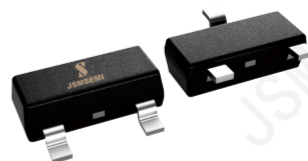## Description

The PMV250EPEAR-JSM 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.
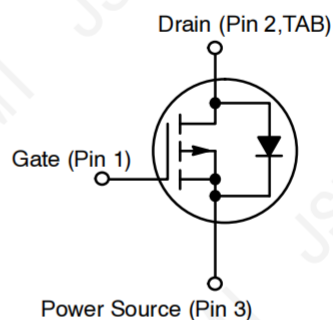
General Features

V_{DS} = -40V I_D =-5.0A

$R_{DS(ON)}$ < 70mΩ @ V_{GS}=-10V

Application

Battery protection

Load switch

Uninterruptible power supply

SOT-23

Drain (Pin 2,TAB)

Gate (Pin 1)

Power Source (Pin 3)

Absolute Maximum Ratings (T_C=25℃ unless otherwise noted)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-40	V
V_{GS}	Gate-Source Voltage	±20	V
I_D@T_A=25℃	Continuous Drain Current, V_{GS} @ -10V[1]	-5	A
I_D@T_A=70℃	Continuous Drain Current, V_{GS} @ -10V[1]	-3.8	A
I_{DM}	Pulsed Drain Current[2]	-18	A
EAS	Single Pulse Avalanche Energy[3]	21	mJ
I_{AS}	Avalanche Current	-20.5	A
P_D@T_A=25℃	Total Power Dissipation[4]	1.5	W
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃
$R_{θJA}$	Thermal Resistance Junction-Ambient [1]	85	℃/W
$R_{θJC}$	Thermal Resistance Junction-Case[1]	50	℃/W

Electrical Characteristics (T$_J$=25℃, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ	Max.	Unit
BVDSS	Drain-Source Breakdown Voltage	V$_{GS}$=0V , I$_D$=-250uA	-40	-46	---	V
△BVDSS/△TJ	BV$_{DSS}$ Temperature Coefficient	Reference to 25℃ , I$_D$=-1mA	---	-0.018	---	V/℃
RDS(ON)	Static Drain-Source On-Resistance[2]	V$_{GS}$=-10V , I$_D$=-3A	---	65	70	mΩ
		V$_{GS}$=-4.5V , I$_D$=-2A	---	85	100	
VGS(th)	Gate Threshold Voltage	V$_{GS}$=V$_{DS}$, I$_D$ =-250uA	-1.0	-1.5	-2.5	V
△V$_{GS(th)}$	V$_{GS(th)}$ Temperature Coefficient		---	2.5	---	mV/℃
IDSS	Drain-Source Leakage Current	V$_{DS}$=-24V , V$_{GS}$=0V , T$_J$=25℃	---	---	-1	uA
		V$_{DS}$=-24V , V$_{GS}$=0V , T$_J$=55℃	---	---	-5	
IGSS	Gate-Source Leakage Current	V$_{GS}$=±20V , V$_{DS}$=0V	---	---	±100	nA
gfs	Forward Transconductance	V$_{DS}$=-5V , I$_D$=-3A	---	5.8	---	S
Q$_g$	Total Gate Charge (-4.5V)	V$_{DS}$=-32V , V$_{GS}$=-4.5V , I$_D$=-3A	---	6.4	---	nC
Qgs	Gate-Source Charge		---	2.1	---	
Qgd	Gate-Drain Charge		---	2.5	---	
Td(on)	Turn-On Delay Time	V$_{DD}$=-20V , V$_{GS}$=-4.5V , R$_G$=3.3Ω, I$_D$=-3A	---	4.2	---	ns
T$_r$	Rise Time		---	23	---	
Td(off)	Turn-Off Delay Time		---	26.8	---	
T$_f$	Fall Time		---	20.6	---	
Ciss	Input Capacitance	V$_{DS}$=-15V , V$_{GS}$=0V , f=1MHz	---	620	---	pF
Coss	Output Capacitance		---	65	---	
Crss	Reverse Transfer Capacitance		---	53	---	
IS	Continuous Source Current[1,4]	V$_G$=V$_D$=0V , Force Current	---	---	-3.2	A
ISM	Pulsed Source Current[2,4]		---	---	-16.1	A
VSD	Diode Forward Voltage[2]	V$_{GS}$=0V , Is=-1A , T$_J$=25℃	---	---	-1	V

Note :

1、The data tested by surface mounted on a 1 inch FR-4 board with 2OZ copper.

