SiC Schottky Diode

V_{RRM} = **650 V**

I_F (T_C=155°C) = **4 A**

Q_C = **12 nC**

TO-252-2

CASE

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
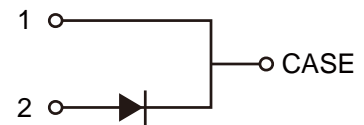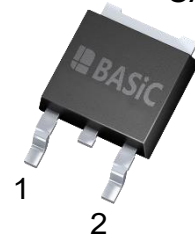- Power factor correction

Package Pin Definitions

- Pin1- Cathode
- Pin2- Anode

Package Parameters

Part Number	Marking	Package
B1D04065E	B1D04065E	TO-252-2

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_C=25°C T_C=155°C	14 4	A
I_{FSM}	Non-Repetitive forward surge current	T_C=25°C , t_p=10ms, Half Sine Wave	30	A
$\int i^2 dt$	i²t value	T_C=25°C ,t_p=10ms	4.5	A²S
P_{tot}	Power dissipation	T_C=25°C T_C=110°C	60 26	W
T_j	Operating junction temperature		-55~175	°C
T_{stg}	Storage temperature		-55~135	°C

Thermal Characteristics

Symbol	Parameter	Value			Unit
		Min.	Typ.	Max.	
$R_{th(jc)}$	Thermal resistance from junction to case		2.473		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		1.4 1.7		V
I_R	Reverse current	V_R=650V T_j=25°C V_R=650V T_j=175°C		1 10		µA

AC Characteristics

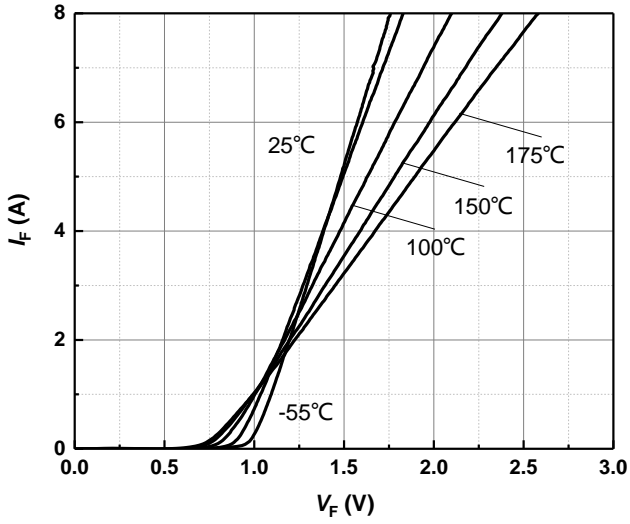| Symbol	Parameter	Test conditions	Value			Unit
			Min.	Typ.	Max.	
Q_C	Total capacitive charge	V_R=400V T_j=25°C $Q_c = \int_0^{VR} C(V)dV$		12		nC
C	Total capacitance	V_R=1V f=1MHz V_R=300V f=1MHz V_R=600V f=1MHz		181 21.6 21.3		pF
E_C	Capacitance stored energy	V_R=400V		1.9		µJ

Typical Performance

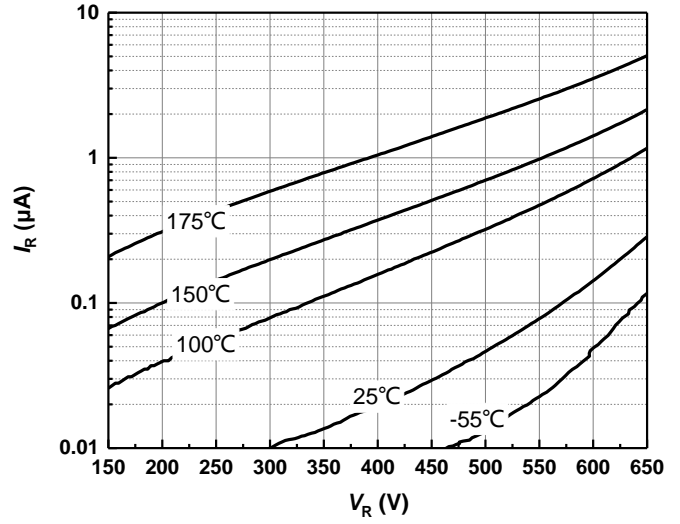**Figure 1. Typical forward characteristics**

