

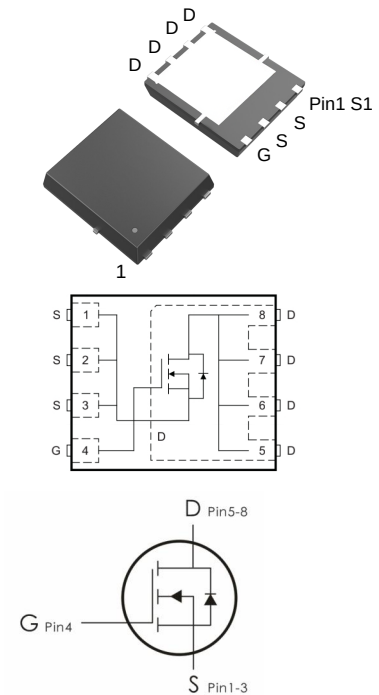
Description:

This N-Channel MOSFET uses advanced trench technology and design to provide excellent $R_{DS(on)}$ with low gate charge.

It can be used in a wide variety of applications.

Features:

- 1) $V_{DS}=20V, I_D=90A, R_{DS(ON)} < 4m\Omega @ V_{GS}=4.5V$ (Typ: $2.5m\Omega$)
- 2) Low gate charge.
- 3) Green device available.
- 4) Advanced high cell density trench technology for ultra low $R_{DS(ON)}$.
- 5) Excellent package for good heat dissipation.
- 6) MSL3



Package Marking and Ordering Information:

Part NO.	Marking	Package	Packing
NB004NG	B004N	DFN5*6-8	5000 pcs/Reel

Absolute Maximum Ratings: ($T_C=25^\circ C$ unless otherwise noted)

Symbol	Parameter	Ratings	Units
V_{DS}	Drain-Source Voltage	20	V
V_{GS}	Gate-Source Voltage	± 12	V
I_D	Continuous Drain Current ¹	90	A
	Continuous Drain Current- $T_C=100^\circ C$ ¹	63	
I_{DM}	Pulsed Drain Current ²	360	
P_D	Power Dissipation	54	W
E_{AS}	Single pulse avalanche energy ³	100	mJ
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55-+175	$^\circ C$

Thermal Characteristics:

Symbol	Parameter	Max	Units
$R_{\theta JC}$	Thermal Resistance, Junction to Case	2.32	$^\circ C/W$

Electrical Characteristics: ($T_C=25^{\circ}\text{C}$ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250 μ A	20	---	---	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{GS} =0V, V _{DS} =20V	---	---	1	μ A
I _{GSS}	Gate-Source Leakage Current	V _{GS} =± 12V, V _{DS} =0A	---	---	± 100	nA
On Characteristics (Note3)						
V _{GS(th)}	Gate-Source Threshold Voltage	V _{GS} =V _{DS} , I _D =250 μ A	0.4	0.7	1	V
R _{DS(on)}	Drain-Source On Resistance ⁴	V _{GS} =4.5V, I _D =20A	---	2.5	4	m Ω
		V _{GS} =2.5V, I _D =10A	---	3.5	6	
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =10V, V _{GS} =0V, f=1MHz	---	3100	---	pF
C _{oss}	Output Capacitance		---	500	--	
C _{rss}	Reverse Transfer Capacitance		---	455	---	
Switching Characteristics						
t _{d(on)}	Turn-On Delay Time	V _{DS} =10V, I _D =30A, R _G =1.8 Ω, V _{GS} =4.5V	---	20	---	ns
t _r	Rise Time		---	32	---	ns
t _{d(off)}	Turn-Off Delay Time		---	75	---	ns
t _f	Fall Time		---	28	---	ns
Q _g	Total Gate Charge	V _{GS} =4.5V, V _{DS} =10V, I _D =30A	---	34	---	nC
Q _{gs}	Gate-Source Charge		---	4	---	nC
Q _{gd}	Gate-Drain “Miller” Charge		---	20	---	nC
Drain-Source Diode Characteristics						
V _{SD}	Diode Forward Voltage	V _{GS} =0V, I _{SD} =30A	---	---	1.2	V
I _S	Continuous Drain Current	V _D =V _G =0V	---	---	75	A
I _{SM}	Pulsed Drain Current		---	---	300	A
T _{rr}	Reverse Recovery Time	I _F =30A, T _J =25 °C	---	23	---	ns
Q _{rr}	Reverse Recovery Charge	dI/dt=100A/us	---	10	---	nC

Notes:

