TM50N03YS

N-Channel Enhancement Mosfet

General Description

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

Applications

- Load switch
- PWM

General Features

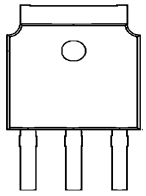
V_{DS} = 30V I_D =50A

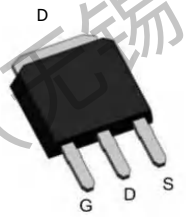
$R_{DS(ON)}$=7.6mΩ (typ.) @ V_{GS}=10V

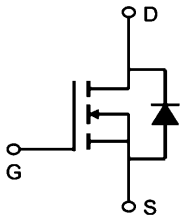
100% UIS Tested

100% R_g Tested

YS:TO-251S-3L







Marking: 50N03

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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	30	V
V_{GS}	Gate-Source Voltage	±20	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ 10V	50	A
I_D@T_C=100℃	Continuous Drain Current, V_{GS} @ 10V	26	A
I_{DM}	Pulsed Drain Current	168	A
EAS	Single Pulse Avalanche Energy	3	mJ
I_{AS}	Avalanche Current	23.8	A
P_D@T_C=25℃	Total Power Dissipation	30.5	W
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient	---	62	℃/W
$R_{\theta JC}$	Thermal Resistance Junction Case	---	6.6	℃/W

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Electrical Characteristics (T_J=25℃ unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
Off Characteristic						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250μA	30	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} =30V, V_{GS}=0V,	-	-	1.0	μA
I_{GSS}	Gate to Body Leakage Current	V_{DS}=0V, V_{GS}=±20V	-	-	±100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250μA	0.9	1.2	1.5	V
$R_{DS(on)}$	Static Drain-Source on-Resistance note3	V_{GS}=10V, I_D=20A	-	7.6	10	mΩ
		V_{GS}=4.5V, I_D=10A	-	10.2	17	
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS}=15V, V_{GS}=0V, f=1.0MHz	-	1011	-	pF
C_{oss}	Output Capacitance		-	142	-	pF
C_{rss}	Reverse Transfer Capacitance		-	119	-	pF
Q_g	Total Gate Charge	V_{DS}=15V, I_D=20A, V_{GS}=10V	-	19	-	nC
Q_{gs}	Gate-Source Charge		-	6.3	-	nC
Q_{gd}	Gate-Drain("Miller") Charge		-	4.5	-	nC
Switching Characteristics						
$t_{d(on)}$	Turn-on Delay Time	V_{DS}=30V, I_D=2A, R_{GEN}=3Ω, V_{GS}=10V	-	6	-	ns
t_r	Turn-on Rise Time		-	5	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	25	-	ns
t_f	Turn-off Fall Time		-	7	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain to Source Diode Forward Current		-	-	50	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	160	A
V_{SD}	Drain to Source Diode Forward Voltage	V_{GS}=0V, I_S=30A	-	-	1.2	V
trr	Body Diode Reverse Recovery Time	I_F=30A,dI/dt=100A/μs	-	7	-	ns
Qrr	Body Diode Reverse Recovery Charge		-	6.3	-	nC

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Typical Performance Characteristics

