MSC39N12

N-Channel 30V 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

- 30V,25A, RDS(ON) =18mΩ @VGS = 10V
- Improved dv/dt capability
- Fast switching
- 100% EAS Guaranteed
- Green Device Available
- RoHS compliant package

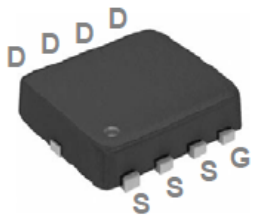
Applications

- MB / VGA / Vcore
- Load Switch
- Hand-Held Instrument

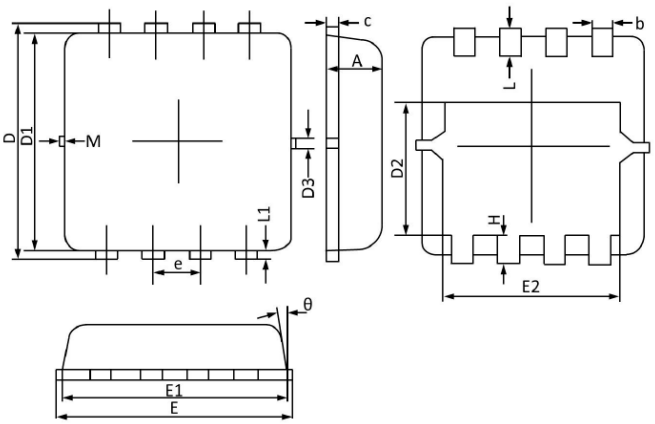
Package type：DFN 3X3

Packing & Order information

3,000/Reel

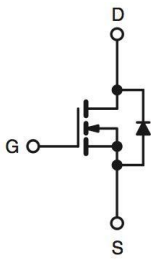


RoHS COMPLIANT



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.700	0.800	0.028	0.031
b	0.250	0.350	0.010	0.013
c	0.100	0.250	0.004	0.009
D	3.250	3.450	0.128	0.135
D1	3.000	3.200	0.119	0.125
D2	1.780	1.980	0.070	0.077
D3	0.130 REF		0.005 REF	
E	3.200	3.400	0.126	0.133
E1	3.000	3.200	0.119	0.125
E2	2.390	2.590	0.094	0.102
e	0.650 BSC		0.026 BSC	
H	0.300	0.500	0.011	0.019
L	0.300	0.500	0.011	0.019
L1	0.130 REF		0.005 REF	
θ	0°	12°	0°	12°
M	0.150 REF		0.006 REF	

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	30	V
V_{GS}	Gate-Source Voltage	±20	V
I_D	Drain Current - Continuous (T_C=25°C)	25	A
	Drain Current - Continuous (T_C=100°C)	16	A
I_{DM}	Drain Current - Pulsed[1]	100	A
EAS	Single Pulse Avalanche Energy[2]	32	mJ
IAS	Single Pulse Avalanched Current[2]	8	A

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Absolute Maximum Ratings (T_A=25°C unless otherwise noted)			
Symbol	Parameter	Value	Unit
P_D	Power Dissipation (T_C=25°C)	21	W
	Power Dissipation - Derate above 25°C	0.17	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
$R_{\Theta jA}$	Thermal Resistance Junction to ambient	--	62	°C/W
$R_{\theta JC}$	Thermal Resistance Junction to Case	--	6	

Electrical Characteristics (TJ=25℃, 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 = 250uA	30			V
ΔBV_{DSS} /ΔTJ	BV_{DSS} Temperature Coefficient	Reference to 25°C , I_D = 1mA		0.04		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} = 30 V , V_{GS} = 0 V , T_J= 25°C V_{DS} = 24 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 = 12 A V_{GS} = 4.5 V , I_D = 8 A		14 20	18 28	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D =-250μA	1.2	1.6	2.5	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient	V_{DS} = V_{GS}, I_D =-250μA		-4		mV/°C
g_{fs}	Forward Tranconductance	V_{DS} = 10 V , I_S = 6 A		6.5		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} = 15 V	--	2.8	5	ns
t_r	Rise Time[3,4]		--	7.2	14	ns
$t_{d(off)}$	Turn-Off Delay Time[3,4]		--	15.8	30	ns
tf	Fall Time[3,4]		--	4.6	9	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} = 15 V , I_D = 6 A, V_{GS} = 4.5 V	--	4.1	8	nC
Q_{gs}	Gate-Source Charge[3,4]		--	1	2	nC
Q_{gd}	Gate-Drain Charge[3,4]		--	2.1	4	nC
C_{ISS}	Input Capacitance	V_{DS} = 25 V f = 1 MHz , V_{GS} = 0 V	--	345	500	pF
C_{OSS}	Output Capacitance		--	55	80	pF
C_{RSS}	Reverse Transfer Capacitance		--	32	45	pF
Rg	Total Gate Charge	V_{DS} = 0 V , f = 1 MHz , V_{GS} = 0 V	--	3.2	6.4	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 V , Force Current	--	--	25	A
I_{SM}	Pulsed Source Current		--	--	100	A
V_{SD}	Diode Forward Voltage	V_{GS} = 0 V , I_S = 1 A , TJ = 25°C	--	--	1	V
trr	Reverse Recovery Time	V_{GS} = 0 V , I_S = 1 A , di/dt=100A/μs , TJ=25°C	--	--	--	ns
Qrr	Reverse Recovery Charge		--	--	--	nC

