TM50N06HP N-Channel Enhancement Mosfet

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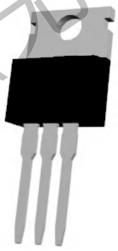
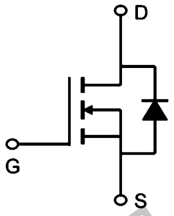
General Description	**General Features**
• Low R DS(ON) • RoHS and Halogen-Free Compliant **Applications** • Load switch • PWM	V_{DS} = 60V I_D =50A $R_{DS(ON)}$ =13mΩ(typ.)@ V_{GS}=10V 100% UIS Tested 100% R_g Tested Green Product

P:TO-220AB

Marking: 50N06





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

Symbol	Parameter	Ratings	Units
V_{DS}	Drain-Source Voltage	60	V
V_{GS}	Gate-Source Voltage	±20	V
I_D	Continuous Drain Curren	50	A
	Continuous Drain Current-T_C=100℃	35.4	
I_{DM}	Pulsed Drain Current	190	
P_D	Power Dissipation	85	W
E_{AS}	Single pulse avalanche energy (Note 5)	245	mJ
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55-+175	℃

Thermal Characteristics：

Symbol	Parameter	Max	Units
$R_{θJC}$	Thermal Resistance,Junction to Case (Note 2)	1.67	℃/W
$R_{θJA}$	Thermal Resistance,Junction to Ambient[1]	62	

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	2	3	4	V
$R_{DS(ON)}$	Drain-Source On Resistance	V_{GS}=10V,I_D=20A	---	13	18	mΩ
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	---	1900	---	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

