



TMN6030DF

N-Channel Enhancement Mosfet

General Description

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

Applications

- Load switch
- PWM

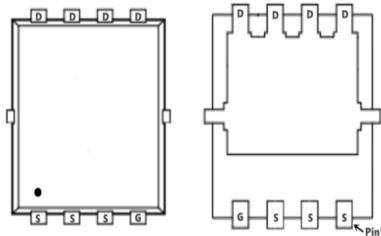
General Features

$V_{DS} = 60V$ $I_D = 30A$

$R_{DS(ON)} = 28m\Omega$ (typ.) @ $V_{GS} = 10V$

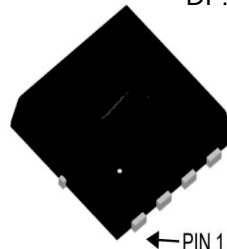
100% UIS Tested

100% R_g Tested

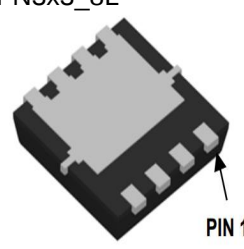


Marking 30N06

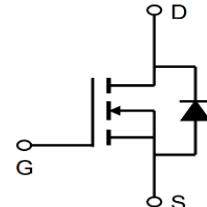
DF:DFN3x3_8L



PIN 1



PIN 1



Absolute Maximum Ratings@ $T_j = 25^\circ C$ (unless otherwise specified)

Symbol	Parameter	Max.	Units
V_{DS}	Drain-Source Voltage	60	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D @ T_C = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	30	A
$I_D @ T_C = 100^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	16	A
IDM	Pulsed Drain Current	74	A
IAS	Avalanche Current	13	A
EAS	Single Pulsed Avalanche Energy	22	mJ
$P_D @ T_C = 25^\circ C$	Power Dissipation	31.3	W
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to +175	$^\circ C$
$R_{\theta JA}$	Thermal Resistance Junction-Ambient ¹	62.5	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	4	$^\circ C/W$

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BVDSS	Drain-Source Breakdown Voltage	$V_{GS}=0V$, $I_D=250\mu A$	60	65	---	V
$\Delta BVDSS/\Delta T_J$	BVDSS Temperature Coefficient	Reference to 25°C , $I_D=1mA$	---	0.044	---	$V/^{\circ}\text{C}$
RDS(ON)	Static Drain-Source On-Resistance ²	$V_{GS}=10V$, $I_D=15A$	---	28	36	$m\Omega$
		$V_{GS}=4.5V$, $I_D=7A$	---	38	45	$m\Omega$
VGS(th)	Gate Threshold Voltage	$V_{GS}=V_{DS}$, $I_D=250\mu A$	1.2	1.6	2.5	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	-4.8	---	$mV/^{\circ}\text{C}$
IDSS	Drain-Source Leakage Current	$V_{DS}=48V$, $V_{GS}=0V$, $T_J=25^{\circ}\text{C}$	---	---	1	μA
		$V_{DS}=48V$, $V_{GS}=0V$, $T_J=55^{\circ}\text{C}$	---	---	5	
IGSS	Gate-Source Leakage Current	$V_{GS}=\pm 20V$, $V_{DS}=0V$	---	---	± 100	nA
gfs	Forward Transconductance	$V_{DS}=5V$, $I_D=15A$	---	25.3	---	S
R _g	Gate Resistance	$V_{DS}=0V$, $V_{GS}=0V$, $f=1MHz$	---	2.5	---	Ω
Q _g	Total Gate Charge (10V)	$V_{DS}=48V$, $V_{GS}=10V$, $I_D=15A$	---	19	---	nC
Q _{gs}	Gate-Source Charge		---	2.5	---	
Q _{gd}	Gate-Drain Charge		---	5	---	
Td(on)	Turn-On Delay Time	$V_{DD}=30V$, $V_{GS}=10V$, $R_G=3.3\Omega$, $I_D=15A$	---	2.8	---	ns
T _r	Rise Time		---	16.6	---	
Td(off)	Turn-Off Delay Time		---	21.2	---	
T _f	Fall Time		---	5.6	---	
C _{iss}	Input Capacitance	$V_{DS}=15V$, $V_{GS}=0V$, $f=1MHz$	---	1027	---	pF
C _{oss}	Output Capacitance		---	65	---	
C _{rss}	Reverse Transfer Capacitance		---	46	---	
I _s	Continuous Source Current ^{1,6}	$V_G=V_D=0V$, Force Current	---	---	20	A
ISM	Pulsed Source Current ^{2,6}		---	---	40	A
VSD	Diode Forward Voltage ²	$V_{GS}=0V$, $I_S=1A$, $T_J=25^{\circ}\text{C}$	---	---	1.2	V
t _{rr}	Reverse Recovery Time	$I_F=15A$, $dI/dt=100A/\mu s$, $T_J=25^{\circ}\text{C}$	---	12.2	---	nS
Q _{rr}	Reverse Recovery Charge		---	7.3	---	nC

