

Product Summary

V_{RRM}	1200 V
$I_F (T_C=155^{\circ}\text{C})$	40 A
Q_C	225 nC

Features

- Low leakage current (I_R)
- Zero reverse recovery current
- Temperature independent switching behavior
- Positive temperature coefficient on V_F
- High surge current capacity
- Low capacitive charge

Benefits

- System cost savings due to smaller magnetics
- System efficiency improvement over Si diodes
- Reduction of heat sink requirements
- Enabling higher frequency
- Reduced EMI

Applications

- Switch mode power supplies (SMPS)
- Uninterruptible power supplies
- Server/telecom power supplies
- Power factor correction
- Solar

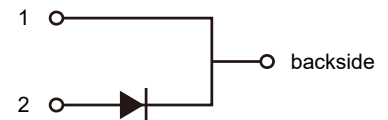
Package Pin Definitions

- Pin1 and backside - Cathode
- Pin2 - Anode

Package Parameters

Part Number	Marking	Package
B2D40120H1	B2D40120H1	TO-247-2

Package: TO-247-2

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
E_{AS}	Single pulse avalanche energy	$T_c=25^\circ\text{C}$, $L=1\text{mH}$, $I_{AS}=22\text{A}$, $V=140\text{V}$	242	mJ
I_F	Continuous forward current	$T_c=25^\circ\text{C}$	135	A
		$T_c=135^\circ\text{C}$	64	
		$T_c=155^\circ\text{C}$	40	
I_{FSM}	Non-repetitive forward surge current	$T_c=25^\circ\text{C}$, $t_p=10\text{ms}$ Half sine wave	280	A
I_{FRM}	Repetitive forward surge current	$T_c=25^\circ\text{C}$, $t_p=10\text{ms}$ Half sine wave	240	A
$\int i^2 dt$	i^2t value	$T_c=25^\circ\text{C}$, $t_p=10\text{ms}$	392	A^2S
P_{tot}	Power dissipation	$T_c=25^\circ\text{C}$ $T_c=110^\circ\text{C}$	681 295	W
T_j	Operating junction temperature		-55~175	$^\circ\text{C}$
T_{stg}	Storage temperature		-55~175	$^\circ\text{C}$
	TO-247 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		0.22		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	$I_F=40A$ $T_J=25^{\circ}C$ $I_F=40A$ $T_J=175^{\circ}C$		1.38 2	1.7 2.9	V
I_R	Reverse current	$V_R=1200V$ $T_J=25^{\circ}C$ $V_R=1200V$ $T_J=175^{\circ}C$		10 35	250 350	μA

AC Characteristics

Symbol	Parameter	Test conditions	Value			Unit
			Min.	Typ.	Max.	
Q_C	Total capacitive charge	$V_R=800V$ $T_J=25^{\circ}C$ $Q_C=\int_0^{t_{VR}} C(V)dV$		225		nC
C	Total capacitance	$V_R=1V$ $f=1MHz$ $V_R=400V$ $f=1MHz$ $V_R=800V$ $f=1MHz$		2524 209 167		pF
E_C	Capacitance stored energy	$V_R=800V$		115		μJ

