PDH0970

100V N-Channel MOSFETs
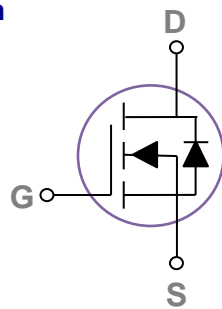
General Description

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
100V	3.6mΩ	190A

Features

- *100V,190A, RDS(ON) =3.6mΩ@VGS = 10V*
- *Improved dv/dt capability*
- *Fast switching*
- *100% EAS Guaranteed*
- *Green Device Available*

Applications

- *Networking*
- *Load Switch*
- *LED applications*
- *Quick Charger*

TO263 Pin Configuration

Absolute Maximum Ratings Tc=25℃ unless otherwise noted

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	100	V
V_{GS}	Gate-Source Voltage	±20	V
I_D	Drain Current – Continuous (T_C=25℃)	190	A
	Drain Current – Continuous (T_C=100℃)	120	A
I_{DM}	Drain Current – Pulsed[1]	840	A
EAS	Single Pulse Avalanche Energy[2]	280	mJ
IAS	Single Pulse Avalanche Current[2]	75	A
P_D	Power Dissipation (T_C=25℃)	463	W
	Power Dissipation – Derate above 25℃	3.7	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
$R_{θJA}$	Thermal Resistance Junction to ambient	---	62	℃/W
$R_{θJC}$	Thermal Resistance Junction to Case	---	0.27	℃/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	100	---	---	V
△BV$_{DSS}$/△T$_J$	BV$_{DSS}$ Temperature Coefficient	Reference to 25℃ , I$_D$=1mA	---	0.05	---	V/℃
I$_{DSS}$	Drain-Source Leakage Current	V$_{DS}$=100V , V$_{GS}$=0V , T$_J$=25℃	---	---	1	uA
		V$_{DS}$=80V , V$_{GS}$=0V , T$_J$=125℃	---	---	10	uA
I$_{GSS}$	Gate-Source Leakage Current	V$_{GS}$=±20V , 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	---	3	3.5	mΩ
V$_{GS(th)}$	Gate Threshold Voltage	V$_{GS}$=V$_{DS}$, I$_D$ =250uA	1.5	2.5	3.5	V
△V$_{GS(th)}$	V$_{GS(th)}$ Temperature Coefficient		---	-5	---	mV/℃
gfs	Forward Transconductance	V$_{DS}$=10V , I$_D$=3A	---	15	---	S

Dynamic and switching Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q$_g$	Total Gate Charge[3,4]	V$_{DS}$=80V , V$_{GS}$=10V , I$_D$=10A	---	295	450	nC
Q$_{gs}$	Gate-Source Charge[3,4]		---	70	140	
Q$_{gd}$	Gate-Drain Charge[3,4]		---	75	150	
T$_{d(on)}$	Turn-On Delay Time[3,4]	V$_{DD}$=50V , V$_{GS}$=10V , R$_G$=6Ω I$_D$=1A	---	66.2	120	ns
T$_r$	Rise Time[3,4]		---	79.6	160	
T$_{d(off)}$	Turn-Off Delay Time[3,4]		---	242	480	
T$_f$	Fall Time[3,4]		---	103	200	
C$_{iss}$	Input Capacitance	V$_{DS}$=50V , V$_{GS}$=0V , F=1MHz	---	19000	38000	pF
C$_{oss}$	Output Capacitance		---	680	1360	
C$_{rss}$	Reverse Transfer Capacitance		---	270	540	
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	---	---	190	A
I$_{SM}$	Pulsed Source Current		---	---	380	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$_S$=10A ,	---	64	---	ns
Q$_{rr}$	Reverse Recovery Charge	dI/dt=100A/µs , T$_J$=25℃	---	150	---	nC

Note :
1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. V$_{DD}$=50V,V$_{GS}$=10V,L=0.1mH,I$_{AS}$=75A.,R$_G$=25Ω, Starting T$_J$=25℃.
3. The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%.
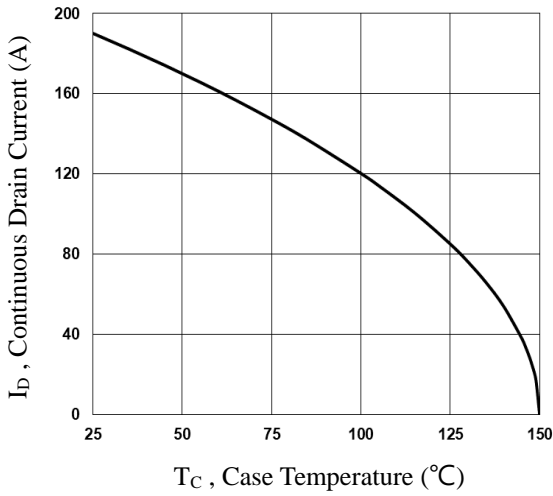4. Essentially independent of operating temperature.
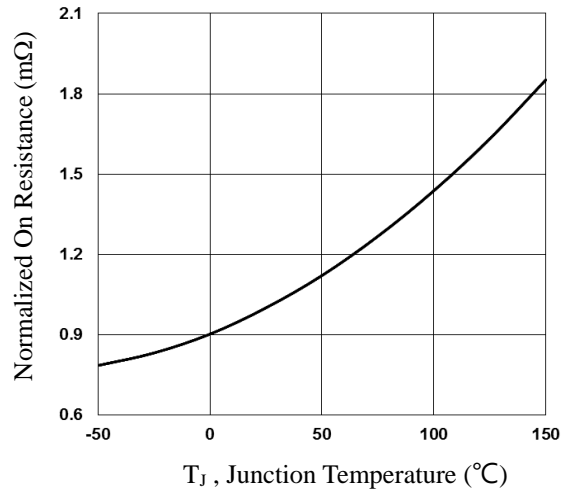
Fig.1   Continuous Drain Current vs. T_C

