
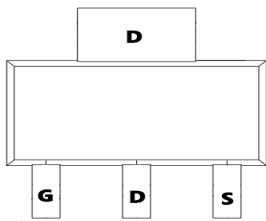




**TMN6010SI**

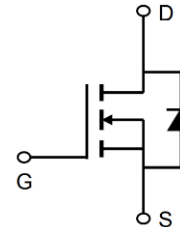
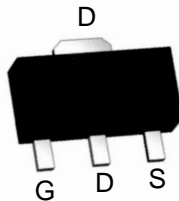
**N-Channel Enhancement Mosfet**

<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=10A</math>  <math>R_{DS(ON)} = 40m\Omega</math> (Typ.) @ <math>V_{GS}=10V</math></p> <p>100% UIS Tested                  100% <math>R_g</math> Tested</p> 
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Marking: 10N06

SI:SOT-89-3L



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

Symbol	Parameter	Max.	Units
$V_{DSS}$	Drain-Source Voltage	60	V
$V_{GSS}$	Gate-Source Voltage	$\pm 20$	V
$I_D$	Continuous Drain Current	$T_C = 25^\circ C$	10
		$T_C = 100^\circ C$	6.8
$I_{DM}$	Pulsed Drain Current <sup>note1</sup>	30	A
EAS	Single Pulsed Avalanche Energy <sup>note2</sup>	6.3	mJ
$P_D$	Power Dissipation	4	W
$R_{\theta JC}$	Thermal Resistance, Junction to Case	63	$^\circ C/W$
$T_J, T_{STG}$	Operating and Storage Temperature Range	-55 to +175	$^\circ C$

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N-Channel Enhancement Mosfet

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

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
<b>Off Characteristic</b>						
V <sub>(BR)DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	60	-	-	V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =60V, V <sub>GS</sub> =0V,	-	-	1.0	μA
I <sub>GSS</sub>	Gate to Body Leakage Current	V <sub>DS</sub> =0V, V <sub>GS</sub> =±20V	-	-	±100	nA
<b>On Characteristics</b>						
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	1	1.6	2.5	V
R <sub>DS(on)</sub>	Static Drain-Source on-Resistance note3	V <sub>GS</sub> =10V, I <sub>D</sub> =15A	-	40	49	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =10A	-	45	63	
<b>Dynamic Characteristics</b>						
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, f=1.0MHz	-	825	-	pF
C <sub>oss</sub>	Output Capacitance		-	49	-	pF
C <sub>rss</sub>	Reverse Transfer Capacitance		-	41	-	pF
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =30V, I <sub>D</sub> =4.5A, V <sub>GS</sub> =10V	-	14	-	nC
Q <sub>gs</sub>	Gate-Source Charge		-	2.9	-	nC
Q <sub>gd</sub>	Gate-Drain("Miller") Charge		-	5.2	-	nC
<b>Switching Characteristics</b>						
t <sub>d(on)</sub>	Turn-on Delay Time	V <sub>DS</sub> =30V, I <sub>D</sub> =2A, R <sub>L</sub> =6.7Ω, R <sub>G</sub> =3Ω, V <sub>GS</sub> =10V	-	5	-	ns
t <sub>r</sub>	Turn-on Rise Time		-	2.6	-	ns
t <sub>d(off)</sub>	Turn-off Delay Time		-	16.1	-	ns
t <sub>f</sub>	Turn-off Fall Time		-	2.3	-	ns
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
I <sub>S</sub>	Maximum Continuous Drain to Source Diode Forward Current		-	-	10	A
I <sub>SM</sub>	Maximum Pulsed Drain to Source Diode Forward Current		-	-	30	A
V <sub>SD</sub>	Drain to Source Diode Forward Voltage	V <sub>GS</sub> =0V, I <sub>S</sub> =15A	-	-	1.2	V
trr	Body Diode Reverse Recovery Time	T <sub>J</sub> =25°C, I <sub>F</sub> =15A, dI/dt=100A/μs	-	35	-	ns
Q <sub>rr</sub>	Body Diode Reverse Recovery Charge		-	53	-	nC

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

2. EAS condition : T<sub>J</sub>=25°C, V<sub>DD</sub>=30V, V<sub>G</sub>=10V, L=0.5mH, R<sub>G</sub>=25Ω, I<sub>AS</sub>=6.1A

