TM50N06F

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

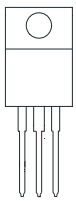
$R_{DS(ON)}$ =14mΩ(typ.)@ V_{GS}=10V

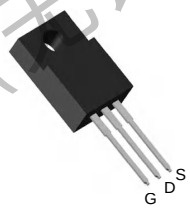
100% UIS Tested

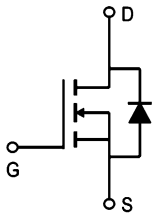
100% R_g Tested

Green Product

F:TO-220F







Marking: 50N06 OR 018

Absolute Maximum Ratings (T_C = 25°C 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°C	Continuous Drain Curren	50	A
I_D@T_C=100°C	Continuous Drain Current-T_C=100°C	35.4	A
I_{DM}	Pulsed Drain Current	90	A
EAS	Single Pulse Avalanche Energy (Note 5)	245	mJ
P_D	Total Power Dissipation	85	W
T_{STG}	Storage Temperature Range	-55 to 175	°C
T_J	Operating Junction Temperature Range	-55 to 175	°C

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient	---	62	°C/W
$R_{\theta JC}$	Thermal Resistance Junction-Case	---	1.4	°C/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 (Note3)						
$V_{GS(th)}$	GATE-Source Threshold Voltage	V_{GS}=V_{DS}, I_D=250μA	1	2	3	V
$R_{DS(ON)}$	Drain-Source On Resistance	V_{GS}=10V,I_D=20A	---	14	18	mΩ
		V_{GS}=4.5V, I_D=10A	---	19	25	
G_{FS}	Forward Transconductance	V_{DS}=5V,I_D=20A	18	---	---	S
Dynamic Characteristics (Note 4)						
C_{iss}	Input Capacitance	V_{DS}=30V, V_{GS}=0V, f=1MHz	---	2000	---	pF
C_{oss}	Output Capacitance		---	150	--	
C_{rss}	Reverse Transfer Capacitance		---	110	---	
Switching Characteristics (Note 4)						
$t_{d(on)}$	Turn-On Delay Time	V_{DS}=30V, R_L=6.7Ω R_G=3Ω,V_{GS}=10V	---	7.2	---	ns
t_r	Rise Time		---	4.9	---	ns
$t_{d(off)}$	Turn-Off Delay Time		---	27.8	---	ns
t_f	Fall Time		---	5.2	---	ns
Q_g	Total Gate Charge	V_{GS}=10V, V_{DS}=30V, I_D=20A	---	48	---	nC
Q_{gs}	Gate-Source Charge		---	5	---	nC
Q_{gd}	Gate-Drain “Miller” Charge		---	13	---	nC
Drain-Source Diode Characteristics						
I_S	Continuous Drain Curren	VD=VG=0V	---	---	50	A
V_{SD}	Diode Forward Voltage (Note 3)	V_{GS}=0V, I_{SD}=20A	---	---	1.2	V
Trr	Reverse Recovery Time	I_F=20A,T_J=25℃ dI/dt=100A/us	---	28	---	NS
Qrr	Reverse Recovery Charge		---	40	---	NC

Notes:
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production
5. EAS condition : Tj=25℃,VDD=30V,VG=10V,L=0.5mH,Rg=25Ω

