



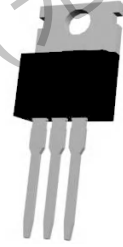
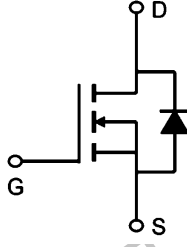


TM160N04P

N-Channel Enhancement Mosfet

<p>General Description</p> <ul style="list-style-type: none"> • Low $R_{DS(ON)}$ • RoHS and Halogen-Free Compliant <p>Applications</p> <ul style="list-style-type: none"> • Load switch • PWM 	<p>General Features</p> <p>$V_{DS} = 40V$ $I_D = 160A$ $R_{DS(ON)} = 2.0m\Omega (typ.) @ V_{GS} = 10V$</p> <p>100% UIS Tested 100% R_g Tested</p> 
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P:TO-220AB

Marking: 160N04

Absolute Maximum Ratings: ($T_c = 25^\circ C$ unless otherwise noted)

Symbol	Parameter	Ratings	Units
V_{DS}	Drain-Source Voltage	40	V
V_{GS}	Gate-Source Voltage	± 20	V
I_D	Continuous Drain Current-	160	A
	Continuous Drain Current- $T_C = 100^\circ C$	90	
	Pulsed Drain Current	380	
E_{AS}	Single Pulse Avalanche Energy	500	mJ
P_D	Power Dissipation	96	W
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55 to +150	$^\circ C$

Thermal Characteristics:

Symbol	Parameter	Max	Units
$R_{\theta JC}$	Thermal Resistance, Junction to Case	1.67	$^\circ C/W$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	62	

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Electrical Characteristics at Tc=25°C unless otherwise specified

Characteristics	Test Condition	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	$V_{GS} = 0 V, I_D = 250 \mu A$	BV_{DSS}	40	-	-	V
Drain-Source Leakage Current	$V_{DS} = 40 V, V_{GS} = 0 V$	I_{DSS}	-	-	1	μA
Gate Leakage Current	$V_{GS} = \pm 20 V, V_{DS} = 0 V$	I_{GSS}	-	-	± 100	nA
Gate-Source Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250 \mu A$	$V_{GS(th)}$	1.2	1.6	2.0	V
Drain-Source On-State Resistance (Note2)	$V_{GS} = 10 V, I_D = 20 A$	$R_{DS(on)}$	-	2.0	2.4	m Ω
	$V_{GS} = 4.5 V, I_D = 15 A$		-	2.5	3.5	m Ω
Input Capacitance	$V_{DS}=25 V, V_{GS}=0V, f=1MHz$	C_{iss}	-	7800	-	pF
Output Capacitance		C_{oss}	-	1256	-	pF
Reverse Transfer Capacitance		C_{rss}	-	780	-	pF
Turn-on Delay Time(Note2)		$t_{d(ON)}$	-	25	-	ns
Rise Time(Note2)	$V_{DD}=20 V, V_{GS}=10 V, RG=3.7 \Omega, I_D=70A$	t_r	-	80	-	ns
Turn-Off Delay Time(Note2)		$t_{d(OFF)}$	-	85	-	ns
Fall Time(Note2)		t_f	-	42	-	ns
Total Gate Charge(Note2)	$V_{DS}=20V, V_{GS}=4.5V, I_D=70A$	Q_G	-	170	-	nC
Gate to Source Charge(Note2)		Q_{GS}	-	52	-	nC
Gate to Drain Charge(Note2)		Q_{GD}	-	70	-	nC

