



TM03N10AI

N-Channel Enhancement Mosfet

General Description

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

Applications

- Load switch
- PWM

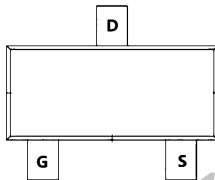
General Features

$V_{DS} = 100V$ $I_D = 3A$
 $R_{DS(ON)} = 200m\Omega(\text{typ.}) @ V_{GS} = 10V$

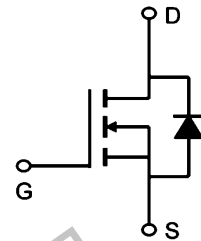
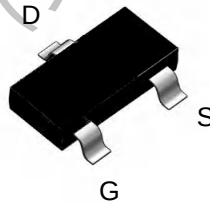
100% UIS Tested
100% R_g Tested



I: SOT-23



Marking: 1002 OR MA4



Absolute Maximum Ratings ($T_C = 25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	100	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D @ T_A = 25^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10V^1$	3	A
$I_D @ T_A = 70^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10V^1$	1.7	A
I_{DM}	Pulsed Drain Current ²	8.8	A
$P_D @ T_A = 25^\circ\text{C}$	Total Power Dissipation ³	1	W
T_{STG}	Storage Temperature Range	-55 to 175	$^\circ\text{C}$
T_J	Operating Junction Temperature Range	-55 to 175	$^\circ\text{C}$

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient ¹	---	162	$^\circ\text{C/W}$
R	Thermal Resistance Junction Case ¹			$^\circ\text{C/W}$

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Electrical Characteristics (T_J=25°C unless otherwise specified)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}, I_D = 250\mu\text{A}$	100	-	-	V
Gate Leakage Current	I_{GSS}	$V_{GS} = \pm 20\text{V}, V_{DS} = 0\text{V}$	-	-	± 100	nA
Drain Cut-off Current	I_{DSS}	$V_{DS} = 100\text{V}, V_{GS} = 0\text{V}$	-	-	1	μA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS} = V_{DS}, I_D = 250\mu\text{A}$	1.0	2.0	3.0	V
Drain-Source on-state Resistance ³	$R_{DS(on)}$	$V_{GS} = 10\text{V}, I_D = 2\text{A}$	-	200	230	m Ω
		$V_{GS} = 4.5\text{V}, I_D = 1.5\text{A}$	-	---	---	
Dynamic Characteristics ⁴						
Input Capacitance	C_{iss}	$V_{GS} = 0\text{V}, V_{DS} = 50\text{V},$ $f = 1\text{MHz}$	-	440	-	pF
Output Capacitance	C_{oss}		-	14	-	
Reverse Transfer Capacitance	C_{rss}		-	10	-	
Switching Characteristics ⁴						
Total gate charge	Q_g	$V_{GS} = 10\text{V}, V_{DS} = 50\text{V},$ $I_D = 2\text{A}$	-	5.3	-	nC
Gate-source charge	Q_{gs}		-	1.4	-	
Gate-drain charge	Q_{gd}		-	1.8	-	
Turn-on Time	$t_{d(on)}$	$V_{GS} = 10\text{V}, V_{DD} = 50\text{V},$ $R_G = 1\Omega, I_D = 2\text{A}$	-	14	-	ns
Rise time	t_r		-	54	-	
Turn-off Time	$t_{d(off)}$		-	18	-	
Fall time	t_f		-	11	-	
Source-Drain Diode characteristics						
Body Diode Voltage ³	V_{SD}	$I_S = 1\text{A}, V_{GS} = 0\text{V}$	-	-	1.2	V
Continuous Source Current	I_S		-	-	3	A

Notes:

1. Repetitive rating, pulse width limited by junction temperature T_{J(MAX)}=150°C.
2. The data tested by surface mounted on a 1 inch2 FR-4 board with 20Z copper, The value in any given application depends on the user's specific board design.
3. Pulse Test: Pulse width≤300μs, duty cycles≤2%.
4. This value is guaranteed by design hence it is not included in the production test.

