MSL03N20

200V 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
- Green Device Available
- RoHS compliant package

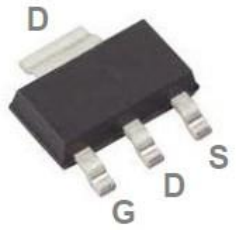
Applications

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

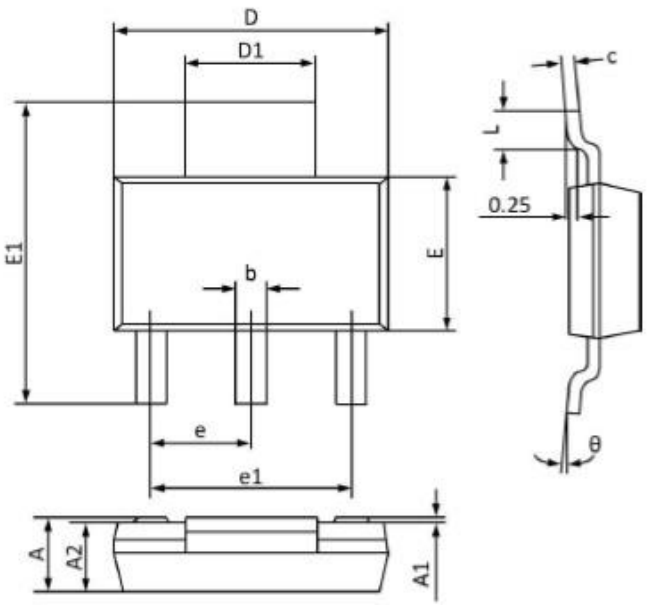
Package type：SOT-223

Packing & Order Information

3,000/Reel

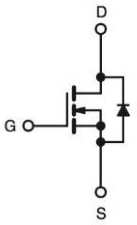


RoHS COMPLIANT



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	200	V
V_{GS}	Gate-Source Voltage	±30	V
I_D	Drain Current - Continuous (T_C=25°C) (Chip Limitation)	3	A
	Drain Current - Continuous (T_C=100°C) (Chip Limitation)	1.9	A
I_{DM}	Drain Current - Pulsed[1]	12	A
P_D	Power Dissipation (T_C=25°C)	1.78	W

MSL03N20

200V N-Channel MOSFETs

Absolute Maximum Ratings (T_A=25°C unless otherwise noted)			
Symbol	Parameter	Value	Unit
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	--	70	°C/W
$R_{\theta JC}$	Thermal Resistance Junction to Case	--	20	

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	200			V
ΔBV_{DSS} /ΔTJ	BVDSS Temperature Coefficient	Reference to 25°C , ID=1mA		0.5		V/°C
I_{GSS}	Gate-Source Leakage Current	V_{DS} = 0 V , V_{GS} = ±30 V			±100	nA
I_{DSS}	Drain-Source Leakage Current	V_{DS} = 200 V , V_{GS} = 0 V , T_J= 25°C V_{DS} = 160 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 = 2 A		0.7	0.85	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D =-250μA	3	4	5	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient	V_{DS} = V_{GS}, I_D =-250μA		-8		mV/°C
g_{fs}	Forward Tranconductance	V_{DS} = 10 V , I_D = 2 A		3.6		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 = 25 Ω, V_{GS} = 10 V , V_{DD} =100 V	--	10	20	ns
t_r	Rise Time[3,4]		--	35	70	ns
$t_{d(off)}$	Turn-Off Delay Time[3,4]		--	10	20	ns
tf	Fall Time[3,4]		--	28	56	ns
C_{ISS}	Input Capacitance	V_{DS} = 25 V f = 1 MHz , V_{GS} = 0 V	--	266	500	pF
C_{OSS}	Output Capacitance		--	160	300	pF
C_{RSS}	Reverse Transfer Capacitance		--	55	110	pF
Rg	Total Gate Charge	V_{DS} = 0 V , f = 1 MHz , V_{GS} = 0 V	--	1.5	3	Ω

MSL03N20

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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} = 160 V , I_D = 1 A, V_{GS} = 10 V	--	4.8	9	nC
Q_{gs}	Gate-Source Charge[3,4]		--	2	4	nC
Q_{gd}	Gate-Drain Charge[3,4]		--	0.8	2	nC

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	--	--	1	A
I_{SM}	Pulsed Source Current		--	--	2	A
V_{SD}	Diode Forward Voltage	V_{GS} = 0 V , I_S = 0.3 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.The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%.

