

MSL01N60

600V N-Channel MOSFETs

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.

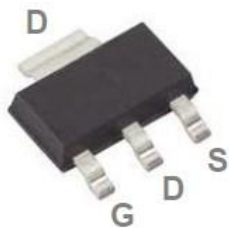
Features

- Improved dv/dt capability
- Fast switching
- 100% EAS Guaranteed
- Green Device Available
- RoHS compliant package

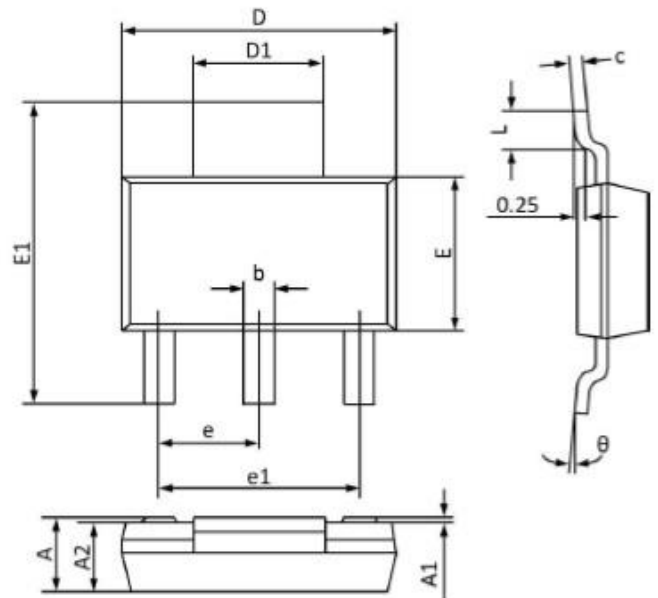
Applications

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

SOT223 Pin Configuration

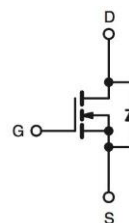


**RoHS
COMPLIANT**



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MAX	MIN	MAX	MIN
A	1.800	1.520	0.071	0.060
A1	0.100	0.000	0.004	0.000
A2	1.700	1.500	0.067	0.059
b	0.820	0.660	0.032	0.026
c	0.350	0.250	0.014	0.010
D	6.400	6.200	0.252	0.244
D1	3.100	2.900	0.122	0.114
E	3.700	3.300	0.146	0.130
E1	7.070	6.830	0.278	0.269
e	2.30(BSC)		0.091(BSC)	
e1	4.700	4.500	0.185	0.177
L	1.150	0.900	0.045	0.035
θ	10°	0°	10°	0°

Graphic symbol



MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

Absolute Maximum Ratings (T_A=25°C unless otherwise noted)

Symbol	Parameter	Value	Unit
V _{DS}	Drain-Source Voltage	600	V
V _{GS}	Gate-Source Voltage	±30	V
I _D	Drain Current - Continuous (T _C =25°C) (Chip Limitation)	1	A
	Drain Current - Continuous (T _C =100°C) (Chip Limitation)	0.6	A
I _{DM}	Drain Current - Pulsed ¹	4	A
EAS	Single Pulse Avalanche Energy ²	2	mJ

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Absolute Maximum Ratings ($T_A=25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Value	Unit
I _{AS}	Single Pulse Avalanched Current ²	1.9	A
P _D	Power Dissipation ($T_C=25^\circ\text{C}$)	5.2	W
	Power Dissipation - Derate above 25°C	0.042	W/ $^\circ\text{C}$
T _J	Operating Junction Temperature Range	-55 to +150	$^\circ\text{C}$
T _{STG}	Storage Temperature Range	-55 to +150	$^\circ\text{C}$

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Units
R _{θJA}	Thermal Resistance Junction to ambient	--	70	$^\circ\text{C}/\text{W}$
R _{θJC}	Thermal Resistance Junction to Case	--	24	

Electrical Characteristics ($T_J=25^\circ\text{C}$, unless otherwise noted)

Off Characteristics

Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
BV _{DSS}	Drain-Source Breakdown Voltage	$V_{GS} = V_{GS}, I_D = 250\mu\text{A}$	600			V
$\frac{\Delta BV_{DSS}}{\Delta T_J}$	BVDSS Temperature Coefficient	Reference to 25°C , $I_D=1\text{mA}$		0.6		V/ $^\circ\text{C}$
I _{GSS}	Gate-Source Leakage Current	$V_{DS} = 0\text{V}, V_{GS} = \pm 30\text{V}$			± 100	nA
I _{DSS}	Drain-Source Leakage Current	$V_{DS} = 600\text{V}, V_{GS} = 0\text{V}, T_J = 25^\circ\text{C}$ $V_{DS} = 480\text{V}, V_{GS} = 0\text{V}, T_J = 125^\circ\text{C}$			1 10	uA