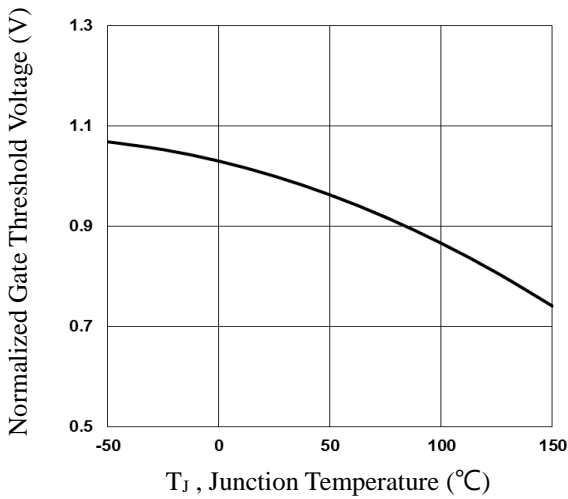Fig.2   Normalized RDSON vs. T_J

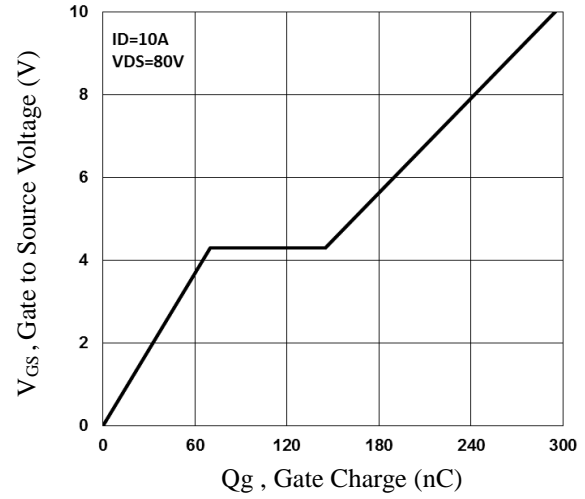Fig.3   Normalized Vth vs. T_J

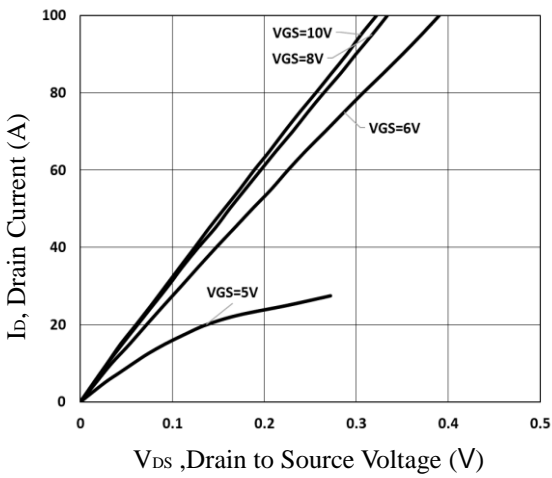Fig.4   Gate Charge Characteristics

Fig.5   Typical Output Characteristics
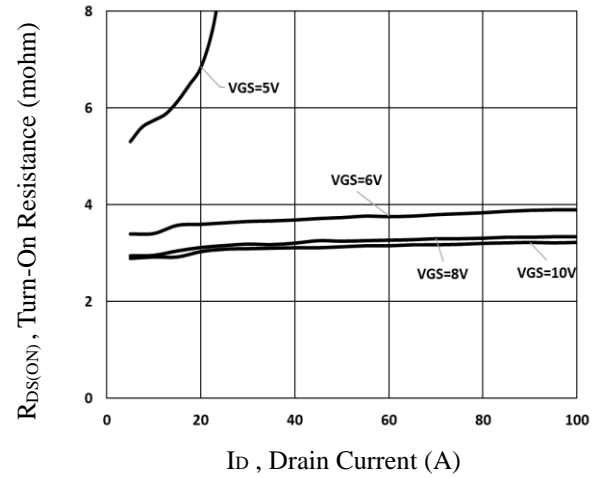

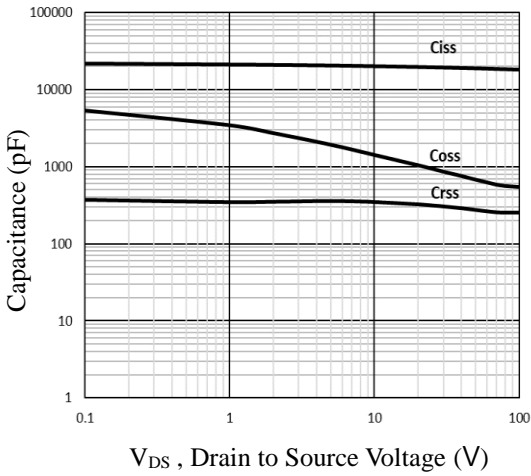Fig.6   Turn-On Resistance vs. I_D