Figure1: Output Characteristics

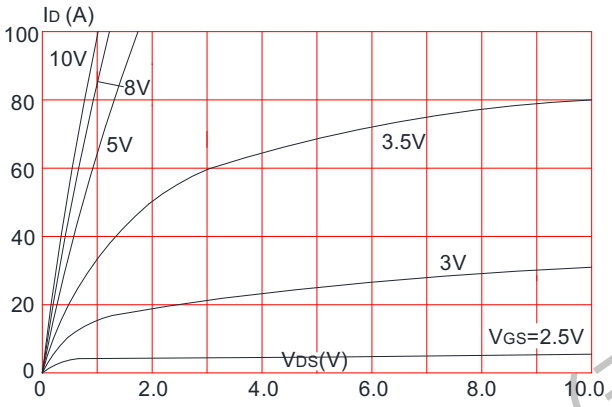

Figure 2: Typical Transfer Characteristics

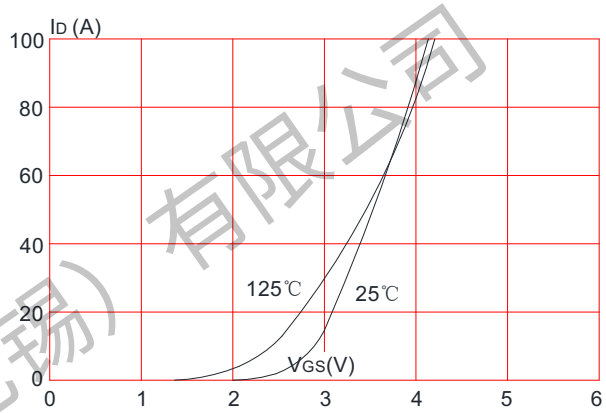

Figure 3: On-resistance vs. Drain Current

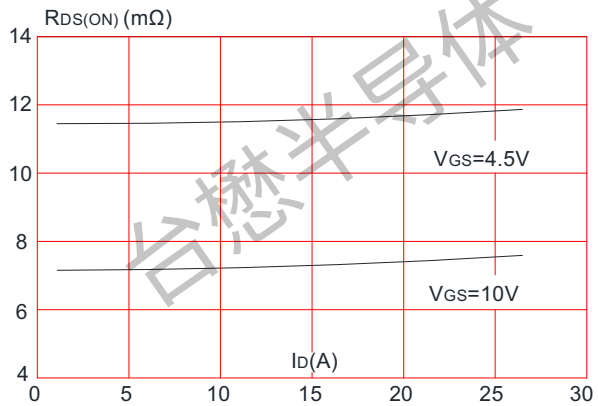

Figure 4: Body Diode Characteristics

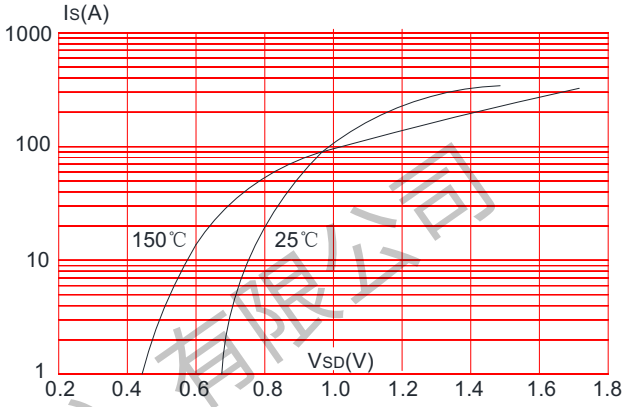

Figure 5: Gate Charge Characteristics

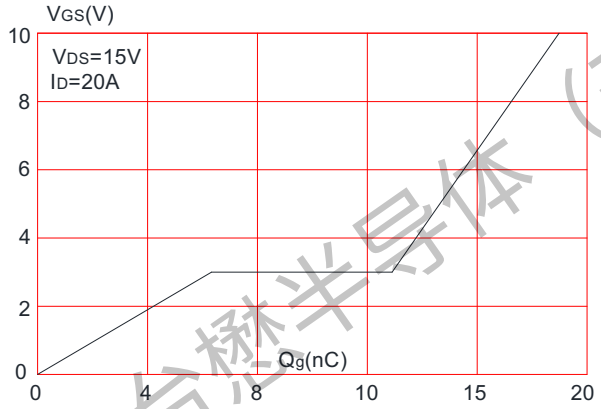

Figure 6: Capacitance Characteristics

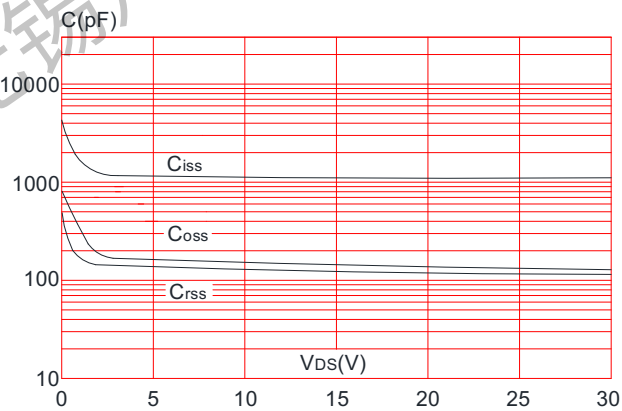

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Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

