

TM07N10MSI

N-Channel Enhancement Mosfet

General Description

- Low $R_{DS(ON)}$
- RoHS and Halogen-Free Compliant

Applications

- Load switch
- PWM

General Features

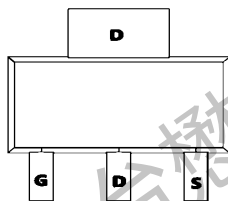
$V_{DS} = 100V$ $I_D = 7A$

$R_{DS(ON)} = 115m\Omega$ (typ.) @ $V_{GS} = 10V$

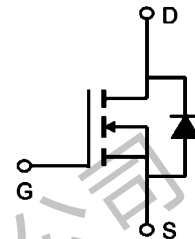
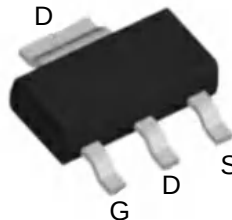
100% UIS Tested
100% R_g Tested



MSI:SOT-223-3L



Marking: 7N10



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	± 20	V
$I_D @ T_C = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	7	A
$I_D @ T_C = 100^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	5.5	A
I_{DM}	Pulsed Drain Current ²	44	A
P_D	Total Power Dissipation ³	2	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 ¹	---	62	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	---	6.6	$^\circ C/W$

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

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250 μA	100	---	---	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{GS} =0V, V _{DS} =60V	---	---	1	μA
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±20V, V _{DS} =0A	---	---	±100	nA
On Characteristics ³						
V _{GS(th)}	GATE-Source Threshold Voltage	V _{GS} =V _{DS} , I _D =250 μA	1.0	2.0	3.0	V
R _{DS(ON)}	Drain-Source On Resistance	V _{GS} =10V, I _D =5A	---	115	120	mΩ
		V _{GS} =4.5V, I _D =5A	---	---	---	
G _{FS}	Forward Transconductance	V _{DS} =5V, I _D =5A	11	---	---	S
Dynamic Characteristics ⁴						
C _{iss}	Input Capacitance	V _{DS} =30V, V _{GS} =0V, f=1MHz	---	979	---	pF
C _{oss}	Output Capacitance		---	120	---	
C _{rss}	Reverse Transfer Capacitance		---	100	---	
Switching Characteristics ⁴						
t _{d(on)}	Turn-On Delay Time	V _{DD} =30V, R _L =6.7Ω V _{GS} =10V, R _G =3Ω	---	5.2	---	ns
t _r	Rise Time		---	3	---	ns
t _{d(off)}	Turn-Off Delay Time		---	17	---	ns
t _f	Fall Time		---	2.5	---	ns
Q _g	Total Gate Charge	V _{GS} =10V, V _{DS} =30V, I _D =5A	---	22	---	nC
Q _{gs}	Gate-Source Charge		---	3.3	---	nC
Q _{gd}	Gate-Drain “Miller” Charge		---	5.2	---	nC
Drain-Source Diode Characteristics						
V _{SD}	Source-Drain Diode Forward Voltage ³	V _{GS} =0V, I _S =5A	---	---	1.2	V

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production
5. EAS condition: $T_j=25^\circ\text{C}$, $V_{DD}=30V, V_G=10V, L=0.5mH, R_g=25\Omega$.



