基本半导体
BASiC Semiconductor

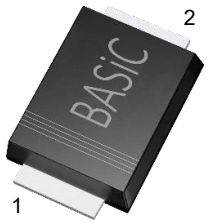
B2D04065V1

SiC Schottky Diode

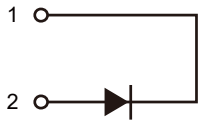
Product Summary

V_{RRM}	650 V
I_F (T_C=135°C)	4 A
Q_C	12 nC

Package: SMBF



Electrical Connection



Features

- Extremely low reverse current
- No reverse recovery current
- Temperature independent switching
- Positive temperature coefficient on V_F
- Excellent surge current capability
- Low capacitive charge

Benefits

- Essentially no switching losses
- System efficiency improvement over Si diodes
- Increased power density
- Enabling higher switching frequency
- Reduction of heat sink requirements
- System cost savings due to smaller magnetics
- Reduced EMI

Applications

- Switch mode power supplies (SMPS)
- Uninterruptible power supplies
- Motor drivers
- Power factor correction

Package Pin Definitions

- Pin1 - Cathode
- Pin2 - Anode

Package Parameters

Part Number	Marking	Package
B2D04065V1	2465	SMBF

Maximum Ratings (T_c=25℃ unless otherwise specified)

Symbol	Parameter	Test conditions	Value	Unit
V_{RRM}	Repetitive peak reverse voltage		650	V
V_{RSM}	Non-repetitive peak reverse voltage		650	V
I_F	Continuous forward current	T_{Case}=25℃ (1)	10	A
		T_{PCB}=25℃ (2)	6	
		T_{Case}=135℃ (1)	4	
		T_{PCB}=100℃ (2)	4	
I_{FSM}	Non-repetitive forward surge current	T_C=25℃, t_p=10ms, Half sine wave	32	A
$\int i^2dt$	i²t value	T_C=25℃, t_p=10ms	5.12	A²S
$P_{tot(case)}$ (1)	Power dissipation	T_C=25℃ T_C=110℃	25 10	W
$P_{tot(PCB)}$ (2)	Power dissipation	T_C=25℃ T_C=110℃	12 5	W
T_j	Operating junction temperature		-55~175	°C
T_{stg}	Storage temperature		-55~175	°C

(1) This value is rated according to $R_{th(case)}$
(2) This value is rated according to $R_{th(PCB)}$

Thermal Characteristics

Symbol	Parameter	Value			Unit
		Min.	Typ.	Max.	
$R_{th(case)}$	Thermal resistance from junction to case		6		K/W
$R_{th(PCB)}$ (1)	Thermal resistance from junction to PCB		12.13		K/W

(1) When mounted on a 1-inch² FR-4, 2 Oz copper board, t < 10 s

Electrical Characteristics
Static Characteristics

Symbol	Parameter	Test conditions	Value			Unit
			Min.	Typ.	Max.	
V_{DC}	DC blocking voltage	T_j=25℃	650			V
V_F	Diode forward voltage	I_F=4A T_j=25℃ I_F=4A T_j=175℃		1.31 1.5	1.6 2	V
I_R	Reverse current	V_R=650V T_j=25℃ V_R=650V T_j=175℃		1 10	60 100	μA

AC Characteristics

Symbol	Parameter	Test conditions	Value			Unit
			Min.	Typ.	Max.	
Q_C	Total capacitive charge	V_R=400V T_j=25°C $Q_C=\int_0^{V_R} C(V)dV$		12		nC
C	Total capacitance	V_R=1V f=1MHz V_R=300V f=1MHz V_R=600V f=1MHz		183 21 20.5		pF
E_C	Capacitance stored energy	V_R=400V		3		μJ

