

# MSKSEMI 美森科

SEMICONDUCTOR



ESD



TVS



TSS



MOV



GDT



PLED

## MSK20P80GNF

Product specification

## Description

The MSK20P80GNF uses advanced trench technology to provide excellent  $R_{DS(ON)}$ , low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.

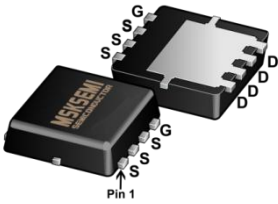
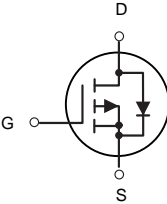

## General Features

- $V_{DS} = -18V$   $I_D = -80A$
- $R_{DS(ON)} < 3\ m\Omega$   $V_{GS} = -10V$

## Application

- Battery protection
- Load switch
- Uninterruptible power supply

## Reference News

PACKAGE OUTLINE	P-Channel MOSFET	Marking
 DFN5X6-8L		

## Absolute Maximum Ratings (TC=25°C unless otherwise noted)

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	-18	V
$V_{GS}$	Gate-Source Voltage	$\pm 12$	V
$I_D @ T_C = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$ <sup>1</sup>	-80	A
$I_{DM}$	Pulsed Drain Current <sup>2</sup>	-360	A
$P_D @ T_C = 25^\circ C$	Total Power Dissipation <sup>4</sup>	41.67	W
$T_{STG}$	Storage Temperature Range	-55 to 150	$^\circ C$
$T_J$	Operating Junction Temperature Range	-55 to 150	$^\circ C$
$R_{\theta JA}$	Thermal Resistance Junction-Ambient <sup>1</sup>	62	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case <sup>1</sup>	3	$^\circ C/W$

**Electrical Characteristics (T<sub>J</sub>=25 °C, unless otherwise noted)**
**Off Characteristics**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V , I <sub>D</sub> =-250uA	-18	---	---	V
ΔBV <sub>DSS</sub> /ΔT <sub>J</sub>	BV <sub>DSS</sub> Temperature Coefficient	Reference to 25°C , I <sub>D</sub> =-1mA	---	-0.008	---	V/°C
I <sub>DSS</sub>	Drain-Source Leakage Current	V <sub>DS</sub> =-20V , V <sub>GS</sub> =0V , T <sub>J</sub> =25°C	---	---	-1	uA
		V <sub>DS</sub> =-16V , V <sub>GS</sub> =0V , T <sub>J</sub> =125°C	---	---	-30	uA
I <sub>GSS</sub>	Gate-Source Leakage Current	V <sub>GS</sub> =±12V , V <sub>DS</sub> =0V	---	---	±500	nA

**On Characteristics**

R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance					
		V <sub>GS</sub> =-4.5V , I <sub>D</sub> =-20A	---	2.5	3.0	mΩ
		V <sub>GS</sub> =-2.5V , I <sub>D</sub> =-20A	---	3.3	4.5	
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =-250uA	-0.4	-0.6	-1.0	V
ΔV <sub>GS</sub>	V <sub>GS(th)</sub> Temperature Coefficient		---	-3.44	---	mV/°C
g <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> =-10V , I <sub>S</sub> =-3A	---	30	---	S

