

Product Summary

V_{RRM}	650 V
$I_F (T_C=155^{\circ}\text{C})$	6 A
Q_C	17 nC

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

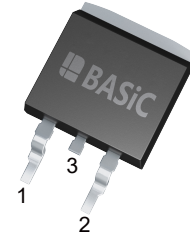
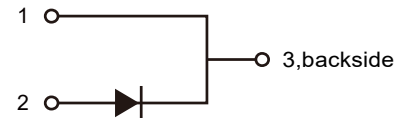
- Switch mode power supplies (SMPS)
- Uninterruptible power supplies
- Motor drivers
- Power factor correction

Package Pin Definitions

- Pin1,3 and backside - Cathode
- Pin2 - Anode

Package Parameters

Part Number	Marking	Package
B1D06065F	B1D06065F	TO-263-2

Package: TO-263-2

Electrical Connection


Maximum Ratings ($T_c=25^\circ\text{C}$ 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	$T_c=25^\circ\text{C}$ $T_c=155^\circ\text{C}$	21 6	A
I_{FSM}	Non-repetitive forward surge current	$T_c=25^\circ\text{C}$, $t_p=10\text{ms}$ Half sine wave	45	A
$\int i^2 dt$	i^2t value	$T_c=25^\circ\text{C}$, $t_p=10\text{ms}$	10.12	A^2S
P_{tot}	Power dissipation	$T_c=25^\circ\text{C}$ $T_c=110^\circ\text{C}$	89 38	W
T_j	Operating junction temperature		-55~175	$^\circ\text{C}$
T_{stg}	Storage temperature		-55~175	$^\circ\text{C}$

Thermal Characteristics

Symbol	Parameter	Value			Unit
		Min.	Typ.	Max.	
$R_{th(jc)}$	Thermal resistance from junction to case		1.671		K/W

Electrical Characteristics
Static Characteristics

Symbol	Parameter	Test conditions	Value			Unit
			Min.	Typ.	Max.	
V_{DC}	DC blocking voltage	$T_J=25^{\circ}C$	650			V
V_F	Diode forward voltage	$I_F=6A$ $T_J=25^{\circ}C$ $I_F=6A$ $T_J=175^{\circ}C$		1.43 1.73		V
I_R	Reverse current	$V_R=650V$ $T_J=25^{\circ}C$ $V_R=650V$ $T_J=175^{\circ}C$		1 20		μA

AC Characteristics

Symbol	Parameter	Test conditions	Value			Unit
			Min.	Typ.	Max.	
Q_C	Total capacitive charge	$V_R=400V$ $T_J=25^{\circ}C$ $Q_C=\int_0^{V_R} C(V)dV$		17		nC
C	Total capacitance	$V_R=1V$ $f=1MHz$ $V_R=300V$ $f=1MHz$ $V_R=600V$ $f=1MHz$		271 30.1 29.8		pF
E_C	Capacitance stored energy	$V_R=400V$		4.5		μJ

