ZHEJIANG UNIU-NE Technology CO.,LTD

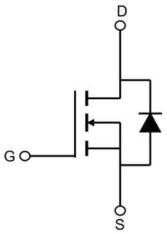
浙 江 宇 力 微 新 能 源 科 技 有 限 公 司

AP9565K Data Sheet

V 1.1

Feature

- -40V,-24A
  $R_{DS(ON)}$ <33mΩ @V_{GS}=-10V TYP:27 mΩ
  $R_{DS(ON)}$ <47mΩ @V_{GS}=-4.5V TYP:34 mΩ
- Advanced Trench Technology
- Lead free product is acquired
- Excellent $R_{DS(ON)}$ and Low Gate Charge



Schematic Diagram

Marking and pin assignment

Application

- PWM applications
- Load Switch
- Power management

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity (PCS)
9565K	AP9565K	TO-252	13 inch	-	2500

ABSOLUTE MAXIMUM RATINGS (T_a=25℃ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	-40	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current (T_C=25℃)	I_D	-24	A
Continuous Drain Current (T_C=100℃)	I_D	-15	A
Pulsed Drain Current (1)	I_{DM}	-72	A
Single Pulsed Avalanche Energy (2)	E_{AS}	54	mJ
Power Dissipation	P_D	39	W
Thermal Resistance from Junction to Case	$R_{\theta JC}$	3.2	℃/W
Junction Temperature	T_J	150	℃
Storage Temperature	T_{STG}	-55~ +150	℃

MOSFET ELECTRICAL CHARACTERISTICS(T_a=25℃ unless otherwise noted)

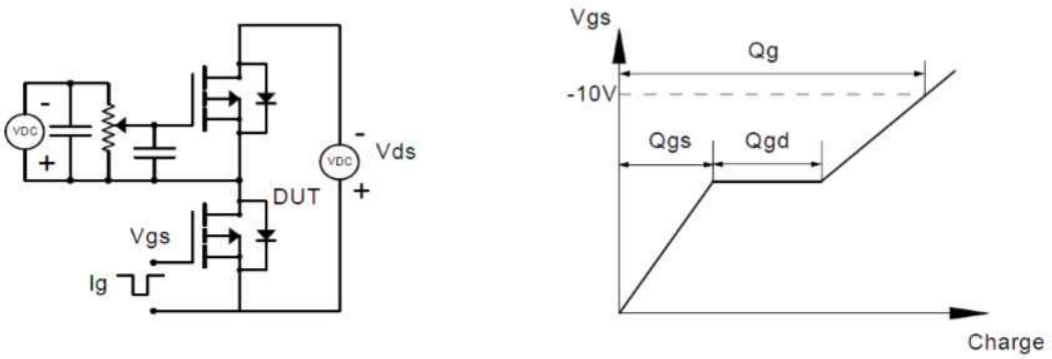
Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Static Characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D =-250μA	-40	-	-	V
Zero gate voltage drain current	I_{DSS}	V_{DS} =-40V, V_{GS} = 0V	-	-	1	μA
Gate-body leakage current	I_{GSS}	V_{GS} =±20V, V_{DS} = 0V	-	-	±100	nA
Gate threshold voltage(3)	$V_{GS(th)}$	V_{DS} =V_{GS}, I_D =-250μA	-1	-1.6	-2.5	V
Drain-source on-resistance(3)	$R_{DS(on)}$	V_{GS} =-10V, I_D =-20A	-	27	33	mΩ
		V_{GS} =-4.5V, I_D =-10A	-	34	47	
Dynamic characteristics						
Input Capacitance	C_{iss}	V_{DS} =-20V, V_{GS} =0V, f =1MHz	-	1512	-	pF
Output Capacitance	C_{oss}		-	115	-	
Reverse Transfer Capacitance	C_{rss}		-	104	-	
Switching characteristics						
Turn-on delay time	$t_{d(on)}$	V_{DD}=-20V, I_D=-20A, R_L=1Ω V_{GS}=-10V, R_G=2.5Ω	-	4	-	ns
Turn-on rise time	t_r		-	27	-	
Turn-off delay time	$t_{d(off)}$		-	39	-	
Turn-off fall time	t_f		-	10	-	
Total Gate Charge	Qg	VDS=-20V, ID=-10A, VGS=-10V	-	27	-	nC
Gate-Source Charge	Qgs		-	4.5	-	
Gate-Drain Charge	Qgd		-	5.4	-	
Source-Drain Diode characteristics						
Diode Forward voltage(3)	V_{DS}	V_{GS} =0V, I_S=-20A	-	-	-1.2	V
Diode Forward current(4)	I_S		-	-	-24	A
Body Diode Reverse Recovery Time	trr	T_J=25°， IF=-15A,di/dt=100A/us		11		ns
Body Diode Reverse Recovery Charge	Qrr	T_J=25°， IF=-15A,di/dt=100A/us		2.1		nc

