500V N-Channel MOSFETs

PMX24N50P

General Description

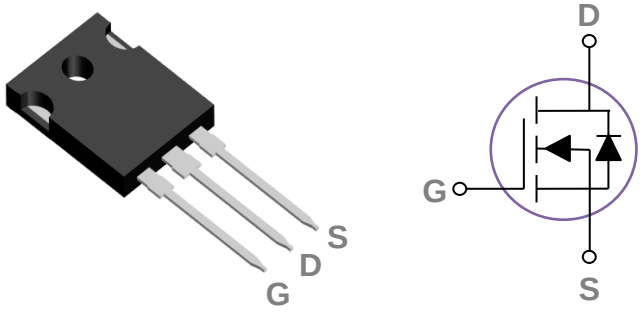
These N-Channel enhancement mode power field effect transistors are planar stripe, DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These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

BVDSS	RDSON	ID
500V	0.2Ω	24A

Features

- *Improved dv/dt capability*
- *Fast switching*
- *100% EAS Guaranteed*
- *Green Device Available*

TO247 Pin Configuration



Applications

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

Absolute Maximum Ratings Tc=25℃ unless otherwise noted

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	500	V
V_{GS}	Gate-Source Voltage	±30	V
I_D	Drain Current – Continuous (T_C=25℃)	24	A
	Drain Current – Continuous (T_C=100℃)	15	A
I_{DM}	Drain Current – Pulsed[1]	96	A
EAS	Single Pulse Avalanche Energy[2]	3645	mJ
IAS	Single Pulse Avalanche Current[2]	27	A
P_D	Power Dissipation (T_C=25℃)	480	W
	Power Dissipation – Derate above 25℃	3.84	W/℃
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to ambient	---	62	℃/W
$R_{\theta JC}$	Thermal Resistance Junction to Case	---	0.26	℃/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	500	---	---	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=500V , V_{GS}=0V , T_J=25℃	---	---	1	uA
		V_{DS}=400V , V_{GS}=0V , T_J=100℃	---	---	20	uA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±30V , V_{DS}=0V	---	---	±100	nA

On Characteristics

$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V , I_D=12A	---	0.15	0.2	Ω
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	2.5	3.5	4.5	V
gfs	Forward Transconductance	V_{DS}=30V , I_D=5A	---	12	---	S

Dynamic and switching Characteristics

Q_g	Total Gate Charge[3,4]	V_{DS}=250V , V_{GS}=10V , I_D=12A	---	145	220	nC
Q_{gs}	Gate-Source Charge[3,4]		---	35	55	
Q_{gd}	Gate-Drain Charge[3,4]		---	78	120	
$T_{d(on)}$	Turn-On Delay Time[3,4]	V_{DD}=250V , V_{GS}=10V , R_G=25Ω I_D=12A	---	80	120	ns
T_r	Rise Time[3,4]		---	135	205	
$T_{d(off)}$	Turn-Off Delay Time[3,4]		---	410	615	
T_f	Fall Time[3,4]		---	120	180	
C_{iss}	Input Capacitance	V_{DS}=25V , V_{GS}=0V , F=1MHz	---	5570	8360	pF
C_{oss}	Output Capacitance		---	440	660	
C_{rss}	Reverse Transfer Capacitance		---	35	55	
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, F=1MHz	---	2	---	Ω

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	---	---	24	A
I_{SM}	Pulsed Source Current		---	---	48	A
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_S=12A , T_J=25℃	---	---	1.3	V
t_{rr}	Reverse Recovery Time	V_R=400V, I_S=10A di/dt=100A/μs , T_J=25℃	---	430	---	ns
Q_{rr}	Reverse Recovery Charge		---	6.1	---	uC

Note :
1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. V_{DD}=50V,V_{GS}=10V,L=10mH,I_{AS}=27A.,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.

