

MSN23P09S

P-Channel 20V P MOSFETs

Description

These P-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

- -20V, -5.8A, $R_{DS(ON)} = 33m\Omega @ V_{GS} = -4.5V$
- Improved dv/dt capability
- Green Device Available
- 100% EAS Guaranteed
- Fast Switching
- RoHS compliant package

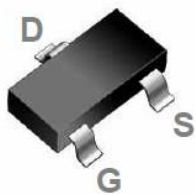
Application

- Notebook
- Load Switch
- Battery Protection
- Hand-held Instruments

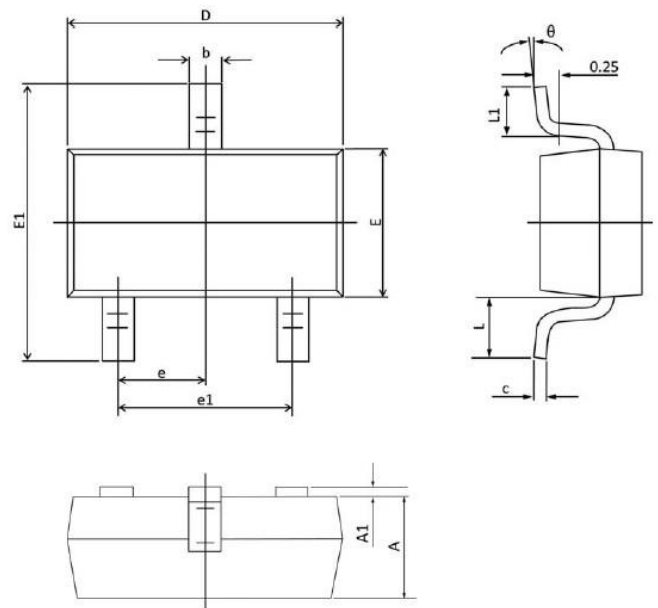
Package type : SOT23-3S

Packing & Order information

3,000/Reel

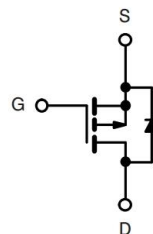


**RoHS
COMPLIANT**



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.000	0.035	0.039
A1	0.000	0.100	0.000	0.004
b	0.300	0.500	0.012	0.020
c	0.090	0.110	0.003	0.004
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP.		0.037 TYP.	
e1	1.800	2.000	0.071	0.079
L	0.550 REF.		0.022 REF.	
L1	0.300	0.500	0.012	0.020
θ	1°	7°	1°	7°

Graphic symbol



MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

Absolute Maximum Ratings ($T_c=25^\circ C$ unless otherwise specified)

Symbol	Parameter	Value	Unit
V_{DS}	Drain to Source Voltage	-20	V
V_{GS}	Gate to Source Voltage	± 10	V
I_D	Continuous Drain Current ($T_C=25^\circ C$)	-5.8	A
	Continuous Drain Current ($T_C=100^\circ C$)	-3.7	A
I_{DM}	Drain Current Pulsed ¹	-23.2	A

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Absolute Maximum Ratings (Tc=25°C unless otherwise specified)

Symbol	Parameter	Value	Unit
P _D	Power Dissipation (TC = 25°C)	1.56	W
	Power Dissipation – Derate above 25°C	0.012	W/°C
T _{STG}	Storage Temperature Range	-55 to +150	°C
T _J	Operating Junction Temperature Range	-55 to +150	°C

Thermal Characteristics

Symbol	Parameter	Value			Units
		Min.	Typ.	Max.	
R _{θJA}	Thermal Resistance, Junction-to-Ambient	--	--	80	°C/W

Electrical Characteristics (T_J=25°C, unless otherwise noted)

Off Characteristics

Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} = 0 V, I _D = 250 μA	-60	--	--	V
ΔBV _{DSS} /ΔT _J	BV _{DSS} Temperature Coefficient	I _D = -1 mA, Referenced to 25°C	--	-0.05	--	V/°C
I _{DSS}	Drain-Source Leakage Current	V _{DS} = -20 V, T _J = 25°C V _{DS} = -16 V, T _J = 125°C	--	--	-1 -10	μA
I _{GSS}	Gate-Source Leakage, Forward	V _{GS} = ±10 V, V _{DS} = 0 V	--	--	±100	nA

