TM50N06YS

N -Channel Enhancement Mosfet

General Description

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

Applications

- Load switch
- PWM

General Features

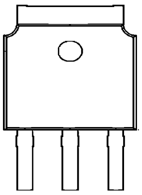
V_{DS} = 60V I_D =50A

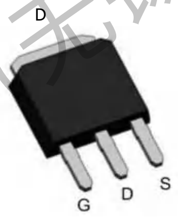
$R_{DS(ON)}$=12 mΩ (typ.)@ V_{GS}=10V

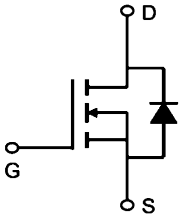
100% UIS Tested

100% R_g Tested

YS:TO-251S-3L







Marking: 50N06

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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	60	V
V_{GS}	Gate-Source Voltage	±20	V
I_D@T_C=25˚C	Continuous Drain Current, V_{GS} @ 10V[1]	50	A
I_D@T_C=100˚C	Continuous Drain Current, V_{GS} @ 10V[1]	23	A
I_{DM}	Pulsed Drain Current[2]	120	A
EAS	Single Pulsed Avalanche Energy[note2]	280	mJ
P_D@T_C=25˚C	Total Power Dissipation[3]	87.7	W
T_{STG}	Storage Temperature Range	-55 to 175	˚C
T_J	Operating Junction Temperature Range	-55 to 175	˚C

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{θJA}$	Thermal Resistance Junction-ambient [1]	---	62	˚C/W
$R_{θJC}$	Thermal Resistance Junction Case[1]	---	6.6	˚C/W

Electrical Characteristics (T_C=25℃unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=250μA	60	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=60V,V_{GS}=0V	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±20V,V_{DS}=0V	-	-	±100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250μA	1.0	2.0	3.0	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=30A	-	12	16	mΩ
Forward Transconductance	g_{FS}	V_{DS}=5V,I_D=30A	30	-	-	S
Dynamic Characteristics (Note4)						
Input Capacitance	C_{iss}	V_{DS}=25V,V_{GS}=0V, F=1.0MHz	-	1798	-	PF
Output Capacitance	C_{oss}		-	185	-	PF
Reverse Transfer Capacitance	C_{rss}		-	80	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=30V,I_D=2A,R_L=1Ω V_{GS}=10V,R_{GEN}=3Ω	-	12	-	nS
Turn-on Rise Time	t_r		-	5.2	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	38	-	nS
Turn-Off Fall Time	t_f		-	27	-	nS
Total Gate Charge	Q_g	V_{DS}=30V,I_D=30A, V_{GS}=10V	-	36	-	nC
Gate-Source Charge	Q_{gs}		-	9.9	-	nC
Gate-Drain Charge	Q_{gd}		-	6.6	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	V_{GS}=0V,I_S=30A	-	-	1.2	V
Diode Forward Current (Note 2)	I_S		-	-	50	A
Reverse Recovery Time	t_{rr}	TJ = 25°C, IF =30A di/dt = 100A/μs(Note3)	-	35		nS
Reverse Recovery Charge	Qrr		-	47		nC
Forward Turn-On Time	t_{on}	Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)				

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. E_{AS} condition: Tj=25℃,V_{DD}=30V,V_G=10V,L=0.5mH,Rg=25Ω