Typical Performance

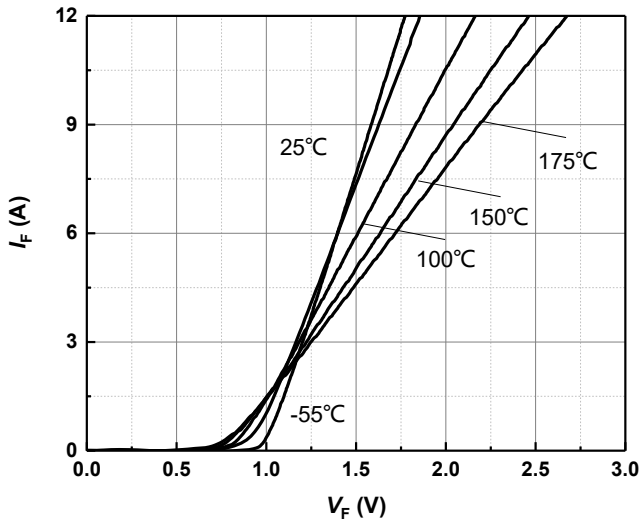


Figure 1 Typical forward characteristics

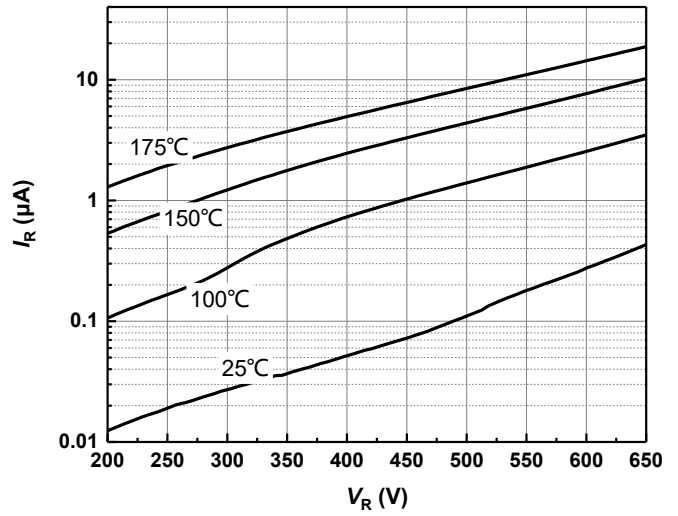


Figure 2 Typical reverse current as function of reverse voltage

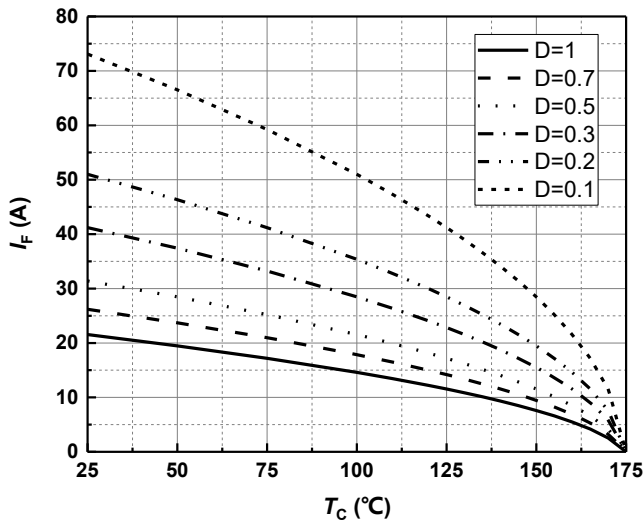


Figure 3 Diode forward current as function of temperature, D =duty cycle

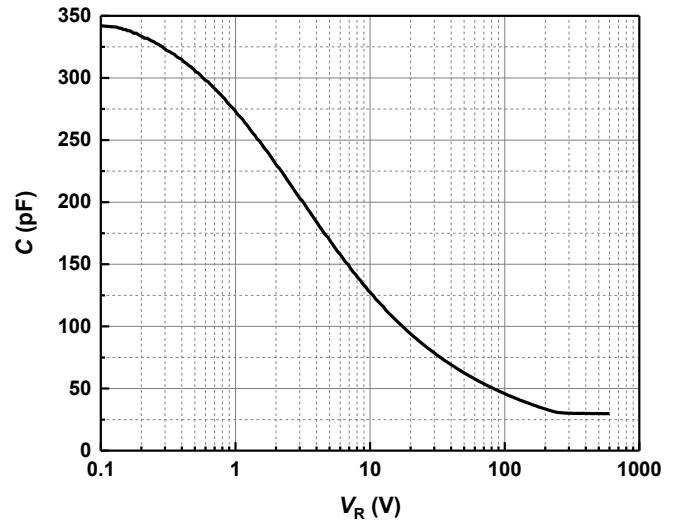


Figure 4 Typical capacitance as function of reverse voltage, $C=f(V_R)$; $T_J=25^\circ\text{C}$; $f=1\text{ MHz}$