Typical Performance

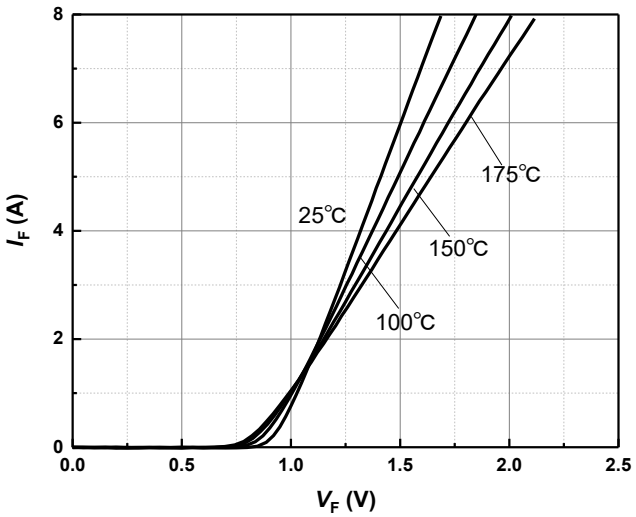


Figure 1 Typical forward characteristics

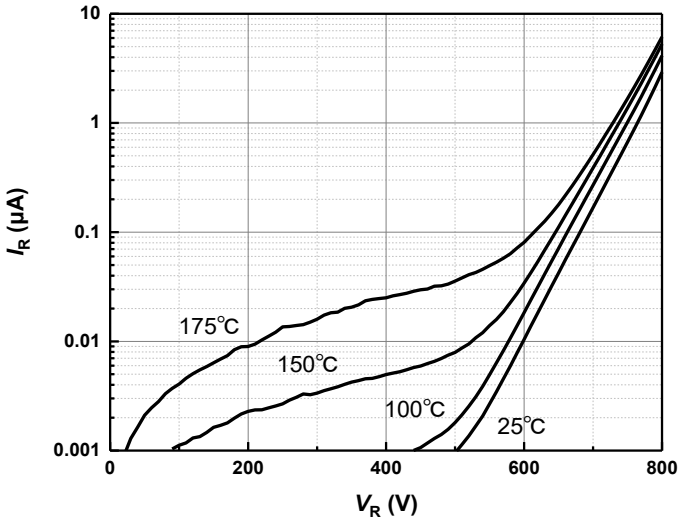


Figure 2 Typical reverse current as function of reverse voltage

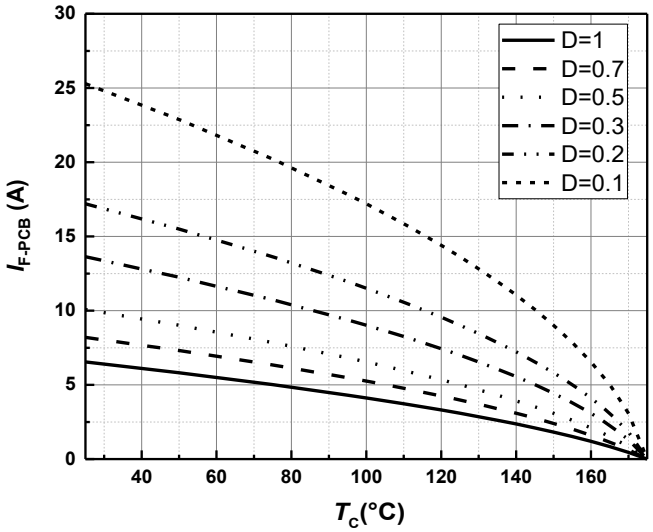


Figure 3 Diode forward current ($I_{F\text{-}PCB}$) as function of temperature, D=duty cycle

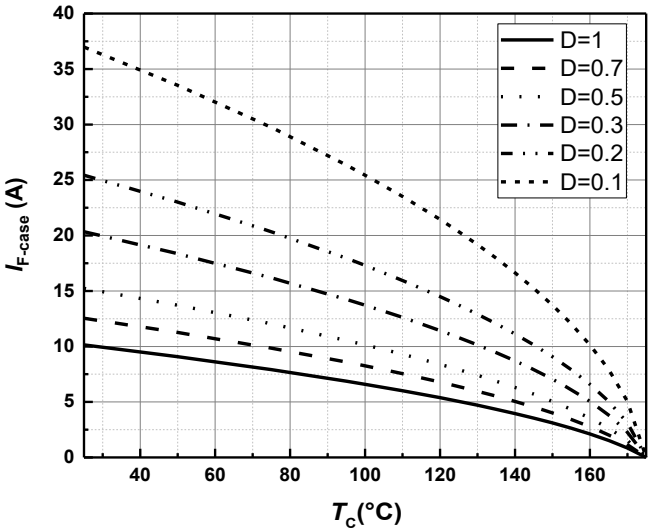


Figure 4 Diode forward current ($I_{F\text{-}case}$) as function of temperature, D=duty cycle