Notes:

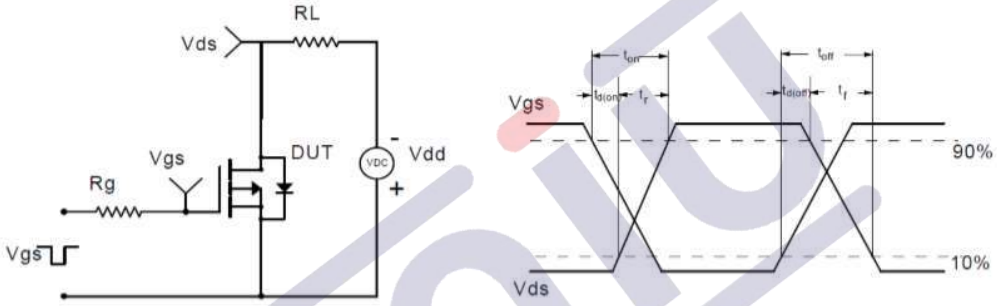
1. Repetitive Rating: pulse width limited by maximum junction temperature
2. EAS Condition:T_J=25℃,V_{DD}=-20V,R_G=25Ω,L=0.5mH
3. Pulse Test: pulse width≤300μs, duty cycle≤2%
4. Surface Mounted on FR4 Board,t≤10 sec

Test Circuit

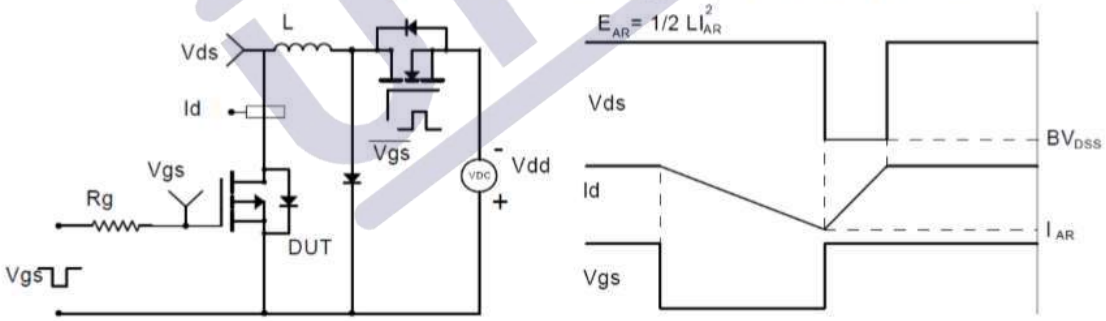
Gate Charge Test Circuit & Waveform



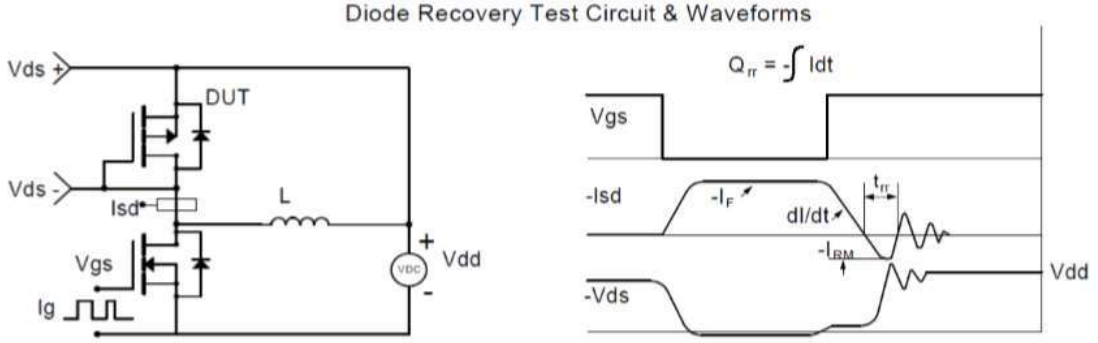
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Typical Performance Characteristics

