
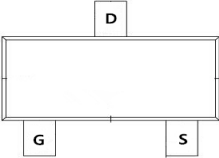




**TMN6005MI**

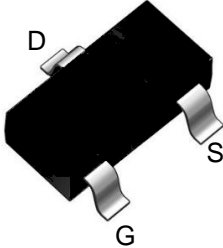
**N-Channel Enhancement Mosfet**

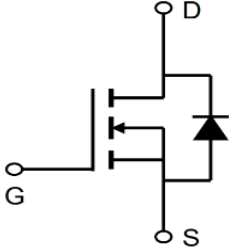
<p><b>General Description</b></p> <ul style="list-style-type: none"> <li>• Low <math>R_{DS(ON)}</math></li> <li>• RoHS and Halogen-Free Compliant</li> </ul> <p><b>Applications</b></p> <ul style="list-style-type: none"> <li>• Load switch</li> <li>• PWM</li> </ul>	<p><b>General Features</b></p> <p><math>V_{DS} = 60V</math>   <math>I_D = 5.0A</math></p> <p><math>R_{DS(ON)} = 40 m\Omega(Typ.) @ V_{GS}=10V</math></p> <p>100% UIS Tested 100% <math>R_g</math> Tested</p> 
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Marking:6005

MI:SOT-23-3L





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

Symbol	Parameter	Max.	Units
$V_{DSS}$	Drain-Source Voltage	60	V
$V_{GSS}$	Gate-Source Voltage	$\pm 20$	V
$I_D$	Continuous Drain Current	$T_C = 25^\circ C$	5.0
		$T_C = 100^\circ C$	3.8
$I_{DM}$	Pulsed Drain Current <sup>note1</sup>	30	A
EAS	Single Pulsed Avalanche Energy <sup>note2</sup>		mJ
$P_D$	Power Dissipation	3	W
$R_{\theta JC}$	Thermal Resistance, Junction to Case	73	$^\circ C/W$
$T_J, T_{STG}$	Operating and Storage Temperature Range	-55 to +175	$^\circ C$



**TMN6005MI**

**N-Channel Enhancement Mosfet**

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

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
<b>Off Characteristic</b>						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	60	-	-	V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=60V, V_{GS}=0V,$	-	-	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	1.6	2.5	V
$R_{DS(on)}$	Static Drain-Source on-Resistance <small>note3</small>	$V_{GS}=10V, I_D=15A$	-	40	49	m $\Omega$
		$V_{GS}=4.5V, I_D=10A$	-	45	63	
<b>Dynamic Characteristics</b>						
$C_{iss}$	Input Capacitance	$V_{DS}=25V, V_{GS}=0V,$ $f=1.0MHz$	-	825	-	pF
$C_{oss}$	Output Capacitance		-	49	-	pF
$C_{rss}$	Reverse Transfer Capacitance		-	41	-	pF
$Q_g$	Total Gate Charge	$V_{DS}=30V, I_D=4.5A,$ $V_{GS}=10V$	-	14	-	nC
$Q_{gs}$	Gate-Source Charge		-	2.9	-	nC
$Q_{gd}$	Gate-Drain("Miller") Charge		-	5.2	-	nC
<b>Switching Characteristics</b>						
$t_{d(on)}$	Turn-on Delay Time	$V_{DS}=30V, I_D=2A,$ $R_L=6.7\Omega, R_G=3\Omega,$ $V_{GS}=10V$	-	5	-	ns
$t_r$	Turn-on Rise Time		-	2.6	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	16.1	-	ns
$t_f$	Turn-off Fall Time		-	2.3	-	ns
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
$I_S$	Maximum Continuous Drain to Source Diode Forward Current		-	-	5	A
$I_{SM}$	Maximum Pulsed Drain to Source Diode Forward Current		-	-	30	A
$V_{SD}$	Drain to Source Diode Forward Voltage	$V_{GS}=0V, I_S=15A$	-	-	1.2	V
$t_{rr}$	Body Diode Reverse Recovery Time	$T_J=25^{\circ}\text{C}, I_F=15A,$ $dI/dt=100A/\mu s$	-	35	-	ns
$Q_{rr}$	Body Diode Reverse Recovery Charge		-	53	-	nC

