TM50N06Y

N -Channel Enhancement Mosfet

General Description

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

Applications

- Load switch
- PWM

General Features

V_{DS} = 60V I_D =50A

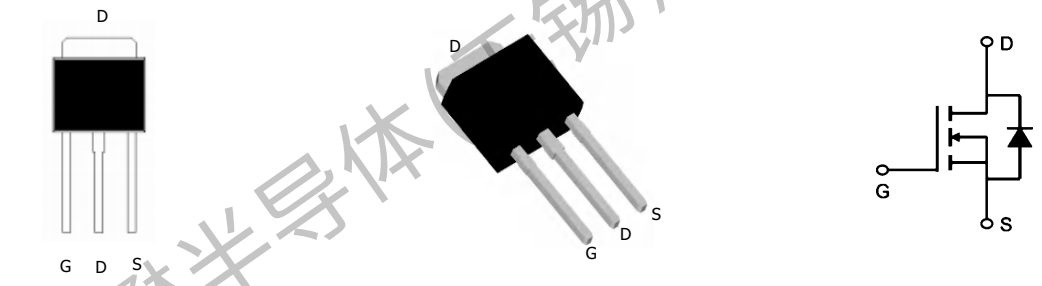
$R_{DS(ON)}$=12 mΩ (typ.)@ V_{GS}=10V

100% UIS Tested

100% R_g Tested

Green Product

Y:TO-251-3L



Marking: 50N06

Absolute Maximum Ratings (T_C=25℃ unless otherwise noted)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	60	V
V_{GS}	Gate-Source Voltage	±20	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ 10V[1]	50	A
I_D@T_C=100℃	Continuous Drain Current, V_{GS} @ 10V[1]	32	A
I_{DM}	Pulsed Drain Current[2]	185	A
EAS	Single Pulse Avalanche Energy[3]	98	mJ
I_{AS}	Avalanche Current	30	A
P_D	Total Power Dissipation[4]	62.5	W
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient [1]	---	62	℃/W
$R_{\theta JC}$	Thermal Resistance Junction-Case[1]	---	3.6	℃/W

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Electrical Characteristics (T_C=25℃ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain-Sourtce Breakdown Voltage	V_{GS}=0V,I_D=250μA	60	---	---	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						
$V_{GS(th)}$	GATE-Source Threshold Voltage	V_{GS}=V_{DS}, I_D=250μA	1.0	2.0	3.0	V
$R_{DS(ON)}$	Drain-Source On Resistance	V_{GS}=10V,I_D=20A	---	12	17	mΩ
		V_{GS}=4.5V,I_D=20A	---	16	23	mΩ
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS}=30V, V_{GS}=0V, f=1MHz	---	1798	---	pF
C_{oss}	Output Capacitance		---	112	--	
C_{rss}	Reverse Transfer Capacitance		---	91	---	
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{DS}=30V, I_D=20A, R_{ENG}=3Ω,V_{GS}=10V	---	12	---	ns
t_r	Rise Time		---	24	---	ns
$t_{d(off)}$	Turn-Off Delay Time		---	59	---	ns
t_f	Fall Time		---	8	---	ns
Q_{gs}	Total Gate Charge	V_{GS}=10V, V_{DS}=30V, I_D=20A	---	39	---	nc
Q_{gd}	Gate-Source Charge		---	7.7	---	nc
Q_g	Gate-Drain “Miller” Charge		---	8.2	---	nc
Drain-Source Diode Characteristics						
V_{SD}	Diode Forward Voltage	V_{GS}=0V, I_{SD}=20A	---	---	1.2	V
I_S	Continuous Drain Curren	VD=VG=0V	---	---	50	A
I_{SM}	Pulsed Drain Current		---	---	185	A
Trr	Reverse Recovery Time[3]	I_F=20A,T_J=25℃	---	29	---	ns
Qrr	Reverse Recovery Charge	dI/dt=100A/us	---	21	---	nc

Notes:
1.L=0.5mH, V_{DD}=30V, Start T_J=25℃.
2.Limited by maximum junction temperature.
3.Repetitive Rating: Pulse width limited by maximum junction temperature.

