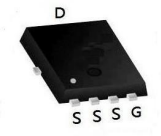
150N03NF

N-Ch 30V Fast Switching MOSFETs

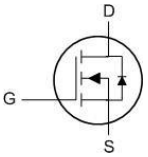
Description

The 150N03NF is the high cell density trenched N-ch MOSFETs, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications.

The 150N03NF meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

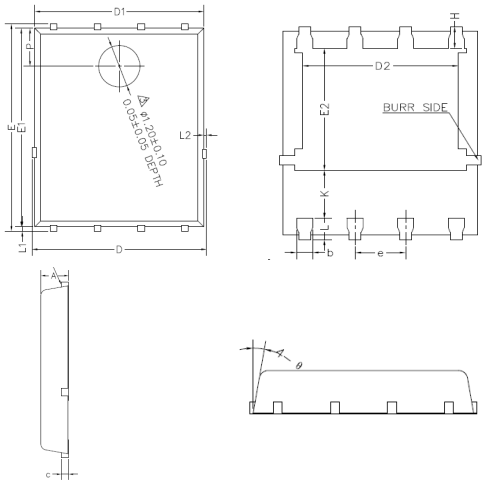


Super Low Gate Charge
100% EAS Guaranteed
Green Device Available
Excellent CdV/dt effect decline
Advanced high cell density Trench technology



Product Summary

BVDSS	RDSON	ID
30V	1.5mΩ	150A



PDFN5X6

Dimensions In Millimeters								
SYMBOL	min	max	SYMBOL	min	max	SYMBOL	min	max
A	0.95	1.20	E	5.9	6.1	L2		0.2
b	0.25	0.40	E1	5.7	5.8	θ		13°
c	0.21	0.34	E2	3.34	3.54	P	1.0	1.2
D		5.1	H	0.51	0.71			
D1	4.8	5.0	K	1.1				
D2	3.91	4.20	L	0.51	0.71			
e	1.17	1.37	L1	0.06	0.2			

Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	30	V
V_{GS}	Gate-Source Voltage	±20	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ 10V[1]	150	A
I_D@T_C=100℃	Continuous Drain Current, V_{GS} @ 10V[1]	80	A
I_{DM}	Pulsed Drain Current[2]	450	A
EAS	Single Pulse Avalanche Energy[3]	580	mJ
I_{AS}	Avalanche Current	60	A
P_D@T_C=25℃	Total Power Dissipation[4]	87	W
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient [1]	---	62	℃/W
$R_{\theta JC}$	Thermal Resistance Junction-Case[1]	---	2.1	℃/W

150N03NF

Electrical characteristic (T_J = 25°C unless otherwise specified)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
Off characteristics						
BV_{DSS}	Drain to source breakdown voltage	V_{GS}=0V, I_D=250uA	30			V
ΔBV_{DSS} / ΔT_J	Breakdown voltage temperature coefficient	I_D=250uA, referenced to 25°C		0.02		V/°C
I_{DSS}	Drain to source leakage current	V_{DS}=30V, V_{GS}=0V			1	uA
		V_{DS}=24V, T_J=125°C			50	uA
I_{GSS}	Gate to source leakage current, forward	V_{GS}=20V, V_{DS}=0V			100	nA
	Gate to source leakage current, reverse	V_{GS}=-20V, V_{DS}=0V			-100	nA
On characteristics						
$V_{GS(TH)}$	Gate threshold voltage	V_{DS}=V_{GS}, I_D=250uA	1.2		2.4	V
$R_{DS(ON)}$	Drain to source on state resistance	V_{GS}=4.5V, I_D=30A,T_J=25°C		2.2	4.8	mΩ
		V_{GS}=10V, I_D=30A,T_J=25°C		1.5	2.9	mΩ
		V_{GS}=10V, I_D=30A,T_J=125°C		2.5		mΩ
G_{fs}	Forward transconductance	V_{DS}=5V, I_D=30A		73		S
Dynamic characteristics						
C_{iss}	Input capacitance	V_{GS}=0V, V_{DS}=15V, f=1MHz		6272		pF
C_{oss}	Output capacitance			1022		
C_{rss}	Reverse transfer capacitance			718		
$t_{d(on)}$	Turn on delay time	V_{DS}=15V, I_D=30A, R_G=4.7Ω, V_{GS}=10V (note 4)		20		ns
t_r	Rising time			58		
$t_{d(off)}$	Turn off delay time			158		
t_f	Fall time			77		
Q_g	Total gate charge	V_{DS}=24V, V_{GS}=10V, I_D=30A , I_G=5mA (note 4)		143		nC
Q_{gs}	Gate-source charge			17		
Q_{gd}	Gate-drain charge			43		
R_g	Gate resistance	V_{DS}=0V, Scan F mode		4.2		Ω