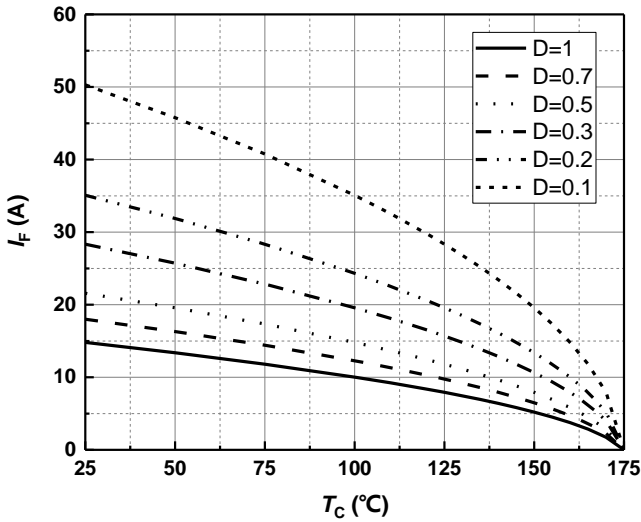**Figure 2. Typical reverse current as function of reverse voltage**

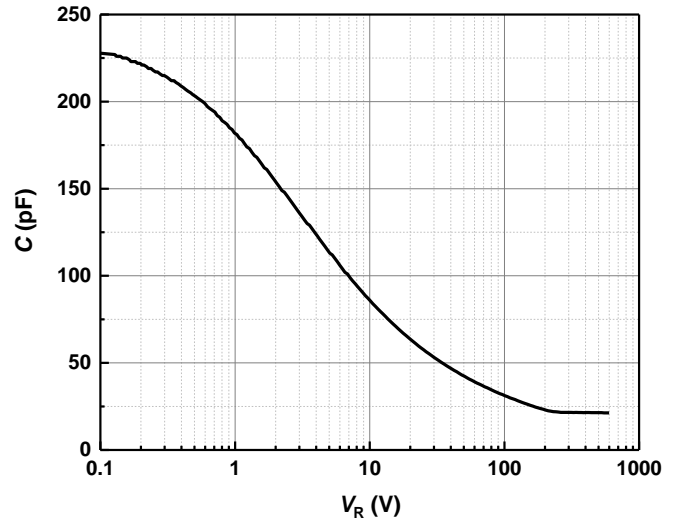**Figure 3. Diode forward current as function of temperature, D=duty cycle**

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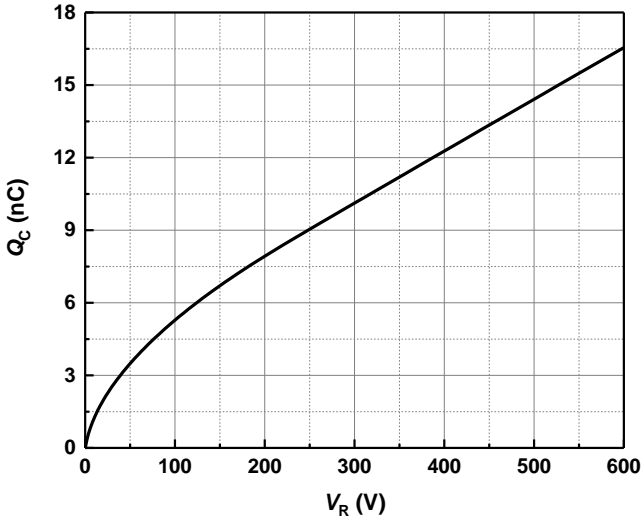
Typical Performance

