基本半导体
BASiC Semiconductor

B2D04065K1

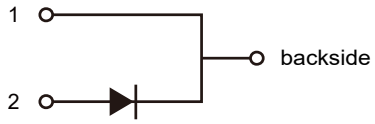
SiC Schottky Diode

Product Summary

V_{RRM}	650 V
I_F (T_C=150°C)	4 A
Q_C	14 nC

Package: TO-220-2

Electrical Connection



Features

- Low leakage current (I_R)
- Zero reverse recovery current
- Temperature independent switching behavior
- Positive temperature coefficient on V_F
- High surge current capacity
- Low capacitive charge

Benefits

- System cost savings due to smaller magnetics
- System efficiency improvement over Si diodes
- Reduction of heat sink requirements
- Enabling higher frequency
- Reduced EMI

Applications

- Switch mode power supplies (SMPS)
- Uninterruptible power supplies
- Server/telecom power supplies
- Power factor correction
- Solar

Package Pin Definitions

- Pin1 and backside - Cathode
- Pin2 - Anode

Package Parameters

Part Number	Marking	Package
B2D04065K1	B2D04065K1	TO-220-2

Packing Quantities

Tube Packing	PCS/Tube	Tube/Box	PCS/Box
TO-220-2	50	10	500

Maximum Ratings (T_C=25°C 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_C=25°C T_C=150°C	18 4	A
I_{FSM}	Non-repetitive forward surge current	T_C=25°C, t_p=10ms Half sine wave	34	A
		T_C=110°C, t_p=10ms Half sine wave	30	
$I_{F, Max}$	Non-repetitive peak forward current	T_C=25°C, t_p=10us, pulse T_C=110°C, t_p=10us, pulse	330 300	A
$\int i^2dt$	i^2t value	T_C=25°C, t_p=10ms	5	A^2S
P_{tot}	Power dissipation	T_C=25°C T_C=110°C	91 39	W
T_j	Operating junction temperature		-55~175	°C
T_{stg}	Storage temperature		-55~175	°C
	TO-220 mounting torque	M3 Screw	0.7	Nm

Thermal Characteristics

Symbol	Parameter	Value			Unit
		Min.	Typ.	Max.	
$R_{th(jc)}$	Thermal resistance from junction to case		1.643		K/W

Electrical Characteristics
Static Characteristics

Symbol	Parameter	Test conditions	Value			Unit
			Min.	Typ.	Max.	
V_{DC}	DC blocking voltage	T_j=25°C	650			V
V_F	Diode forward voltage	I_F=4A T_j=25°C I_F=4A T_j=175°C		1.33 1.6	1.5 2.1	V
I_R	Reverse current	V_R=650V T_j=25°C V_R=650V T_j=175°C		1 20	70 200	μA

AC Characteristics

Symbol	Parameter	Test conditions	Value			Unit
			Min.	Typ.	Max.	
Q_C	Total capacitive charge	V_R=400V T_j=25°C $Q_C=\int_0^{VR} C(V)dV$		14		nC
C	Total capacitance	V_R=1V f=1MHz V_R=300V f=1MHz V_R=600V f=1MHz		183 26 25		pF
E_C	Capacitance stored energy	V_R=400V		3		μJ