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Typical Characteristics

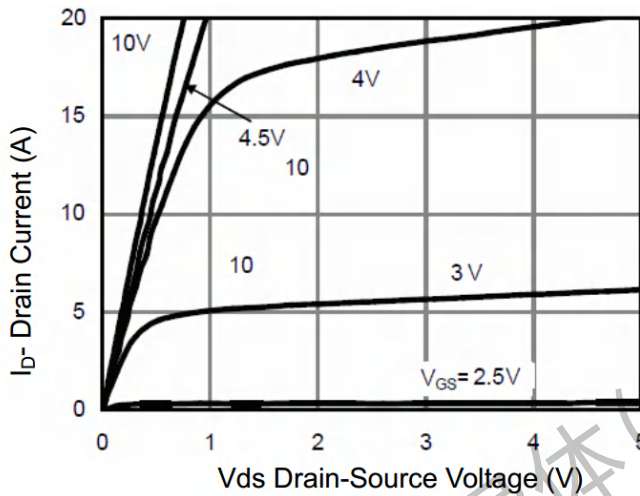


Figure 1 Output Characteristics

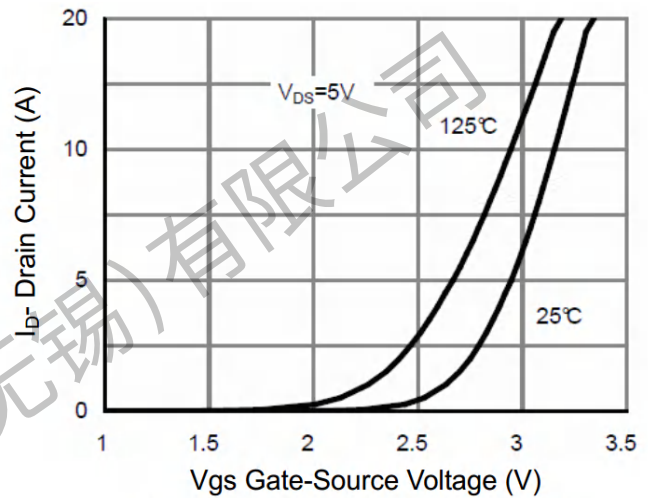


Figure 2 Transfer Characteristics

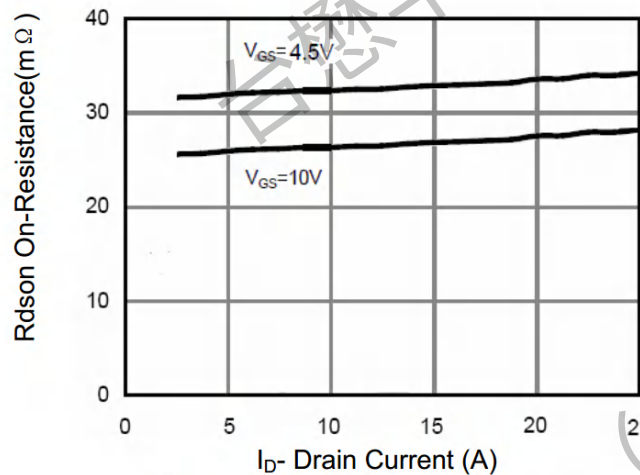


Figure 3 $R_{DS(on)}$ - Drain Current

