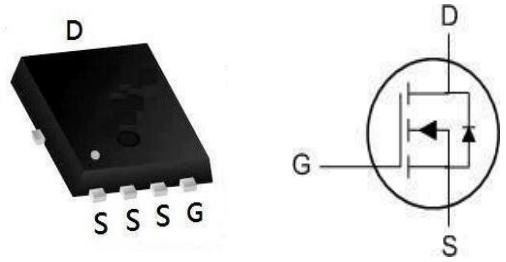
DONGGUAN NANJING ELECTRONICS LTD.,

Plastic-Encapsulate MOSFETS

NJ50N03D3 N-Channel Enhancement Mode Field Effect Transistor

Product Summary

- V_{DS} 30V
- I_D 50A
- $R_{DS(ON)}$(at V_{GS}=10V) typ 7mohm
- $R_{DS(ON)}$(at V_{GS}=4.5V) typ 10mohm



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General Description

- Trench Power LV MOSFET technology
- Excellent package for heat dissipation
- High density cell design for low $R_{DS(ON)}$

Applications

- High current load applications
- Load switching
- Hard switched and high frequency circuits
- Uninterruptible power supply

Absolute Maximum Ratings (T_A=25℃unless otherwise noted)

Parameter		Symbol	Limit	Unit
Drain-source Voltage		V_{DS}	30	V
Gate-source Voltage		V_{GS}	±20	V
Drain Current	T_C=25℃	I_D	50	A
	T_C=100℃		35	
Pulsed Drain Current [A]		I_{DM}	190	A
Total Power Dissipation	T_C=25℃	P_D	42	W
	T_C=100℃		21	W
Single Pulse Avalanche Energy [B]		E_{AS}	225	mJ
Thermal Resistance Junction-to-Case [C]		$R_{\theta JC}$	3.6	℃/ W
Junction and Storage Temperature Range		T_J ,T_{STG}	-55～+175	℃

Ordering Information (Example)

PREFERED P/N	PACKING CODE	Marking	MINIMUM PACKAGE(pcs)	INNER BOX QUANTITY(pcs)	OUTER CARTON QUANTITY(pcs)	DELIVERY MODE
NJ50N03D3	F1	50N03	5000	10000	100000	13“ reel

MOSFET ELECTRICAL CHARACTERISTICS

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Static Parameter						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}= 0V, I_D=250μA	30			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=30V,V_{GS}=0V			1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}= ±20V, V_{DS}=0V			±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}= V_{GS}, I_D=250μA	1.0	1.5	2.5	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}= 10V, I_D=15A		7	10	mΩ
		V_{GS}= 4.5V, I_D=15A		10	14	
Diode Forward Voltage	V_{SD}	I_S=20A,V_{GS}=0V			1.2	V
Maximum Body-Diode Continuous Current	I_S				50	A
Dynamic Parameters						
Input Capacitance	C_{iss}	V_{DS}=15V,V_{GS}=0V,f=1MHZ		2504		pF
Output Capacitance	C_{oss}			323		
Reverse Transfer Capacitance	C_{rss}			283		
Gate resistance	R_g	F= 1MHZ			3	Ω
Switching Parameters						
Total Gate Charge	Q_g	V_{GS}=10V,V_{DS}=15V,I_D=20A		54		nC
Gate-Source Charge	Q_{gs}			26		
Gate-Drain Charge	Q_{gd}			8.5		
Reverse Recovery Chrage	Q_{rr}	I_F=15A, di/dt=100A/us		10.2		
Reverse Recovery Time	t_{rr}			15		ns
Turn-on Delay Time	$t_{D(on)}$	V_{GS}=10V,V_{DD}=20V, I_D=2A R_{GEN}=3Ω		11		
Turn-on Rise Time	t_r			20		
Turn-off Delay Time	$t_{D(off)}$			41		
Turn-off fall Time	t_f			25		

A. Pulse Test: Pulse Width≤300us,Duty cycle ≤2%.

B. $R_{\theta JA}$ is the sum of the junction-to-Case and Case-to-ambient thermal resistance, where the Case thermal reference is defined as the solder mounting surface of the drain pins. $R_{\theta JC}$ is guaranteed by design, while $R_{\theta JA}$ is determined by the board design. The maximum rating presented here is based on mounting on a 1 in 2 pad of 2oz copper.