Typical Performance

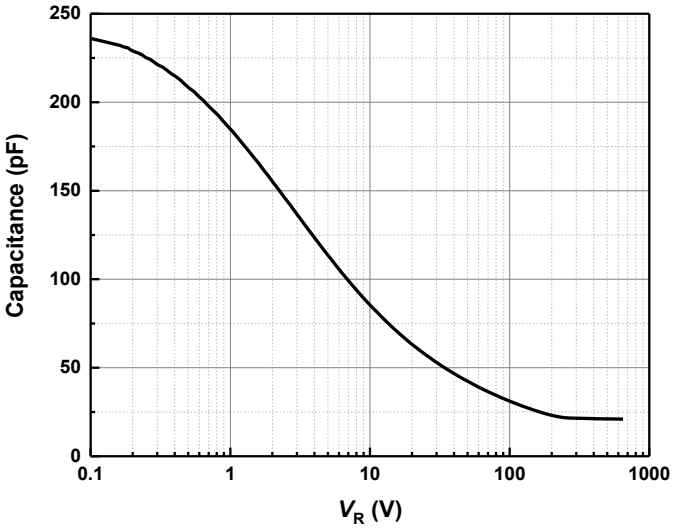


Figure 5 Typical capacitance as function of reverse voltage, C=f(V_R); T_j=25°C; f=1 MHz

