

# MSKSEMI 美森科

SEMICONDUCTOR



ESD



TVS



TSS



MOV



GDT



PLED

## **BSZ0904NSI-MS**

Product specification

## Description

The BSZ0904NSI-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.

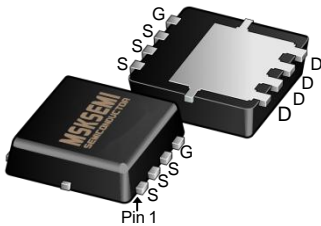
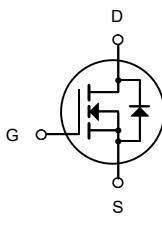

## Features

- $V_{DS} = 30V$   $I_D = 60A$
- $R_{DS(ON)} < 5.5m\Omega$  @  $V_{GS}=10V$

## Application

- Battery protection
- Load switch
- Uninterruptible power supply

## Reference News

DFN3X3-8L	N-Channel MOSFET	Marking
		

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

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	30	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$I_D@T_A=25^\circ C$	Continuous Drain Current, $V_{GS}$ @ 10V <sup>1</sup>	60	A
$I_D@T_A=100^\circ C$	Continuous Drain Current, $V_{GS}$ @ 10V <sup>1</sup>	42	A
$I_{DM}$	Pulsed Drain Current <sup>2</sup>	192	A
EAS	Single Pulse Avalanche Energy <sup>3</sup>	144.7	mJ
$I_{AS}$	Avalanche Current	53.8	A
$P_D@T_c=25^\circ C$	Total Power Dissipation <sup>4</sup>	62.5	W
$P_D@T_c=25^\circ C$	Total Power Dissipation <sup>4</sup>	4.5	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>	2.4	$^\circ C/W$

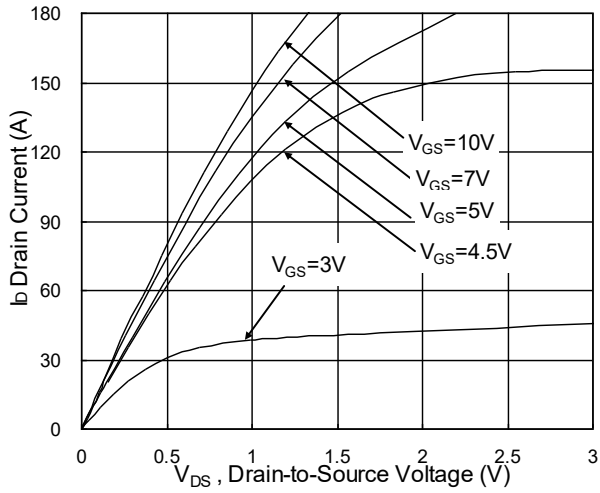
**Electrical Characteristics** ( $T_J=25^{\circ}\text{C}$  unless otherwise specified)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V$ , $I_D=250\mu A$	30	---	---	V
$\Delta BV_{DSS}/\Delta T_J$	BVDSS Temperature Coefficient	Reference to $25^{\circ}\text{C}$ $I_D=1mA$ ,	---	0.0213	---	$V/^{\circ}\text{C}$
$R_{DS(ON)}$	Static Drain-Source On-Resistance <sup>2</sup>	$V_{GS}=10V$ , $I_D=30A$	---	4	5.5	$m\Omega$
		$V_{GS}=4.5V$ , $I_D=15A$		5.2	6	
$V_{GS(th)}$	Gate Threshold Voltage		1.0	---	2.5	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient	$V_{GS}=V_{DS}$ , $I_D=250\mu A$	---	-5.8	---	$mV/^{\circ}\text{C}$
$I_{DSS}$	Drain-Source Leakage Current	$V_{DS}=24V$ , $V_{GS}=0V$ , $T_J=25^{\circ}\text{C}$	---	---	1	$\mu A$
		$V_{DS}=24V$ , $V_{GS}=0V$ , $T_J=55^{\circ}\text{C}$	---	---	5	
$I_{GSS}$	Gate-Source Leakage Current	$V_{GS}=\pm 20V$ , $V_{DS}=0V$	---	---	$\pm 100$	nA
$g_{fs}$	Forward Transconductance	$V_{DS}=5V$ , $I_D=30A$	---	26.5	---	S
$R_g$	Gate Resistance	$V_{DS}=0V$ , $V_{GS}=0V$ , $f=1MHz$	---	1.4	---	$\Omega$
$Q_g$	Total Gate Charge (4.5V)	$V_{DS}=15V$ , $V_{GS}=4.5V$ , $I_D=15A$	---	31.6	---	nC
$Q_{gs}$	Gate-Source Charge		---	8.6	---	
$Q_{gd}$	Gate-Drain Charge		---	11.7	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=15V$ , $V_{GS}=10V$ , $R_G=3.3\Omega$ , $I_D=15A$	---	9	---	ns
$T_r$	Rise Time		---	19	---	
$T_{d(off)}$	Turn-Off Delay Time		---	58	---	
$T_f$	Fall Time		---	15.2	---	
$C_{iss}$	Input Capacitance	$V_{DS}=15V$ , $V_{GS}=0V$ , $f=1MHz$	---	3075	---	pF
$C_{oss}$	Output Capacitance		---	400	---	
$C_{rss}$	Reverse Transfer Capacitance		---	315	---	
$I_S$	Continuous Source Current <sup>1,6</sup>	$V_G=V_D=0V$ ,	---	---	60	A
$I_{SM}$	Pulsed Source Current <sup>2,6</sup>	Force Current	---	---	192	A
$V_{SD}$	Diode Forward Voltage <sup>2</sup>	$V_{GS}=0V$ , $I_S=1A$ , $T_J=25^{\circ}\text{C}$	---	---	1	V

