

MSC49N60X

N-Channel 40V 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

- 40V, 140A, $R_{DS(ON)} = 2.8\text{m}\Omega @ V_{GS} = 10\text{V}$
- Improved dv/dt capability
- Fast switching

- Green Device Available
- RoHS compliant package

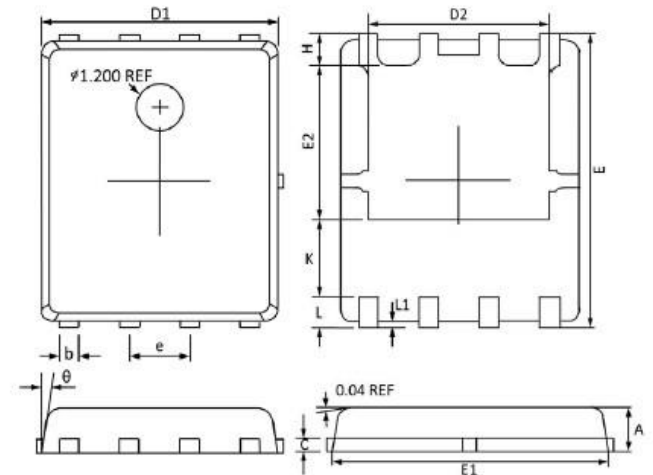
Applications

- MB / VGA / Vcore
- POL Applications
- SMPS 2nd SR

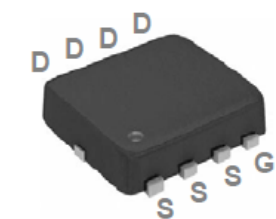
Package type : DFN5X6-8L

Packing & Order Information

3.000/Reel

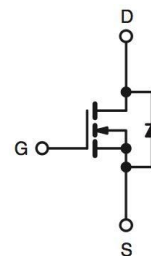


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MAX	MIN	MAX	MIN
A	1.100	0.800	0.043	0.031
b	0.510	0.330	0.020	0.013
C	0.300	0.200	0.012	0.008
D1	5.100	4.800	0.201	0.189
D2	4.100	3.610	0.161	0.142
E	6.200	5.900	0.244	0.232
E1	5.900	5.700	0.232	0.224
E2	3.780	3.350	0.149	0.132
e	1.27BSC		0.05BSC	
H	0.700	0.410	0.028	0.016
K	1.500	1.100	0.059	0.043
L	0.710	0.510	0.028	0.020
L1	0.200	0.060	0.008	0.002
θ	12°	0°	12°	0°



**RoHS
COMPLIANT**

Graphic symbol



MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

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

Symbol	Parameter	Value	Unit
V_{DS}	Drain-Source Voltage	40	V
V_{GS}	Gate-Source Voltage	± 20	V
I_D	Drain Current - Continuous ($T_C = 25^\circ\text{C}$) (Chip Limitation)	100	A
	Drain Current - Continuous ($T_C = 100^\circ\text{C}$) (Chip Limitation)	63	A
I_{DM}	Drain Current - Pulsed ¹	400	A
EAS	Single Pulse Avalanche Energy ²	312	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	79	A
P _D	Power Dissipation ($T_C=25^{\circ}\text{C}$)	135	W
	Power Dissipation - Derate above 25°C	1.08	W/°C
T _J	Operating Junction Temperature Range	-55 to +150	°C
T _{STG}	Storage Temperature Range	-55 to +150	°C

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Units
R _{θJA}	Thermal Resistance Junction to ambient	--	62	°C/W
R _{θJC}	Thermal Resistance Junction to Case	--	0.92	

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 = 250μA	40			V
ΔBV _{DSS} /ΔT _J	BVDSS Temperature Coefficient	Reference to 25°C, I _D =1mA		0.03		V/°C
I _{GSS}	Gate-Source Leakage Current	V _{DS} = 0 V, V _{GS} = ±20 V			±100	nA
I _{DSS}	Drain-Source Leakage Current	V _{DS} = 40 V, V _{GS} = 0 V, T _J = 25°C V _{DS} = 32 V, V _{GS} = 0 V, T _J = 125°C			1 10	uA