Typical Performance Characteristics

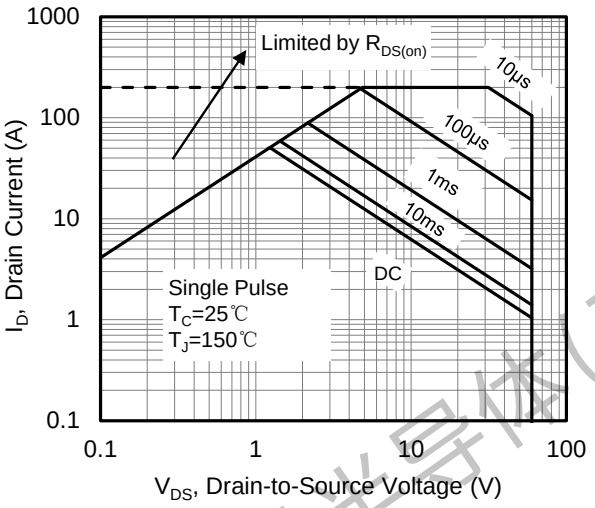


Figure 1. Maximum Safe Operating Area

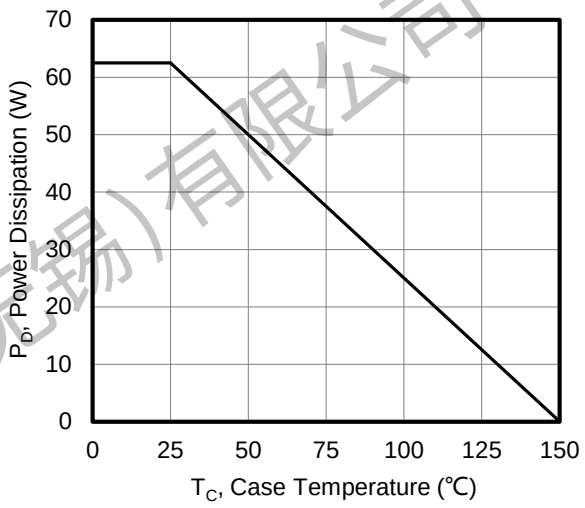


Figure 2. Maximum Power Dissipation vs Case Temperature