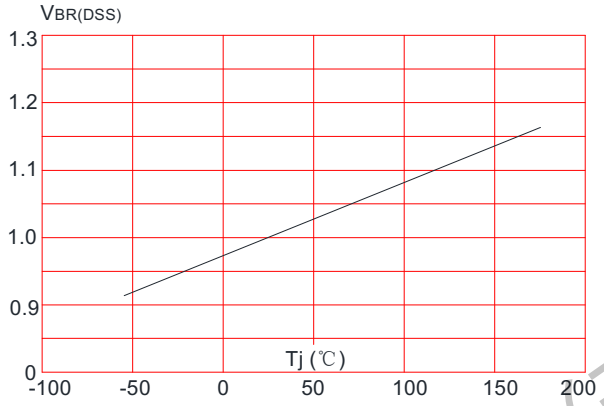


Figure 8: Normalized on Resistance vs. Junction Temperature

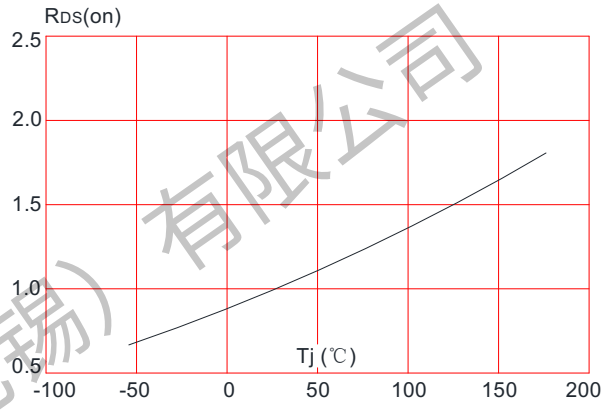


Figure 9: Maximum Safe Operating Area

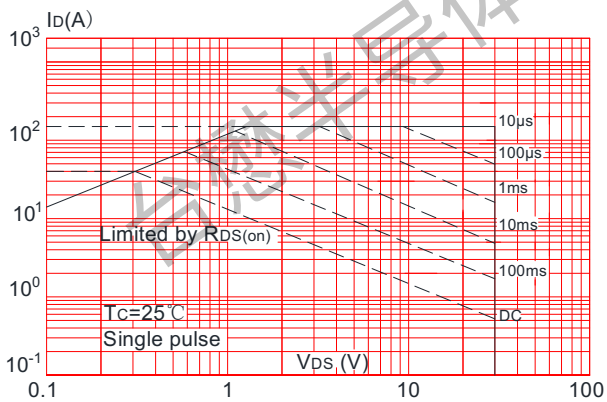
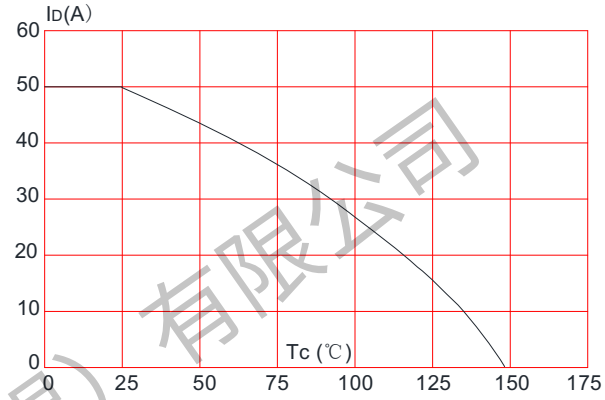
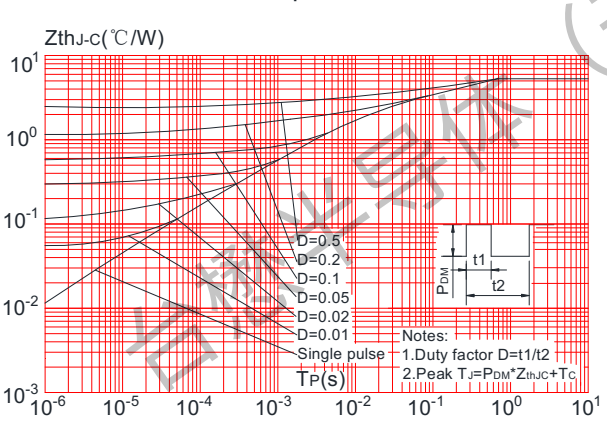


