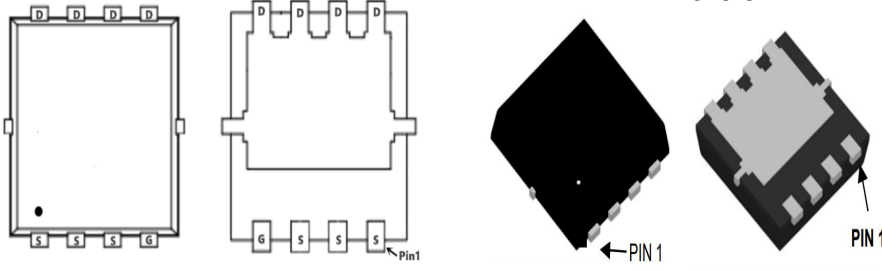# TMN40100NF

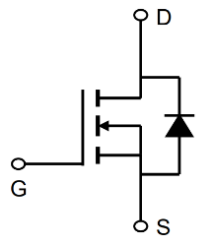## N-Channel Enhancement Mosfet

General Description
- Low $R_{DS(ON)}$
- RoHS and Halogen-Free Compliant

Applications
- Load switch
- PWM

General Features

V_{DS} = 40V I_D = 100A

$R_{DS(ON)}$=4.2mΩ(typ.)@V_{GS}=10V

100% UIS Tested
100% R_g Tested

Green Product

NF:DFN5x6-8L

PIN 1

PIN 1

Marking: 100N04

Absolute Maximum Ratings： (T$_C$=25℃ unless otherwise noted)

Symbol	Parameter	Ratings	Units
V_{DS}	Drain-Source Voltage	40	V
V_{GS}	Gate-Source Voltage	±20	V
I_D	Continuous Drain Current-TC=25℃	100	A
	Continuous Drain Current-TC=100℃	57	
	Pulsed Drain Current	360	
E_{AS}	Single Pulse Avalanche Energy	59	mJ
P_D	Power Dissipation	83	W
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55 to +150	℃

Thermal Characteristics：

Symbol	Parameter	Max	Units
$R_{θJC}$	Thermal Resistance,Junction to Case[2]	1.5	℃/W
$R_{θJA}$	Thermal Resistance Junction to mbient	62	℃/W

Electrical Characteristics： (T$_C$=25℃ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV$_{DSS}$	Drain-Sourtce Breakdown Voltage	V$_{GS}$=0V,I$_D$=250μA	40	---	---	V
I$_{DSS}$	Zero Gate Voltage Drain Current	V$_{GS}$=0V, V$_{DS}$=40V	---	---	1	μA
I$_{GSS}$	Gate-Source Leakage Current	V$_{GS}$=±20V, V$_{DS}$=0A	---	---	±100	nA
On Characteristics[3]						
V$_{GS(th)}$	GATE-Source Threshold Voltage	V$_{GS}$=V$_{DS}$, I$_D$=250μA	1.2	1.6	2.5	V
R$_{DS(ON)}$	Drain-Source On Resistance[2]	V$_{GS}$=10V,I$_D$=20A	---	4.2	5.5	mΩ
		V$_{GS}$=4.5V,I$_D$=10A	---	5.3	7	
G$_{FS}$	Forward Transconductance	V$_{DS}$=10V, I$_D$=2A	---	16.5	---	S
Dynamic Characteristics[4]						
C$_{iss}$	Input Capacitance		---	2400	3580	pF
C$_{oss}$	Output Capacitance	V$_{DS}$=25V, V$_{GS}$=0V, f=1MHz	---	220	380	
C$_{rss}$	Reverse Transfer Capacitance		---	150	220	
Switching Characteristics[4]						
t$_{d(on)}$	Turn-On Delay Time 3 , 4		---	14.2	28	ns
t$_r$	Rise Time 3 , 4	V$_{DD}$=15V,I$_D$=1A,R$_G$=3.3Ω	---	18.3	36	ns
t$_{d(off)}$	Turn-Off Delay Time 3 , 4	V$_{GS}$=10V	---	38.8	76	ns
t$_f$	Fall Time 3 , 4		---	13.9	28	ns
Q$_g$	Total Gate Charge 3 , 4		---	25	50	nC
Q$_{gs}$	Gate-Source Charge 3 , 4 3 , 4	V$_{GS}$=4.5V, V$_{DS}$=32V, I$_D$=10A	---	6.4	13	nC
Q$_{gd}$	Gate-Drain "Miller" Charge 3 , 4		---	12.1	24	nC
Drain-Source Diode Characteristics						
Symbol	Parameter	Conditions	Min	Typ	Max	Units
V$_{SD}$	Source-Drain Diode Forward Voltage[3]	V$_{GS}$=0V,I$_S$=1A	---	---	1	V
LS	Continuous Source Current	V$_G$=V$_D$=0V , Force Current	---	---	100	A
LSM	Pulsed Source Current		---	---	180	A