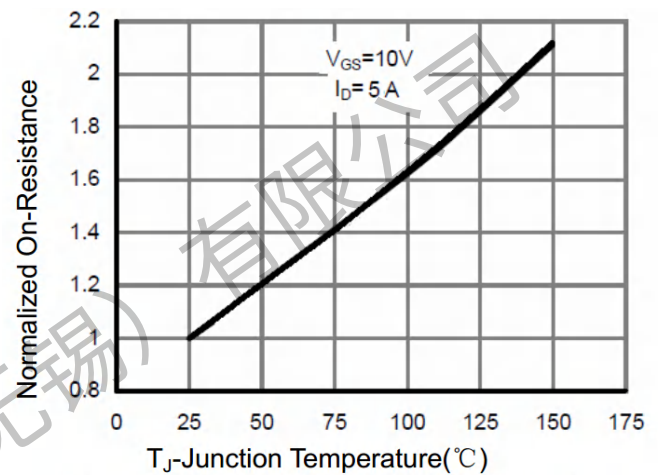


Figure 4 $R_{DS(on)}$ -Junction Temperature

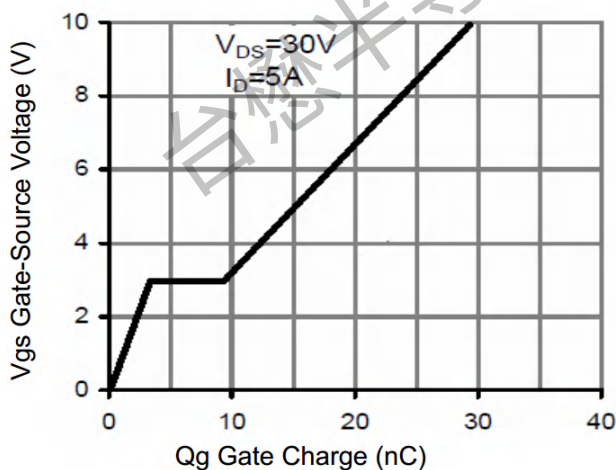


Figure 5 Gate Charge

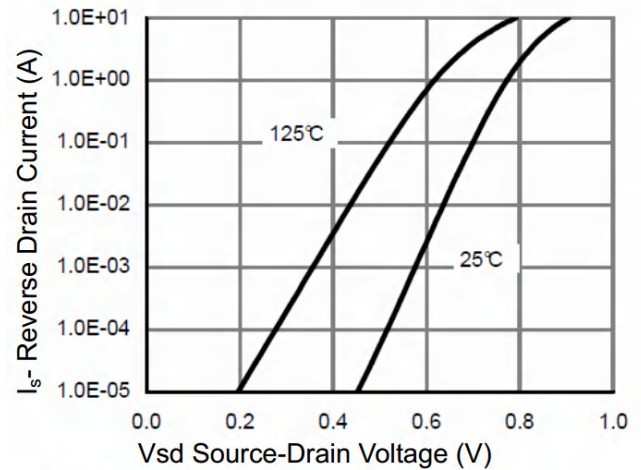


Figure 6 Source- Drain Diode Forward

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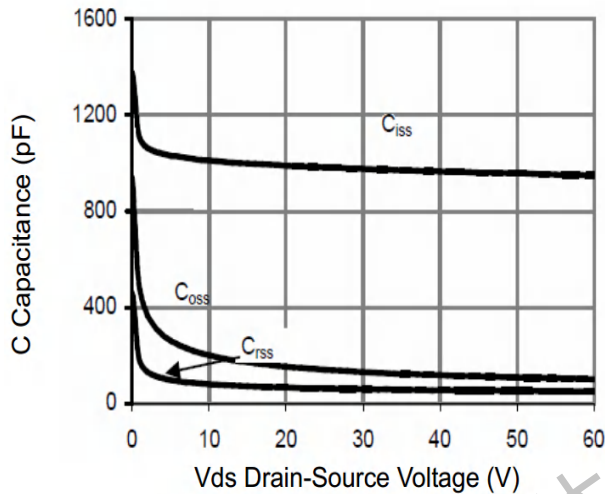


