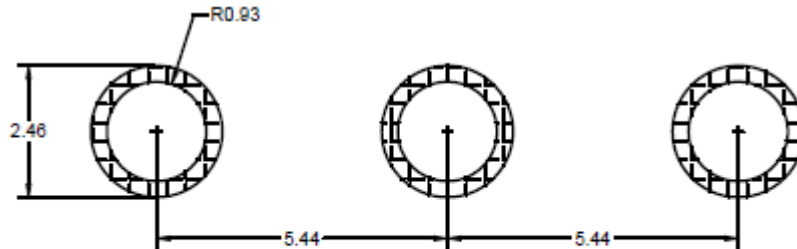
Package Information



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
$\phi P$	3.40	3.60	3.80
$\phi P1$	-	-	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	SDS065J040G3-ISATH
Package	TO-247-3L
Unit quantity	300 EA
Packing type	Tube



## Important Notices – Read Carefully

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