



**TM03N10MI**

**N-Channel Enhancement Mosfet**

**General Description**

- Low  $R_{DS(ON)}$
- RoHS and Halogen-Free Compliant

**Applications**

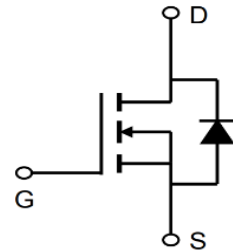
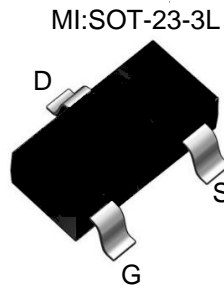
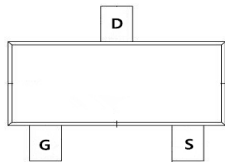
- Load switch
- PWM

**General Features**

$V_{DS} = 100V$   $I_D = 3.2A$

$R_{DS(ON)} = 200m\Omega$ (typ.)@  $V_{GS}=10V$

100% UIS Tested  
 100%  $R_g$  Tested



Marking: 3N10 OR 1002

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

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	100	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$I_D @ T_A=25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	3.2	A
$I_D @ T_A=70^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	2.1	A
$I_{DM}$	Pulsed Drain Current <sup>2</sup>	12	A
$P_D @ T_A=25^\circ C$	Total Power Dissipation <sup>3</sup>	1	W
$T_{STG}$	Storage Temperature Range	-55 to 150	$^\circ C$
$T_J$	Operating Junction Temperature Range	-55 to 150	$^\circ C$

**Thermal Data**

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient <sup>1</sup>	---	125	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case <sup>1</sup>	---	80	$^\circ C/W$

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

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
<b>Static Characteristics</b>						
Drain-Source Breakdown Voltage	<b>V<sub>(BR)DSS</sub></b>	V <sub>GS</sub> = 0 V, I <sub>D</sub> = 250μA	100	-	-	V
Gate Leakage Current	<b>I<sub>GSS</sub></b>	V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V	-	-	±100	nA
Drain Cut-off Current	<b>I<sub>DSS</sub></b>	V <sub>DS</sub> = 100V, V <sub>GS</sub> = 0V	-	-	1	μA
Gate Threshold Voltage	<b>V<sub>GS(th)</sub></b>	V <sub>GS</sub> = V <sub>DS</sub> , I <sub>D</sub> = 250μA	1.1	1.5	2.5	V
Drain-Source on-state Resistance <sup>3</sup>	<b>R<sub>DS(on)</sub></b>	V <sub>GS</sub> = 10V, I <sub>D</sub> = 2A	-	200	230	mΩ
<b>Dynamic Characteristics<sup>4</sup></b>						
Input Capacitance	<b>C<sub>iss</sub></b>	V <sub>GS</sub> = 0V, V <sub>DS</sub> = 50V, f = 1MHz	-	440	-	pF
Output Capacitance	<b>C<sub>oss</sub></b>		-	14	-	
Reverse Transfer Capacitance	<b>C<sub>rss</sub></b>		-	10	-	
<b>Switching Characteristics<sup>4</sup></b>						
Total gate charge	<b>Q<sub>g</sub></b>	V <sub>GS</sub> = 10V, V <sub>DS</sub> = 50V, I <sub>D</sub> = 2A	-	5.3	-	nC
Gate-source charge	<b>Q<sub>gs</sub></b>		-	1.4	-	
Gate-drain charge	<b>Q<sub>gd</sub></b>		-	1.8	-	
Turn-on Time	<b>t<sub>d(on)</sub></b>	V <sub>GS</sub> = 10V, V <sub>DD</sub> = 50V, R <sub>G</sub> = 1Ω, I <sub>D</sub> = 2A	-	14	-	ns
Rise time	<b>t<sub>r</sub></b>		-	54	-	
Turn-off Time	<b>t<sub>d(off)</sub></b>		-	18	-	
Fall time	<b>t<sub>f</sub></b>		-	11	-	
<b>Source-Drain Diode characteristics</b>						
Body Diode Voltage <sup>3</sup>	<b>V<sub>SD</sub></b>	I <sub>S</sub> = 1A, V <sub>GS</sub> = 0V	-	-	1.2	V
Continuous Source Current	<b>I<sub>S</sub></b>		-	-	3.2	A

**Notes:**

1. Repetitive rating, pulse width limited by junction temperature T<sub>J(MAX)</sub>=150°C.
2. The data tested by surface mounted on a 1 inch2 FR-4 board with 2OZ copper, The value in any given application depends on the user's specific board design.
3. Pulse Test: Pulse width≤300μs, duty cycle≤2%.
4. This value is guaranteed by design hence it is not included in the production test.