Source to drain diode ratings characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_S	Continuous source current	Integral reverse p-n Junction diode in the MOSFET			110	A
I_{SM}	Pulsed source current				440	A
V_{SD}	Diode forward voltage drop.	I_S=45A, V_{GS}=0V			1.4	V
t_{rr}	Reverse recovery time	I_S=30A, V_{GS}=0V, dI_F/dt=100A/us		26		ns
Q_{rr}	Reverse recovery charge			10		nC

※. Notes
1. Repeatitive rating : pulse width limited by junction temperature.
2. L =0.5mH, I_{AS} =48A, V_{DD}=30V, R_G=25Ω, Starting T_J = 25°C
3. I_{SD} ≤30A, di/dt = 100A/us, V_{DD} ≤ BV_{DSS}, Staring T_J =25°C
4. Pulse Test : Pulse Width ≤ 300us, duty cycle ≤ 2%.

RATING AND CHARACTERISTIC CURVES (150N03NF)

Fig. 1. On-state characteristics

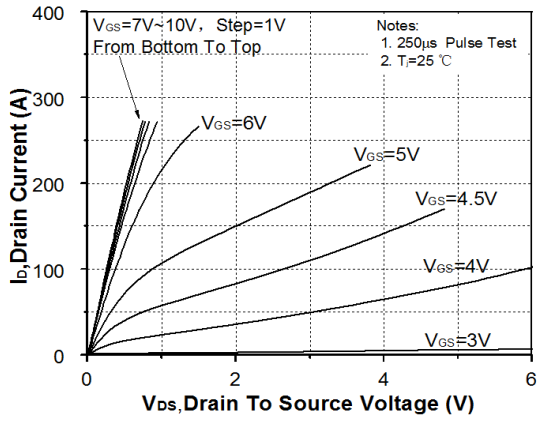


Fig. 2. Transfer Characteristics

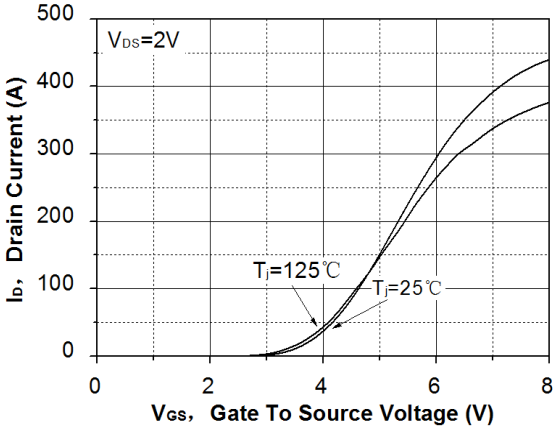


Fig. 3. On-resistance variation vs. drain current and gate voltage

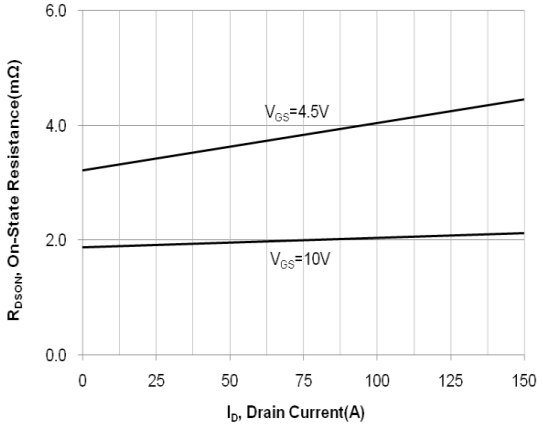


Fig. 4. On-state current vs. diode forward voltage

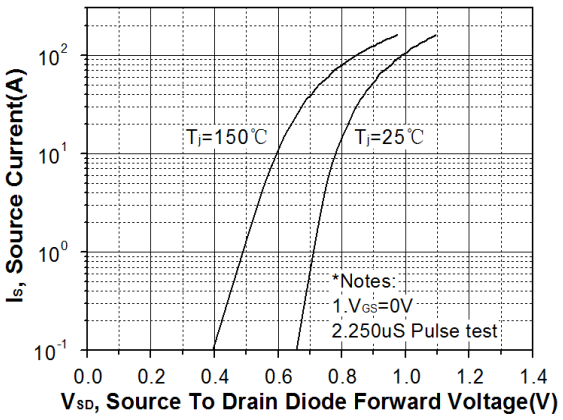


Fig 5. Breakdown voltage variation vs. junction temperature

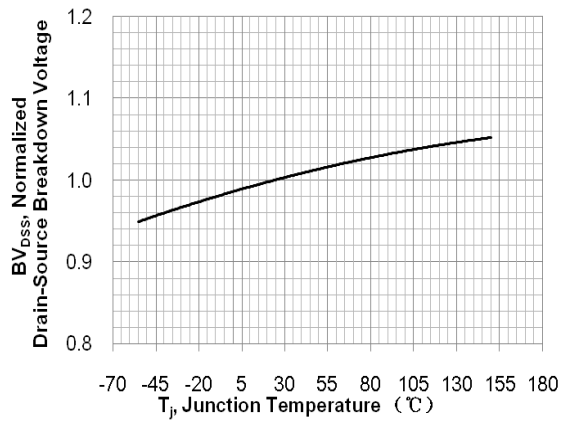
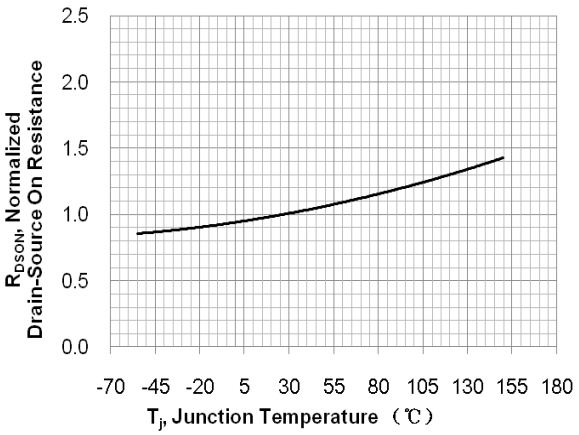


Fig. 6. On-resistance variation vs. junction temperature



RATING AND CHARACTERISTIC CURVES (150N03NF)