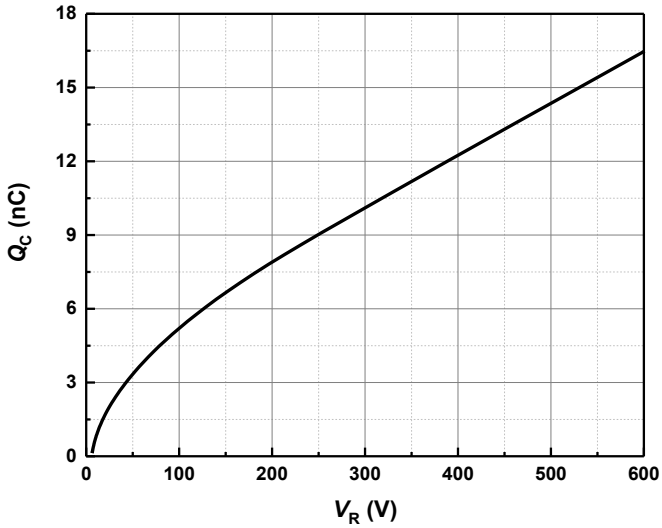


Figure 6 Typical reverse charge as function of reverse voltage

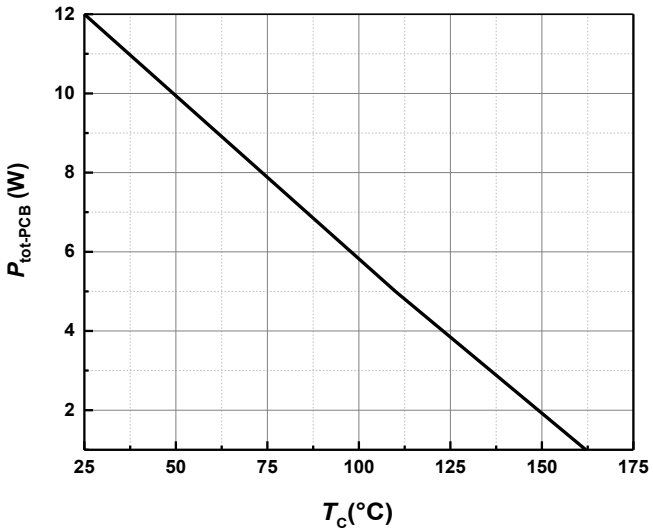


Figure 7 Power dissipation ($P_{tot-PCB}$) as function of case temperature

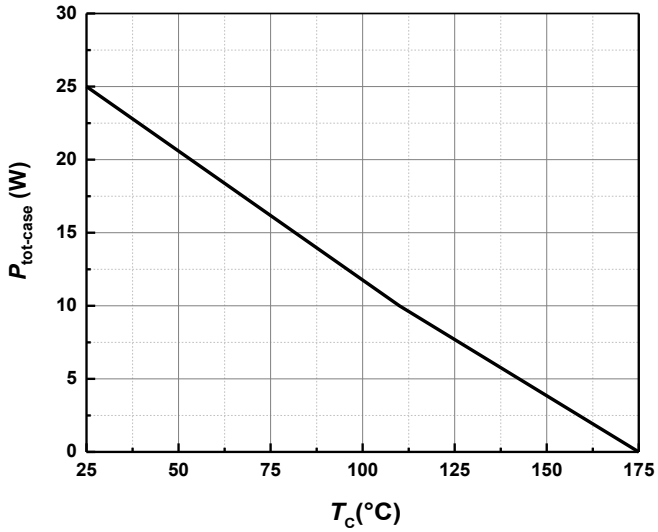


Figure 8 Power dissipation ($P_{tot-case}$) as function of case temperature

Typical Performance

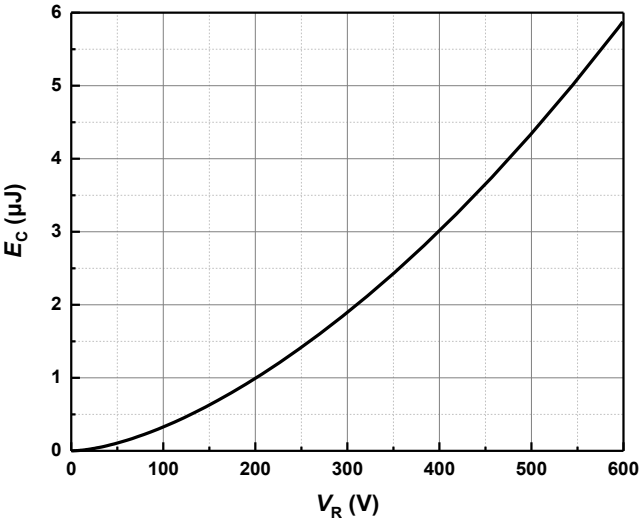


Figure 9 Capacitance stored energy

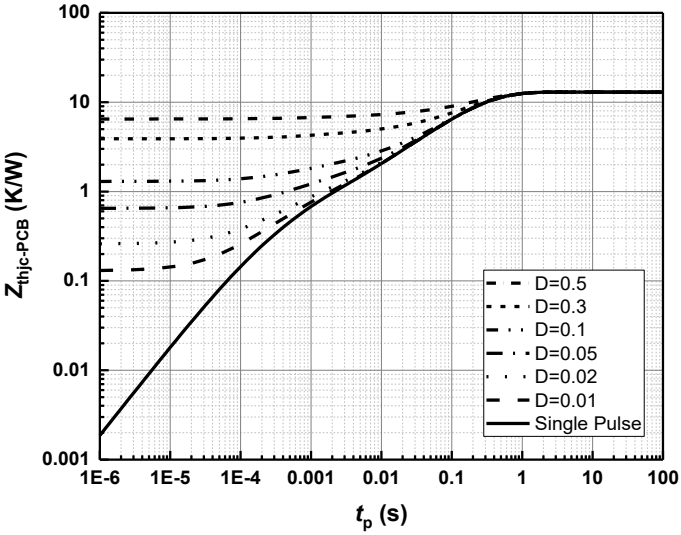


Figure 10 Max. transient thermal impedance, $Z_{thjc-PCB}$= f(t), parameter: $D = t / T$