Notes:
1. Repetitive Rating：Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%.
3. Essentially independent of operating temperature.

Typical Characteristics： (T$_C$=25℃ unless otherwise noted)
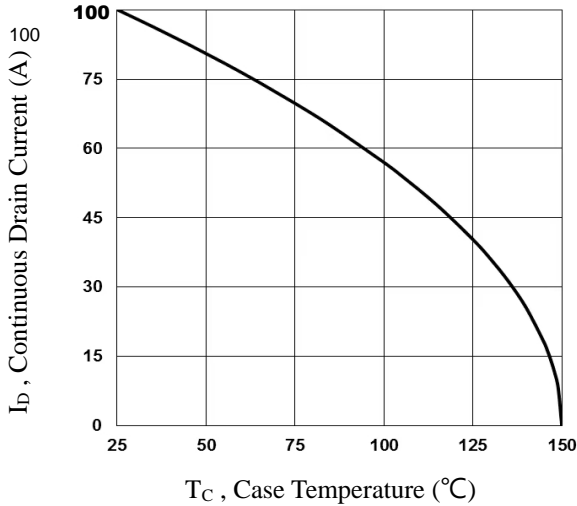

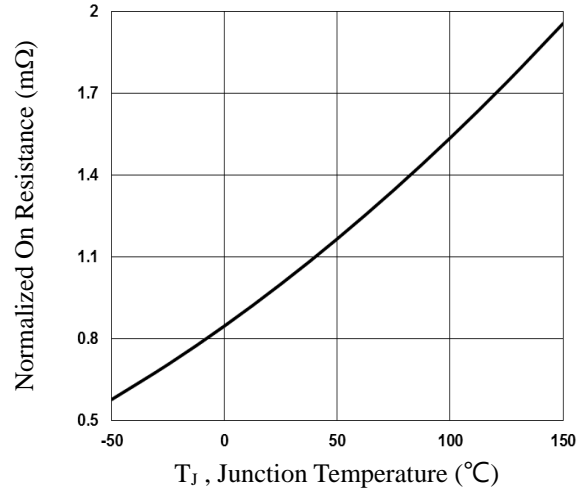**Fig.1 Continuous Drain Current vs. T$_C$**
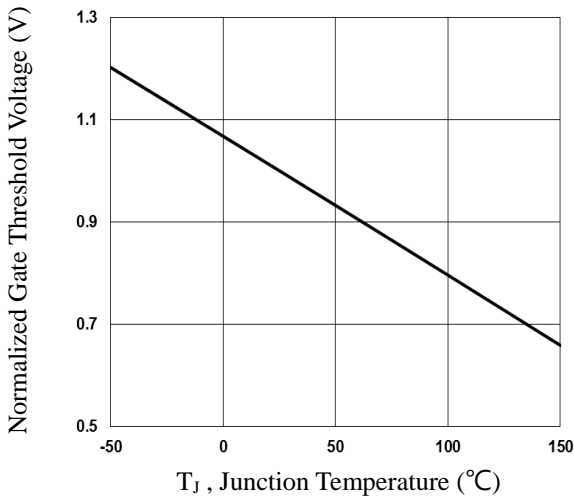

