
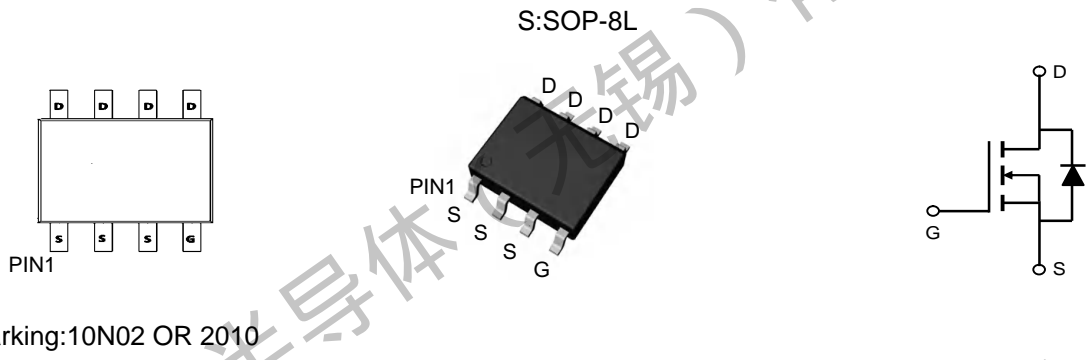


**TM10N02S**

**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} = 4.5V</math></p> <p>100% UIS Tested 100% <math>R_g</math> Tested</p> 
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**Absolute Maximum Ratings** ( $T_A = 25^\circ C$  Unless Otherwise Noted)

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	20	V
$V_{GS}$	Gate-Source Voltage	$\pm 12$	V
$I_D @ T_A = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 4.5V^1$	10	A
$I_D @ T_A = 100^\circ C$	Continuous Drain Current, $V_{GS} @ 4.5V^1$	6	A
$I_{DM}$	Pulsed Drain Current <sup>2</sup>	26	A
$P_D @ T_A = 25^\circ C$	Total Power Dissipation <sup>4</sup>	2.25	W
$T_{STG}$	Storage Temperature Range	-55 to 150	$^\circ C$
$T_J$	Operating Junction Temperature Range	-55 to 150	$^\circ C$

**Thermal Data**

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient <sup>1</sup>	---	80	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case <sup>1</sup>	---	25	$^\circ C/W$



# TM10N02S

## 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	0.5	0.7	0.9	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 inch<sup>2</sup> 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.