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Typical Characteristics

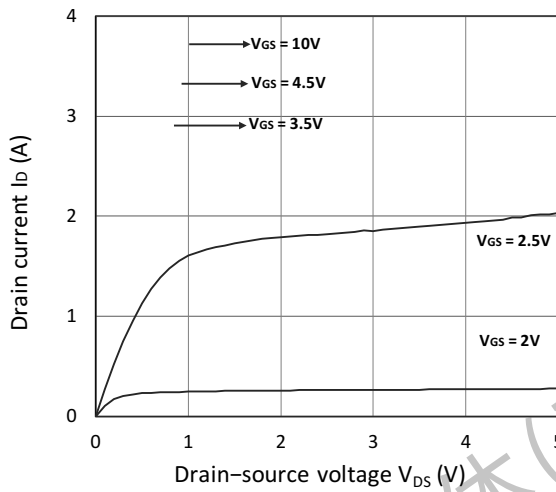


Figure 1. Output Characteristics

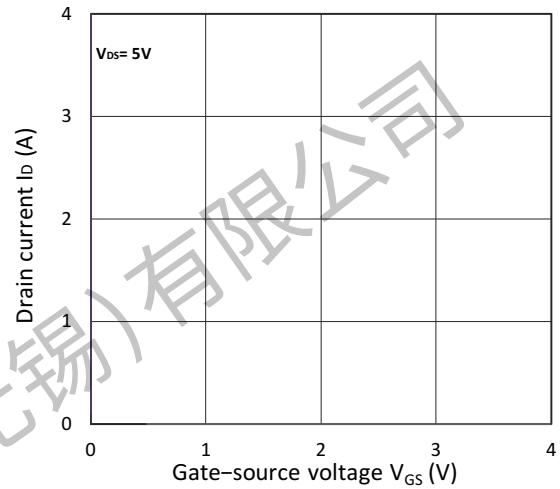


Figure 2. Transfer Characteristics

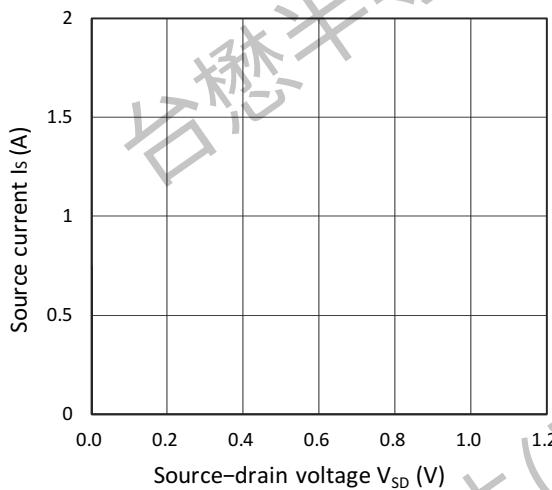


Figure 3. Forward Characteristics of Reverse

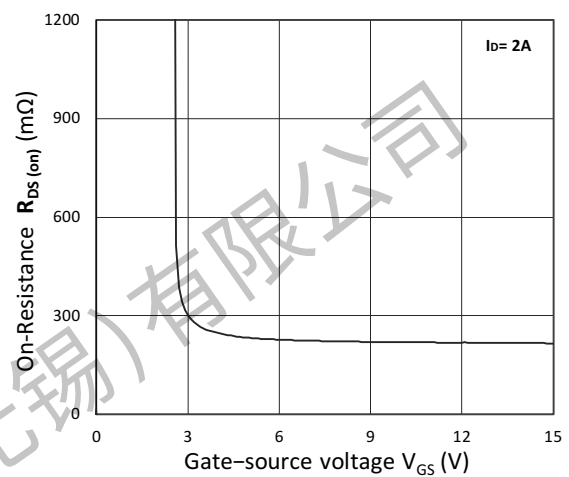


Figure 4. $R_{DS(on)}$ vs. V_{GS}

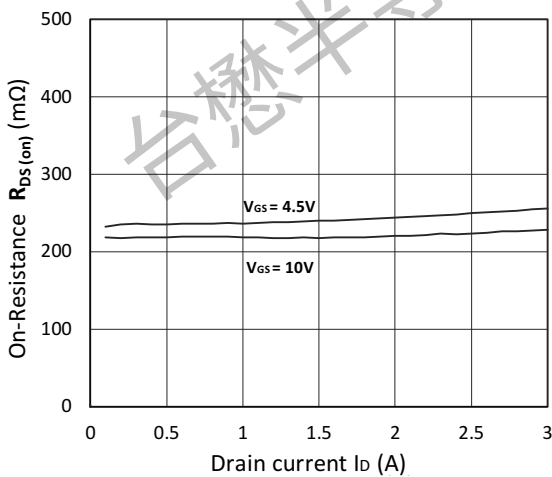


