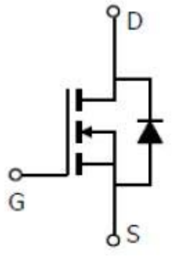
N-Channel Enhancement Mode Power MOSFET

● Features

V_{DS}= 30V
I_D= 37A
$R_{DS(ON)}$≤ 12mΩ(V_{GS}=10V)

● Pin Configurations

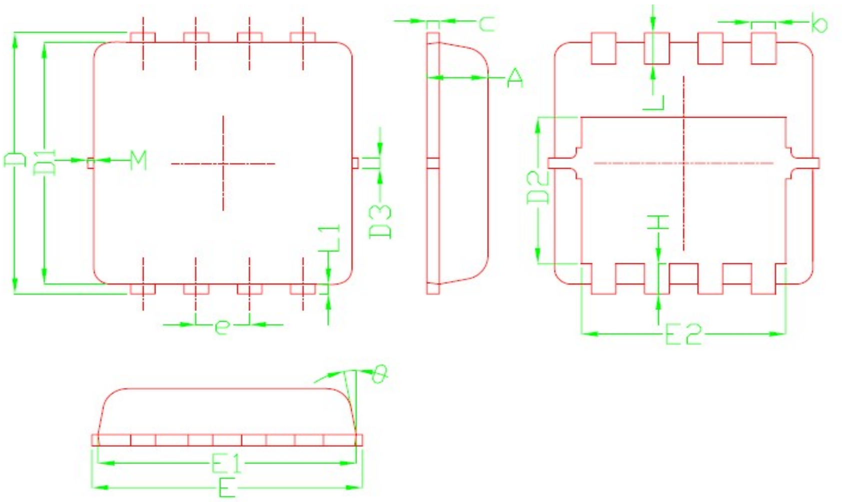


● General Description

The TNM1230N5X 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 TNM1230N5X meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

● Package Information

PDFN3X3-8L



SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.70	0.85	0.027	0.034
b	0.20	0.40	0.007	0.016
c	0.10	0.25	0.004	0.010
D	3.15	3.45	0.124	0.136
D1	2.90	3.20	0.114	0.126
D2	1.54	1.98	0.060	0.080
D3	0.10	0.30	0.004	0.012
E	3.15	3.45	0.124	0.136
E1	3.00	3.25	0.118	0.128
E2	2.29	2.65	0.090	0.104
e	0.65 BSC		0.025 BSC	
H	0.28	0.65	0.011	0.026
Θ	0°	14°	0°	14°
L	0.30	0.50	0.012	0.020
L1	0.13		0.005	
M	---	0.15	---	0.006

● Absolute Maximum Ratings (@TA=25°C unless otherwise noted)

Parameter		Symbol	Ratings	Unit
Drain-Source Voltage		V_{DSS}	30	V
Gate Source Voltage		V_{GSS}	±20	V
Drain Current (Continuous) *AC	TA=25°C	I_D	37	A
	TA=100°C		24	
Drain Current (Pulse) *B		I_{DM}	75	A
Power Dissipation	TA=25°C	P_D	26	W
	TA=100°C		21	
Operating Temperature/ Storage Temperature		T_J/T_{STG}	-55~150	°C
Single Pulse Avalanche Energy		E_{AS}	24.2	mJ
Thermal Resistance ,Junction-to-Ambient		$R_{\theta JA}$	75	°C/W

● Electrical Characteristics (@TA=25°C unless otherwise noted)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS}=0V，I_D=250uA	30	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=24V，V_{GS}=0V	--	--	1	uA
Gate Threshold Voltage	$V_{GS(TH)}$	V_{DS}=V_{GS}，I_{DS}=250uA	1.0	--	2.5	V
Gate Leakage Current	I_{GSS}	V_{GS}=±20V，V_{DS}=0V	--	--	±100	nA
Drain-Source On-state Resistance	$R_{DS(on)}$	V_{GS}=10V，I_D=15A	--	--	12	mΩ
		V_{GS}=4.5V，I_D=10A	--	--	16.5	mΩ
Diode Forward Voltage	V_{SD}	I_{SD}=1A，V_{GS}=0V	--	--	1	V
Switching						
Total Gate Charge	Q_g	V_{GS}=4.5V，V_{DS}=15V，I_D=12A	--	9.8	--	nC
Gate- Source Charge	Q_{gs}		--	2.2	--	nC
Gate- Drain Charge	Q_{gd}		--	5.5	--	nC
Tum-on Delay Time	$t_{d(on)}$	V_{GS}=10V，V_{DD}=15V，I_D=20A，R_{GEN}=1.5Ω	--	6.4	--	ns
Turn-on Rise Time	t_r		--	39	--	ns
Turn-off Delay Time	$t_{d(off)}$		--	21	--	ns
Turn-off Fall Time	t_f		--	4.7	--	ns
Dynamic						
Input Capacitance	Ciss	V_{GS}=0V，V_{DS}=15V，f=1MHZ	--	896	--	pF
Output Capacitance	Coss		--	126	--	pF
Reverse Transfer Capacitance	Crss		--	108	--	pF

A: The value of $R_{\theta JA}$ is measured with the device mounted on 1in2 FR- 4 board with 2oz. Copper, in a still air environment with TA=25C. The value in any given application depends on the user's specific board design.