Note :

1.Repetitive Rating : Pulsed width limited by maximum junction temperature.

2.VDD=25V,VGS=10V,L=1mH,IAS=8A.,RG=25Ω,Starting TJ=25℃.

3.The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%.

4.Essentially independent of operating temperature.

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■Characteristics Curve

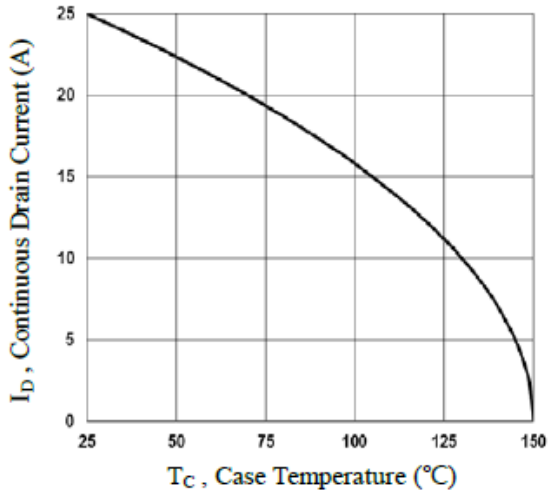

FIG.1-CONTINUOUS DRAIN CURRENT VS. TC

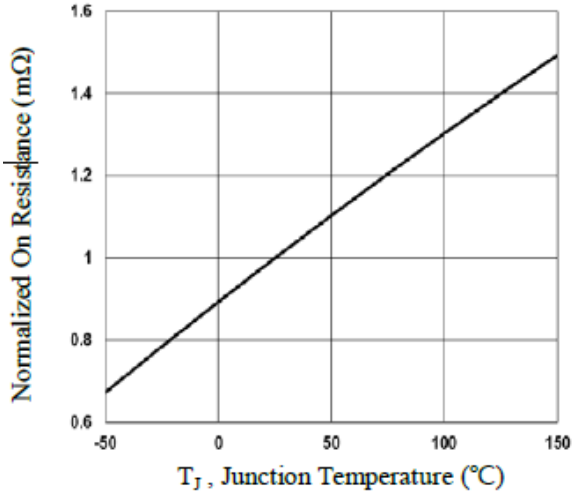

FIG.2-NORMALIZED RDSON VS. TJ

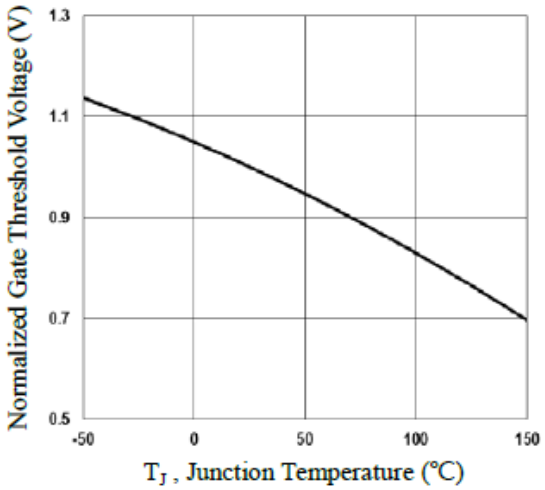