Typical Performance

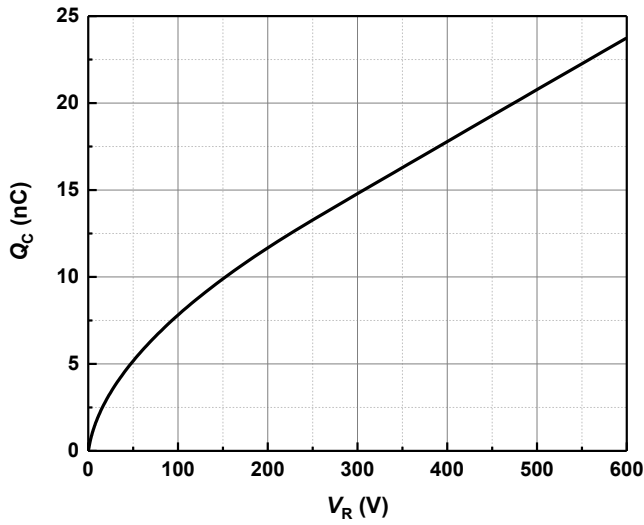


Figure 5 Typical reverse charge as function of reverse voltage

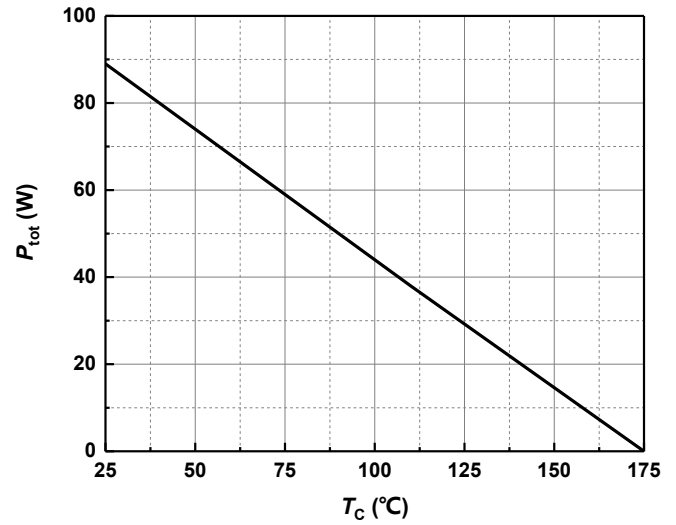


Figure 6 Power dissipation as function of case temperature

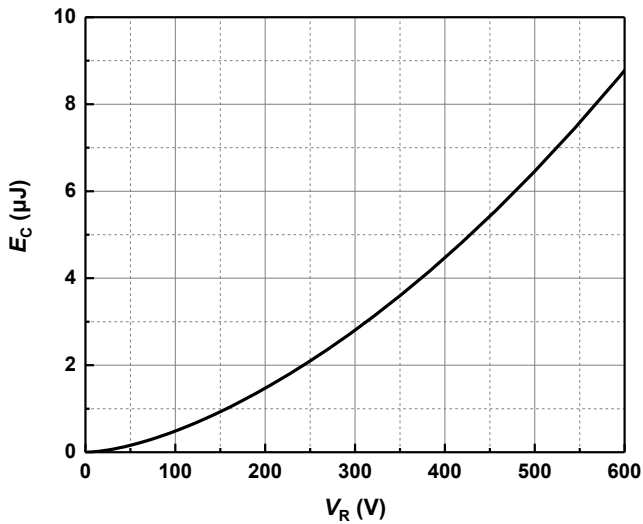


Figure 7 Capacitance stored energy

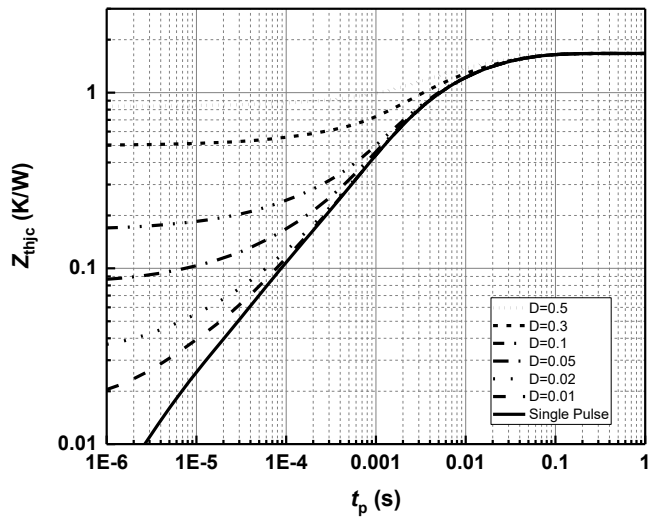
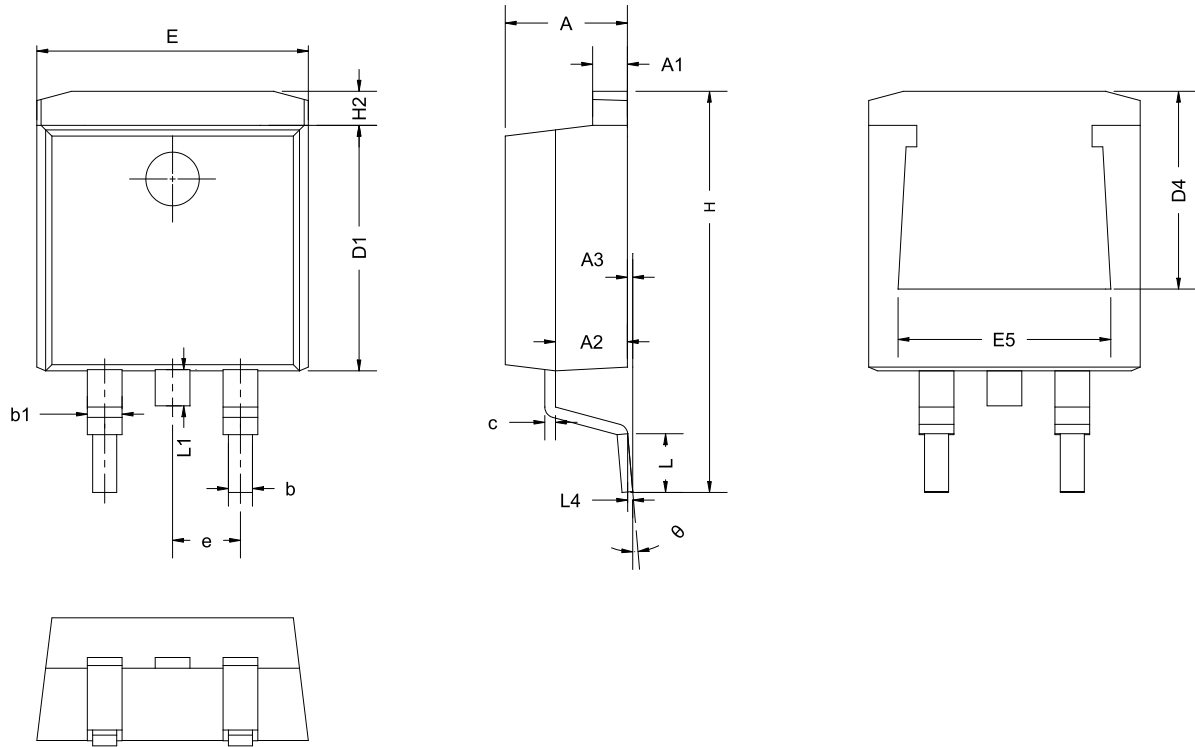


Figure 8 Max. transient thermal impedance, $Z_{thjc} = f(t)$, parameter: $D = t / T$

Package Dimensions



SYMBOL	mm		
	MIN	NOM	MAX
A	4.37	4.57	4.77
A1	1.22	1.27	1.42
A2	2.49	2.69	2.89
A3	0.00	0.13	0.25
b	0.70	0.81	0.96
b1	1.17	1.27	1.47
c	0.30	0.38	0.53
D1	8.50	8.70	8.90
D4	6.60	-	-
E	9.86	10.36	10.36
E5	7.06	-	-
e	2.54 BSC		
H	14.70	15.10	15.50
H2	1.07	1.27	1.47
L	2.00	2.30	2.60
L1	1.40	1.55	1.70
L4	0.25 BSC		
θ	0°	5°	9°

Revision History

Document Version	Date of Release	Description of Changes
Rev. 1.0	2019-02-25	Release of the datasheet.
Rev. 2.0	2020-07-06	Characteristics updated.
Rev. 2.1	2022-05-09	Characteristics updated.
Rev. 2.2	2022-10-08	Characteristics updated.

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Shenzhen, China
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