STEIFPOWER TECHNOLOGY

80V N-Channel MOSFETs

SPX8970

General Description

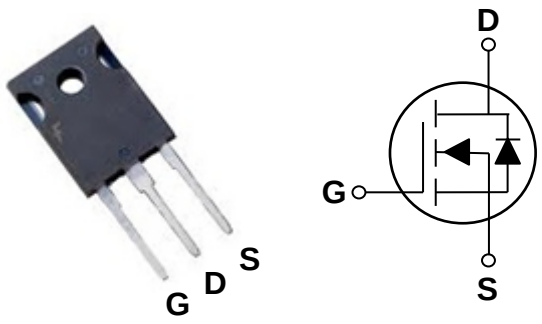
These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These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

BVDSS	RDSON	ID
80V	2.6mΩ	250A

Features

- *80V,250A, RDS(ON) =2.6mΩ@VGS = 10V*
- *Improved dv/dt capability*
- *Fast switching*
- *100% EAS Guaranteed*
- *Green Device Available*

TO247 Pin Configuration



Applications

- *Networking*
- *Load Switch*
- *LED applications*

RoHS COMPLIANT

Absolute Maximum Ratings Tc=25℃ unless otherwise noted

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	80	V
V_{GS}	Gate-Source Voltage	±20	V
I_D	Drain Current – Continuous (T_C=25˚C)	250	A
	Drain Current – Continuous (T_C=100˚C)	155	A
I_{DM}	Drain Current – Pulsed[1]	1000	A
EAS	Single Pulse Avalanche Energy[2]	1280	mJ
IAS	Single Pulse Avalanche Current[2]	160	A
P_D	Power Dissipation (T_C=25˚C)	543	W
	Power Dissipation – Derate above 25˚C	4.35	W/˚C
T_{STG}	Storage Temperature Range	-50 to 150	˚C
T_J	Operating Junction Temperature Range	-50 to 150	˚C

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to ambient	---	62	˚C/W
$R_{\theta JC}$	Thermal Resistance Junction to Case	---	0.23	˚C/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	80	---	---	V
$\triangle BV_{DSS}/\triangle T_J$	BV_{DSS} Temperature Coefficient	Reference to 25℃ , I_D=1mA	---	0.05	---	V/℃
I_{DSS}	Drain-Source Leakage Current	V_{DS}=80V , V_{GS}=0V , T_J=25℃	---	---	1	uA
		V_{DS}=64V , V_{GS}=0V , T_J=125℃	---	---	10	uA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±25V , V_{DS}=0V	---	---	±100	nA

On Characteristics

$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V , I_D=20A	---	2	2.6	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	1.5	2.2	3.5	V
$\triangle V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	-5	---	mV/℃
gfs	Forward Transconductance	V_{DS}=10V , I_D=3A	---	18	---	S

Dynamic and switching Characteristics

Q_g	Total Gate Charge[3,4]	V_{DS}=40V , V_{GS}=10V , I_D=10A	---	247	360	nC
Q_{gs}	Gate-Source Charge[3,4]		---	63.5	125	
Q_{gd}	Gate-Drain Charge[3,4]		---	56	110	
$T_{d(on)}$	Turn-On Delay Time[3,4]	V_{DD}=40V , V_{GS}=10V , R_G=10Ω I_D=10A	---	71	140	ns
T_r	Rise Time[3,4]		---	103	200	
$T_{d(off)}$	Turn-Off Delay Time[3,4]		---	291	580	
T_f	Fall Time[3,4]		---	170	340	
C_{iss}	Input Capacitance	V_{DS}=40V , V_{GS}=0V , F=1MHz	---	16800	33000	pF
C_{oss}	Output Capacitance		---	930	1860	
C_{rss}	Reverse Transfer Capacitance		---	55	110	
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, F=1MHz	---	1.8	3.6	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	---	---	250	A
I_{SM}	Pulsed Source Current		---	---	500	A
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_S=1A , T_J=25℃	---	---	1	V
t_{rr}	Reverse Recovery Time	V_{GS}=0V,I_S=20A , di/dt=100A/μs	---	54	---	ns
Q_{rr}	Reverse Recovery Charge	T_J=25℃	---	78	---	nC

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. V_{DD}=50V,V_{GS}=10V,L=0.1mH,I_{AS}=160A., Starting T_J=25℃
3. The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%.
4. Essentially independent of operating temperature.