FIG.3-NORMALIZED VTH VS. TJ

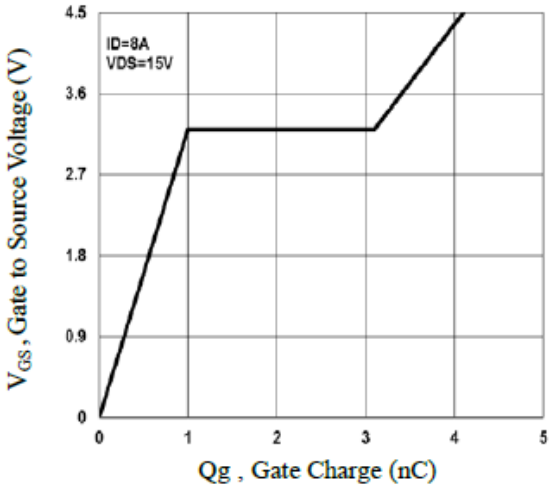

FIG.4-GATE CHARGE WAVEFORM

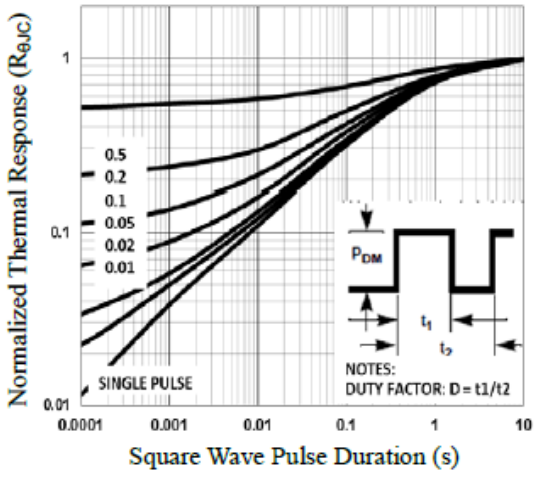

FIG.5-NORMALIZED TRANSIENT IMPEDANCE

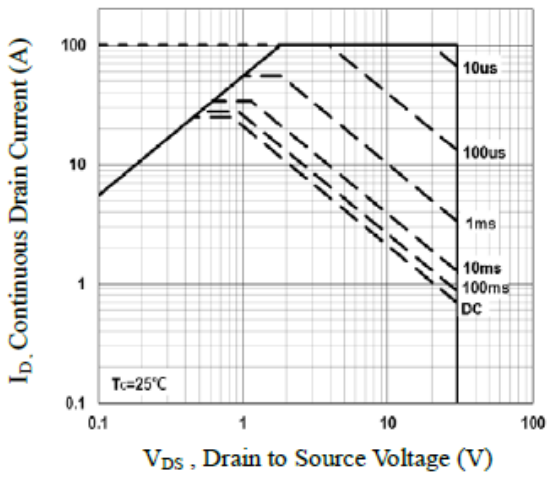

FIG.6-MAXIMUM SAFE OPERATION AREA

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■Characteristics Curve

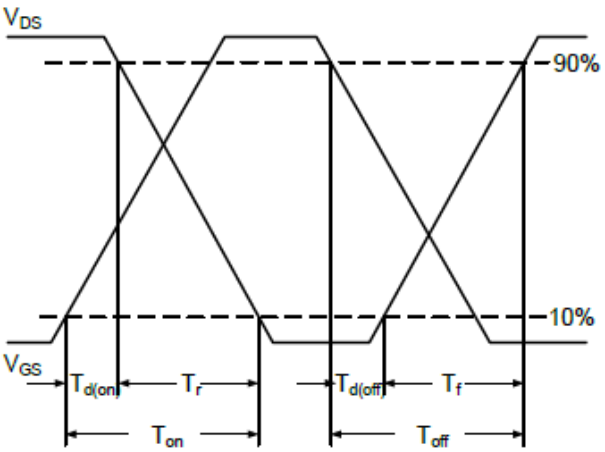

FIG.7-SWITCHING TIME WAVEFORM

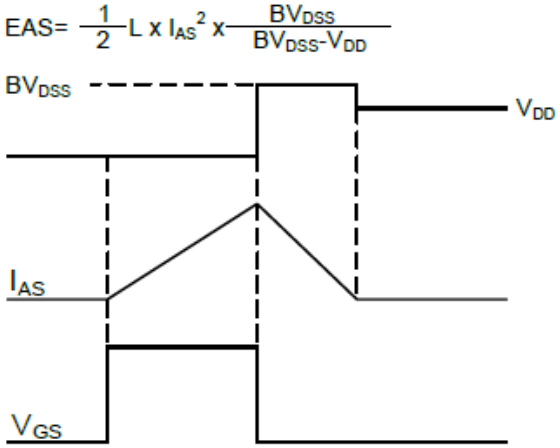

FIG.8-EAS WAVEFORM

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