On Characteristics

Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
R _{DS(on)}	Drain-Source On-Resistance	V _{GS} = 10 V, I _D = 25 A V _{GS} = 4.5 V, I _D = 12 A		2.2 2.6	2.8 3.5	mΩ
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = -250μA	1.2	1.6	2.5	V
ΔV _{GS(th)}	V _{GS(th)} Temperature Coefficient	V _{DS} = V _{GS} , I _D = -250μA		-5		mV/°C
g _{fs}	Forward Transconductance	V _{DS} = 10 V, I _D = 2 A		45		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 A, R _G = 6 Ω, V _{GS} = 10 V, V _{DD} = 20 V	--	28	50	ns
t _r	Rise Time ^{3,4}		--	3.2	6.5	ns
t _{d(off)}	Turn-Off Delay Time ^{3,4}		--	89	160	ns
t _f	Fall Time ^{3,4}		--	14	28	ns

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Dynamic and switching Characteristics

Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
Q_g	Total Gate Charge ^{3,4}	$V_{DS} = 20\text{ V}$, $I_D = 10\text{ A}$, $V_{GS} = 4.5\text{ V}$	--	44.4	80	nC
Q_{gs}	Gate-Source Charge ^{3,4}		--	9.6	18	nC
Q_{gd}	Gate-Drain Charge ^{3,4}		--	16	30	nC
C_{ISS}	Input Capacitance	$V_{DS} = 25\text{ V}$ $f = 1\text{ MHz}$, $V_{GS} = 0\text{ V}$	--	4940	7800	pF
C_{OSS}	Output Capacitance		--	425	800	pF
C_{RSS}	Reverse Transfer Capacitance		--	170	330	pF
R_g	Total Gate Charge	$V_{DS} = 0\text{ V}$, $f = 1\text{ MHz}$, $V_{GS} = 0\text{ V}$	--	1.4	2.8	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	--	--	100	A
I_{SM}	Pulsed Source Current		--	--	200	A
V_{SD}	Diode Forward Voltage	$V_{GS} = 0\text{ V}$, $I_S = 1\text{ A}$, $T_J = 25^\circ\text{C}$	--	--	1	V

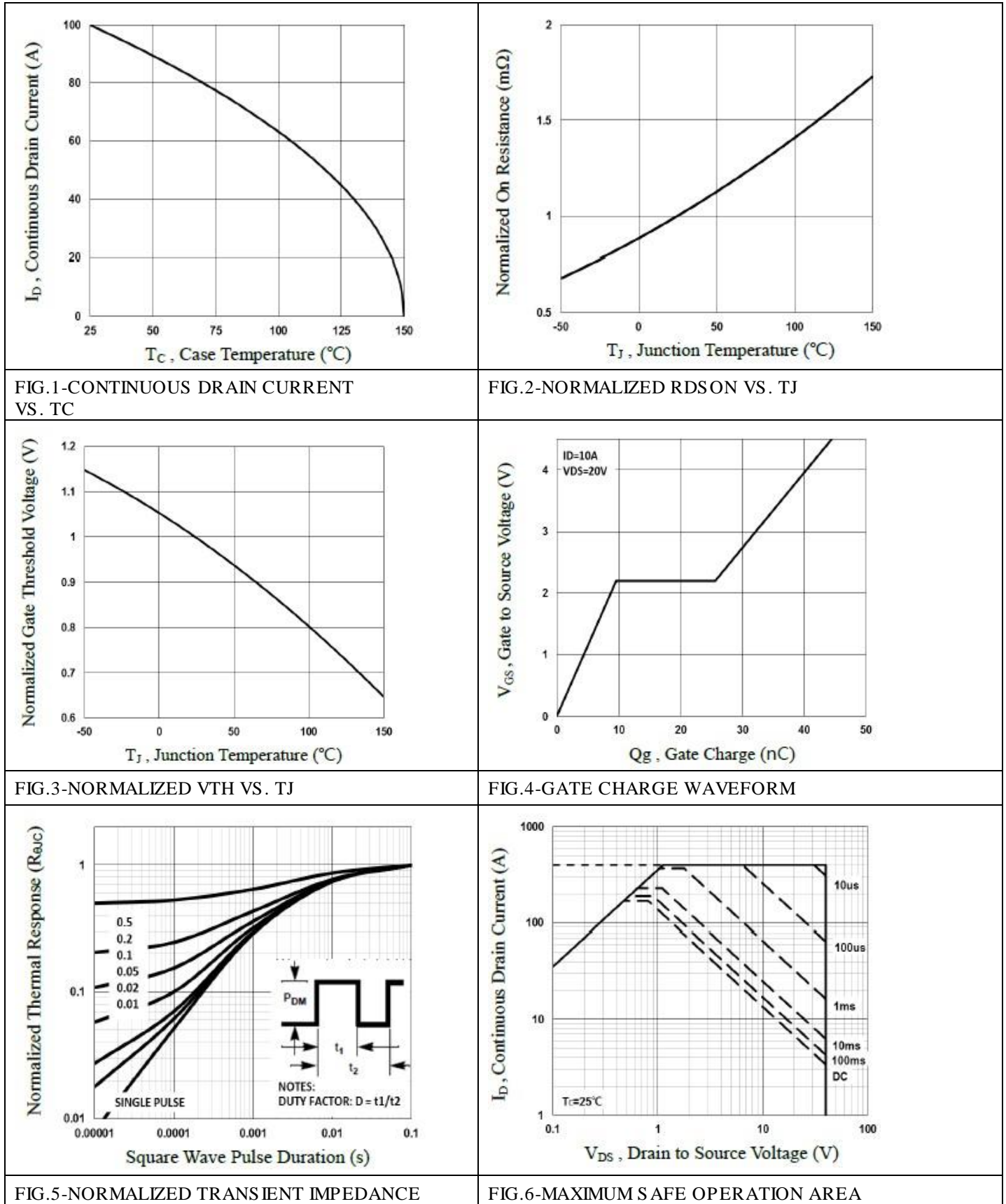
Note :