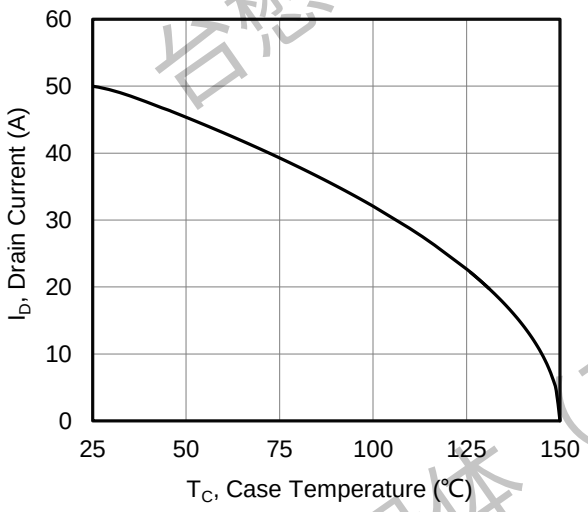


Figure 3. Maximum Continuous Drain Current vs Case Temperature

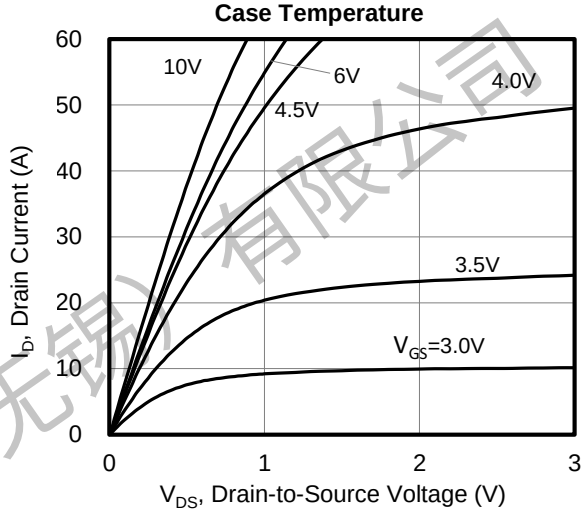
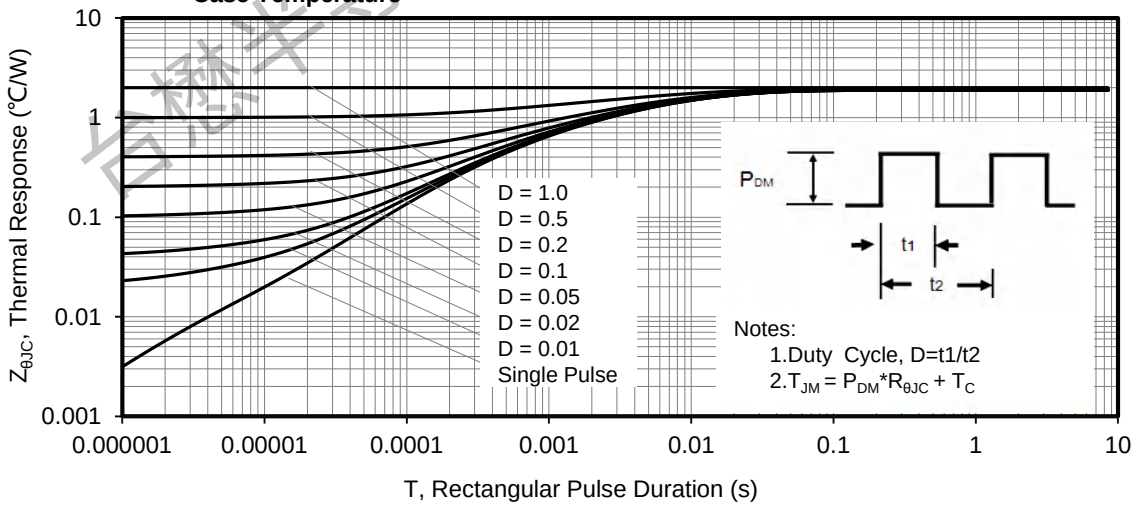


