

### 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

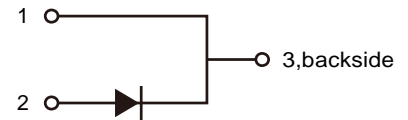
### Package Parameters

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	$\text{A}^2\text{S}$
$P_{tot}$	Power dissipation	$T_c=25^\circ\text{C}$ $T_c=110^\circ\text{C}$	89 38	W
$T_j$	Operating junction temperature		-55~175	$^\circ\text{C}$
$T_{slg}$	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

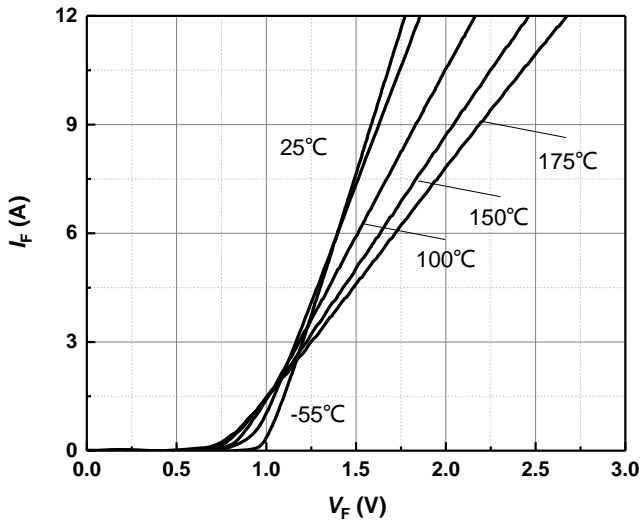
**Electrical Characteristics**  
**Static Characteristics**