On Characteristics

Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
R _{DS(on)}	Drain-Source On-Resistance ³	$V_{GS} = 10\text{V}, I_D = 0.5\text{A}$		8.5	10.5	m Ω
V _{GS(th)}	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = -250\mu\text{A}$	3	4	5	V
$\Delta V_{GS(th)}$	V _{GS(th)} Temperature Coefficient	$V_{DS} = V_{GS}, I_D = -250\mu\text{A}$		-7		mV/ $^\circ\text{C}$
g _{fs}	Forward Transconductance	$V_{DS} = 10\text{V}, I_D = 0.5\text{A}$		1.1		S

Dynamic and switching Characteristics

Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
t _{d(on)}	Turn-On Delay Time ^{3,4}	$I_D = 1\text{A}, R_G = 25\Omega,$ $V_{GS} = 10\text{V}, V_{DD} = 300\text{V}$	--	5	10	ns
t _r	Rise Time ^{3,4}		--	17	30	ns
t _{d(off)}	Turn-Off Delay Time ^{3,4}		--	10	18	ns
t _f	Fall Time ^{3,4}		--	23	35	ns

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Dynamic and switching Characteristics						
Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
Q_g	Total Gate Charge ^{3,4}	$V_{DS} = 480\text{ V}$, $I_D = 1\text{ A}$, $V_{GS} = 10\text{ V}$	--	5.9	11	nC
Q_{gs}	Gate-Source Charge ^{3,4}		--	1.9	3.8	nC
Q_{gd}	Gate-Drain Charge ^{3,4}		--	2	4	nC
C_{ISS}	Input Capacitance	$V_{DS} = 25\text{ V}$ $f = 1\text{ MHz}$, $V_{GS} = 0\text{ V}$	--	185	290	pF
C_{OSS}	Output Capacitance		--	20	40	pF
C_{RSS}	Reverse Transfer Capacitance		--	6	12	pF
R_g	Total Gate Charge	$V_{DS} = 0\text{ V}$, $f = 1\text{ MHz}$, $V_{GS} = 0\text{ V}$	--	1.5	3	Ω

Drain-Source Diode Characteristics and Maximum Ratings						
Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
I_S	Continuous Source Current	$V_G = V_D = 0\text{ V}$, Force Current	--	--	1	A
I_{SM}	Pulsed Source Current		--	--	2	A
V_{SD}	Diode Forward Voltage	$V_{GS} = 0\text{ V}$, $I_S = 0.3\text{ A}$, $T_J = 25^\circ\text{C}$	--	--	1	V
t_{rr}	Reverse Recovery Time	$V_{GS} = 0\text{ V}$, $I_S = 1\text{ A}$, $di/dt = 100\text{ A}/\mu\text{s}$, $T_J = 25^\circ\text{C}$	--	--	--	ns
Q_{rr}	Reverse Recovery Charge		--	--	--	nC

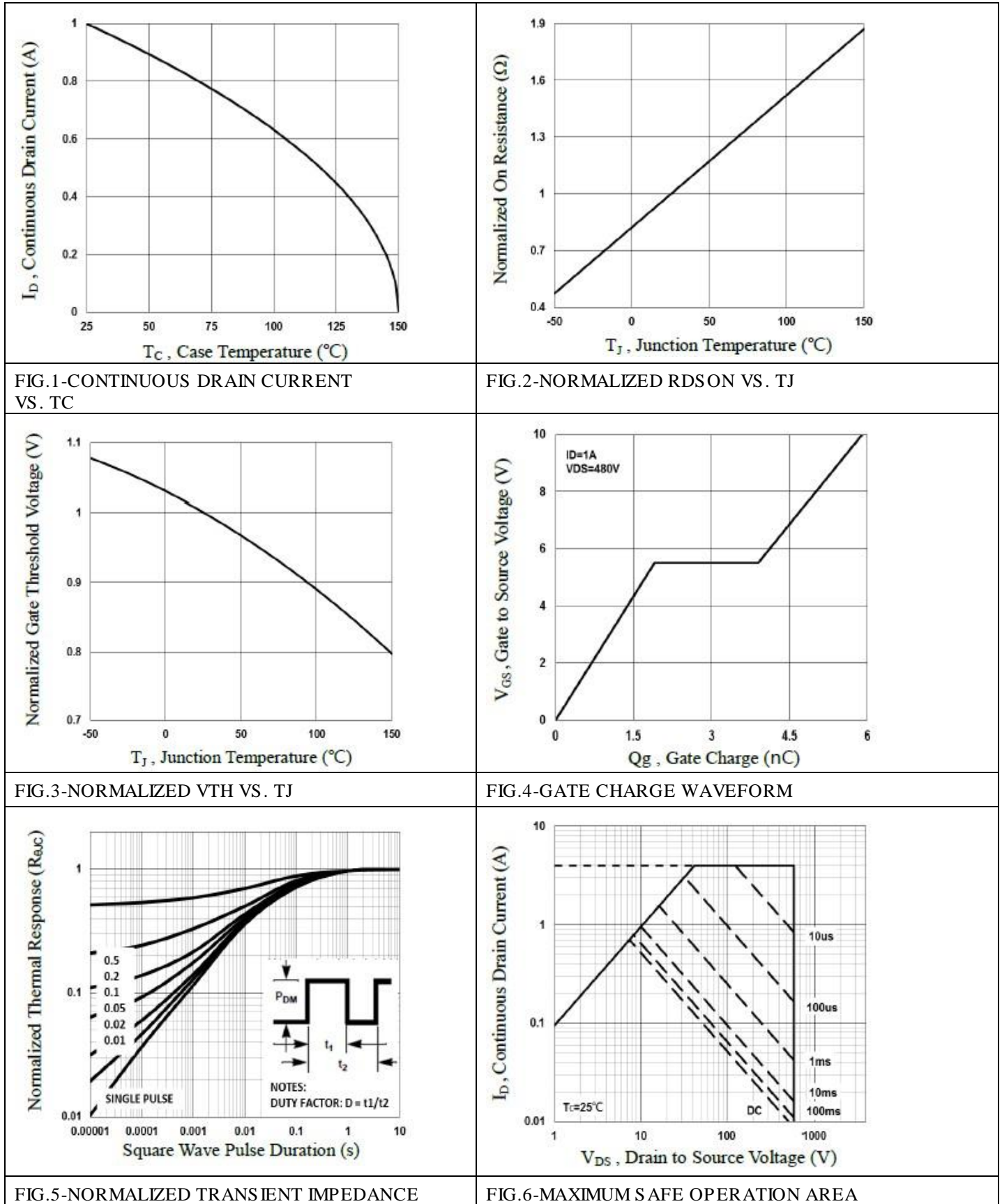
Note :