**Dynamic and switching Characteristics**

Q <sub>g</sub>	Total Gate Charge <sup>2, 3</sup>	V <sub>DS</sub> =-16V , V <sub>GS</sub> =-4.5V , I <sub>D</sub> =-5A	---	149	225	nC
Q <sub>gs</sub>	Gate-Source Charge <sup>2, 3</sup>		---	14.4	22	
Q <sub>gd</sub>	Gate-Drain Charge <sup>2, 3</sup>		---	42.8	65	
T <sub>d(on)</sub>	Turn-On Delay Time <sup>2, 3</sup>	V <sub>DD</sub> =-15V , V <sub>GS</sub> =-4.5V , R <sub>G</sub> =25Ω I <sub>D</sub> =-1A	---	21.2	42	nS
T <sub>r</sub>	Rise Time <sup>2, 3</sup>		---	20.6	40	
T <sub>d(off)</sub>	Turn-Off Delay Time <sup>2, 3</sup>		---	26	52	
T <sub>f</sub>	Fall Time <sup>2, 3</sup>		---	400	600	
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =-15V , V <sub>GS</sub> =0V , F=1MHz	---	12000	16000	pF
C <sub>oss</sub>	Output Capacitance		---	1670	2500	
C <sub>rss</sub>	Reverse Transfer Capacitance		---	730	1100	
R <sub>g</sub>	Gate resistance	V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, F=1MHz	---	2.6	---	Ω

**Drain-Source Diode Characteristics and Maximum Ratings**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I <sub>S</sub>	Continuous Source Current	V <sub>G</sub> =V <sub>D</sub> =0V , Force Current	---	---	-85	A
I <sub>SM</sub>	Pulsed Source Current		---	---	-190	A
V <sub>SD</sub>	Diode Forward Voltage	V <sub>GS</sub> =0V , I <sub>S</sub> =-1A , T <sub>J</sub> =25°C	---	---	-1	V

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.

