

Product Summary

V_{RRM}	1200 V
$I_F (T_c=160^\circ\text{C})$	5 A
Q_c	32 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

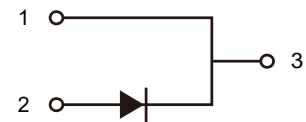
Package Pin Definitions

- Pin1- Cathode
- Pin2- Anode

Package Parameters

Part Number	Marking	Package
B1D05120K	B1D05120K	TO-220-2

Package: TO-220-2

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		1200	V
V_{RSM}	Non-repetitive peak reverse voltage		1200	V
I_F	Continuous forward current	$T_c=25^\circ\text{C}$ $T_c=160^\circ\text{C}$	30 5	A
I_{FSM}	Non-repetitive forward surge current	$T_c=25^\circ\text{C}$, $t_p=10\text{ms}$ Half sine wave	60	A
$\int j^2 dt$	i^2t value	$T_c=25^\circ\text{C}$, $t_p=10\text{ms}$	18	A ² S
P_{tot}	Power dissipation	$T_c=25^\circ\text{C}$ $T_c=110^\circ\text{C}$	129 56	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		1.16		K/W

Electrical Characteristics
Static Characteristics

Symbol	Parameter	Test conditions	Value			Unit
			Min.	Typ.	Max.	
V_{DC}	DC blocking voltage	$T_j=25^{\circ}C$	1200			V
V_F	Diode forward voltage	$I_F=5A T_j=25^{\circ}C$ $I_F=5A T_j=175^{\circ}C$		1.40 1.78		V
I_R	Reverse current	$V_R=1200V T_j=25^{\circ}C$ $V_R=1200V T_j=175^{\circ}C$		2 10		μA

AC Characteristics

Symbol	Parameter	Test conditions	Value			Unit
			Min.	Typ.	Max.	
Q_C	Total capacitive charge	$V_R=800V T_j=25^{\circ}C$ $Q_C=\int_0^{V_R} C(V)dV$		32		nC
C	Total capacitance	$V_R=1V f=1MHz$ $V_R=400V f=1MHz$ $V_R=800V f=1MHz$		352 31 23		pF
E_C	Capacitance stored energy	$V_R=800V$		16		μJ