B: Repetitive rating, pulse width limited by junction temperature .

C: The current rating is based on the t< 10s junction to ambient thermal resistance rating.

- **TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS**

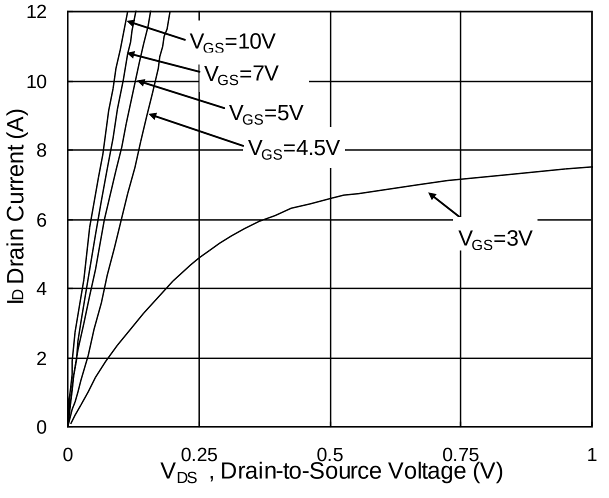


Fig.1 Typical Output Characteristics

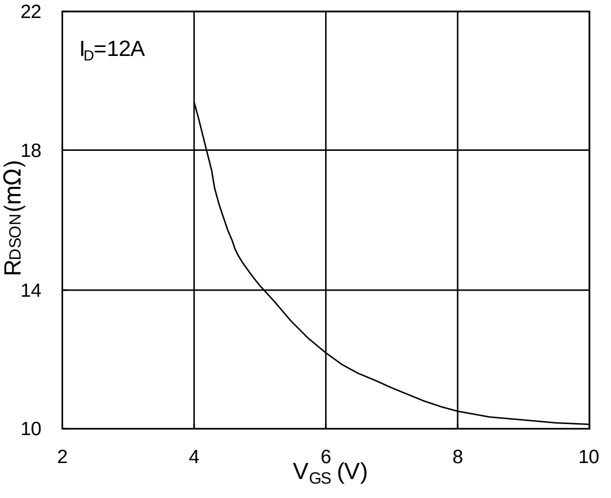


Fig.2 On-Resistance vs. G-S Voltage