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Typical Characteristics

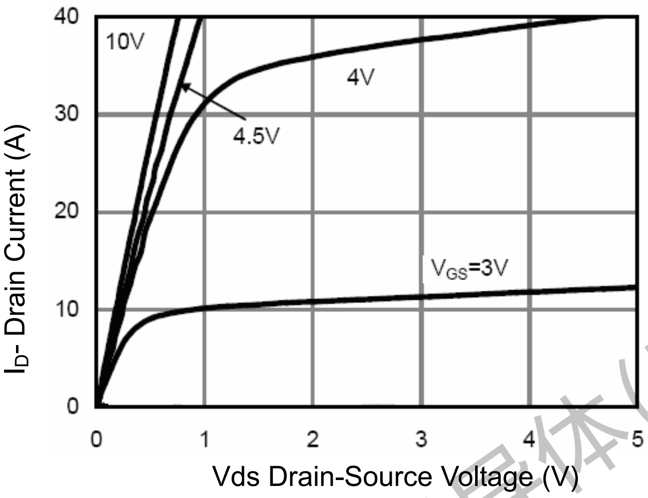

Figure 1 Output Characteristics

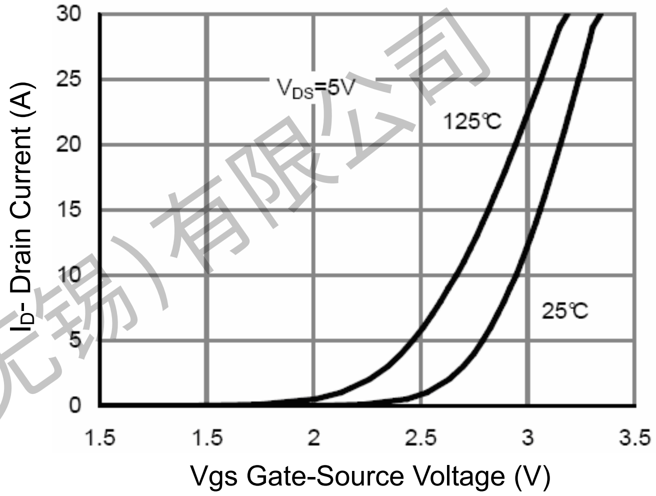

Figure 2 Transfer Characteristics

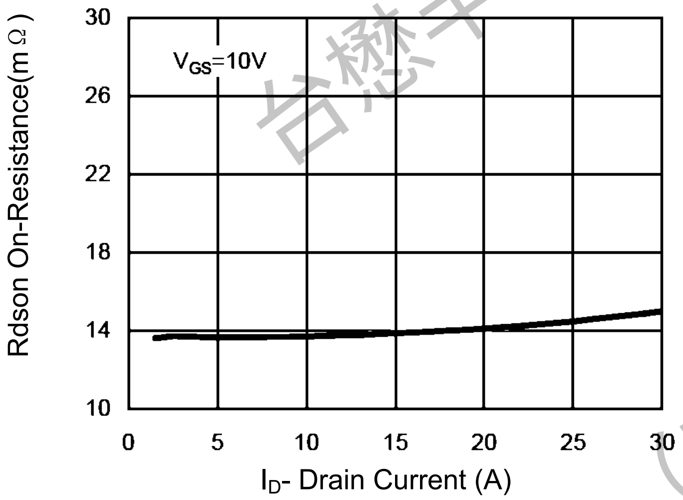

Figure 3 Rdson- Drain Current