Typical Performance Characteristics

Figure1: Output Characteristics

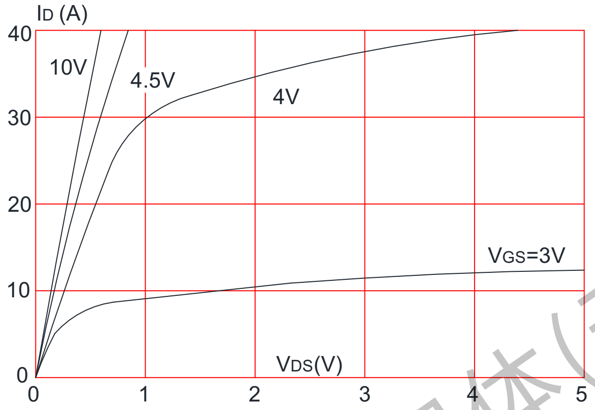


Figure 2: Typical Transfer Characteristics

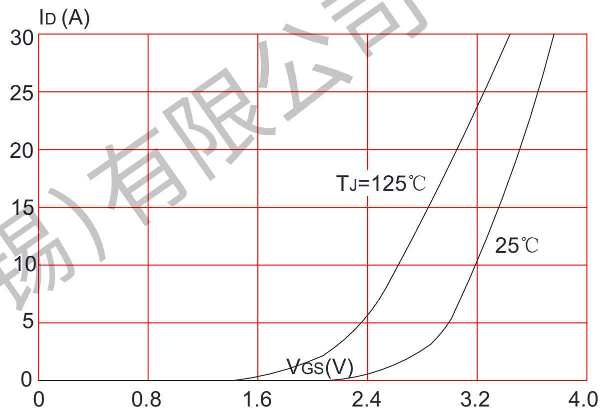


Figure 3: On-resistance vs. Drain Current

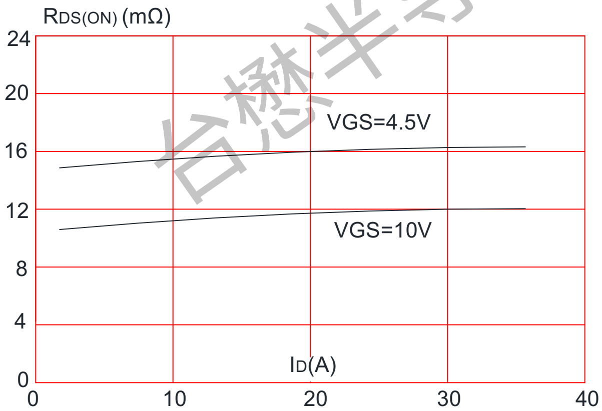


Figure 4: Body Diode Characteristics

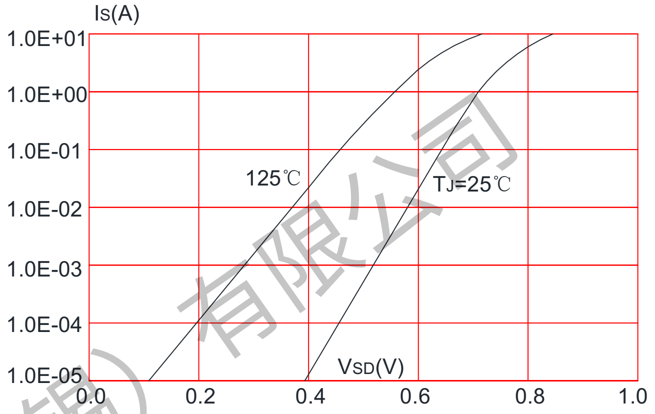


Figure 5: Gate Charge Characteristics

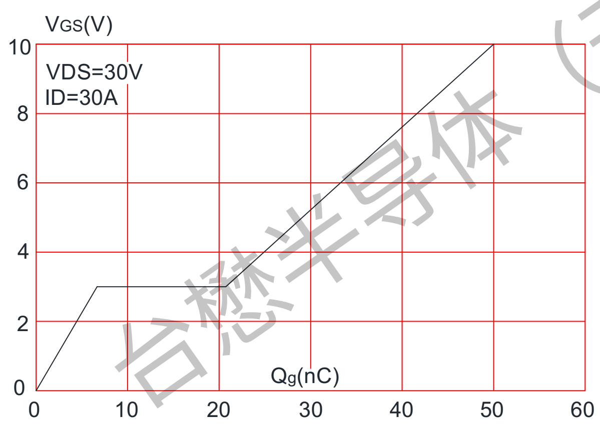


Figure 6: Capacitance Characteristics