Figure 7 Capacitance vs Vds

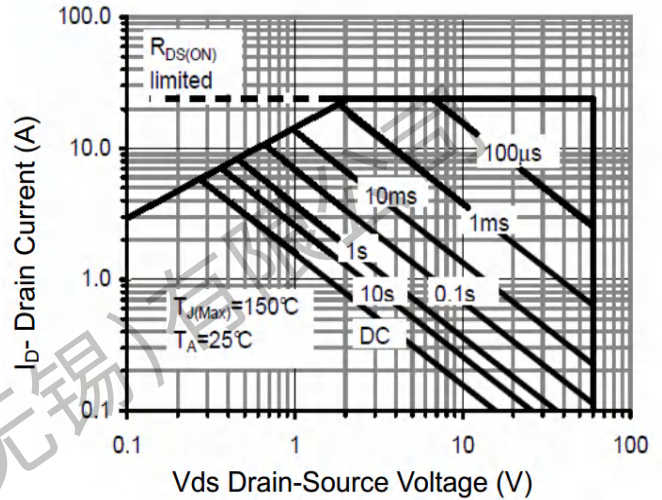


Figure 8 Safe Operation Area

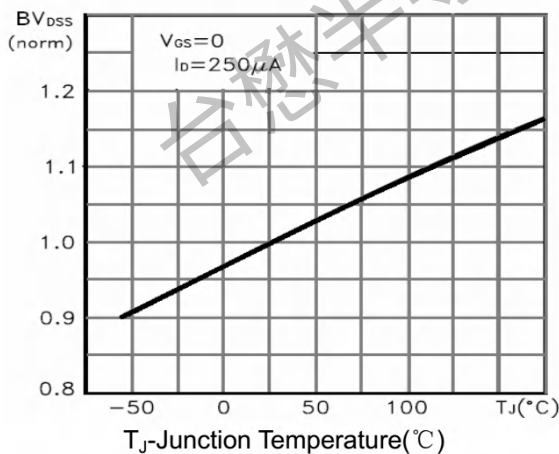


Figure 9 BV_{DSS} vs Junction Temperature

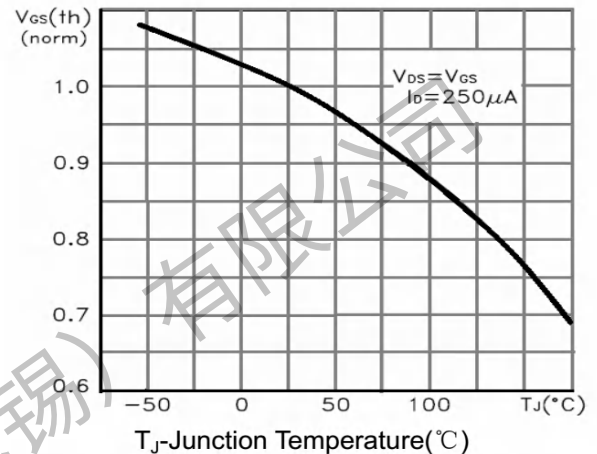


Figure 10 $V_{GS(th)}$ vs Junction Temperature

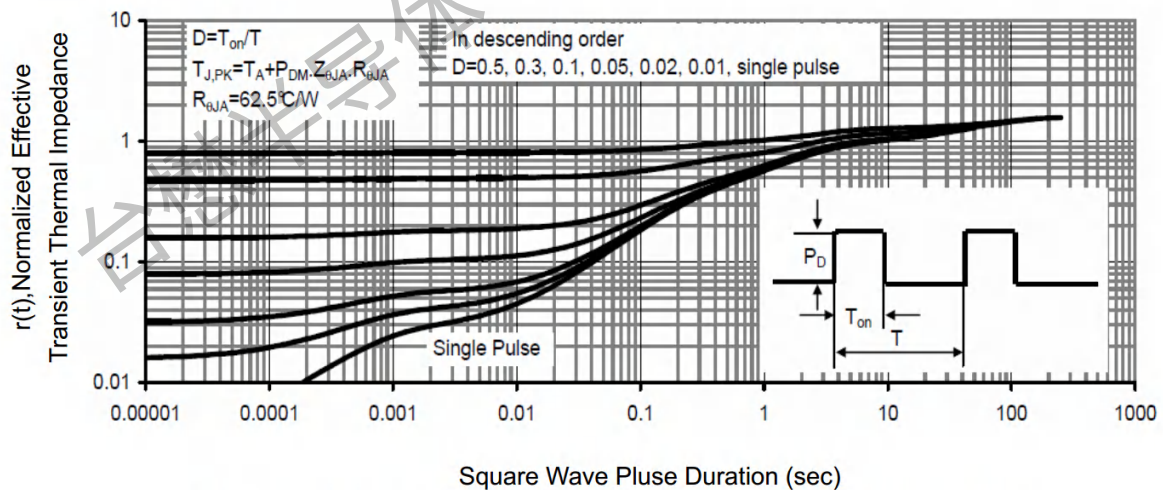
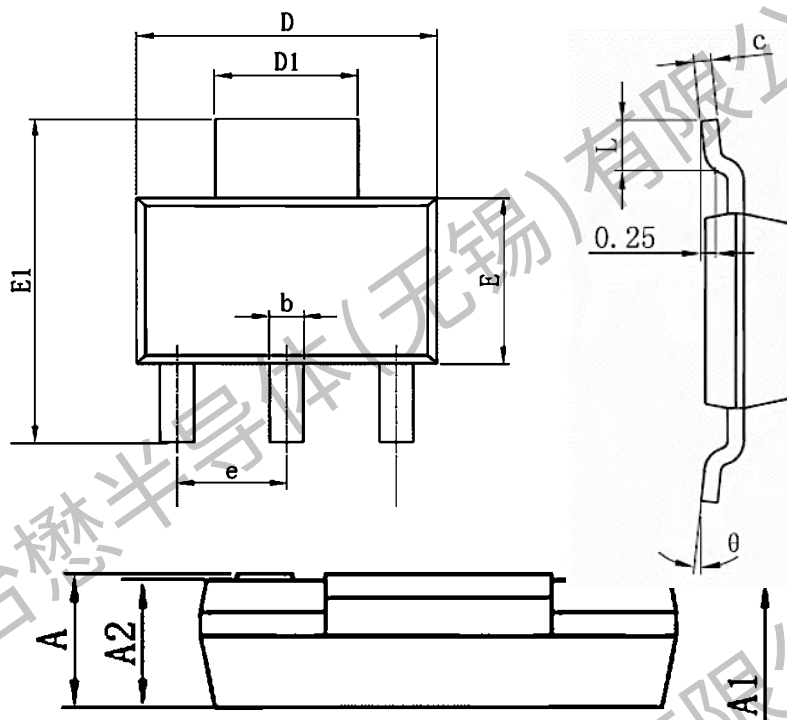


Figure 11 Normalized Maximum Transient Thermal Impedance

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Package Mechanical Data:SOT-223-3L

