

Key Features

- Zero Forward Recovery Voltage
- Zero Reverse Recovery Current
- Excellent Surge Current Capability
- Temperature Independent Switching
- Positive Temperature Coefficient on VF
- High Frequency Operation

Benefits

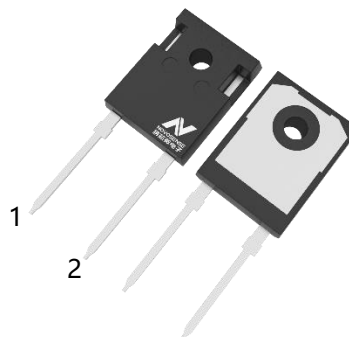
- Increased Power Density
- Essentially no Switching Losses
- Reduction of Heat Sink Requirements
- Higher Efficiency
- Reduced EMI

Applications

- Uninterruptible Power Supplies
- Switch Mode Power Supplies
- Power Factor Correction
- Motor Drivers

Device information

Part Number	V_{RRM}	$I_F(T_C=150^{\circ}C)$	Q_C	T_{jmax}	Package
NPD020N120A-DTOGT	1200V	20A	106nC	175°C	TO-247-2



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1. Maximum Ratings

at $T_j = 25^\circ\text{C}$ unless otherwise specified

Symbol	Parameter	Test conditions	Value	Unit
V_{RRM}	Repetitive peak reverse voltage		1200	V
V_{RSM}	Surge peak reverse voltage		1200	V
I_F	Continuous forward current	$T_c = 25^\circ\text{C}$ $T_c = 135^\circ\text{C}$ $T_c = 150^\circ\text{C}$	61 28 20	A
I_{FSM}	Non-Repetitive forward surge current	$T_c = 25^\circ\text{C}$, $t_p = 10\text{ms}$, Half Sine Wave	135	A
P_{tot}	Power dissipation	$T_c = 25^\circ\text{C}$ $T_c = 150^\circ\text{C}$	267 44	W
$\int i^2 dt$	i^2t value	$T_c = 25^\circ\text{C}$, $t_p = 10\text{ms}$	171	A^2S
T_j	Operating junction temperature		-55~175	$^\circ\text{C}$
T_{stg}	Storage temperature		-55~175	$^\circ\text{C}$
M	Mounting torque, M3 screw		0.6	Nm

2. Electrical Characteristics

Static Characteristics, at $T_j = 25^\circ\text{C}$ unless otherwise specified

Symbol	Parameter	Test conditions	Value			Unit
			Min.	Typ.	Max.	
V_{DC}	DC blocking voltage	$T_j = 25^\circ\text{C}$	1200			V
V_F	Diode forward voltage	$I_F = 20\text{A}$, $T_j = 25^\circ\text{C}$ $I_F = 20\text{A}$, $T_j = 175^\circ\text{C}$		1.41 1.90	1.60 2.80	V
I_R	Reverse current	$V_R = 1200\text{V}$, $T_j = 25^\circ\text{C}$ $V_R = 1200\text{V}$, $T_j = 175^\circ\text{C}$		0.5 5	200 400	μA

AC Characteristics, at $T_j = 25^\circ\text{C}$ unless otherwise specified

Symbol	Parameter	Test conditions	Value			Unit
			Min.	Typ.	Max.	
Q_C	Total capacitive charge	$V_R = 800\text{V}$, $T_j = 25^\circ\text{C}$		106		nC
C	Total capacitance	$V_R = 1\text{V}$, $f = 1\text{MHz}$ $V_R = 400\text{V}$, $f = 1\text{MHz}$ $V_R = 800\text{V}$, $f = 1\text{MHz}$		1144 99 74		pF