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		$\mu A$

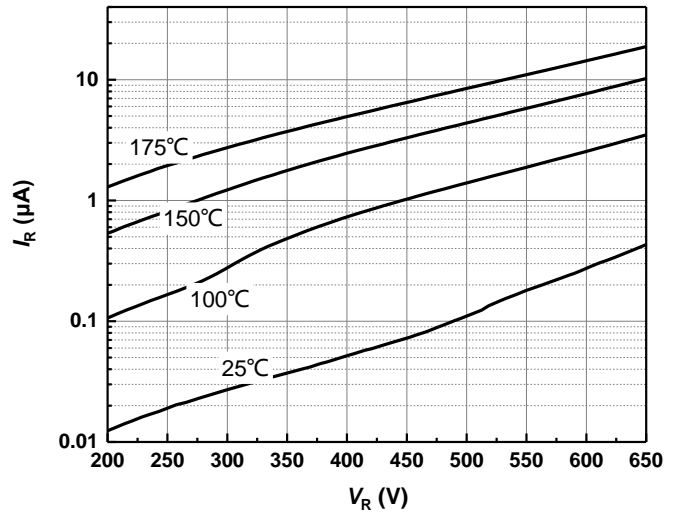
**AC Characteristics**

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		$\mu J$

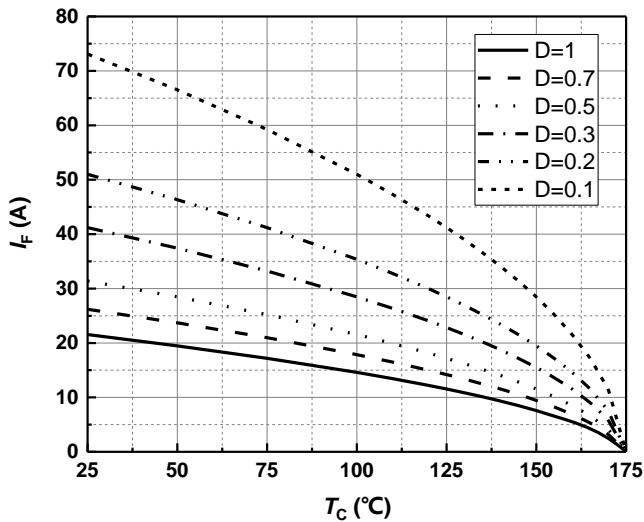
**Typical Performance**



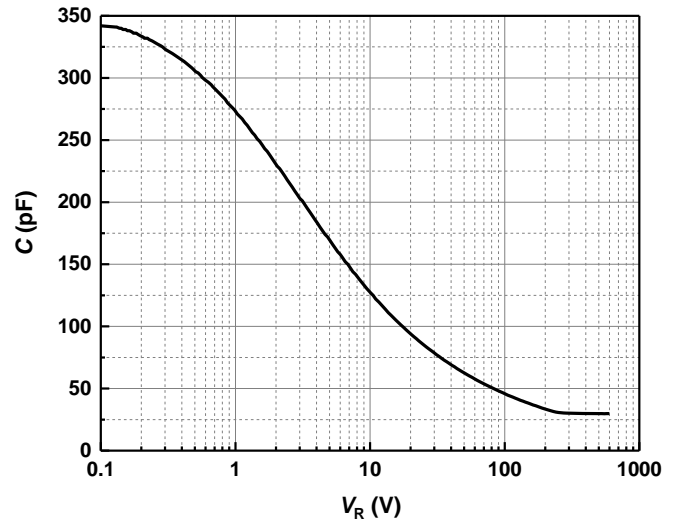
**Figure 1** Typical forward characteristics



