TM20N10P

N -Channel Enhancement Mosfet

General Description

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

Applications

- Load switch
- PWM

General Features

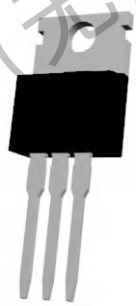
V_{DS} =100V I_D =20A

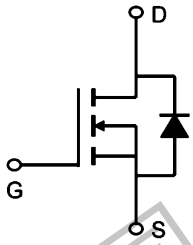
$R_{DS(ON)}$ 65=m Ω(typ.) @ V_{GS}=10V

100% UIS Tested

100% R_g Tested

P:TO-220AB





Marking: 20N10

G D S

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

Symbol	Parameter		Value	Units
V_{DSS}	Drain-to-Source Voltage		100	V
I_D	Continuous Drain Current	T_C = 25 °C	20	A
	Continuous Drain Current	T_C = 100 °C	10	A
I_{DM}	Pulsed Drain Current		64	A
E_{AS}	Single pulse avalanche energy		25	mJ
V_{GS}	Gate-to-Source Voltage		±20	V
P_D	Power Dissipation		52	W
T_J, T_{STG}	Operating Junction and Storage Temperature Range		175, –55 to 175	℃

Thermal Characteristics

Symbol	Parameter	Value	Units
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	2.4	℃/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	52	℃/W

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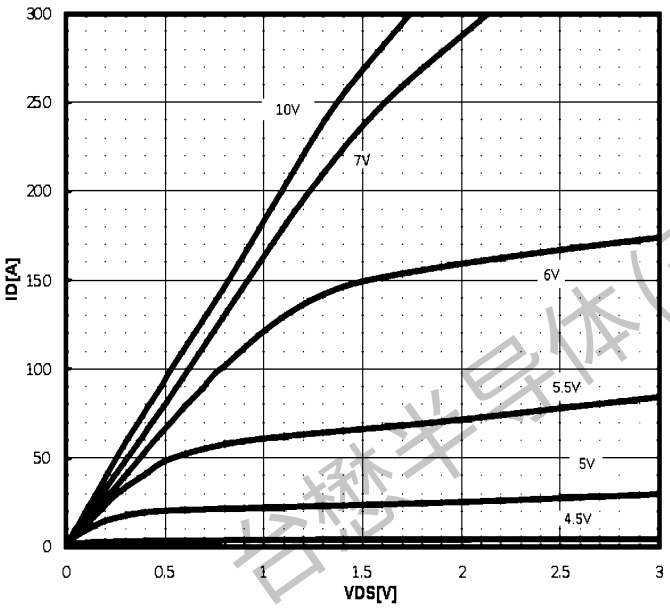
Electrical Characteristics (Tc= 25℃ unless otherwise specified):

