

Product Summary

V_{RRM}	650 V
$I_F (T_C=95^\circ\text{C})$	10 A
Q_C	29 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- Cathode
- Pin2- Anode

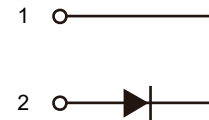
Package Parameters

Part Number	Marking	Package
B1D10065KF	B1D10065KF	TO-220F-2

Package: TO-220F-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	$T_c=25^\circ\text{C}$ $T_c=95^\circ\text{C}$	15 10	A
I_{FSM}	Non-repetitive forward surge current	$T_c=25^\circ\text{C}$, $t_p=10\text{ms}$ Half sine wave	75	A
$\int i^2 dt$	i^2t value	$T_c=25^\circ\text{C}$, $t_p=10\text{ms}$	28.12	A ² S
P_{tot}	Power dissipation	$T_c=25^\circ\text{C}$ $T_c=110^\circ\text{C}$	34 15	W
T_j	Operating junction temperature		-55~175	$^\circ\text{C}$
T_{stg}	Storage temperature		-55~175	$^\circ\text{C}$
	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		4.331		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	$I_F=10A$ $T_J=25^{\circ}C$ $I_F=10A$ $T_J=175^{\circ}C$		1.43 1.75	1.6 2.1	V
I_R	Reverse current	$V_R=650V$ $T_J=25^{\circ}C$ $V_R=650V$ $T_J=175^{\circ}C$		5 50	70 500	μA

AC Characteristics

Symbol	Parameter	Test conditions	Value			Unit
			Min.	Typ.	Max.	
Q_C	Total capacitive charge	$V_R=400V$ $T_J=25^{\circ}C$ $Q_C=\int_0^{V_R} C(V)dV$		29		nC
C	Total capacitance	$V_R=1V$ $f=1MHz$ $V_R=300V$ $f=1MHz$ $V_R=600V$ $f=1MHz$		457 49.7 49.3		pF
E_C	Capacitance stored energy	$V_R=400V$		4.5		μJ