Source-Drain Diode Characteristics at Ta=25°C unless otherwise specified

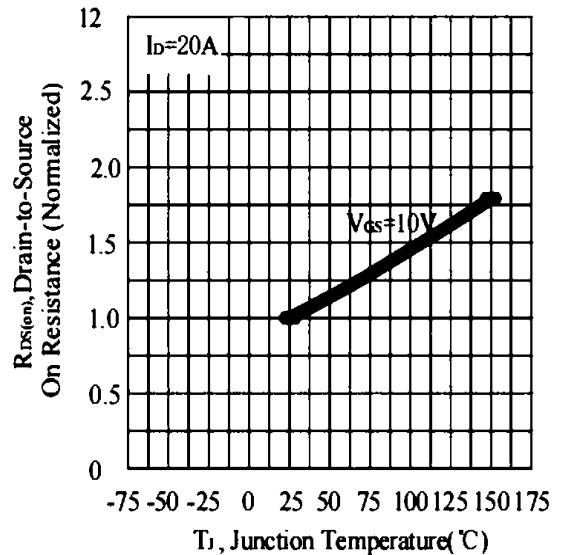
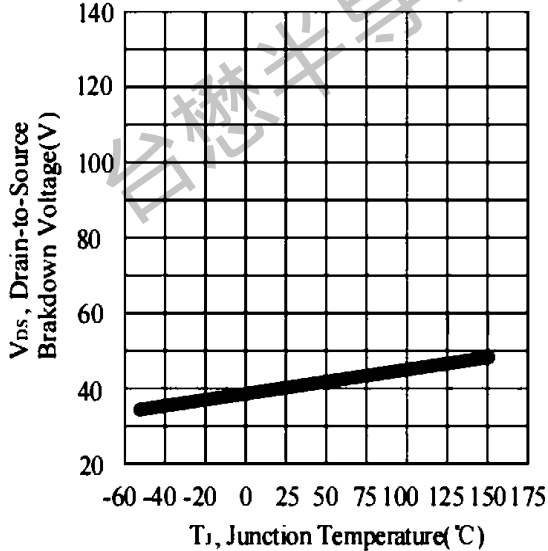
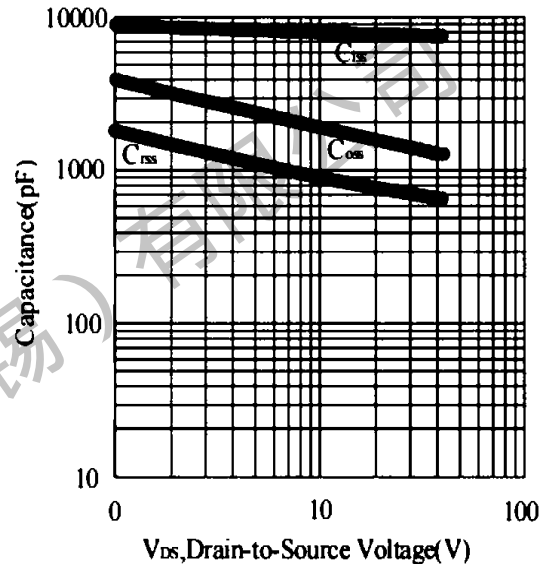
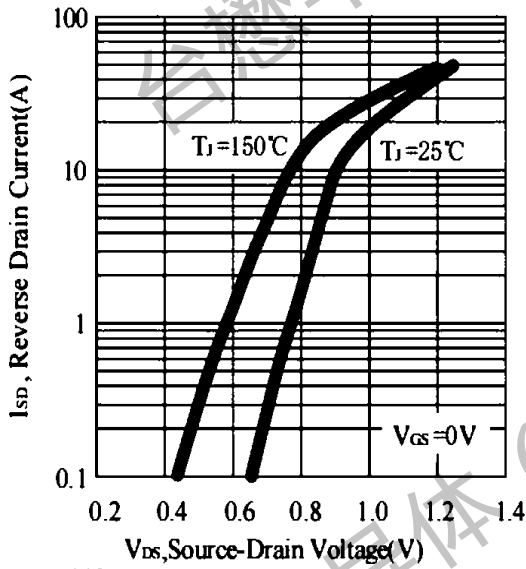
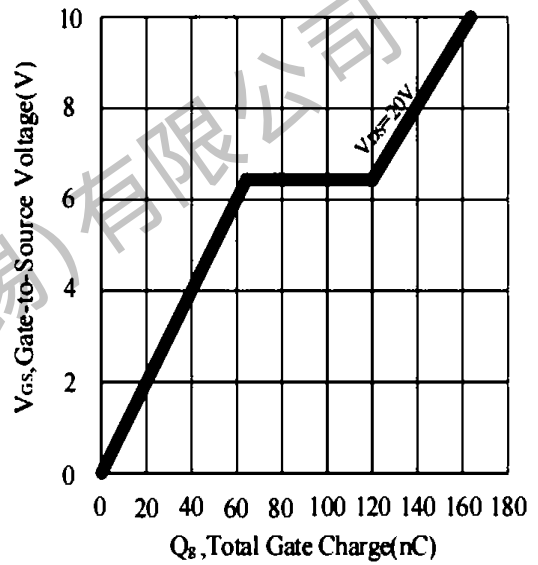
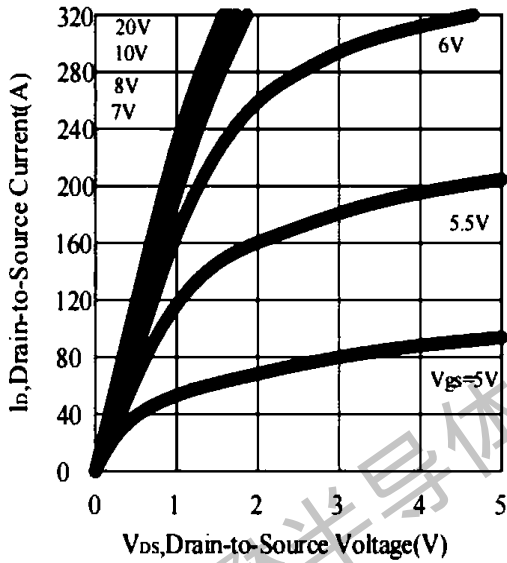
Characteristics	Test Condition	Symbo	Min.	Typ.	Max.	Unit
Maximun Body-Diode Continuous Current		I_S	-	-	160	A
Drain-Source Diode Forward Voltage	$V_{GS}=0V, I_S=20A, T_J=25^\circ C$	V_{SD}	-	-	1.2	V
Reverse Recovery Time(Note2)	$T_J = 25^\circ C, I_F= 40A$ $di / dt = 100 A/\mu s$	t_{rr}	-	31	-	ns
Reverse Recovery Charge(Note2)		Q_{rr}	-	27	-	nC