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

2. EAS condition :  $T_J=25^{\circ}\text{C}, V_{DD}=30V, V_G=10V, L=0.5mH, R_g=25\Omega, I_{AS}=6.1A$

3. Pulse Test: Pulse Width $\leq 300\mu s$ , Duty Cycle $\leq 0.5\%$



## Typical Performance Characteristics

Figure 1: Output Characteristics

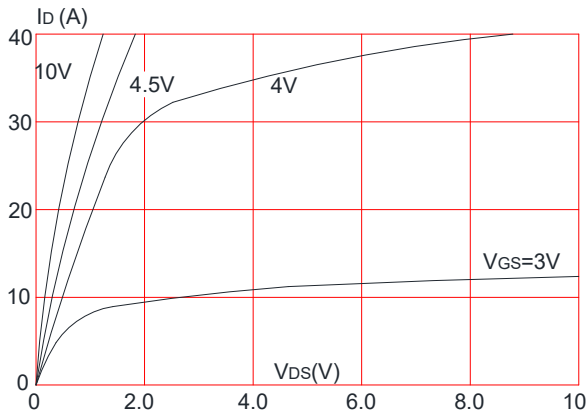


Figure 2: Typical Transfer Characteristics

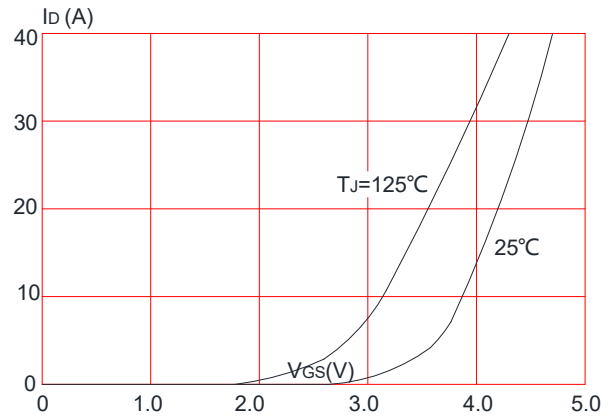


Figure 3: On-resistance vs. Drain Current

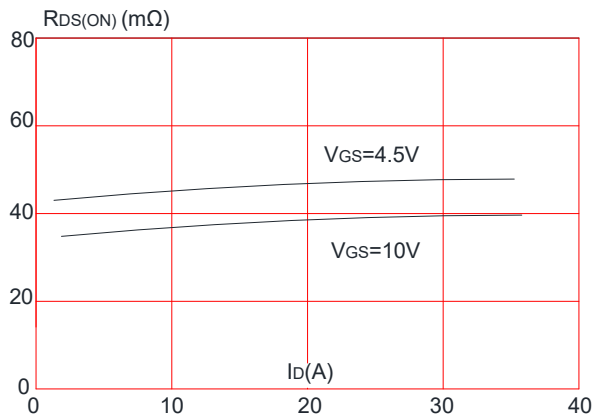


Figure 4: Body Diode Characteristics

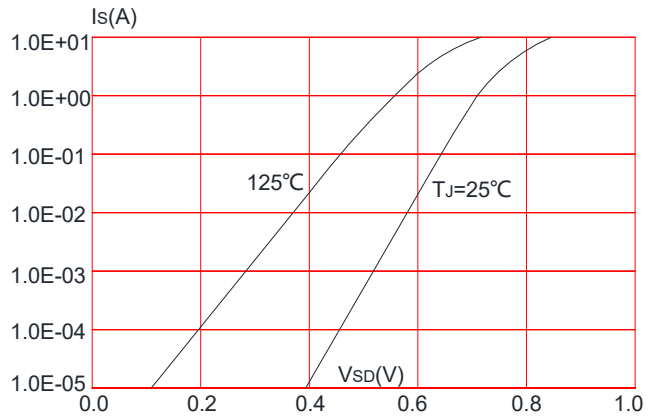


Figure 5: Gate Charge Characteristics

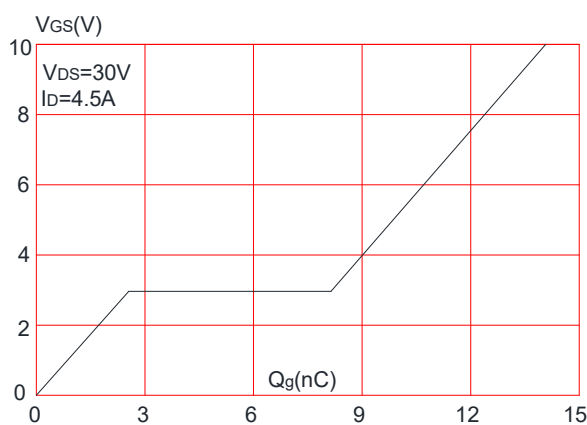
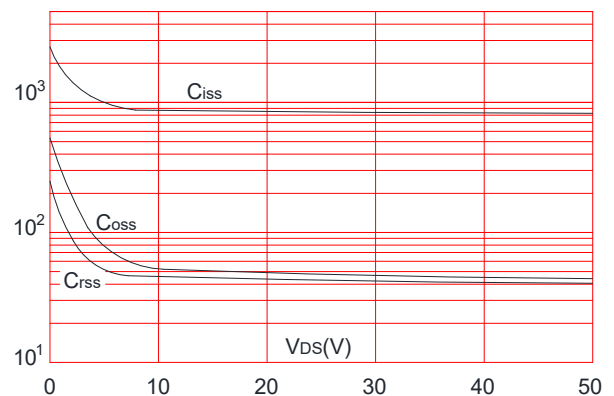


Figure 6: Capacitance Characteristics



TMN6005MI

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Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

