


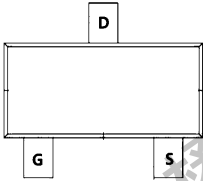


**TM02N10I**

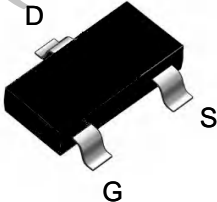
**N-Channel Enhancement Mosfet**

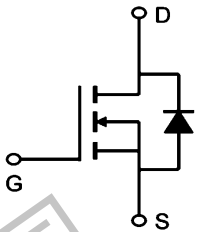
<p><b>General Description</b></p> <ul style="list-style-type: none"> <li>• Low <math>R_{DS(ON)}</math></li> <li>• RoHS and Halogen-Free Compliant</li> </ul> <p><b>Applications</b></p> <ul style="list-style-type: none"> <li>• Load switch</li> <li>• PWM</li> </ul>	<p><b>General Features</b></p> <p><math>V_{DS} = 100V</math> <math>I_D = 2A</math></p> <p><math>R_{DS(ON)} = 230m\Omega</math> (typ.) @ <math>V_{GS} = 10V</math></p> <p>100% UIS Tested 100% <math>R_g</math> Tested</p> <div style="text-align: right;">  </div>
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I: SOT-23



Marking: 02N10





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

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, $V_{GS} @ 10V$	2	A
$I_D @ T_A=70^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	1.4	A
$I_{DM}$	Pulsed Drain Current	8	A
$P_D @ T_A=25^\circ C$	Total Power Dissipation	2.3	W
$T_{STG}$	Storage Temperature Range	-55 to 175	$^\circ C$
$T_J$	Operating Junction Temperature Range	-55 to 175	$^\circ C$

**Thermal Data**

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient	---	54	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction Case	---	---	$^\circ C/W$

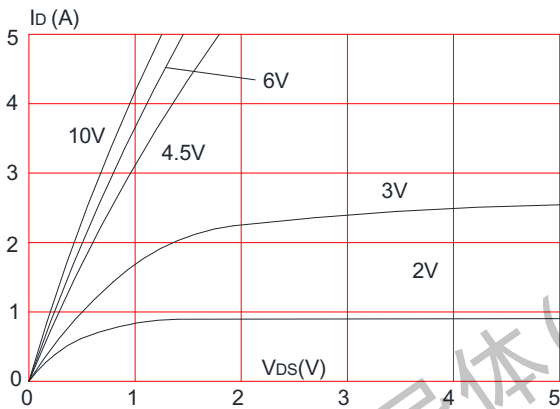
**TM02N10I**
**N-Channel Enhancement Mosfet**

 Electrical Characteristics : (  $T_A=25^{\circ}\text{C}$  unless otherwise noted)

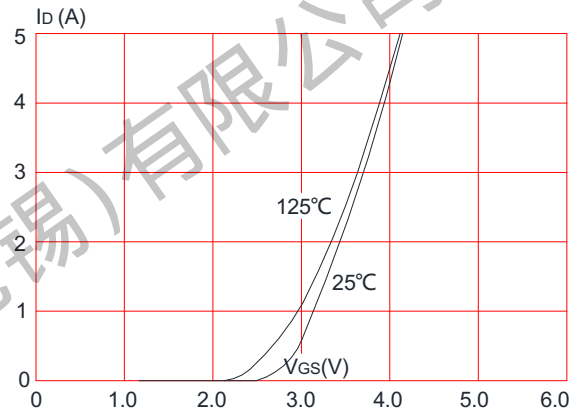
Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
<b>Off Characteristic</b>						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	100	-	-	V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=100V, V_{GS}=0V$	-	-	1.0	$\mu A$
$I_{GSS}$	Gate to Body Leakage Current	$V_{DS}=0V, V_{GS}=\pm 20V$	-	-	$\pm 100$	nA
<b>On Characteristics</b>						
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	1.0	2.0	3.0	V
$R_{DS(on)}$	Static Drain-Source on-Resistance <small>note2</small>	$V_{GS}=10V, I_D=2A$	-	230	260	m $\Omega$
		$V_{GS}=4.5V, I_D=1A$	-	---	---	
<b>Dynamic Characteristics</b>						
$C_{iss}$	Input Capacitance	$V_{DS}=25V, V_{GS}=0V,$ $f=1.0MHz$	-	490	-	pF
$C_{oss}$	Output Capacitance		-	21	-	pF
$C_{rss}$	Reverse Transfer Capacitance		-	15	-	pF
$Q_g$	Total Gate Charge	$V_{DS}=30V, I_D=2A,$ $V_{GS}=10V$	-	5.3	-	nC
$Q_{gs}$	Gate-Source Charge		-	1.3	-	nC
$Q_{gd}$	Gate-Drain("Miller") Charge		-	1.7	-	nC
<b>Switching Characteristics</b>						
$t_{d(on)}$	Turn-on Delay Time	$V_{DS}=30V,$ $I_D=1A, R_{GEN}=3\Omega,$ $V_{GS}=10V$	-	14	-	ns
$t_r$	Turn-on Rise Time		-	54	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	18	-	ns
$t_f$	Turn-off Fall Time		-	11	-	ns
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
$I_S$	Maximum Continuous Drain to Source Diode Forward Current		-	-	2	A
$I_{SM}$	Maximum Pulsed Drain to Source Diode Forward Current		-	-	8	A
$V_{SD}$	Drain to Source Diode Forward Voltage	$V_{GS}=0V, I_S=2A$	-	-	1.2	V