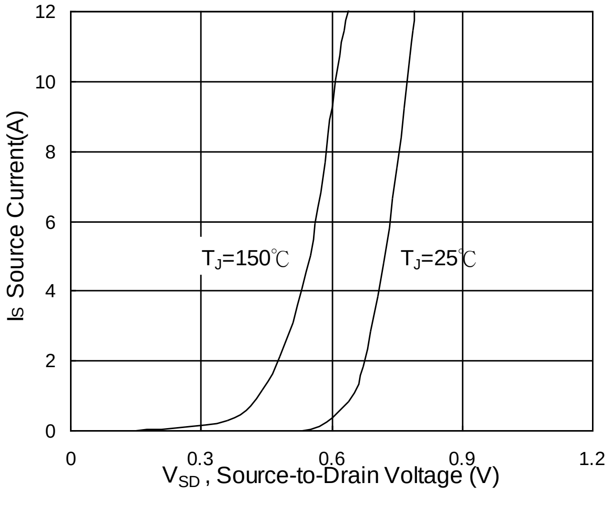


Fig.3 Forward Characteristics of Reverse

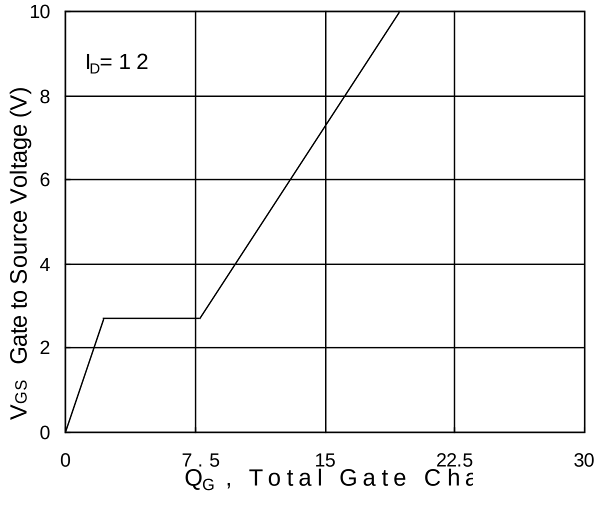


Fig.4 Gate-charge Characteristics

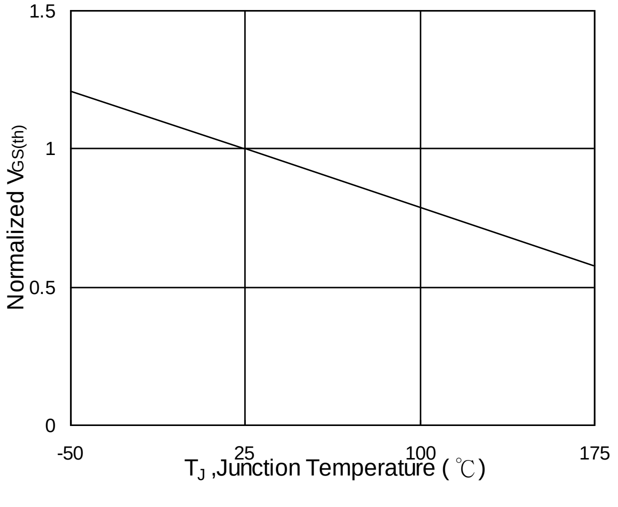


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

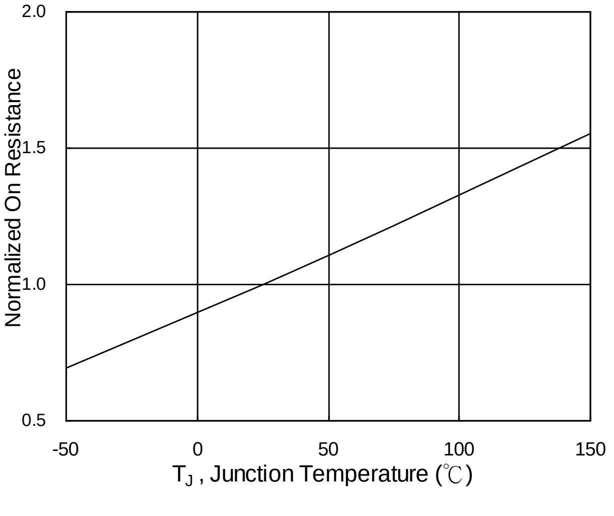


Fig.6 Normalized R_{DSON} vs. T_J

