MSD30N94

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, 90A, RDS(ON) =4mΩ@VGS = 10V
- Improved dv/dt capability
- Fast switching
- 100% EAS Guaranteed
- Green Device Available
- RoHS compliant package

Applications

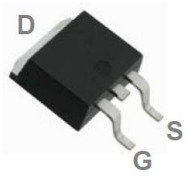
- MB / VGA / Vcore
- POL Applications
- SMPS 2nd SR

Package type：TO-252

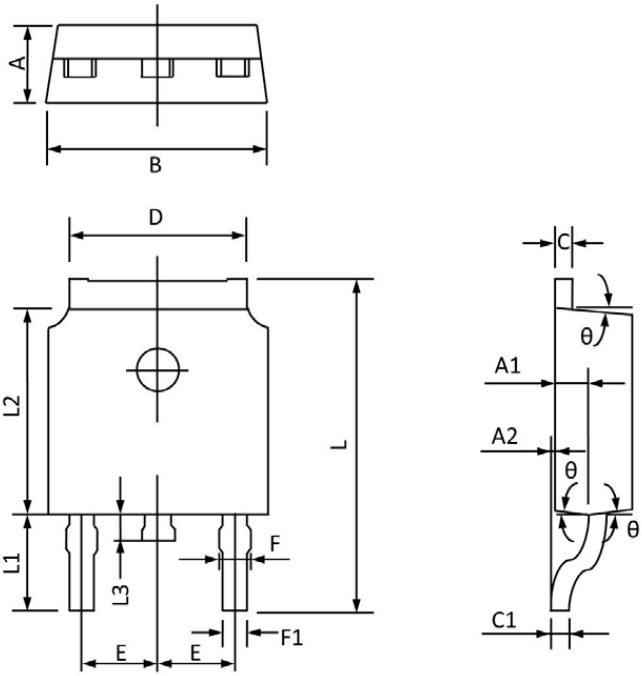
Packing & Order information

R：2,500/Reel

T：80/Tube ; 4,000/Box

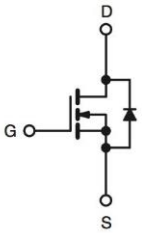


RoHS COMPLIANT



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	2.20	2.40	0.087	0.094
A1	0.91	1.11	0.036	0.044
A2	0.00	0.15	0.000	0.006
B	6.50	6.70	0.256	0.264
C	0.46	0.580	0.018	0.230
C1	0.46	0.580	0.018	0.030
D	5.10	5.46	0.201	0.215
E	2.186	2.386	0.086	0.094
F	0.74	0.94	0.029	0.037
F1	0.660	0.860	0.026	0.034
L	9.80	10.40	0.386	0.409
L1	2.9REF		0.114REF	
L2	6.00	6.20	0.236	0.244
L3	0.60	1.00	0.024	0.039
θ	3°	9°	3°	9°

Graphic symbol



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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)	90	A
	Drain Current - Continuous (T_C=100°C)	57	A
I_{DM}	Drain Current - Pulsed[1]	360	A
E_{AS}	Single Pulse Avalanche Energy[2]	125	mJ
I_{AS}	Single Pulse Avalanche Current[2]	50	A
P_D	Power Dissipation (T_C=25°C)	88	W
	Power Dissipation - Derate above 25°C	0.59	W/°C
T_J	Storage Temperature Range	-55 to +175	°C
T_{STG}	Operating Junction Temperature Range	-55 to +175	°C

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Thermal Resistance Junction to ambient	--	62	°C/W
$R_{\theta JA}$	Thermal Resistance Junction to Case	--	1.7	

Electrical Characteristics (TJ=25 ℃, unless otherwise noted)

Static State 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		0.03		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} = 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
$R_{DS(on)}$	Drain-Source On-Resistance[3]	V_{GS} = 10 V, I_D = 24 A V_{GS} = 4.5 V , I_D = 12 A		3.1 4.5	4 6	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		-5		mV/°C
g_{fs}	Forward Tranconductance	V_{DS} = 10 V , I_D = 10 A		15.5		S

Guaranteed Avalanche Energy

Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
EAS	Single Pulse Avalanche Energy	V_{DD} = 25 V , L = 0.1Mh , I_{AS} = 24 A	31	--	--	mJ