3. Thermal Characteristics

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

4. Electrical Characteristics Diagrams

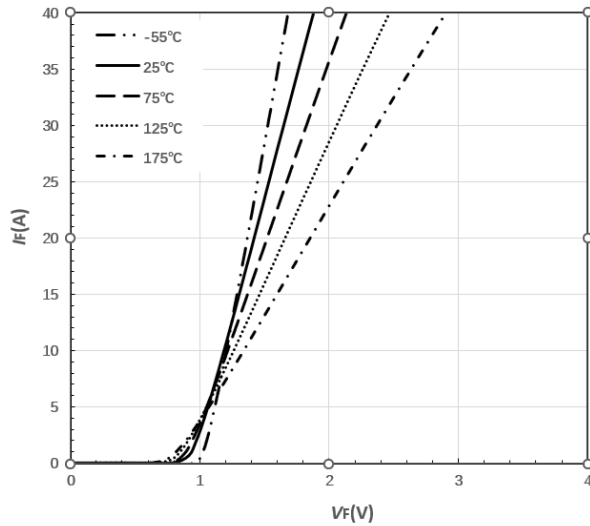


Figure 1. Typical forward characteristics

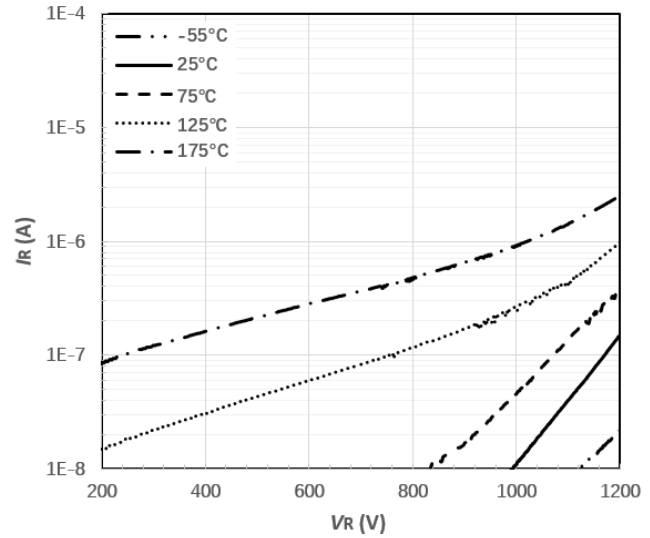


Figure 2. Typical reverse characteristics

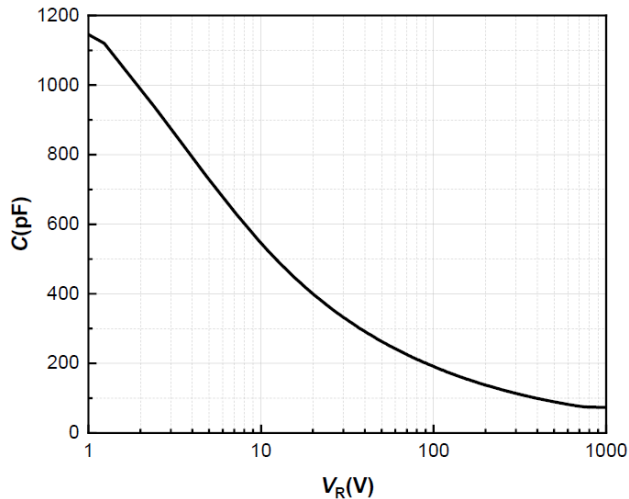


Figure 3. Typical capacitance as function of reverse voltage, $C=f(V_R)$; $T_j=25^\circ\text{C}$; $f=1\text{ MHz}$