TM50N06F **N-Channel Enhancement Mosfet**

Typical Characteristics

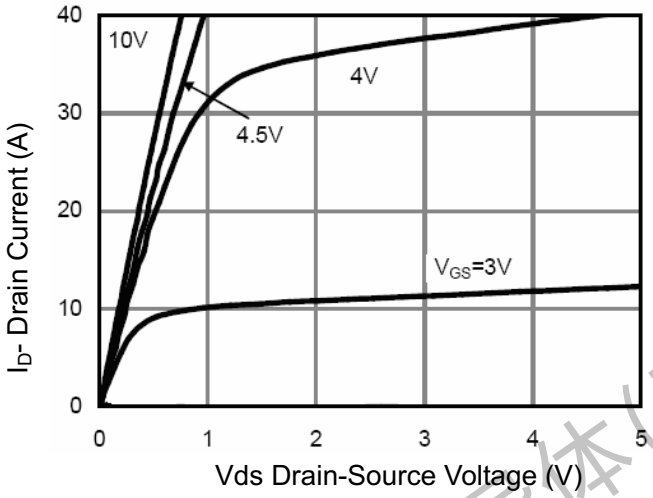

Figure 1 Output Characteristics

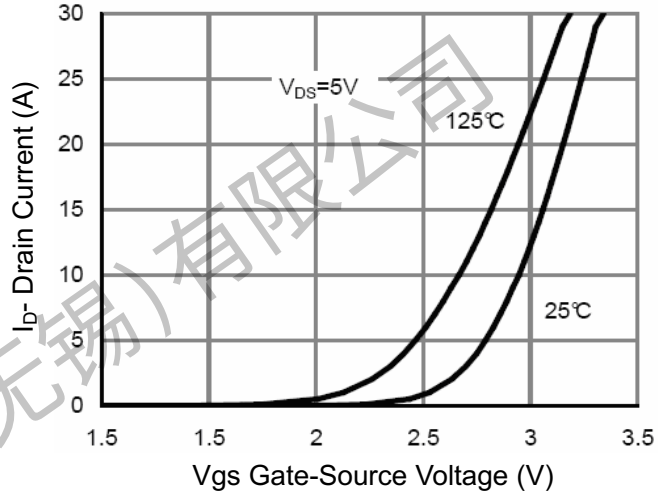

Figure 2 Transfer Characteristics

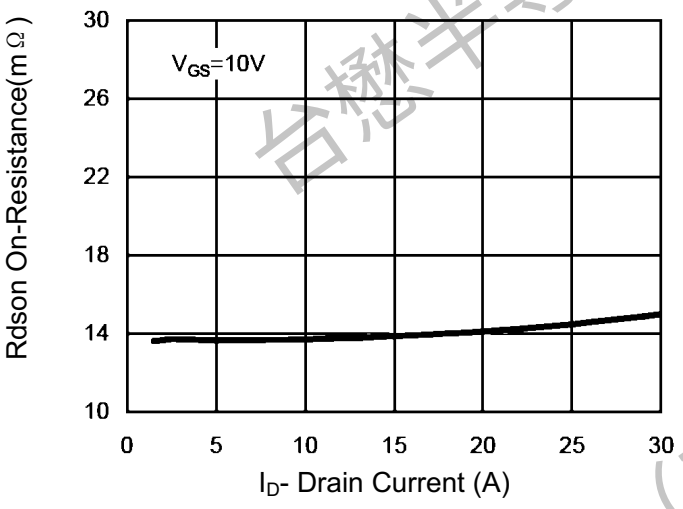

Figure 3 Rdson- Drain Current