Figure 10: Maximum Continuous Drain Current vs. Case Temperature



Maximum Effective Transient Thermal Impedance, Junction-to-Case



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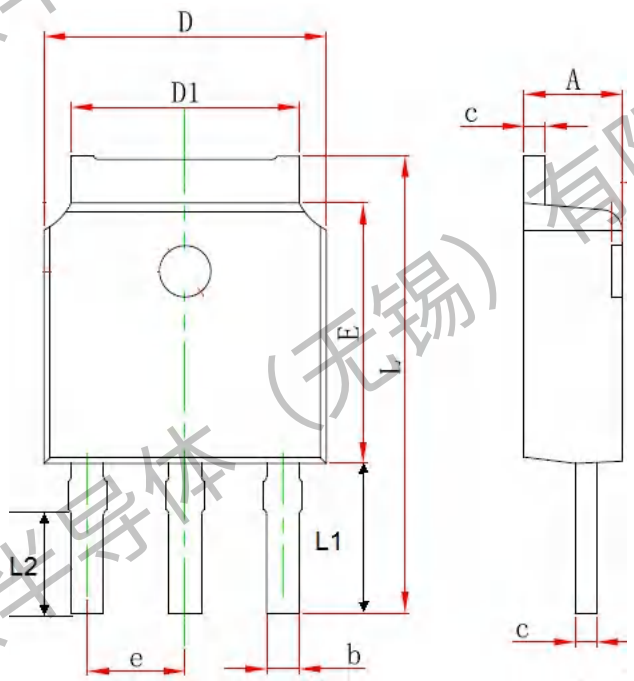
Package Mechanical Data:TO-251S-3L

UNIT：mm

SYMBOL	min	nom	max
A	2.20		2.40
b	0.50		0.85
C	0.45	0.50	0.60
D	6.50		6.70
D1	5.10		5.50
E	5.9		6.20
e	2.18	2.29	2.38
L	11.00		12.40
L1	3.9		4.2
L2	2.7		3.0



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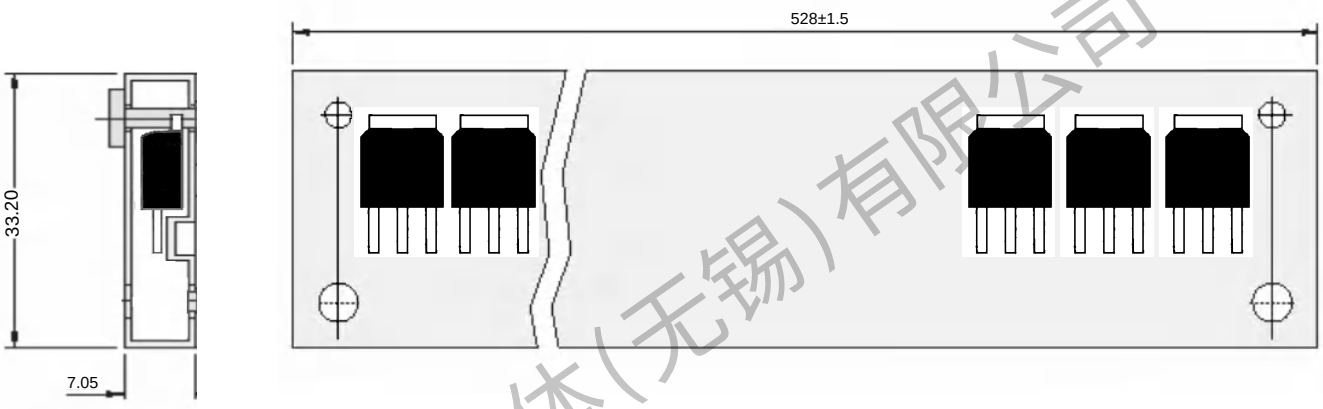

