600V N-Channel MOSFETs

PJX60N60T

General Description

These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency fast switching applications.

BVDSS	RDSON	ID
600V	65mΩ	60A

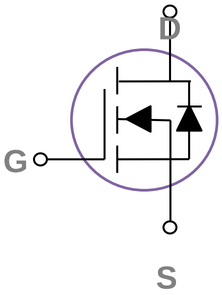
Features

- *600V,60A, RDS(ON) =65mΩ@VGS = 10V*
- *Improved dv/dt capability*
- *Fast switching*
- *100% EAS Guaranteed*
- *Green Device Available*

Applications

- *High efficient switched mode power supplies*
- *LED Lighting*
- *Adapter/charger*

TO247 Pin Configuration



Absolute Maximum Ratings Tc=25℃ unless otherwise noted

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	600	V
V_{GS}	Gate-Source Voltage	±30	V
I_D	Drain Current – Continuous (T_C=25℃)	60	A
	Drain Current – Continuous (T_C=100℃)	38	A
I_{DM}	Drain Current – Pulsed[1]	240	A
EAS	Single Pulse Avalanche Energy[2]	1800	mJ
IAS	Single Pulse Avalanche Current[2]	10	A
P_D	Power Dissipation (T_C=25℃)	312	W
	Power Dissipation – Derate above 25℃	2.5	W/℃
T_{STG}	Storage Temperature Range	-50 to 150	℃
T_J	Operating Junction Temperature Range	-50 to 150	℃

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to ambient	---	40	℃/W
$R_{\theta JC}$	Thermal Resistance Junction to Case	---	0.4	℃/W

Electrical Characteristics (T_J=25 ℃, unless otherwise noted)

Off Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250uA	600	---	---	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=600V , V_{GS}=0V , T_J=25℃	---	---	50	uA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±30V , V_{DS}=0V	---	---	±100	nA

On Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V , I_D=20A	---	---	65	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	2.5	---	4.5	V

Dynamic and switching Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q_g	Total Gate Charge^{3,4}	V_{DS}=50V , V_{GS}=10V , I_D=1.3A	---	160	---	nC
Q_{gs}	Gate-Source Charge^{3,4}		---	25	---	
Q_{gd}	Gate-Drain Charge^{3,4}		---	65	---	
$T_{d(on)}$	Turn-On Delay Time^{3,4}	V_{DD}=30V , V_{GS}=10V , R_G=25Ω I_D=0.5A	---	150	---	ns
T_r	Rise Time^{3,4}		---	500	---	
$T_{d(off)}$	Turn-Off Delay Time^{3,4}		---	1400	---	
T_f	Fall Time^{3,4}		---	823	---	
C_{iss}	Input Capacitance	V_{DS}=25V , V_{GS}=0V , F=1MHz	---	4900	---	pF
C_{oss}	Output Capacitance		---	2730	---	
C_{rss}	Reverse Transfer Capacitance		---	128	---	

Drain-Source Diode Characteristics and Maximum Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	V_G=V_D=0V , Force Current	---	---	60	A
I_{SM}	Pulsed Source Current		---	---	120	A
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_S=60A , T_J=25℃	---	---	1.4	V
Trr	Body Diode Reverse Recovery Time	I_S=30A , V_{GS}=0V, V_R=200V dI_F/dt=100A/uS	---	640	---	nS
Qrr	Body Diode Reverse Recovery Charge		---	14	---	uC

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. V_{DD}=50V,V_{GS}=10V,L=36mH,I_{AS}=10A.,R_G=25Ω,Starting T_J=25℃.
3. The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%.
4. Essentially independent of operating temperature.