Fig1. Power Dissipation Derating Curve

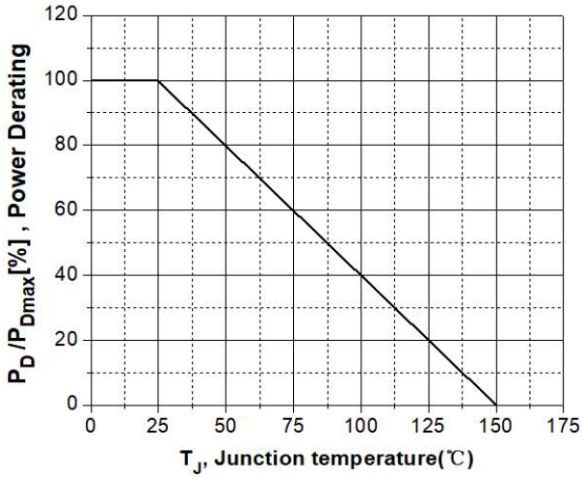


Fig2. Avalanche Energy Derating Curve vs. Junction Temperature

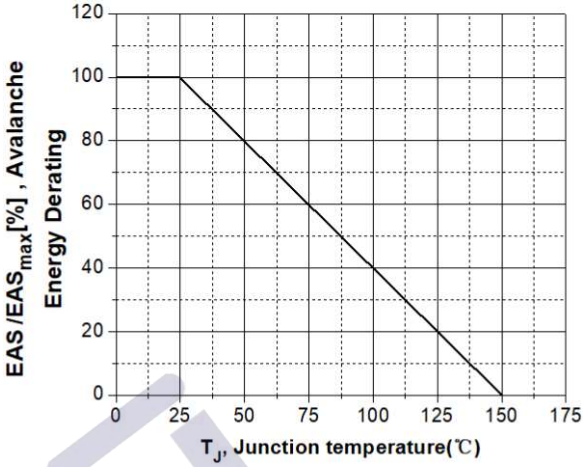


Fig3. Typical Output Characteristics@Tj= 125℃

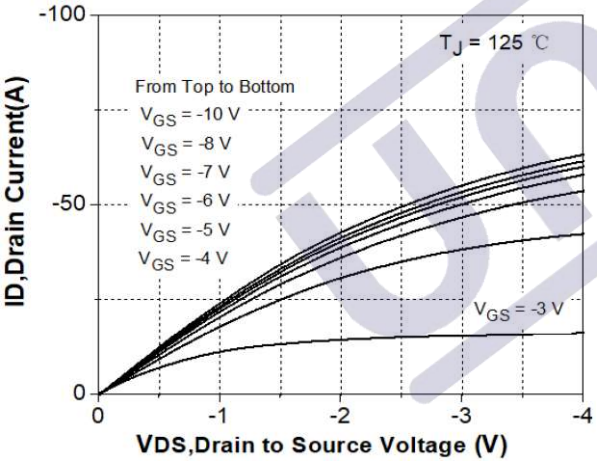


Fig4. Transconductance vs. Drain Current @Tj= -25/25/75/125℃

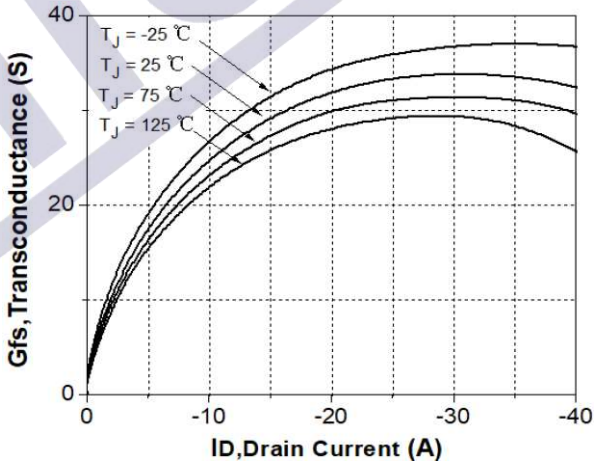


Fig5. Typical Transfer Characteristics @Tj= -25/25/75/125℃