All Dimensions are in mm

1.TO-251S-3L Packaging

Package	Packing Form	Quantity		
		Tube	Inner Box	Outbox
TO-251S-3L	Tube Tape	80 Or 75	5 Or 6	1

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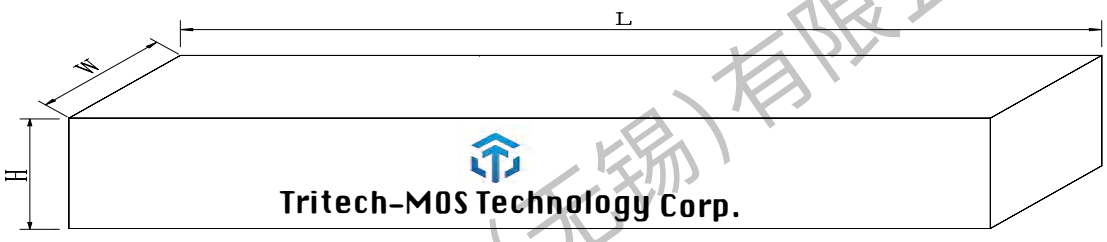
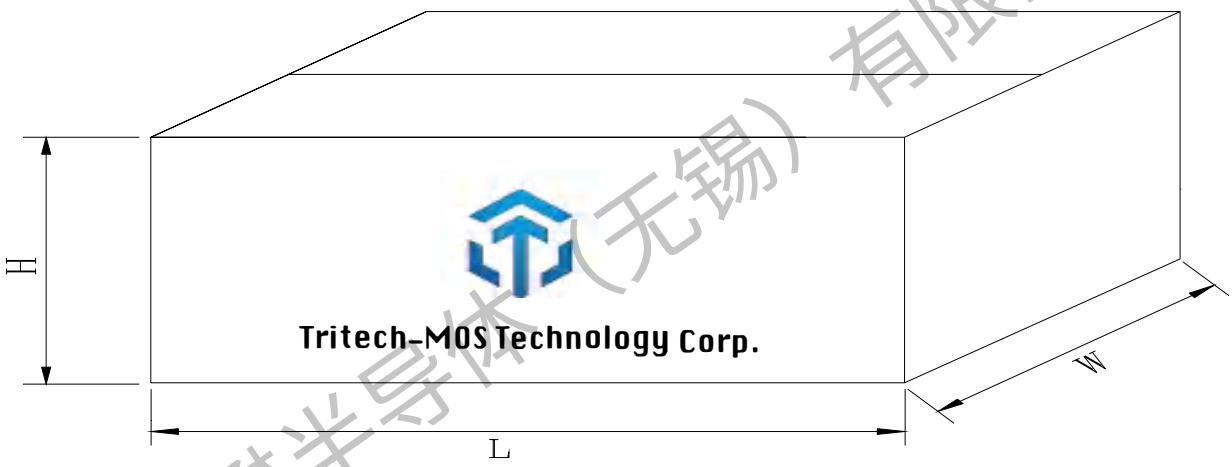
Inner Box



Dimension : 580 (L)×154(W) ×49(H) mm

Quantity : 80 × 50Ea = 4000pcs Or 75 × 56Ea = 4200pcs

Outer Box



Dimension : 595(L)×285(W) ×185(H) mm

Quantity : 4000 × 6Ea = 24000pcs Or 4200 × 5Ea = 21000pcs

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Revision history:

Date	Rev	Description	Page
2023.07.08	23.07	Original	

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