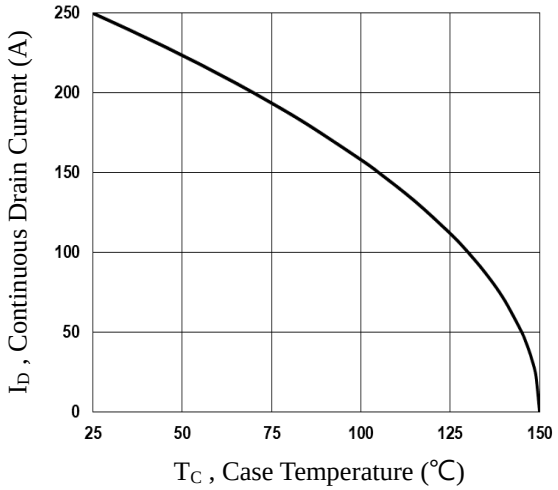


Fig.1 Continuous Drain Current vs. T_C

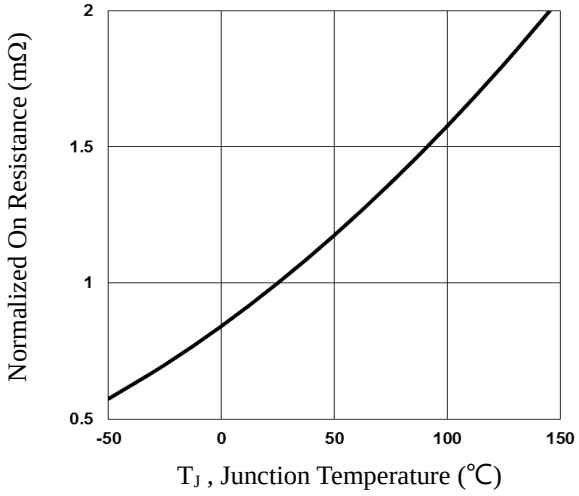


Fig.2 Normalized RDSON vs. T_J

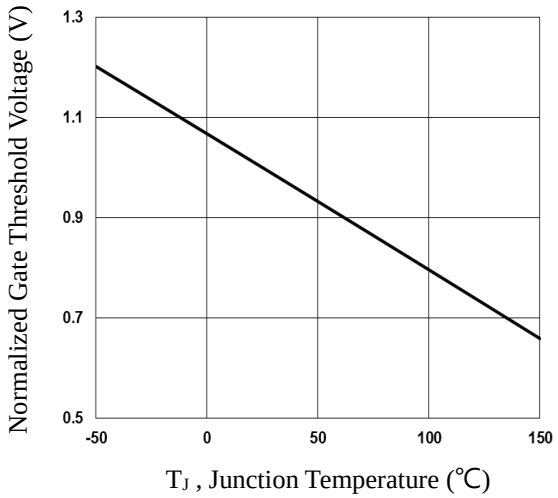


Fig.3 Normalized Vth vs. T_J

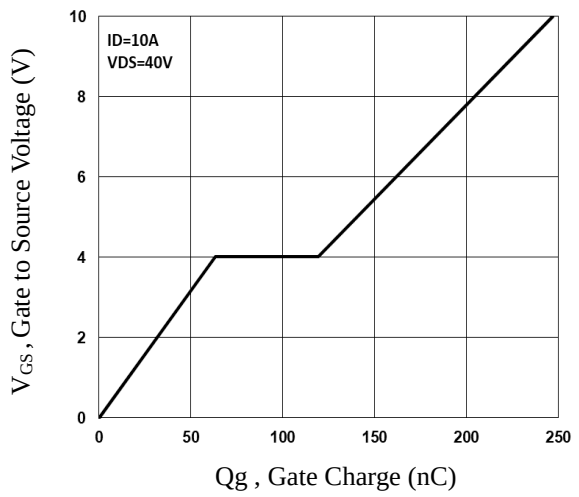


Fig.4 Gate Charge Characteristics

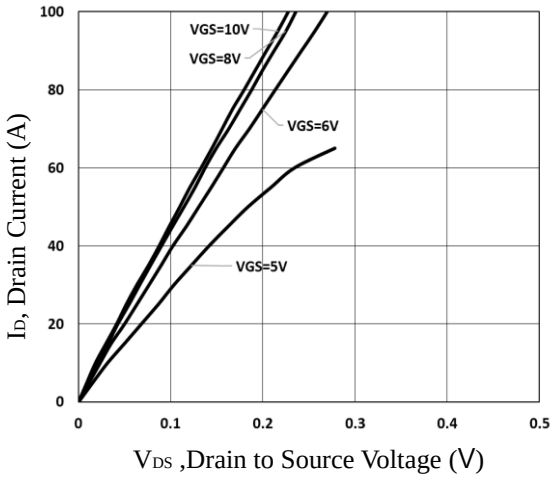


Fig.5 Typical Output Characteristics

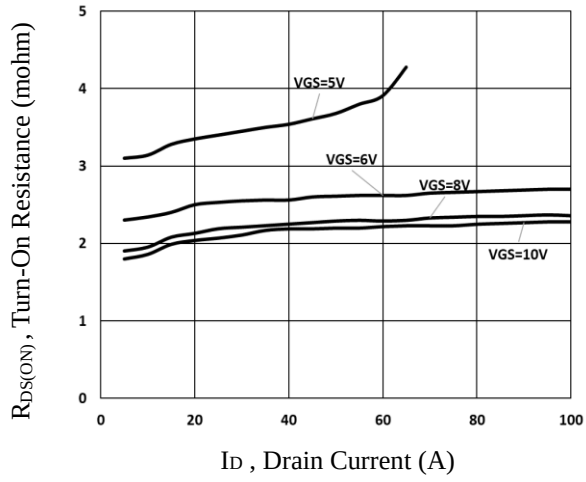


Fig.6 Turn-On Resistance vs. ID

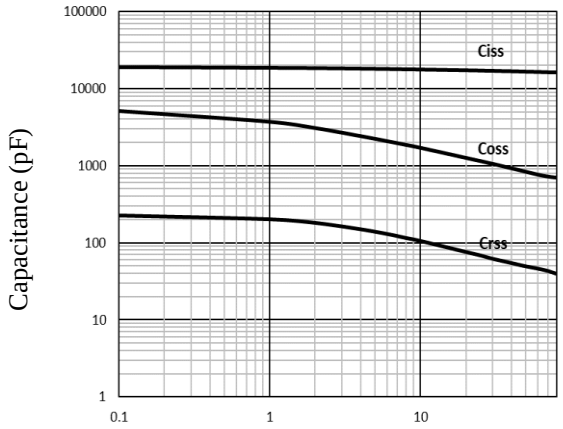


Fig.7 Capacitance Characteristics