Typical Performance

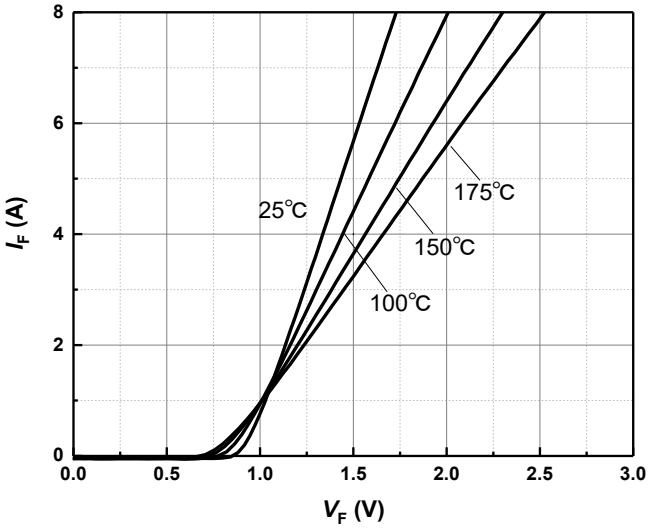


Figure 1 Typical forward characteristics

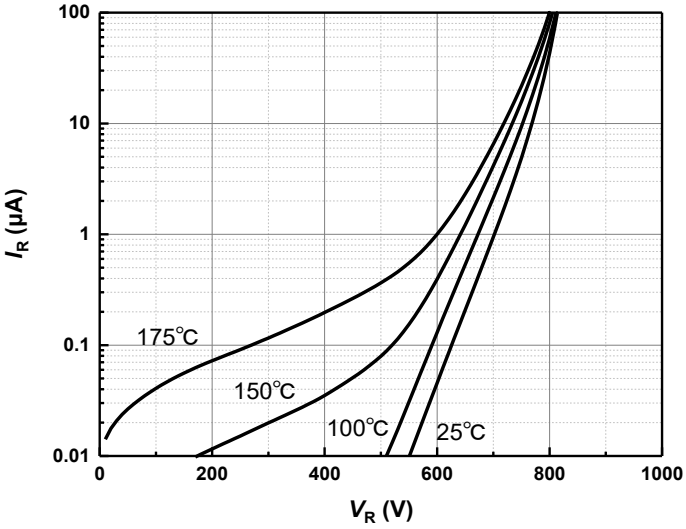


Figure 2 Typical reverse current as function of reverse voltage

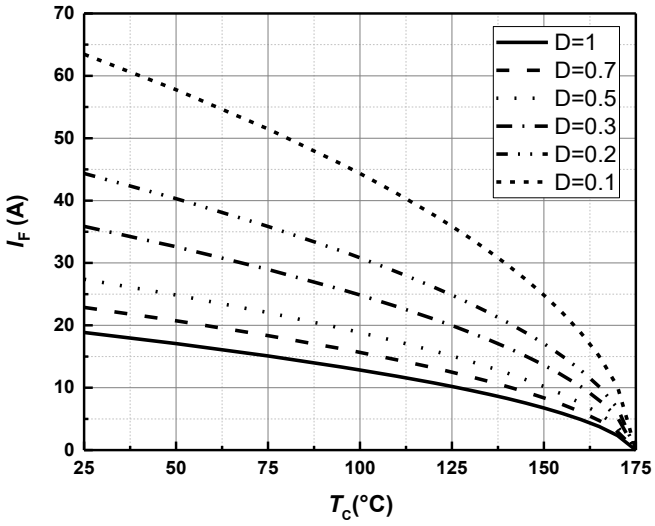


Figure 3 Diode forward current as function of temperature, D=duty cycle

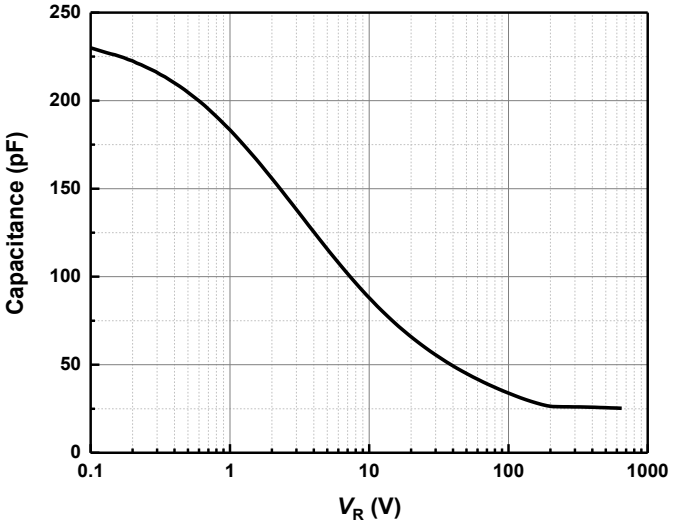


Figure 4 Typical capacitance as function of reverse voltage, C=f(V_R); T_j=25°C; f=1 MHz