Typical Performance

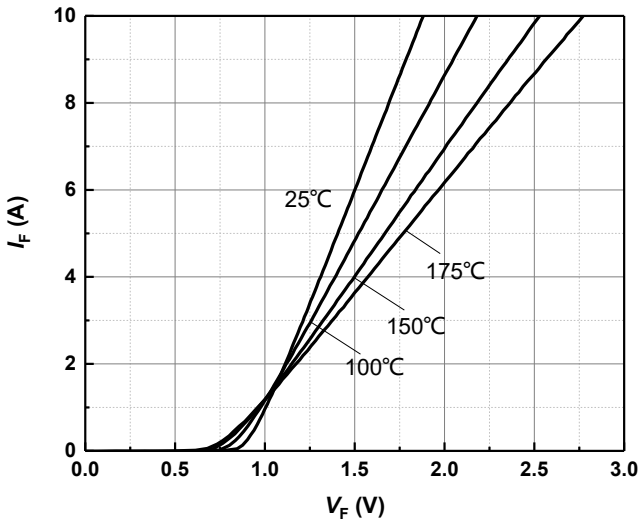


Figure 1 Typical forward characteristics

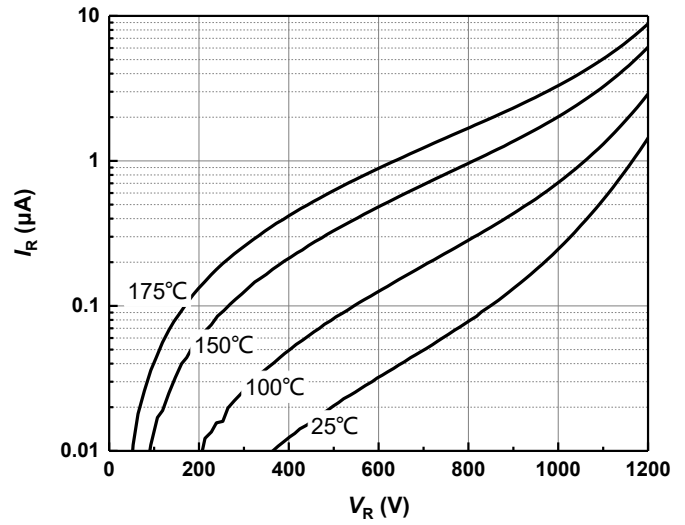


Figure 2 Typical reverse current as function of reverse voltage

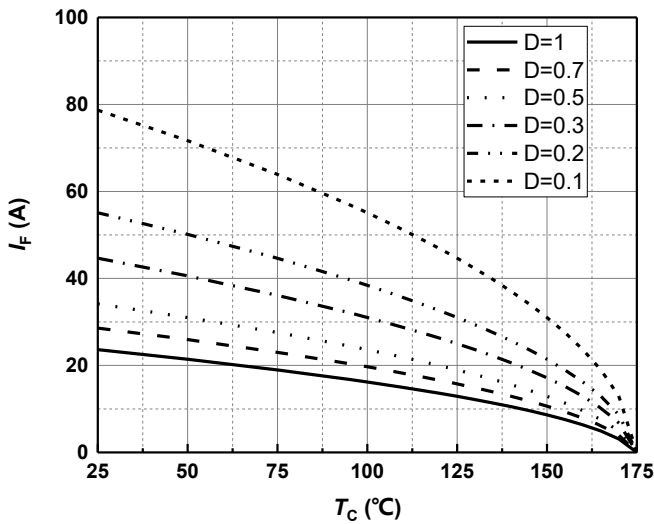


Figure 3 Diode forward current as function of temperature, D=duty cycle

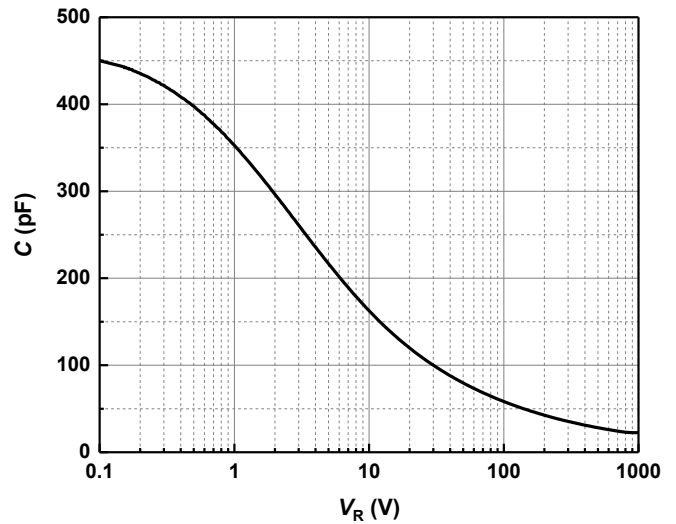


Figure 4 Typical capacitance as function of reverse voltage, $C=f(V_R)$; $T_j=25^{\circ}$ C; $f=1$ MHz

