TMG120N15P

N-Channel Enhancement Mosfet

General Description

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

Applications

- Load switch
- PWM

General Features

V_{DS} =150V I_D =120A

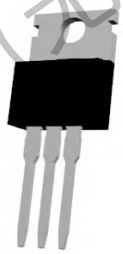
$R_{DS(ON)}$ =9.5mΩ(typ.) @ V_{GS}=10V

100% UIS Tested

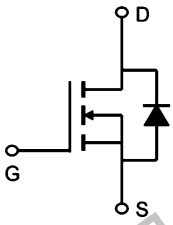
100% R_g Tested

Green Product

P:TO-220AB



G D S



Marking: G120N15

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

Symbol	Parameter	Ratings	Units
V_{DS}	Drain-Source Voltage	150	V
V_{GS}	Gate-Source Voltage	±20	V
I_D	Continuous Drain Curren	120	A
	Continuous Drain Current-T_C=100℃	78	
I_{DM}	Pulsed Drain Current	494	
P_D	Power Dissipation	178.6	W
E_{AS}	Single pulse avalanche energy	204.8	mJ
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55-+175	℃

Thermal Characteristics

Symbol	Parameter	Max	Units
$R_{\Theta JC}$	Thermal Resistance,Junction to Case	1.67	℃/W

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Electrical Characteristics（T_J = 25°C, unless otherwise noted）

Parameter		Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics							
Drain-Source Breakdown Voltage		$V_{(BR)DSS}$	V_{GS} = 0V, I_D = 250μA	150	-	-	V
Gate-body Leakage Current		I_{GSS}	V_{DS} = 0V, V_{GS} = ±20V	-	-	±100	nA
Zero Gate Voltage Drain Current	T_J=25°C	I_{DSS}	V_{DS} = 150V, V_{GS} = 0V	-	-	1	μA
	T_J=100°C			-	-	100	
Gate-Threshold Voltage		$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	2	2.5	3	V
Drain-Source On-Resistance[4]		$R_{DS(on)}$	V_{GS} = 10V, I_D = 20A	-	9.5	11.5	mΩ
Forward Transconductance[4]		g_{fs}	V_{DS} = 10V, I_D = 20A	-	69	-	S
Dynamic Characteristics[5]							
Input Capacitance		C_{iss}	V_{DS} = 75V, V_{GS} =0V, f =1MHz	-	3310	-	pF
Output Capacitance		C_{oss}		-	268	-	
Reverse Transfer Capacitance		C_{rss}		-	9.4	-	
Gate Resistance		R_g	f = 1MHz	-	3.2	-	Ω
Switching Characteristics[5]							
Total Gate Charge		Q_g	V_{GS} = 10V, V_{DS} = 75V, I_D= 20A	-	45	-	nC
Gate-Source Charge		Q_{gs}		-	15	-	
Gate-Drain Charge		Q_{gd}		-	8.5	-	
Turn-On Delay Time		$t_{d(on)}$	V_{GS} =10V, V_{DD} = 75V, R_G = 3Ω, I_D= 20A	-	16	-	ns
Rise Time		t_r		-	12	-	
Turn-Off Delay Time		$t_{d(off)}$		-	30	-	
Fall Time		t_f		-	18	-	
Body Diode Reverse Recovery Time		t_{rr}	I_F=20A, dI/dt=100A/μs	-	76	-	ns
Body Diode Reverse Recovery Charge		Q_{rr}		-	182	-	nC
Drain-Source Body Diode Characteristics							
Diode Forward Voltage[4]		V_{SD}	I_S = 20A, V_{GS} = 0V	-	-	1.2	V
Continuous Source Current	T_C=25°C	I_S	-	-	-	120	A