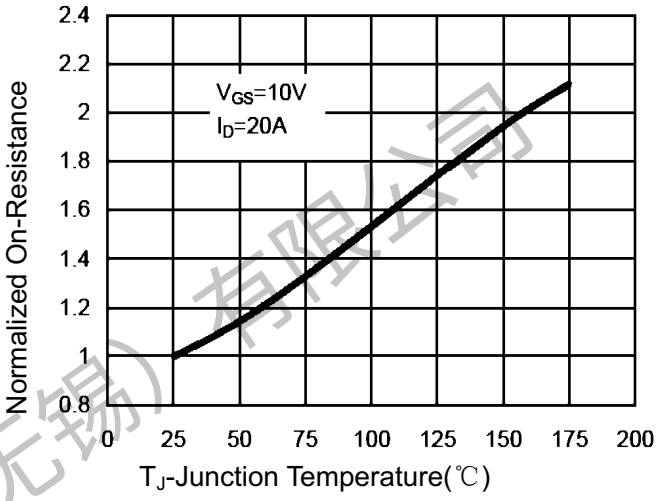

Figure 4 Rdson-Junction Temperature

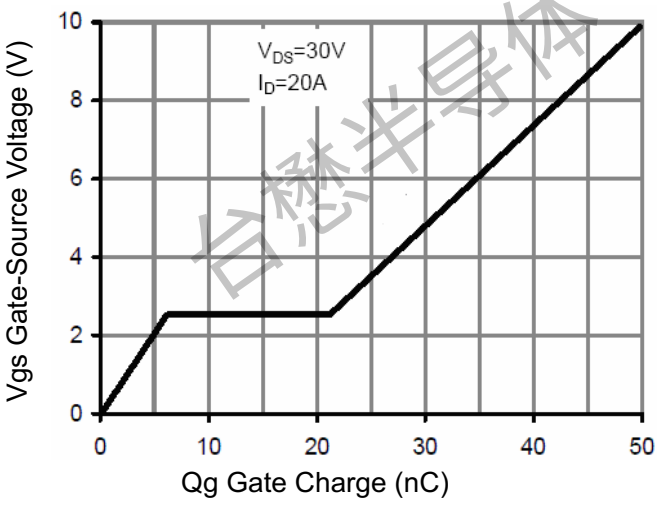

Figure 5 Gate Charge

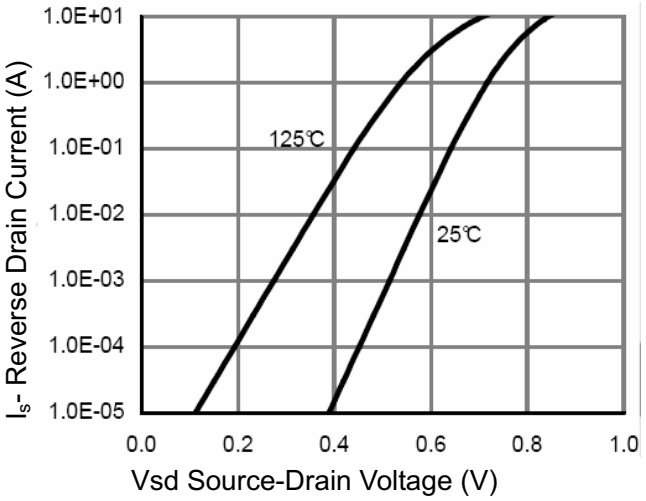

Figure 6 Source- Drain Diode Forward

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N-Channel Enhancement Mosfet