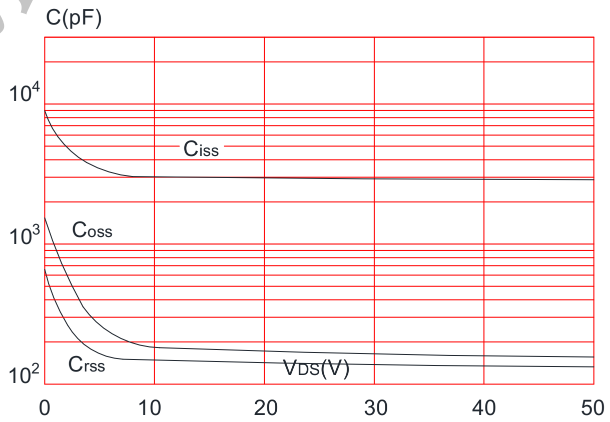


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

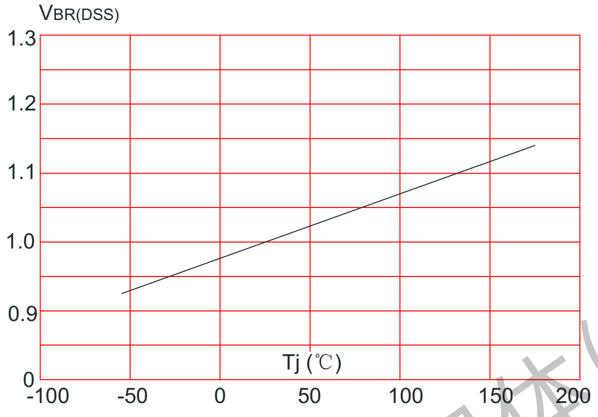


Figure 8: Normalized on Resistance vs. Junction Temperature

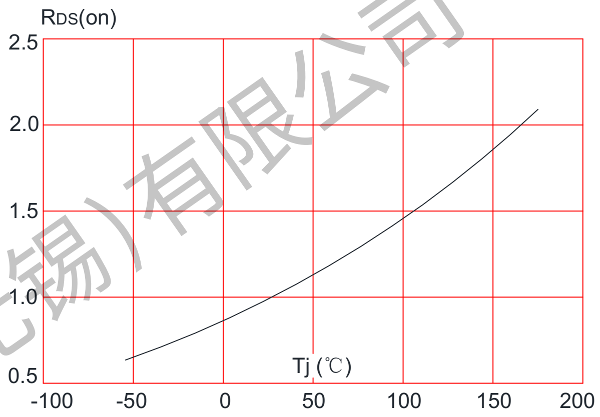


Figure 9: Maximum Safe Operating Area

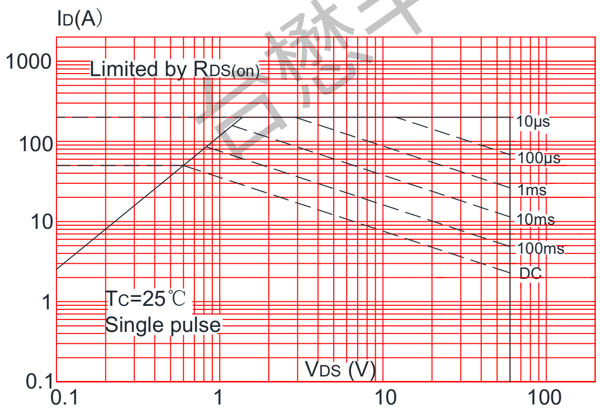


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

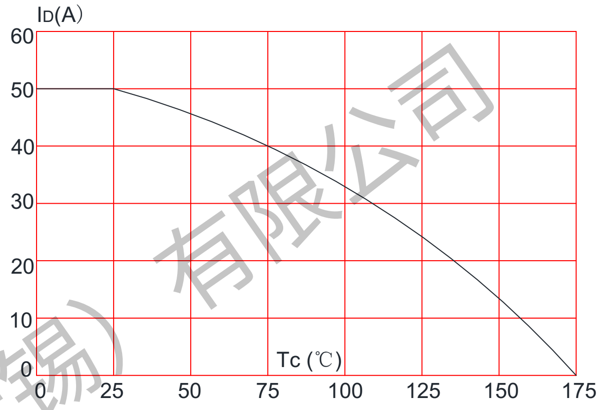
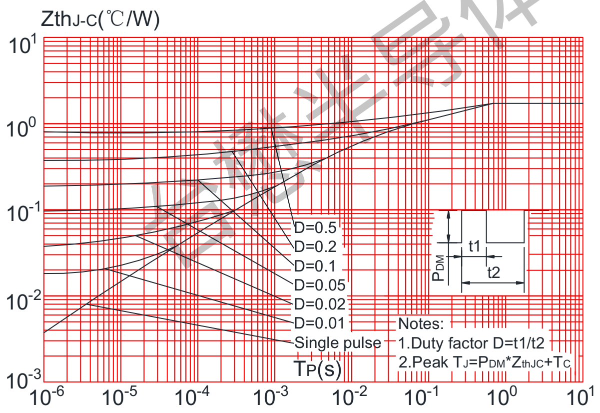


