



60V N-Channel MOSFETs

General Description

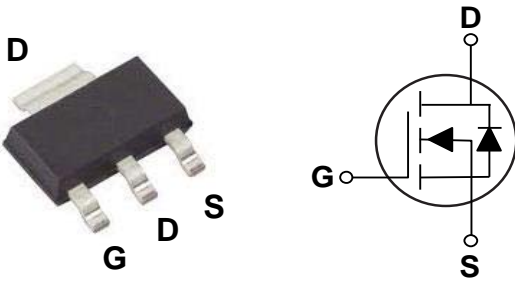
These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These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

BV _{DSS}	R _{DS(ON)}	I _D
60 V	60 mΩ	6.8 A

Features

- R_{DS(ON)} ≤ 60mΩ@V_{GS}=10V
- Improved dv/dt capability
- Fast switching
- Green Device Available

SOT-223 Pin Configuration



Applications

- Motor Drive
- Power Tools
- LED Lighting

Absolute Maximum Ratings T_C=25°C unless otherwise noted

Symbol	Parameter	Rating	Units
V _{DS}	Drain-Source Voltage	60	V
V _{GS}	Gate-Source Voltage	±20	V
I _D	Drain Current - Continuous (T _C =25°C)	6.8	A
	Drain Current - Continuous (T _C =100°C)	4.3	
I _{DM}	Drain Current - Pulsed (NOTE 1)	27.2	A
E _{AS}	Single Pulse Avalanche Energy (NOTE 2)	11	mJ
I _{AS}	Single Pulse Avalanche Current (NOTE 2)	15	A
P _D	Power Dissipation (T _C =25°C)	5.4	W
	Power Dissipation - Derate above 25°C	0.043	
T _J	Operating Junction Temperature Range	-50 to 150	°C
T _{STG}	Storage Temperature Range	-50 to 150	°C
Marking Code		NG060 , DL6910	

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
R _{θJA}	Thermal Resistance Junction to Ambient	---	85	°C/W
R _{θJC}	Thermal Resistance Junction to Case	---	23	°C/W

**Electrical Characteristics (T_J=25°C, unless otherwise noted)****Off Characteristics**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250uA	60	---	---	V
I _{DSS}	Drain-Source Leakage Current	V _{DS} =60V, V _{GS} =0V, T _J =25°C	---	---	1	uA
		V _{DS} =48V, V _{GS} =0V, T _J =125°C	---	---	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 =6A	---	50	60	mΩ
		V _{GS} =4.5V, I _D =3A	---	56	70	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	1.2	1.8	2.5	V
g _{fs}	Forward Transconductance	V _{DS} =10V, I _D =4A	---	10	---	S

Dynamic and switching Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q _g	Total Gate Charge	V _{DS} =48V, V _{GS} =10V, I _D =8A (NOTE 3、4)	---	14	21	nC
Q _{gs}	Gate-Source Charge		---	2.9	5	
Q _{gd}	Gate-Drain Charge		---	2.4	4	
T _{d(on)}	Turn-On Delay Time	V _{DD} =30V, V _{GS} =10V, R _G =6Ω, I _D =8A (NOTE 3、4)	---	14	27	nS
T _r	Rise Time		---	4	8	
T _{d(off)}	Turn-Off Delay Time		---	32	60	
T _f	Fall Time		---	2	4	
C _{iss}	Input Capacitance	V _{DS} =25V, V _{GS} =0V, f=1MHz	---	835	1300	pF
C _{oss}	Output Capacitance		---	69	130	
C _{rss}	Reverse Transfer Capacitance		---	40	80	
R _g	Gate Resistance	V _{DS} =0V, V _{GS} =0V, f=1MHz	---	1.7	3.4	Ω

Drain-Source Diode Characteristics and Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I _S	Continuous Source Current	V _G =V _D =0V, Force Current	---	---	6.8	A
I _{SM}	Pulsed Source Current		---	---	13.6	A
V _{SD}	Diode Forward Voltage	V _{GS} =0V, I _S =1A, T _J =25°C	---	---	1	V
t _{rr}	Reverse Recovery Time	V _{GS} =0V, I _S =8A, di/dt=100A/μs,	---	14.6	---	nS
Q _{rr}	Reverse Recovery Charge	T _J =25°C	---	6.6	---	nC

NOTES :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=15A, Starting T_J=25°C.
3. The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%.
4. Essentially independent of operating temperature.