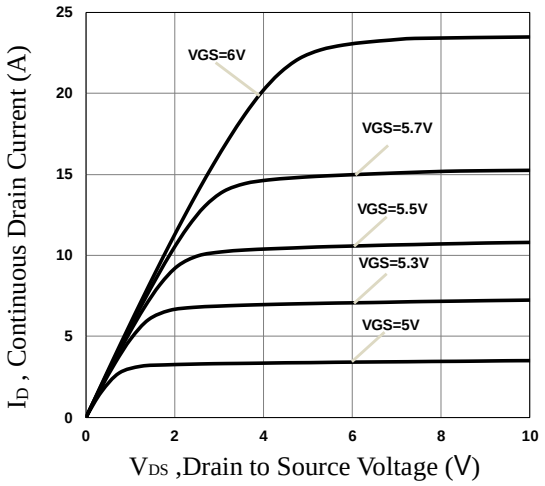


Fig.1 Typical Output Characteristics

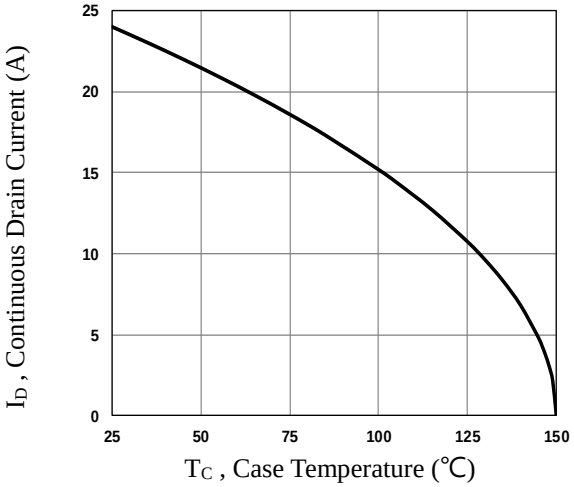


Fig.2 Continuous Drain Current vs. T_C

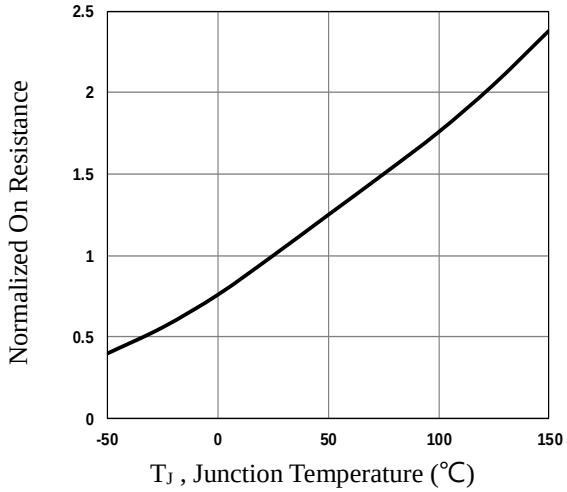


Fig.3 Normalized RDSON vs. T_J

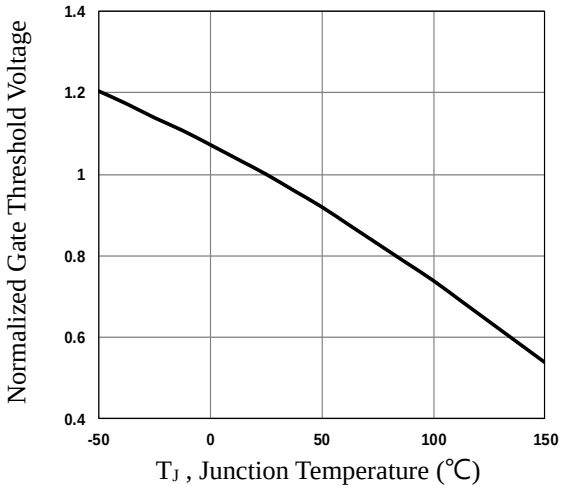


Fig.4 Normalized V_{th} vs. T_J

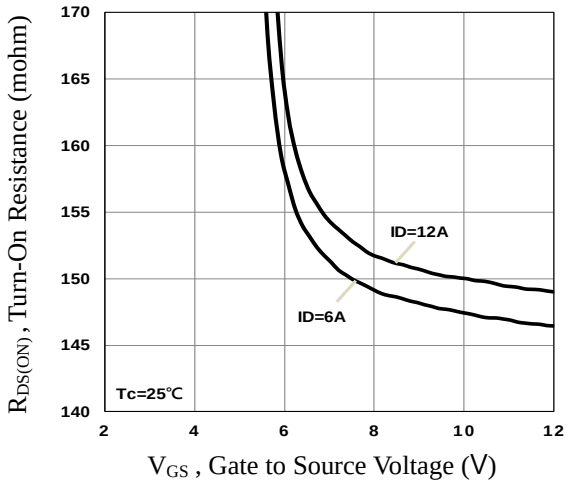


Fig.5 Turn-On Resistance vs. V_{GS}

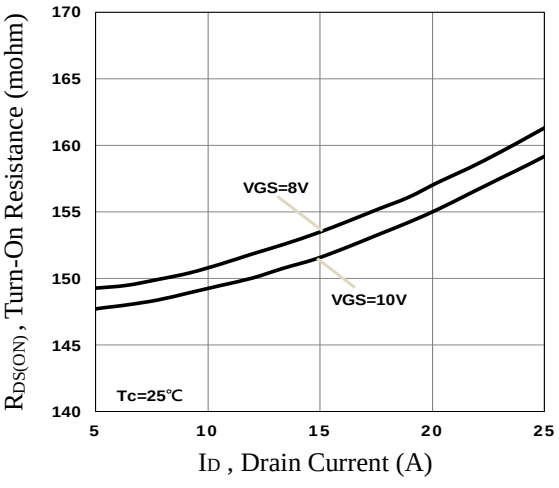