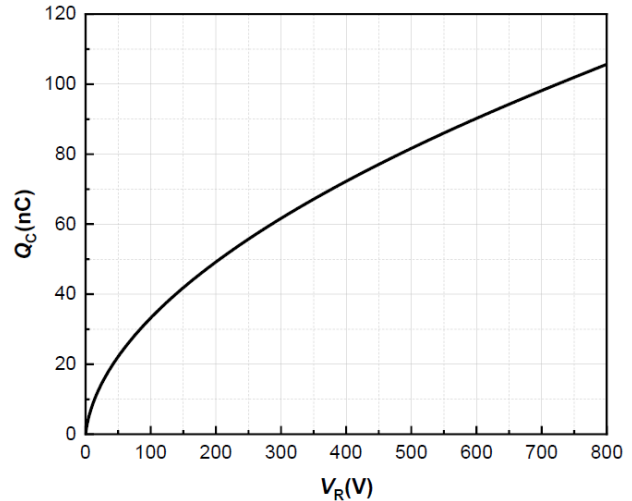


Figure 4. Typical reverse charge as function of reverse voltage

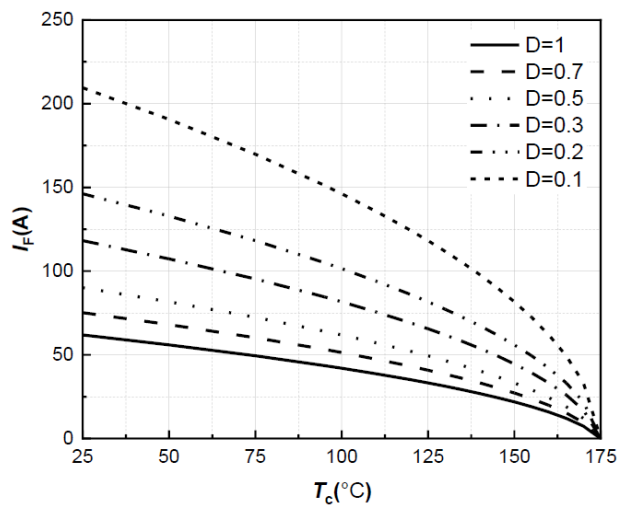


Figure 5. Forward current as function of case temperature

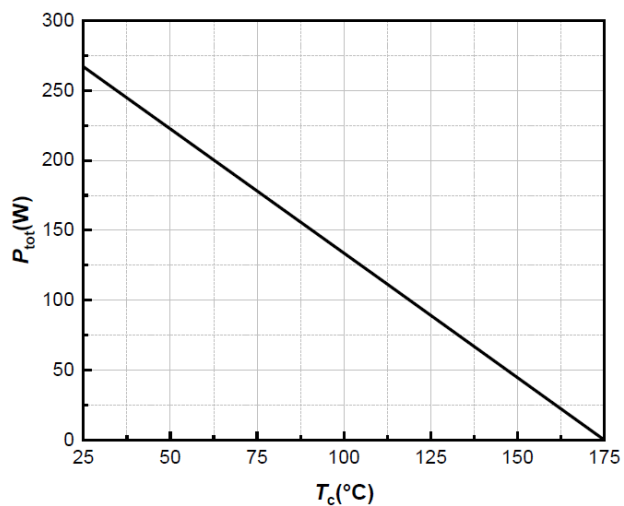


Figure 6. Power dissipation as function of case temperature

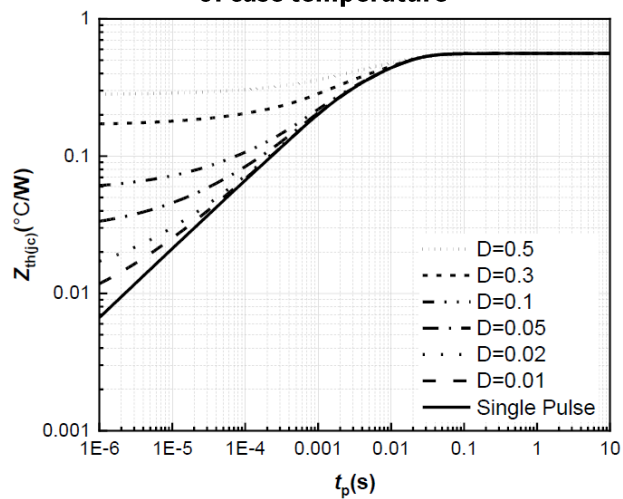
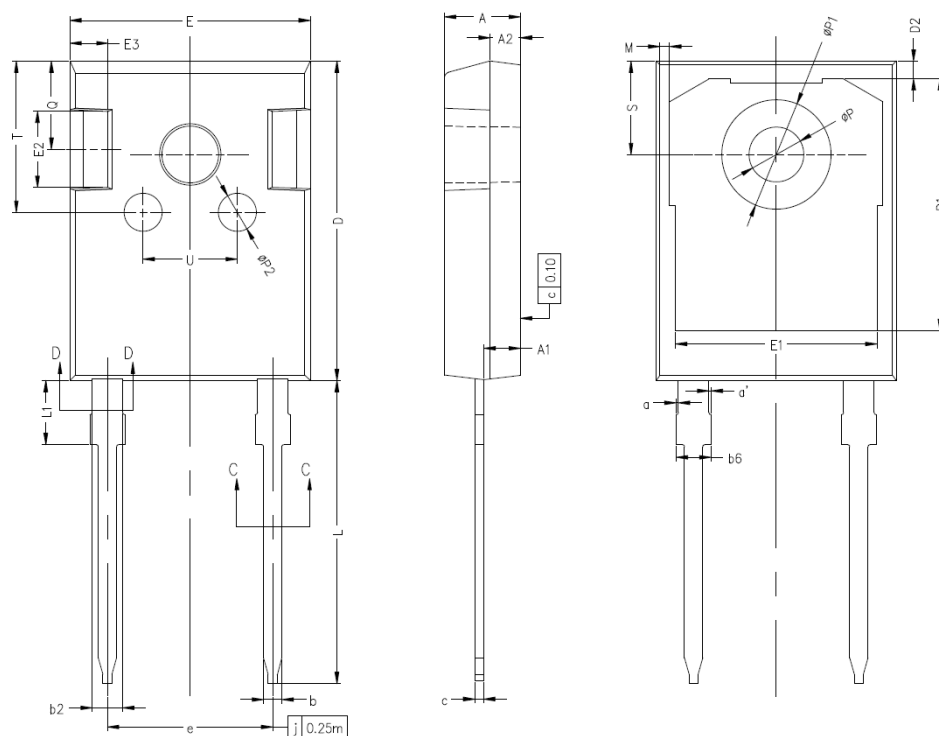


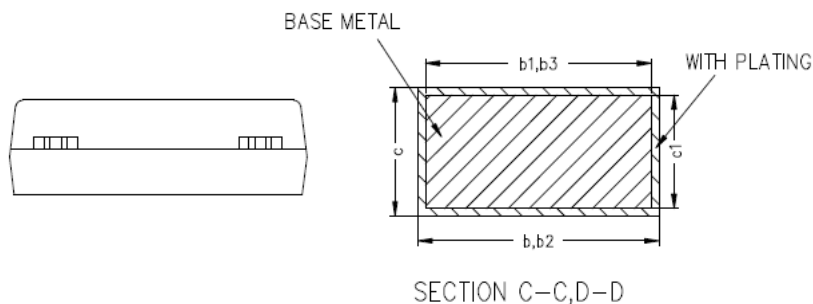
Figure 7. Max transient thermal impedance

5. Package Information



(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	4.90	5.00	5.10
A1	2.31	2.41	2.51
A2	1.90	2.00	2.10
a	0	—	0.15
a'	0	—	0.15
b	1.16	—	1.29
b1	1.15	1.20	1.25
b2	1.96	—	2.06
b3	1.95	2.00	2.02
b6	—	—	2.25
c	0.59	—	0.66
c1	0.58	0.60	0.62
D	20.90	21.00	21.10
D1	16.25	16.55	16.85
D2	1.05	1.20	1.35
E	15.70	15.80	15.90
E1	13.06	13.26	13.46
E2	4.90	5.00	5.10
E3	2.40	2.50	2.60
e	10.78	10.88	10.98
L	19.80	19.92	20.10
L1	3.93	—	4.46
M	0.35	—	0.95
P	3.50	3.60	3.70
P1	7.00	—	7.40
P2	2.40	2.50	2.60
Q	5.60	—	6.00
S	6.05	6.15	6.25
T	9.80	—	10.20
U	6.00	—	6.40



NOTES:

1. ALL DIMENSIONS REFER TO JEDEC STANDARD TO-247 AD DO NOT INCLUDE MOLD FLASH OR PROTRUSIONS.
2. EJECTION MARK DEPTH $0.10^{+0.15}_{-0.05}$.

6. Ordering Information

Part Number	Package Type	Packing Type	SPQ
NPD020N120A-DTOGT	TO247-2	Tube	30

7. Revision History

Revision	Description	Date
1.0	Released version	2023/1/10

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