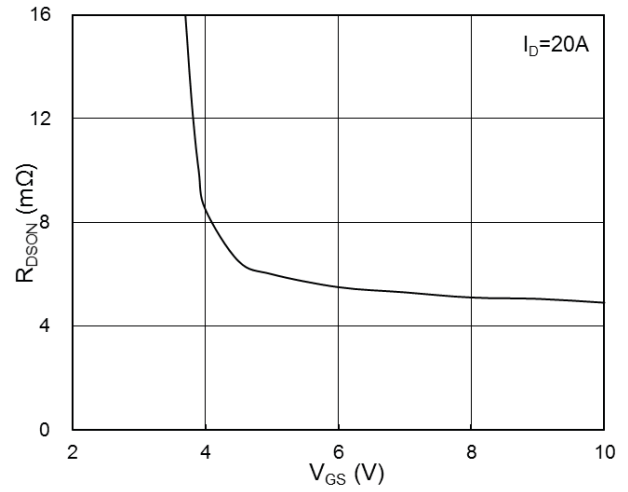
**Note :**

- 1.The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2OZ copper.
- 2.The data tested by pulsed , pulse width  $\leq 300\mu s$  , duty cycle  $\leq 2\%$
- 3 .The EAS data shows Max. rating . The test condition is  $V_{DD}=25V$ ,  $V_{GS}=10V$ ,  $L=0.1mH$ ,  $I_{AS}=34A$
- 4.The power dissipation is limited by  $150^{\circ}\text{C}$  junction temperature
- 5 .The data is theoretically the same as  $I_D$  and  $I_{DM}$  , in real applications , should be limited by total power dissipation.

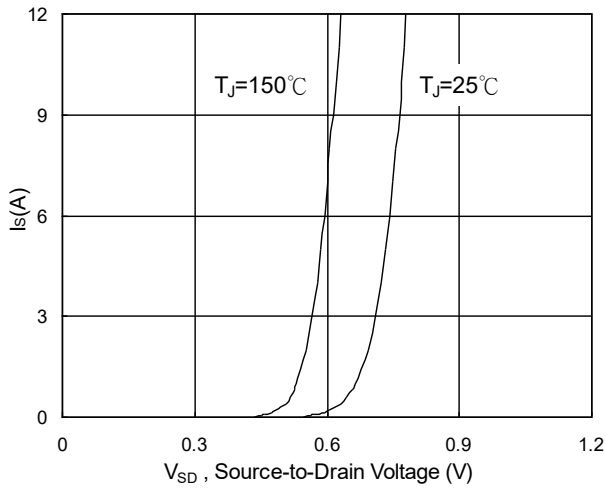
## Typical Characteristics



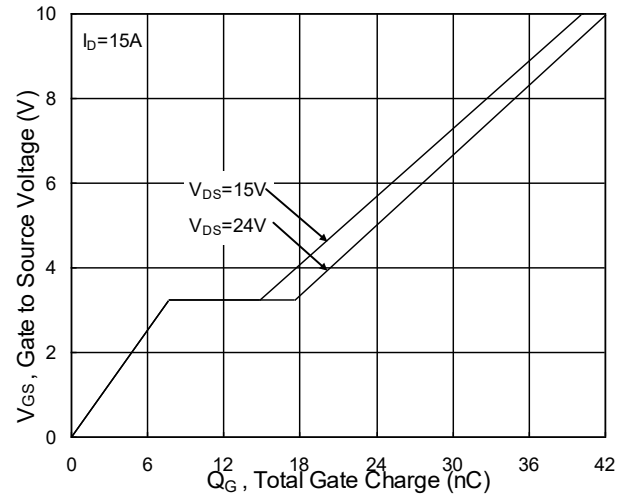
**Fig.1 Typical Output Characteristics**