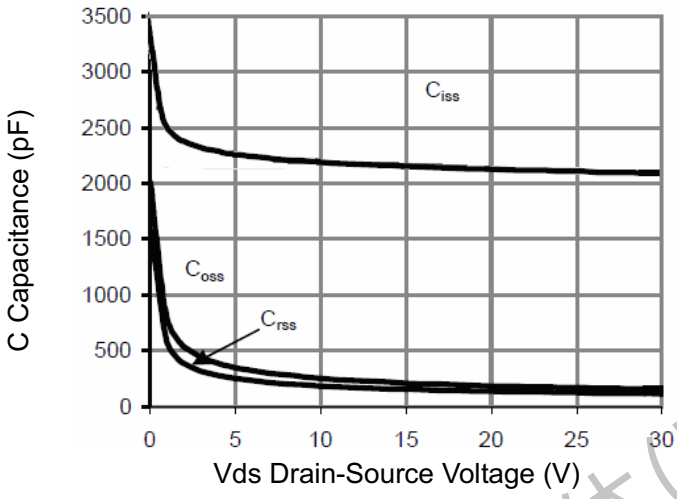


Figure 7 Capacitance vs Vds

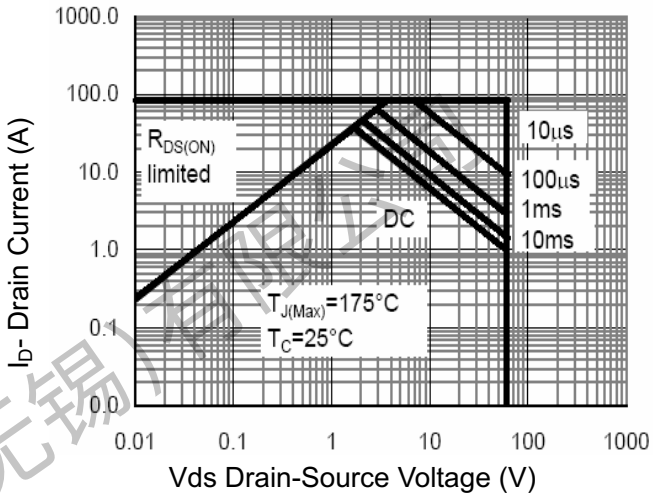


Figure 8 Safe Operation Area

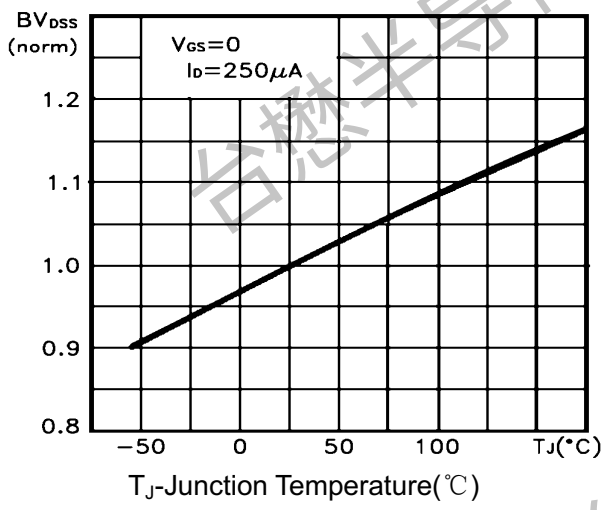


Figure 9 BV_{DSS} vs Junction Temperature