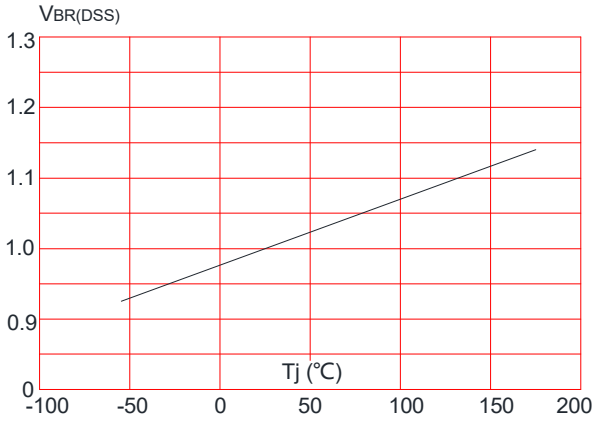


Figure 8: Normalized on Resistance vs. Junction Temperature

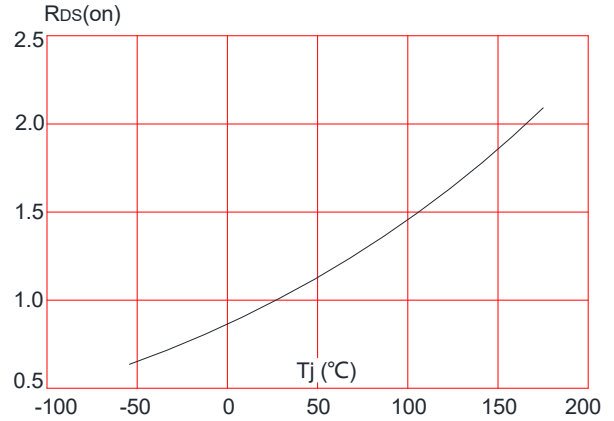


Figure 9: Maximum Safe Operating Area

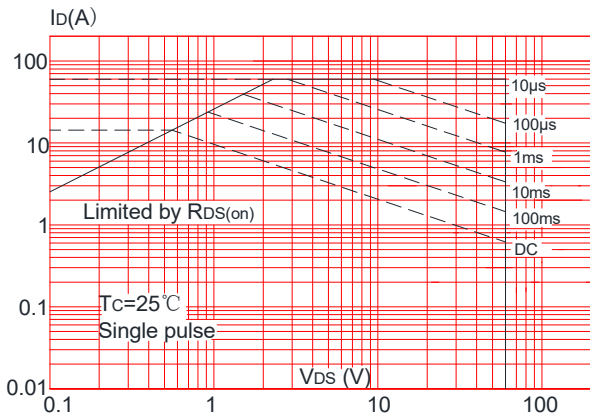


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