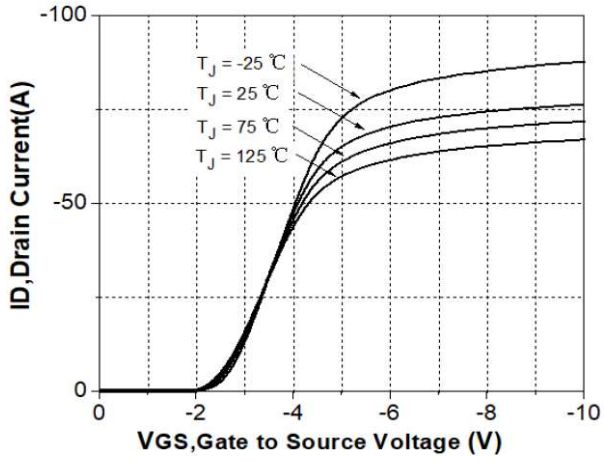


Fig6. Static Drain - Source On - State Resistance vs. Drain Current @Tj= -25℃

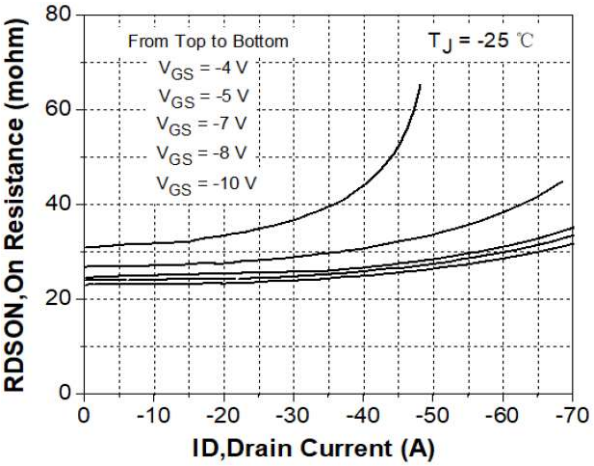


Fig7. Static Drain - Source On - State Resistance vs. Drain Current @Tj= 25℃

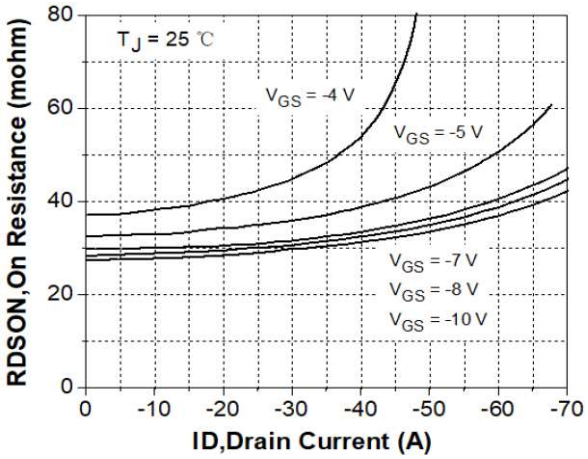


Fig8. Static Drain - Source On - State Resistance vs. Drain Current @Tj= 75℃

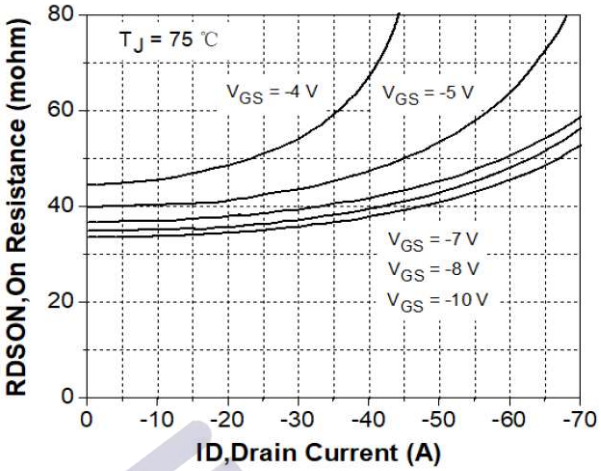


