



ESD



TVS



TSS



MOV



GDT



PLED

# 3400N-MS

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## Product specification

## Description

The 3400N-MS is the high cell density trenched N-ch MOSFETs, which provides excellent RDSON and efficiency for most of the small power switching and load switch applications.

The 3400N-MS meet the RoHS and Green Product requirement with full function reliability approved.

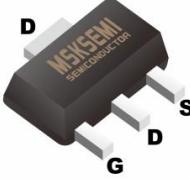
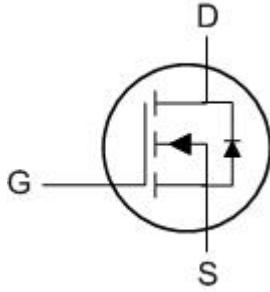
## Product Summary

<b>BVDSS</b>	30V
<b>RDSON</b>	15mΩ
<b>ID</b>	7A

## FEATURE

- Green Device Available
- Super Low Gate Charge
- Excellent CdV/dt effect decline
- Advanced high cell density Trench technology

## Reference News

PACKAGE OUTLINE	PIN CONFIGURATION	Marking
 SOT-89		

## Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	30	V
$V_{GS}$	Gate-Source Voltage	$\pm 12$	V
$I_D @ T_A = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	7.0	A
$I_D @ T_A = 70^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	4.5	A
$I_{DM}$	Pulsed Drain Current <sup>2</sup>	25.4	A
$P_D @ T_A = 25^\circ C$	Total Power Dissipation <sup>3</sup>	2.5	W
$T_{STG}$	Storage Temperature Range	-55 to 150	°C
$T_J$	Operating Junction Temperature Range	-55 to 150	°C

## Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient <sup>1</sup>	---	92	°C/W
$R_{\theta JC}$	Thermal Resistance Junction-Case <sup>1</sup>	---	---	°C/W

## Electrical Characteristics (T<sub>J</sub>=25°C unless otherwise specified)

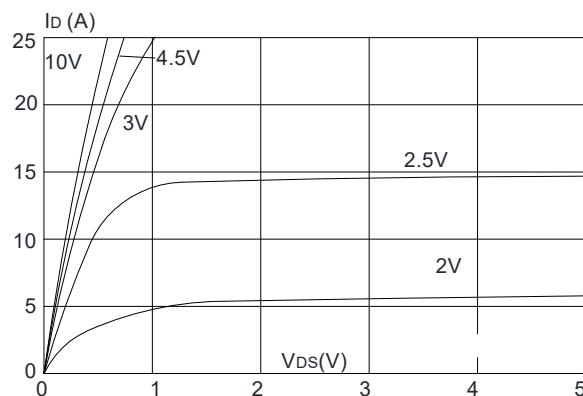
Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
<b>Off Characteristics</b>						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V$ , $I_D=250\mu A$	30	-	-	V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=30V$ , $V_{GS}=0V$ ,	-	-	1.0	μA
$I_{GSS}$	Gate to Body Leakage Current	$V_{DS}=0V$ , $V_{GS}= \pm 12V$	-	-	$\pm 100$	nA
<b>On Characteristics</b>						
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}$ , $I_D=250\mu A$	0.5	0.9	1.4	V
$R_{DS(on)}$	Static Drain-Source on-Resistance <small>note2</small>	$V_{GS}=10V$ , $I_D=4.2A$	-	20	28	mΩ
		$V_{GS}=4.5V$ , $I_D=4A$	-	25	34	
		$V_{GS}=2.5V$ , $I_D=1A$	-	35	50	
<b>Dynamic Characteristics</b>						
$C_{iss}$	Input Capacitance	$V_{DS}=15V$ , $V_{GS}=0V$ , $f=1.0MHz$	-	602	-	pF
$C_{oss}$	Output Capacitance		-	56	-	pF
$C_{rss}$	Reverse Transfer Capacitance		-	42	-	pF
$Q_g$	Total Gate Charge	$V_{DS}=15V$ , $I=4A$ , $V_{GS}=4.5V$	-	4.8	-	nC
$Q_{gs}$	Gate-Source Charge		-	1.2	-	nC
$Q_{gd}$	Gate-Drain("Miller") Charge		-	1.7	-	nC
<b>Switching Characteristics</b>						
$t_{d(on)}$	Turn-on Delay Time	$V_{DS}=15V$ , $I_D=4A$ , $R_{GEN}=3\Omega$ , $V_{GS}=4.5V$	-	12	-	ns
$t_r$	Turn-on Rise Time		-	52	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	17	-	ns
$t_f$	Turn-off Fall Time		-	10	-	ns
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
$I_s$	Maximum Continuous Drain to Source Diode Forward Current	-	-	7.0	A	
$I_{SM}$	Maximum Pulsed Drain to Source Diode Forward Current	-	-	25.2	A	
$V_{SD}$	Drain to Source Diode Forward Voltage	$V_{GS}=0V$ , $I_s=5.8A$	-	-	1.2	V