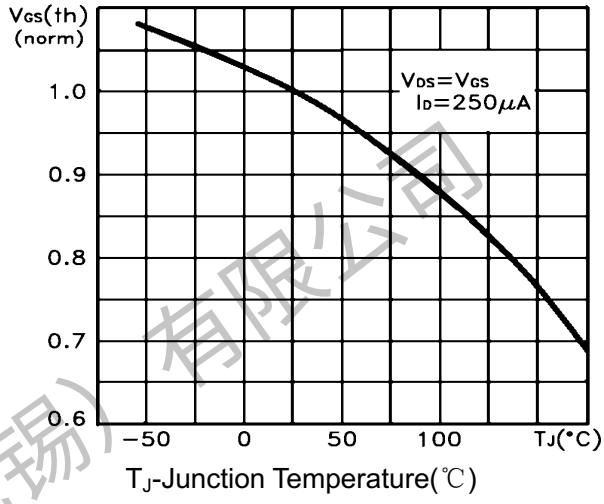


Figure 10 $V_{GS(th)}$ vs Junction Temperature

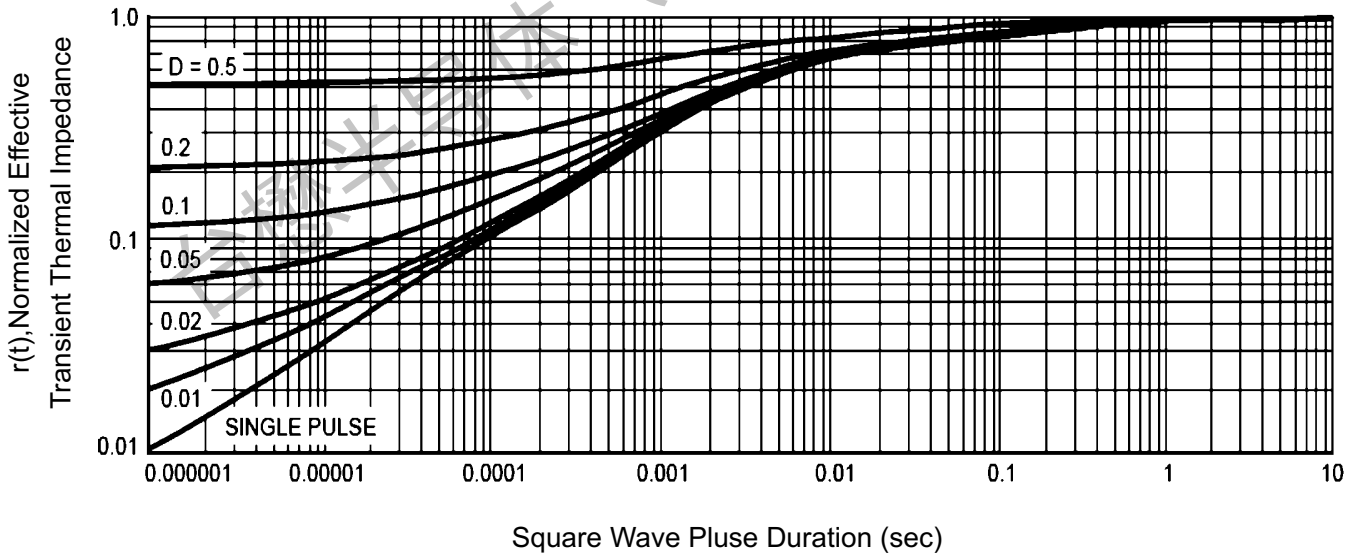
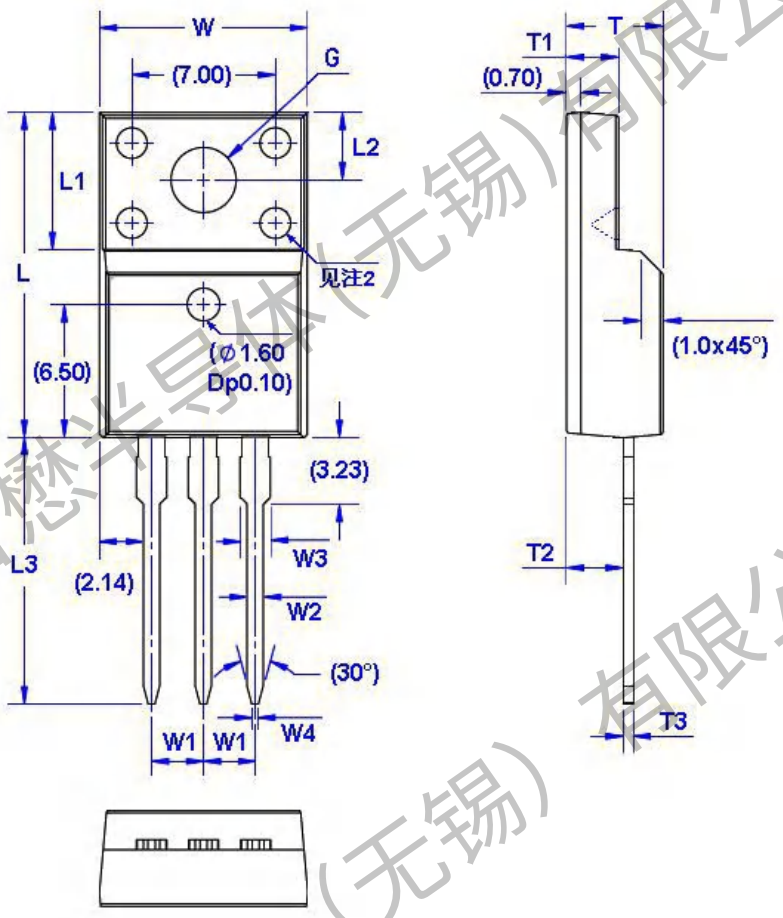
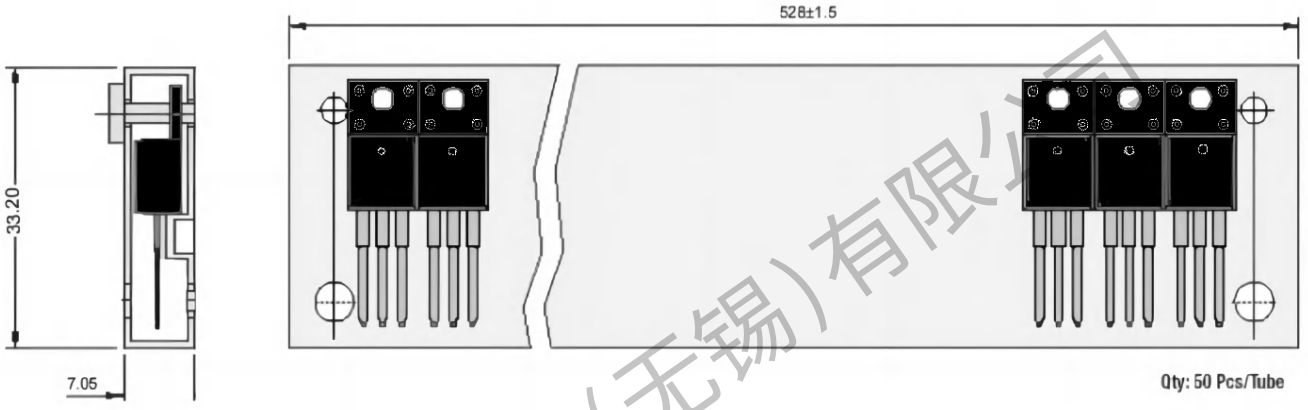