Typical Performance

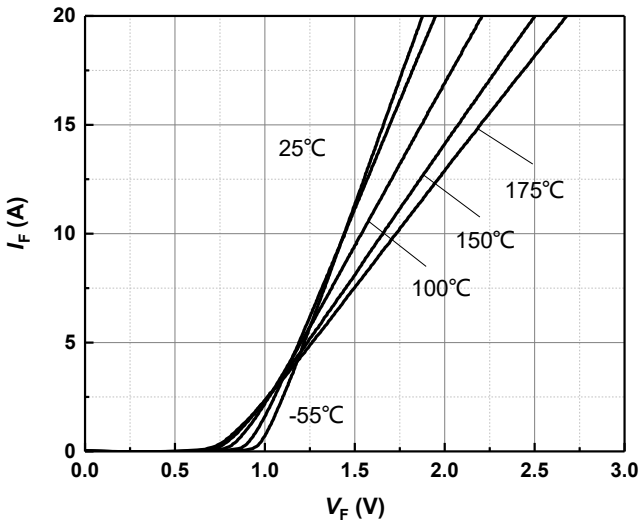


Figure 1 Typical forward characteristics

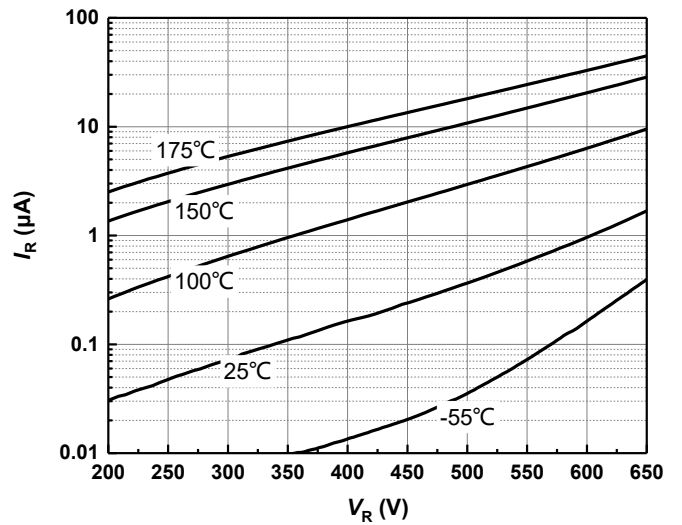


Figure 2 Typical reverse current as function of reverse voltage

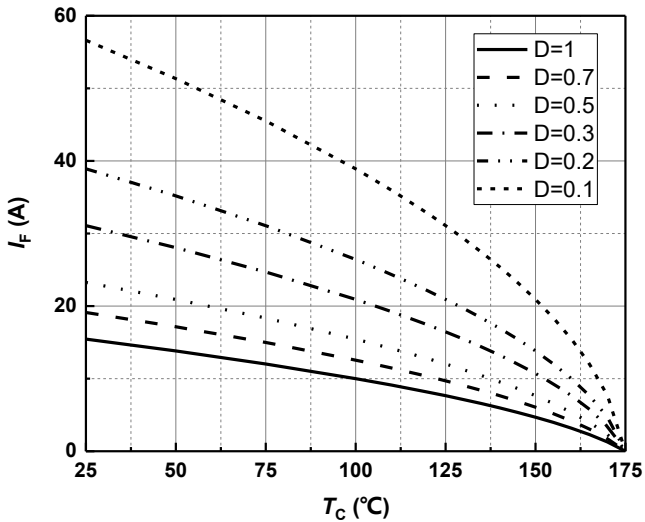


Figure 3 Diode forward current as function of temperature, D=duty cycle

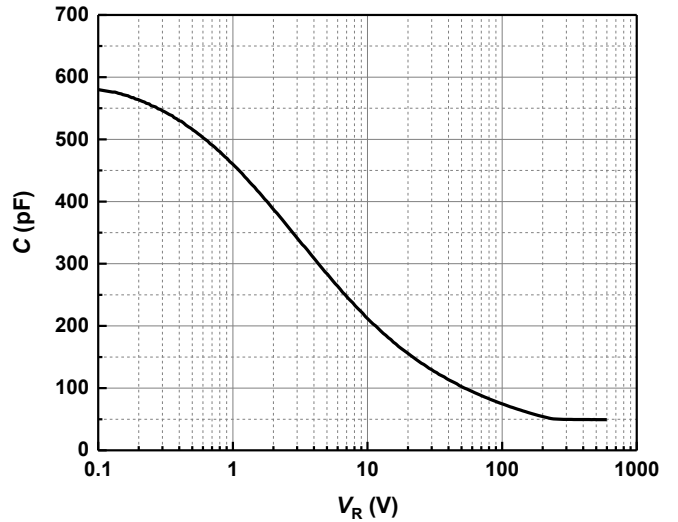


Figure 4 Typical capacitance as function of reverse voltage, $C=f(V_R)$; $T_j=25^{\circ}$ C; $f=1$ MHz