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Typical Characteristics

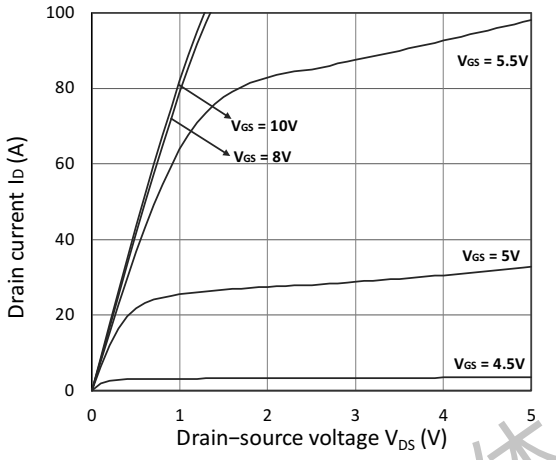

Figure 1. Output Characteristics

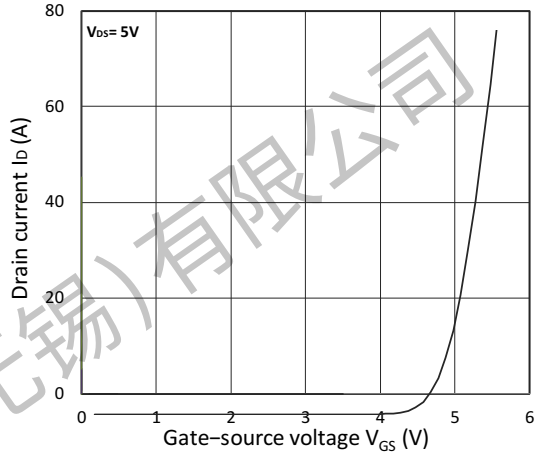

Figure 2. Transfer Characteristics

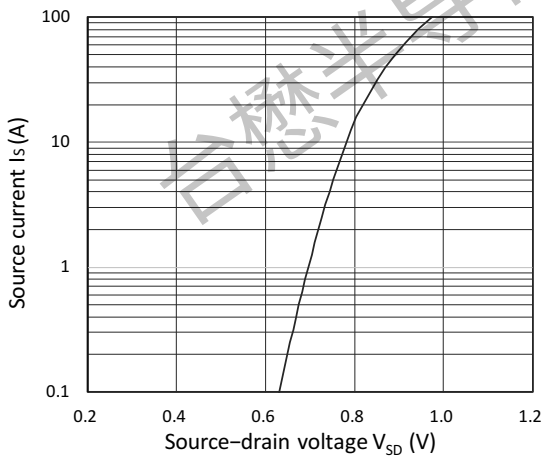

Figure 3. Forward Characteristics of Reverse

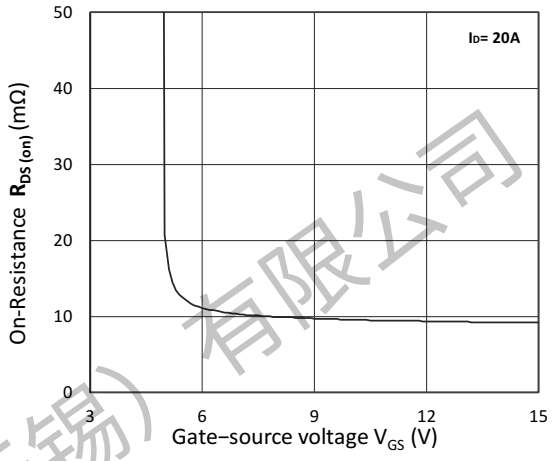

Figure 4. $R_{DS(ON)}$ vs. V_{GS}

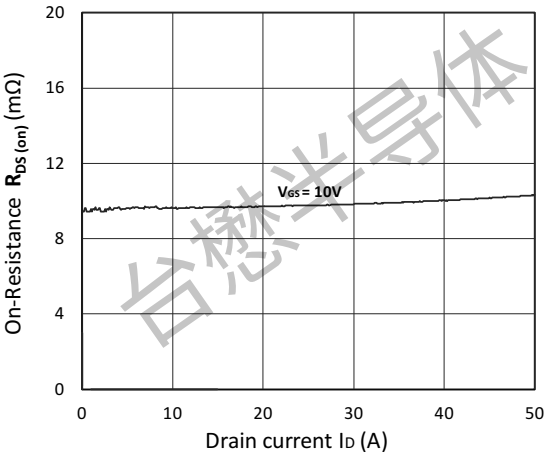

Figure 5. $R_{DS(ON)}$ vs. I_D

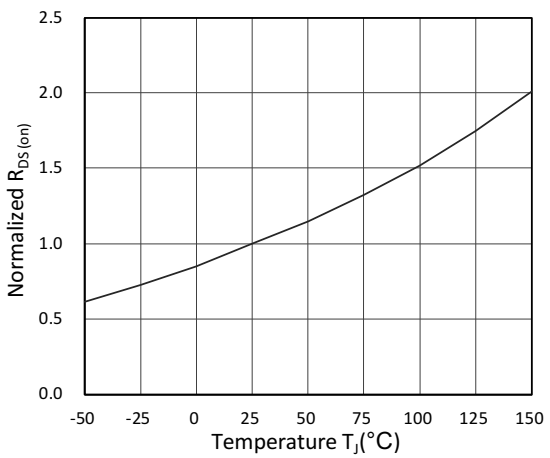

Figure 6. Normalized $R_{DS(on)}$ vs. Temperature

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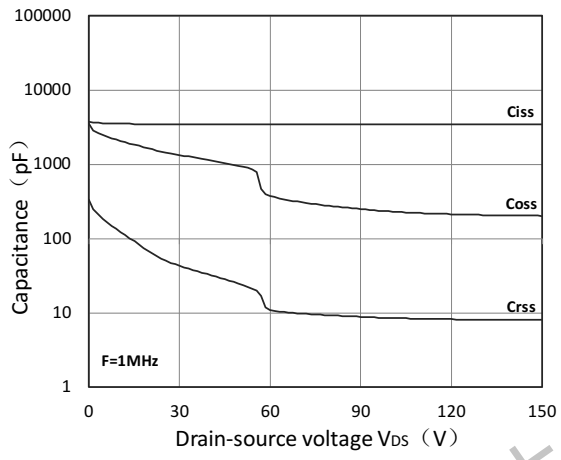