Figure 5. $R_{DS(on)}$ vs. I_D

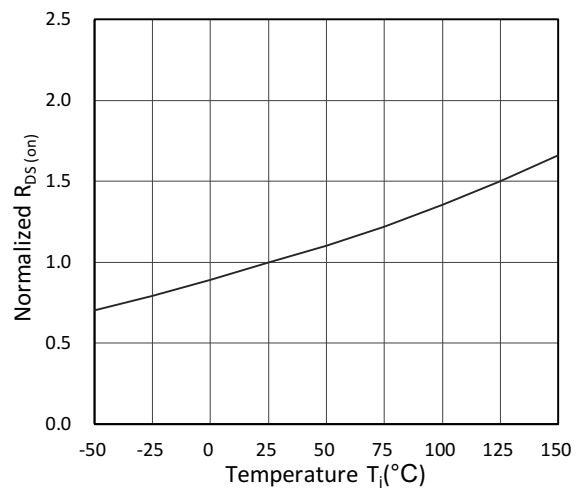


Figure 6. Normalized $R_{DS(on)}$ vs. Temperature

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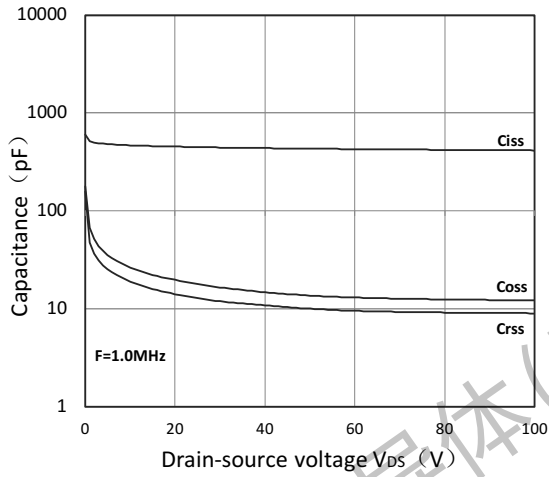


Figure 7. Capacitance Characteristics

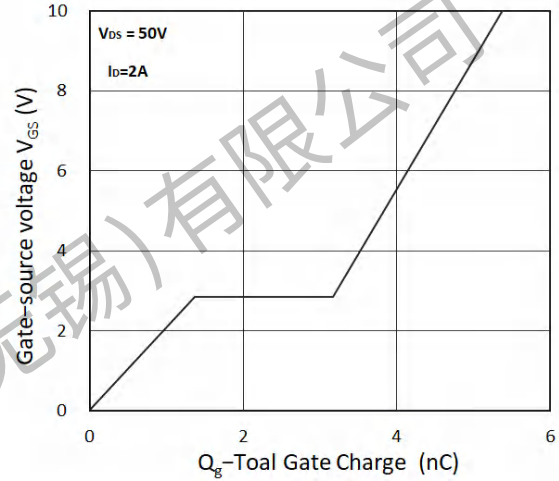


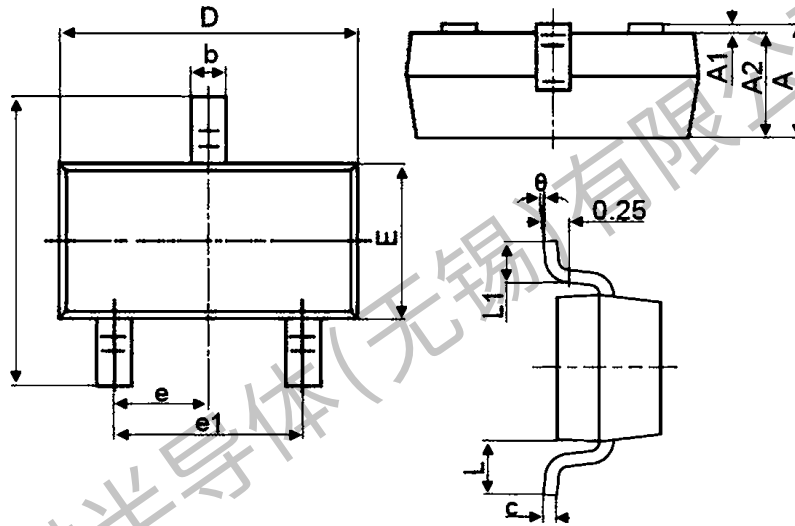
Figure 8. Gate Charge Characteristics



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Package Mechanical Data:SOT-23