Typical Performance

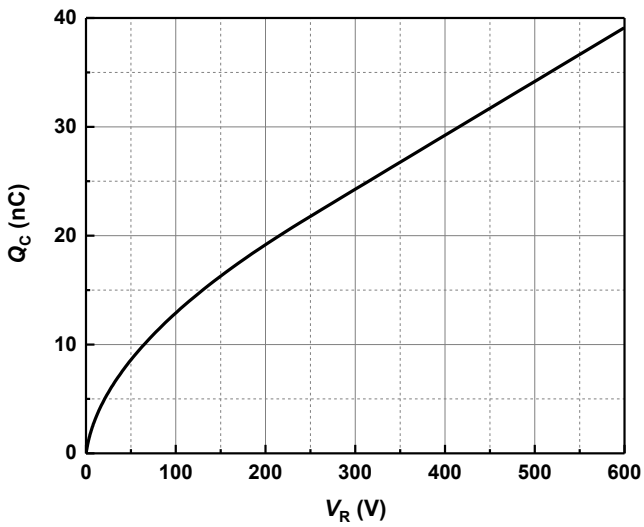


Figure 5 Typical reverse charge as function of reverse voltage

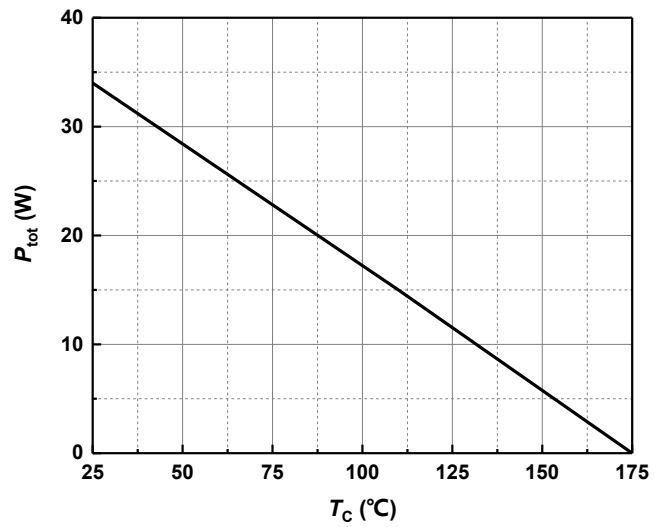


Figure 6 Power dissipation as function of case temperature

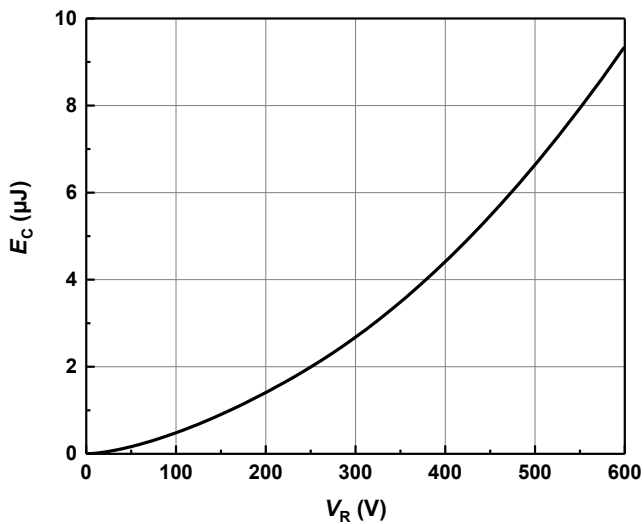


Figure 7 Capacitance stored energy

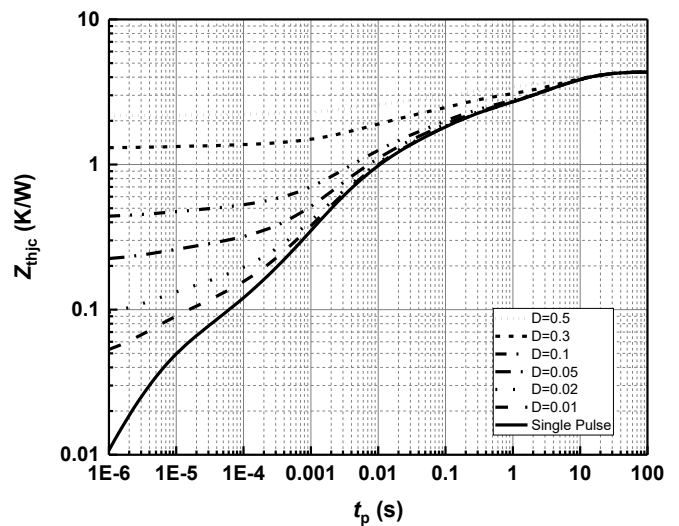
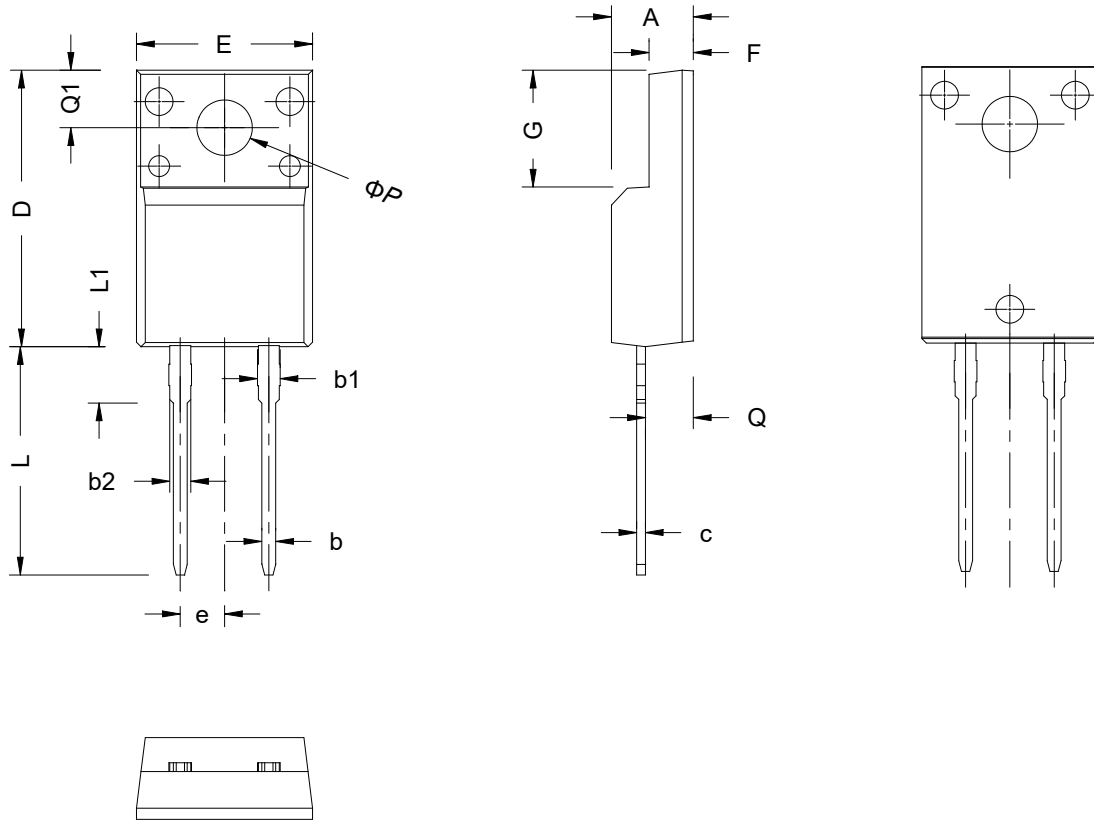


Figure 8 Max. transient thermal impedance, $Z_{thjc} = f(t)$, parameter: $D = t_p / T$

Package Dimensions


SYMBOL	mm		
	MIN	NOM	MAX
A	4.60	4.70	4.80
b	0.70	0.80	0.91
b1	1.20	1.30	1.47
b2	1.10	1.20	1.30
c	0.45	0.50	0.63
D	15.80	15.87	15.97
e	2.54 BSC		
E	10.00	10.10	10.30
F	2.44	2.54	2.64
G	6.50	6.70	6.90
L	12.90	13.10	13.30
L1	3.13	3.23	3.33
Q	2.65	2.75	2.85
Q1	3.20	3.30	3.40
ϕ P	2.08	3.18	3.28

Revision History

Document Version	Date of Release	Description of Changes
Rev 1.0	2020-07-06	Release of the datasheet.
Rev 1.1	2021-11-05	Characteristics updated.

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