Fig.2 Normalized RDSON vs. T$_J$

Fig.3 Normalized V$_{th}$ vs. T$_J$
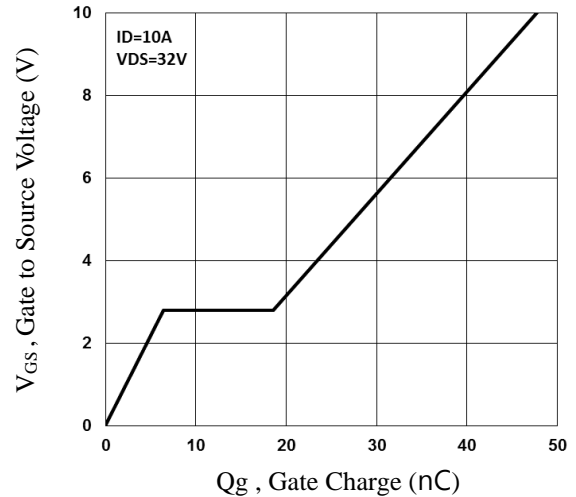
Fig.4 Gate Charge Waveform
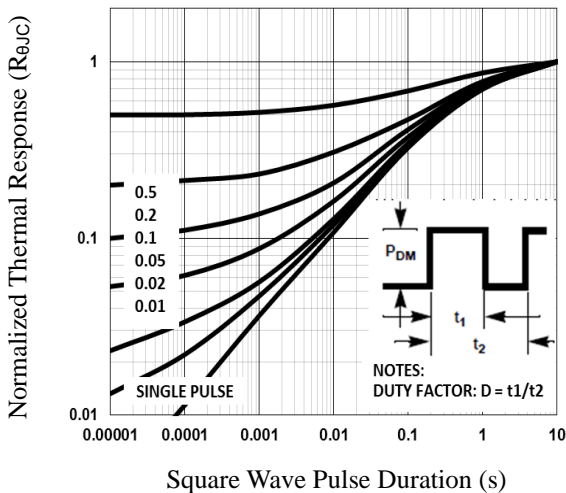
Fig.5 Normalized Transient Impedance
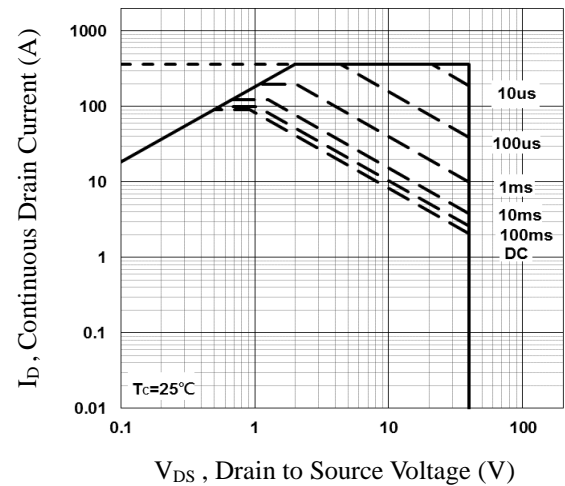
Fig.6 Maximum Safe Operation Area