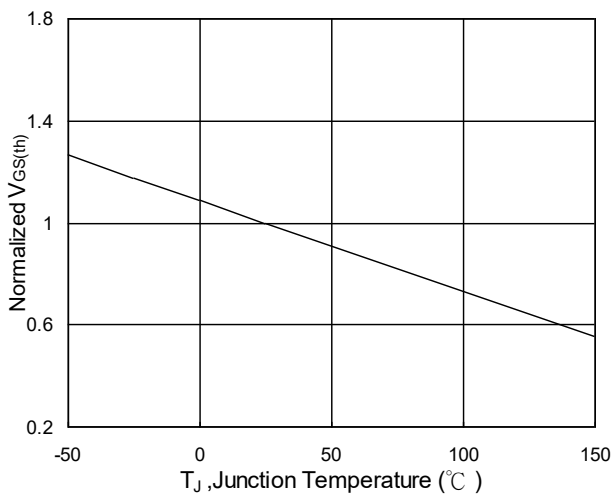
**Fig.2 On-Resistance vs. G-S Voltage**



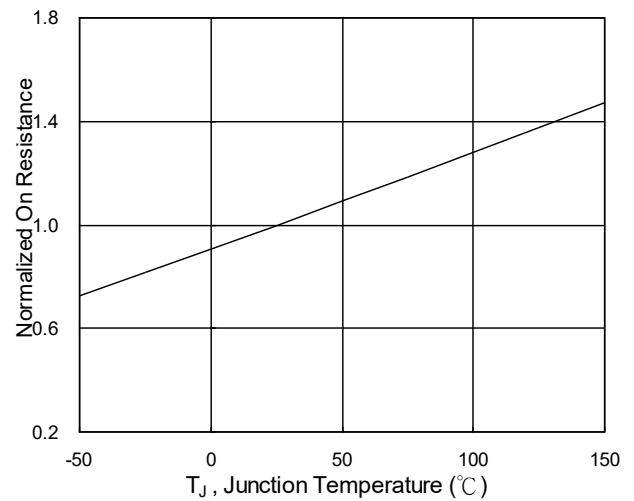
**Fig.3 Forward Characteristics of Reverse**



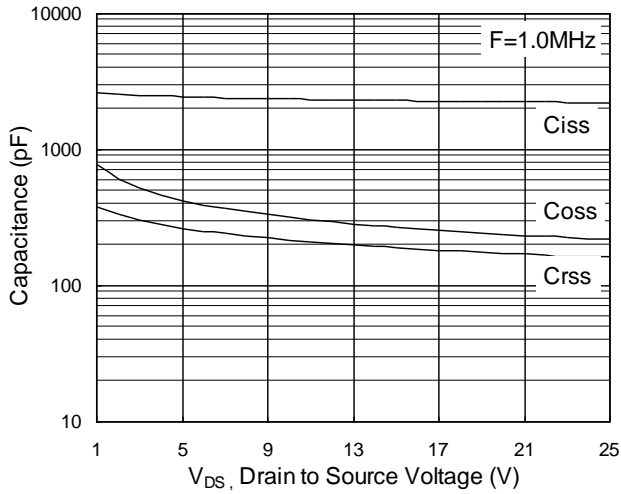
**Fig.4 Gate-Charge Characteristics**



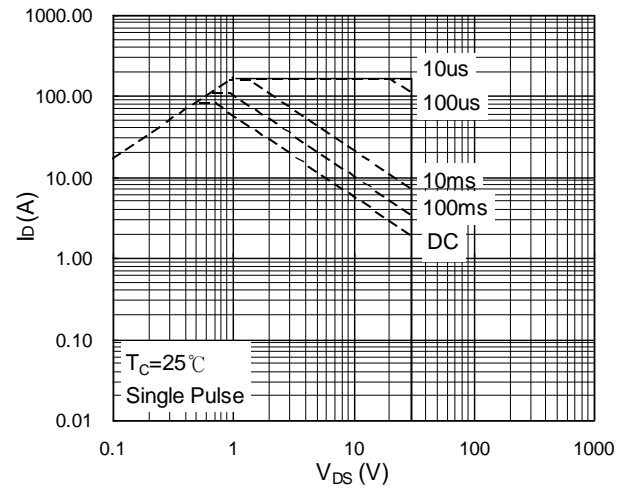
**Fig.5 Normalized  $V_{GS(th)}$  vs.  $T_J$**