Note :

- 1、The data tested by surface mounted on a 1 inch² FR-4 board with 20Z copper.
- 2、The data tested by pulsed , pulse width .The EAS data shows Max. rating .
- 3、The test cond $\leq 300\mu s$ duty cycle $\leq 2\%$, duty cycle ition is $T_J=25^{\circ}\text{C}$, $V_{DD}=48V$, $V_G=10V$, $R_G=25\Omega$, $L=0.1mH$, $I_{AS}=13A$
- 4、The power dissipation is limited by 175°C junction temperature
- 5、The data is theoretically the same as ID and IDM , in real applications , should be limited by total power dissipation.



Typical Characteristics

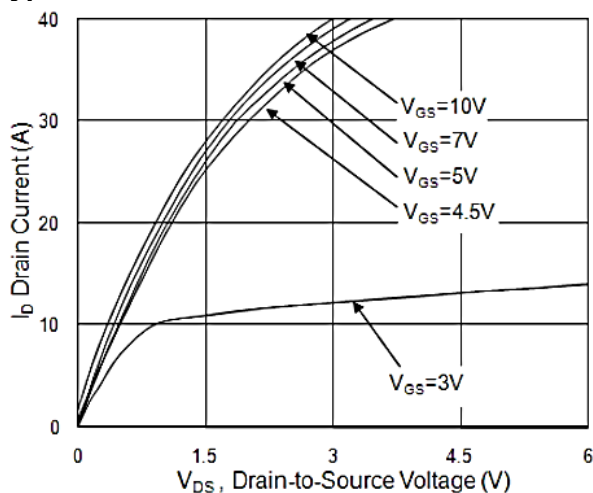


Fig.1 Typical Output Characteristics

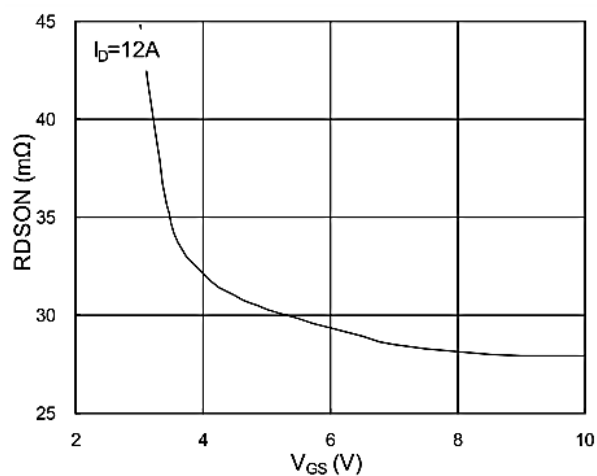


Fig.2 On-Resistance vs. Gate-Source

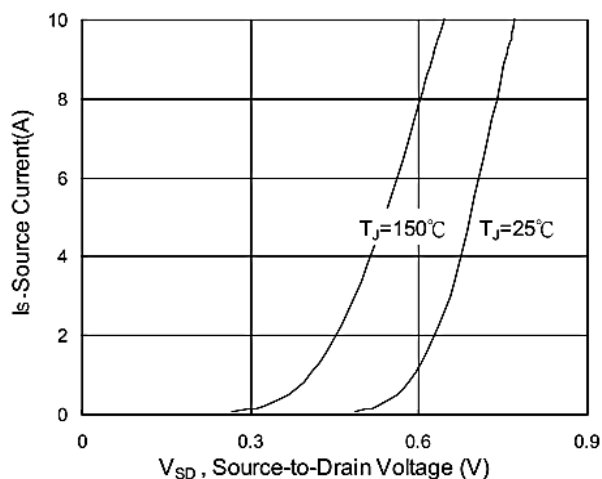


Fig.3 Forward Characteristics Of Reverse

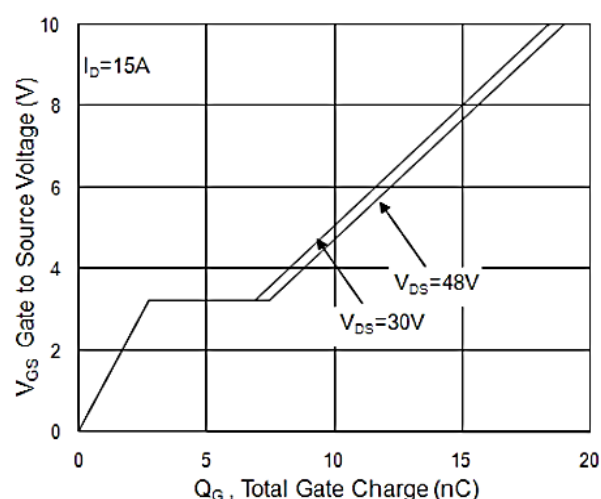
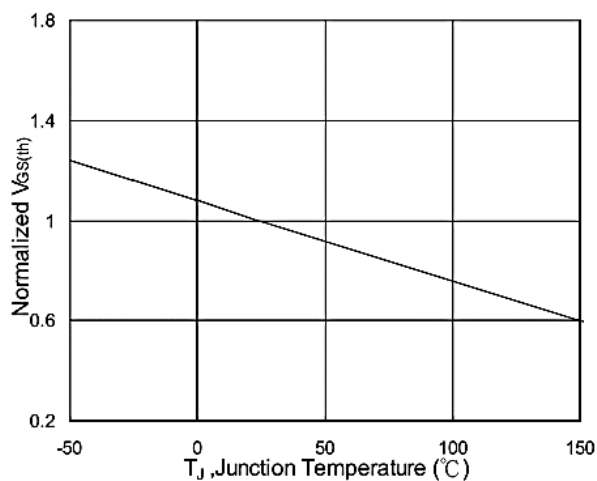
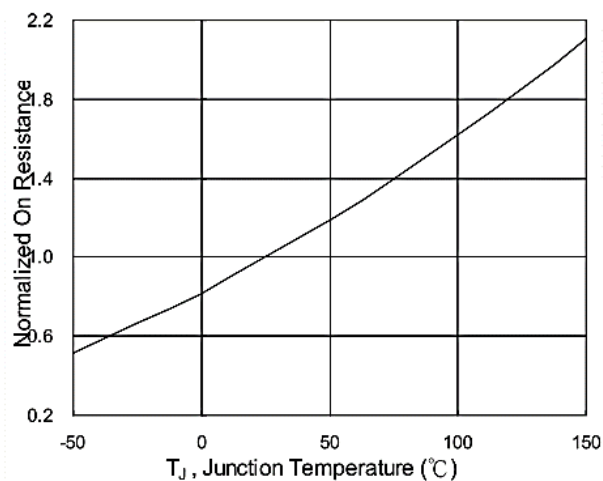