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

3、The power dissipation is limited by 150℃ junction temperature

4、The data is theoretically the same as I$_D$ and I$_{DM}$, in real applications , should be limited by total power dissipation.
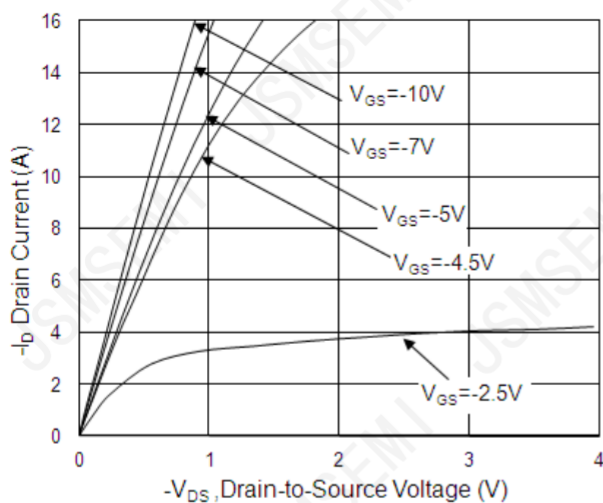
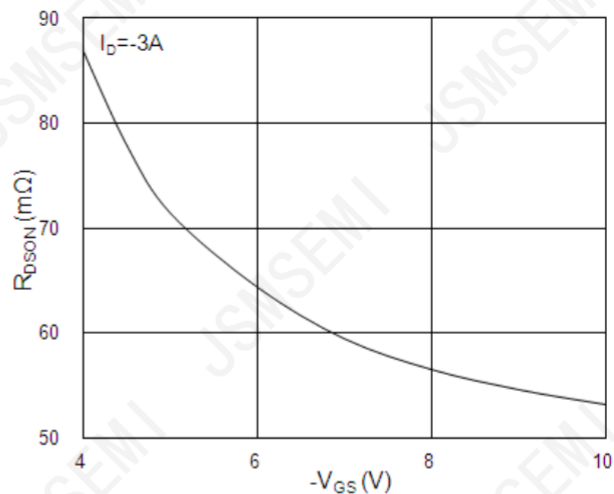## Typical Characteristics

Fig.1 Typical Output Characteristics
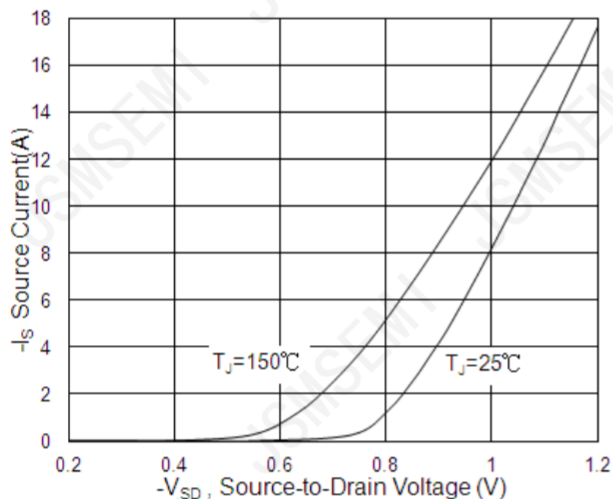

Fig.2 On-Resistance vs. G-S Voltage

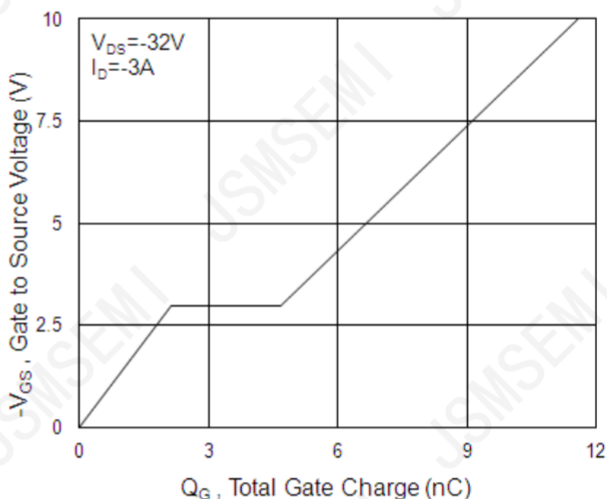**Fig.3 Forward Characteristics Of Reverse**
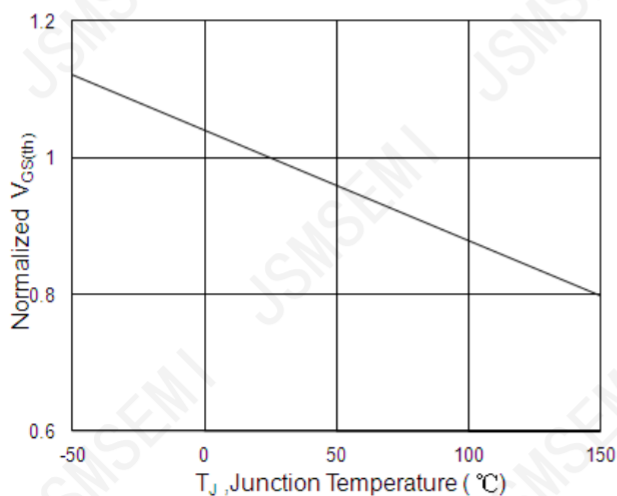

