

$V_{RRM}$  = 650 V  
 $I_F(T_C=150^{\circ}C)$  = 20 A  
 $Q_C$  = 66 nC

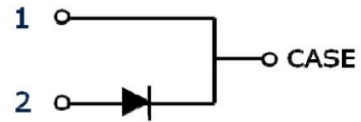
**Features:**

- 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)
- Uninterruptable power supplies
- Motor Drivers
- Power Factor Correction

**Pacakge Pin definitions**

- Pin1-Cathode
- Pin2-Anode

**Package Parameters**

Part Number	Marking	Package
B1D20065K	B1D20065K	TO-220-2L

**Maximum ratings**

Symbol	Parameter	Test conditions	Value	Unit
$V_{RRM}$	Repetitive Peak Reverse Voltage		650	V
$V_{RSM}$	Surge Peak Reverse Voltage		650	V
$I_F$	Continuous Forward Current	$T_C=25^{\circ}C$ $T_C=135^{\circ}C$ $T_C=150^{\circ}C$	62 30 20	A
$I_{FSM}$	Non-Repetitive Forward Surge Current	$T_C=25^{\circ}C$ , $t_p=10ms$ , sine halfwave	140	A
$\int i^2 dt$	$i^2t$ Value	$T_C=25^{\circ}C$ , $t_p=10ms$	98	A <sup>2</sup> S
$P_{tot}$	Power Dissipation	$T_C=25^{\circ}C$ $T_C=110^{\circ}C$	267 116	W
$T_j$	Operating junction temperature		-55~175	°C
$T_{stg}$	Storage temperature		-55~135	°C

**Thermal Characteristics**

Symbol	Parameter	Value			Unit
		Min.	Typ.	Max.	
$R_{th(jc)}$	Thermal resistance from junction to case		0.56		K/W

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

Symbol	Parameter	Test conditions	Value			Unit
			Min.	Typ.	Max.	
V <sub>DC</sub>	DC blocking voltage	T <sub>j</sub> =25°C	650			V
V <sub>F</sub>	Diode forward voltage	I <sub>F</sub> =20A T <sub>j</sub> =25°C I <sub>F</sub> =20A T <sub>j</sub> =175°C		1.48 1.87		V
I <sub>R</sub>	Reverse current	V <sub>R</sub> =650V T <sub>j</sub> =25°C V <sub>R</sub> =650V T <sub>j</sub> =175°C		0.7 6		μA

**Dynamic Characteristics (T<sub>j</sub>=25°C unless otherwise specified)**

Symbol	Parameter	Test conditions	Value			Unit
			Min.	Typ.	Max.	
Q <sub>C</sub>	Total capacitive charge	V <sub>R</sub> =400V T <sub>j</sub> =25°C $Q_c = \int_0^{V_R} C(V)dV$		66		nC
C	Total Capacitance	V <sub>R</sub> =1V f=1MHz V <sub>R</sub> =300V f=1MHz V <sub>R</sub> =600V f=1MHz		945 109 107		pF