3.Essentially independent of operating temperature.

MSL03N20

200V N-Channel MOSFETs

■Characteristics Curve

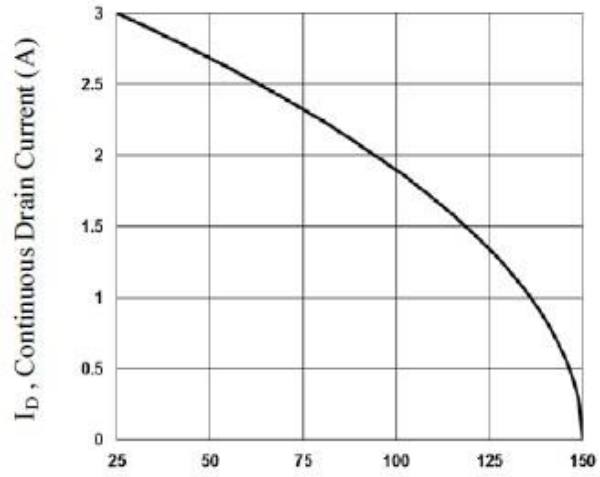

FIG.1-CONTINUOUS DRAIN CURRENT VS. TC

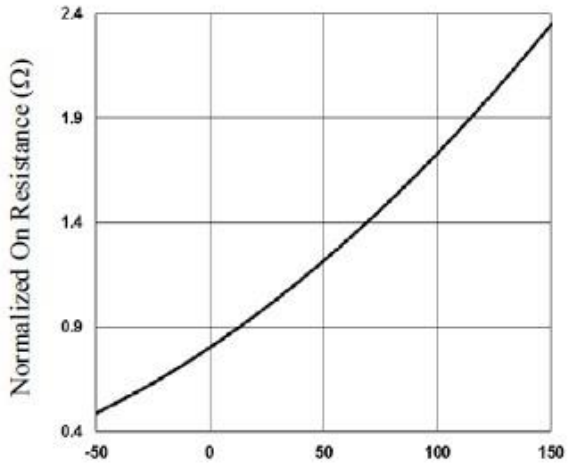

FIG.2-NORMALIZED RDSON VS. TJ

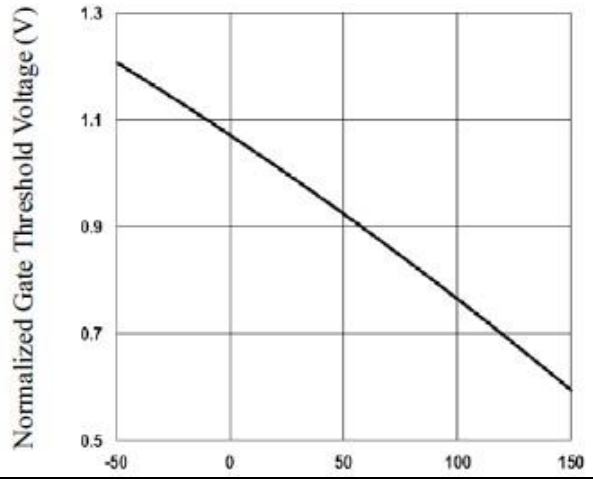

FIG.3-NORMALIZED VTH VS. TJ

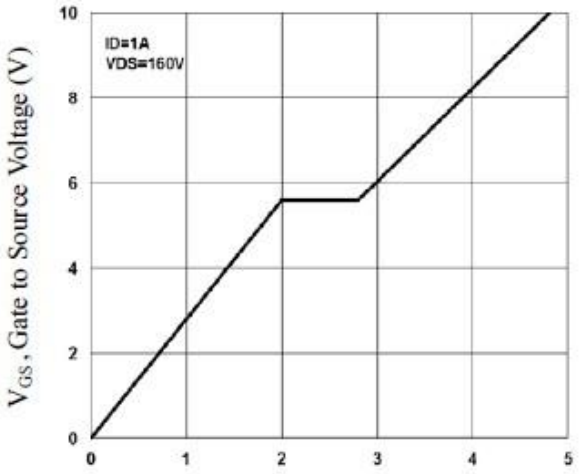

FIG.4-GATE CHARGE WAVEFORM