- 1.Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. $V_{DD} = 50\text{ V}$, $V_{GS} = 10\text{ V}$, $L = 0.1\text{ mH}$, $I_{AS} = 1.9\text{ A}$, $R_G = 25\Omega$, Starting $T_J = 25^\circ\text{C}$
- 3.The data tested by pulsed , pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.
- 4.Essentially independent of operating temperature.

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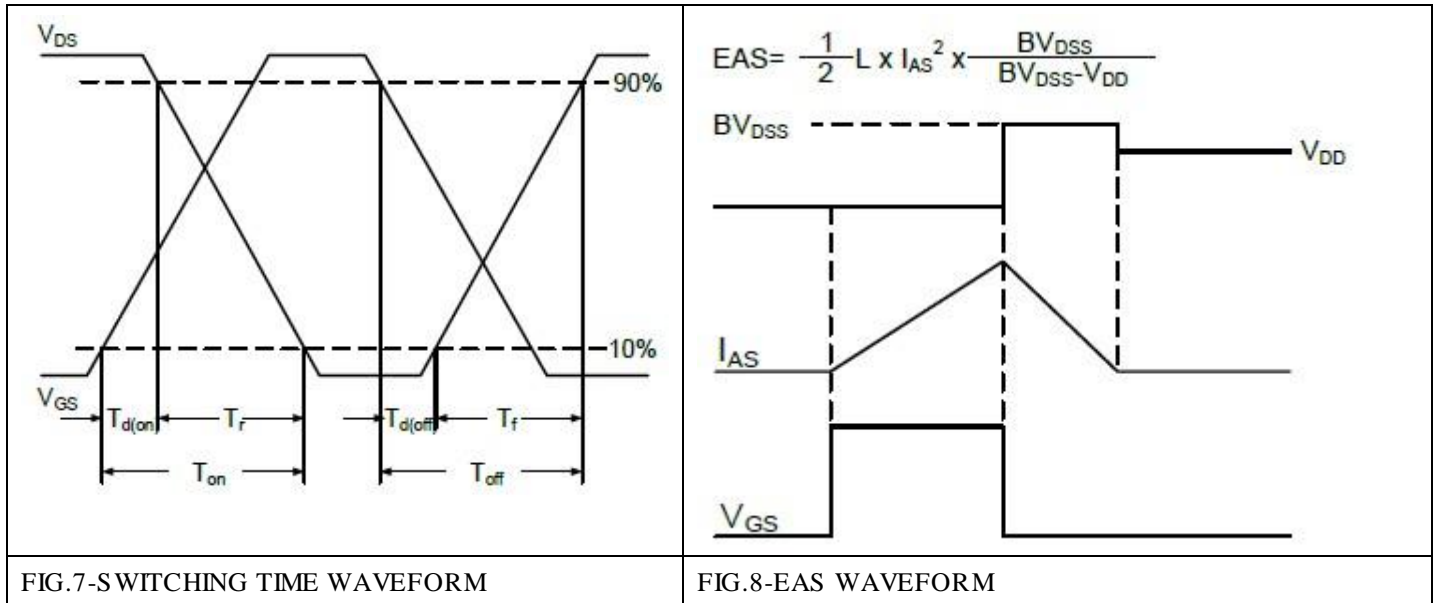
■ Characteristics Curve



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■ Characteristics Curve



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