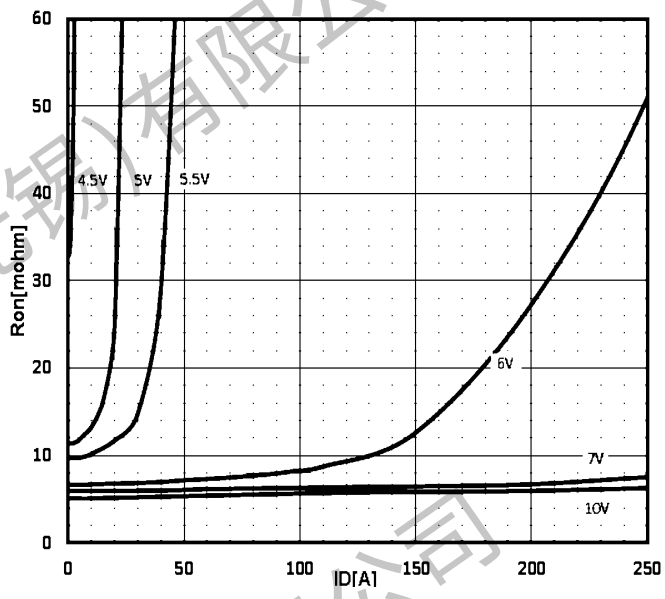
Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain-Sourtce Breakdown Voltage	V_{GS}=0V,I_D=250μA	100	---	---	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{GS}=0V, V_{DS}=100V	---	---	1	μA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V, V_{DS}=0A	---	---	±100	nA
On Characteristics						
$V_{GS(th)}$	GATE-Source Threshold Voltage	V_{GS}=V_{DS}, I_D=250μA	1	2	3	V
$R_{DS(ON)}$	Drain-Source On Resistance	V_{GS}=10V,I_D=7A	---	65	74	mΩ
		V_{GS}=4.5V,I_D=5A	---	---	---	mΩ
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS}=25V, V_{GS}=0V, f=1MHz	---	1030	---	pF
C_{oss}	Output Capacitance		---	50	--	
C_{rss}	Reverse Transfer Capacitance		---	39	---	
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{DS}=50V, I_D=10A, R_{ENG}=3Ω ,V_{GS}=10V	---	13	---	ns
t_r	Rise Time		---	5.2	---	ns
$t_{d(off)}$	Turn-Off Delay Time		---	28	---	ns
t_f	Fall Time		---	5	---	ns
Q_g	Total Gate Charge	V_{GS}=10V, V_{DS}=50V, I_D=10A	---	21	---	nc
Q_{gs}	Gate-Source Charge		---	3.1	---	nc
Q_{gd}	Gate-Drain “Miller” Charge		---	6.3	---	nc
Drain-Source Diode Characteristics						
V_{SD}	Diode Forward Voltage	V_{GS}=0V, I_{SD}=15A	---	---	1.2	V
I_S	Continuous Drain Curren	VD=VG=0V	---	---	20	A
I_{SM}	Pulsed Drain Current		---	---	64	A
Trr	Reverse Recovery Time	I_F=10A,T_J=25℃ dI/dt=100A/us	---	30	---	ns
Qrr	Reverse Recovery Charge		---	42	---	nc

Characteristics Curve:

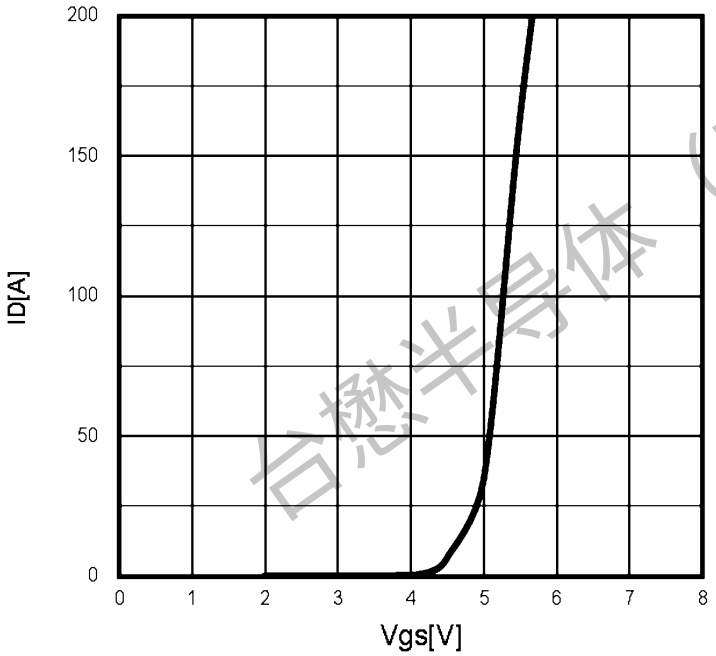
Typ. output characteristics
$I_D=f(V_{DS})$