Notes:1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

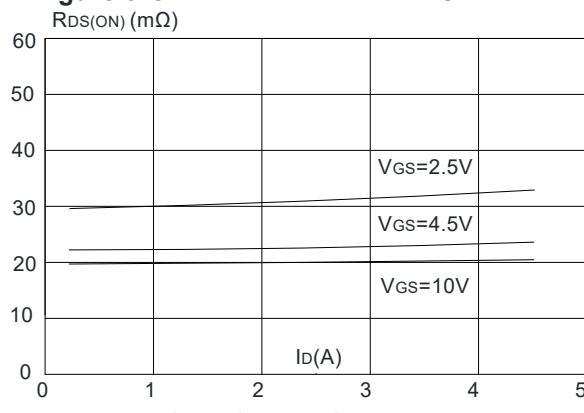
2. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%

## Typical Performance Characteristics

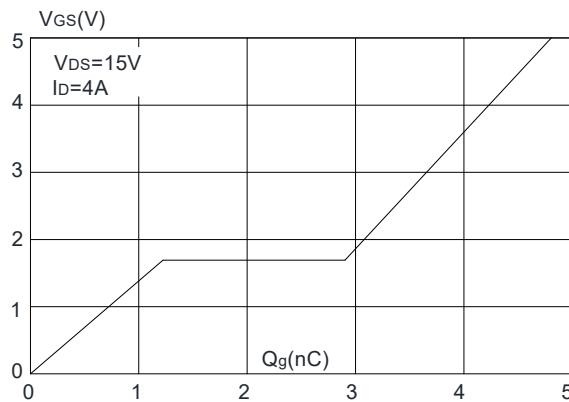
**Figure 1:** Output Characteristics



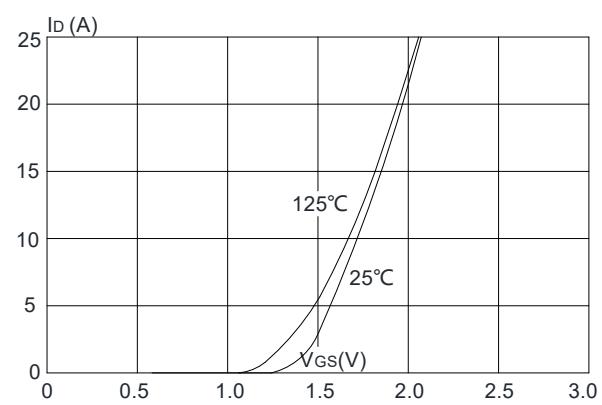
**Figure 3:** On-resistance vs. Drain Current



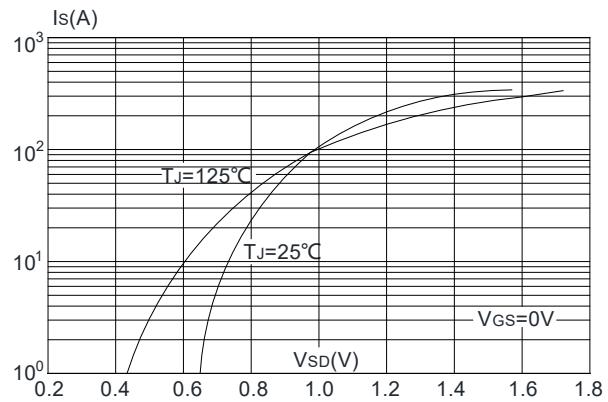
**Figure 5:** Gate Charge Characteristics