# TM10N02S

## N-Channel Enhancement Mosfet

### Typical Characteristics

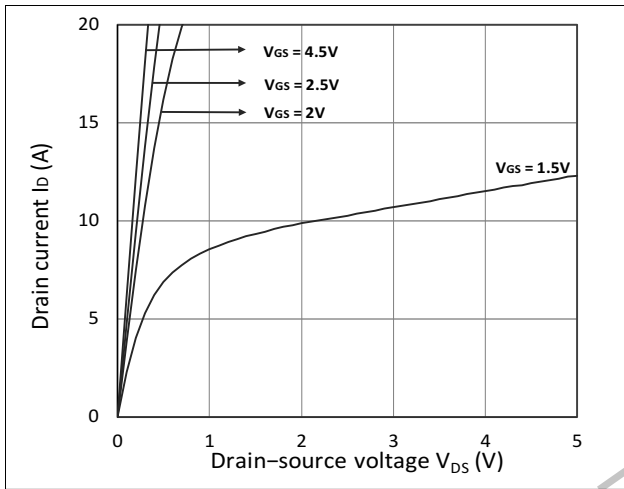


Figure 1. Output Characteristics

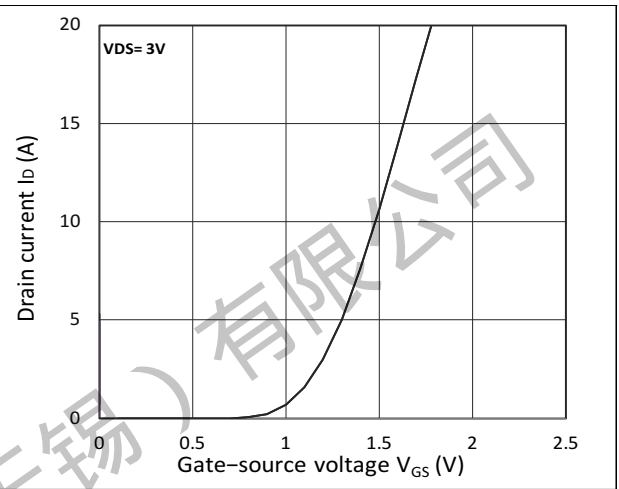


Figure 2. Transfer Characteristics

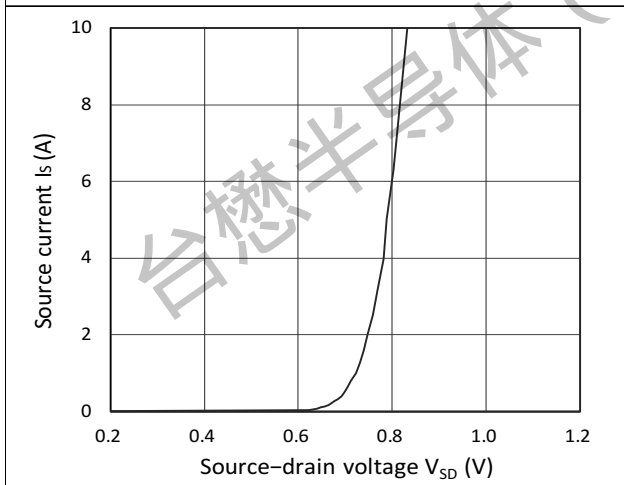


Figure 3. Forward Characteristics of Reverse

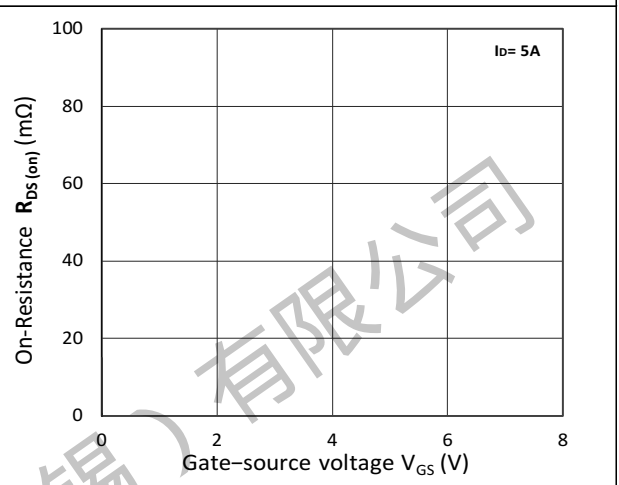


Figure 4.  $R_{DS(on)}$  vs.  $V_{GS}$