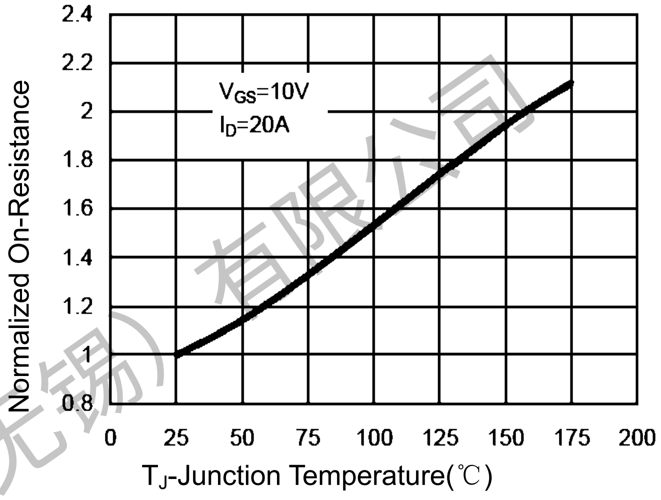

Figure 4 Rdson-Junction Temperature

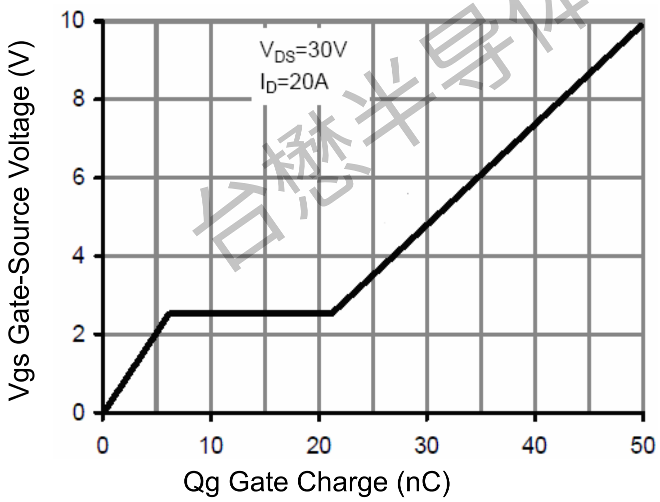

Figure 5 Gate Charge

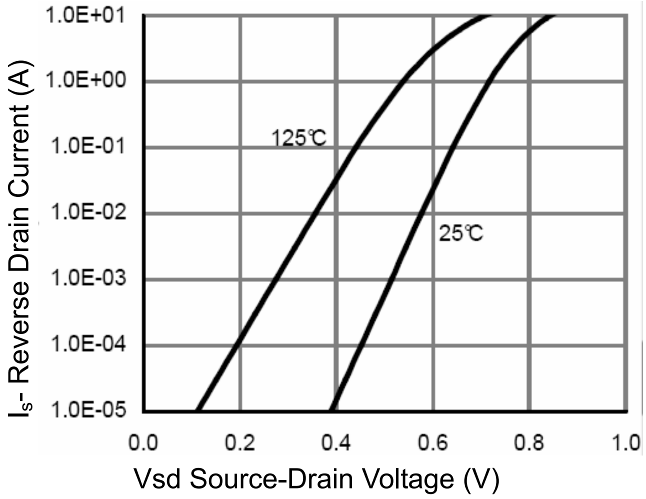

Figure 6 Source- Drain Diode Forward

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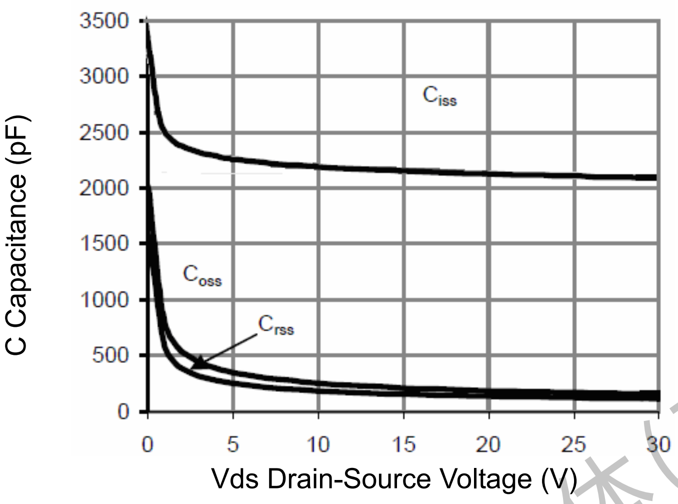