Characteristics Curves

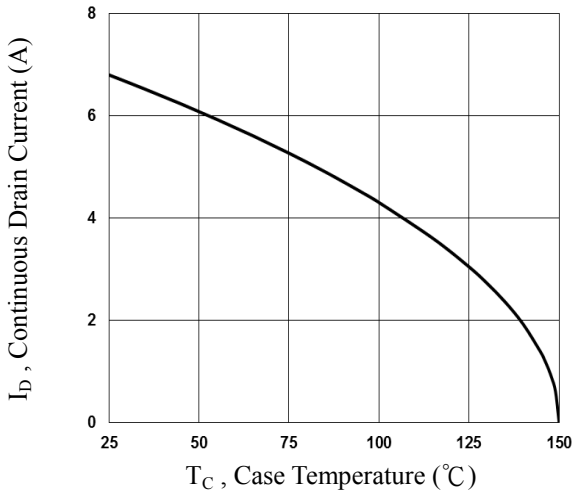


Fig.1 Continuous Drain Current vs. T_C

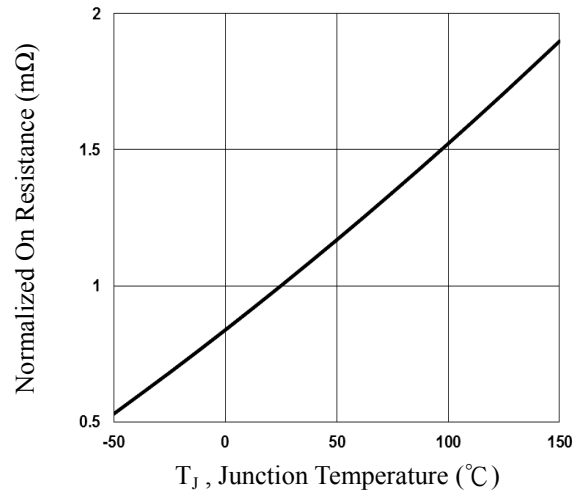


Fig.2 Normalized RDSON vs. T_J

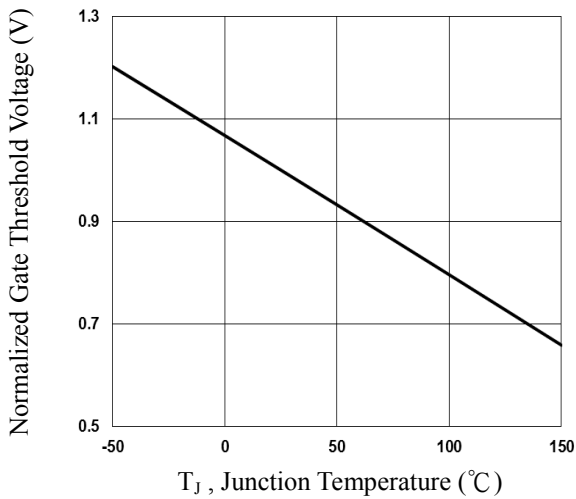


Fig.3 Normalized V_{th} vs. T_J

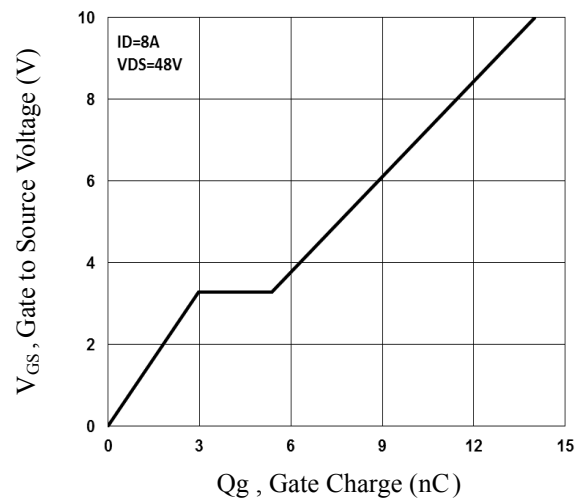


Fig.4 Gate Charge Waveform

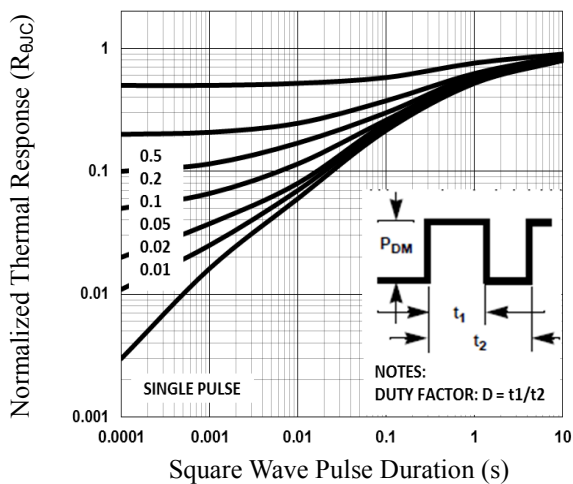


Fig.5 Normalized Transient Impedance

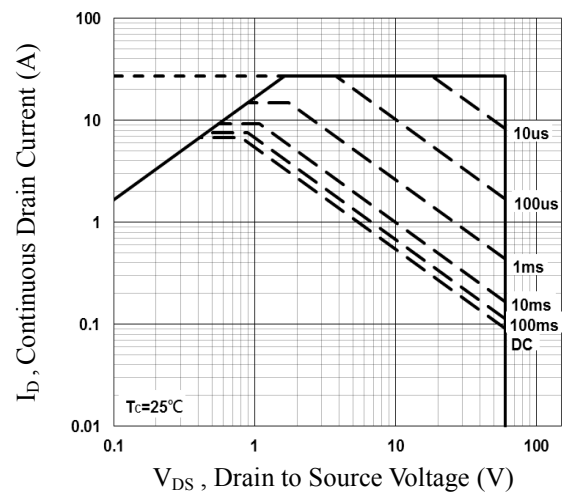