Typical Performance

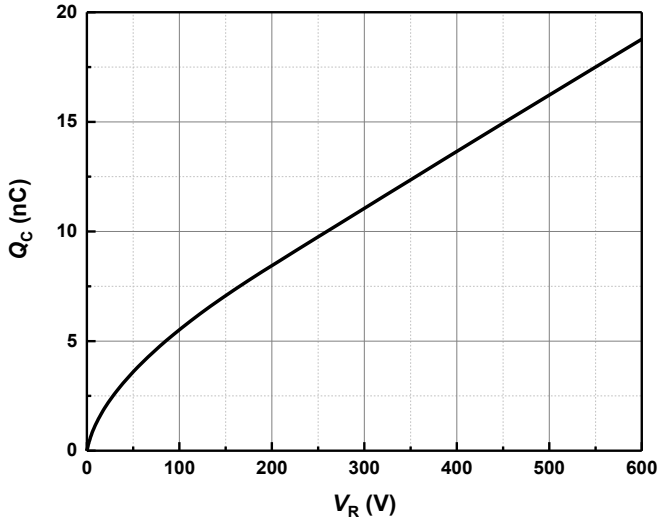


Figure 5 Typical reverse charge as function of reverse voltage

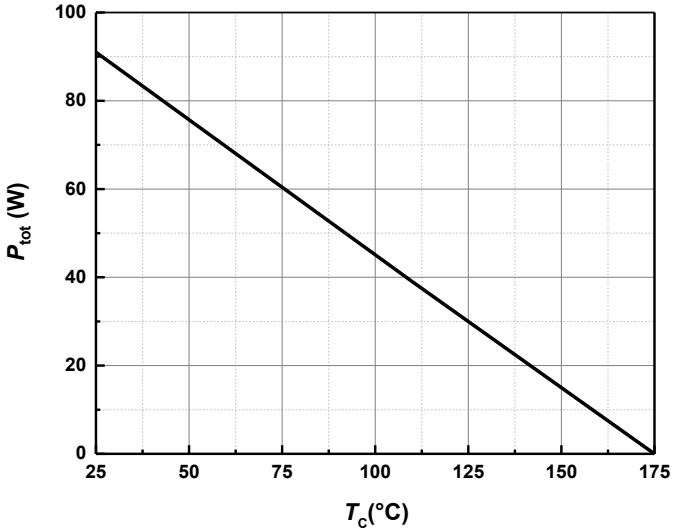


Figure 6 Power dissipation as function of case temperature

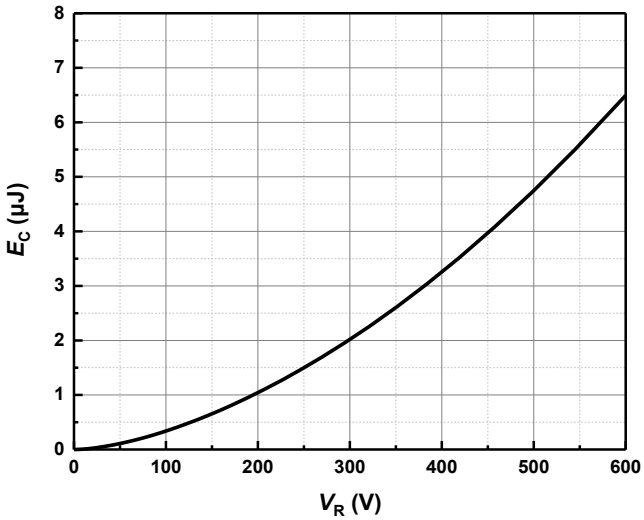