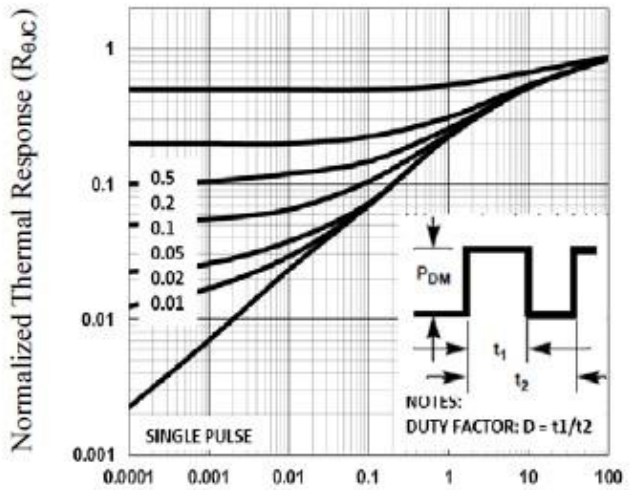

FIG.5-NORMALIZED TRANSIENT IMPEDANCE

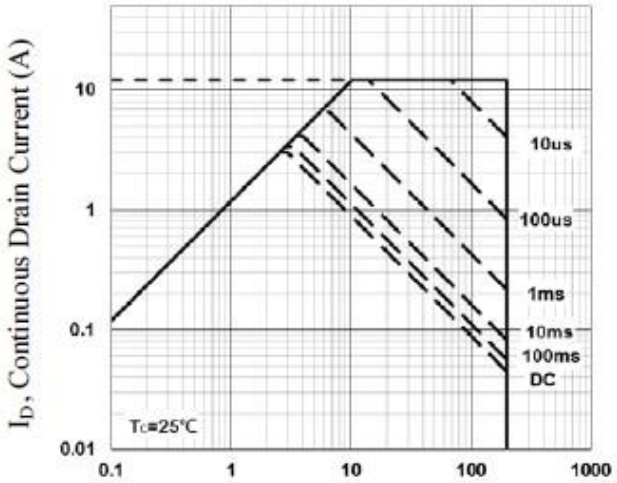

FIG.6-MAXIMUM SAFE OPERATION AREA

MSL03N20

200V N-Channel MOSFETs

■Characteristics Curve

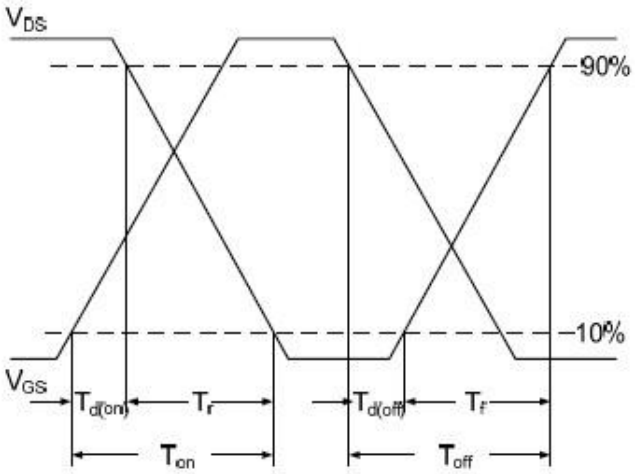

FIG.7-SWITCHING TIME WAVEFORM

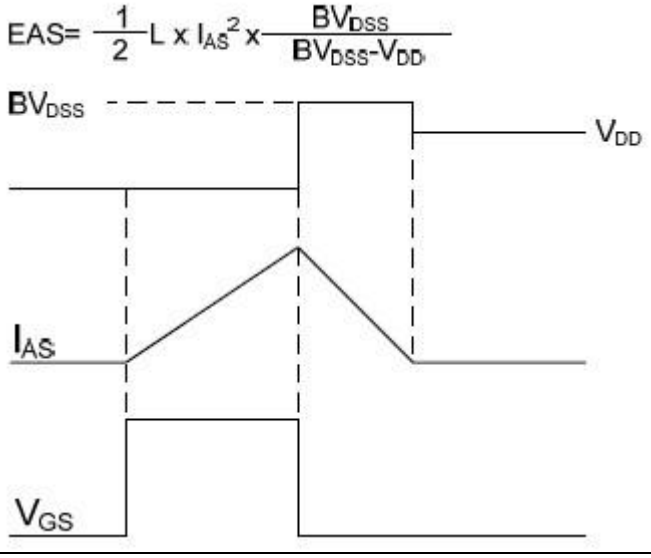

FIG.8-EAS WAVEFORM

MSL03N20

200V N-Channel MOSFETs

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