
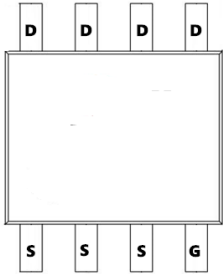


**TMN2012S**

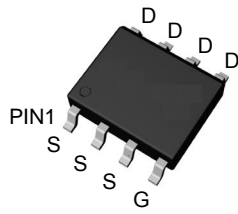
**N-Channel Enhancement Mosfet**

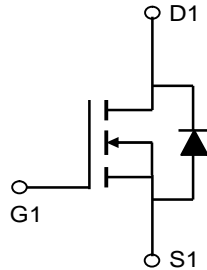
<p><b>General Description</b></p> <ul style="list-style-type: none"> <li>• Low <math>R_{DS(ON)}</math></li> <li>• RoHS and Halogen-Free Compliant</li> </ul> <p><b>Applications</b></p> <ul style="list-style-type: none"> <li>• Load switch</li> <li>• PWM</li> </ul>	<p><b>General Features</b></p> <p><math>V_{DS} = 20V</math> <math>I_D = 10A</math></p> <p><math>R_{DS(ON)} = 12m\ \Omega</math> (typ.) @ <math>V_{GS} = 10V</math></p> <p>100% UIS Tested                  100% <math>R_g</math> Tested</p> 
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PIN1

S:SOP-8L





Marking: 10N02 OR 2010

**Absolute Maximum Rating ( $T_A=25^\circ C$  unless otherwise noted)**

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DS}$	20	V
Gate-Source Voltage	$V_{GS}$	$\pm 12$	V
Continuous Drain Current	$I_D$	10	A
Pulsed Drain Current <sup>1</sup>	$I_{DM}$	20	A
Power Dissipation	$P_D$	2.25	W
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 to 150	$^\circ C$

**Thermal Characteristics**

Parameter	Symbol	Value	Unit
Thermal Resistance from Junction to Ambient <sup>2</sup>	$R_{\theta JA}$	90	$^\circ C/W$

TMN2012S

N-Channel Enhancement Mosfet

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

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
<b>Static Characteristics</b>						
Drain-Source Breakdown Voltage	<b>BV<sub>DSS</sub></b>	V <sub>GS</sub> = 0 V, I <sub>D</sub> = 250μA	20	-	-	V
Gate Leakage Current	<b>I<sub>GSS</sub></b>	V <sub>GS</sub> = ±12V, V <sub>DS</sub> = 0 V	-	-	±100	nA
Drain Cut-off Current	<b>I<sub>DSS</sub></b>	V <sub>DS</sub> = 20V, V <sub>GS</sub> = 0 V	-	-	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	0.45	0.7	1	V
Drain-Source On-State Resistance <sup>3</sup>	<b>R<sub>DS(on)</sub></b>	V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 5A	-	12	15	mΩ
		V <sub>GS</sub> = 2.5V, I <sub>D</sub> = 4.7A	-	17	21	
		V <sub>GS</sub> = 1.8V, I <sub>D</sub> = 4.3A	-	28	50	
<b>Dynamic Characteristics<sup>4</sup></b>						
Input Capacitance	<b>C<sub>iss</sub></b>	V <sub>GS</sub> = 0V, V <sub>DS</sub> = 10V, f = 1MHz	-	700	-	pF
Output Capacitance	<b>C<sub>oss</sub></b>		-	120	-	
Reverse Transfer Capacitance	<b>C<sub>rss</sub></b>		-	105	-	
<b>Switching Characteristics<sup>4</sup></b>						
Total Gate Charge	<b>Q<sub>g</sub></b>	V <sub>GS</sub> = 4.5V, V <sub>DS</sub> = 10V, I <sub>D</sub> = 5A	-	10.5	-	nC
Gate-Source Charge	<b>Q<sub>gs</sub></b>		-	2	-	
Gate-Drain Charge	<b>Q<sub>gd</sub></b>		-	2.5	-	
Turn-On Time	<b>t<sub>d(on)</sub></b>	V <sub>GEN</sub> = 5V, V <sub>DD</sub> = 10V, I <sub>D</sub> = 5A, R <sub>G</sub> = 3Ω,	-	10	-	ns
Rise Time	<b>t<sub>r</sub></b>		-	20	-	
Turn-Off Time	<b>t<sub>d(off)</sub></b>		-	32	-	
Fall Time	<b>t<sub>f</sub></b>		-	12	-	
<b>Source-Drain Diode Characteristics</b>						
Body Diode Voltage <sup>3</sup>	<b>V<sub>SD</sub></b>	I <sub>S</sub> = 4A, V <sub>GS</sub> = 0V	-	-	1.2	V
Continuous Source Current	<b>I<sub>S</sub></b>		-	-	10	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