### Typical Characteristics

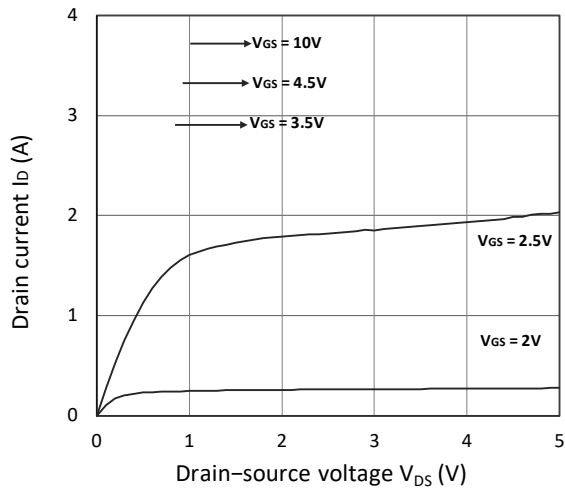


Figure 1. Output Characteristics

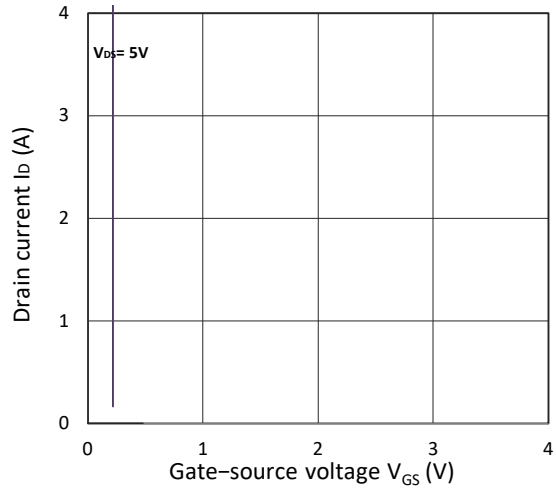


Figure 2. Transfer Characteristics

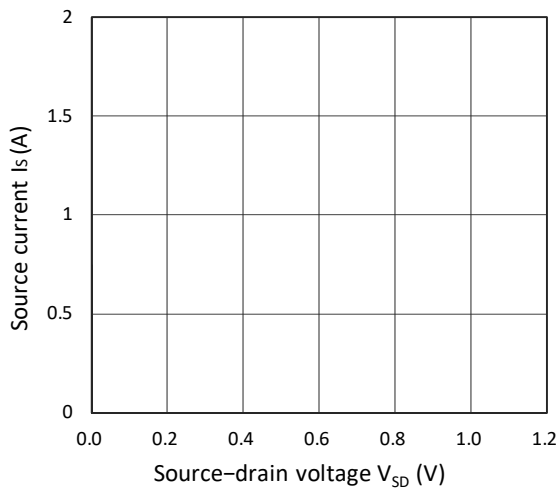


Figure 3. Forward Characteristics of Reverse

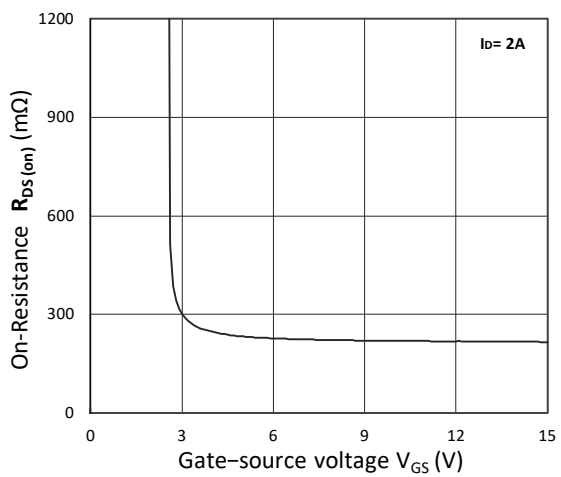


Figure 4.  $R_{DS(on)}$  vs.  $V_{GS}$

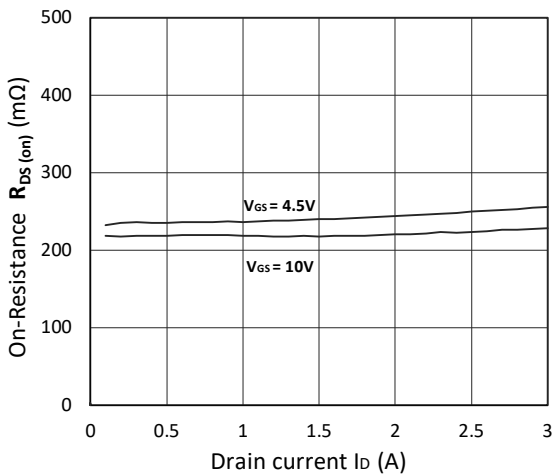


Figure 5.  $R_{DS(on)}$  vs.  $I_D$

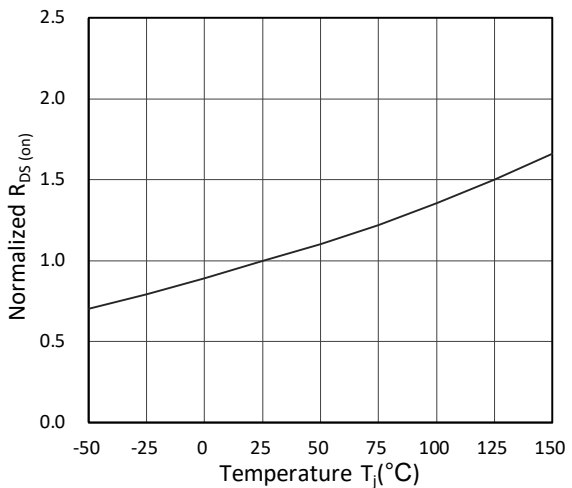