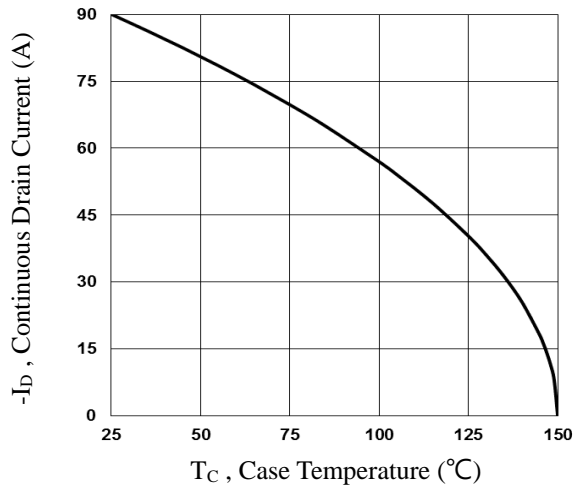


Fig.1 Continuous Drain Current vs.  $T_c$

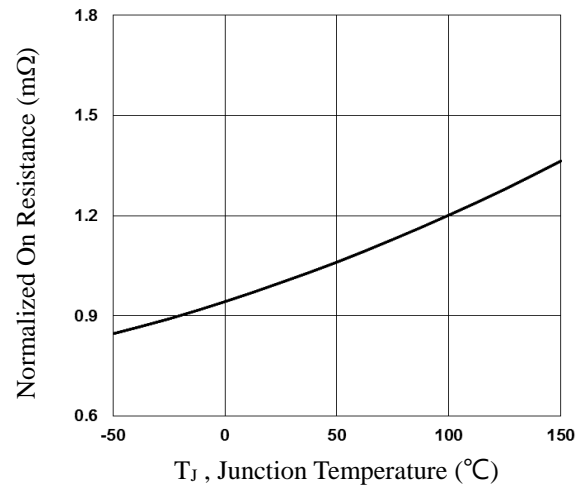


Fig.2 Normalized  $R_{DS(on)}$  vs.  $T_j$

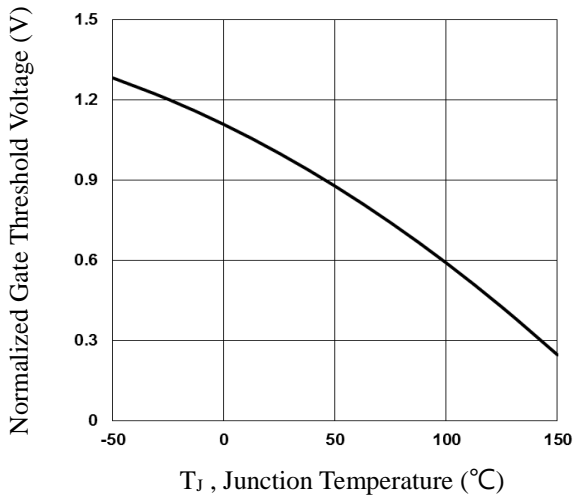


Fig.3 Normalized  $V_{th}$  vs.  $T_j$

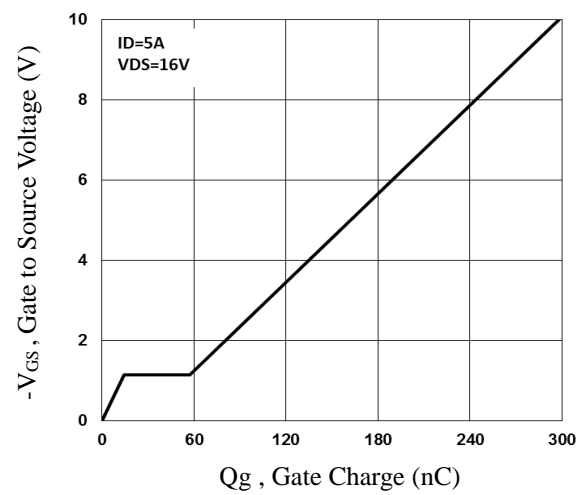


Fig.4 Gate Charge Waveform

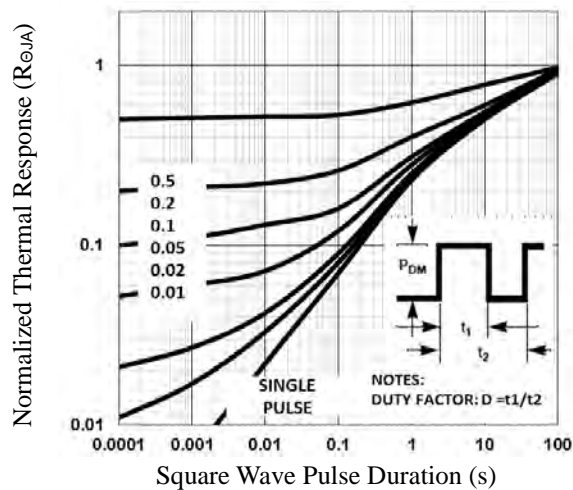


Fig.5 Normalized Transient Response

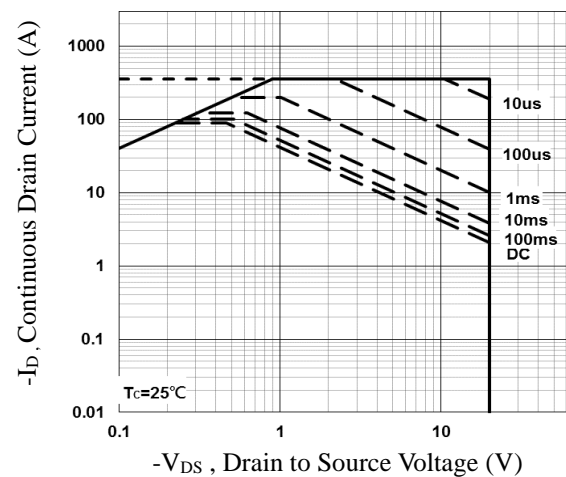


Fig.6 Maximum Safe Operation Area

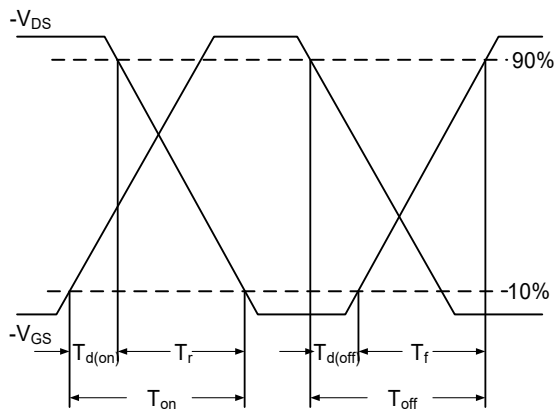


Fig.7 Switching Time Waveform

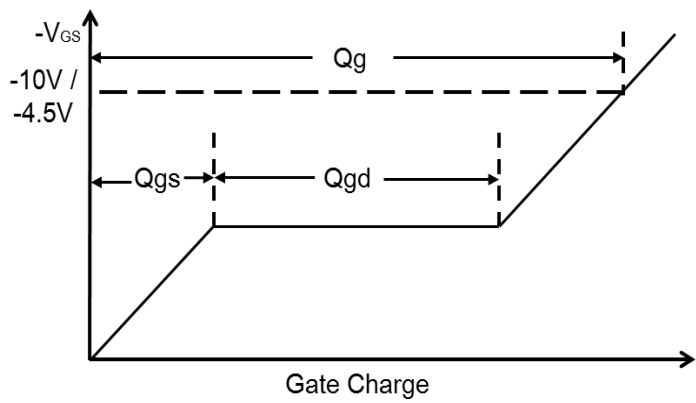