Figure 7. Capacitance Characteristics

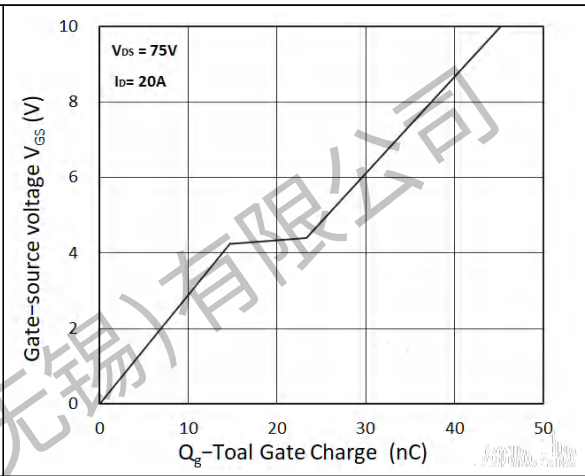


Figure 8. Gate Charge Characteristics

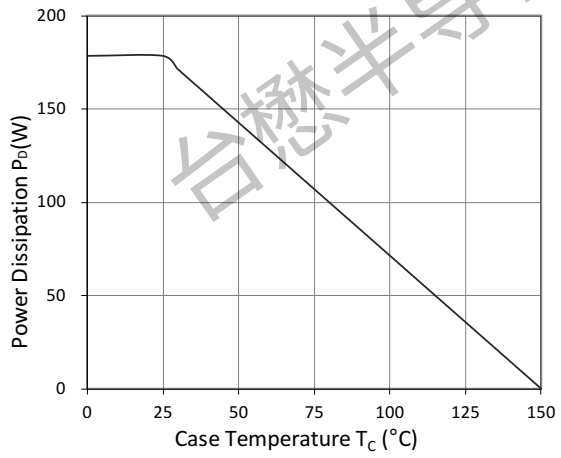