Typical Performance

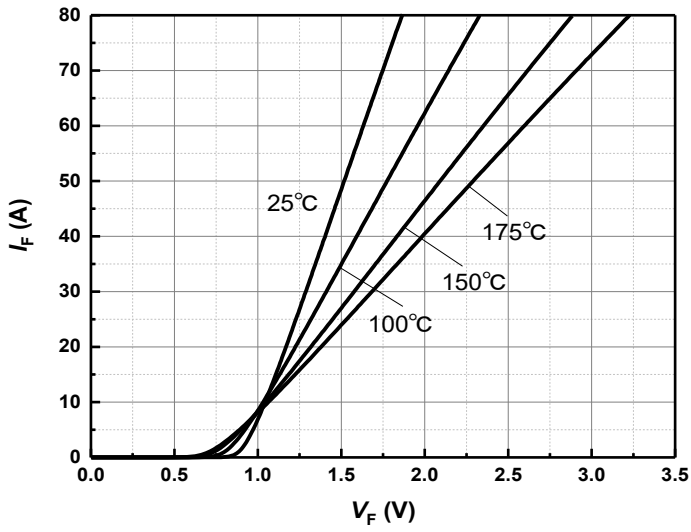


Figure 1 Typical forward characteristics

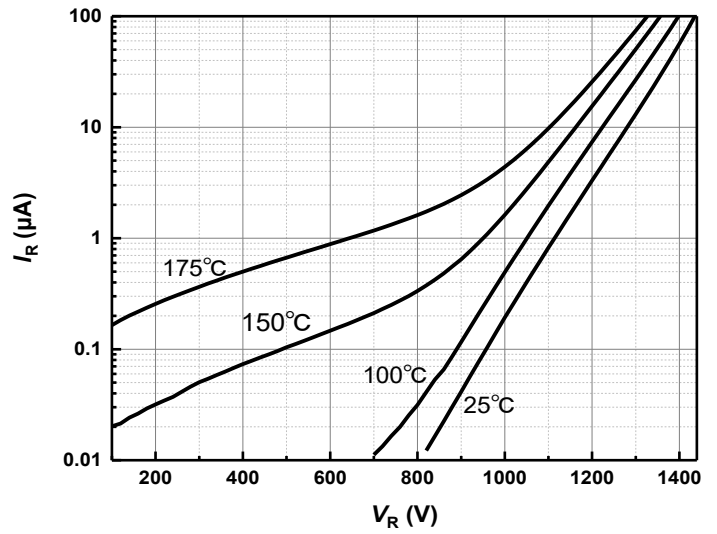


Figure 2 Typical reverse current as function of reverse voltage

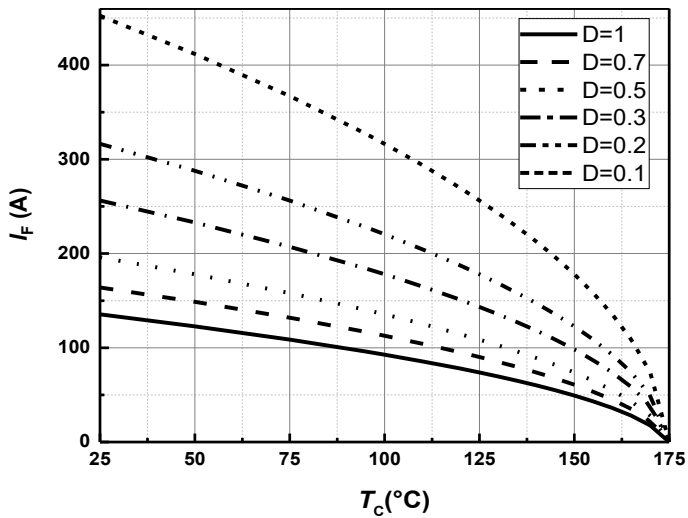


Figure 3 Diode forward current as function of temperature, D=duty cycle

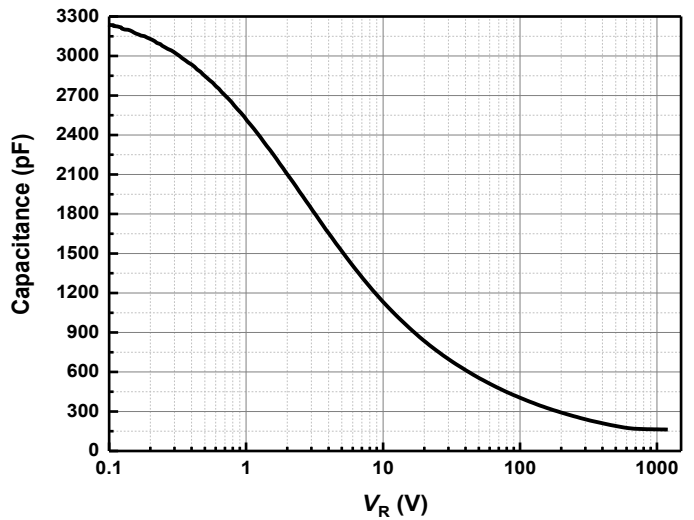


Figure 4 Typical capacitance as function of reverse voltage, $C=f(V_R)$; $T_J=25^\circ\text{C}$; $f=1\text{ MHz}$

