150V N-Channel MOSFETs

PDH150N15BH

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
150V	5.8mΩ	150A

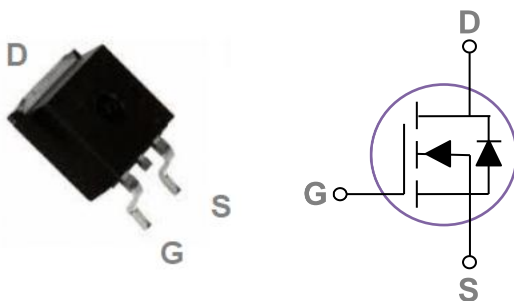
Features

- *150V,150A, RDS(ON) =5.8mΩ @VGS = 10V*
- *Improved dv/dt capability*
- *Fast switching*
- *100% EAS Guaranteed*
- *Green Device Available*

Applications

- *Motor Drive*
- *Power Tools*
- *LED Lighting*

TO263 Pin Configuration



Absolute Maximum Ratings T_C=25℃ unless otherwise noted

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	150	V
V_{GS}	Gate-Source Voltage	±20	V
I_D	Drain Current – Continuous (T_C=25℃)	150	A
	Drain Current – Continuous (T_C=100℃)	95	A
I_{DM}	Drain Current – Pulsed[1]	600	A
EAS	Single Pulse Avalanche Energy[2]	1350	mJ
IAS	Single Pulse Avalanche Current[2]	52	A
P_D	Power Dissipation (T_C=25℃)	305	W
	Power Dissipation – Derate above 25℃	2.44	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
$R_{θJA}$	Thermal Resistance Junction to ambient	---	62	℃/W
$R_{θJC}$	Thermal Resistance Junction to Case	---	0.41	℃/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	150	---	---	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=120V , V_{GS}=0V , T_J=25℃	---	---	1	uA
		V_{DS}=120V , V_{GS}=0V , T_J=85℃	---	---	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[3]	V_{GS}=10V , I_D=30A	---	4.8	5.8	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	2	2.8	4	V
gfs	Forward Transconductance	V_{DS}=10V , I_D=3A	---	18	---	S

Dynamic and switching Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q_g	Total Gate Charge[3,4]	V_{DS}=75V , V_{GS}=10V , I_D=80A	---	130	170	nC
Q_{gs}	Gate-Source Charge[3,4]		---	36	55	
Q_{gd}	Gate-Drain Charge[3,4]		---	32	50	
$T_{d(on)}$	Turn-On Delay Time[3,4]	V_{DD}=75V , V_{GS}=10V , R_G=6Ω I_D=80A	---	70	105	ns
T_r	Rise Time[3,4]		---	205	310	
$T_{d(off)}$	Turn-Off Delay Time[3,4]		---	402	600	
T_f	Fall Time[3,4]		---	197	300	
C_{iss}	Input Capacitance	V_{DS}=75V , V_{GS}=0V , F=1MHz	---	8525	12500	pF
C_{oss}	Output Capacitance		---	700	1050	
C_{rss}	Reverse Transfer Capacitance		---	25	40	
Rg	Gate Resistance	V_{GS}=0V, V_{DS}=0V, F=1MHz	---	2.7	---	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	---	---	150	A
I_{SM}	Pulsed Source Current		---	---	300	A
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_S=1A , T_J=25℃	---	---	1	V
t_{rr}	Reverse Recovery Time	V_R=100V, I_S=20A di/dt=100A/μs , T_J=25℃	---	135	---	ns
Q_{rr}	Reverse Recovery Charge		---	730	---	nC

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. V_{DD}=50V,V_{GS}=10V,L=1mH,I_{AS}=52A.,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.

