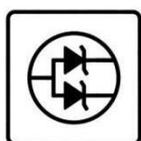


MSKSEMI 美森科

SEMICONDUCTOR



ESD



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TSS



MOV



GDT



PLED

NVTFS5116PL-MS

Product specification

Description

The NVTFS5116PL-MS 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.

Features

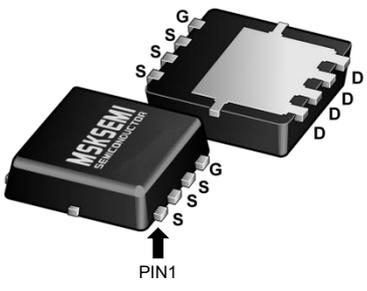
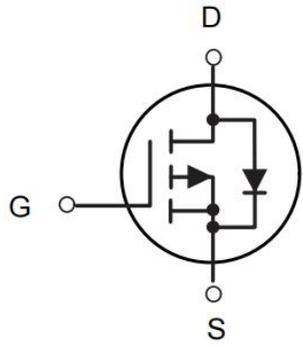
$V_{DS} = -60V$ $I_D = -20A$

$R_{DS(ON)} < 85\text{ m}\Omega @ V_{GS}=4.5V$

Application

- Battery protection
- Load switch
- Uninterruptible power supply

Reference News

PACKAGE OUTLINE	P-Channel MOSFET	Marking
 <p style="text-align: center;">PIN1</p> <p style="text-align: center;">DFN3X3-8L</p>		

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

Symbol	Parameter	Rating	Units
VDS	Drain-Source Voltage	-60	V
VGS	Gate-Source Voltage	±20	V
$I_D @ T_C=25^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10V^1$	-20	A
$I_D @ T_C=100^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10V^1$	-12	A
IDM	Pulsed Drain Current ²	-30	A
$P_D @ T_C=25^\circ\text{C}$	Total Power Dissipation ⁴	25	W
TSTG	Storage Temperature Range	-55 to 150	°C
TJ	Operating Junction Temperature Range	-55 to 150	°C
$R_{\theta JA}$	Thermal Resistance Junction-ambient ¹	62	°C/ W
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	5	°C/ W

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =-250uA	-60	---	---	V
Δ BV _{DSS} /Δ T _J	BV _{DSS} Temperature Coefficient	Reference to 25C, I _D =-1mA	---	-0.023	---	V/°C
R _{DS(on)}	Static Drain-Source On-Resistance ²	V _{GS} =-10V, I _D =-10A	---	70	85	mΩ
		V _{GS} =-4.5V, I _D =-6A	---	83	90	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =-250uA	-1.2	---	-2.5	V
Δ V _{GS(th)}	V _{GS(th)} Temperature Coefficient		---	4	---	Mv/°C
I _{DSS}	Drain-Source Leakage Current	V _{DS} =-24V, V _{GS} =0V, T _J =25°C	---	---	-1	μA
		V _{DS} =-24V, V _{GS} =0V, T _J =55°C	---	---	-5	
I _{GSS}	Gate-Source Leakage Current	V _{GS} = ±20V, V _{DS} =0V	---	---	±100	nA
g _{fs}	Forward Transconductance	V _{DS} =-5V, I _D =-15A	---	12	---	S
Q _g	Total Gate Charge (-4.5V)	V _{DS} =-15V, V _{GS} =-4.5V, I _D =-15A	---	6.1	---	nC
Q _{gs}	Gate-Source Charge		---	3.1	---	
Q _{gd}	Gate-Drain Charge		---	1.8	---	
T _{d(on)}	Turn-On Delay Time	V _{DD} =-15V, V _{GS} =-10V, R _G =3.3Ω, I _D =-15A	---	2.6	---	ns
T _r	Rise Time		---	8.6	---	
T _{d(off)}	Turn-Off Delay Time		---	33.6	---	
T _f	Fall Time		---	6	---	
C _{iss}	Input Capacitance	V _{DS} =-15V, V _{GS} =0V, f=1MHz	---	585	---	pF
C _{oss}	Output Capacitance		---	100	---	
C _{rss}	Reverse Transfer Capacitance		---	85	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I _S	Continuous Source Current ^{1,5}	V _G =V _D =0V, Force Current	---	---	-20	A
I _{SM}	Pulsed Source Current ^{2,5}		---	---	-30	A
V _{SD}	Diode Forward Voltage ²	V _{GS} =0V, I _S =-1A, T _J =25C	---	---	-1.2	V
t _{rr}	Reverse Recovery Time	I _F =-15A, dI/dt=100A/μs,	---	6.1	---	nS
Q _{rr}	Reverse Recovery Charge	T _J =25C	---	1.4	---	nC