1. Computed continuous current assumes the condition of $T_{j,Max}$ while the actual continuous current depends on the thermal & electro-mechanical application board design
2. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
3. EAS condition : $T_J=25^{\circ}C, V_{DD}=10V, V_G=4.5V, L=0.5mH$
4. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 0.5\%$

Typical Characteristics: ($T_C=25^{\circ}C$ unless otherwise noted)

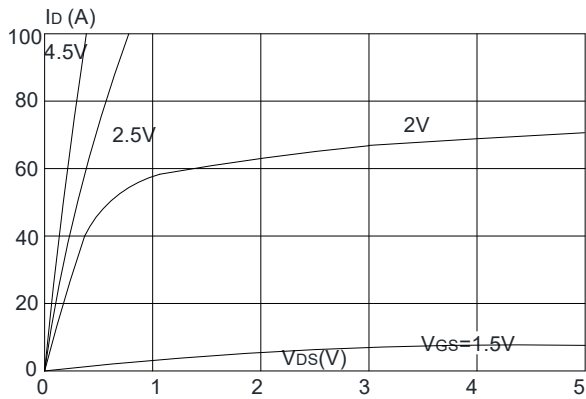


Figure 1: Output Characteristics

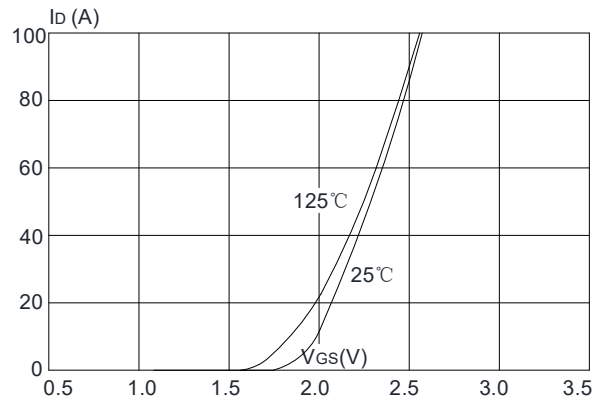