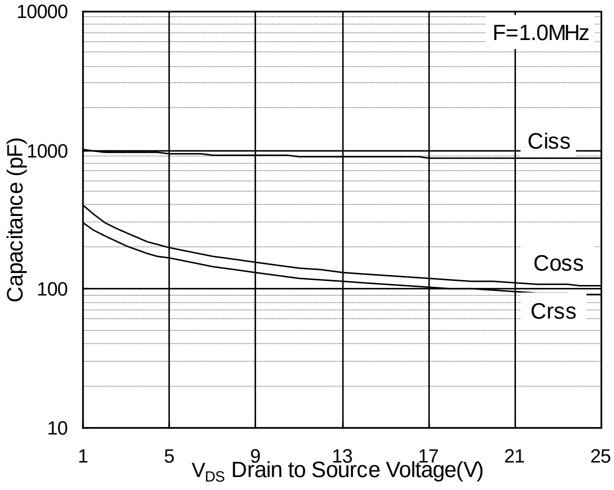


Fig.7 Capacitance

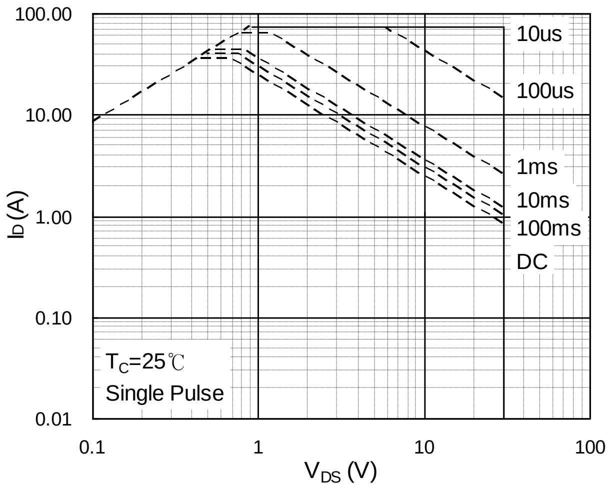


Fig.8 Safe Operating Area

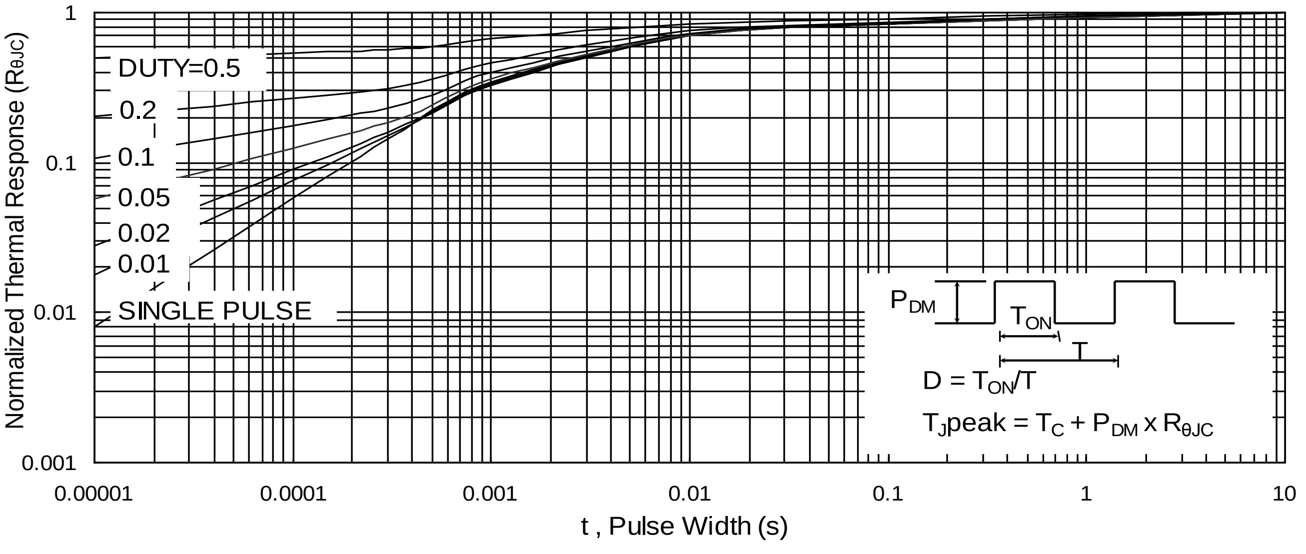


Fig.9 Normalized Maximum Transient Thermal Impedance

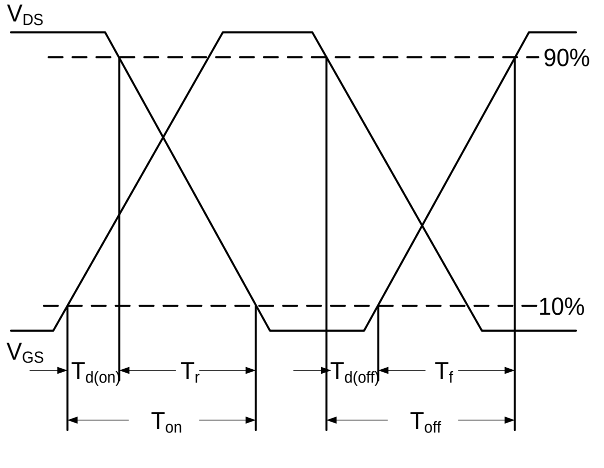


Fig.10 Switching Time Waveform

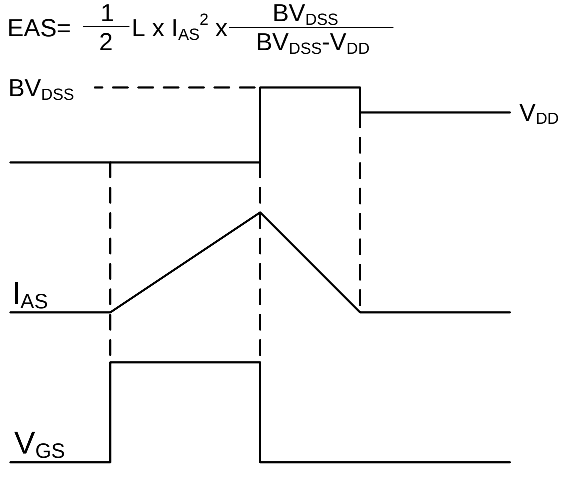


Fig.11 Unclamped Inductive Waveform