

**Product Summary**

$V_{RRM}$	650 V
$I_F (T_C=150^\circ\text{C})$	20 A
$Q_c$	59 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**

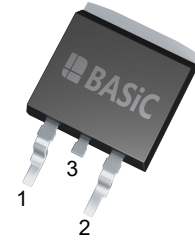
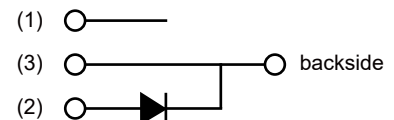
- Pin1 - NC
- Pin2 - Anode
- Pin3 and backside - Cathode

**Package Parameters**

Part Number	Marking	Package
B2D20065F1	B2D20065F1	TO-263-3

**Packing Quantities**

Tape & Reel Packing	PCS/Reel	Reels/Box	PCS/Box
TO-263-3	800	1	800

**Package: TO-263-3**

**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	$T_c=25^\circ\text{C}$	64	A
		$T_c=135^\circ\text{C}$	29	
		$T_c=150^\circ\text{C}$	20	
$I_{FSM}$	Non-repetitive forward surge current	$T_c=25^\circ\text{C}$ , $t_p=10\text{ms}$ Half sine wave	140	A
$\int i^2 dt$	$i^2t$ value	$T_c=25^\circ\text{C}$ , $t_p=10\text{ms}$	98	A <sup>2</sup> S
$P_{tot}$	Power dissipation	$T_c=25^\circ\text{C}$	230	W
		$T_c=110^\circ\text{C}$	100	
$T_j$	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		0.65		K/W

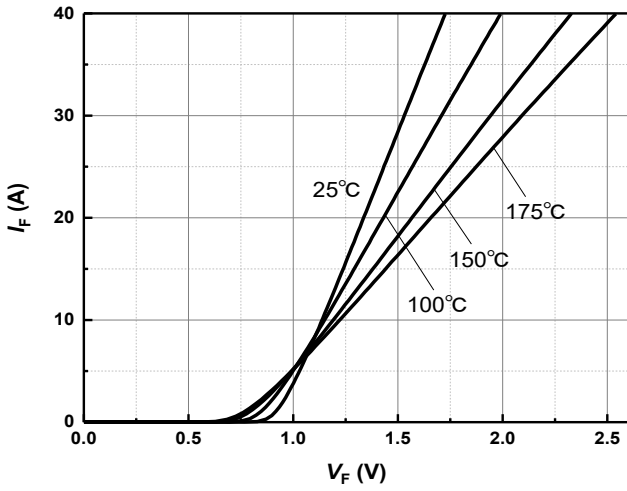
**Electrical Characteristics**  
**Static Characteristics**

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	$I_F=20A$ $T_J=25^{\circ}C$ $I_F=20A$ $T_J=175^{\circ}C$		1.32 1.67	1.6 2.25	V
$I_R$	Reverse current	$V_R=650V$ $T_J=25^{\circ}C$ $V_R=650V$ $T_J=175^{\circ}C$		5 13	100 130	$\mu A$