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

### Typical Performance Characteristics

Figure 1: Output Characteristics

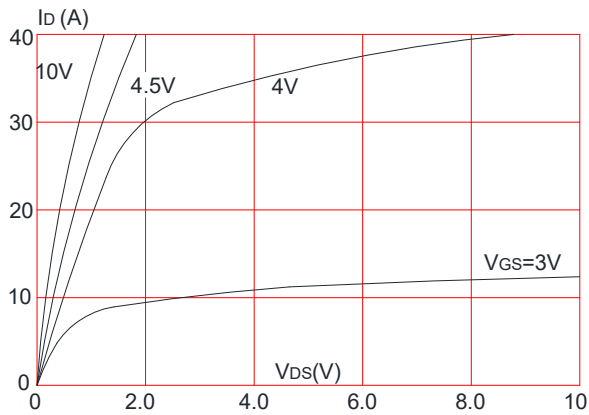


Figure 2: Typical Transfer Characteristics

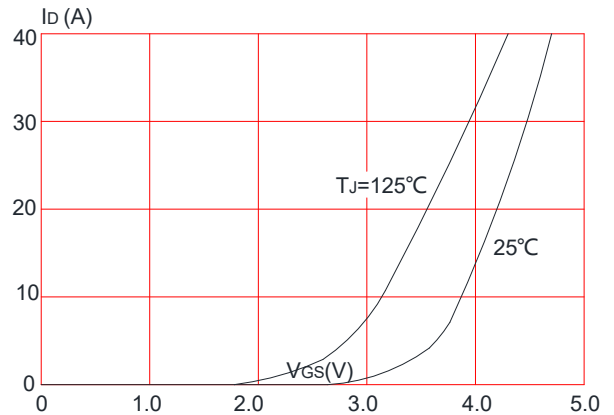


Figure 3: On-resistance vs. Drain Current

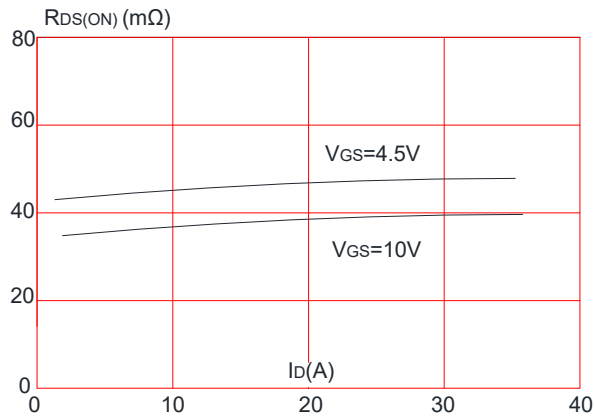


Figure 4: Body Diode Characteristics

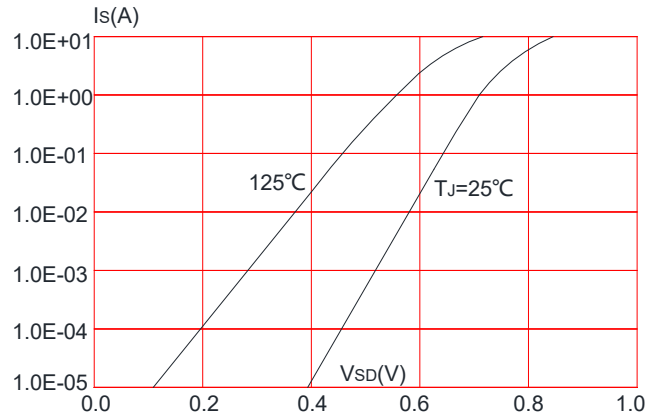


Figure 5: Gate Charge Characteristics