Fig.4 Gate-Charge Characteristics
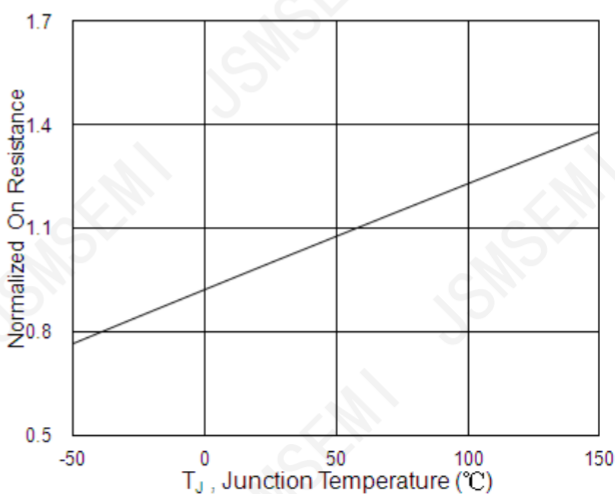

Fig.5 Normalized $V_{GS(th)}$ vs. T_J
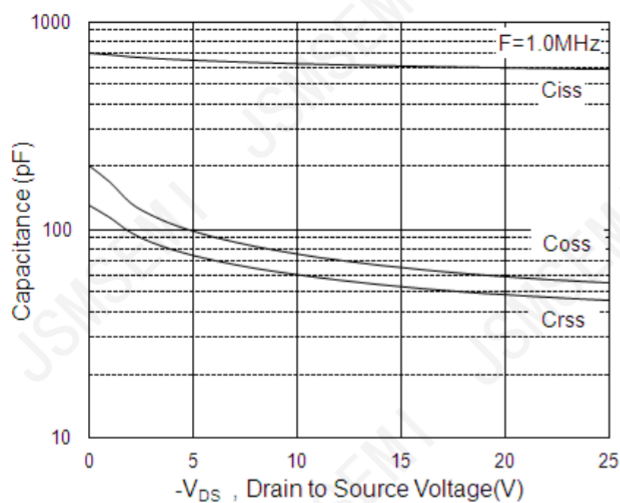

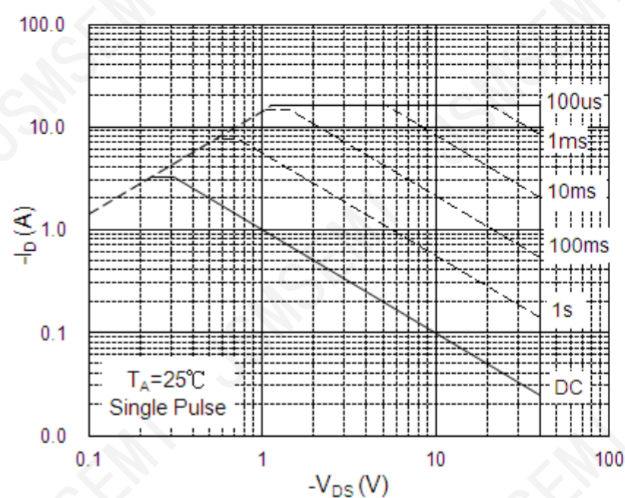**Fig.6 Normalized R_{DSON} vs. T_J**

Fig.7 Capacitance

Fig.8 Safe Operating Area

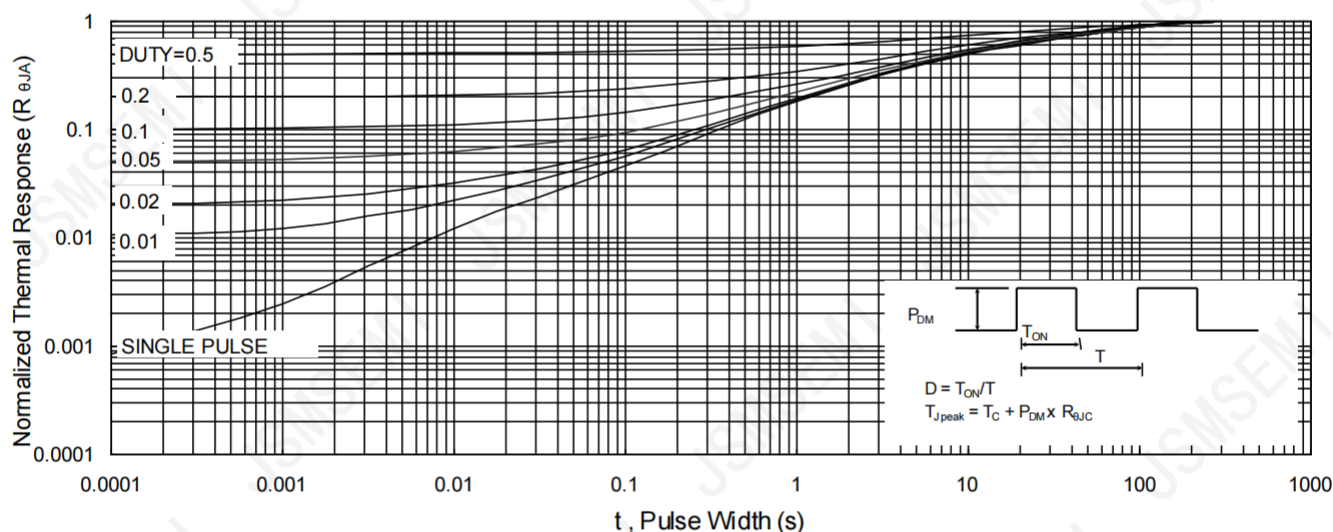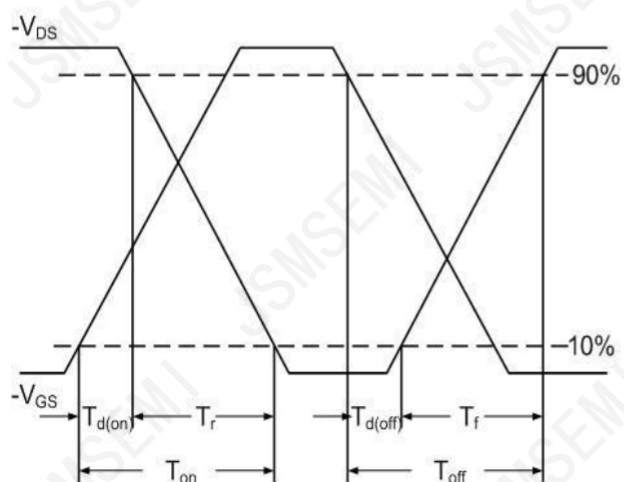**Fig.9 Normalized Maximum Transient Thermal Impedance**

$$D = T_{ON}/T$$
$$T_{Jpeak} = T_C + P_{DM} \times R_{\theta JC}$$

Fig.10 Switching Time Waveform
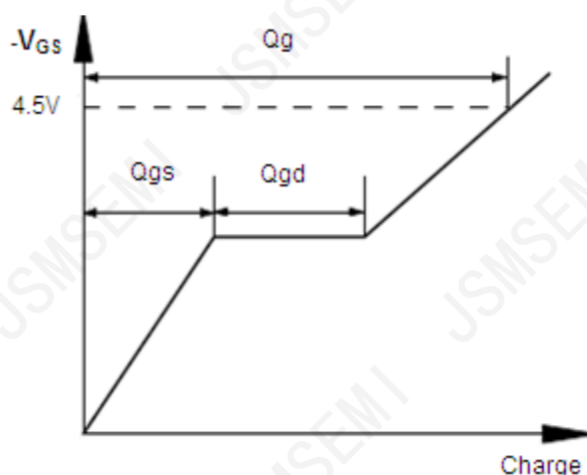
Fig.11 Gate Charge Waveform

Revision History

Rev.	Change	Date
V1.0	Initial version	2/23/2024

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