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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 = 24 A, V_{GS} = 4.5 V	--	24	36	nC
Q_{gs}	Gate-Source Charge[3,4]		--	4.2	8	nC
Q_{gd}	Gate-Drain Charge[3,4]		--	13	20	nC
$t_{d(on)}$	Turn-On Delay Time[3,4]	I_D = 15 A , R_G = 3.3 Ω, V_{GS} = 10 V , V_{DD} = 15 V	--	12.6	24	ns
t_r	Rise Time[3,4]		--	19.5	37	ns
$t_{d(off)}$	Turn-Off Delay Time[3,4]		--	42.8	81	ns
tf	Fall Time[3,4]		--	13.2	25	ns
C_{ISS}	Input Capacitance	V_{DS} = 15 V f = 1 MHz , V_{GS} = 0 V	--	2200	3300	pF
C_{OSS}	Output Capacitance		--	280	410	pF
C_{RSS}	Reverse Transfer Capacitance		--	177	260	pF
Rg	Total Gate Charge	V_{DS} = 0 V , f = 1 MHz , V_{GS} = 0 V	--	2	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	--	--	90	A
I_{SM}	Pulsed Source Current		--	--	360	A
V_{SD}	Diode Forward Voltage	V_{GS} = 0 V , I_S = 1 A , TJ = 25°C	--	--	1	V
trr	Reverse Recovery Time	V_{DS} = 3 0V, 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=0.1mH,IAS=50A.,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