Typical Performance

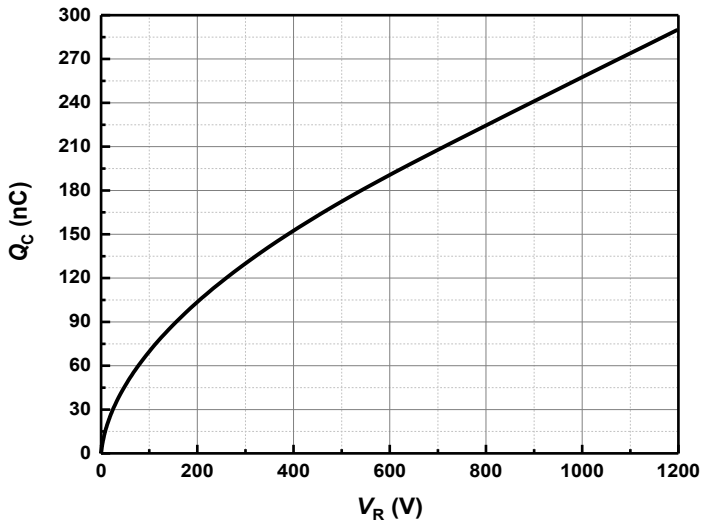


Figure 5 Typical reverse charge as function of reverse voltage

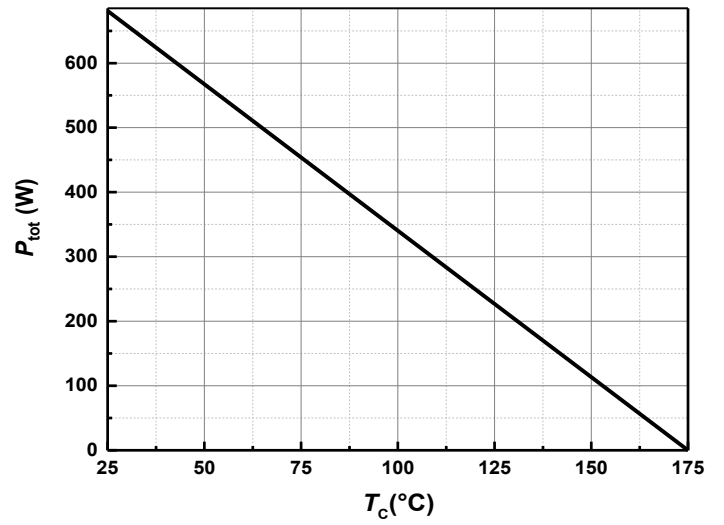


Figure 6 Power dissipation as function of case temperature

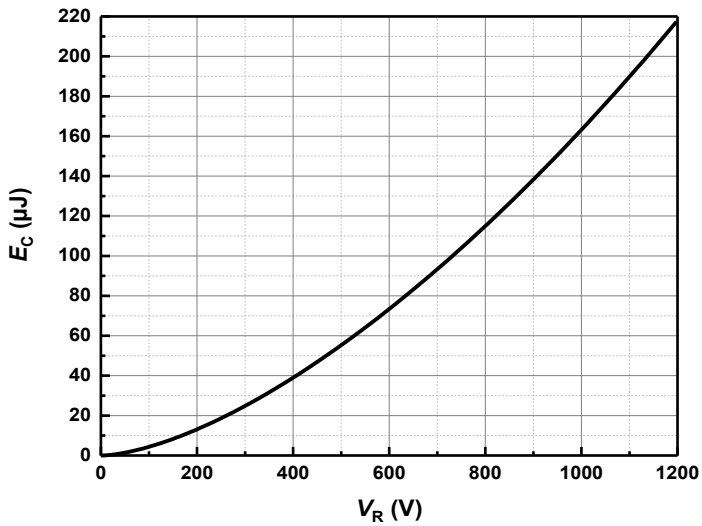


Figure 7 Capacitance stored energy

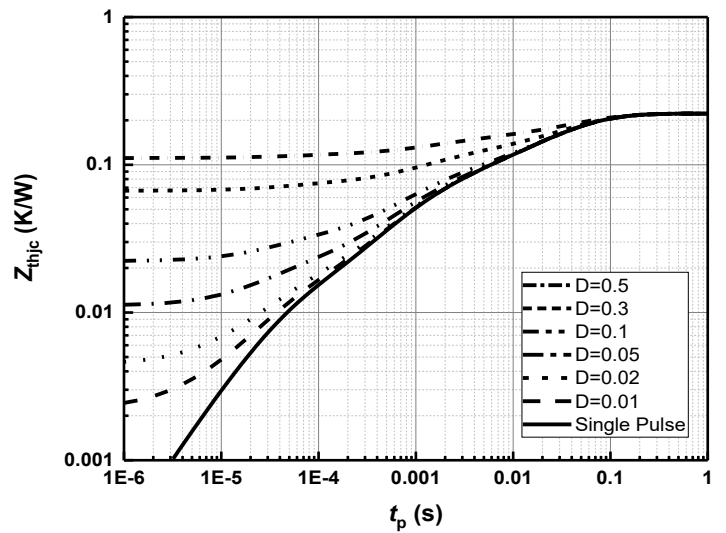
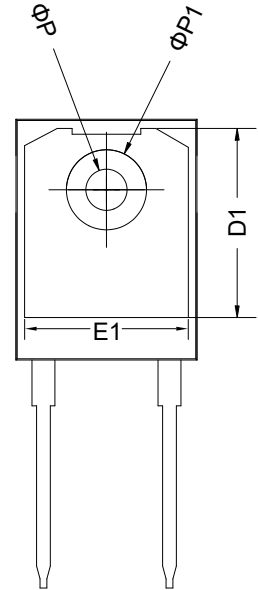
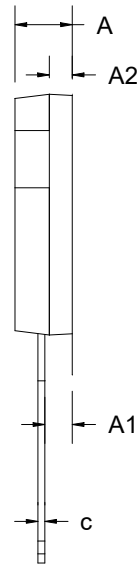
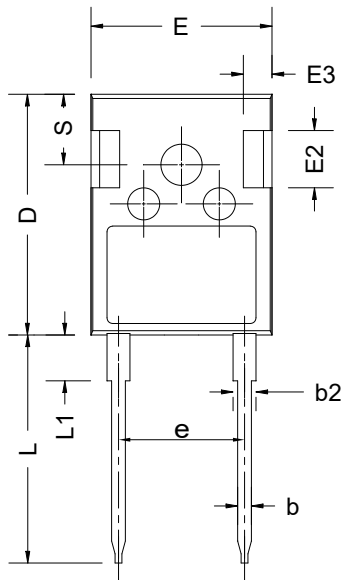
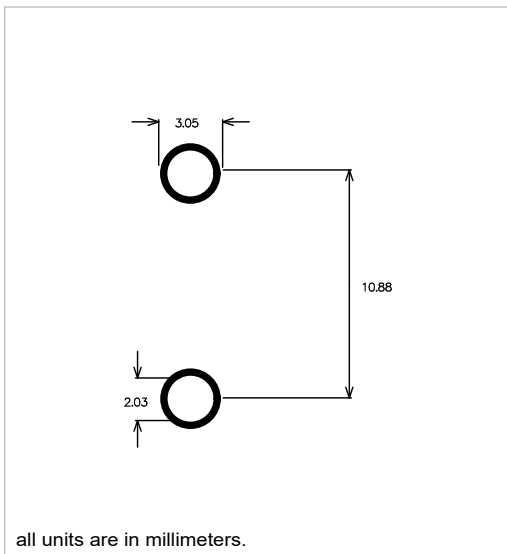


Figure 8 Max. transient thermal impedance, $Z_{thjc} = f(t)$, parameter: $D = t / T$

Package Dimensions



Recommended Solder Pad Layout



SYMBOL	mm		
	MIN	NOM	MAX
A	4.80	5.00	5.20
A1	2.21	2.41	2.61
A2	1.85	2.00	2.15
b	1.11	1.21	1.36
b2	1.91	2.01	2.21
c	0.51	0.61	0.75
D	20.70	21.00	21.30
D1	16.25	16.55	16.85
E	15.50	15.80	16.10
E1	13.00	13.30	13.60
E2	4.80	5.00	5.20
E3	2.30	2.50	2.70
e	10.88 BSC		
L	19.62	19.92	20.22
L1	-	-	4.30
Φ P	3.40	3.60	3.80
Φ P1	-	-	7.30
S	6.15 BSC		

Revision History

Document Version	Date of Release	Description of Changes
Rev. 0.0	2022-08-30	Release of the datasheet.
Rev. 0.1	2023-03-03	Characteristics update.
Rev. 0.2	2023-03-24	Characteristics update.
Rev. 0.3	2023-04-25	Characteristics update.

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Shenzhen, China
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