Figure 2: Typical Transfer Characteristics

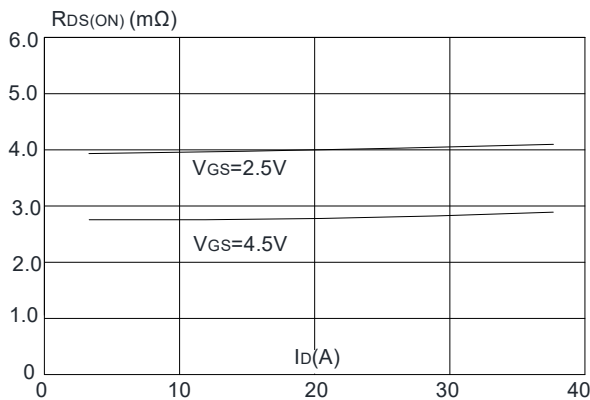


Figure 3: On-resistance vs. Drain Current

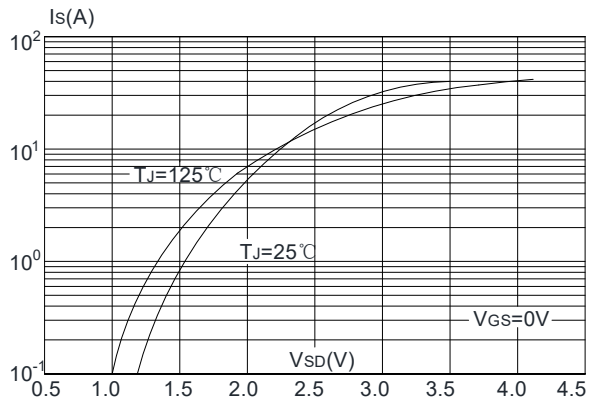


Figure 4: Body Diode Characteristics

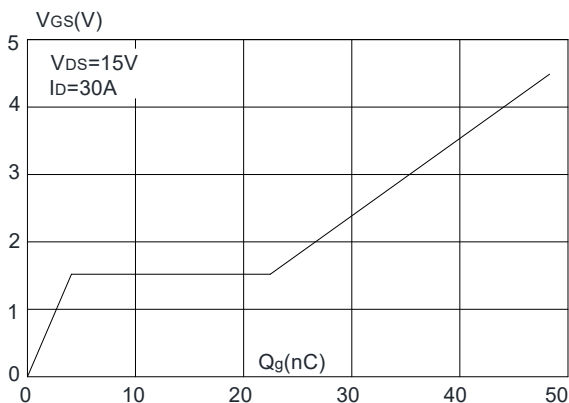


Figure 5: Gate Charge Characteristics

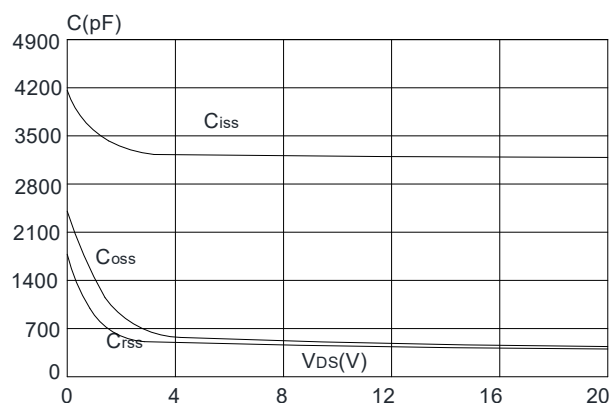


Figure 6: Capacitance Characteristics

Junction Temperature

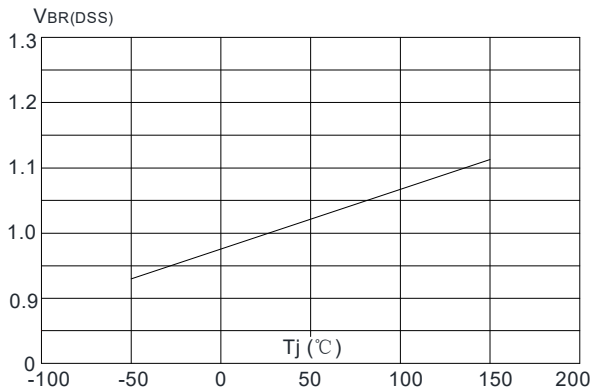


Figure 7: Normalized Breakdown Voltage vs.

Junction Temperature

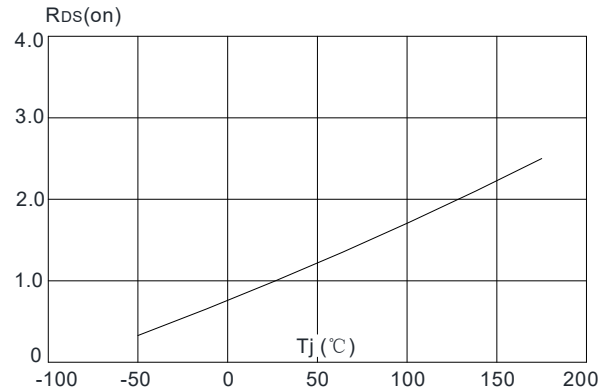


Figure 8: Normalized on Resistance vs.