Figure 9. Power Dissipation

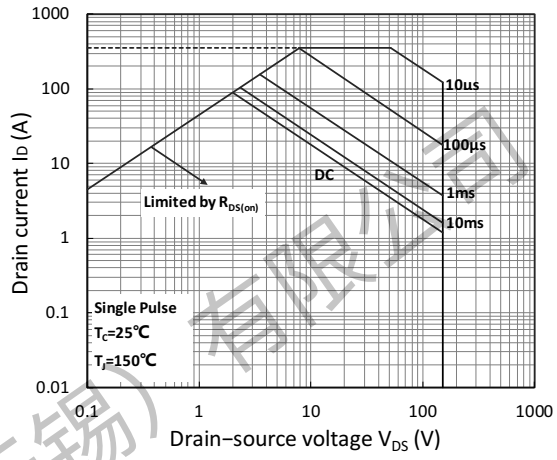


Figure10. Safe Operating Area

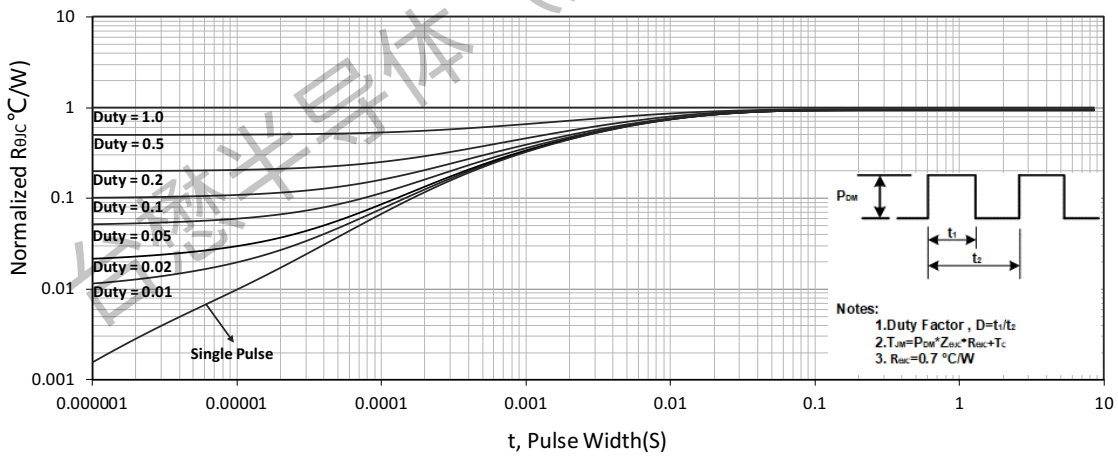
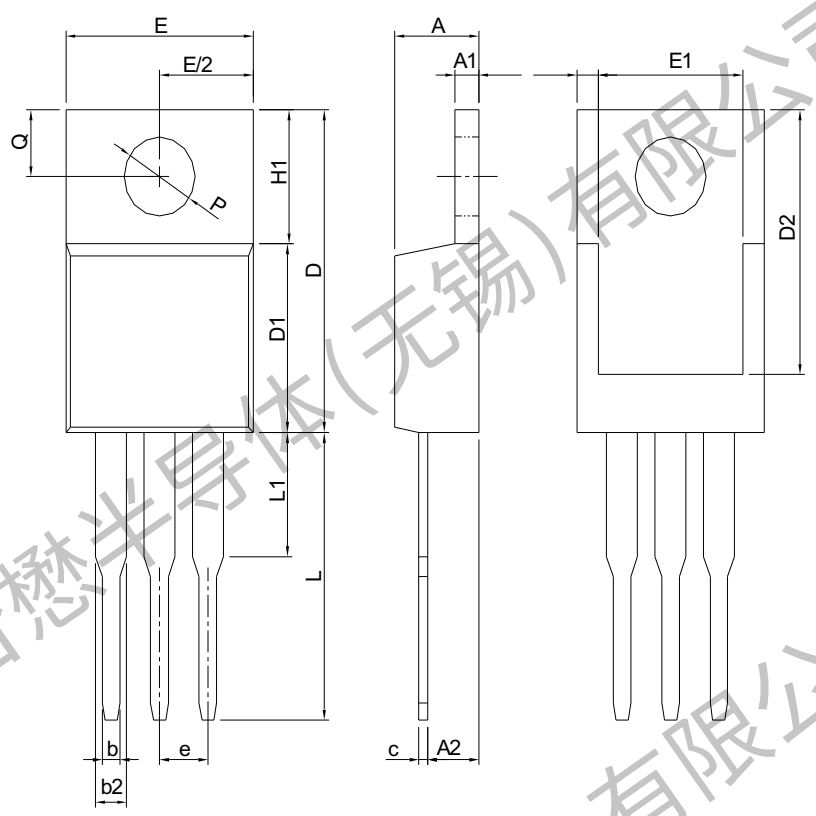