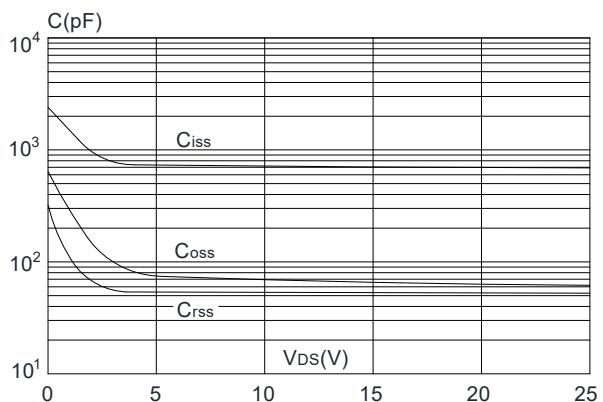
**Figure 2:** Typical Transfer Characteristics



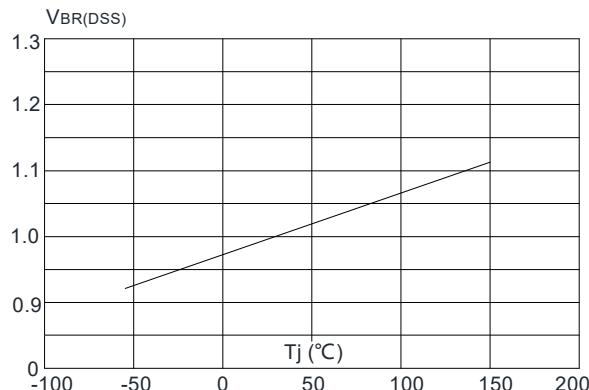
**Figure 4:** Body Diode Characteristics



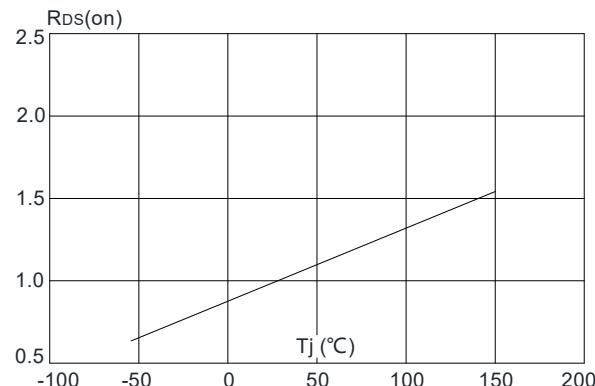
**Figure 6:** Capacitance Characteristics



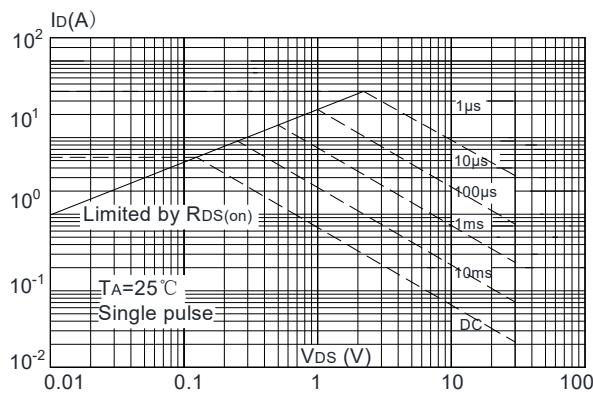
**Figure 7:** Normalized Breakdown Voltage vs. Junction Temperature