Figure 4. Typical output Characteristics



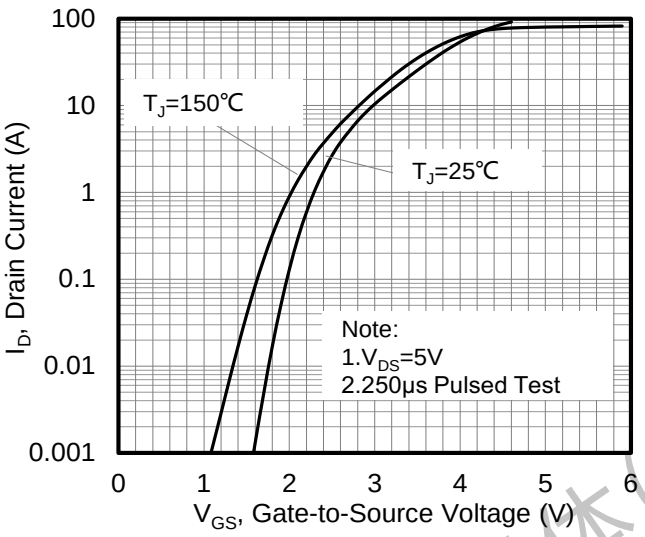


Figure 6. Typical Transfer Characteristics

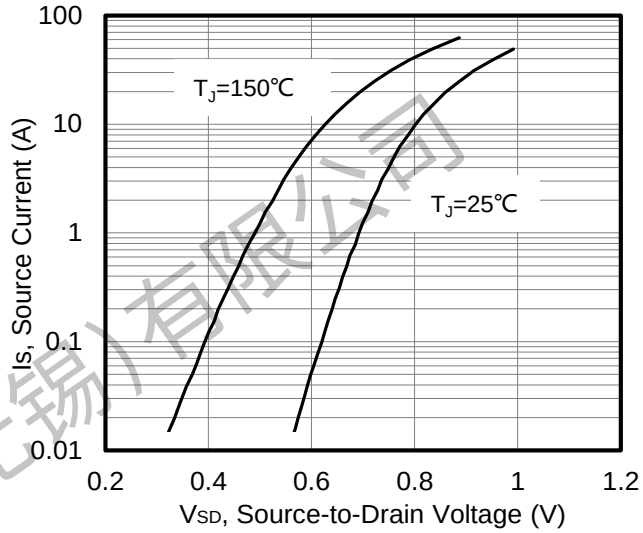


Figure 7. Typical Body Diode Transfer Characteristics

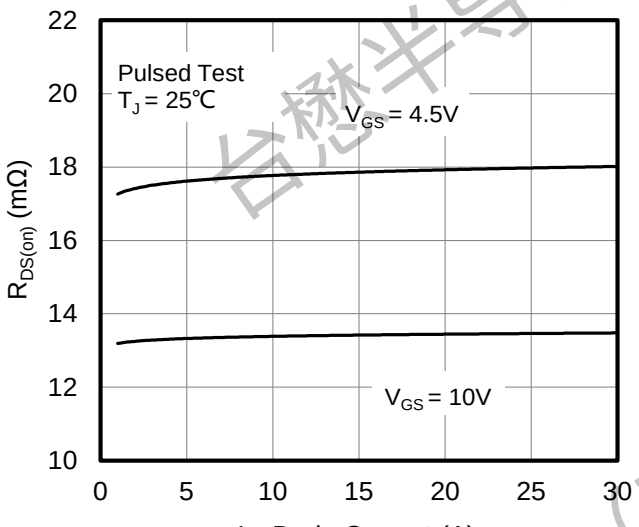


Figure 8. Drain-to-Source On Resistance vs Drain Current