Typical Performance Characteristics

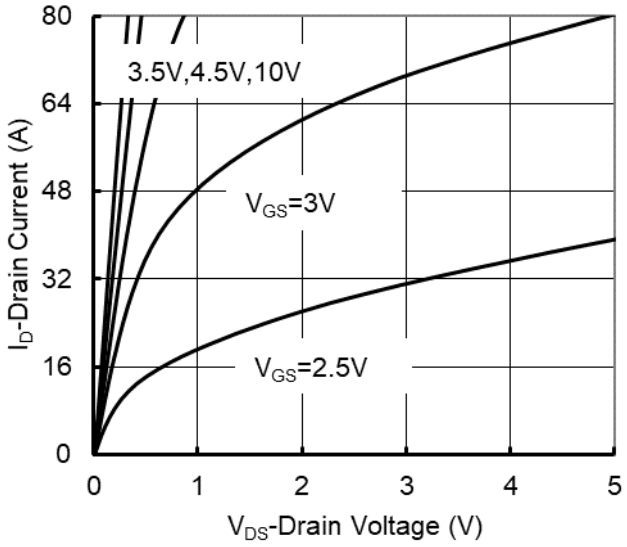


Figure1. Output Characteristics

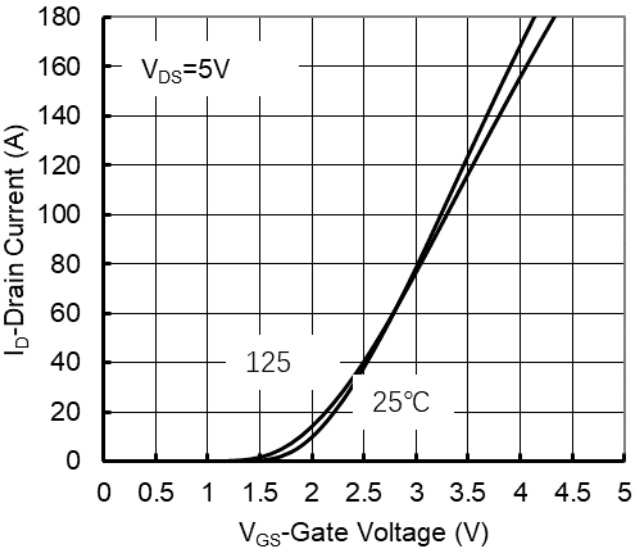


Figure2. Transfer Characteristics

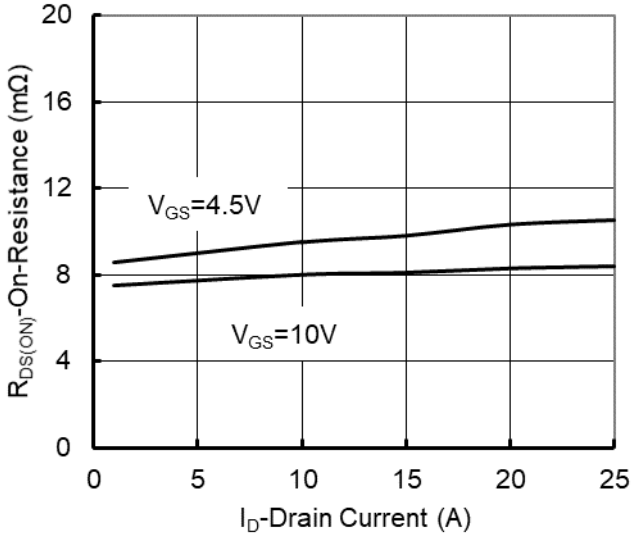


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

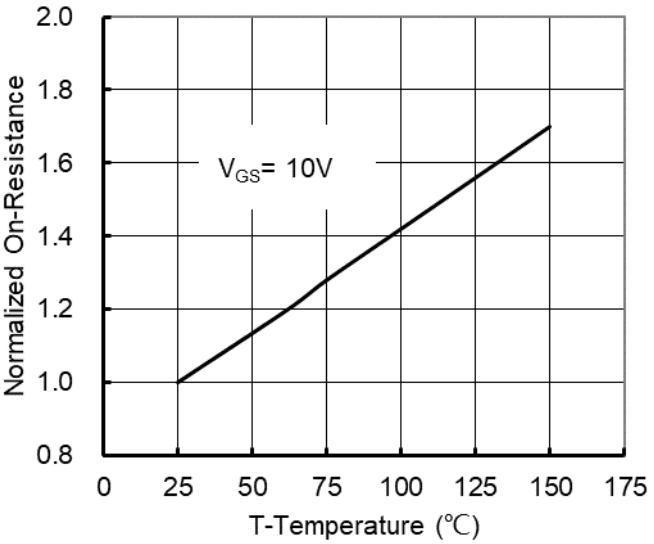