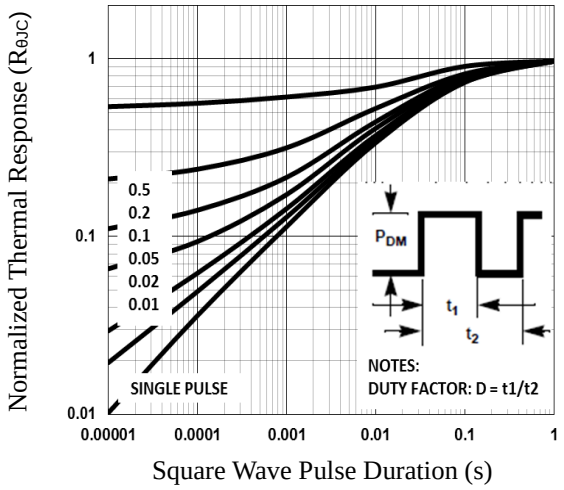


Fig.8 Normalized Transient Impedance

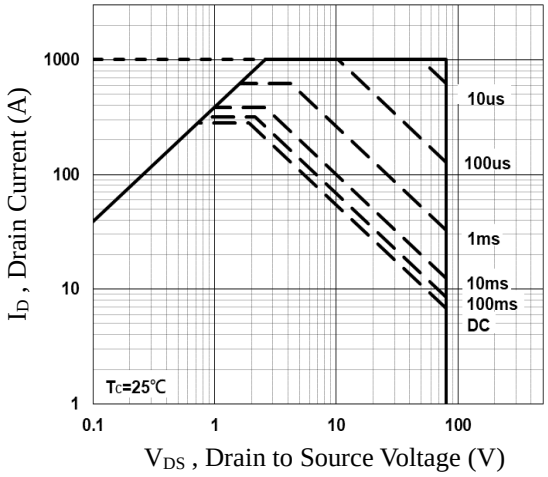


Fig.9 Maximum Safe Operation Area

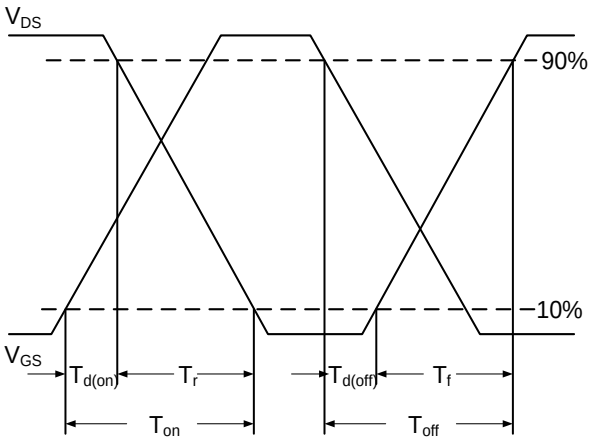


Fig.10 Switching Time Waveform

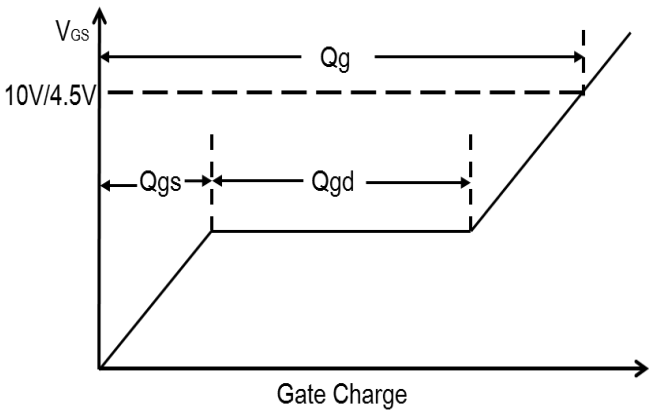
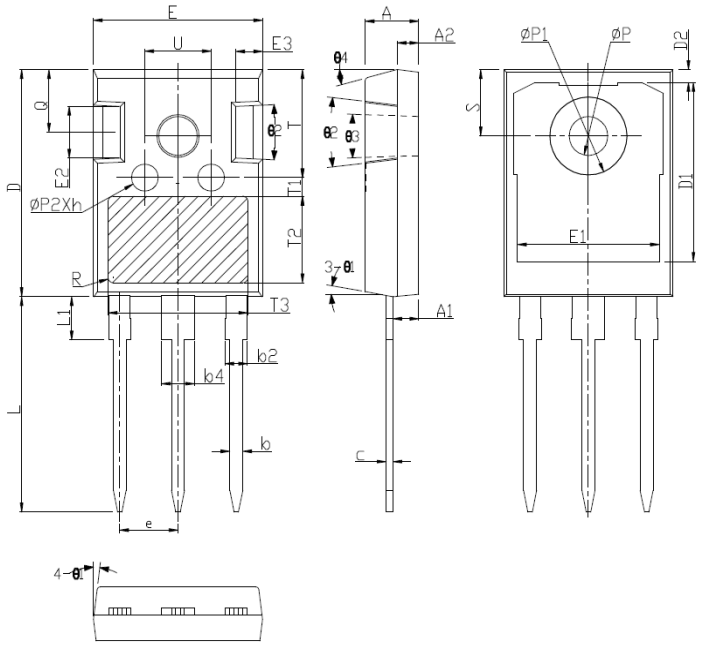


Fig.11 Gate Charge Waveform

TO247 PACKAGE INFORMATION



Symbol	Dimensions In Millimeters			Symbol	Dimensions In Millimeters		
	Min	Nom	Max		Min	Nom	Max
A	4.750	5.000	5.250	L	19.520	19.920	20.320
A1	2.160	2.410	2.660	L1	---	---	4.300
A2	1.850	2.000	2.150	ΦP	3.350	3.600	3.850
b	1.110	1.200	1.350	ΦP1	---	---	7.300
b2	1.900	2.010	2.250	ΦP2	2.250	2.500	2.750
b4	2.900	3.100	3.250	Q	5.500	5.800	6.100
c	0.510	0.610	0.750	S	6.15BSC		
D	20.600	21.000	21.400	R	0.50REF		
D1	16.150	16.550	16.950	T	9.700	---	10.300
D2	1.000	1.200	1.400	T1	1.65REF		
E	15.500	15.800	16.100	T2	8.00REF		
E1	13.000	13.300	13.600	T3	12.80REF		
E2	4.700	5.000	5.300	U	5.900	---	6.500
E3	2.250	2.500	2.750	θ1	3°	7°	10°
e	5.44BSC			θ2	2°	5°	8°
h	0.000	0.100	0.250	θ3	1°	---	2°
				θ4	10°	15°	20°