**Typical Performance**

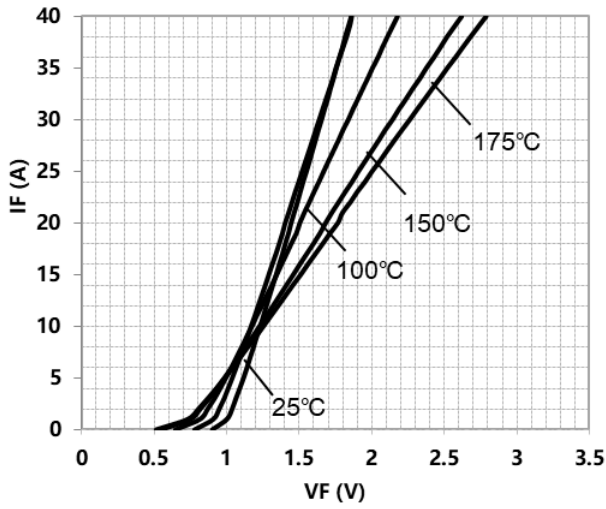


Figure 1. Typical forward characteristics

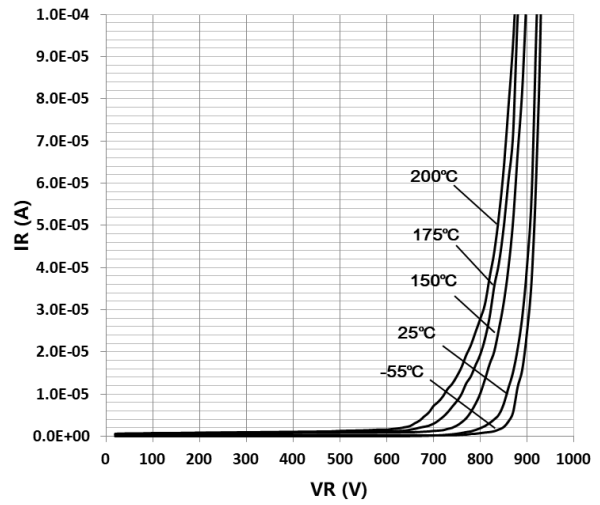


Figure 2. Typical reverse current as function of reverse voltage

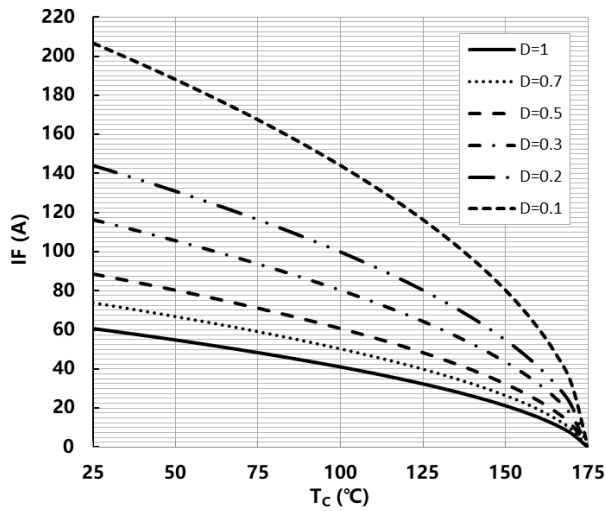


Figure 3. Diode forward current as function of temperature,  $D$ =duty cycle

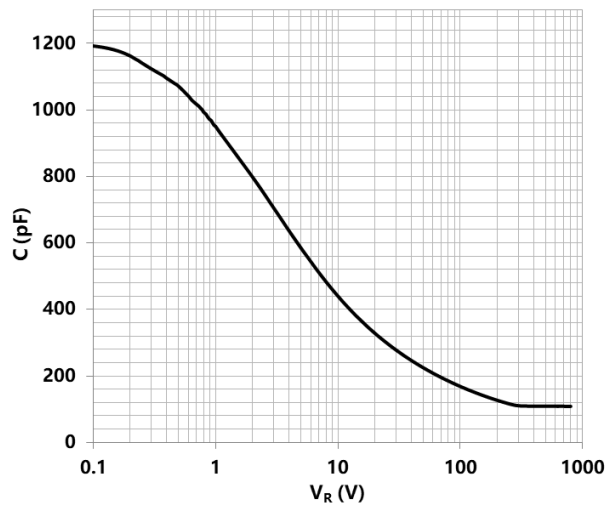


Figure 4. Typical capacitance as function of reverse voltage,  $C=f(V_R)$ ;  $T_j=25^\circ\text{C}$ ;  $f=1\text{ MHz}$

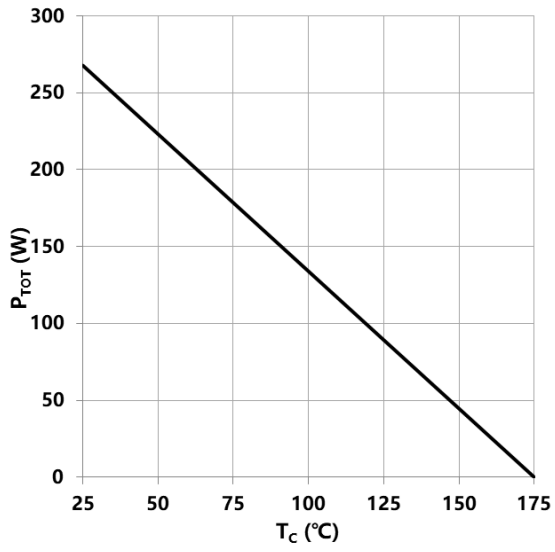
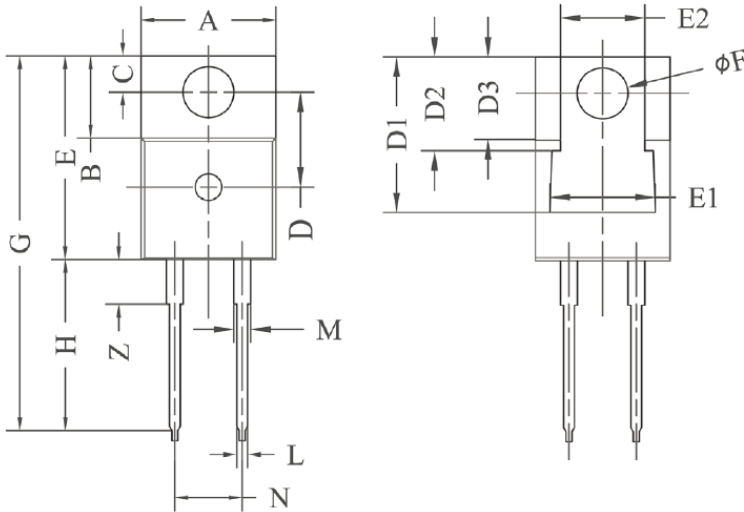


Figure 5. Power dissipation as function of case temperature

**Package Dimensions**


POS	Inches		Millimeters	
	Min	Max	Min	Max
A	.381	.410	9.677	10.414
B	.235	.255	5.969	6.477
C	.100	.120	2.540	3.048
D	.223	.337	5.664	8.560
D1	.457-.490		11.60-12.45 typ	
D2	.277-.303 typ		7.04-7.70 typ	
D3	.244-.252 typ		6.22-6.4 typ	
E	.590	.615	14.986	15.621
E1	.302	.326	7.68	8.28
E2	.227	.251	5.77	6.37
F	.143	.153	3.632	3.886
G	1.105	1.147	28.067	29.134
H	.500	.550	12.700	13.970
L	.025	.036	.635	.914
M	.045	.055	1.143	1.550
N	.195	.205	4.953	5.207
X	3°	5.5°	3°	5.5°
Y	.385	.410	9.779	10.414
Z	.130	.150	3.302	3.810

**Revision History:**

**Preliminary Version**

**Previous Revision:**

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**Shenzhen, China**  
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