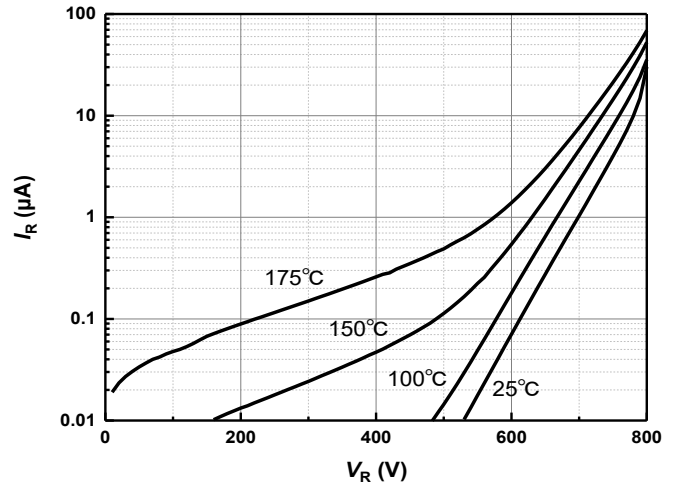
**AC Characteristics**

Symbol	Parameter	Test conditions	Value			Unit
			Min.	Typ.	Max.	
$Q_C$	Total capacitive charge	$V_R=400V$ $T_J=25^{\circ}C$ $Q_C=\int_0^{V_R} C(V)dV$		59		nC
$C$	Total capacitance	$V_R=1V$ $f=1MHz$ $V_R=300V$ $f=1MHz$ $V_R=600V$ $f=1MHz$		917 102 97		pF
$E_C$	Capacitance stored energy	$V_R=400V$		14		$\mu J$

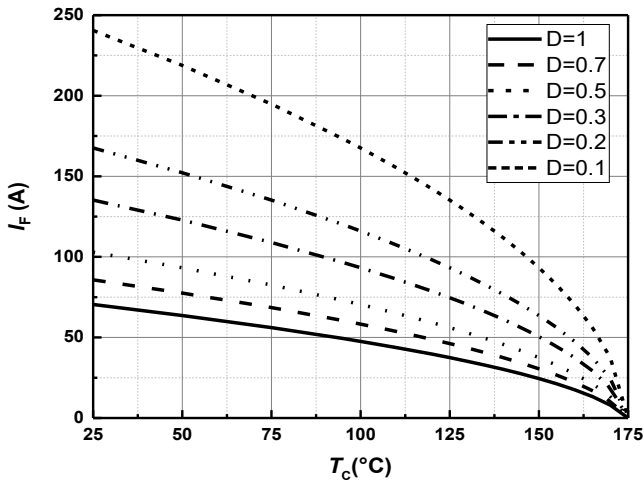
**Typical Performance**



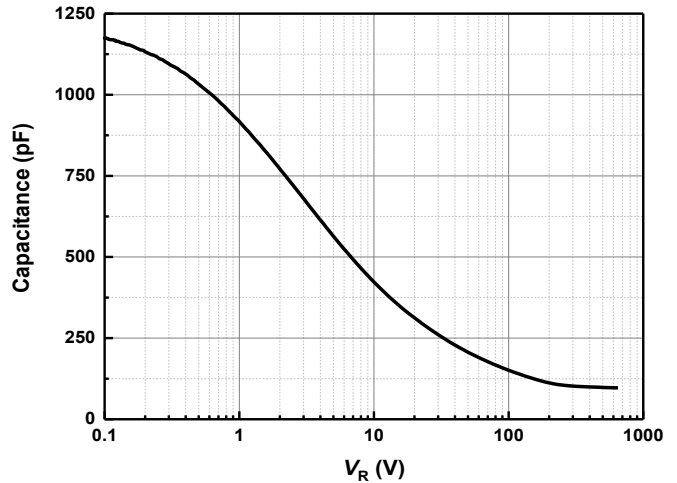
**Figure 1** Typical forward characteristics