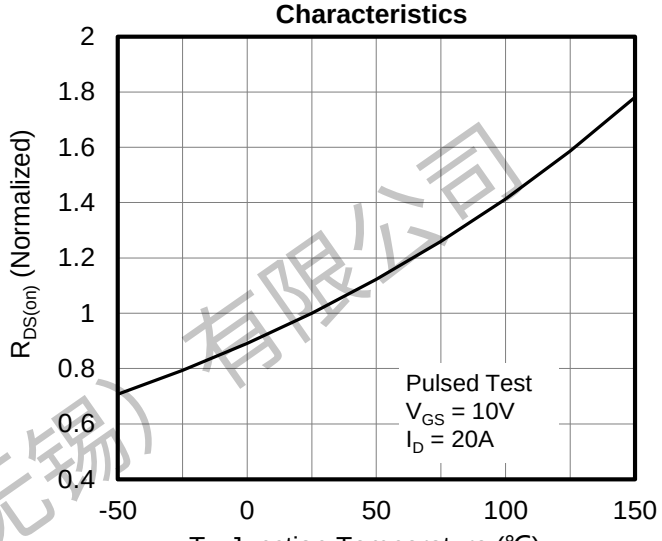


Figure 9. Normalized On Resistance vs Junction Temperature

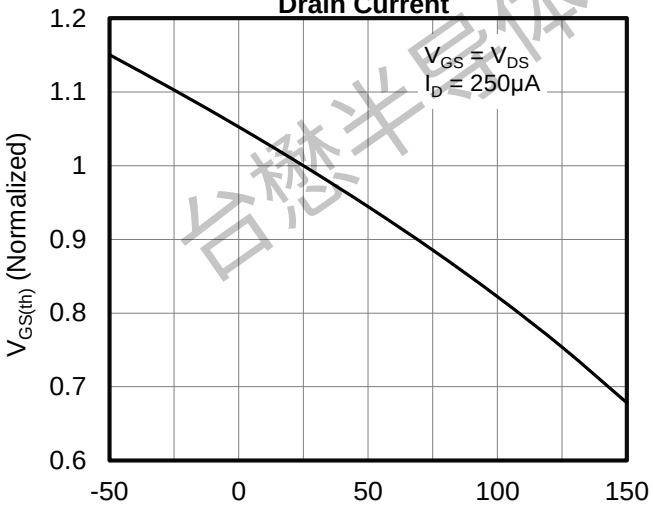


Figure 10. Normalized Threshold Voltage vs Junction Temperature

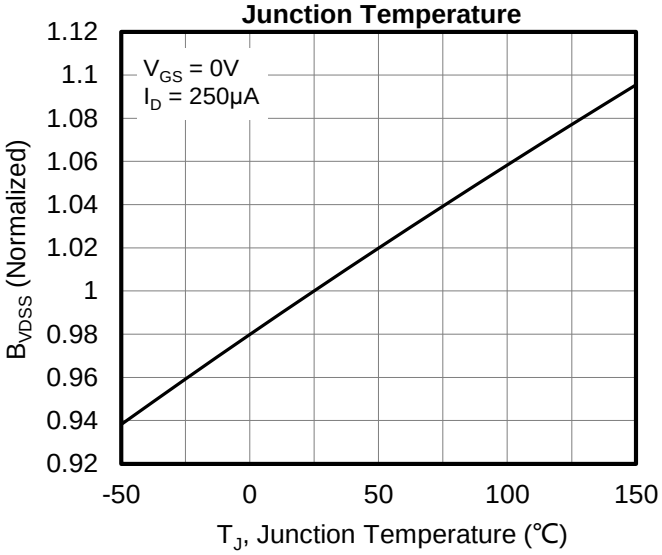


Figure 11. Normalized Breakdown Voltage vs Junction Temperature