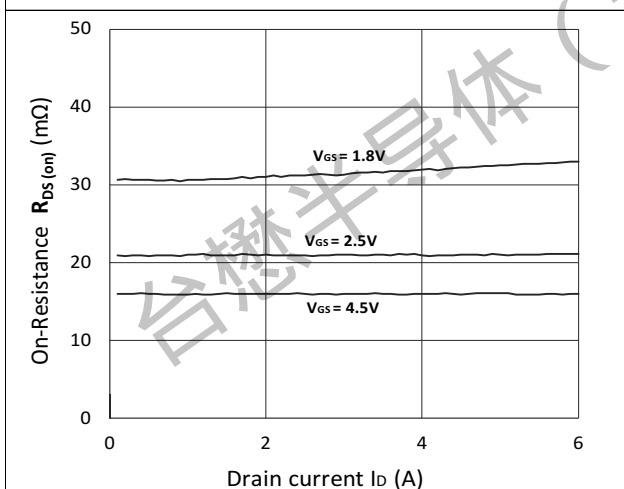


Figure 5.  $R_{DS(on)}$  vs.  $I_D$

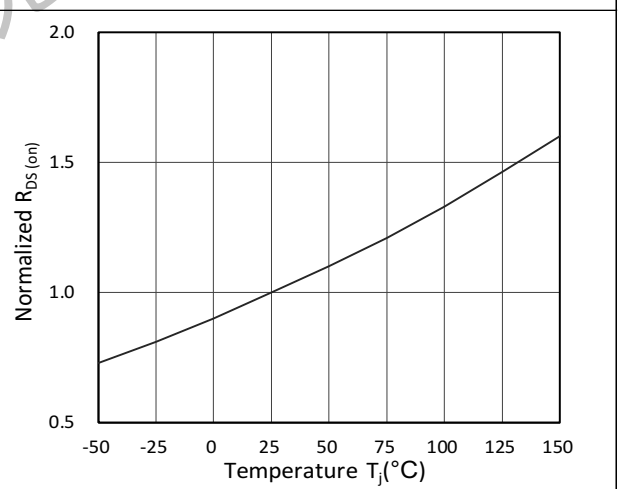


Figure 6. Normalized  $R_{DS(on)}$  vs. Temperature



# TM10N02S

## N-Channel Enhancement Mosfet

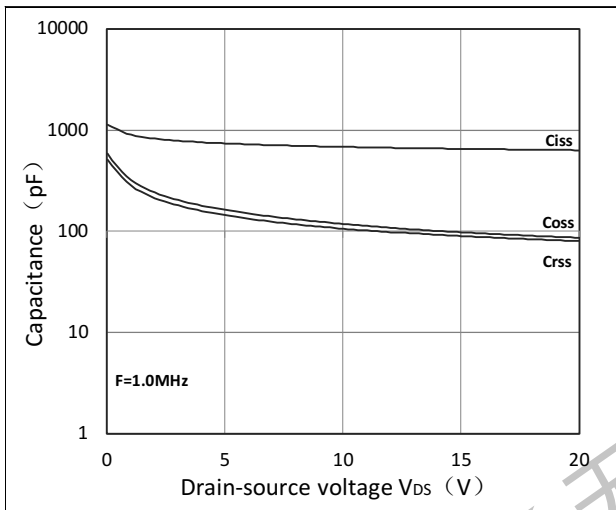


Figure 7. Capacitance Characteristics

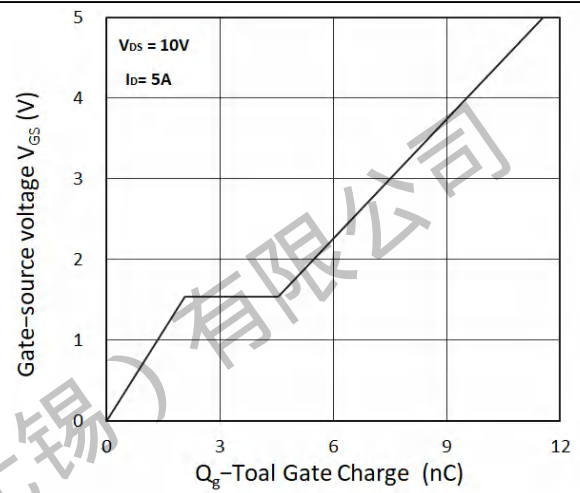
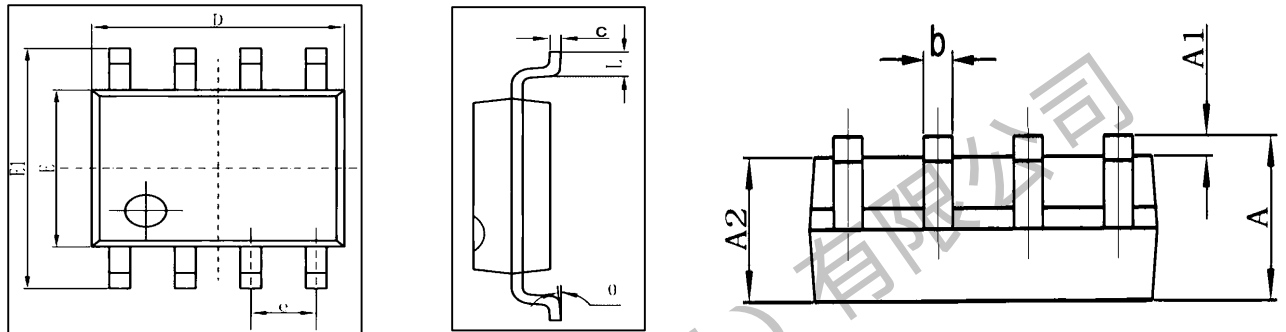