- 1.Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. $V_{DD}=25\text{V}$, $V_{GS}=10\text{V}$, $L=0.1\text{mH}$, $I_{AS}=79\text{A}$., 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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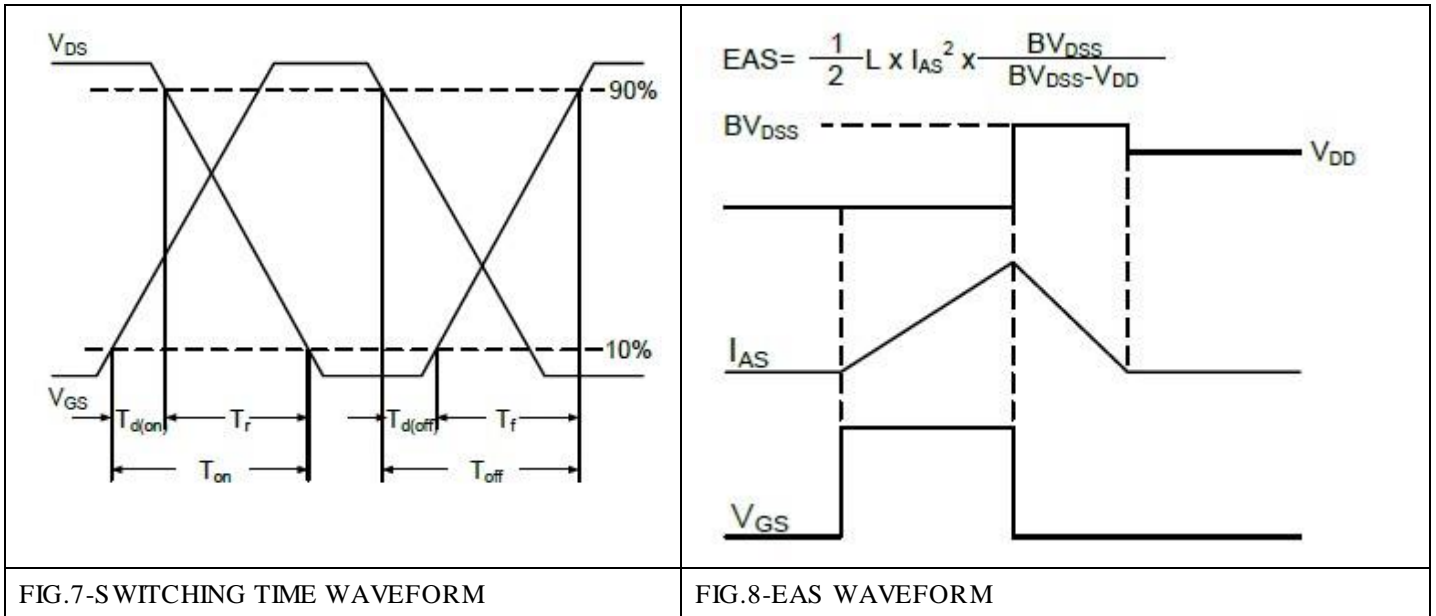
■ Characteristics Curve



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