Fig.4 Gate-Charge Characteristics

Fig.5 Normalized $V_{GS(th)}$ vs. T_J Fig.6 Normalized $R_{DS(on)}$ vs. T_J

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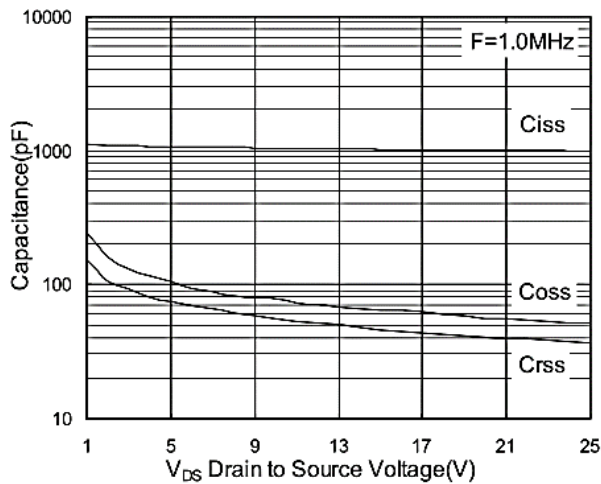


Fig.7 Capacitance

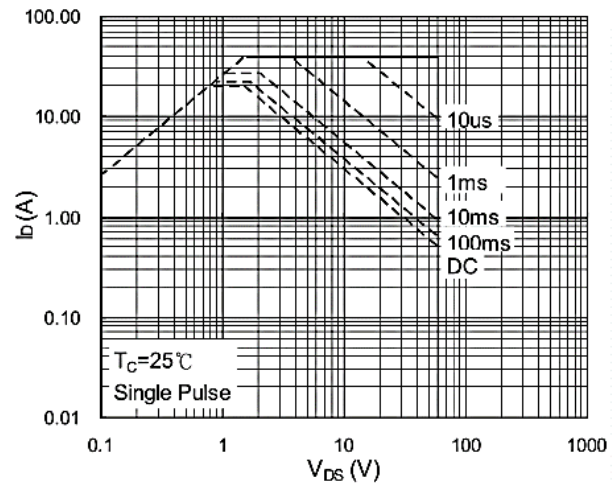


Fig.8 Safe Operating Area

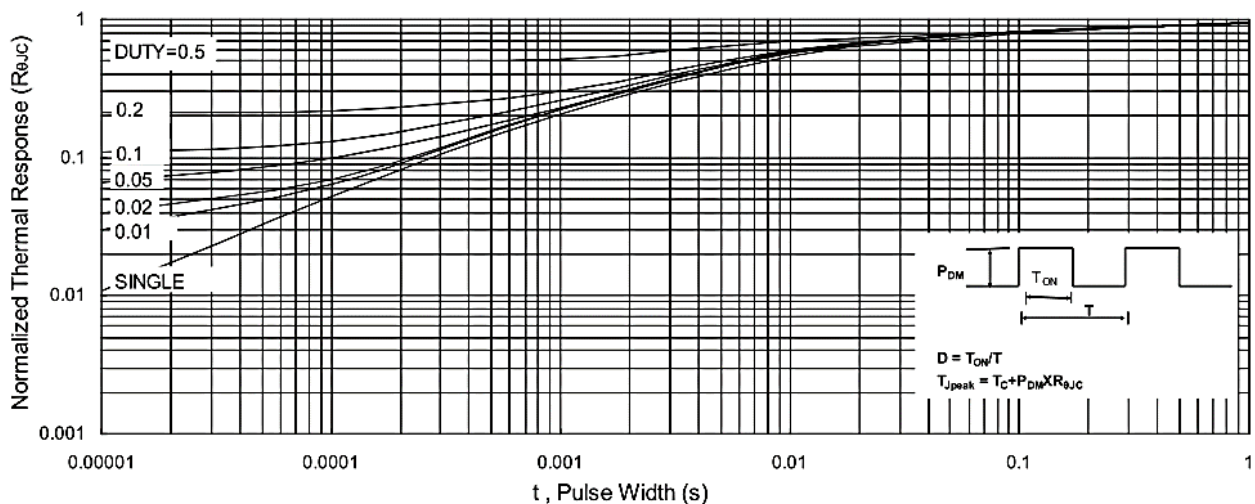


Fig.9 Normalized Maximum Transient Thermal Impedance

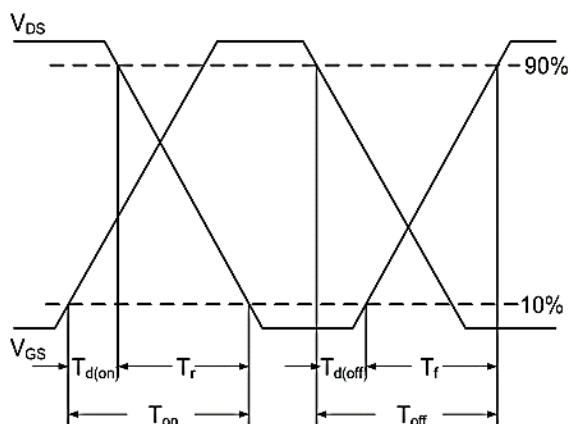


Fig.10 Switching Time Waveform

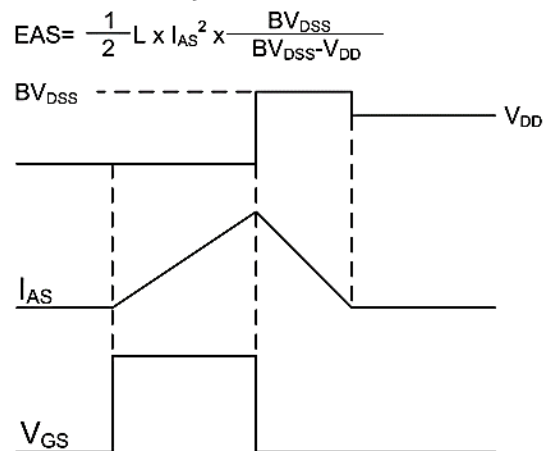