**Typical Performance Characteristics**

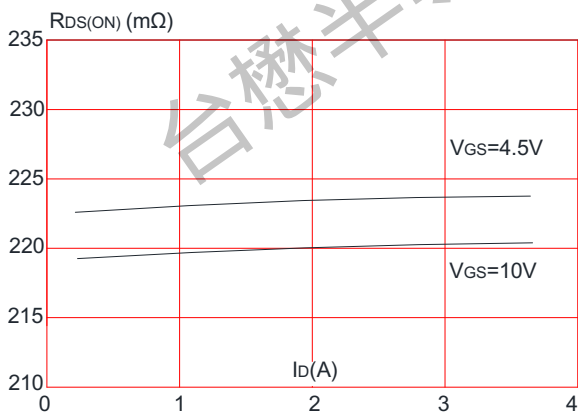
**Figure 1: Output Characteristics**



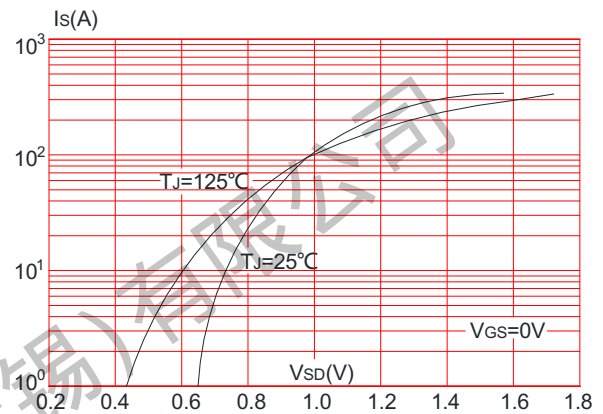
**Figure 2: Typical Transfer Characteristics**



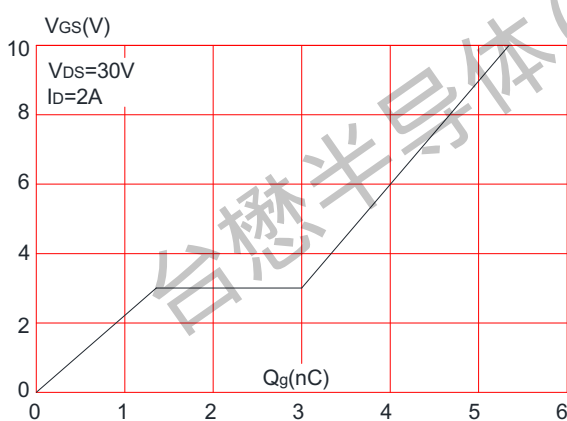
**Figure 3: On-resistance vs. Drain Current**