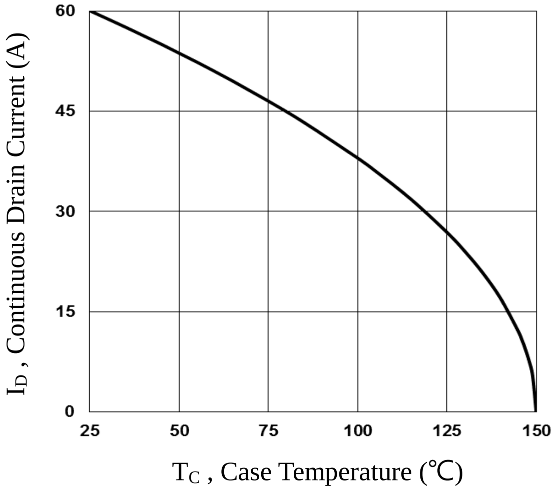


Fig.1 Continuous Drain Current vs. T_C

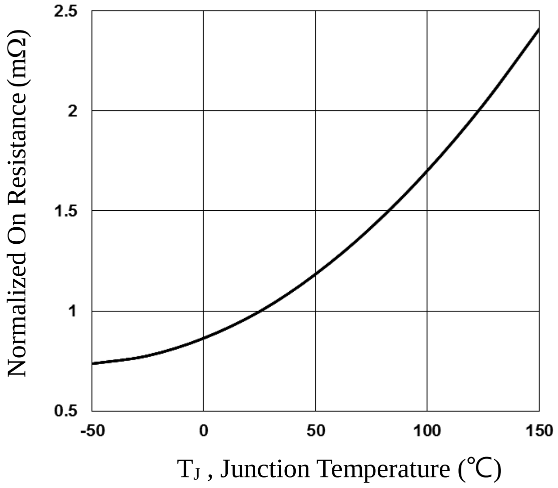


Fig.2 Normalized RDSON vs. T_J

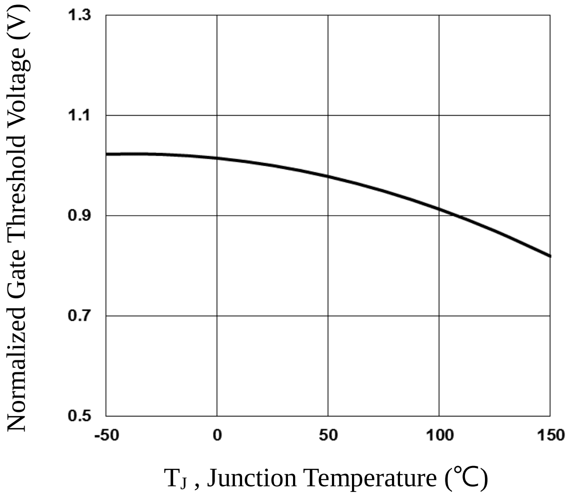


Fig.3 Normalized Vth vs. T_J

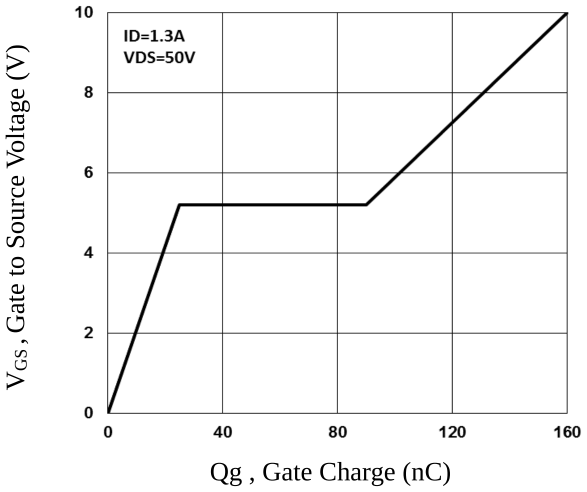


Fig.4 Gate Charge Characteristics

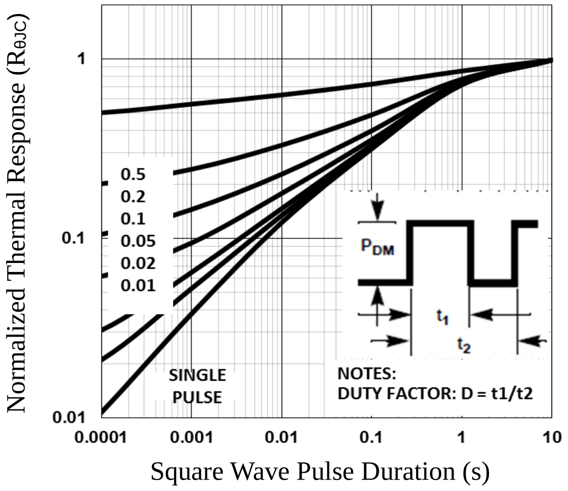


Fig.5 Normalized Transient Impedance

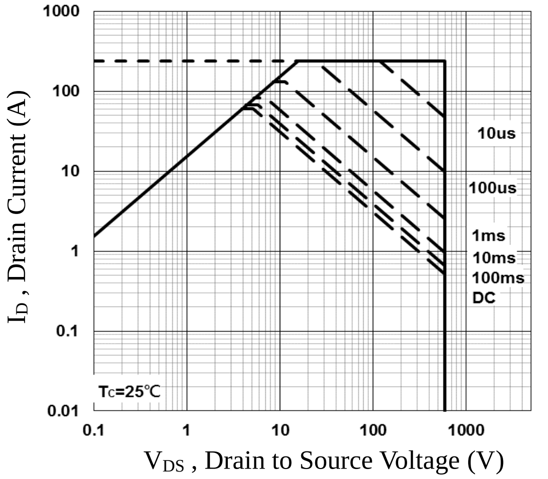


Fig.6 Maximum Safe Operation Area

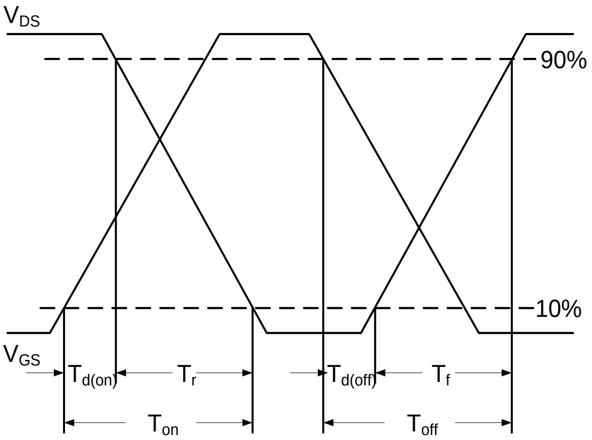


Fig.7 Switching Time Waveform

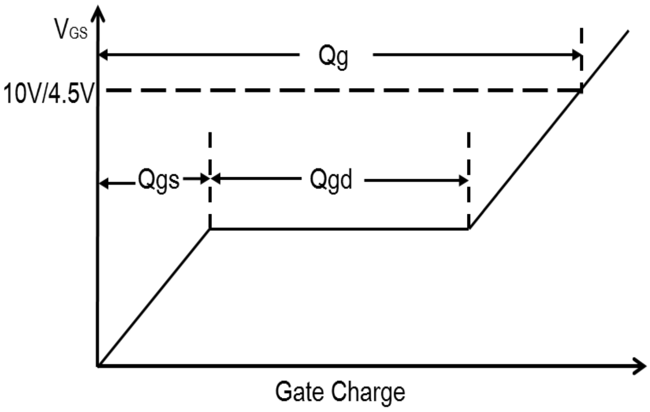


Fig.8 Gate Charge Waveform