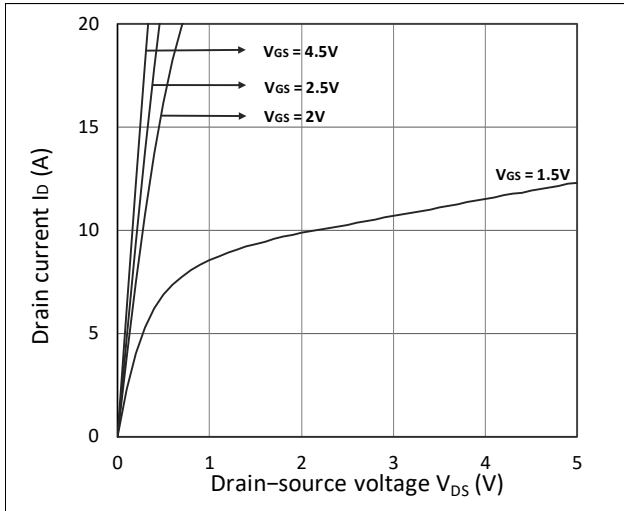


Figure 1. Output Characteristics

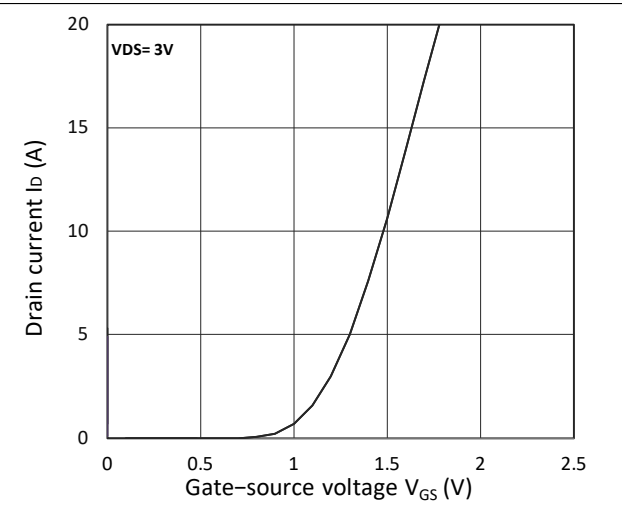


Figure 2. Transfer Characteristics

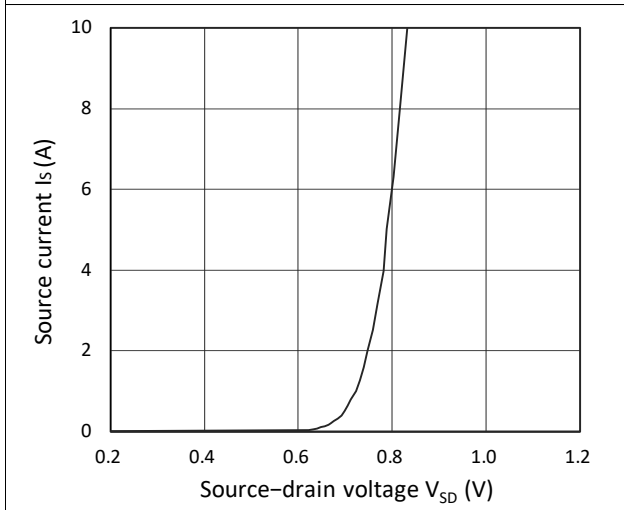


Figure 3. Forward Characteristics of Reverse

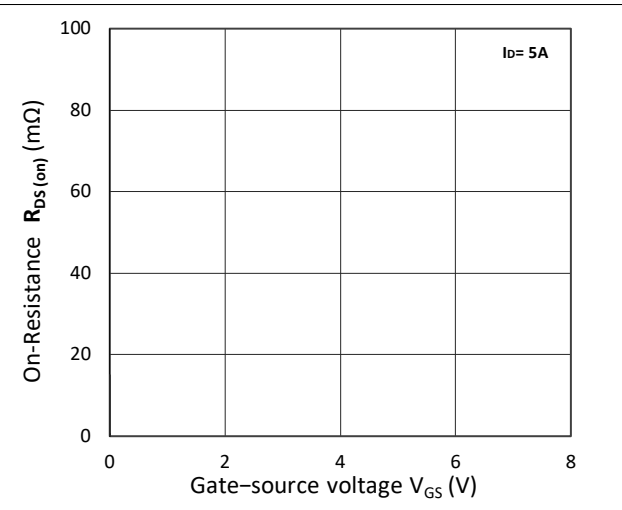


Figure 4.  $R_{DS(on)}$  vs.  $V_{GS}$