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

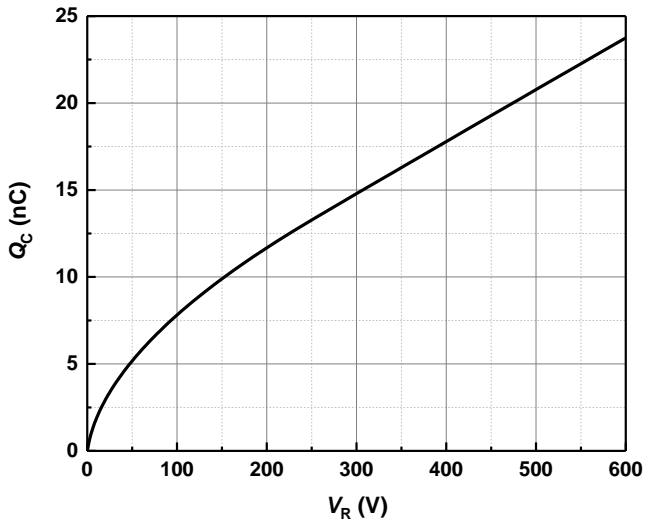


**Figure 3** Diode forward current as function of temperature, D=duty cycle

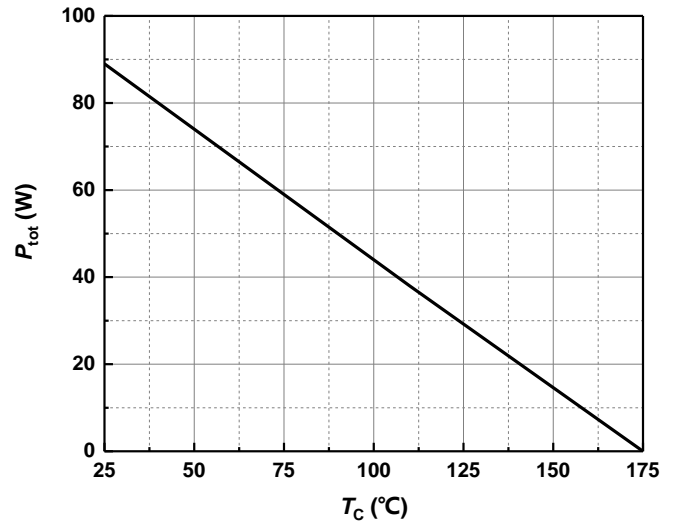


**Figure 4** Typical capacitance as function of reverse voltage,  $C=f(V_R)$ ;  $T_j=25^{\circ}$ C;  $f=1$  MHz

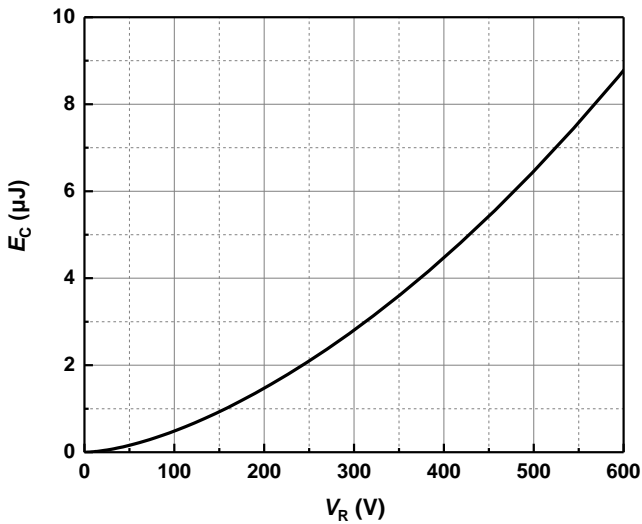
**Typical Performance**



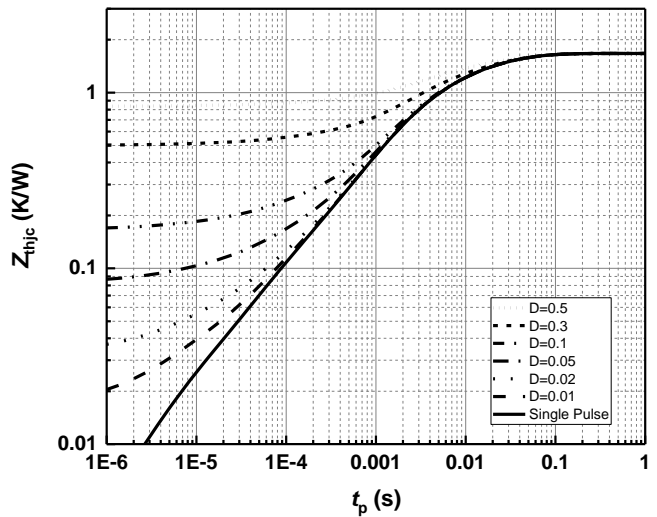
**Figure 5** Typical reverse charge as function of reverse voltage



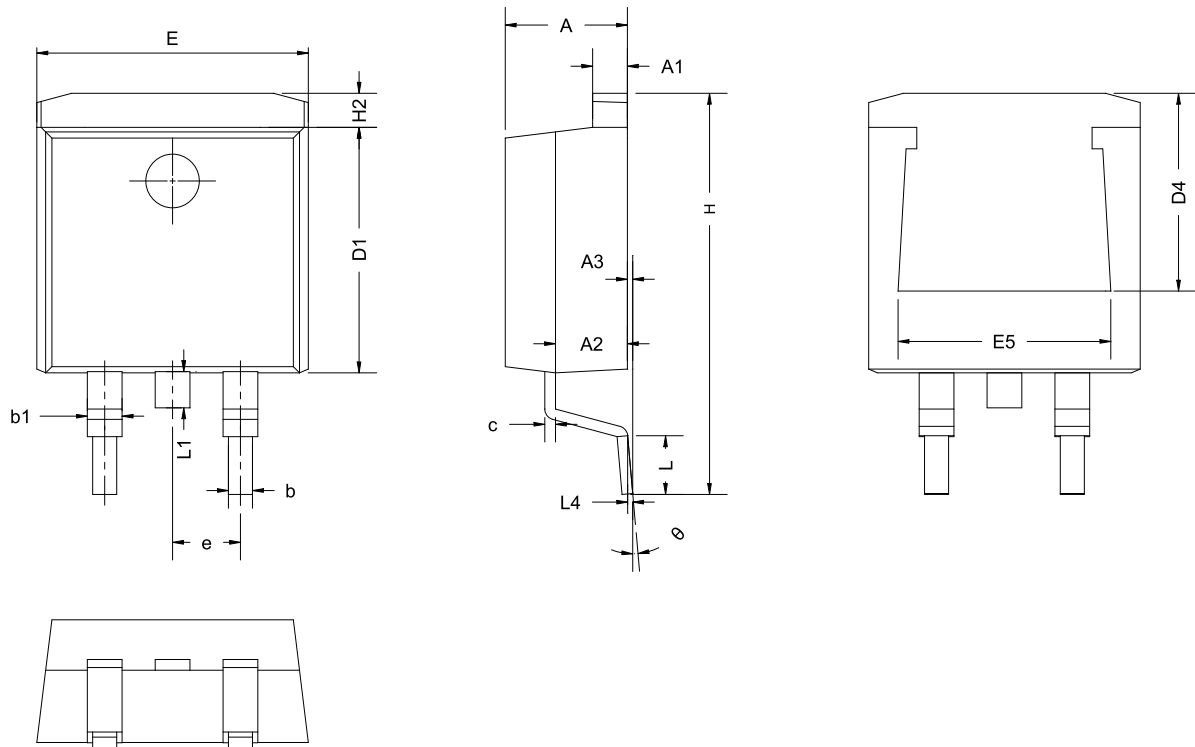
**Figure 6** Power dissipation as function of case temperature



**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	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**

<b>Document Version</b>	<b>Date of Release</b>	<b>Description of Changes</b>
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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