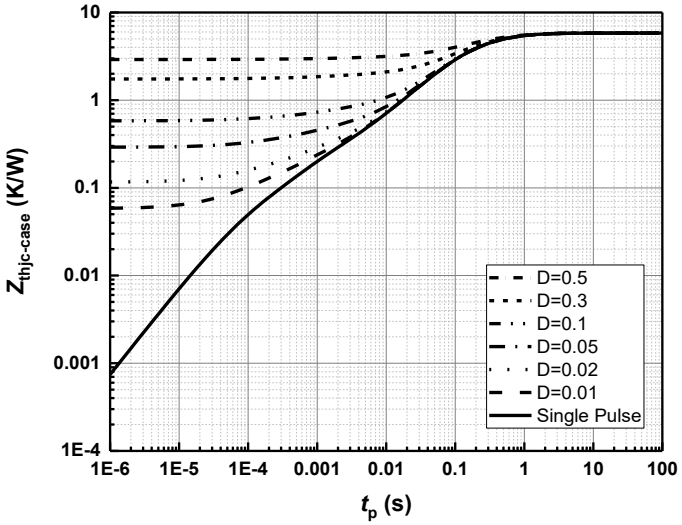
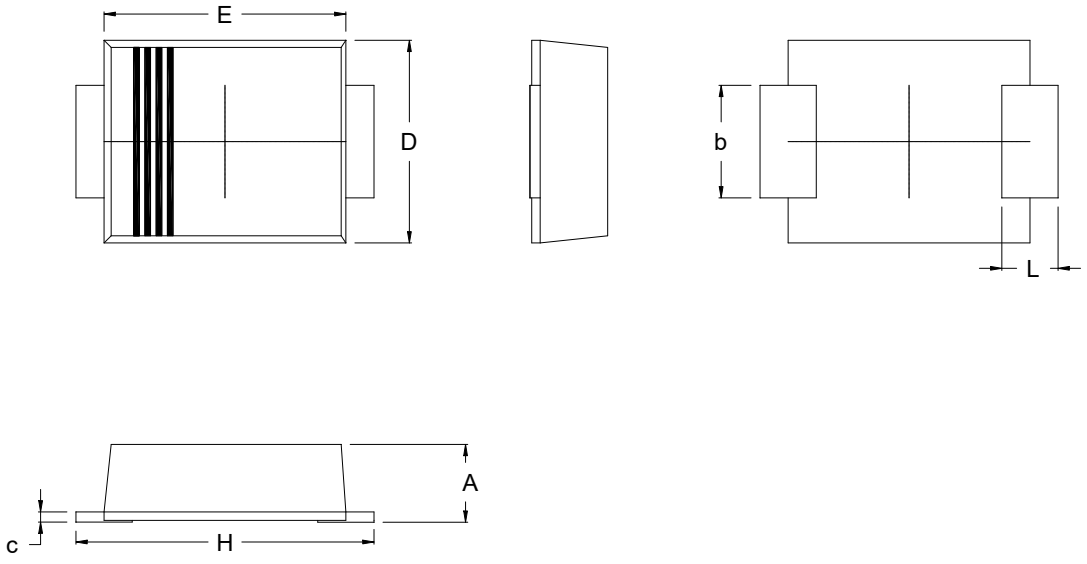


Figure 11 Max. transient thermal impedance, $Z_{thjc-case}$= f(t), parameter: $D = t / T$

Package Dimensions



SYMBOL	mm		
	MIN	NOM	MAX
A	1.30	1.35	1.40
b	1.98	2.00	2.02
c	0.12	0.15	0.18
D	3.55	3.60	3.65
E	4.25	4.30	4.35
H	5.20	5.30	5.40
L	0.70	-	1.02

Revision History

Document Version	Date of Release	Description of Changes
Rev 0.0	2022-07-22	Release of the preliminary datasheet.

Information

For further information on technology, delivery terms and conditions and prices, please contact the nearest BASiC Semiconductor Office

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