Figure 11 Normalized Maximum Transient Thermal Impedance

Package Mechanical Data: TO-220F



Symbol	Size		Symbol	Size		Symbol	Size		Symbol	Size	
	Min	Max		Min	Max		Min	Max		Min	Max
W	9.96	10.36	W4	0.25	0.45	L3	12.78	13.18	T3	0.45	0.60
W1	2.54 (TYP)		L	15.67	16.07	T	4.50	4.90	G(Φ)	3.08	3.28
W2	0.70	0.90	L1	6.48	6.88	T1	2.34	2.74			
W3	1.24	1.47	L2	3.20	3.40	T2	2.56	2.96			

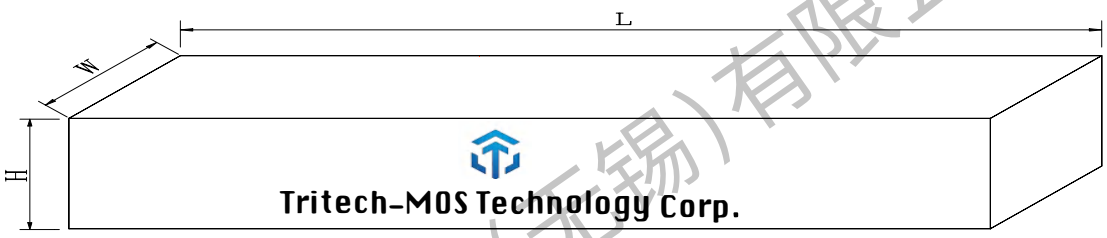


All Dimensions are in mm

1.TO-220F Packaging

Package	Packing Form	Quantity		
		Tube	Inner Box [kpcs]	Outbox [kpcs]
TO-220F	Tube Tape	50	5	1

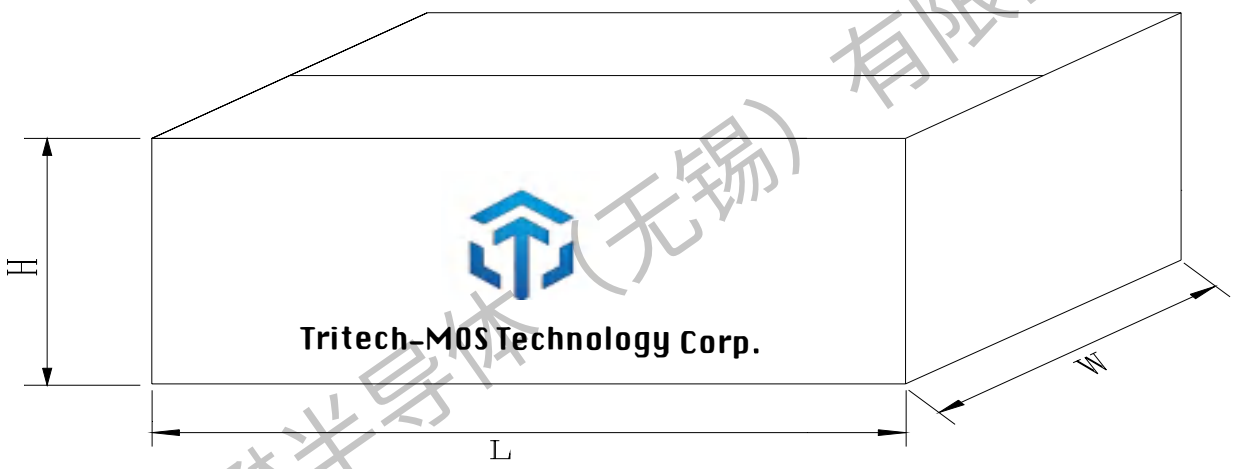
Inner Box



Dimension : 580 (L)×154(W) ×49(H) mm

Quantity : 50 ×20Ea = 1Kpcs

Outer Box



Dimension : 595(L)×285(W) ×185(H) mm

Quantity : 1K×5Ea = 5Kpcs

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Revision history:

Date	Rev	Description	Page
2023.06.06	23.06	Original	