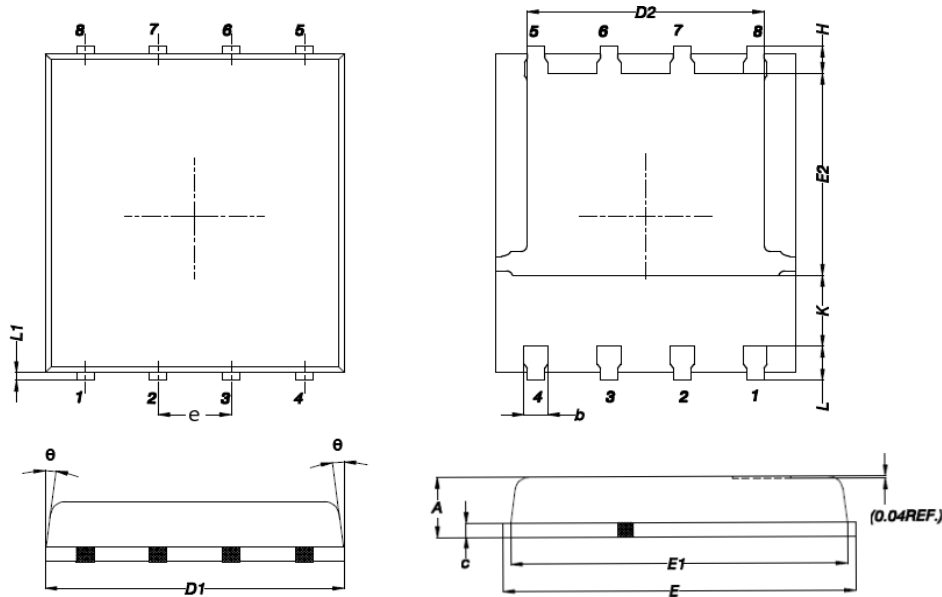


Fig.8 Gate Charge Waveform

PACKAGE INFORMATION



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MAX	MIN	MAX	MIN
A	1.200	0.850	0.047	0.031
b	0.510	0.300	0.020	0.012
C	0.300	0.200	0.012	0.008
D1	5.400	4.800	0.212	0.189
D2	4.310	3.610	0.170	0.142
E	6.300	5.850	0.248	0.230
E1	5.960	5.450	0.235	0.215
E2	3.920	3.300	0.154	0.130
e	1.27BSC		0.05BSC	
H	0.650	0.380	0.026	0.015
K	---	1.100	---	0.043
L	0.710	0.380	0.028	0.015
L1	0.250	0.050	0.009	0.002
θ	12°	0°	12°	0°

REELSPECIFICATION

P/N	PKG	QTY
MSK20P80GNF	DFN5X6-8L	5000

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