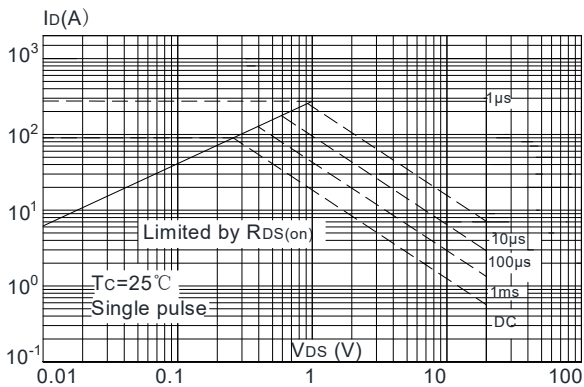


Figure 9: Maximum Safe Operating Area

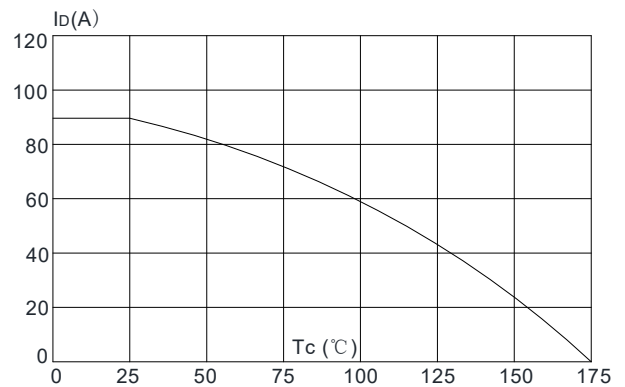


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

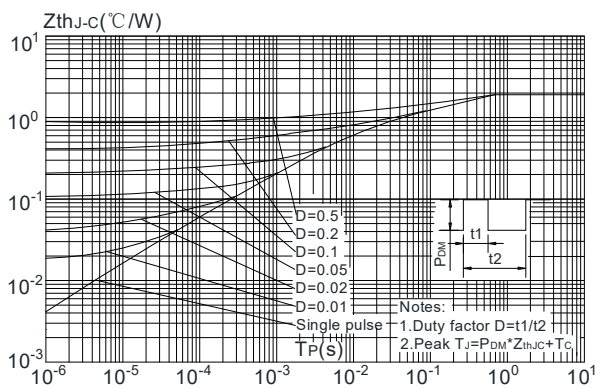
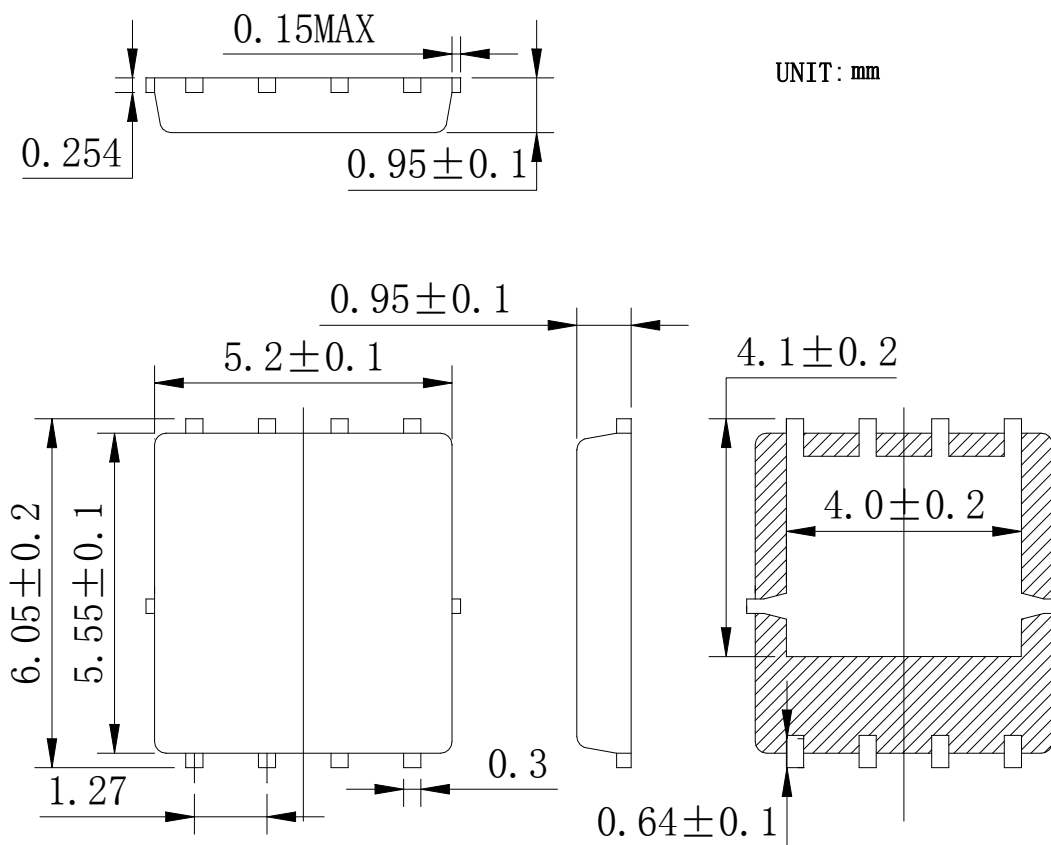