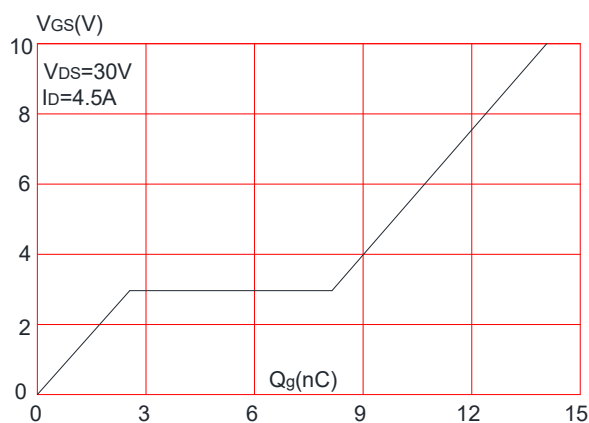
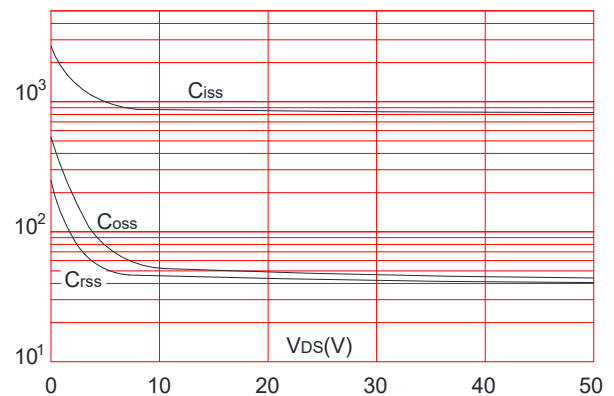


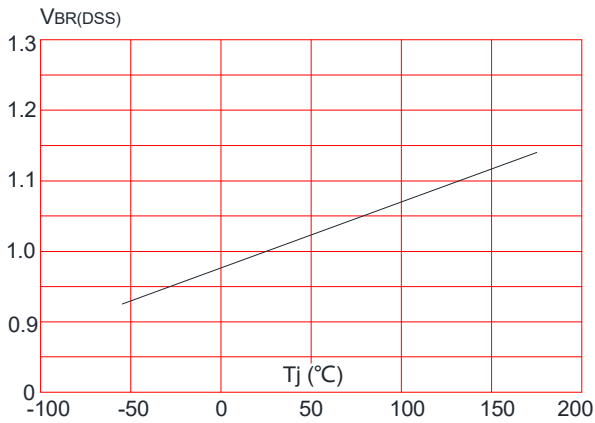
Figure 6: Capacitance Characteristics



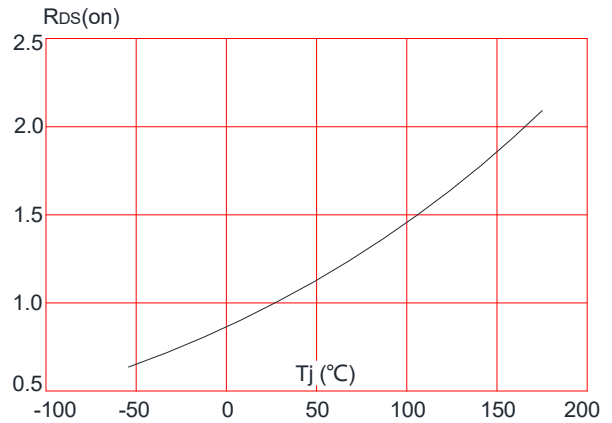
**TMN6010SI**

**N-Channel Enhancement Mosfet**

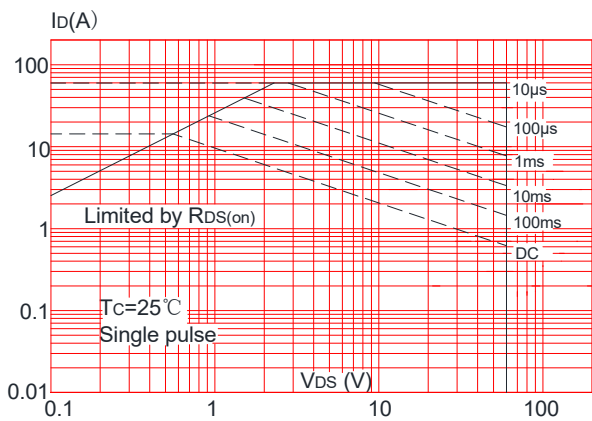
**Figure 7: Normalized Breakdown Voltage vs. Junction Temperature**



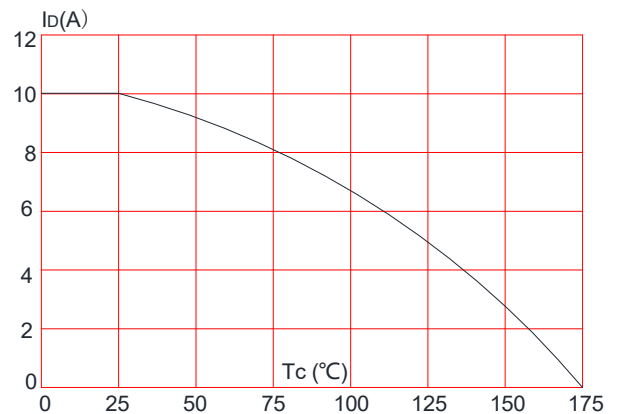
**Figure 8: Normalized on Resistance vs. Junction Temperature**