Figure 8. Gate Charge Characteristics

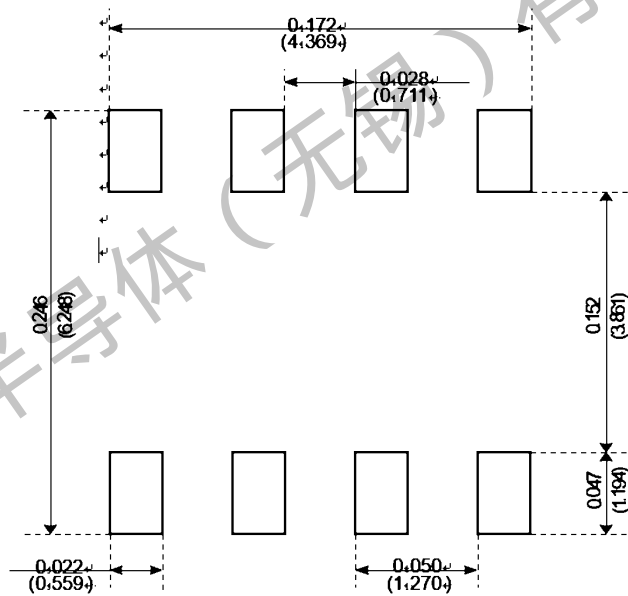
TM10N02S

N-Channel Enhancement Mosfet

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°

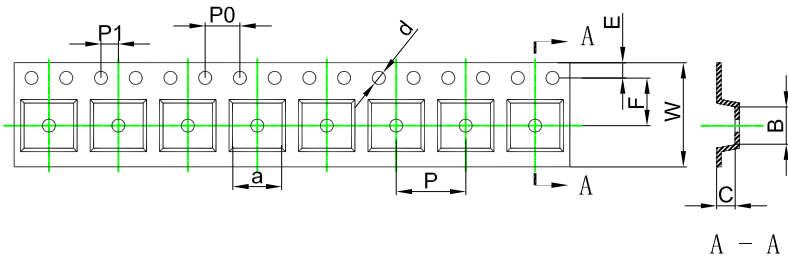


Recommended Minimum Pads

**TM10N02S**

**N-Channel Enhancement Mosfet**

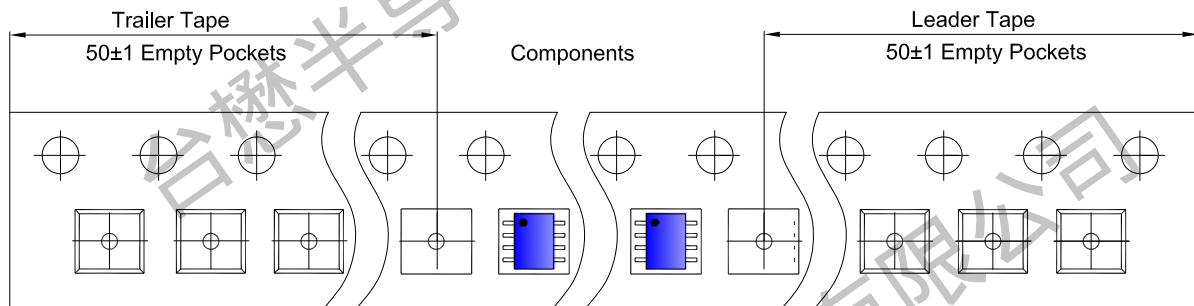
**SOP-8L Embossed Carrier Tape**



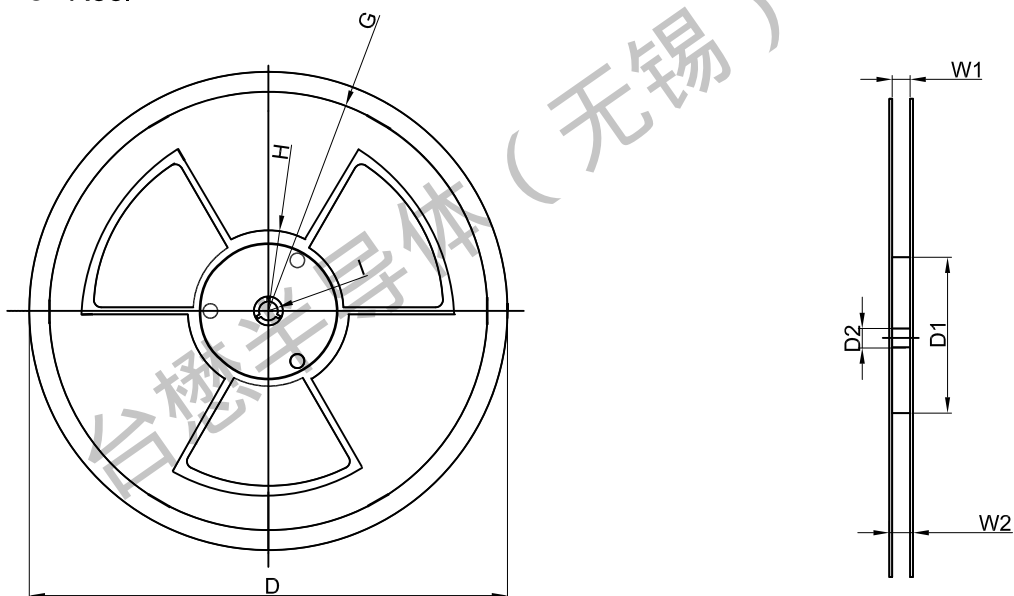
**Packaging Description:**  
SOP-8L parts are shipped in tape. The carrier tape is made from a dissipative (carbon filled) polycarbonate resin. The cover tape is a multilayer film (Heat Activated Adhesive in nature) primarily composed of polyester film, adhesive layer, sealant, and anti-static sprayed agent. These reeled parts in standard option are shipped with 2,500 units per 13" or 33cm diameter reel. The reels are clear in color and is made of polystyrene plastic (anti-static coated).  
**ALL DIM IN mm**

Dimensions are in millimeter										
Pkg type	a	B	C	d	E	F	P0	P	P1	W
SOP-8L	6.40	5.40	2.10	Ø1.50	1.75	5.50	4.00	8.00	2.00	12.00

**SOP-8L Tape Leader and Trailer**



**SOP-8L Reel**



Dimensions are in millimeter								
Reel Option	D	D1	D2	G	H	I	W1	W2
13"Dia	Ø330.00	100.00	13.00	R135.00	R55.00	R6.50	12.00	14.00

REEL	Reel Size	Box	Box Size(mm)	Carton	Carton Size(mm)	G.W.(kg)
3,000 pcs	13 inch	6,000 pcs	370×355×52	48,000 pcs	400×360×368	

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Revision history:

Date	Rev	Description	Page
2023.05.14	23.05	Original	