Figure 7 Capacitance vs Vds

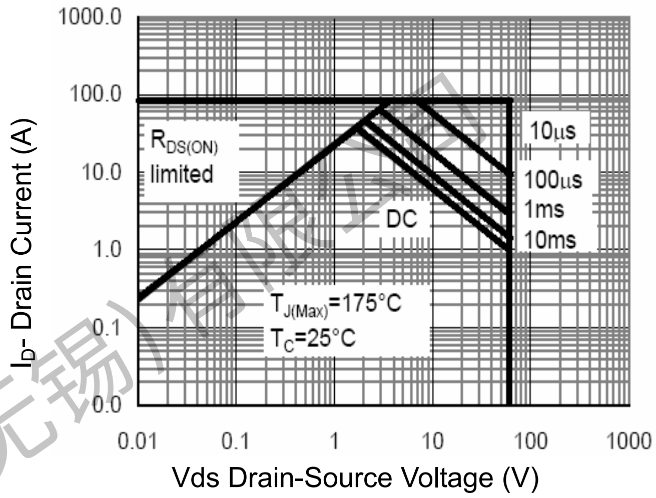


Figure 8 Safe Operation Area

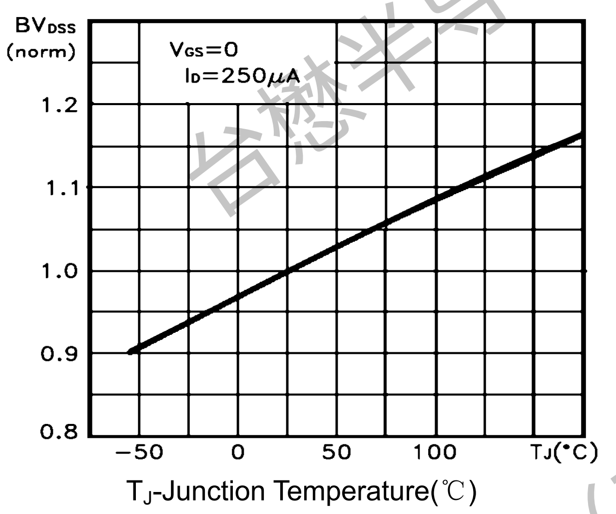


Figure 9 BV_{DSS} vs Junction Temperature