Fig9. Static Drain - Source On - State Resistance vs. Drain Current @Tj= 125℃

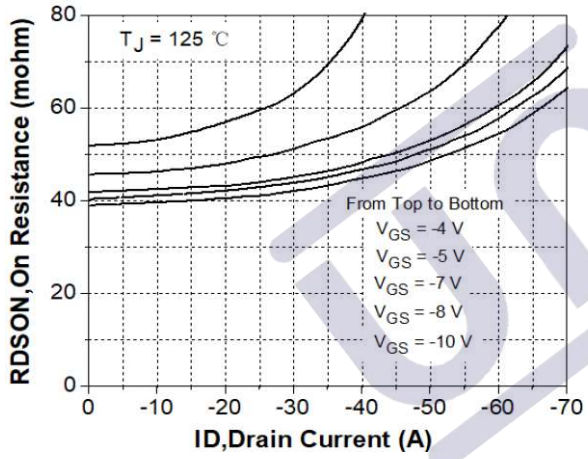


Fig10. Gate Charge Characteristics

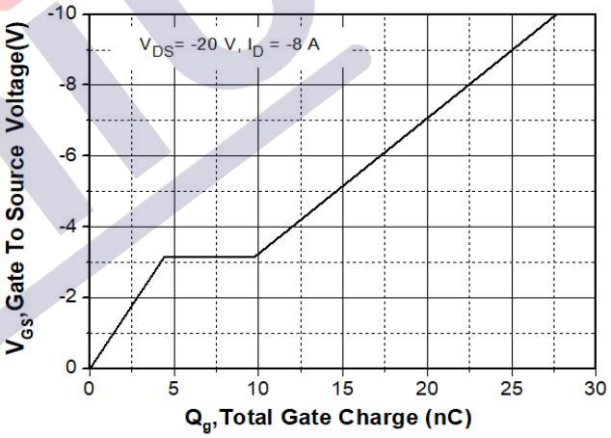


Fig11. Breakdown Voltage vs. Junction Temperature

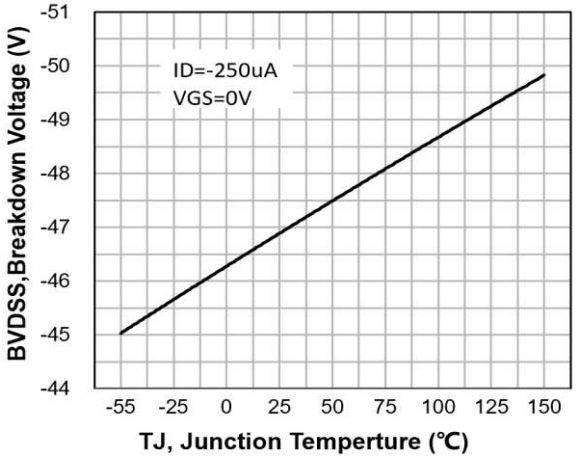


Fig12. Gate Threshold Voltage vs. Junction Temperature

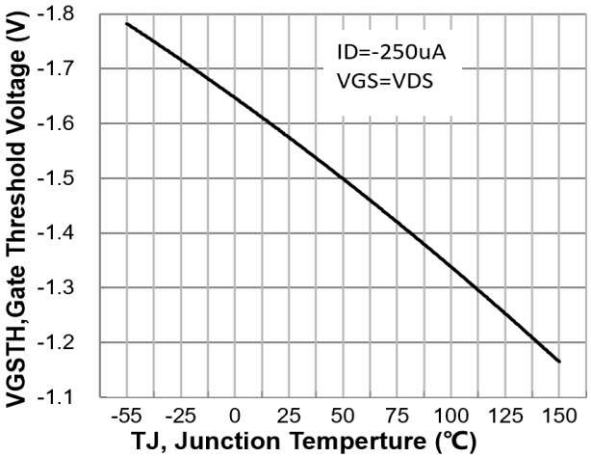