Figure 4: On-Resistance vs. Junction Temperature

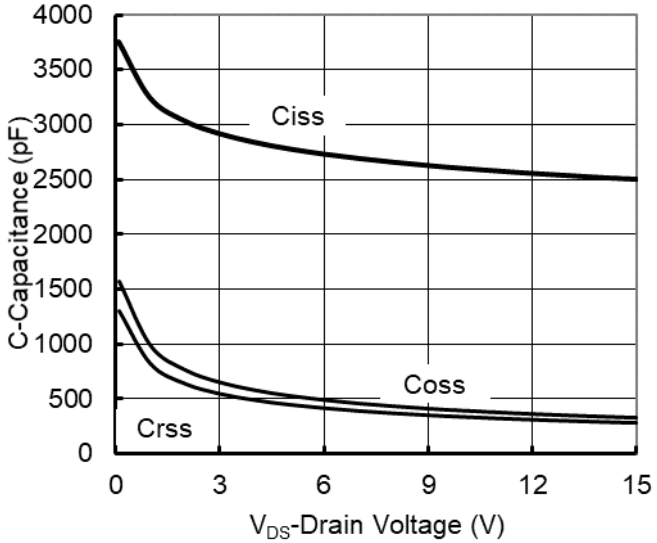


Figure5. Capacitance Characteristics

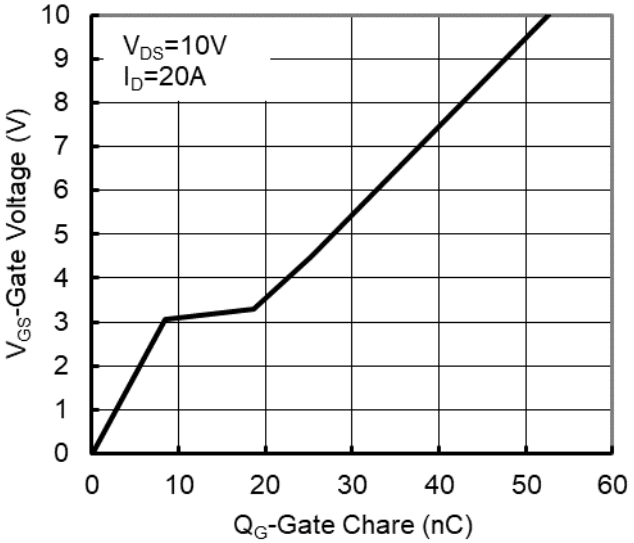


Figure6. Gate Charge

Typical Performance Characteristics

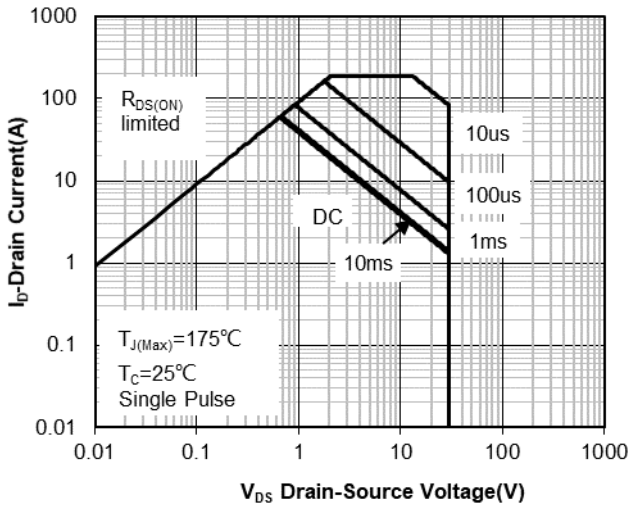


Figure7. Safe Operation Area