Note :

- The data tested by surface mounted on a 1 inch²FR-4 board with 20Z copper.
- The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%
- The EAS data shows Max. rating. The test condition is V_{DD}=-25V, V_{GS}=-10V, L=0.1mH, I_{AS}=-19A
- The power dissipation is limited by 150C junction temperature
- The data is theoretically the same as I_D and I_{DM}, in real applications, should be limited by total power dissipation.

Typical Characteristics

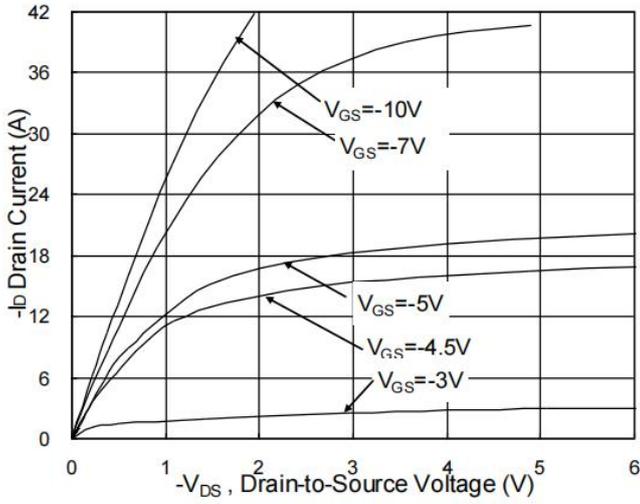


Fig.1 Typical Output Characteristics

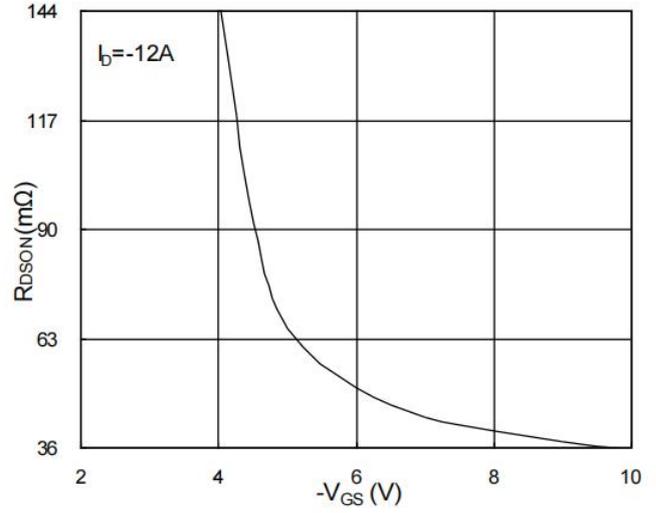


Fig.2 On-Resistance v.s Gate-Source

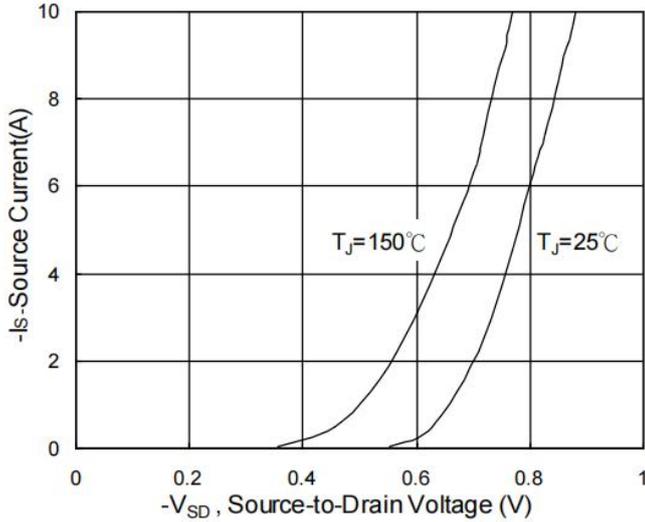


Fig.3 Forward Characteristics of Reverse

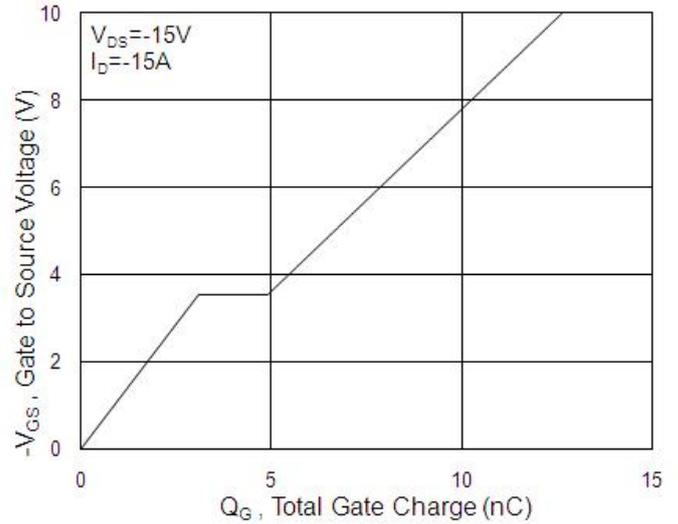


Fig.4 Gate Charge Characteristics

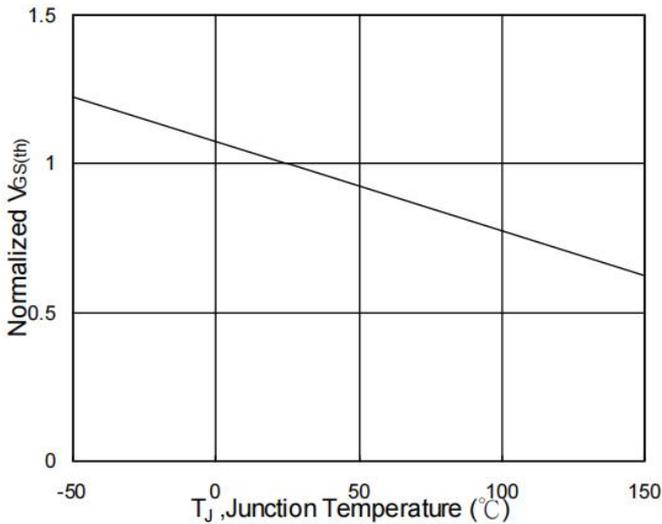


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

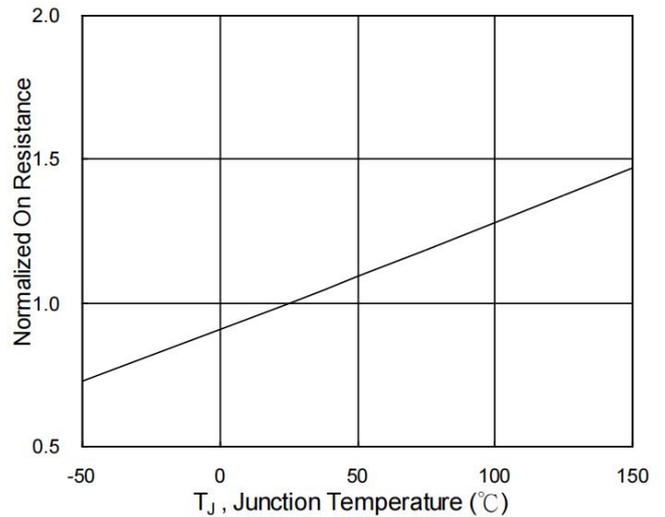