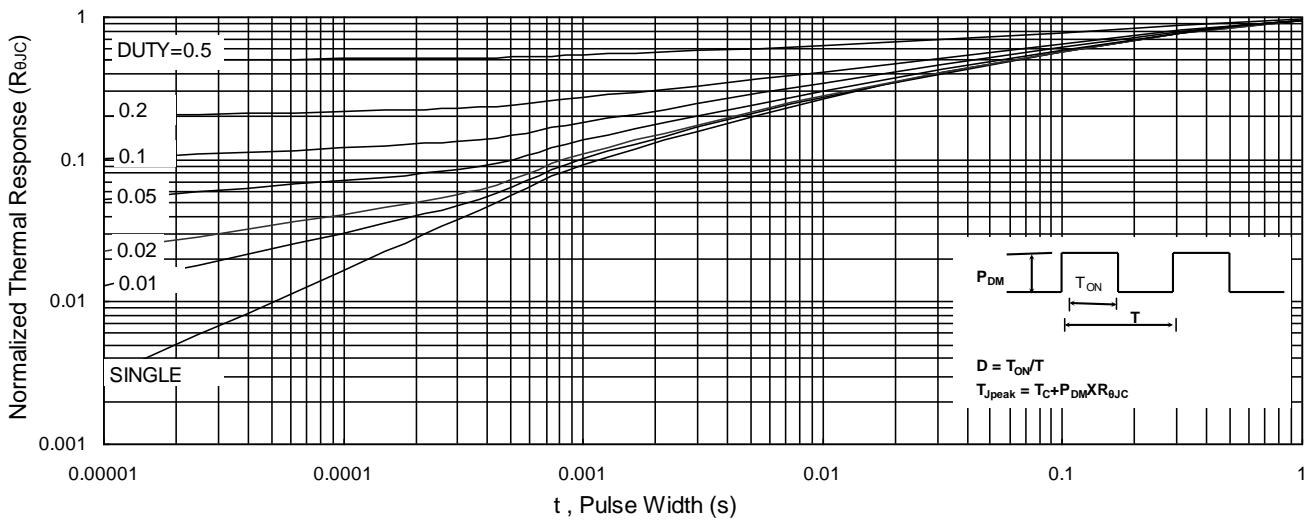
**Fig.6 Normalized  $R_{DS(on)}$  vs.  $T_J$**



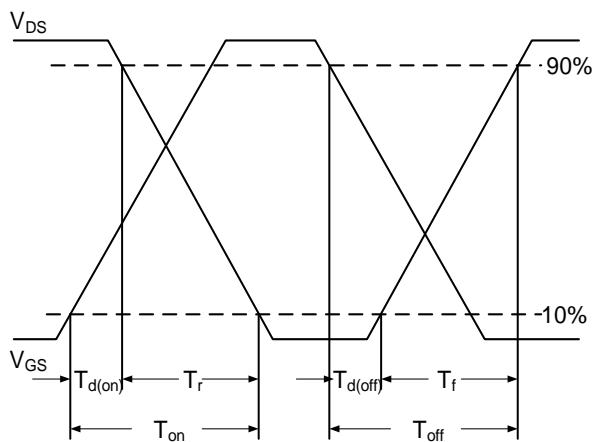
**Fig.7 Capacitance**



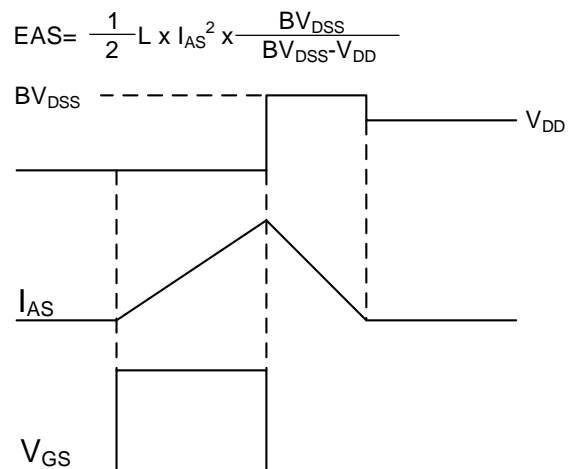
**Fig.8 Safe Operating Area**



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

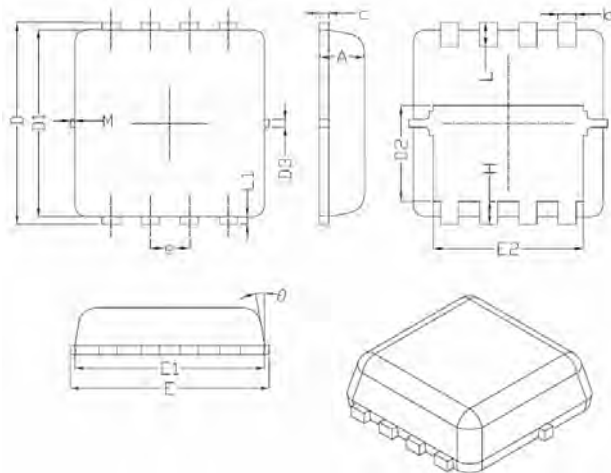


**Fig.10 Switching Time Waveform**



**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
BSZ0904NSI-MS	DFN3X3-8L	5000

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