Note2:Pulse test: 300 μs pulse width, 2 % duty cycle

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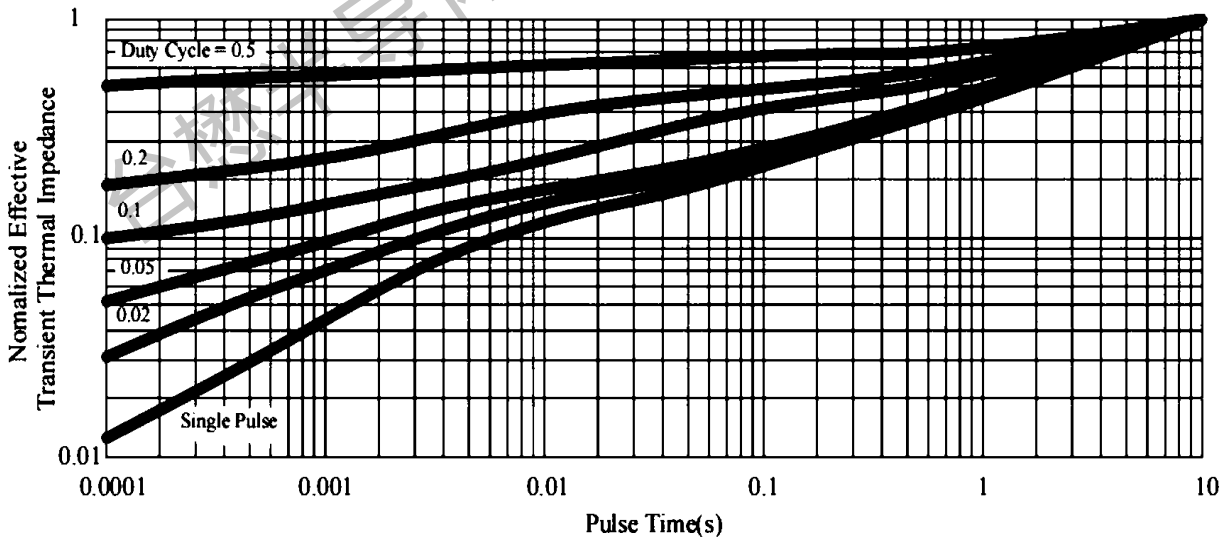
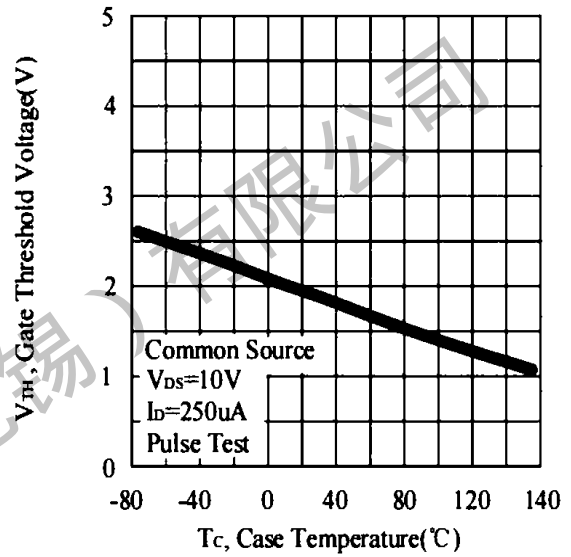
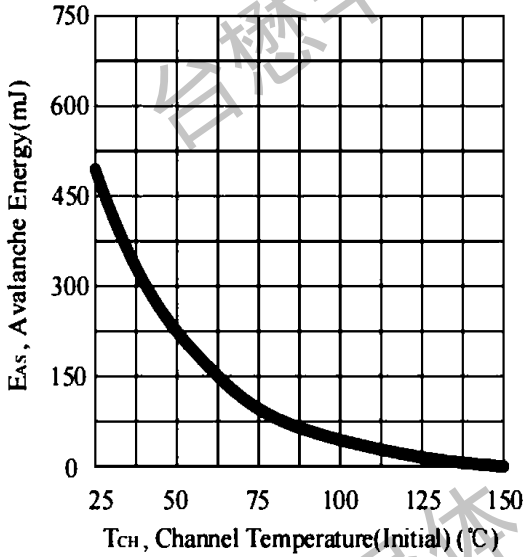
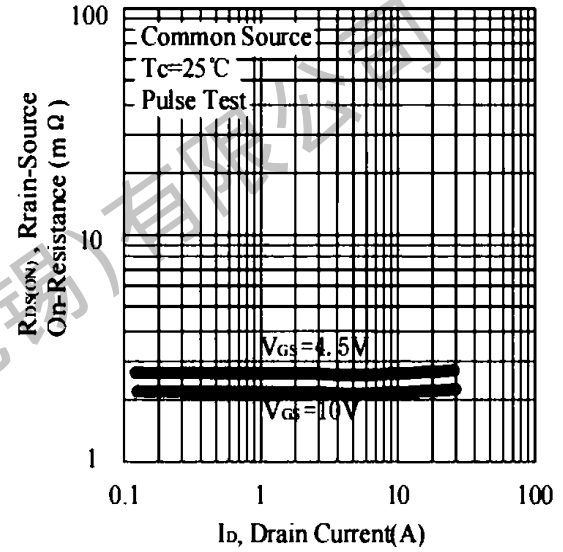
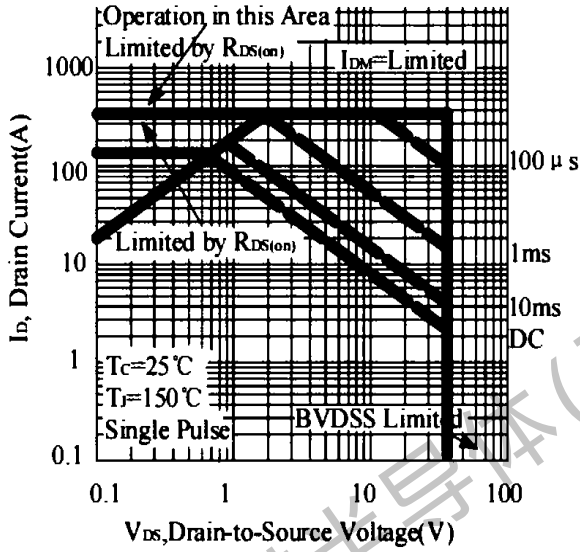
Typical Characteristics