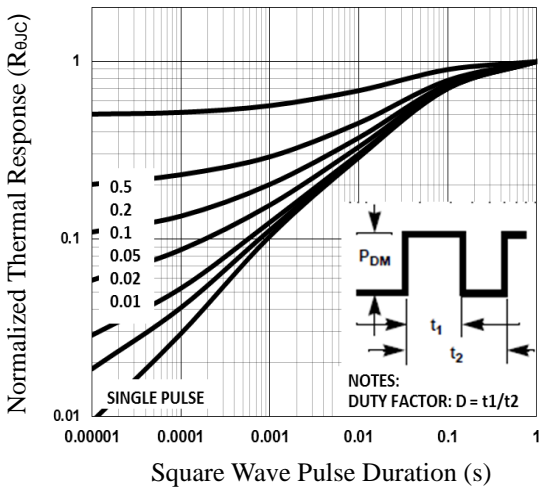
Fig.7   Capacitance Characteristics
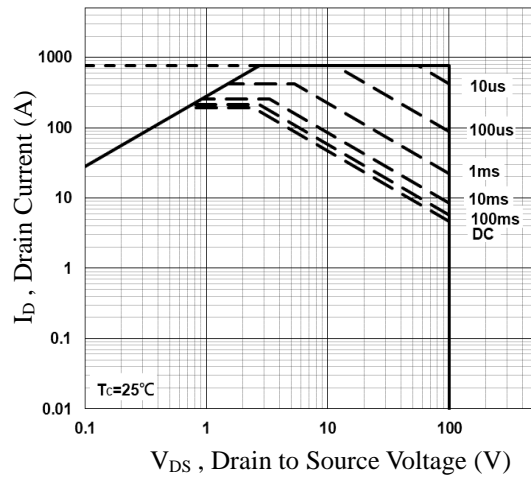

Fig.8   Normalized Transient Impedance

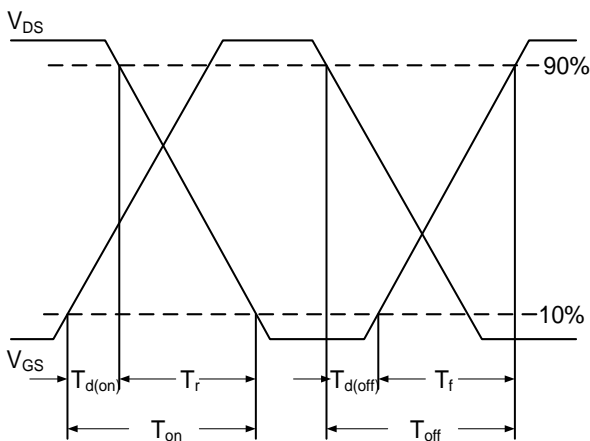
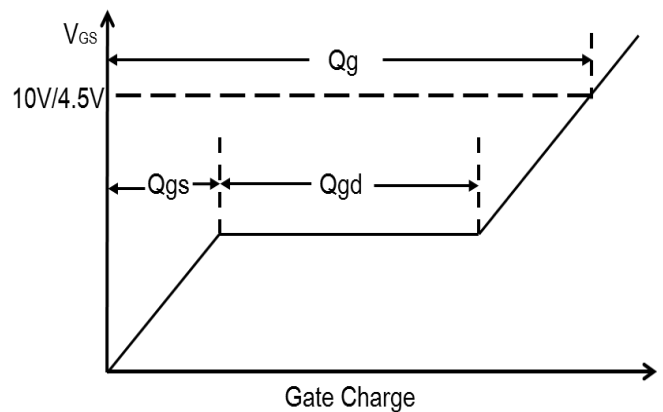Fig.9   Maximum Safe Operation Area

Fig.10   Switching Time Waveform

Fig.11   Gate Charge Waveform

TO263 PACKAGE INFORMATION