On Characteristics

Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 250 μA	-0.3	-0.6	-1	V
R _{DS(ON)}	Static Drain-Source On-state Resistance	V _{GS} = -4.5 V, I _D = -4 A V _{GS} = -2.5 V, I _D = -3 A V _{GS} = -1.8 V, I _D = -2 A		28 37 49	33 45 65	mΩ
ΔV _{GS(th)}	Gate Threshold Voltage	V _{GS} = V _{GS} , I _D = 250 μA		2		mV/°C
g _{fs}	Forward Transconductance	V _{DS} = -10 V, I _S = -3 A		8.4		S

Dynamic Characteristics

Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
Q _g	Total Gate Charge ^{2,3}	V _{DS} = -10 V, V _{GS} = -4.5 V, I _D = -4 A	--	16.1	25	nC
Q _{gs}	Gate-Source Charge ^{2,3}		--	1.8	3	nC
Q _{gd}	Gate-Drain Charge ^{2,3}		--	3.8	7	nC
C _{ISS}	Input Capacitance	V _{GS} = 0 V,	--	1440	2100	pF
C _{OSS}	Output Capacitance	V _{DS} = -15 V,	--	155	230	pF
C _{RSS}	Reverse Transfer Capacitance	f = 1 MHz	--	115	170	pF

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Drain-Source Diode Characteristics and Maximum Ratings

Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
I_S	Continuous Source Current	$V_D = V_G = 0V$	--	--	-5.8	A
I_{SM}	Pulsed Source Current	Force Current	--	--	-23.2	A
V_{SD}	Diode Forward Voltage	$I_S = -1 A, V_{GS} = 0 V, T_J = 25^\circ C$	--	--	-1	V

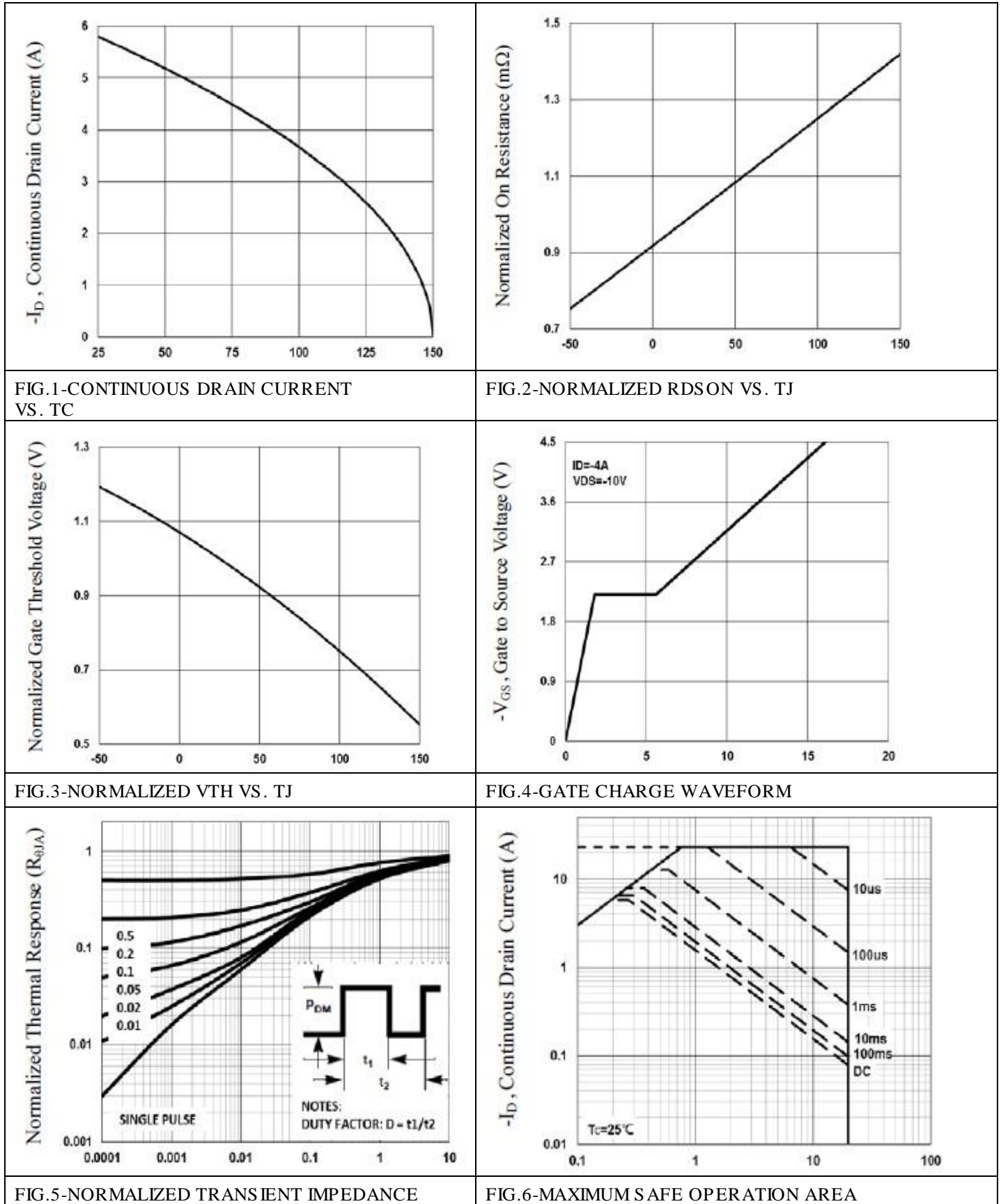
Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
3. Essentially independent of operating temperature.