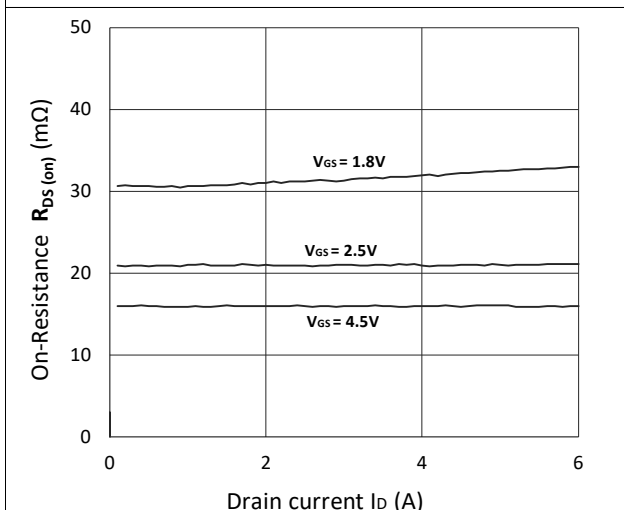


Figure 5.  $R_{DS(on)}$  vs.  $I_D$

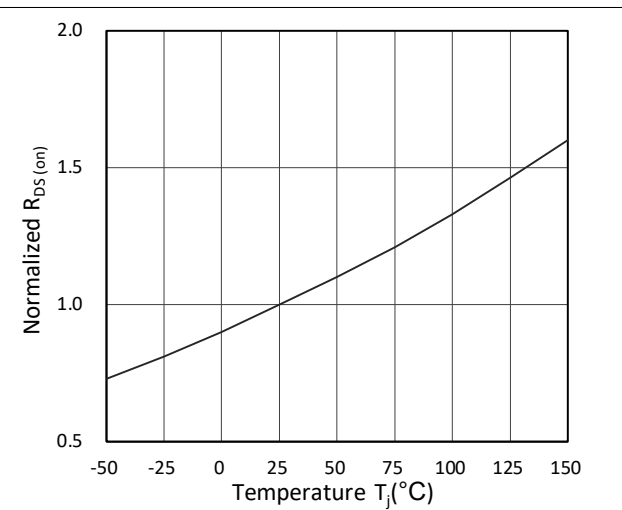


Figure 6. Normalized  $R_{DS(on)}$  vs. Temperature



TMN2012S

N-Channel Enhancement Mosfet

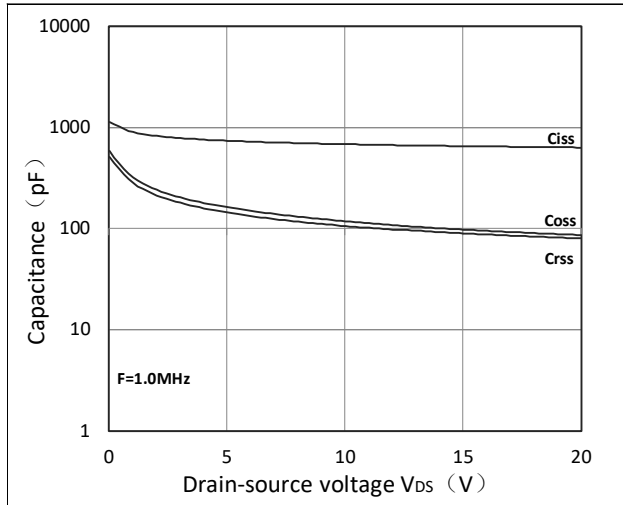


Figure 7. Capacitance Characteristics

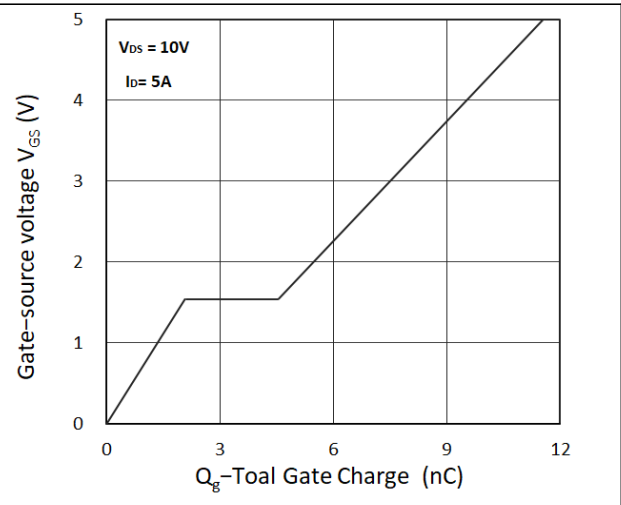