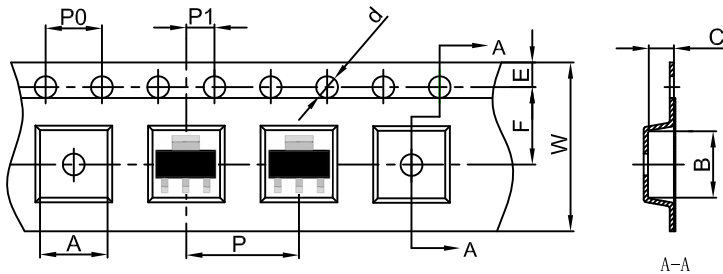


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.52	1.8	0.06	0.049
A1	0.000	0.100	0.000	0.004
A2	1.5	1.7	0.059	0.045
b	0.66	0.82	0.026	0.032
c	0.25	0.35	0.010	0.014
D	6.2	6.4	0.244	0.252
D1	2.9	3.1	0.114	0.122
E	3.3	3.7	0.130	0.146
E1	6.83	7.07	0.269	0.278
e	2.300(BSC)		0.037(BSC)	
e1	4.500	4.700	0.177	0.185
L	0.900	1.15	0.035	0.045
θ	0°	10°	0°	10°

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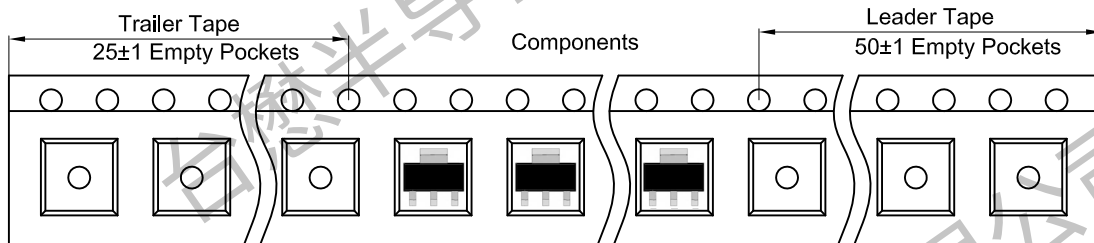
SOT-223-3L Embossed Carrier Tape



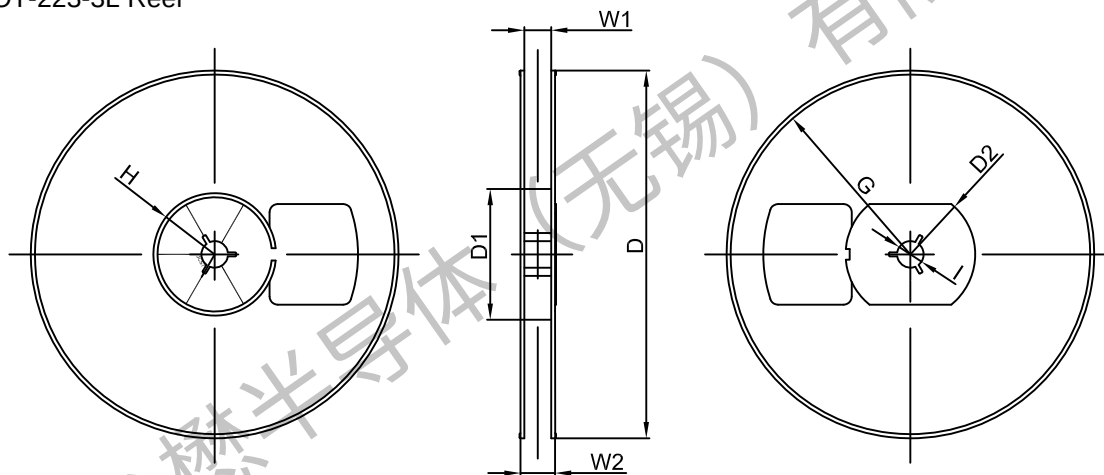
ALL DIM IN mm

Dimensions are in millimeter										
Pkg type	A	B	C	d	E	F	P0	P	P1	W
SOT-223-3L	4.85	4.45	1.85	Ø1.50	1.75	5.50	4.00	8.00	2.00	12.00

SOT-223-3L Tape Leader and Trailer



SOT-223-3L Reel



Dimensions are in millimeter								
Reel Option	D	D1	D2	G	H	I	W1	W2
7"Dia	Ø180.00	60.00	R32.00	R86.50	R30.00	Ø13.00	13.20	16.50

REEL	Box	Box Size(mm)	Carton	Carton Size(mm)
2500pcs	5000pcs	205×195×220	25000pcs	430×415×240
4000pcs	8000pcs	205×195×220	40000pcs	430×415×240

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Revision history:

Date	Rev	Description	Page
2023.04.10	23.04	Original	