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

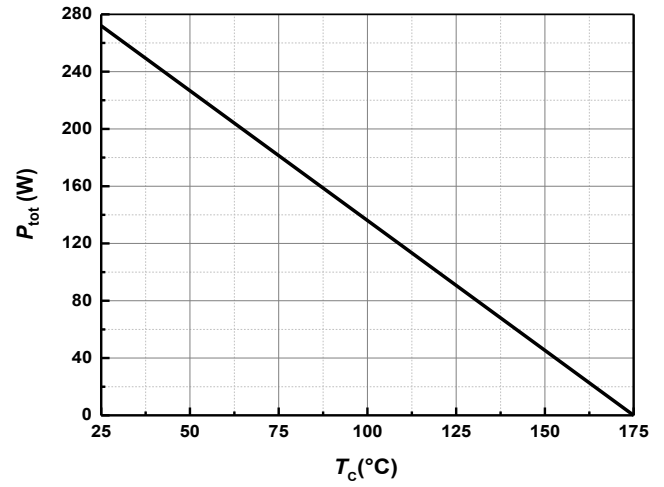
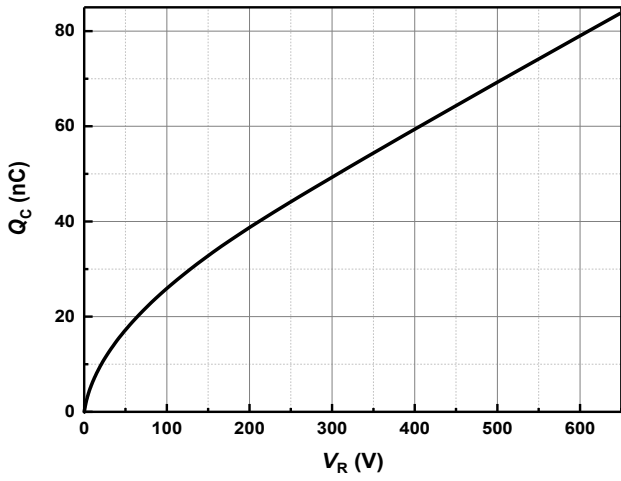


**Figure 3** Diode forward current as function of temperature, D=duty cycle



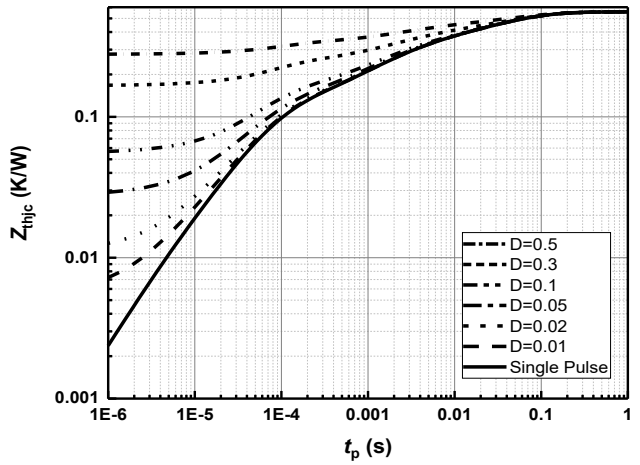
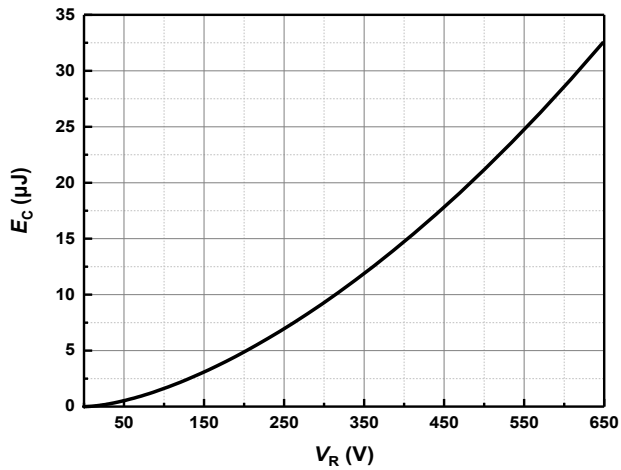
**Figure 4** Typical capacitance as function of reverse voltage,  $C=f(V_R)$ ;  $T_j=25^{\circ}$ C;  $f=1$  MHz