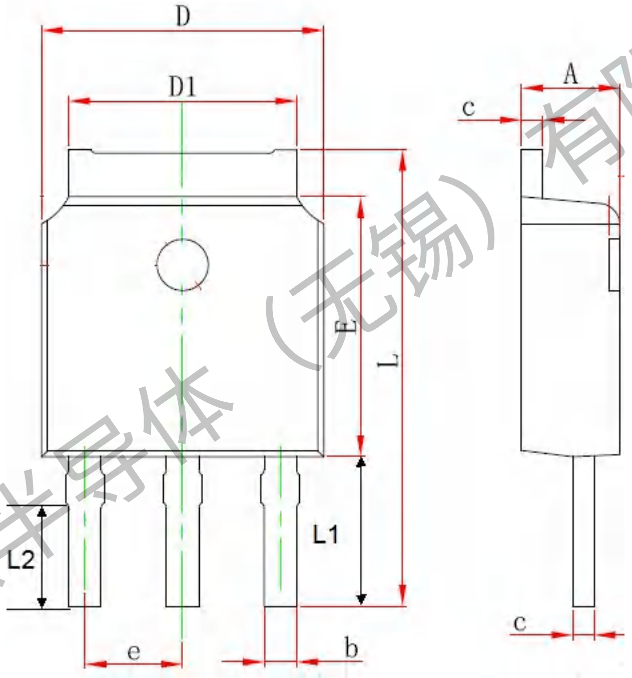
Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case

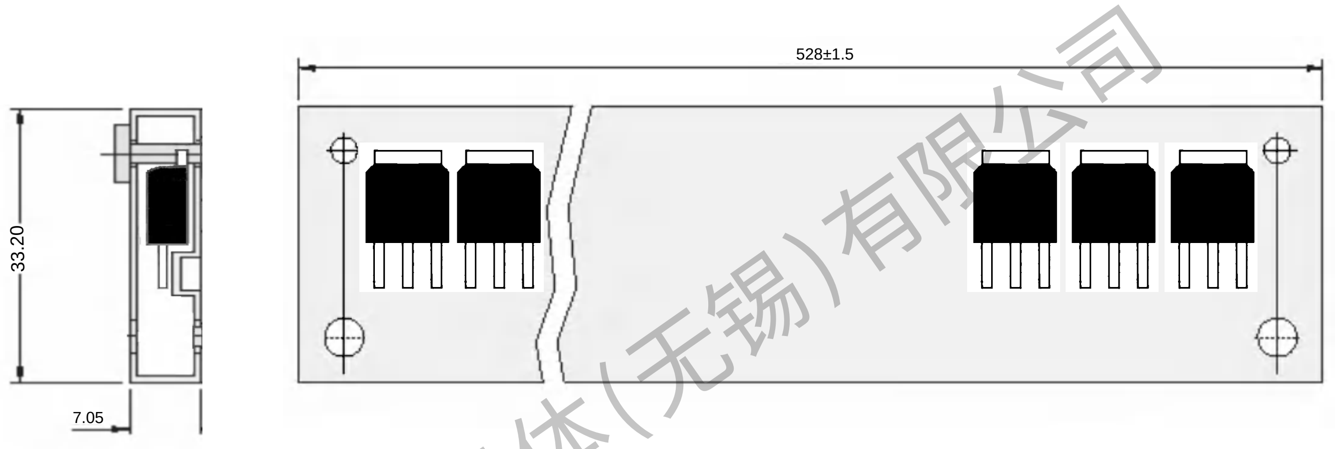


Package Mechanical Data:TO-251S-3L

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	4.8		5.3
L2	3.5		4.2





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

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
2023.10.15	23.10	Original	