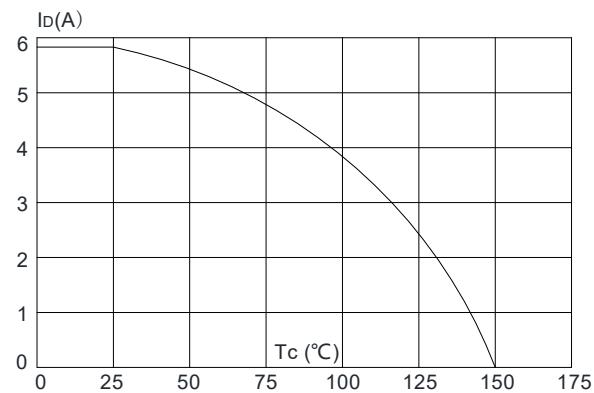
**Figure 8:** Normalized on Resistance vs. Junction Temperature



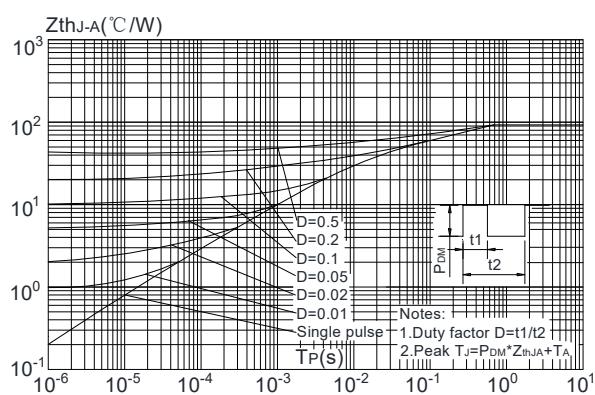
**Figure 9:** Maximum Safe Operating Area

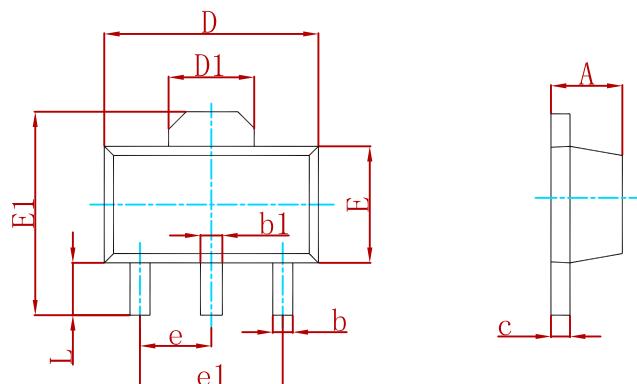


**Figure 10:** Maximum Continuous Drain Current vs. Case Temperature

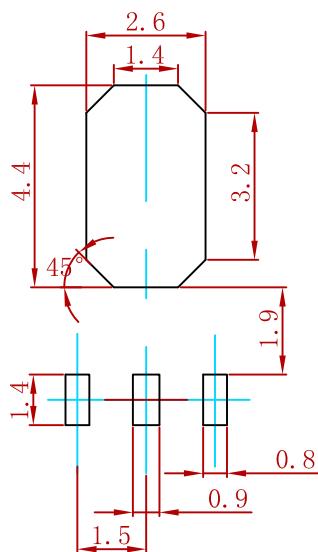


**Figure 11:** Maximum Effective Transient Thermal Impedance, Junction-to-Ambient



**PACKAGE MECHANICAL DATA**


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.400	1.600	0.055	0.063
b	0.320	0.520	0.013	0.020
b1	0.400	0.580	0.016	0.023
c	0.350	0.440	0.014	0.017
D	4.400	4.600	0.173	0.181
D1	1.550 REF.		0.061 REF.	
E	2.300	2.600	0.091	0.102
E1	3.940	4.250	0.155	0.167
e	1.500 TYP.		0.060 TYP.	
e1	3.000 TYP.		0.118 TYP.	
L	0.900	1.200	0.035	0.047

**Suggested Pad Layout**

**Note:**

1. Controlling dimension: in millimeters.
2. General tolerance:  $\pm 0.05$ mm.
3. The pad layout is for reference purposes only.

**REEL SPECIFICATION**

P/N	PKG	QTY
3400N-MS	SOT-89	1000

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