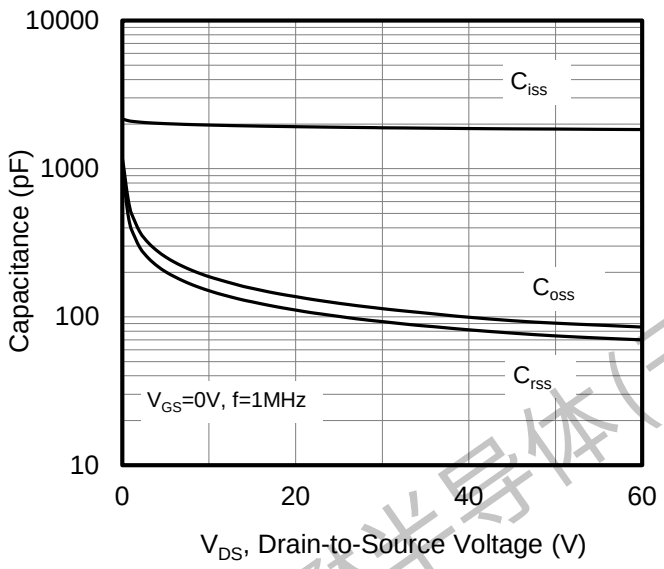


Figure 12. Capacitance Characteristics

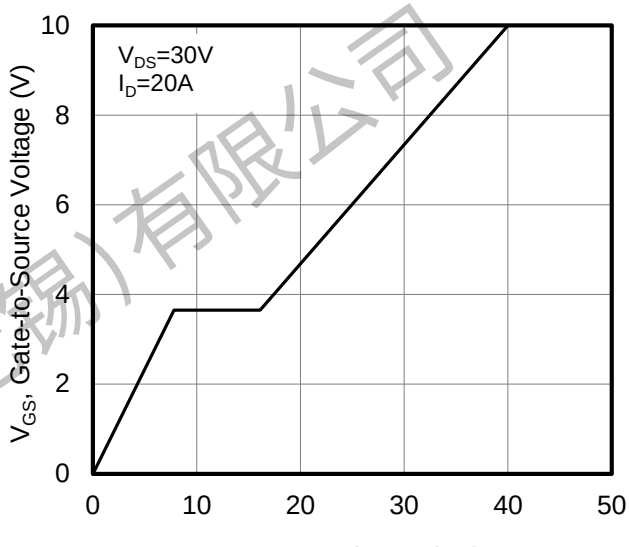
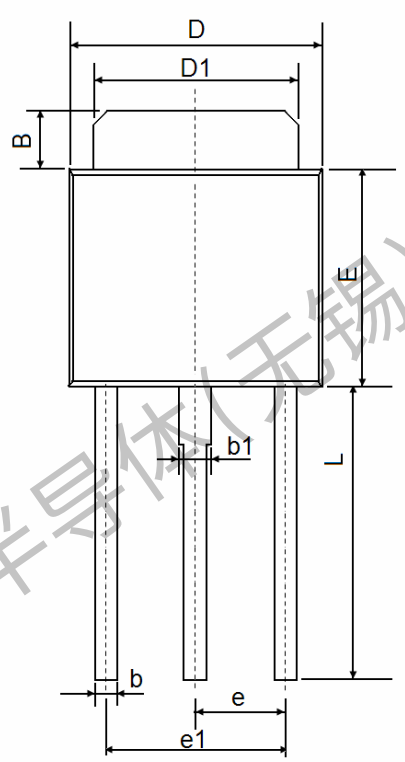
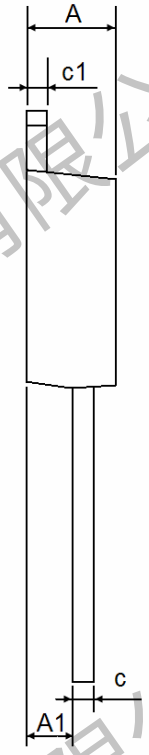


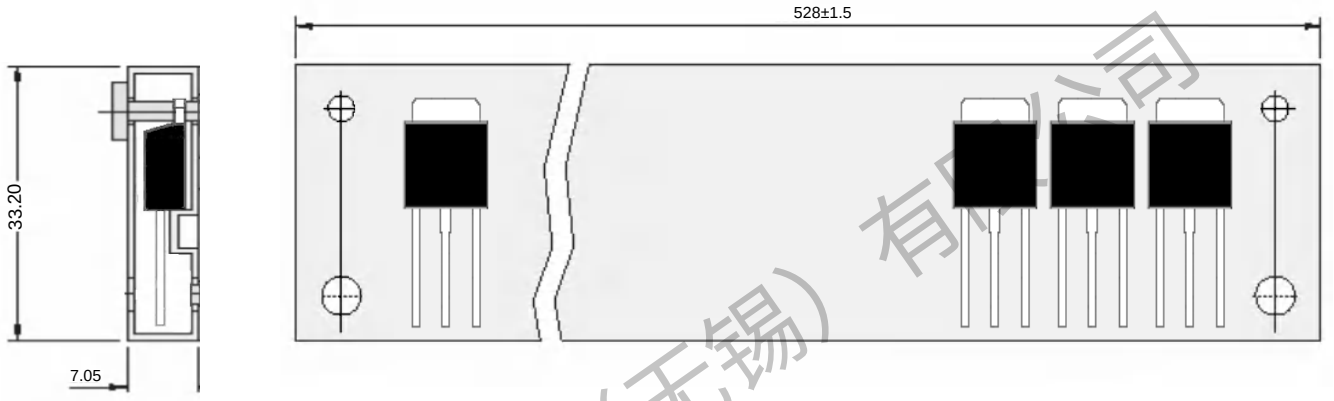
Figure 13. Typical Gate Charge vs Gate to Source Voltage