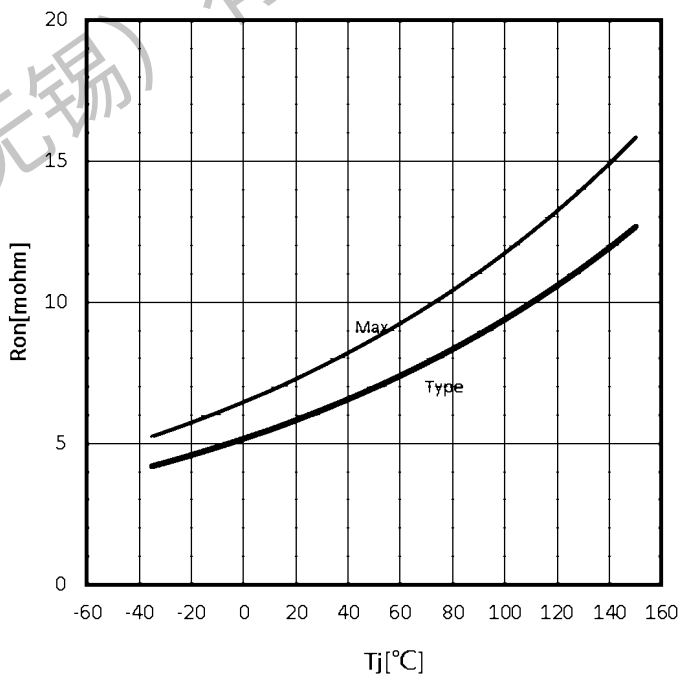
Typ. drain-source on resistance
$R_{DS(on)}=f(I_D)$



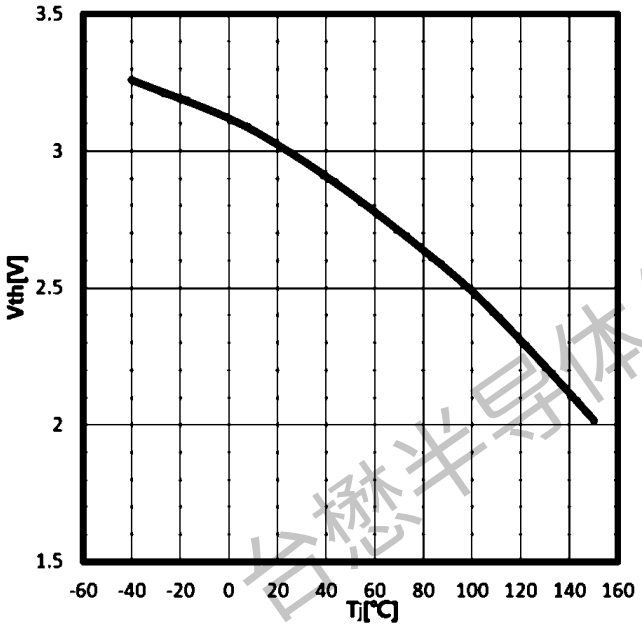
Typ. transfer characteristics
$I_D=f(V_{GS})$



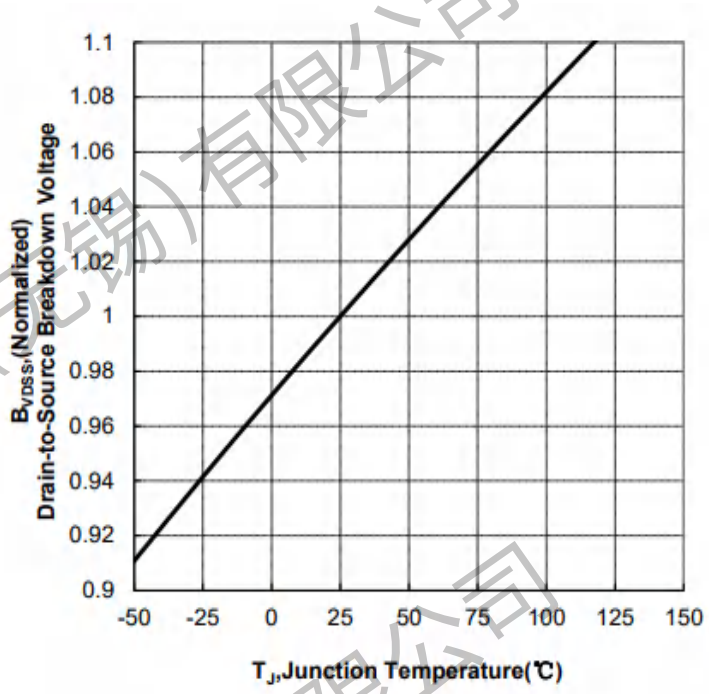
Drain-source on-state resistance
$R_{DS(on)}=f(T_j)$; I_D=20A; V_{GS}=10V