Typical Performance

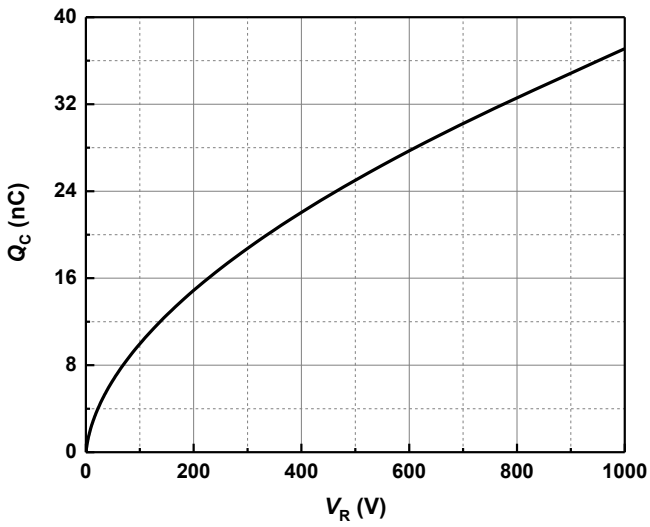


Figure 5 Typical reverse charge as function of reverse voltage

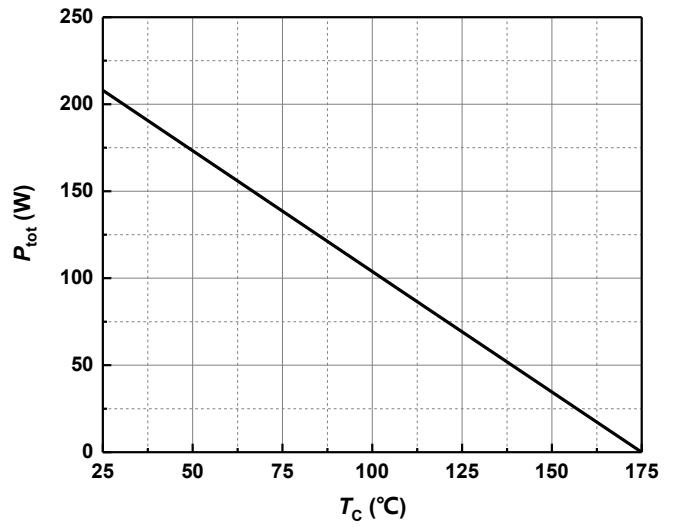


Figure 6 Power dissipation as function of case temperature

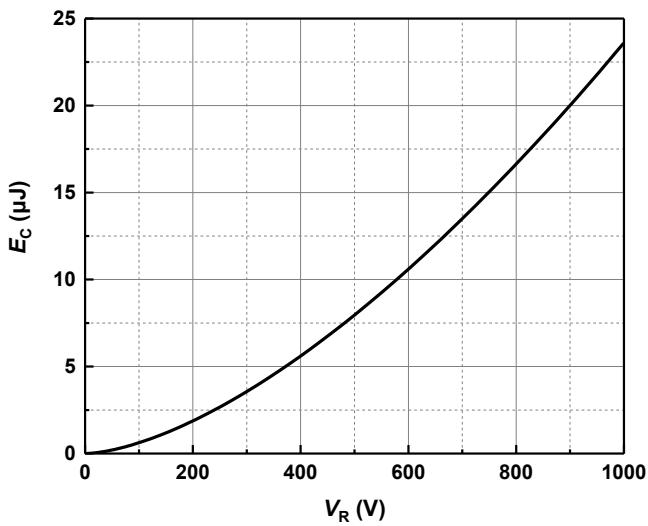


Figure 7 Capacitance stored energy

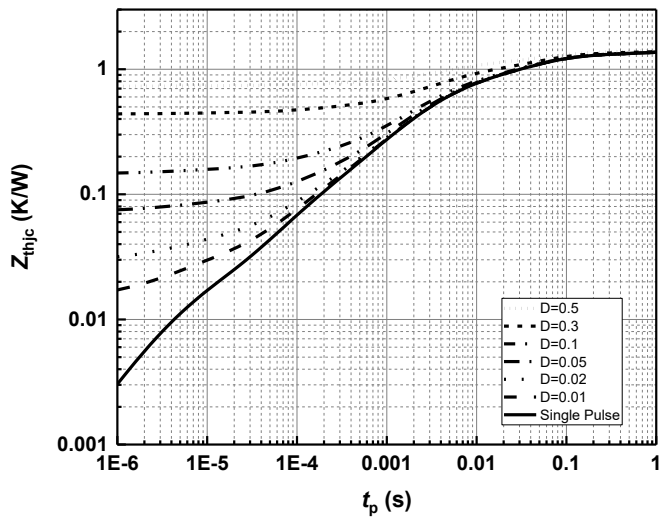
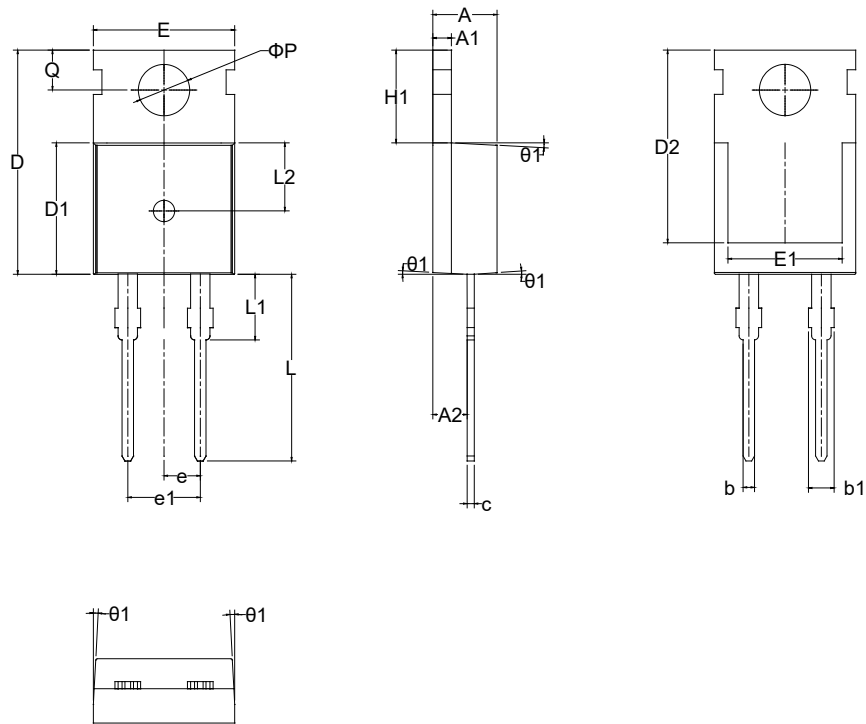


Figure 8 Max. transient thermal impedance, $Z_{thjc} = f(t)$, parameter: $D = t / T$

Package Dimensions


SYMBOL	mm		
	MIN	NOM	MAX
A	4.40	4.50	4.60
A1	1.27	1.30	1.33
A2	2.30	2.40	2.50
b	0.70	-	0.90
b1	1.42	-	1.57
c	0.45	0.50	0.60
D	15.30	15.70	16.10
D1	9.10	9.20	9.30
D2	13.10	-	13.70
E	9.70	9.90	10.20
E1	7.80	8.00	8.20
e	2.54 BSC		
e1	5.08 BSC		
H1	6.30	6.50	6.70
L	12.78	13.08	13.38
L1	-	-	3.50
L2	4.60 REF		
ϕP	3.55	3.60	3.65
Q	2.73	-	2.87
$\theta 1$	1°	3°	5°

Revision History

Document Version	Date of Release	Description of Changes
Rev 0.1	2020-10-23	Characteristics updated.
Rev 0.2	2021-04-15	Characteristics updated.
Rev 0.3	2021-11-03	Characteristics updated.

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