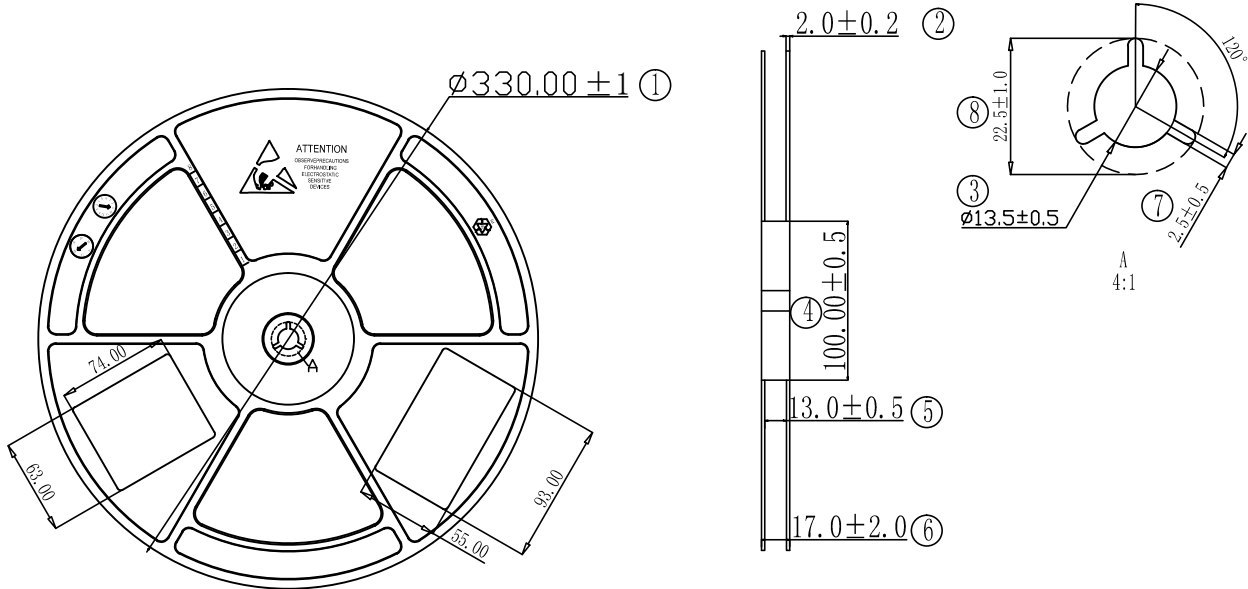
Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case

DFN5x6-8 Package Information:

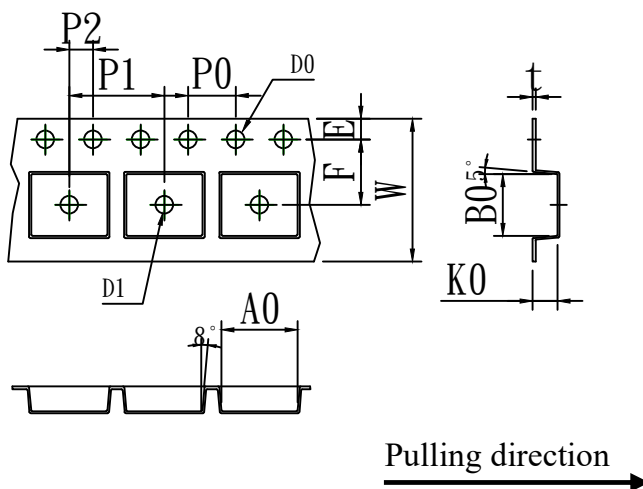


Tape & Reel Information

Dimensions in mm



Symbol	A0	B0	K0	D0	D1	P0	P1	10*P0
Spec	6.15 $\pm$ 0.10	5.40 $\pm$ 0.10	1.30 $\pm$ 0.10	1.55 $\pm$ 0.10	1.55 $\pm$ 0.10	4.00 $\pm$ 0.10	8.00 $\pm$ 0.10	40.00 $\pm$ 0.10
Symbol	W	E	F	P2	t			
Spec	12.00 $\pm$ 0.10	1.75 $\pm$ 0.10	5.50 $\pm$ 0.10	2.00 $\pm$ 0.10	0.20 $\pm$ 0.05			



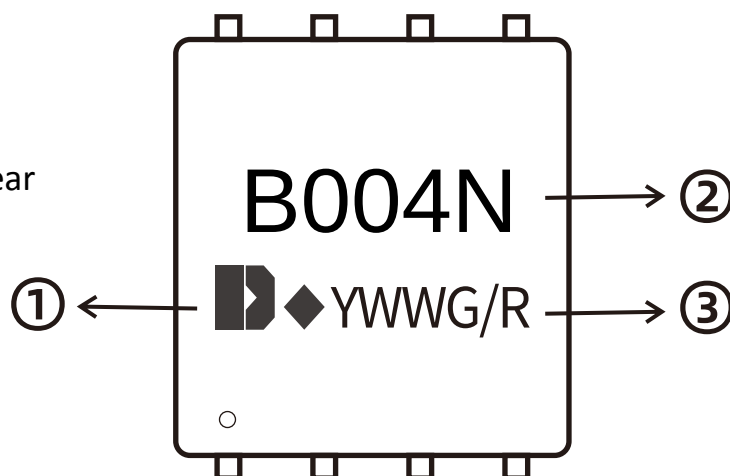
Marking Information:

- ①. Doingter LOGO
- ②. Part NO.
- ③. Date Code(YWWG / R)

Y : Year Code , last digit of the year

WW : Week Code(01-53)

G/R : G(Green) /R(Lead Free)



Previous Version

Version	Date	Subjects (major changes since last revision)
1.0	2025-09-09	Release of final version

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