Fig.6 Maximum Safe Operation Area



Characteristics Curves

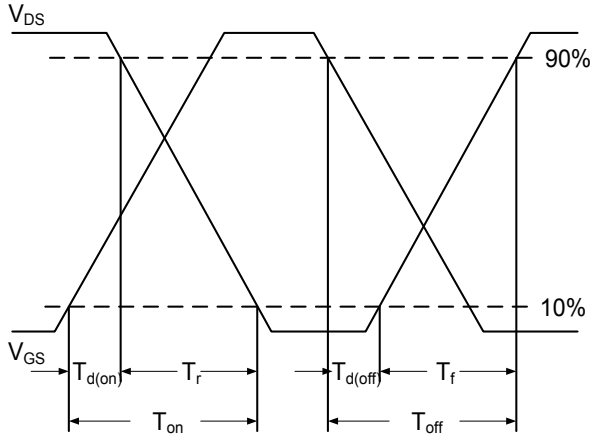


Fig.7 Switching Time Waveform

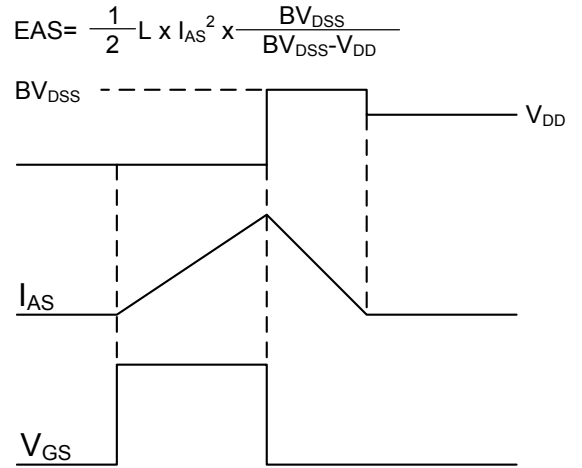
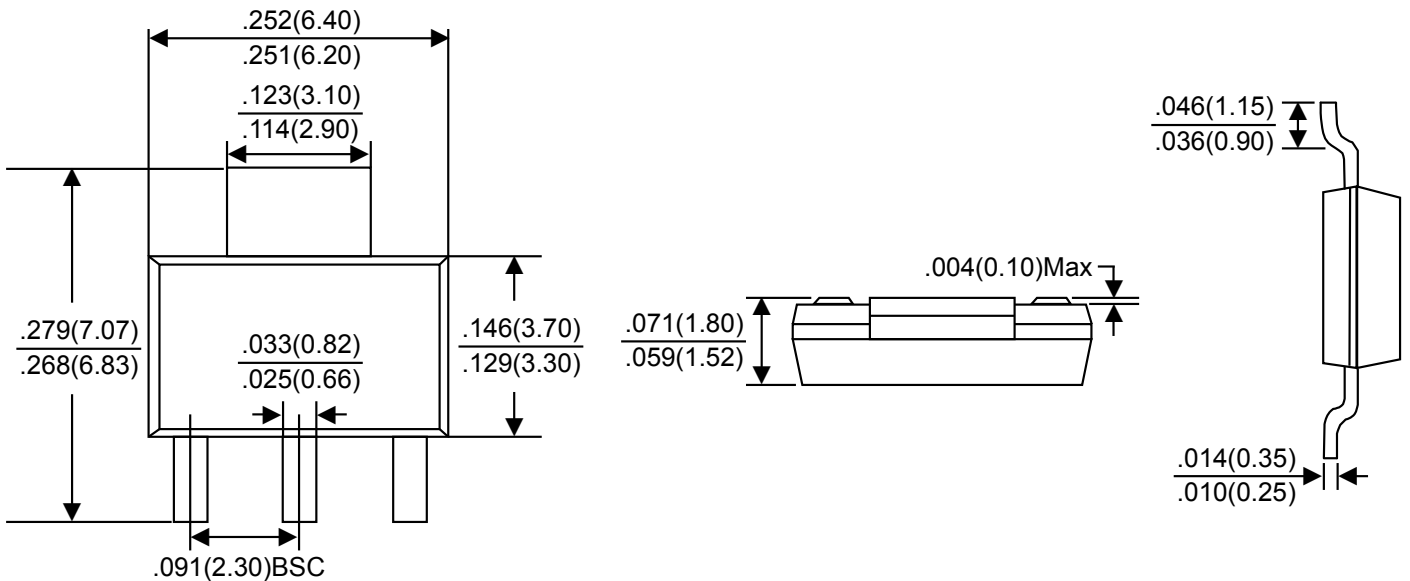


Fig.8 EAS Waveform

$$EAS = \frac{1}{2} L \times I_{AS}^2 \times \frac{BV_{DSS}}{BV_{DSS} - V_{DD}}$$

Package Outline Dimensions



SOT-223

Dimensions in inches and (millimeters)



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