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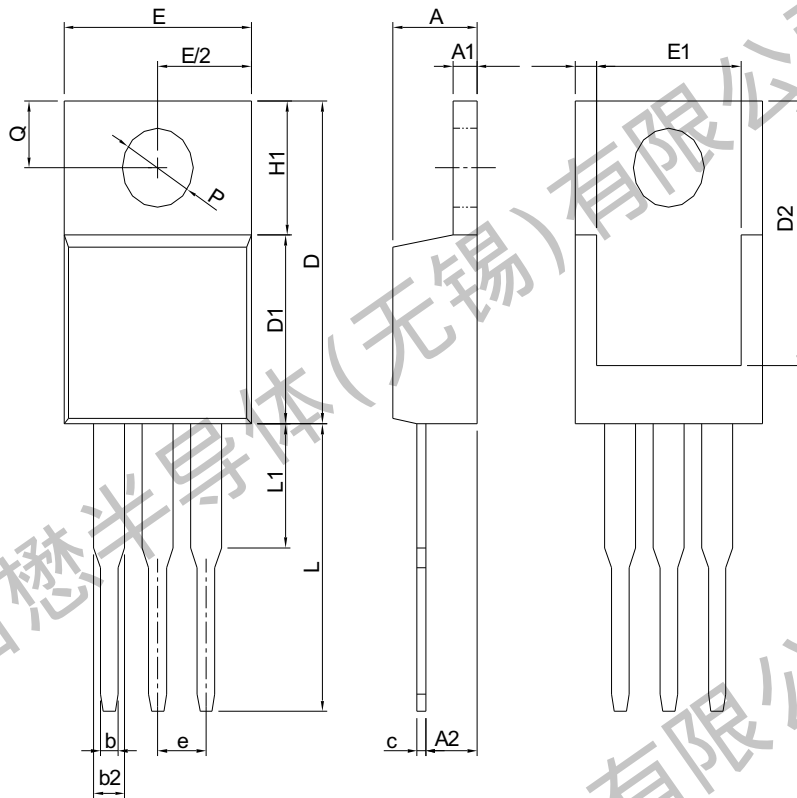




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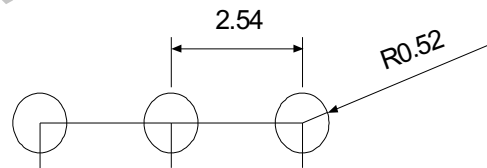
N-Channel Enhancement Mosfet