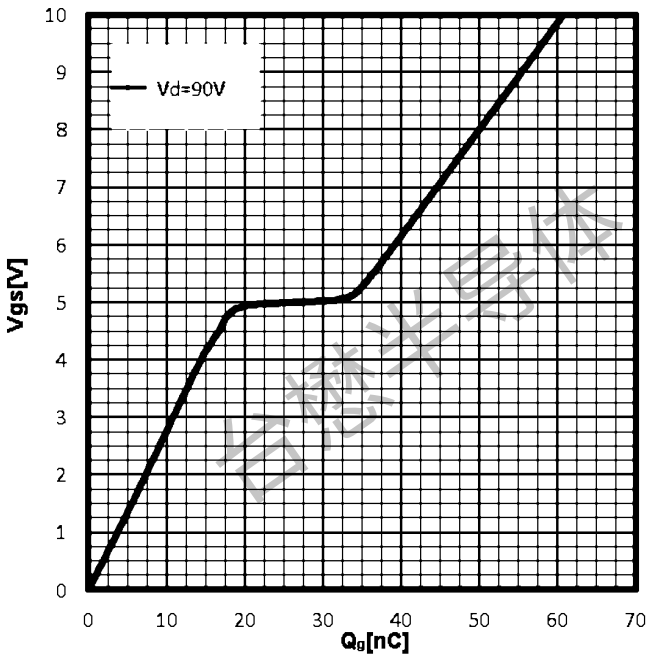
Gate Threshold Voltage
$V_{TH}=f(T_j)$; $I_D=250uA$



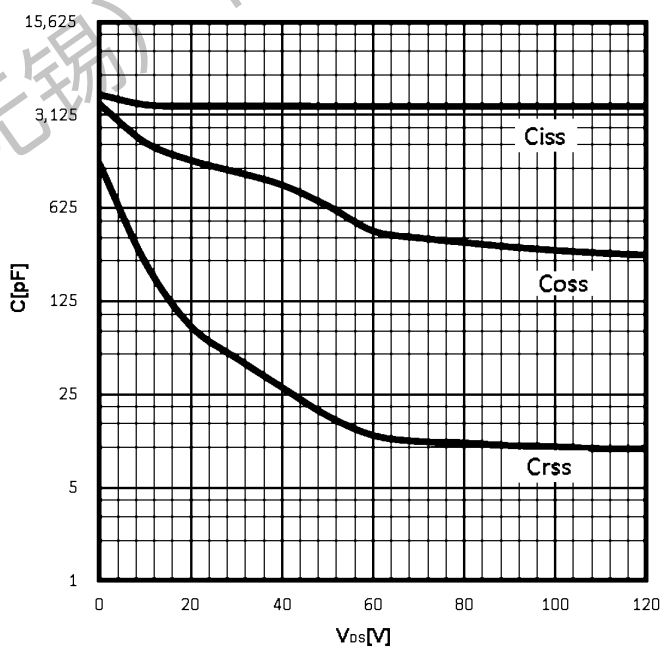
Drain-source breakdown voltage
$V_{BR(DSS)}=f(T_j)$; $I_D=250uA$