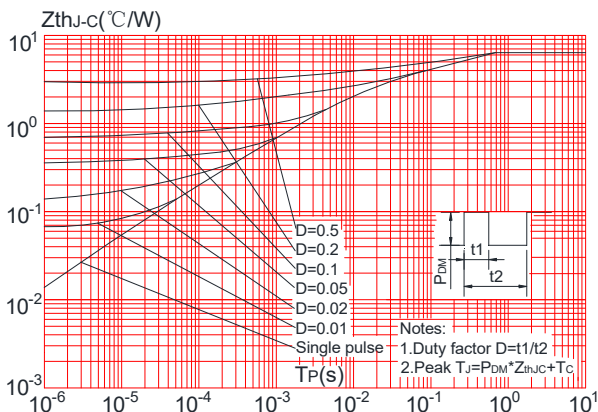
**Figure 9: Maximum Safe Operating Area**



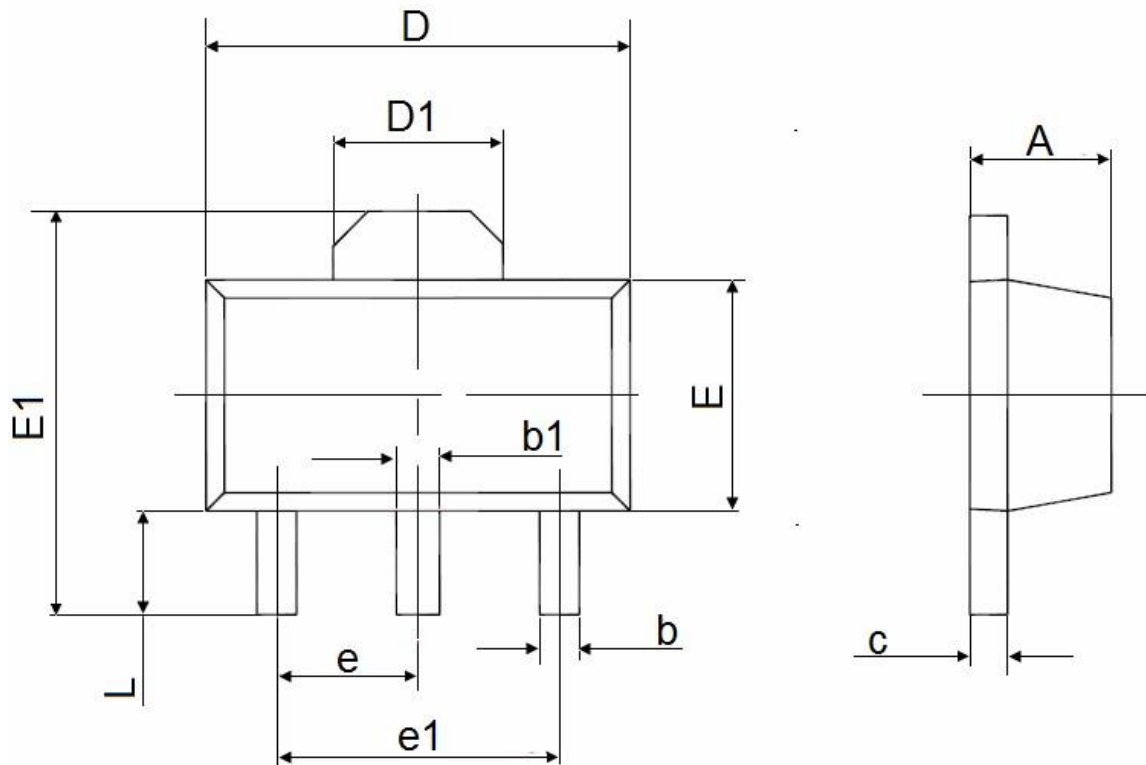
**Figure 10: Maximum Continuous Drain Current vs. Case Temperature**



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



## Package Mechanical Data:SOT-89-3L



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