**Typical Performance**



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

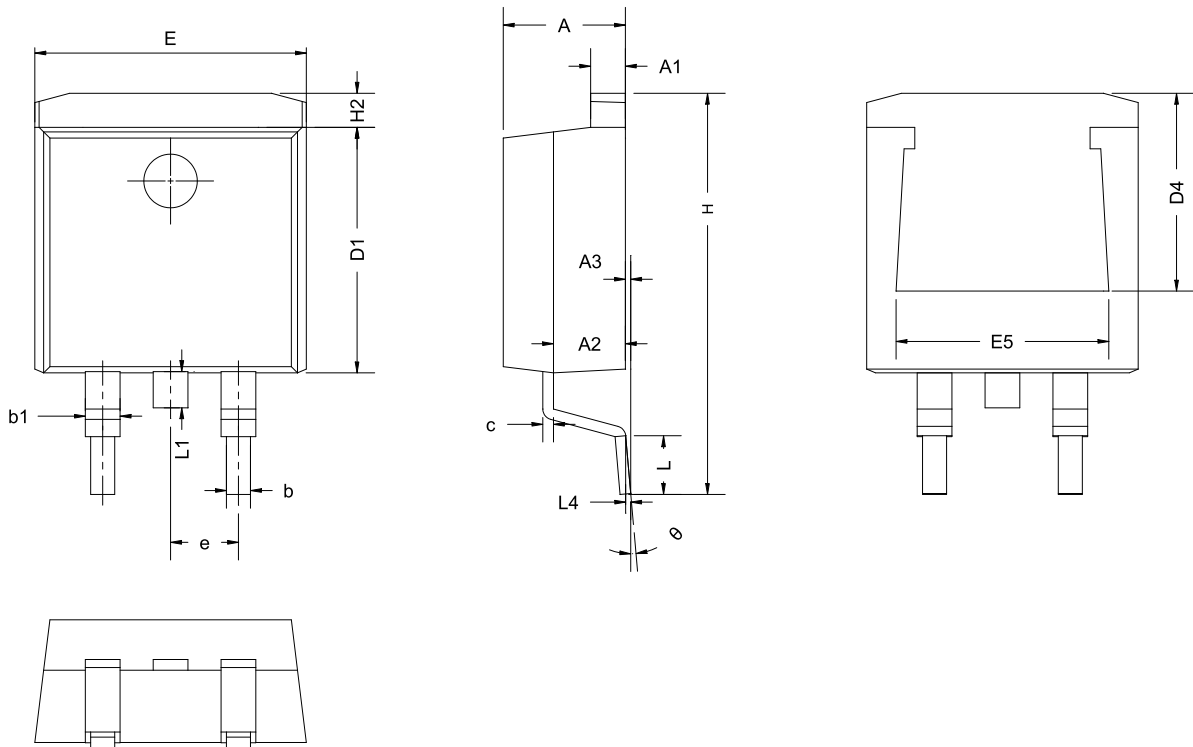
**Figure 6** Power dissipation as function of case temperature



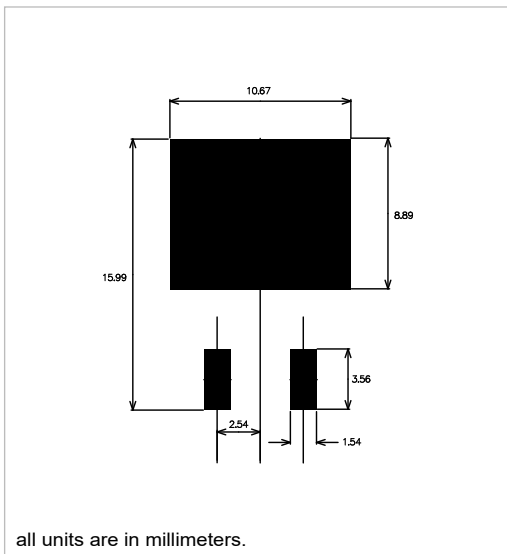
**Figure 7** Capacitance stored energy

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

**Package Dimensions**



**Recommended Solder Pad Layout**



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 0.0	2022-11-18	Release of the datasheet.

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