Fig. 7. Gate charge characteristics

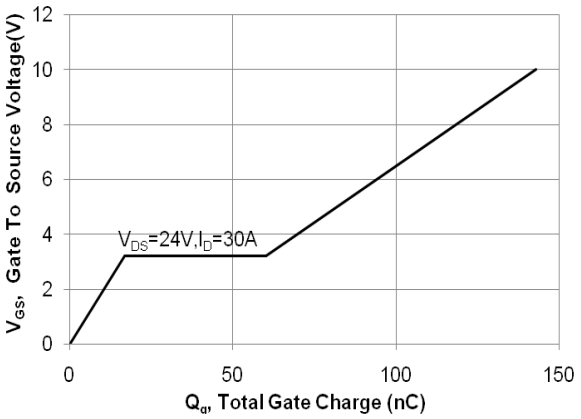


Fig. 8. Capacitance Characteristics

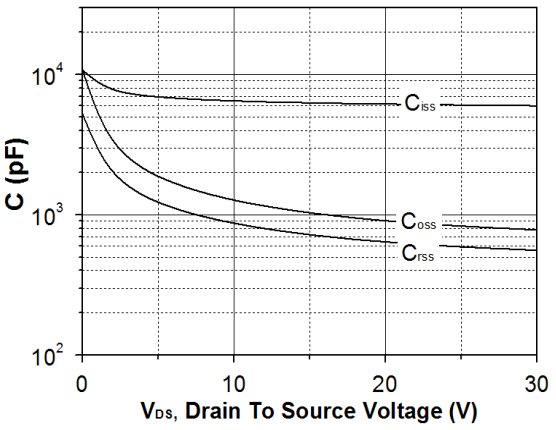


Fig. 9. Maximum safe operating area

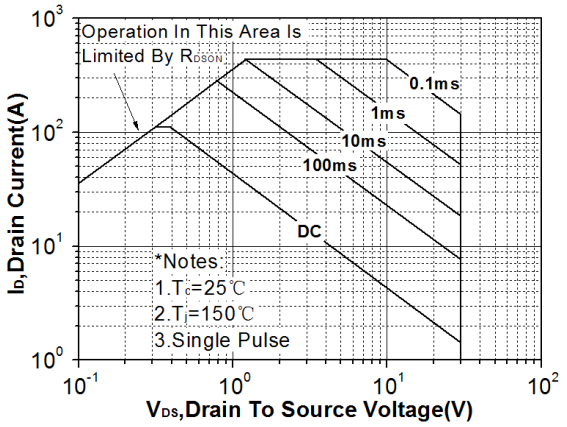


Fig. 10. Maximum drain current vs. case temperature

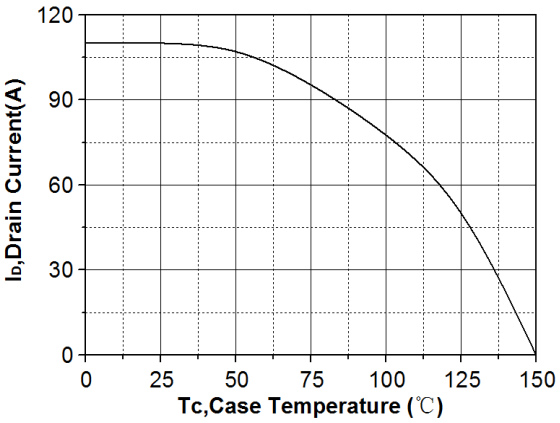
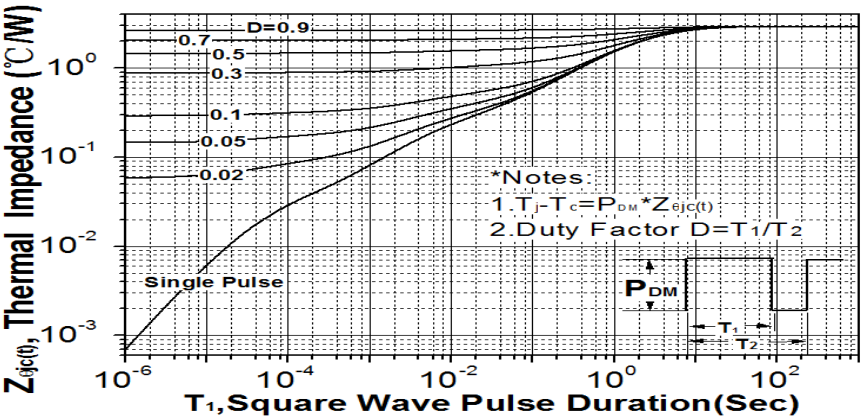