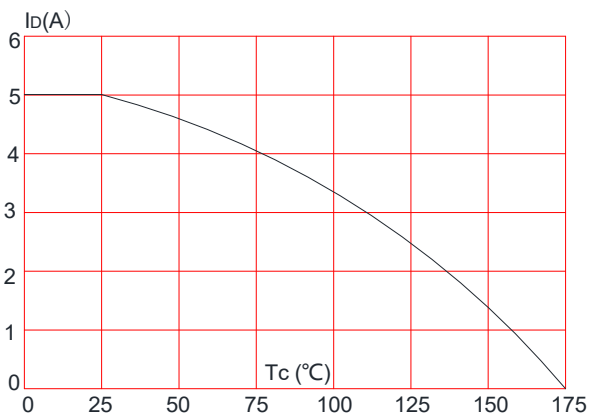
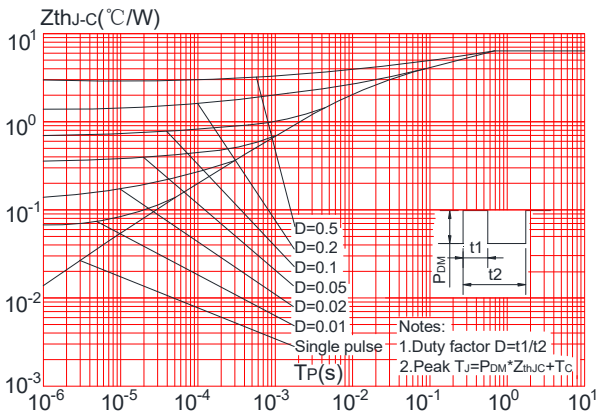
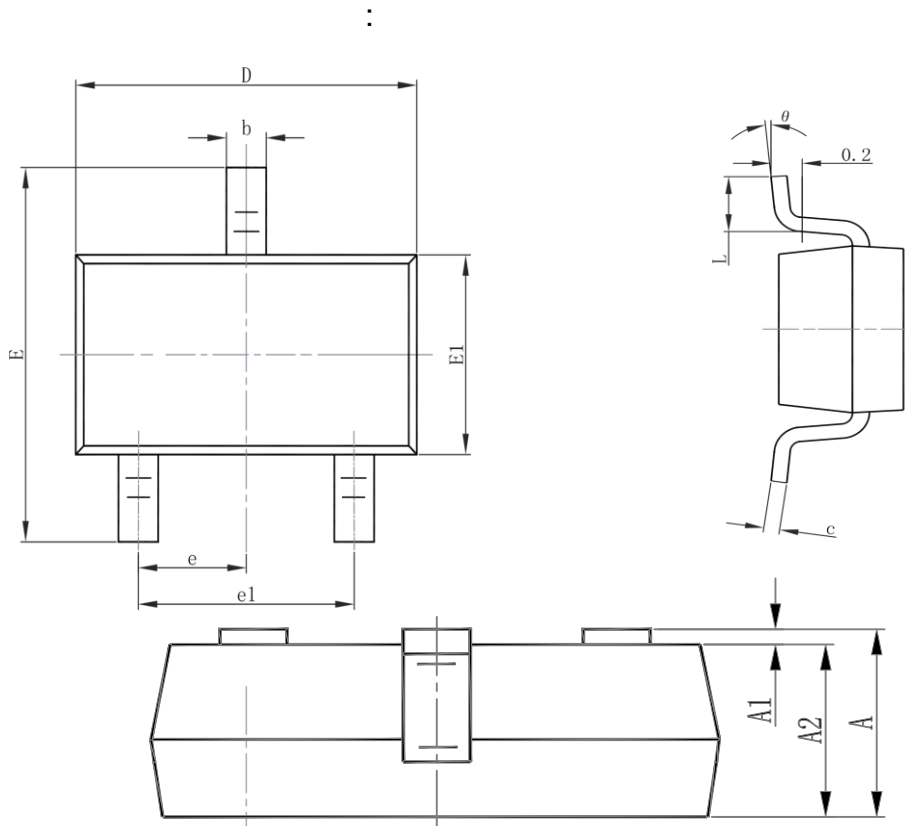


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case



# 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
$\theta$	0°	8°	0°	8°