Figure 7 Capacitance stored energy

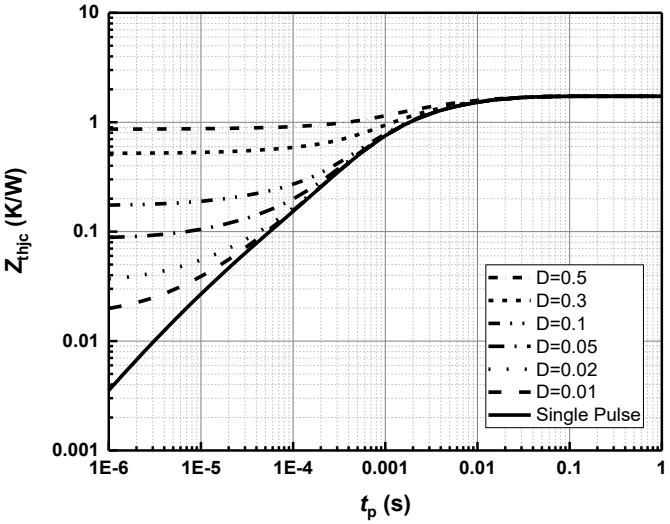


Figure 8 Max. transient thermal impedance, Z_{thjc}= f(t), parameter: $D = t / T$

Typical Performance

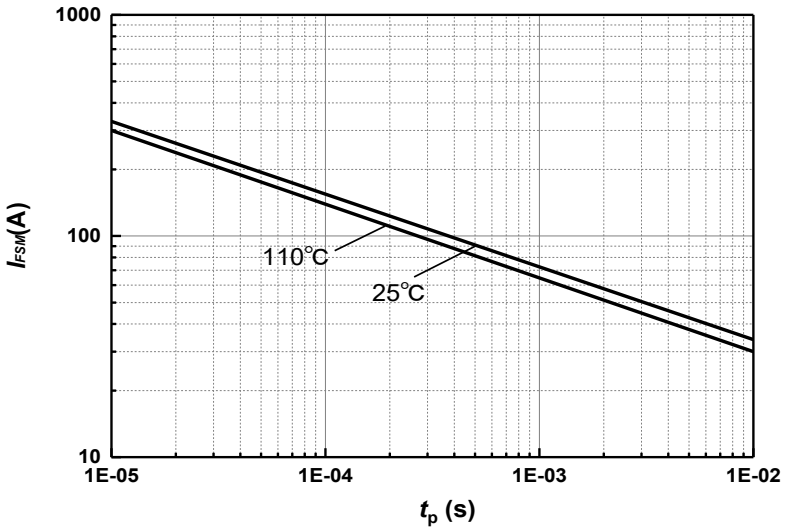
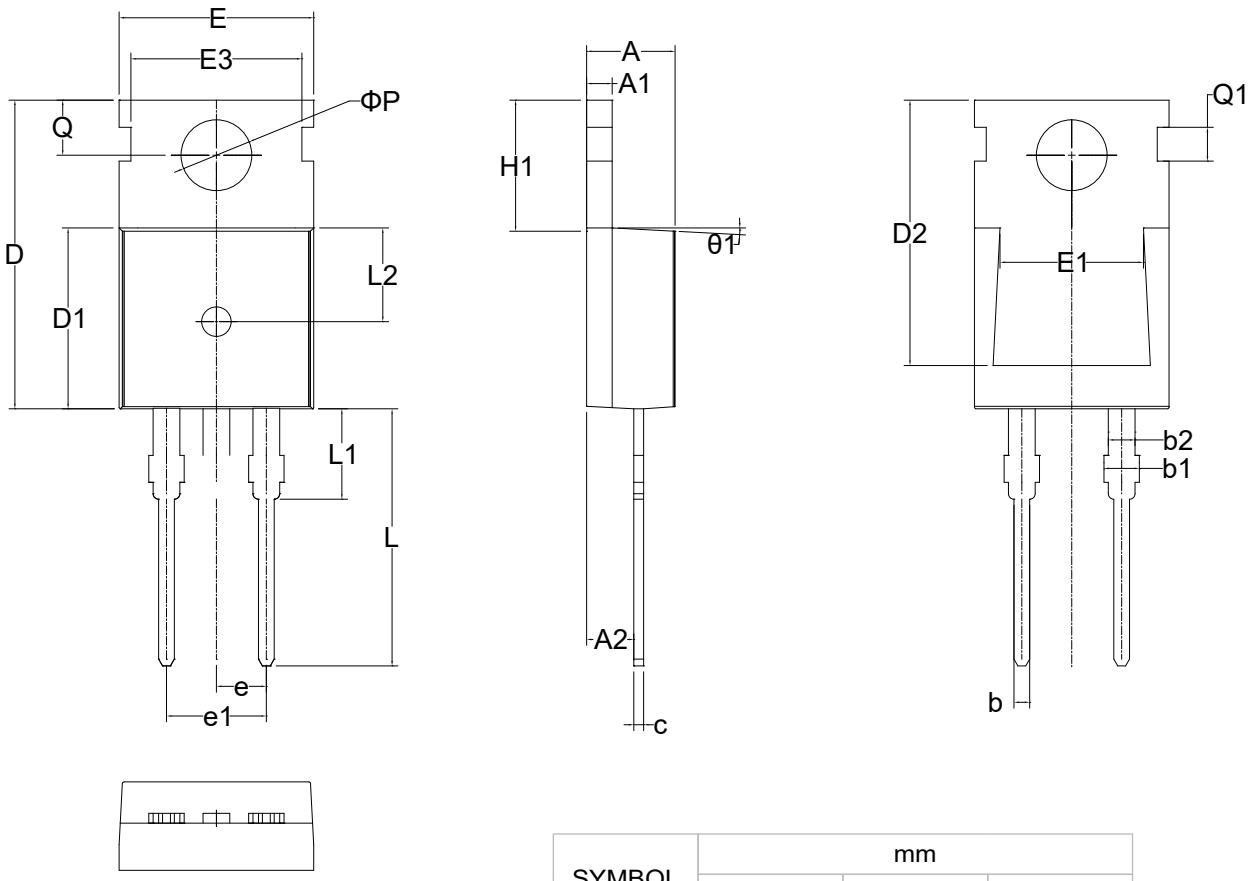