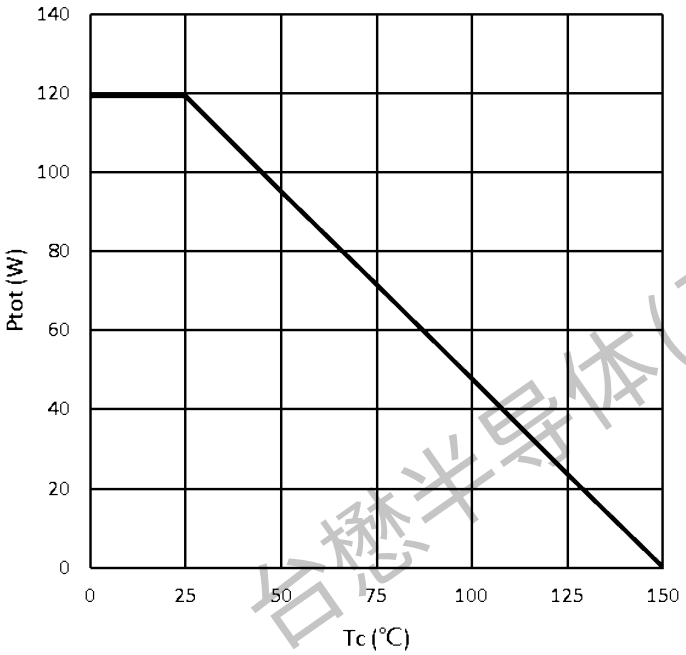
Typ. gate charge
$V_{GS}=f(Q_{gate})$



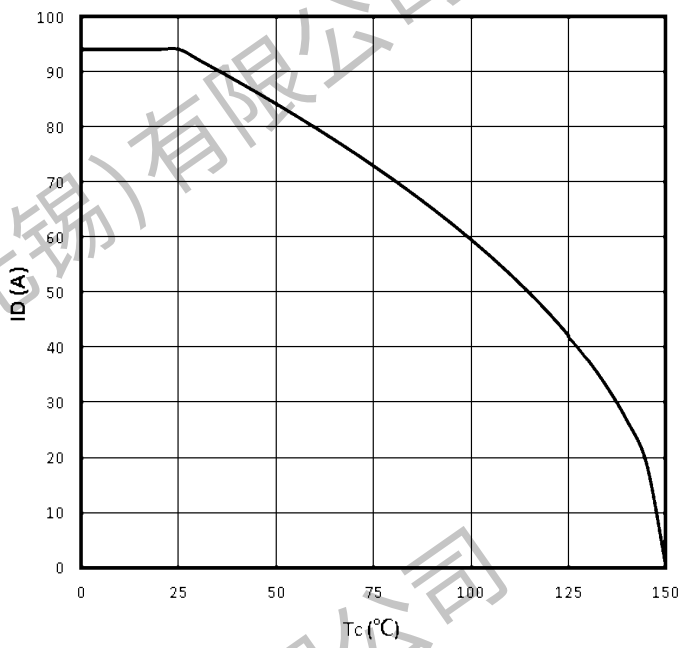
Typ. capacitances
$C=f(V_{DS})$; $V_{GS}=0V$; $f=1MHz$