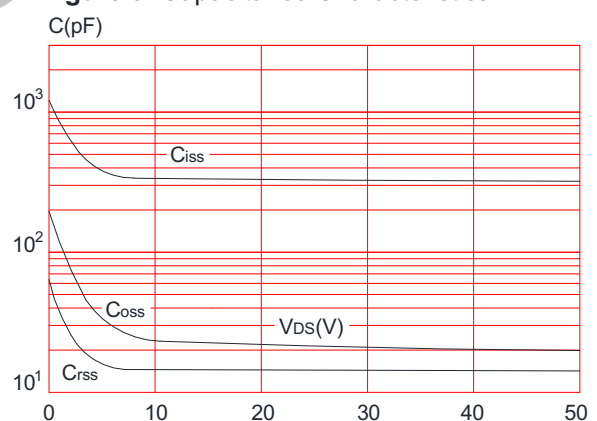
**Figure 4: Body Diode Characteristics**



**Figure 5: Gate Charge Characteristics**



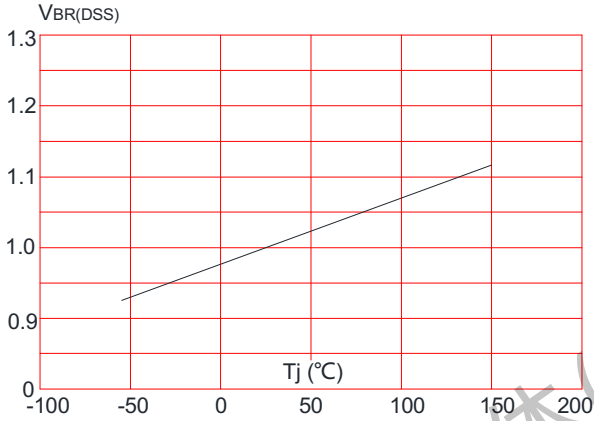
**Figure 6: Capacitance Characteristics**



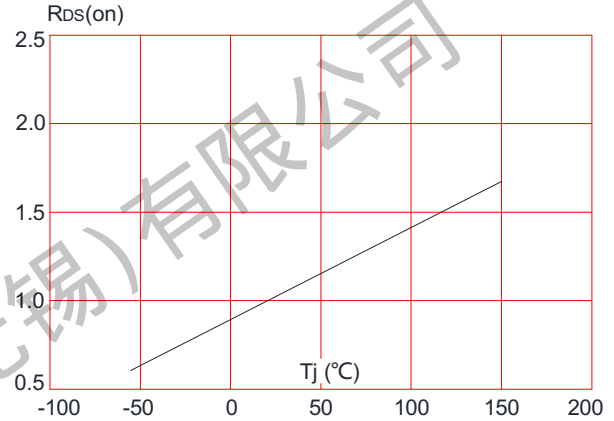
**TM02N10I**

**N-Channel Enhancement Mosfet**

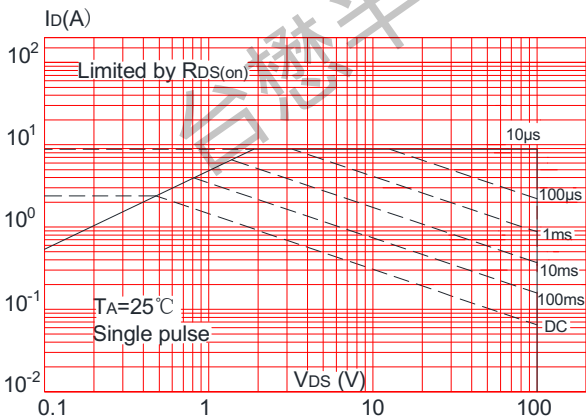
**Figure 7: Normalized Breakdown Voltage vs. Junction Temperature**



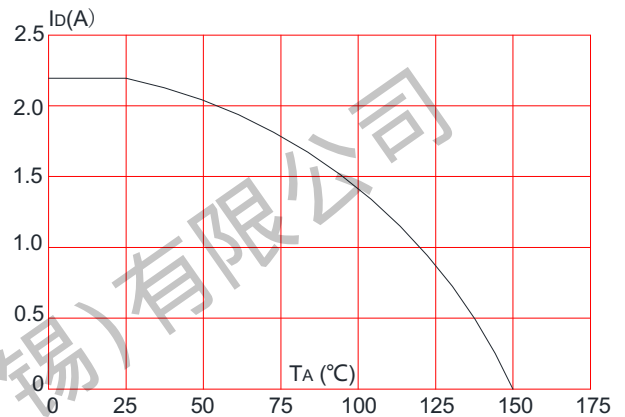
**Figure 8: Normalized on Resistance vs. Junction Temperature**