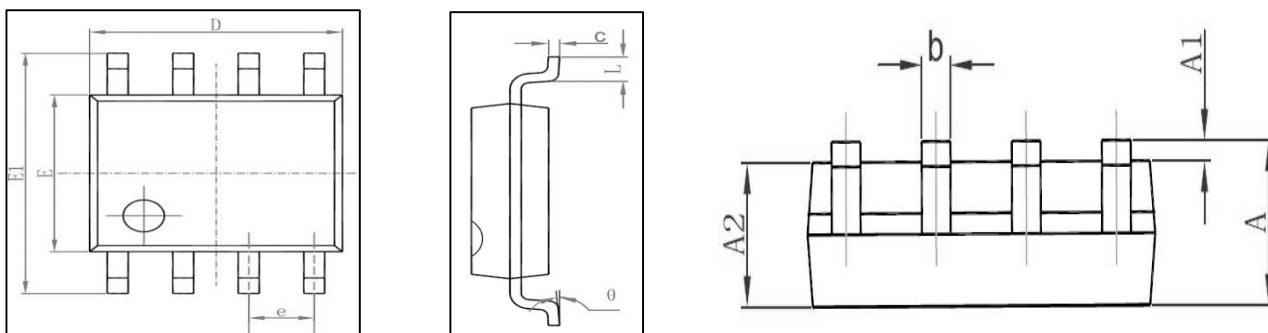
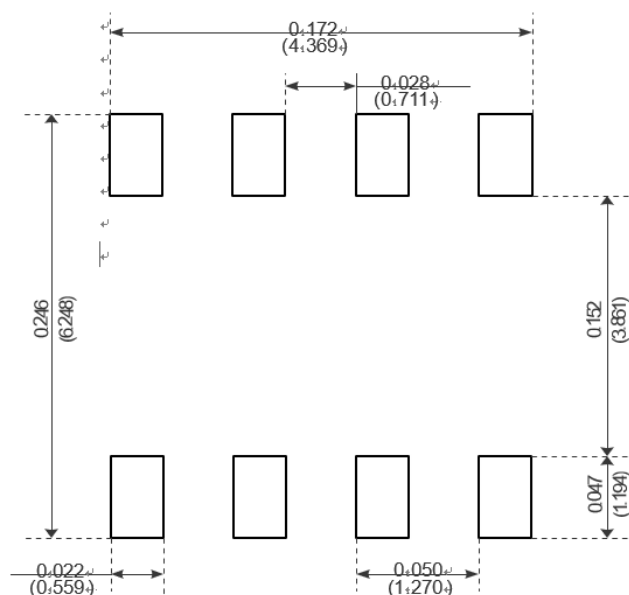


Figure 8. Gate Charge Characteristics

# Package Mechanical Data:SOP-8L



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270 (BSC)		0.050 (BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°



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