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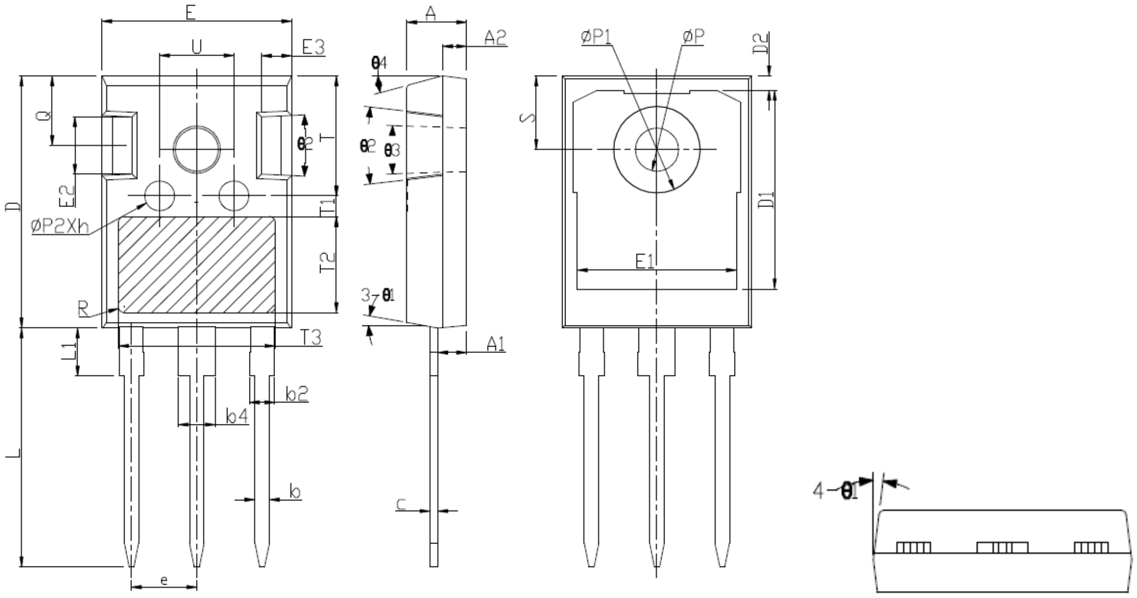

SYMBOL	mm			SYMBOL	mm		
	MIN	NOM	MAX		MIN	NOM	MAX
A	4.75	5.00	5.25	L	19.52	19.92	20.32
A1	2.16	2.41	2.66	L1	---	---	4.30
A2	1.85	2.00	2.15	ΦP	3.35	3.60	3.85
b	1.11	1.20	1.35	ΦP1	---	---	7.30
b2	1.90	2.01	2.25	ΦP2	2.25	2.50	2.75
b4	2.90	3.10	3.25	Q	5.50	5.80	6.10
c	0.51	0.61	0.75	S	6.15BSC		
D	20.60	21.00	21.40	R	0.50REF		
D1	16.15	16.55	16.95	T	9.70	---	10.30
D2	1.00	1.20	1.40	T1	1.65REF		
E	15.50	15.80	16.10	T2	8.00REF		
E1	13.00	13.30	13.60	T3	12.80REF		
E2	4.70	5.00	5.30	U	5.9	---	6.5
E3	2.25	2.50	2.75	θ1	4°	7°	10°
e	5.44BSC			θ2	2°	5°	8°
h	0.00	0.10	0.25	θ3	1°	---	2°
				θ4	10°	15°	20°