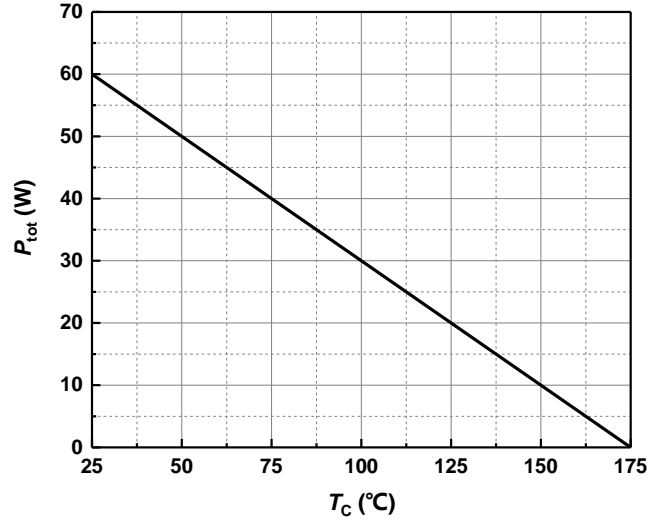**Figure 5. Typical reverse charge as function of reverse voltage**

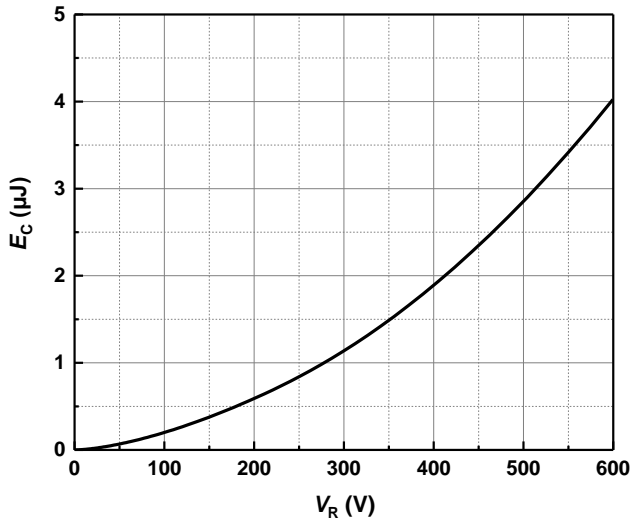**Figure 6. Power dissipation as function of case temperature**