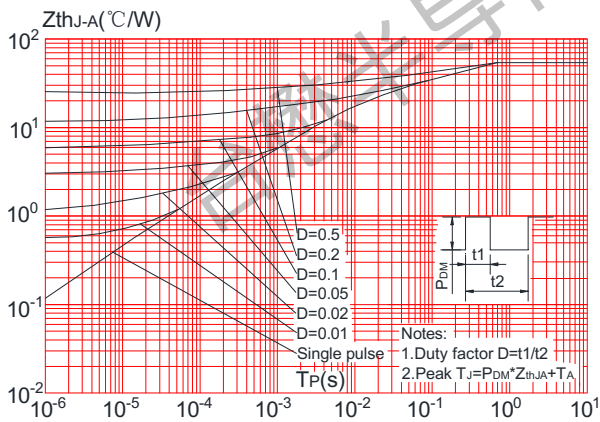
**Figure 9: Maximum Safe Operating Area**



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



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

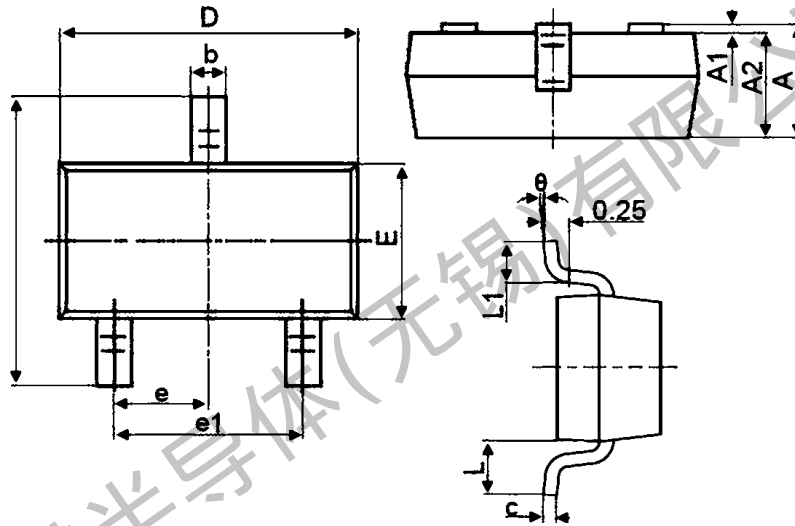




TM02N10I

N-Channel Enhancement Mosfet

Package Mechanical Data:SOT-23



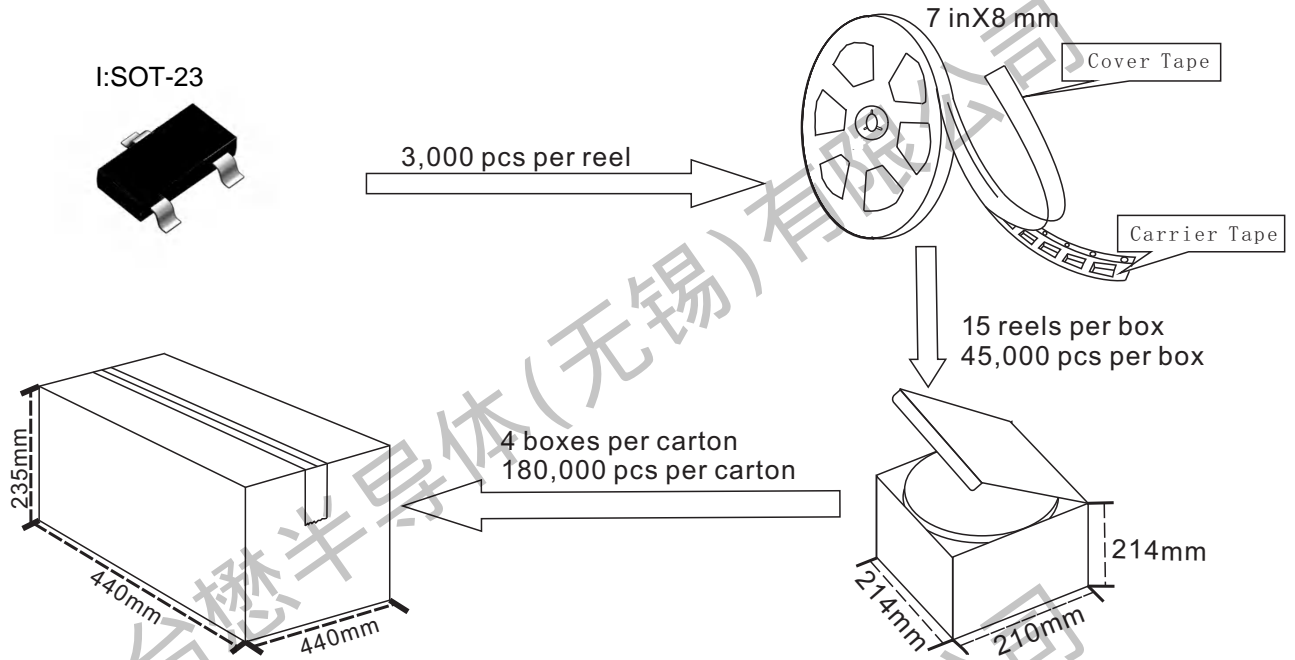
Symbol	Dimensions in Millimeters	
	MIN.	MAX.
A	0.900	1.150
A1	0.000	0.100
A2	0.900	1.050