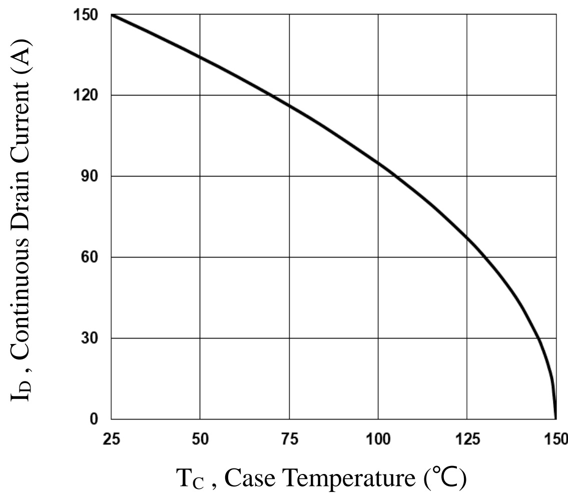


Fig.1 Continuous Drain Current vs. T_C

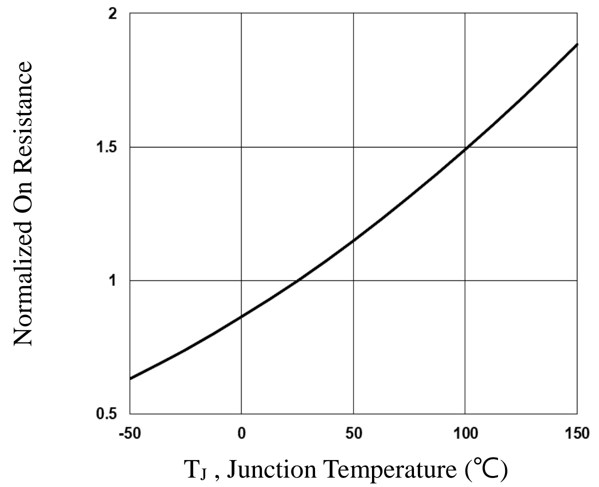


Fig.2 Normalized RDSON vs. T_J

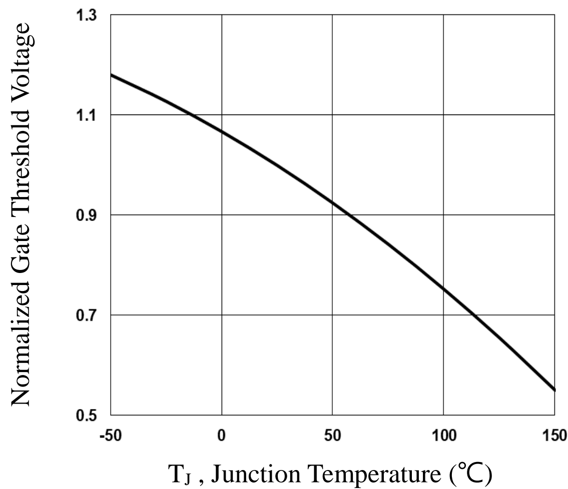


Fig.3 Normalized Vth vs. T_J

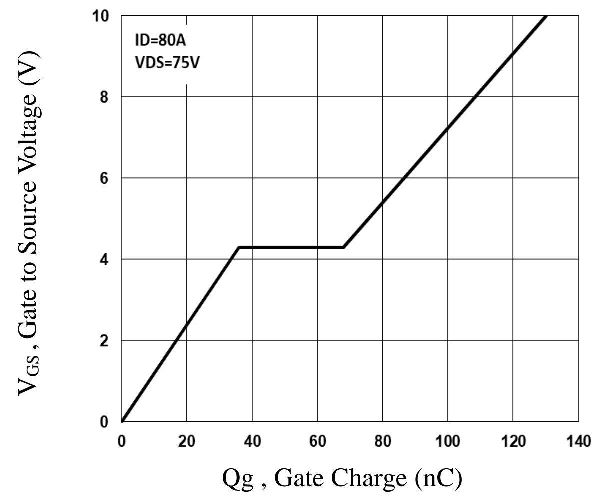


Fig.4 Gate Charge Characteristics

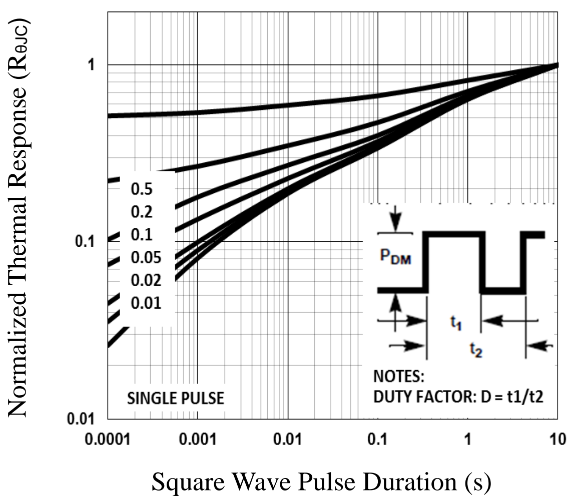