Package Mechanical Data: TO-220AB



DIMENSIONS	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

RECOMMENDED LAND PATTERN



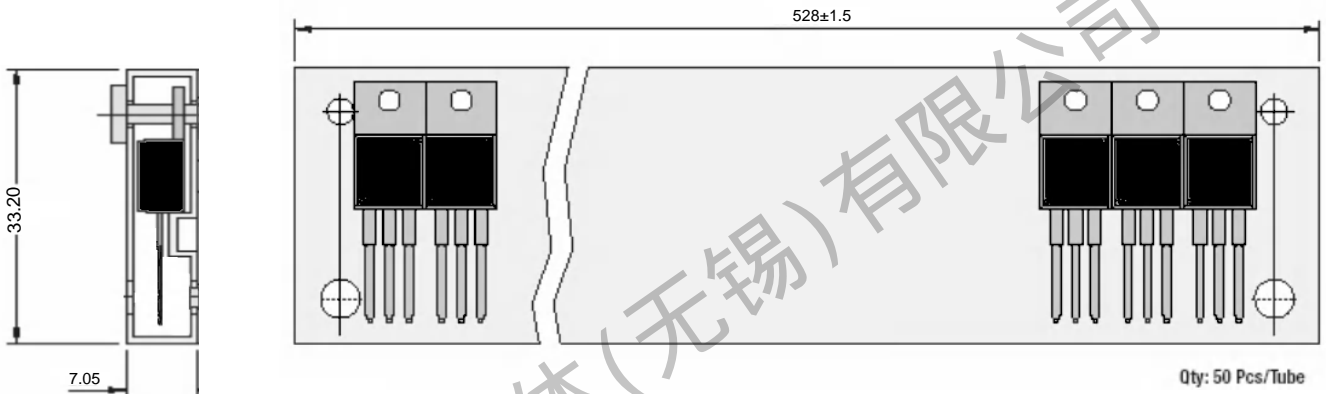
UNIT: mm

Note: Follow JEDEC TO-220 AB.



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All Dimensions are in mm

1. TO-220AB Packaging

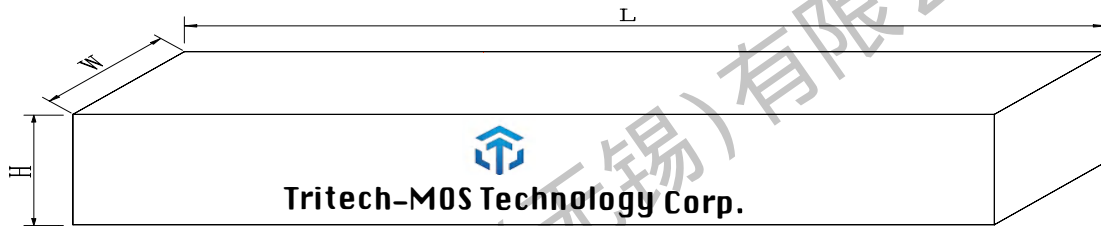
Package	Packing Form	Quantity		
		Tube	Inner Box [kpcs]	Outbox [kpcs]
TO-220AB	Tube Tape	50	5	1



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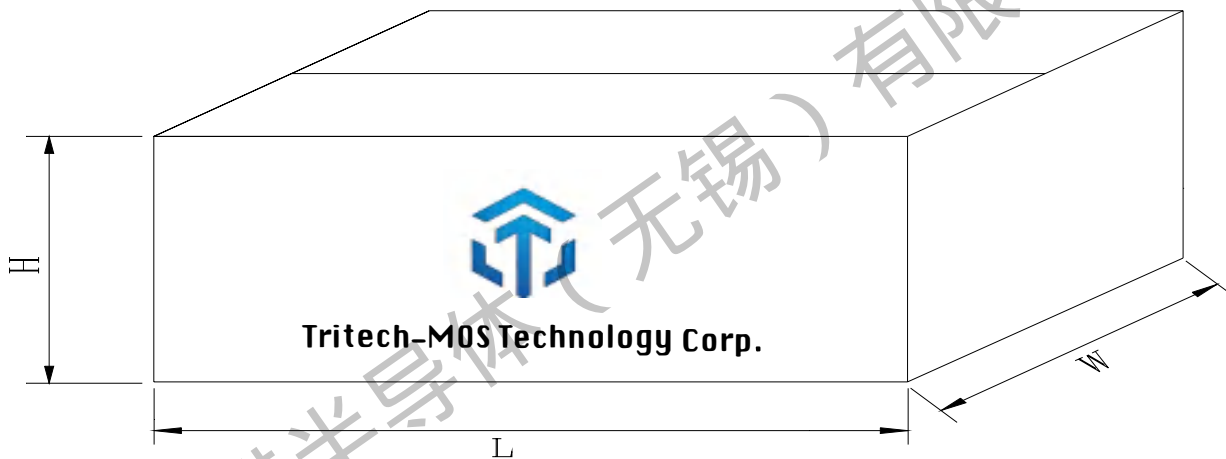
Inner Box



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
2023.10.19	23.10	Original	