Figure 6. Normalized  $R_{DS(on)}$  vs. Temperature



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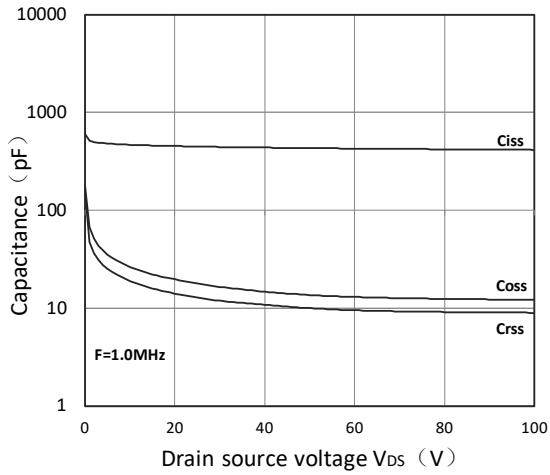


Figure 7. Capacitance Characteristics

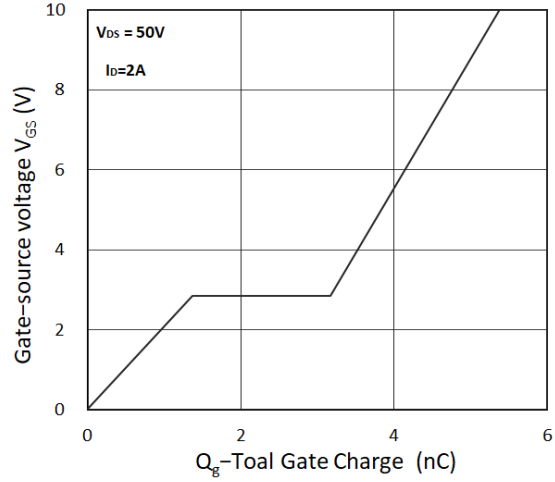
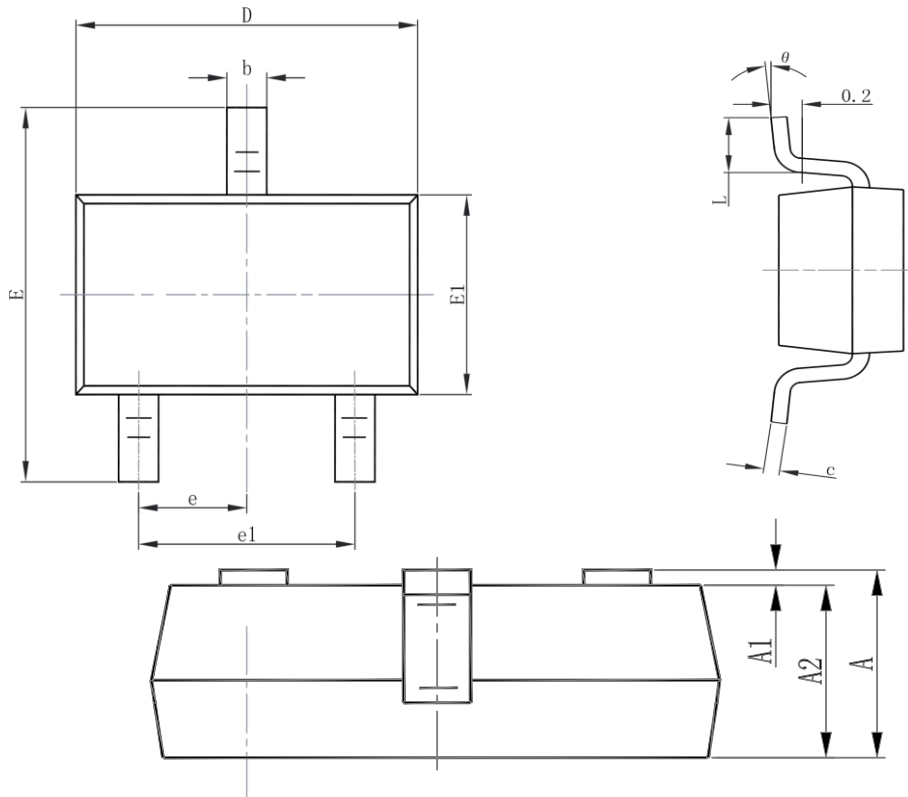


Figure 8. Gate Charge Characteristics

## Package Information:SOT-23-3L



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E1	1.500	1.700	0.059	0.067
E	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°