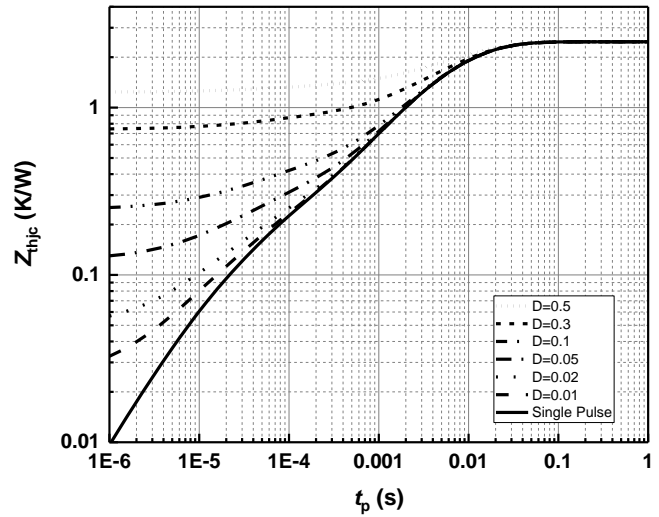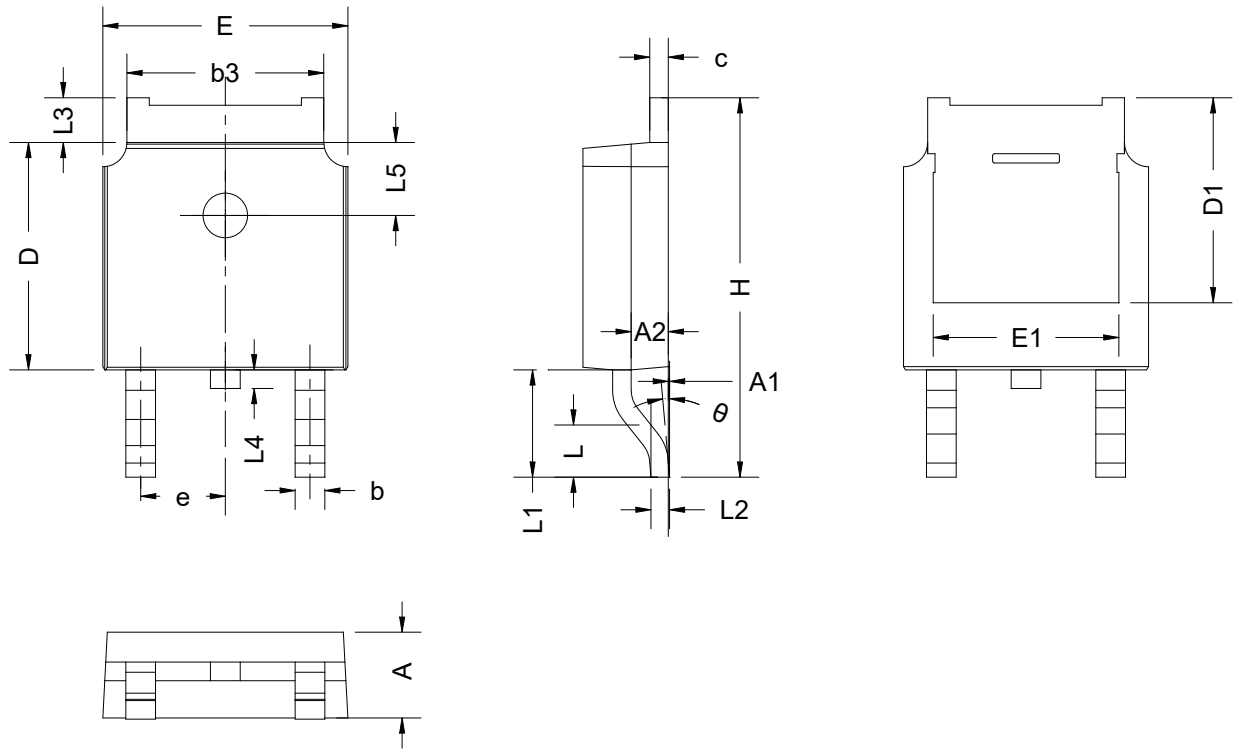
Figure 7.Capacitance stored energy

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

Package Dimensions

SYMBOL	mm		
	MIN	NOM	MAX
A	2.20	2.30	2.38
A1	0.00	-	0.20
A2	0.90	1.07	1.17
b	0.68	0.78	0.90
b3	5.13	5.33	5.46
c	0.43	0.53	0.61
D	5.98	6.10	6.22
D1	5.30 REF		
E	6.40	6.60	6.73
E1	4.63	-	-
e	2.286 BSC		
H	9.40	10.10	10.50
L	1.38	1.50	1.75
L1	2.90 REF		
L2	0.51 BSC		
L3	0.88	-	1.28
L4	0.50	-	1.00
L5	1.65	1.80	1.95
θ	0°	-	8°

Revision History

Document Version	Date of Release	Description of Changes
Rev. 1.0	2019-05-30	Release of the datasheet.
Rev. 2.0	2020-07-06	Characteristics updated.
Rev. 2.1	2020-12-28	Characteristics updated.

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