$$EAS= \frac{1}{2}L \times I_{AS}^{2} \times \frac{BV_{DSS}}{BV_{DSS}-V_{DD}}$$
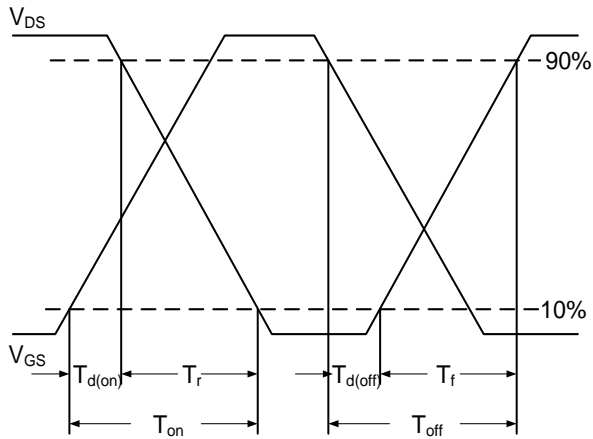
Fig.7   Switching Time Waveform
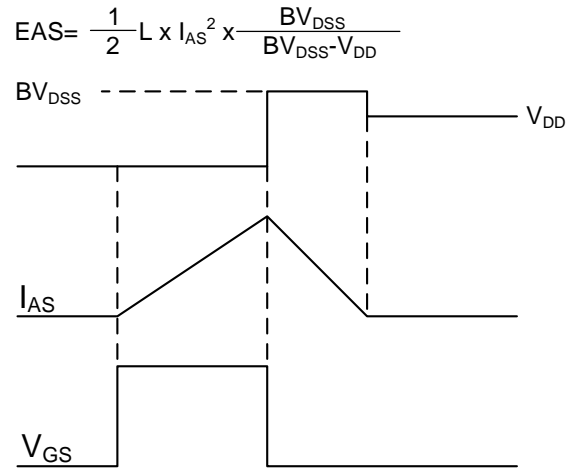
Fig.8   EAS Waveform

Package Mechanical Data:DFN5x6-8L
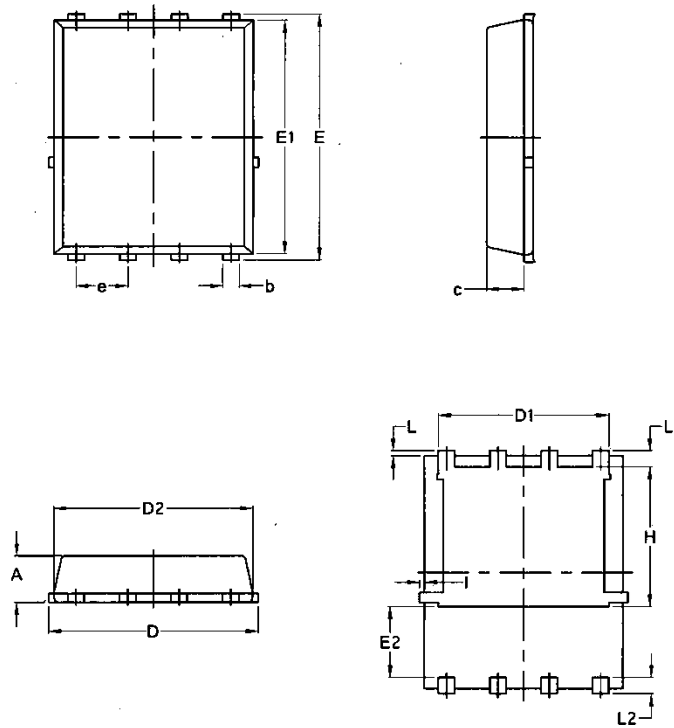
Symbol	Common			
	mm		Inch	
	Mim	Max	Min	Max
A	1.03	1.17	0.0406	0.0461
b	0.34	0.48	0.0134	0.0189
c	0.824	0.0970	0.0324	0.082
D	4.80	5.40	0.1890	0.2126
D1	4.11	4.31	0.1618	0.1697
D2	4.80	5.00	0.1890	0.1969
E	5.95	6.15	0.2343	0.2421
E1	5.65	5.85	0.2224	0.2303
E2	1.60	/	0.0630	/
e	1.27 BSC		0.05 BSC	
L	0.05	0.25	0.0020	0.0098
L1	0.38	0.50	0.0150	0.0197
L2	0.38	0.50	0.0150	0.0197
H	3.30	3.50	0.1299	0.1378
I	/	0.18	/	0.0070

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