Fig13. On-Resistance Variation vs. Junction

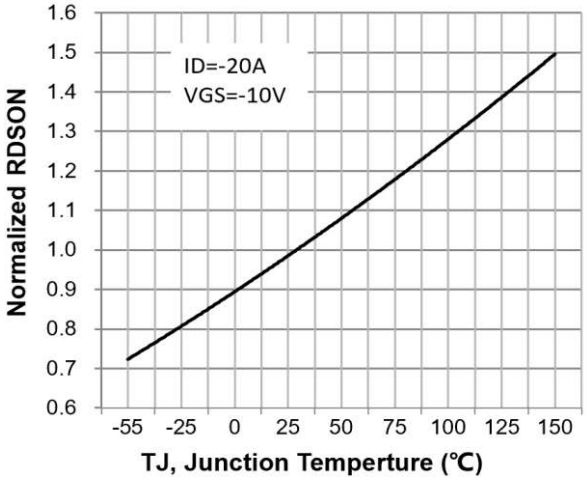


Fig14. Maximum Drain Current vs. Case Temperature

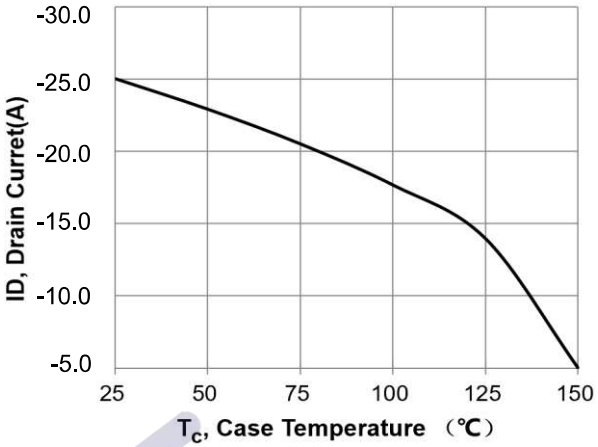


Fig15. Body Diode Forward Voltage vs. Reverse Drain Current

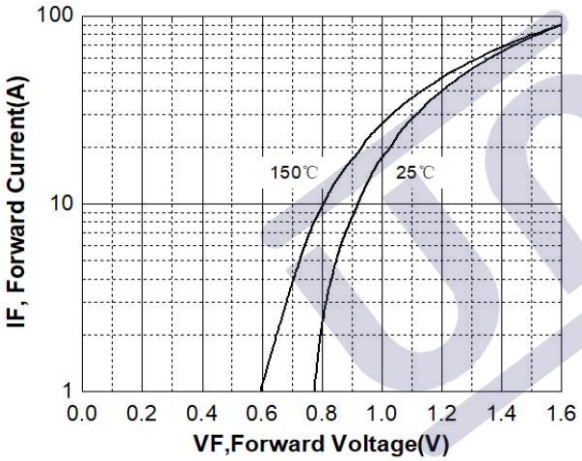


Fig16. Typical Output Characteristics@Tj= 25℃

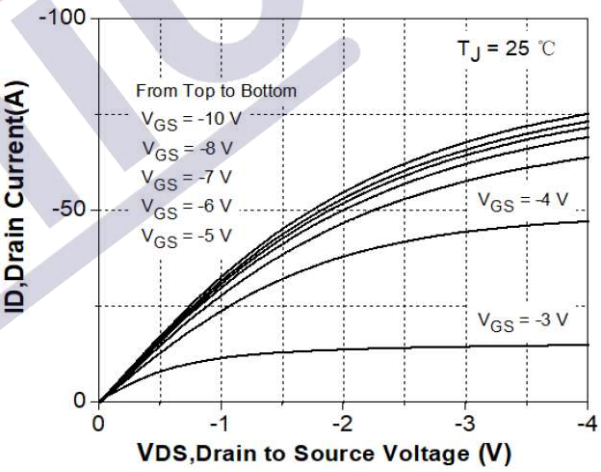


Fig17. Safe Operating Area