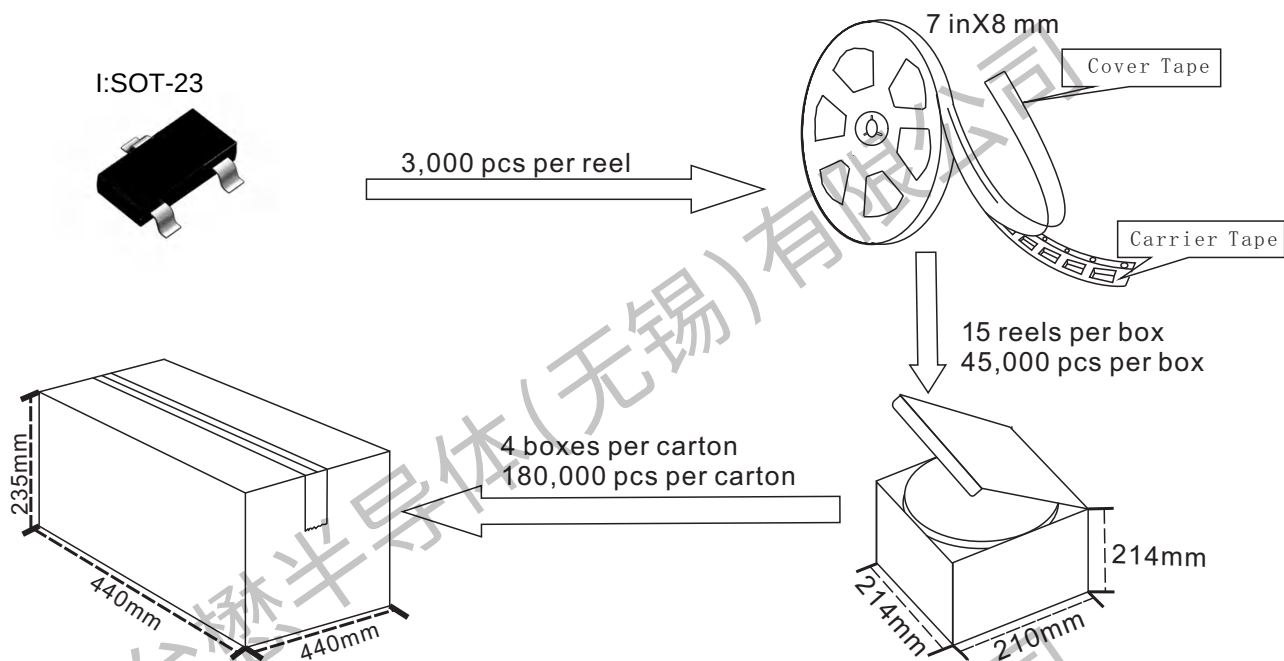
Symbol	Dimensions in Millimeters	
	MIN.	MAX.
A	0.900	1.150
A1	0.000	0.100
A2	0.900	1.050
b	0.300	0.500
c	0.080	0.150
D	2.800	3.000
E	1.200	1.400
E1	2.250	2.550
e	0.950TYP	
e1	1.800	2.000
L	0.550REF	
L1	0.300	0.500
θ	0°	8°

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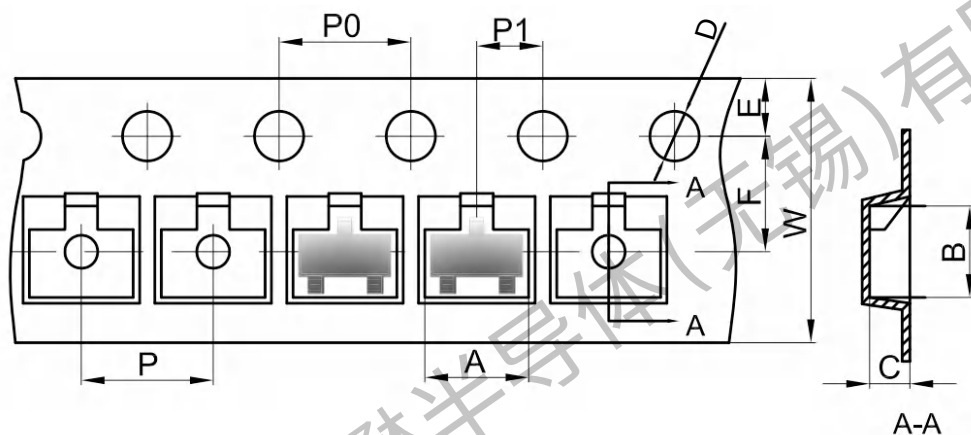
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SOT-23 Packing

1. The method of packaging and dimension are shown as below figure. (Dimension in mm)

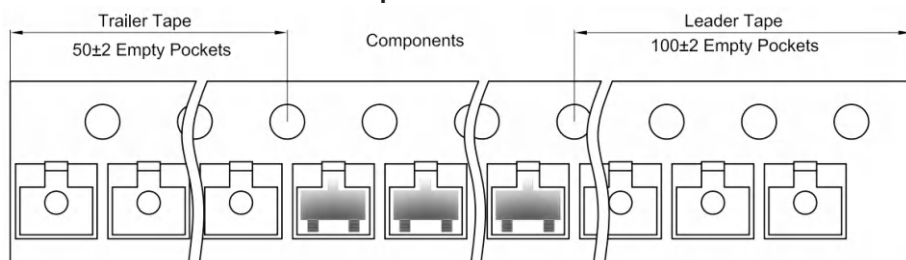


SOT-23 Embossed Carrier Tape



Dimensions are in millimeter										
Pkg type	A	B	C	D	E	F	P0	P	P1	W
SOT-23	3.15	2.77	1.22	Ø1.50	1.75	3.50	4.00	4.00	2.00	8.00

SOT-23 Tape Leader and Trailer



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Revision history:

Date	Rev	Description	Page
2023.04.04	23.04	Original	