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■ Characteristics Curve



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■ Characteristics Curve

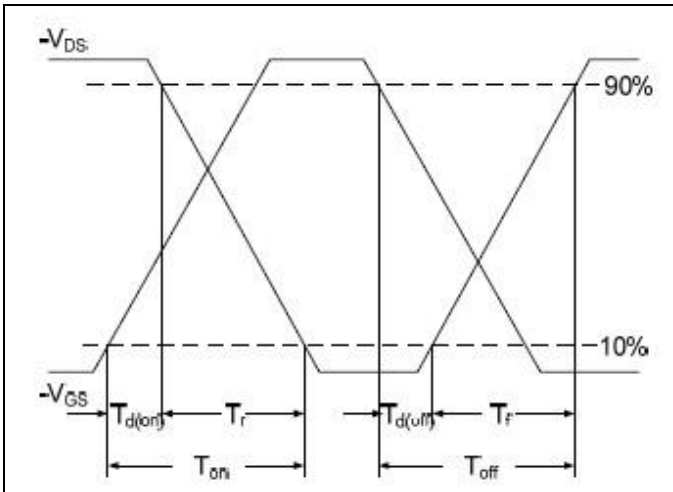


FIG.7-SWITCHING TIME WAVEFORM

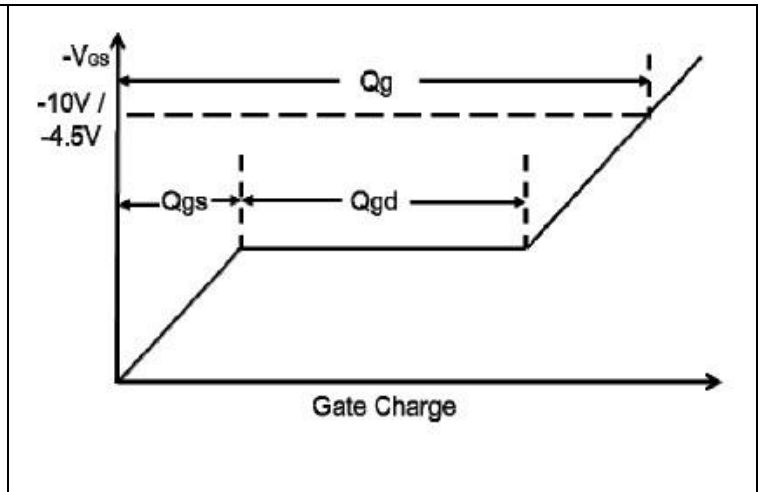


FIG.8-EAS WAVEFORM

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