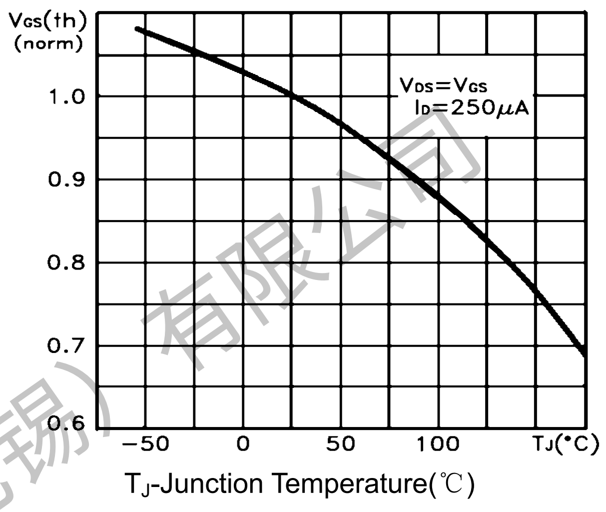


Figure 10 $V_{GS(th)}$ vs Junction Temperature

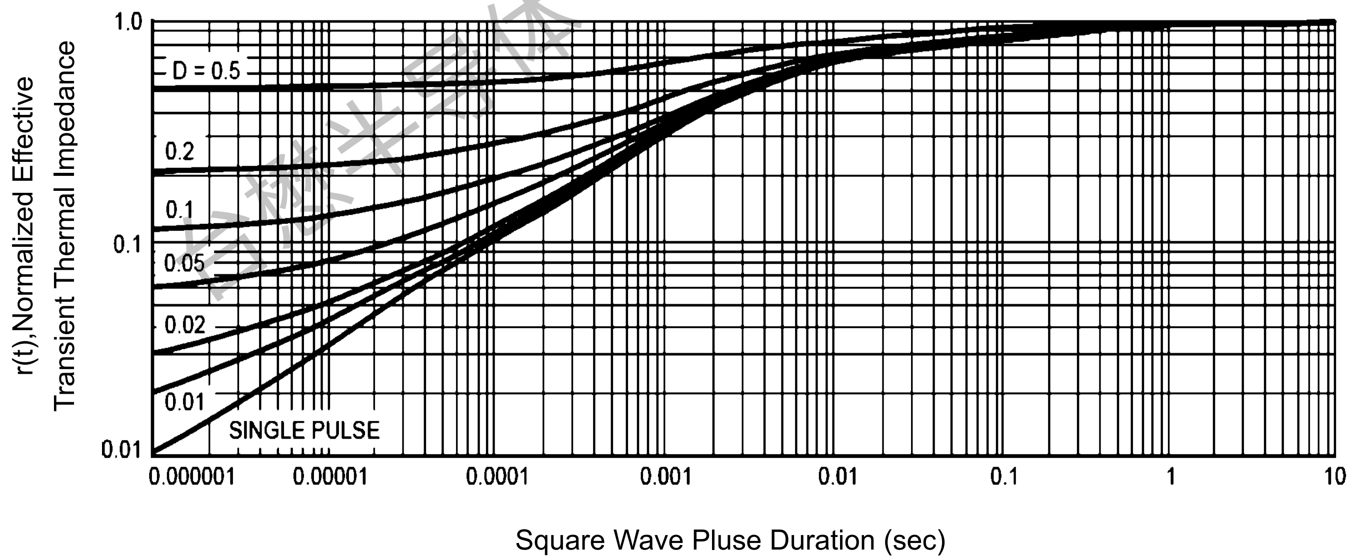
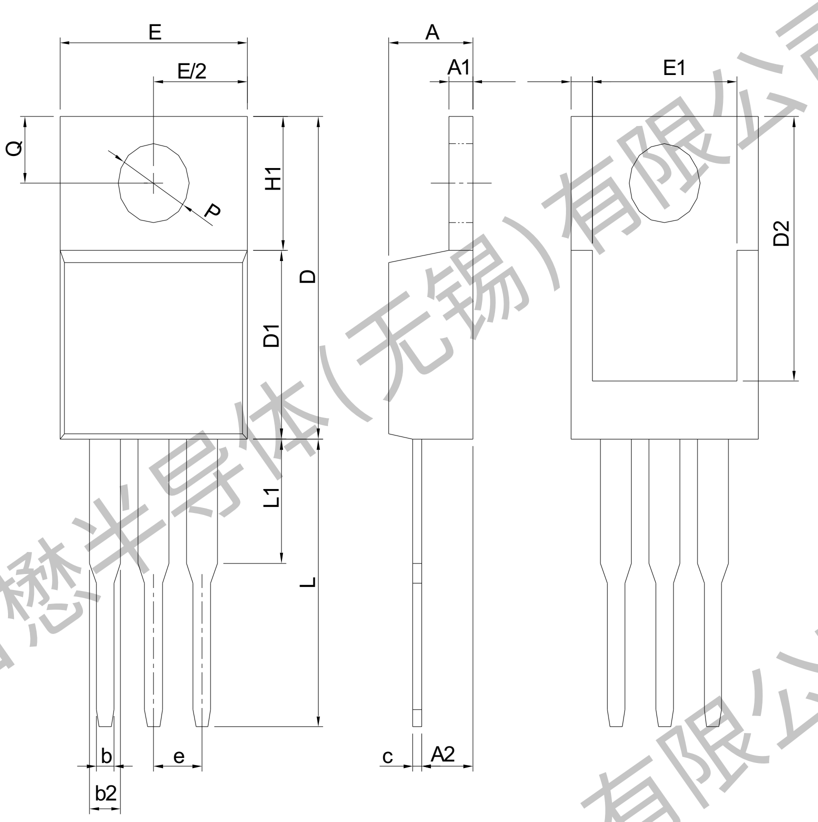