Fig. 11. Transient thermal response curve



Test Circuit

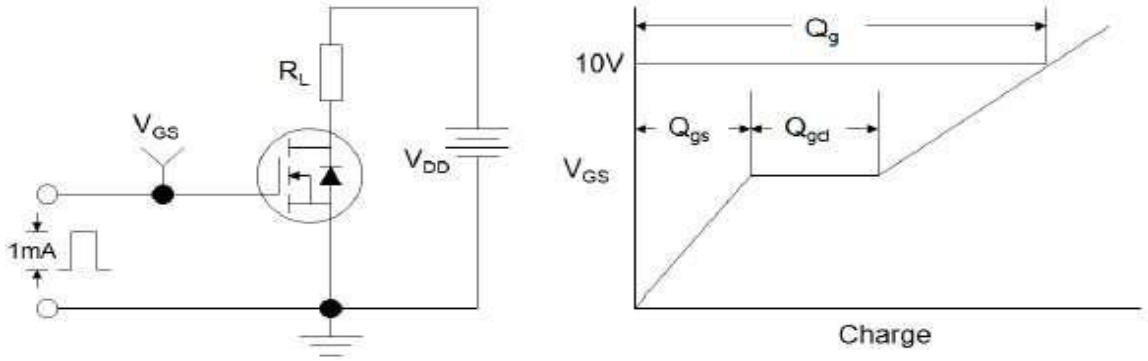


Figure1:Gate Charge Test Circuit & Waveform

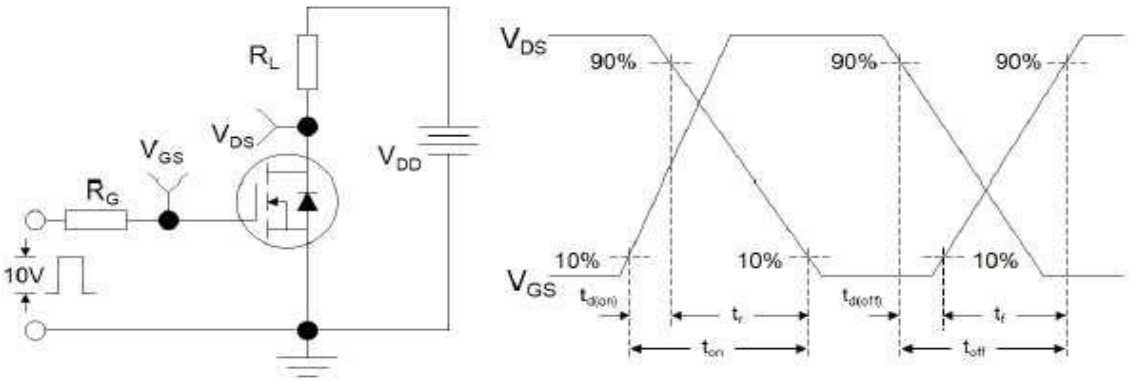


Figure 2: Resistive Switching Test Circuit & Waveforms

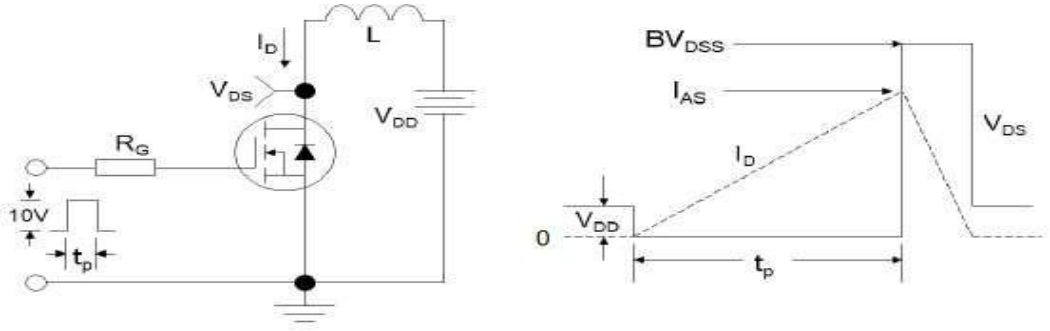


Figure 3:Unclamped Inductive Switching Test Circuit & Waveforms

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