b	0.300	0.500
c	0.080	0.150
D	2.800	3.000
E	1.200	1.400
E1	2.250	2.550
e	0.950TYP	
e1	1.800	2.000
L	0.550REF	
L1	0.300	0.500
θ	0°	8°

**TM02N10I**

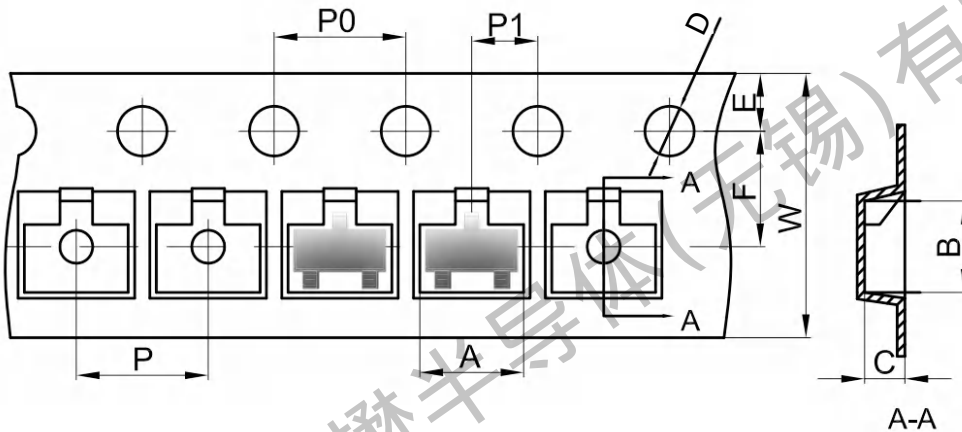
**N-Channel Enhancement Mosfet**

**SOT-23 Packing**

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



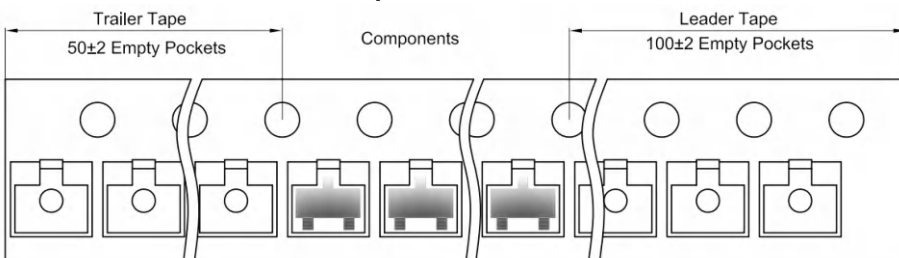
**SOT-23 Embossed Carrier Tape**



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
2023.03.10	23.03	Original	