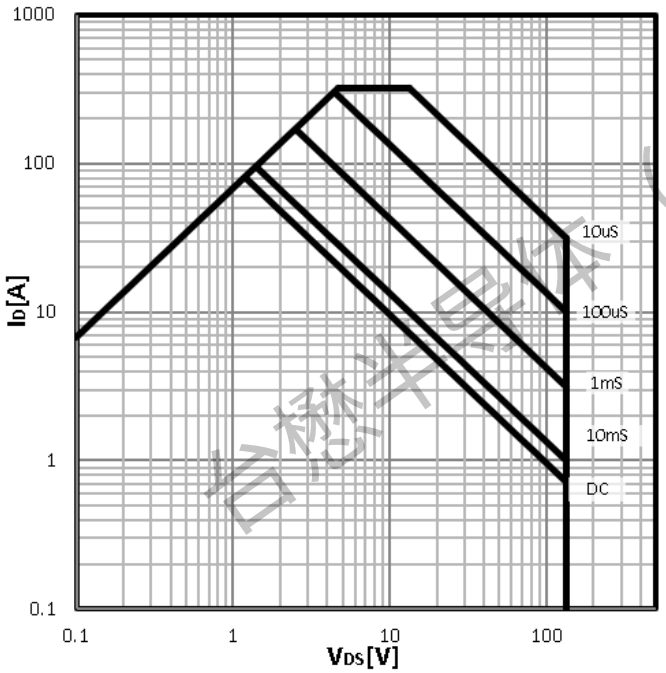
Power Dissipation
$P_{tot}=f(T_j)$



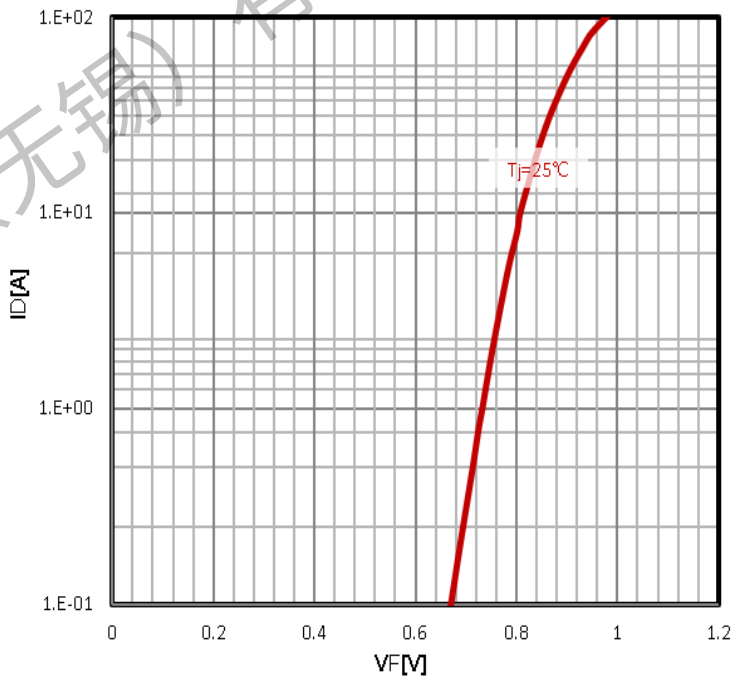
Maximum Drain Current
$I_D=f(T_C)$



Safe operating area
$I_D=f(V_{DS})$

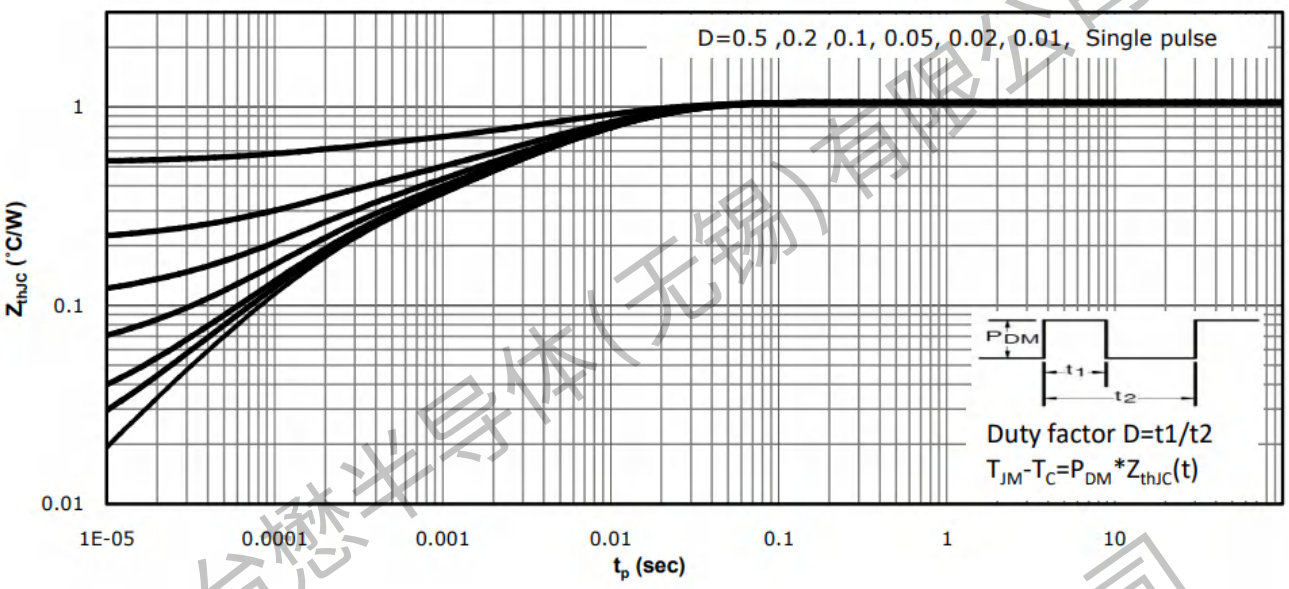


Body Diode Forward Voltage Variation
$I_F=f(V_{GS})$

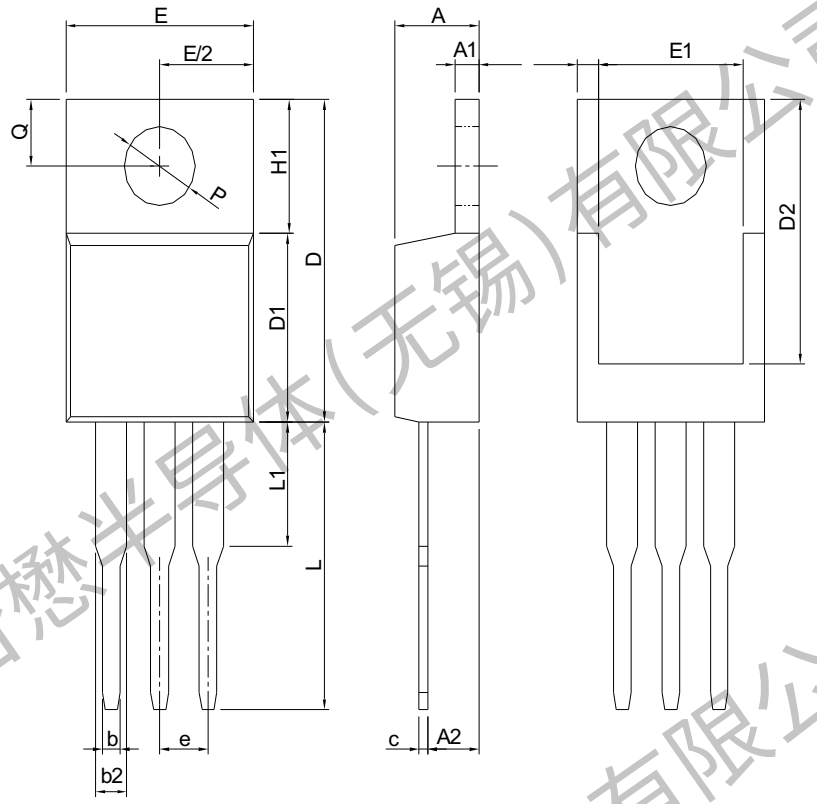


Max. transient thermal impedance

$Z_{thJC}=f(t_p)$



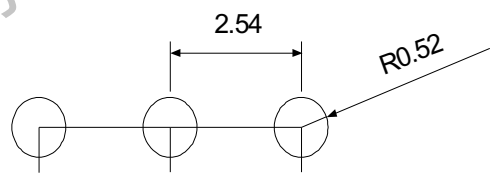