Figure 11 Normalized Maximum Transient Thermal Impedance

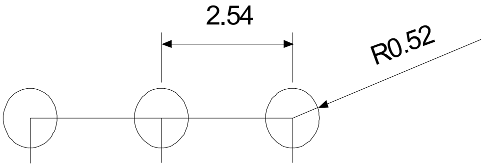
Package Mechanical Data: TO-220AB



SYMBOL	TO-220			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	3.56	4.83	0.140	0.190
A1	0.51	1.40	0.020	0.055
A2	2.03	2.92	0.080	0.115
b	0.38	1.02	0.015	0.040
b2	1.14	1.78	0.045	0.070
c	0.36	0.61	0.014	0.024
D	14.22	16.51	0.560	0.650
D1	8.38	9.02	0.330	0.355
D2	12.19	13.65	0.480	0.537
E	9.65	10.67	0.380	0.420
E1	6.86	8.89	0.270	0.350
e	2.54 BSC		0.100 BSC	
H1	5.84	6.86	0.230	0.270
L	12.70	14.73	0.500	0.580
L1	-	6.35	-	0.250
P	3.53	4.09	0.139	0.161
Q	2.54	3.43	0.100	0.135

Note: Follow JEDEC TO-220 AB.

RECOMMENDED LAND PATTERN



UNIT: mm

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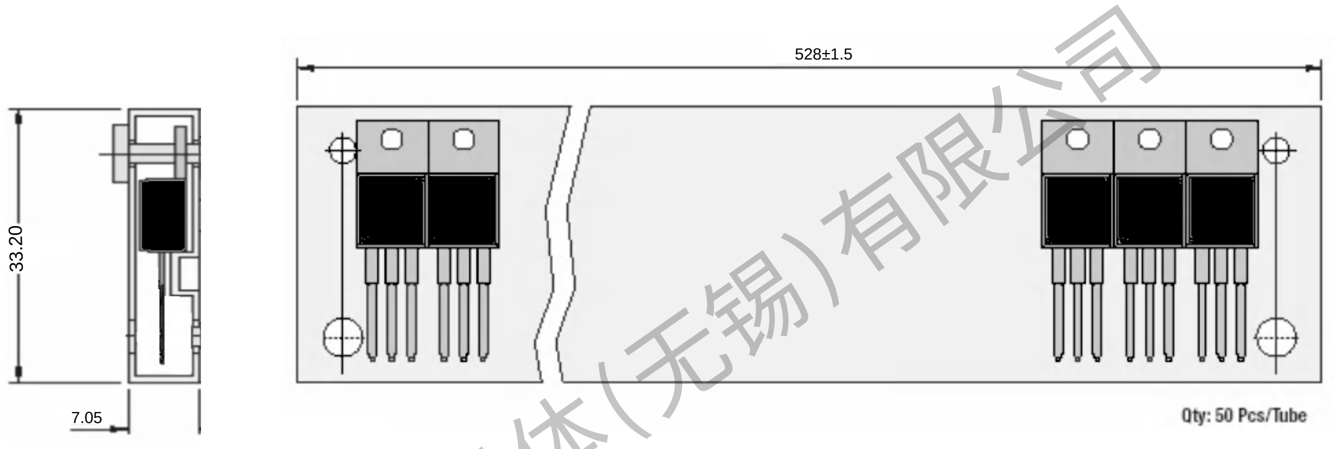

All Dimensions are in mm

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1.TO-220AB Packaging

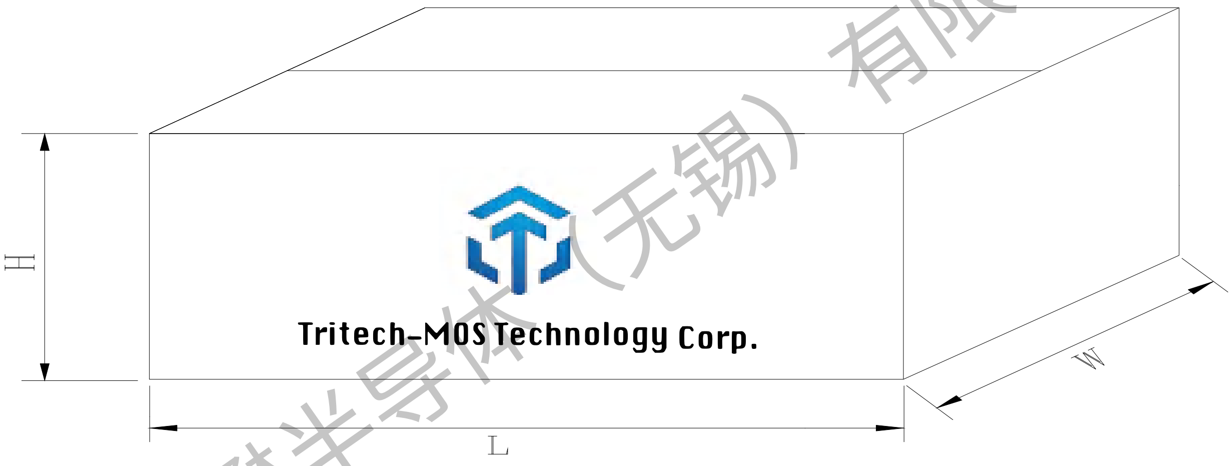
Package	Packing Form	Quantity		
		Tube	Inner Box [kpcs]	Outbox [kpcs]
TO-220AB	Tube Tape	50	5	1

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
2023.04.01	23.04	Original	