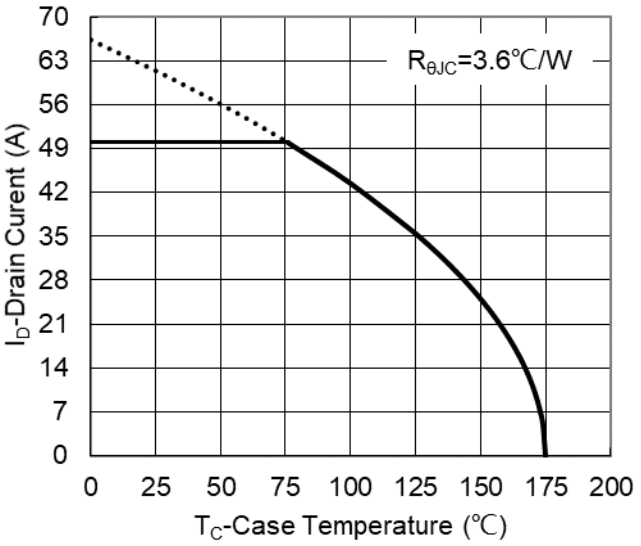


Figure8. Maximum Continuous Drain Current vs Case Temperature

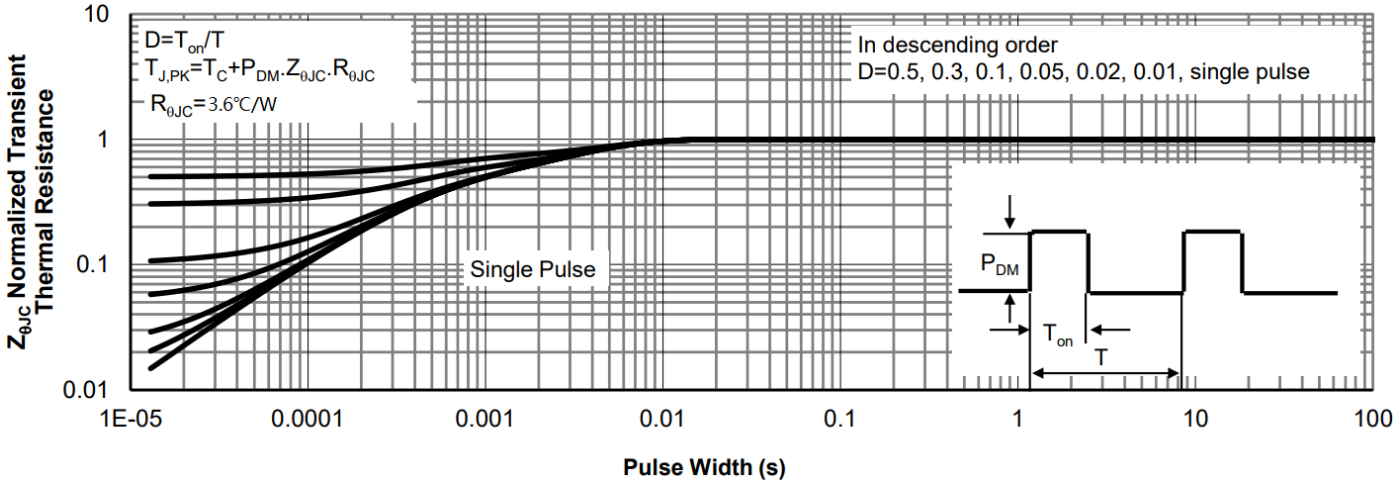
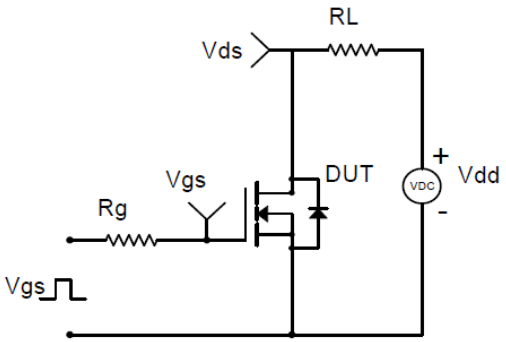
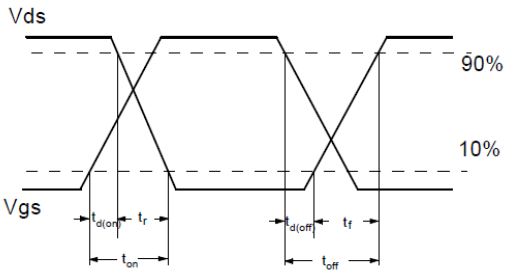


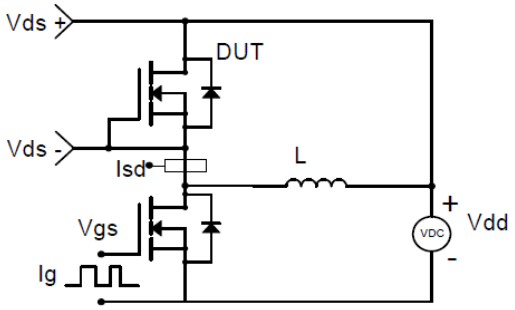
Figure9.Normalized Maximum Transient Thermal Impedance