Figure 9 **Non-repetitive peak forward surge current versus pulse duration (sinusoidal waveform)**

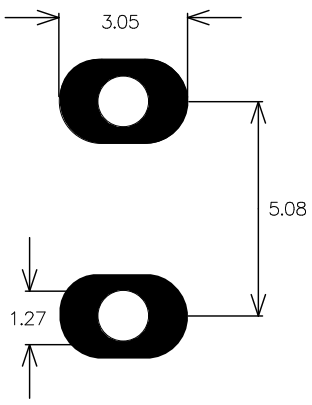
Package Dimensions



SYMBOL	mm		
	MIN	NOM	MAX
A	4.24	4.44	4.64
A1	1.15	1.27	1.40
A2	2.30	2.48	2.70
b	0.70	0.80	0.90
b1	1.20	1.55	1.75
b2	1.20	1.45	1.70
c	0.40	0.50	0.60
D	14.70	15.37	16.00
D1	8.82	8.92	9.02
D2	12.43	12.73	12.83
E	9.96	10.16	10.36
E1	6.86	7.77	8.89
E3	8.70REF		
e	2.44	2.54	2.64
e1	4.98	5.08	5.18
H1	6.30	6.45	6.60
L	13.47	13.72	13.97
L1	3.60	3.80	4.00
ΦP	3.75	3.84	3.93
Q	2.60	2.80	3.00
Q1	1.73REF		

REF：For reference only, no measurement is required.

Recommended Solder Pad Layout



all units are in millimeters.

Revision History

Document Version	Date of Release	Description of Changes
Rev.0.0	2021-11-22	Release of the datasheet.
Rev.0.1	2023-06-20	Characteristics updated.
Rev.0.2	2023-11-06	I_{FSM}, $I_{F, Max}$, Fig 9

Information

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

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