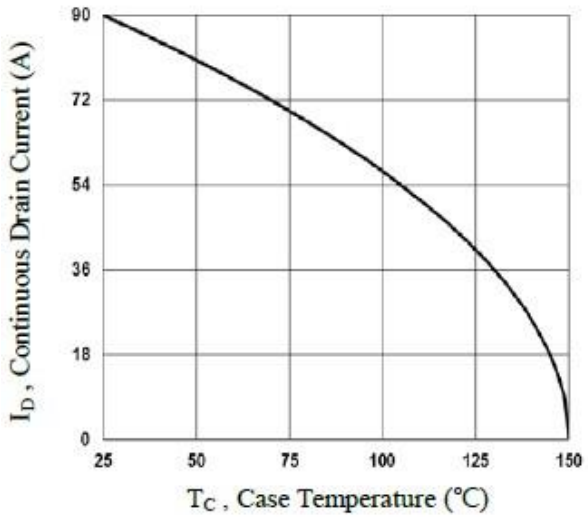

FIG.1-CONTINUOUS DRAIN CURRENT VS. TC

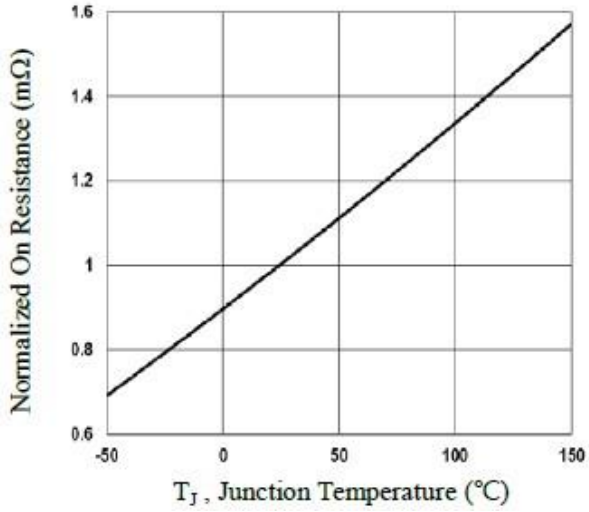

FIG.2-NORMALIZED RDSON VS. TJ

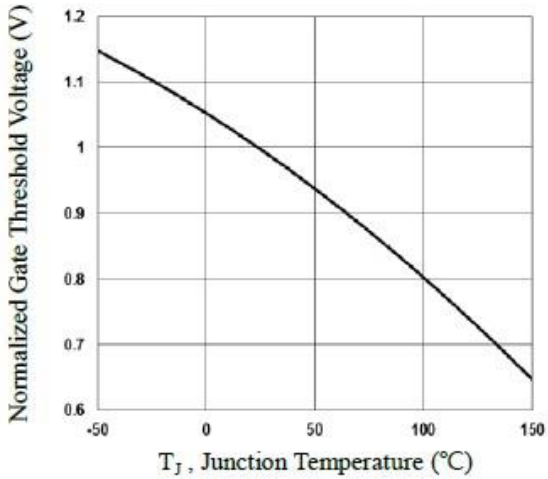

FIG.3-NORMALIZED VTH VS. TJ

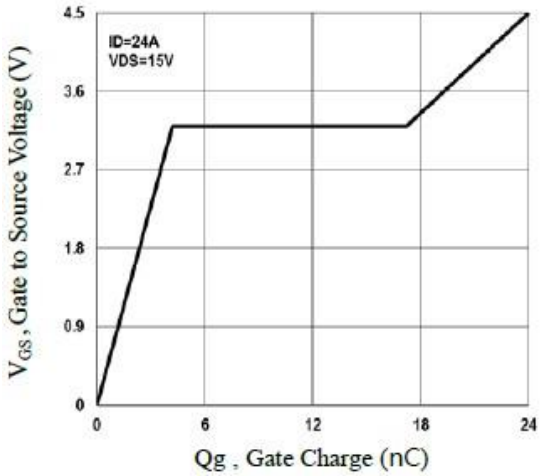

FIG.4-GATE CHARGE WAVEFORM

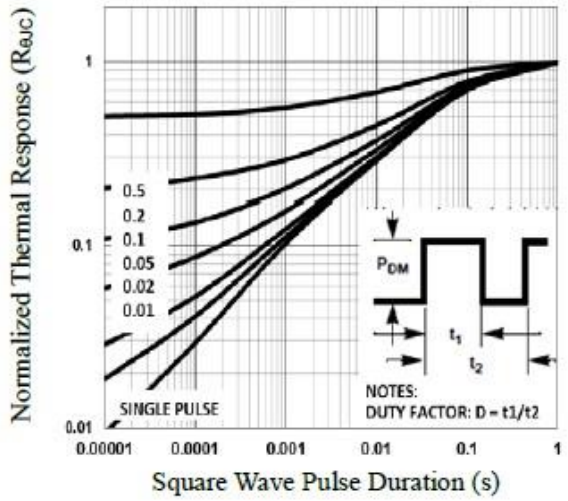

FIG.5-NORMALIZED TRANSIENT IMPEDANCE

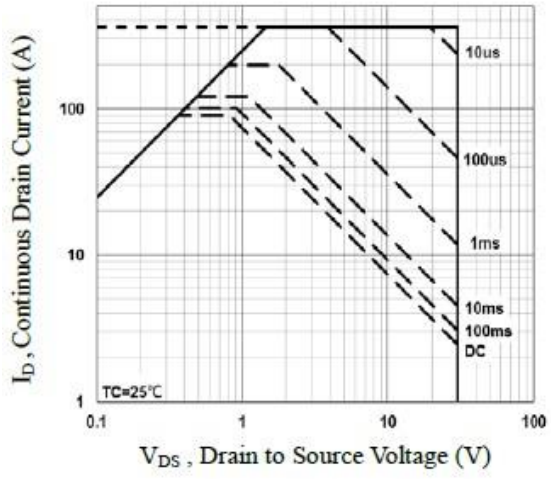

FIG.6-MAXIMUM SAFE OPERATION AREA

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■Characteristics Curve

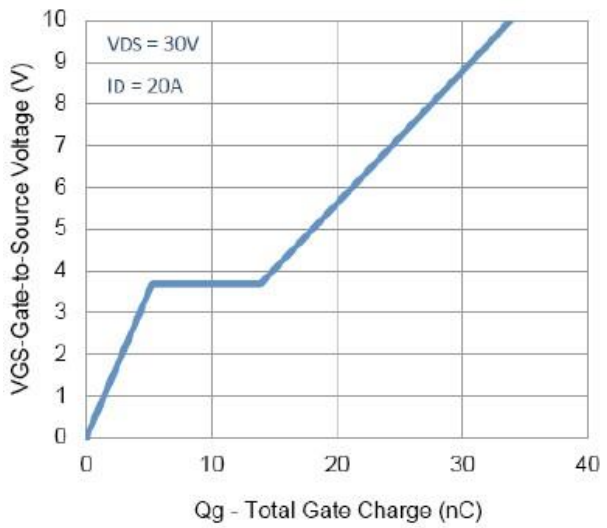

FIG.7-SWITCHING TIME WAVEFORM

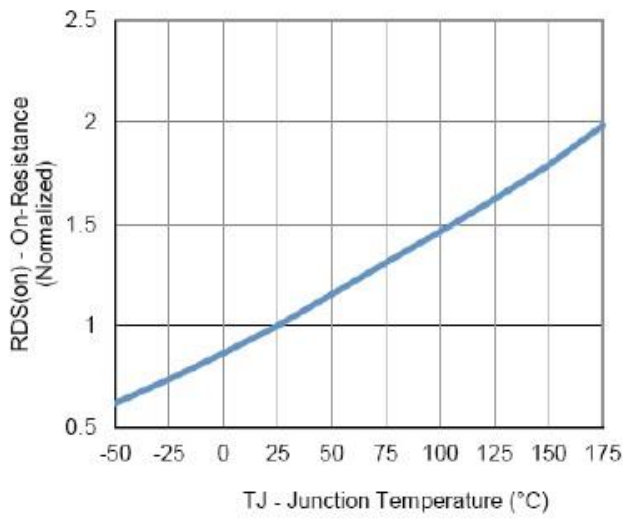

FIG.8-EAS WAVEFORM

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