Fig.6 Turn-On Resistance vs. ID

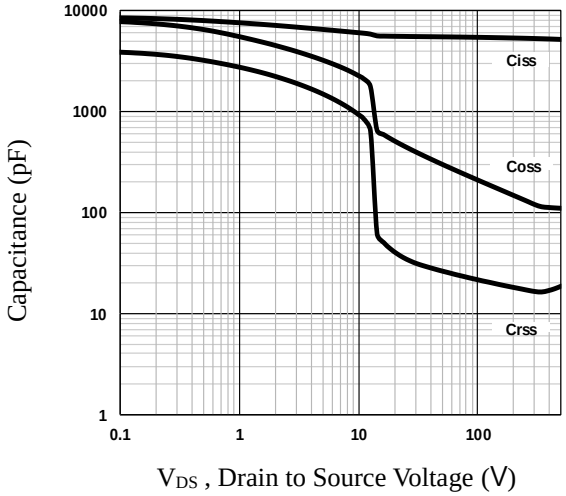


Fig.7 Capacitance Characteristics

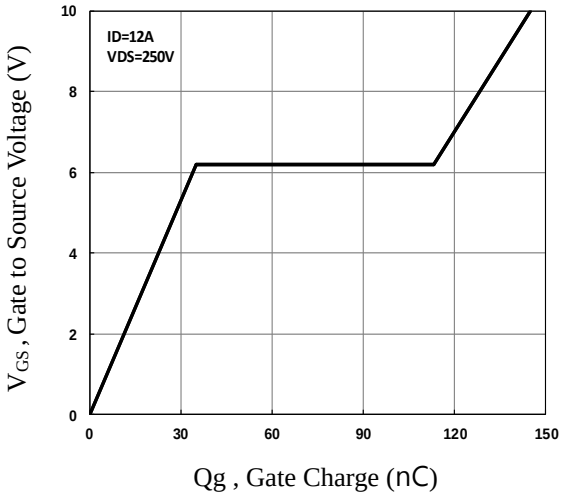


Fig.8 Gate Charge Characteristics

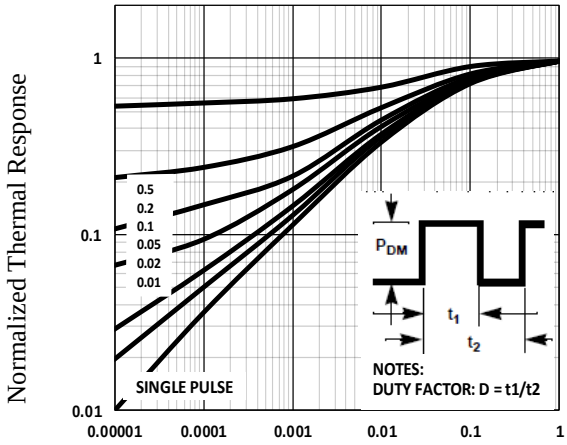


Fig.9 Normalized Transient Impedance

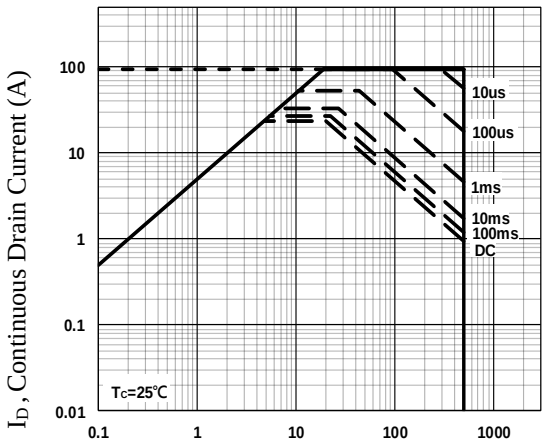


Fig.10 Maximum Safe Operation Area

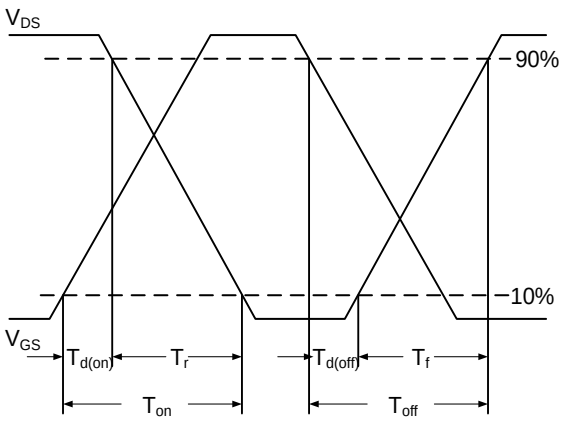


Fig.11 Switching Time Waveform