Package Mechanical Data: TO-220AB



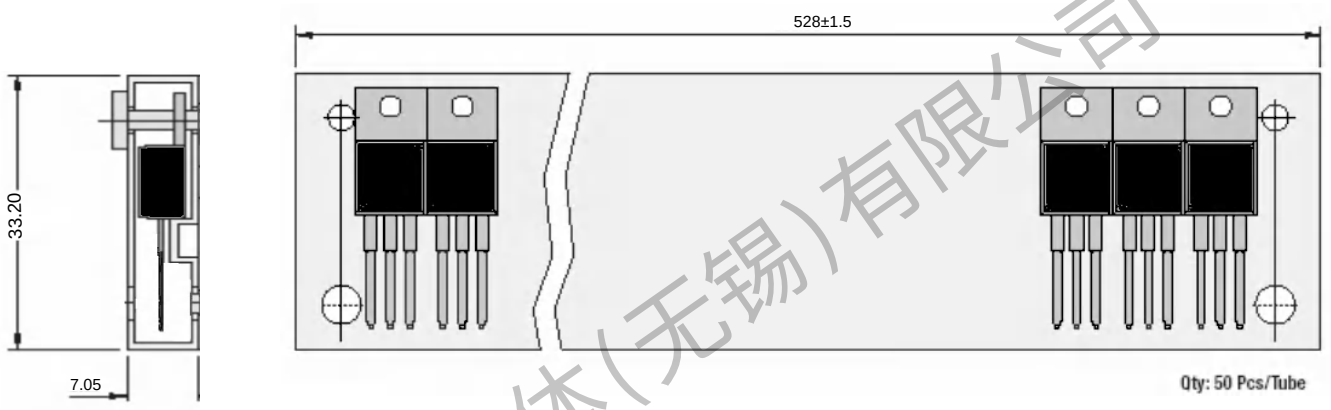
SYMBOL	TO-220			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	3.56	4.83	0.140	0.190
A1	0.51	1.40	0.020	0.055
A2	2.03	2.92	0.080	0.115
b	0.38	1.02	0.015	0.040
b2	1.14	1.78	0.045	0.070
c	0.36	0.61	0.014	0.024
D	14.22	16.51	0.560	0.650
D1	8.38	9.02	0.330	0.355
D2	12.19	13.65	0.480	0.537
E	9.65	10.67	0.380	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