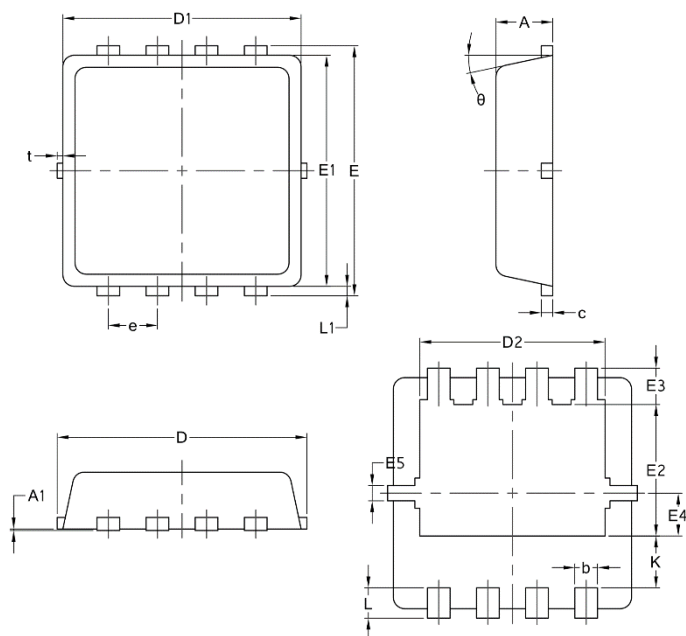


Fig.11 Unclamped Inductive Switching Waveform

Package Mechanical Data:DFN3x3-8L



Symbol	Common		
	mm		
	Mim	Nom	Max
A	0.70	0.75	0.85
A1	/	/	0.05
b	0.20	0.30	0.40
c	0.10	0.152	0.25
D	3.15	3.30	3.45
D1	3.00	3.15	3.25
D2	2.29	2.45	2.65
E	3.15	3.30	3.45
E1	2.90	3.05	3.20
E2	1.54	1.74	1.94
E3	0.28	0.48	0.65
E4	0.37	0.57	0.77
E5	0.10	0.20	0.30
e	0.60	0.65	0.70
K	0.59	0.69	0.89
L	0.30	0.40	0.50
L1	0.06	0.125	0.20
t	0	0.075	0.13
Φ	10	12	14