Package Mechanical Data: TO-251-3L





Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	1.050	1.350	0.042	0.054
B	1.000	1.150	0.053	0.065
b	0.500	0.700	0.020	0.028
b1	0.700	0.900	0.028	0.035
c	0.430	0.580	0.017	0.023
c1	0.430	0.580	0.017	0.023
D	6.350	6.650	0.250	0.262
D1	5.200	5.480	0.205	0.213
E	5.900	6.100	0.213	0.224
e	2.300 TYP.		0.091 TYP.	
e1	4.500	4.700	0.177	0.185
L	9.200	9.400	0.295	0.311

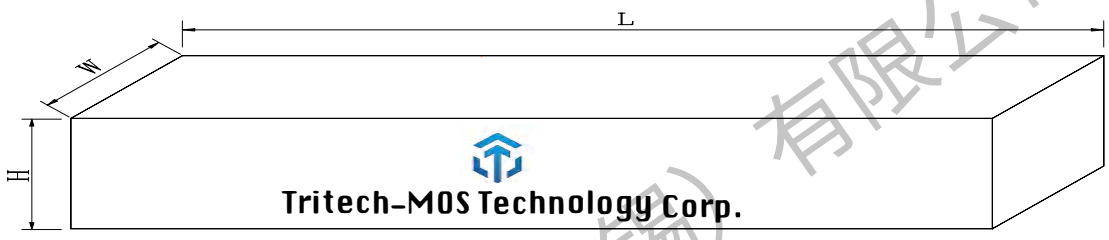


All Dimensions are in mm

1.TO-251-3L Packaging

Package	Packing Form	Quantity		
		Tube	Inner Box	Out box
TO-251-3L	Tube Tape	75	5	1

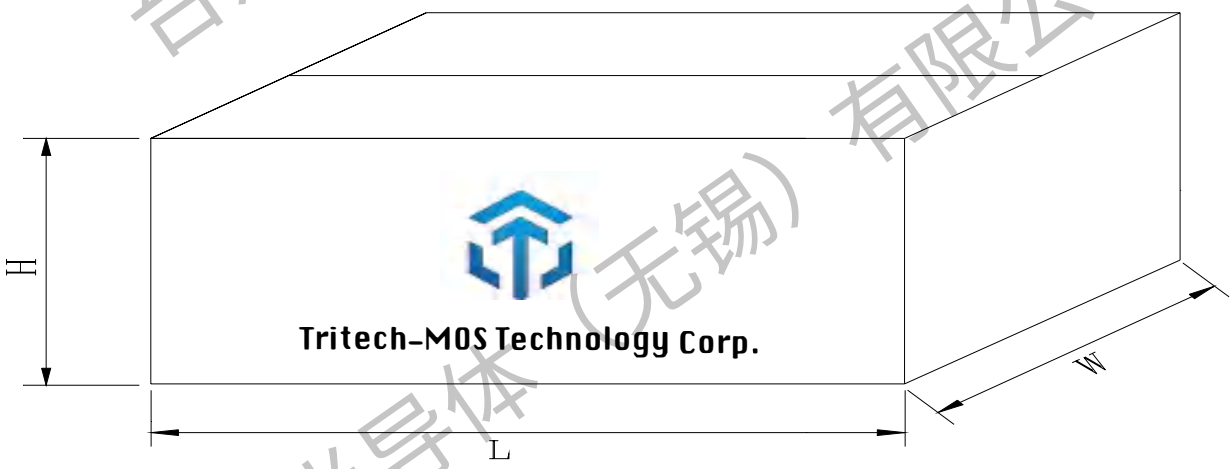
Inner Box



Dimension : 580 (L)×154(W) ×49(H) mm

Quantity : 75 × 56Ea = 4200pcs

Outer Box



Dimension : 595(L)×285(W) ×185(H) mm

Quantity : 4200 × 5Ea = 21000pcs

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Revision history:

Date	Rev	Description	Page
2023.06.14	23.06	Original	