Figure 11. Normalized Maximum Transient Thermal Impedance

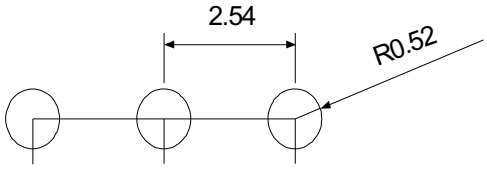
Package Mechanical Data: TO-220AB



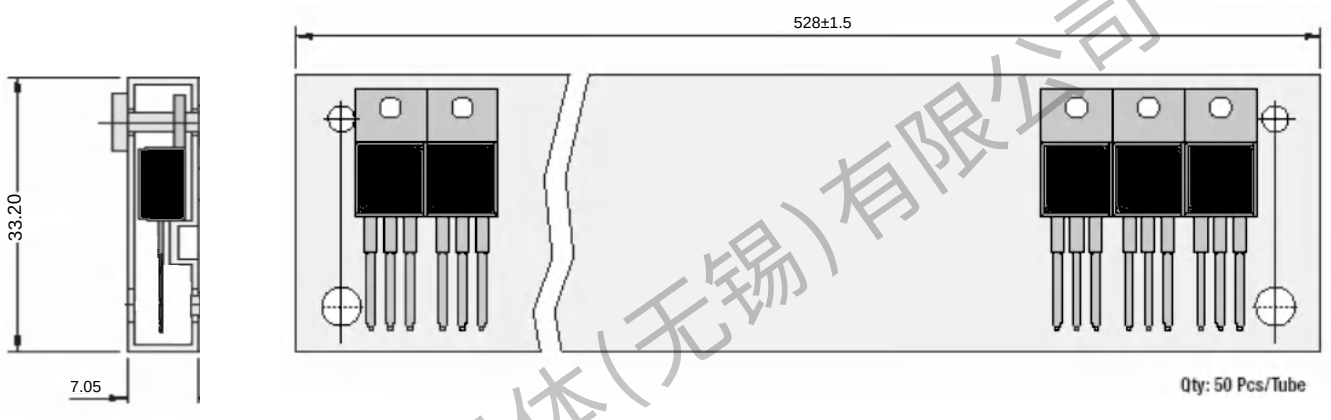
SYMBOL	TO-220			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	3.56	4.83	0.140	0.190
A1	0.51	1.40	0.020	0.055
A2	2.03	2.92	0.080	0.115
b	0.38	1.02	0.015	0.040
b2	1.14	1.78	0.045	0.070
c	0.36	0.61	0.014	0.024
D	14.22	16.51	0.560	0.650
D1	8.38	9.02	0.330	0.355
D2	12.19	13.65	0.480	0.537
E	9.65	10.67	0.380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

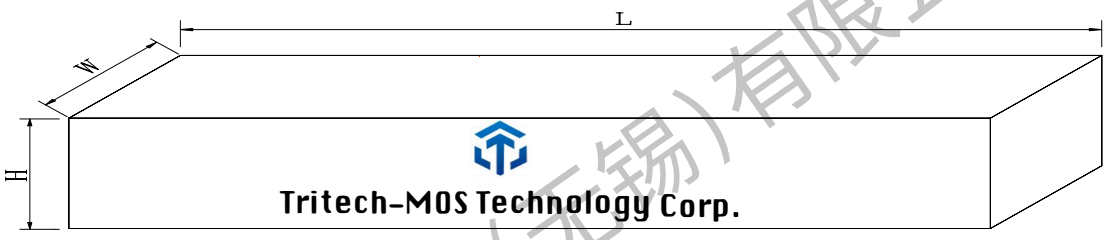


All Dimensions are in mm

1.TO-220AB Packaging

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

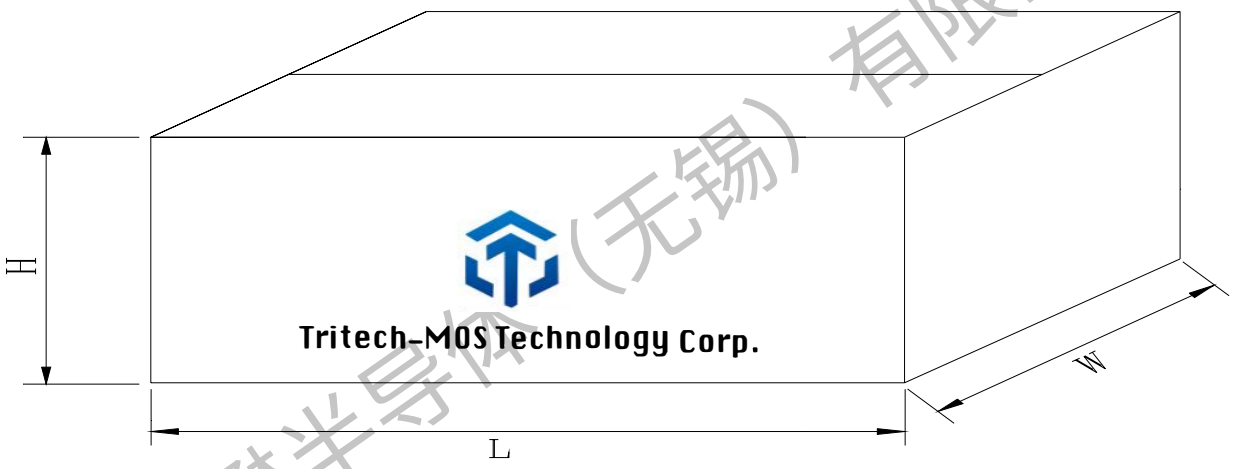
Inner Box



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
2023.09.02	23.09	Original	