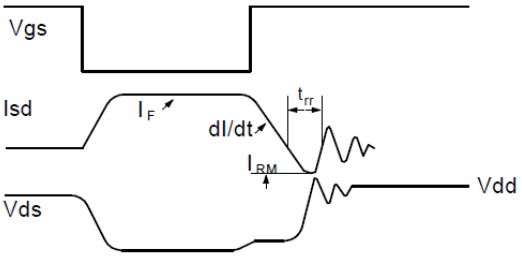
Typical Performance Characteristics



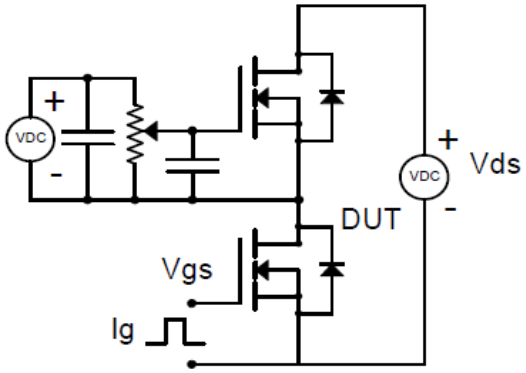


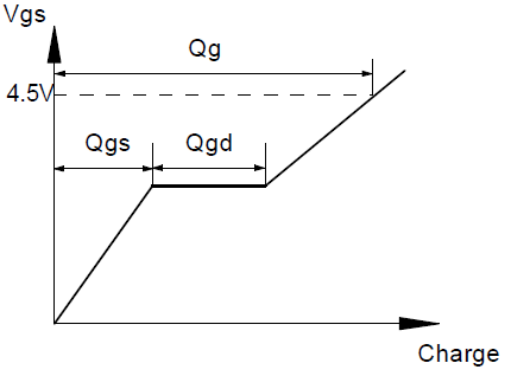
Resistive Switching Test Circuit & Waveforms



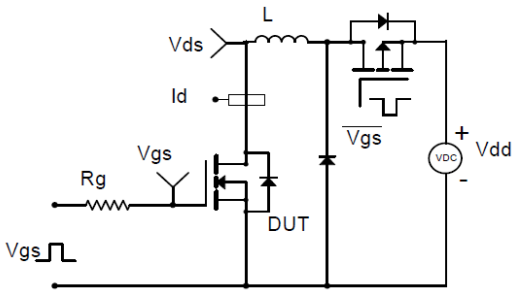


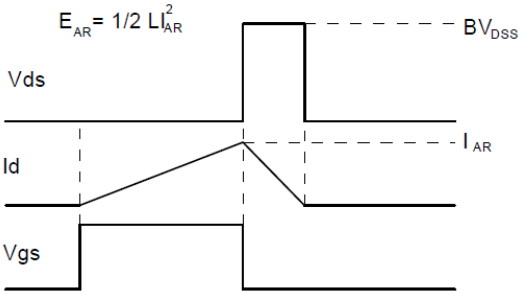
Diode Recovery Test Circuit & Waveforms



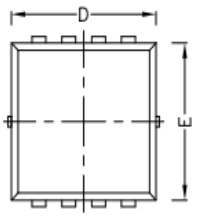


Gate Charge Test Circuit & Waveform

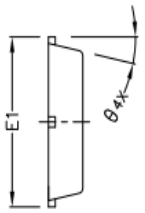




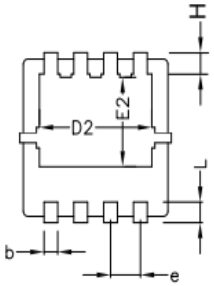
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



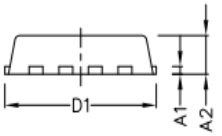
TOP VIEW



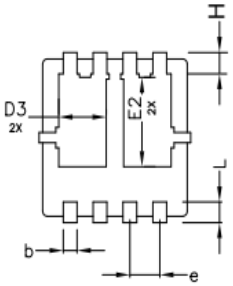
SIDE VIEW



BOTTOM VIEW
OPTION 1



SIDE VIEW



BOTTOM VIEW
OPTION 2

COMMON DIMENSIONS (UNITS OF MEASURE IS mm)			
	MIN	NORMAL	MAX
A1	0.152 BSC		
A2	0.700	0.800	0.900
b	0.250	–	0.400
D	3.050	3.150	3.250
D1	3.200	3.300	3.400
D2	2.350	2.450	2.550
D3	0.935	1.035	1.135
E1	3.200	3.300	3.400
E	2.900	3.000	3.100
E2	1.635	1.735	1.835
e	0.650 REF		
L	0.300	0.400	0.500
H	0.250	–	0.630
θ	12° TYPE		