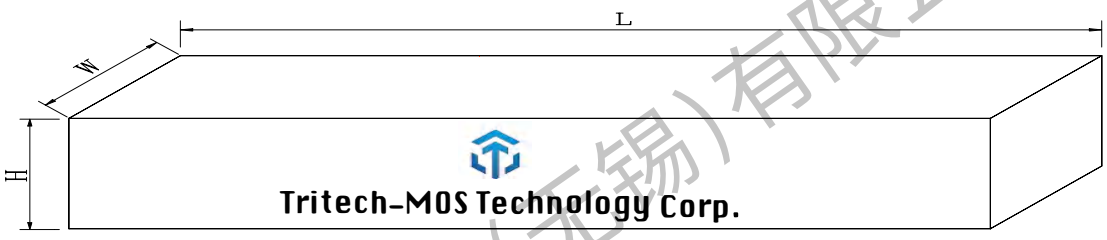


All Dimensions are in mm

1.TO-220AB Packaging

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

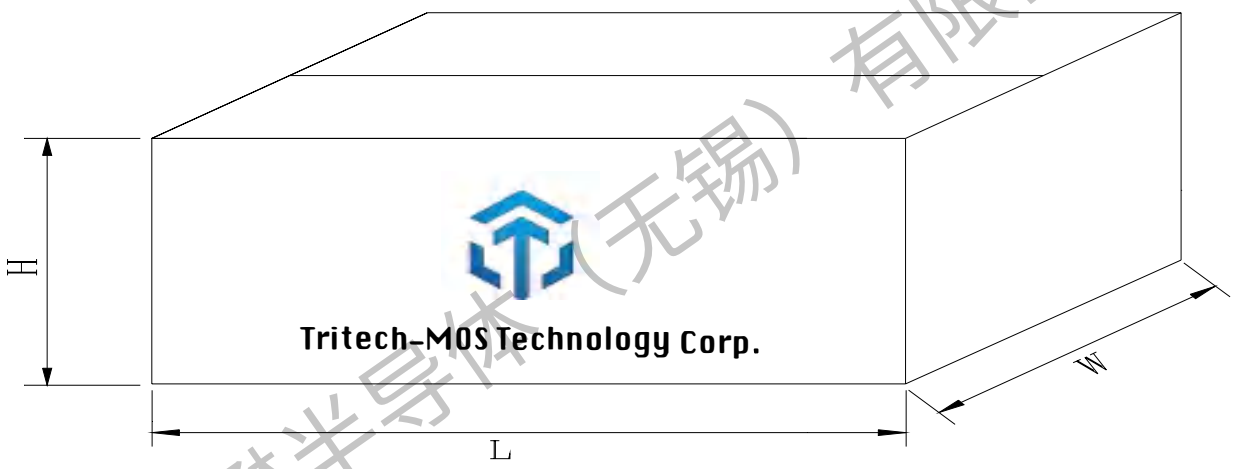
Inner Box



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
2024.06.08	24.06	Original	