Fig.5 Normalized Transient Impedance

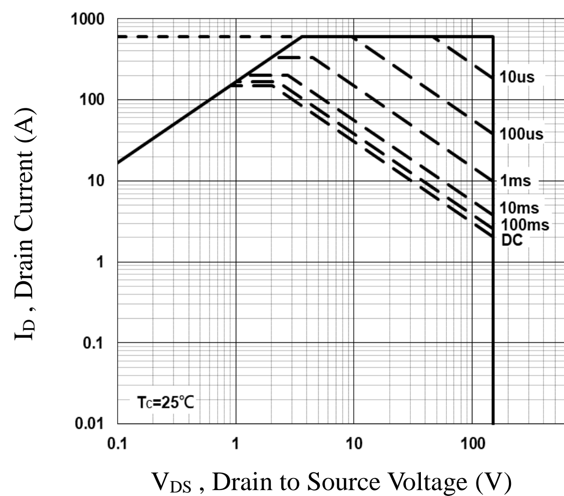


Fig.6 Maximum Safe Operation Area

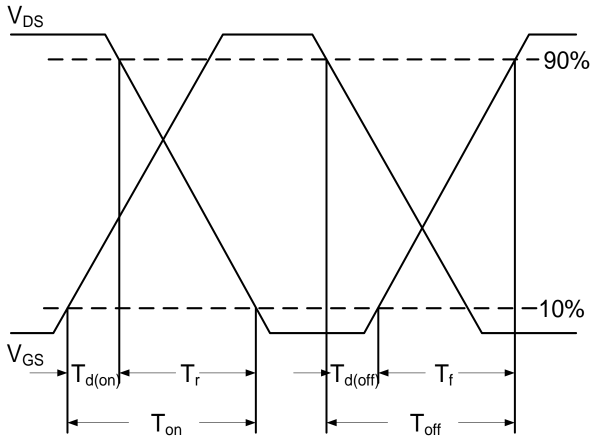


Fig.7 Switching Time Waveform

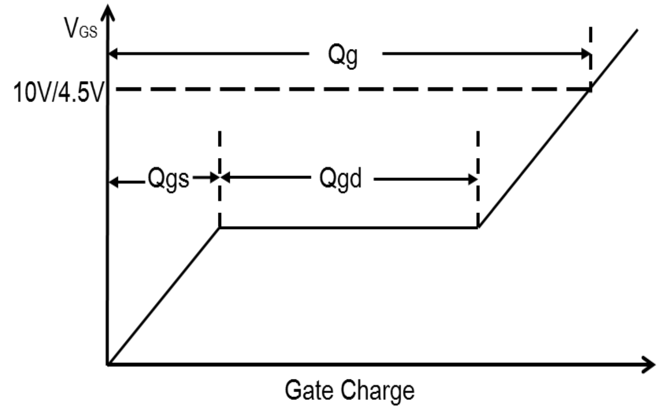


Fig.8 Gate Charge Waveform

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