Fig.6 Normalized $R_{DS(on)}$ vs. T_J

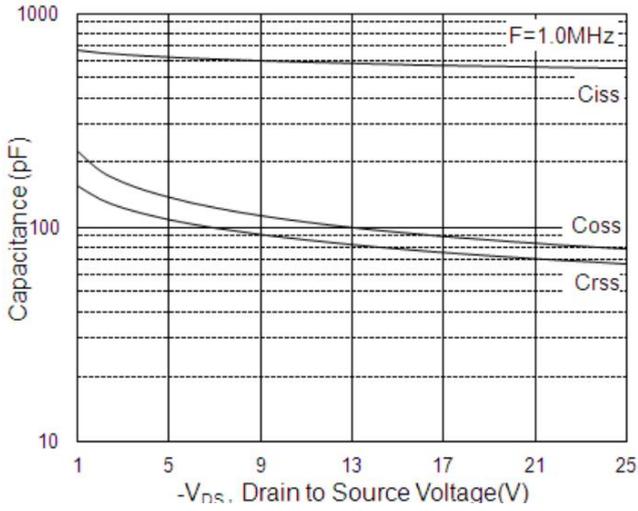


Fig.7 Capacitance

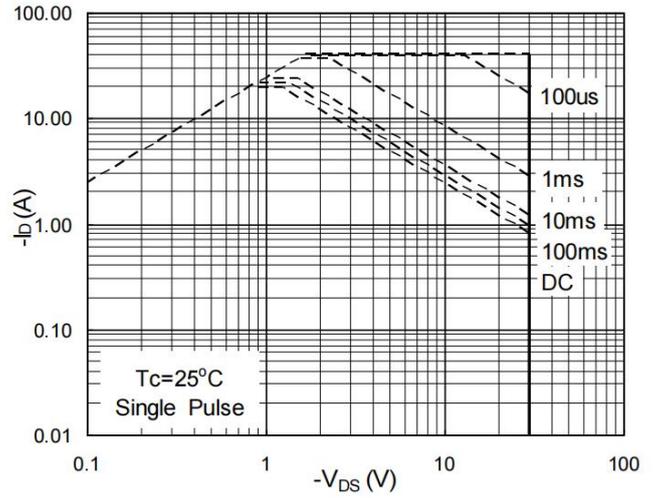


Fig.8 Safe Operating Area

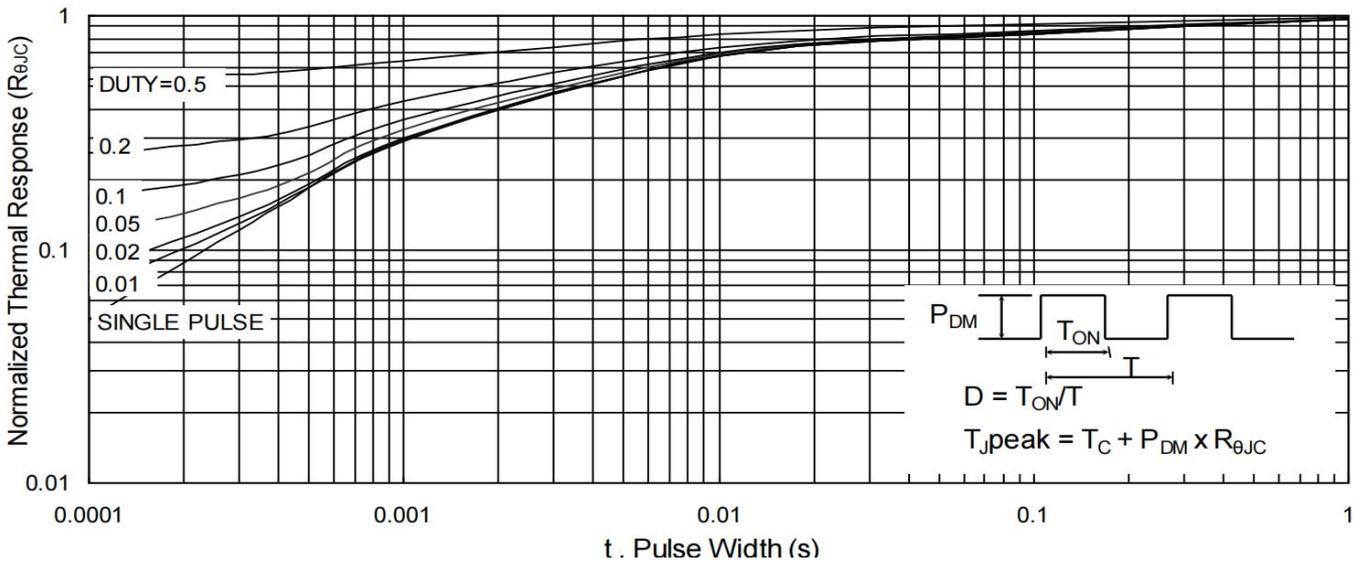


Fig.9 Normalized Maximum Transient Thermal Impedance

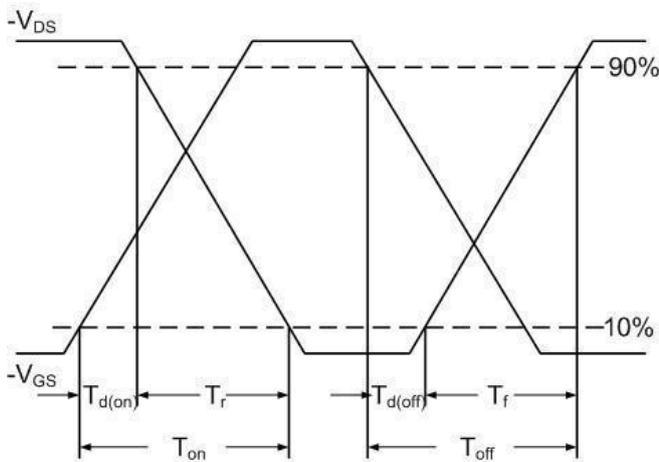


Fig.10 Switching Time Waveform

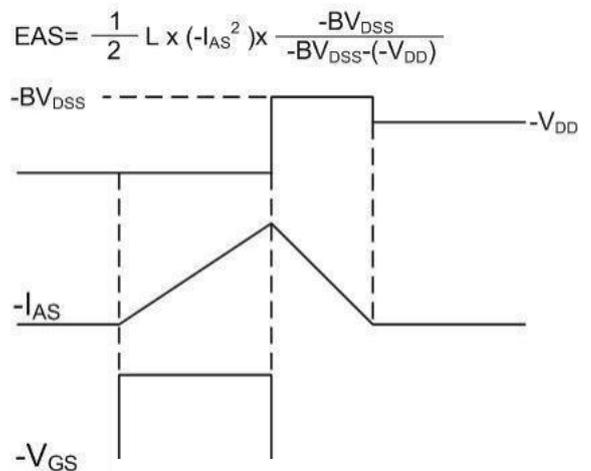
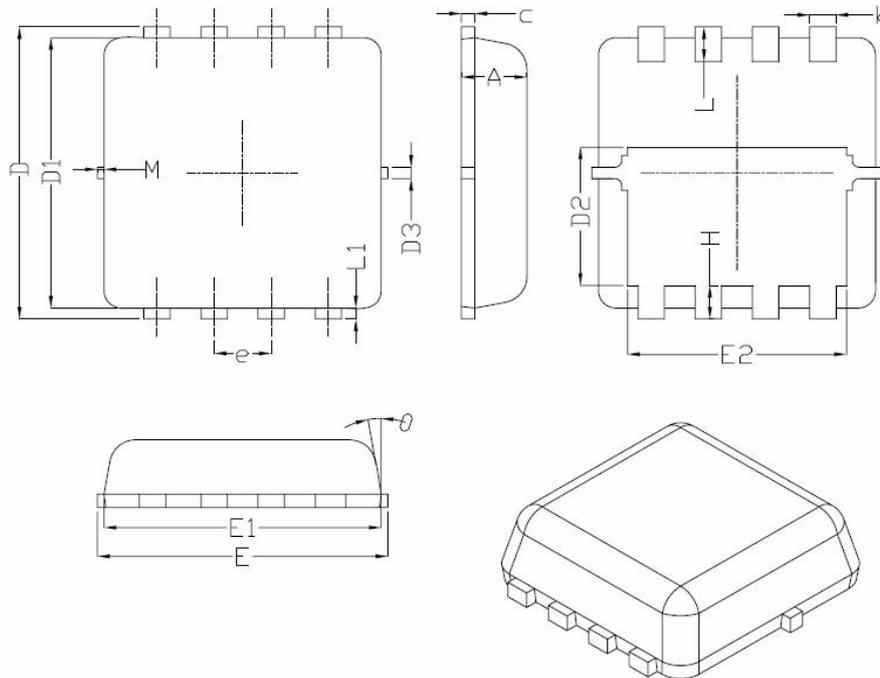


Fig.11 Unclamped Inductive Switching Waveform

DFN3X3-8L Package Information


Symbol	Dimensions In Millimeters		
	Min.	Nom.	Max.
A	0.70	0.75	0.80
b	0.25	0.30	0.35
c	0.10	0.15	0.25
D	3.25	3.35	3.45
D1	3.00	3.10	3.20
D2	1.48	1.58	1.68
D3	-	0.13	-
E	3.20	3.30	3.40
E1	3.00	3.15	3.20
E2	2.39	2.49	2.59
e	0.65BSC		
H	0.30	0.39	0.50
L	0.30	0.40	0.50
L1	-	0.13	-
M	*	*	0.15
θ		10°	12°

REEL SPECIFICATION

P/N	PKG	QTY
NVTFS5116PL-MS	DFN3X3-8L	5000

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