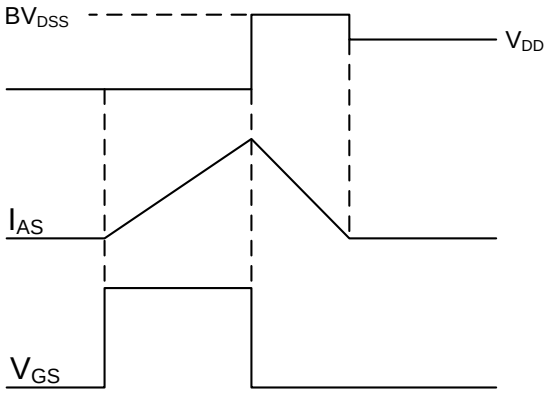
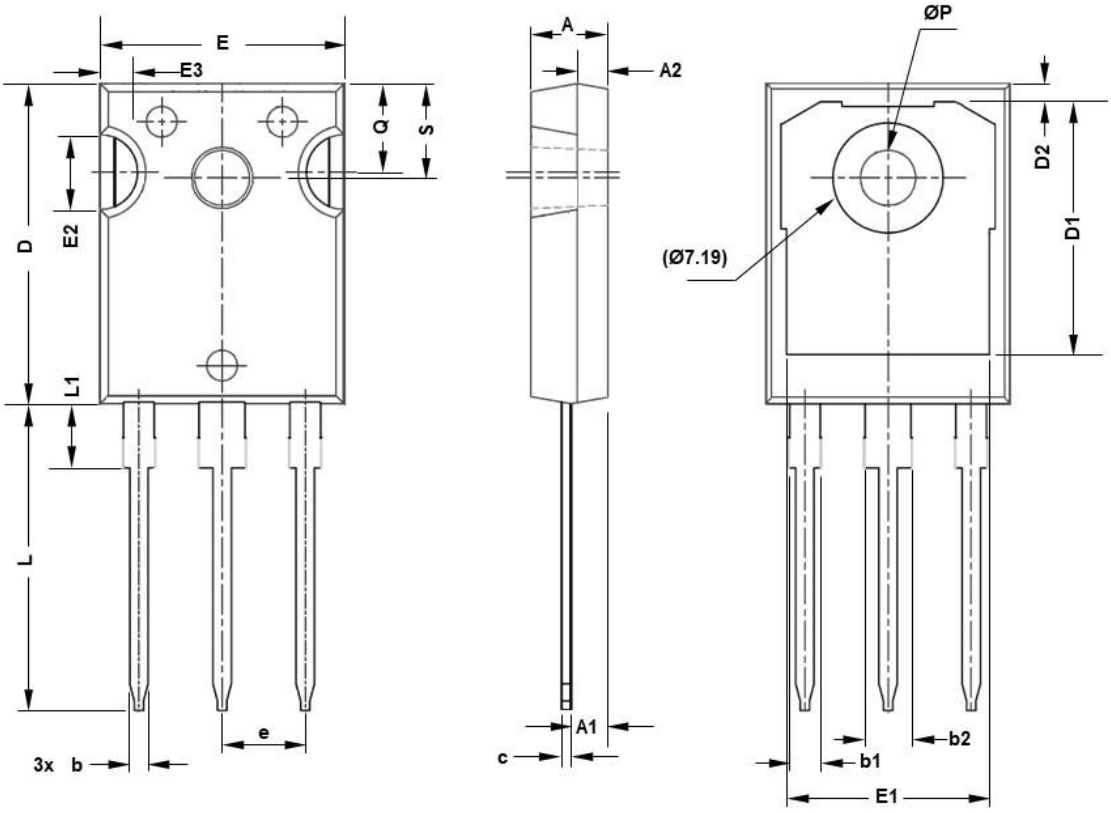


Fig.12 EAS Waveform

TO247 PACKAGE INFORMATION



SYMBOL	mm		SYMBOL	mm	
	MIN	MAX		MIN	MAX
A	4.83	5.21	E2	4.32	5.49
A1	2.29	2.55	E3	2.15	2.80
A2	1.50	2.49	e	5.44BSC	
b	1.12	1.33	L	19.81	20.32
b1	1.91	2.39	L1	4.10	4.40
b2	2.87	3.22	ΦP	3.56	3.65
C	0.55	0.69	Q	5.39	6.20
D	20.80	21.10	S	6.04	6.30
D1	16.25	17.65			
D2	0.51	1.35			
E	15.75	16.13			
E1	13.46	14.16			