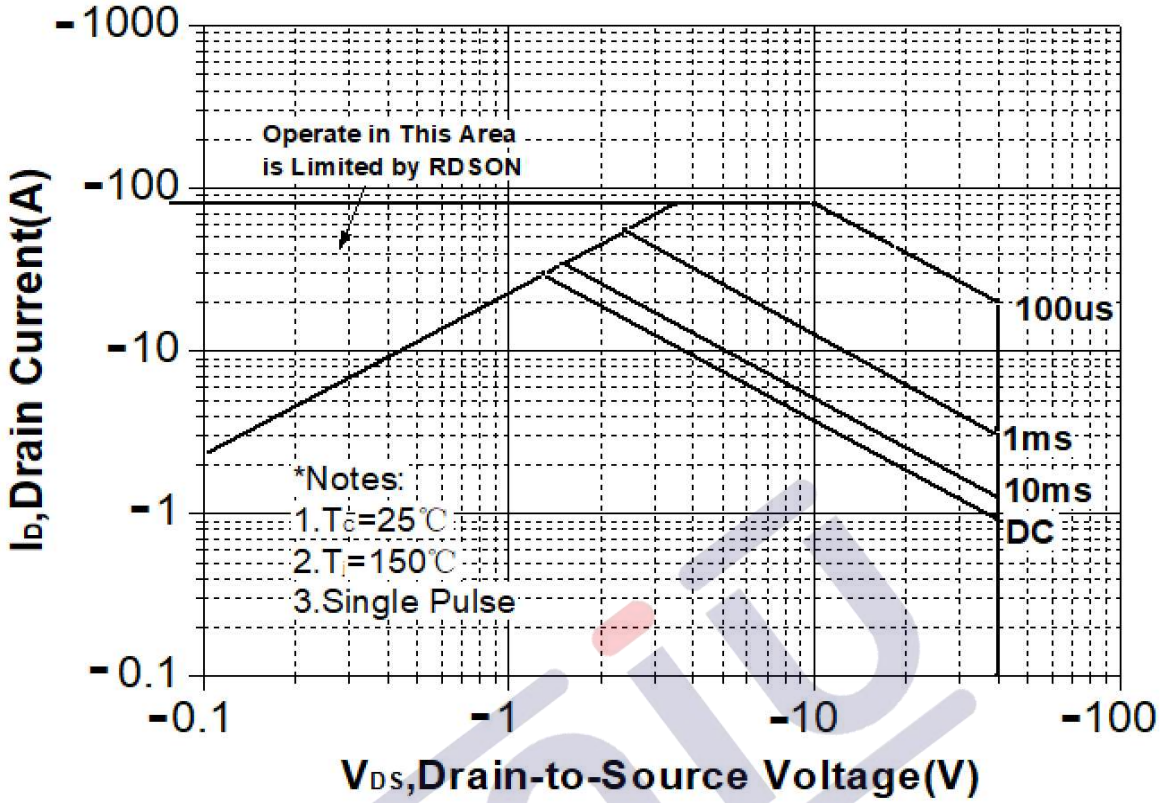
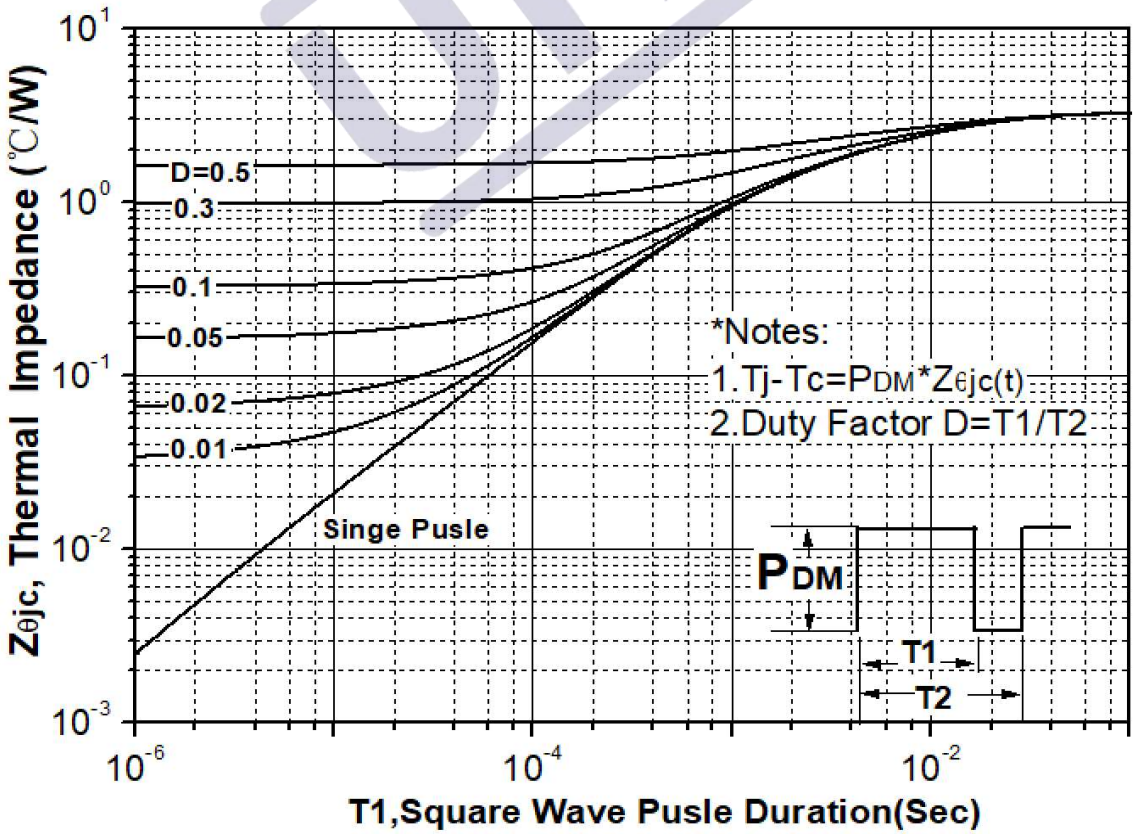
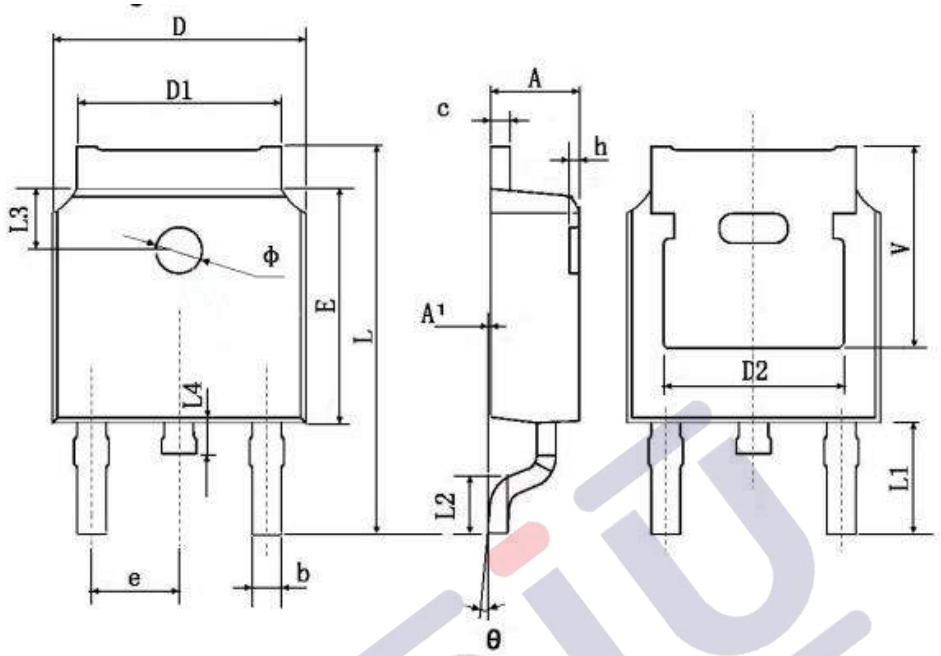


Fig18. Transient Thermal Response Curve



TO-252 Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.250	2.350	0.089	0.093
A1	0.050	0.150	0.002	0.006
b	0.660	0.860	0.026	0.034
c	0.458	0.558	0.018	0.022
D	6.550	6.650	0.259	0.263
D1	5.234	5.434	0.207	0.215
D2	4.826 TYP.		0.191 TYP.	
E	6.050	6.150	0.239	0.243
e	2.236	2.336	0.088	0.092
L	9.820	10.220	0.388	0.404
L1	3.000 TYP.		0.119 TYP.	
L2	1.400	1.600	0.055	0.063
L3	1.800 TYP.		0.071 TYP.	
L4	0.700	0.900	0.028	0.036
Φ	1.150	1.250	0.045	0.049
θ	0°	3°	0°	3°
h	0.000	0.300	0.000	0.012
V	5.399 TYP		0.213 TYP	

1.版本记录

DATE	REV.	DESCRIPTION
2022/10/13	1.0	Initial Release
2023/11/06	1.1	Layout Adjustment

2.免责声明

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