

70A 650V N-channel Super Junction Power MOSFET

1 Description

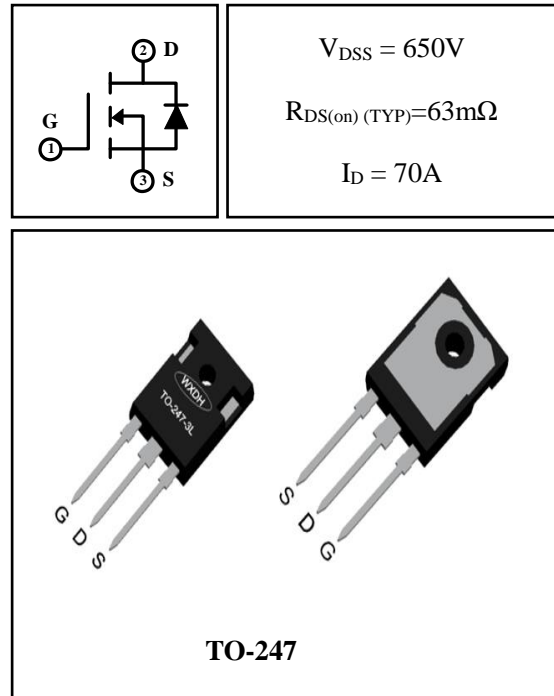
This N-channel enhanced vdmofets, is using advanced super junction technology and design to provide excellent $R_{DS(on)}$ with low gate charge. Which accords with the RoHS standard.

2 Features

- Fast switching
- Low on resistance
- Low gate charge
- Low reverse transfer capacitances
- 100% single pulse avalanche energy test

3 Applications

- Power factor correction(PFC)
- Switched mode power supplies(SMPS)
- Uninterruptible power supply(UPS)
- TV power & LED Lighting Power
- AC to DC Converters
- Telecom Power



4 Electrical characteristics

4.1 Absolute maximum ratings (T_j=25°C, unless otherwise noted)

Parameter	Symbol	Rating	Units
Drain-to-Source Voltage	V _{DSS}	650	V
Gate-to-Source Voltage	V _{GSS}	±30	V
Continuous Drain Current	I _D	T _C =25°C	70
		T _C =100°C	44
Pulsed Drain Current ⁽¹⁾	I _{DM}	276	A
Single Pulse Avalanche Energy ⁽⁴⁾	E _{AS}	2200	mJ
MOSFET dv/dt ruggedness, V _{DS} =0...400V	dv/dt	50	V/ns
Reverse diode dv/dt, V _{DS} =0...400V, I _{DS} ≤I _D	dv/dt	12	V/ns
Power Dissipation, TO-247 T _C =25°C	P _{tot}	781	W
Junction Temperature Range	T _j	-50 ~ 150	°C
Storage Temperature Range	T _{stg}	-50 ~ 150	°C

4.2 Thermal characteristics

Parameter	Symbol	Rating	Unit
Thermal Resistance Junction to Case-sink	R _{thJC}	0.16	°C/W
Thermal Resistance Junction to Ambient	R _{thJA}	48	°C/W

4.3 Electrical characteristics ($T_j=25^{\circ}\text{C}$, unless otherwise noted)

Parameter	Symbol	Test Condition	Value			Units
			Min	Typ	Max	
Off Characteristics						
Drain-to-Source Breakdown Voltage	BV_{DSS}	$I_D=10\text{mA}, V_{GS}=0\text{V}$	650	--	--	V
Drain-to-Source Leakage	I_{DSS}	$V_{DS}=650\text{V}, V_{GS}=0\text{V}, T_C=25^{\circ}\text{C}$	--	--	10	μA
Gate-to-Source Leakage Current	I_{GSS}	$V_{GS}=\pm 30\text{V}$	--	--	± 500	nA
On Characteristics						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=1.0\text{mA}$	2.5	--	4.5	V
Drain-to-Source on-state Resistance	$R_{DS(on)}$	$V_{GS}=10\text{V}, I_D=35\text{A}$	--	63	70	$\text{m}\Omega$
Dynamic Characteristics						
Input Capacitance	C_{iss}	$V_{GS}=0\text{V}, V_{DS}=400\text{V},$ $f=1.0\text{MHz}$	--	4404	--	pF
Output Capacitance	C_{oss}		--	101	--	
Reverse Transfer Capacitance	C_{rss}		--	2.3	--	
Switching Characteristics						
Turn-on Delay Time	$t_{d(on)}$	$I_D=35\text{A}, V_{DD}=400\text{V},$ $V_{GS}=10\text{V}, R_G=25\Omega$	--	75	--	nS
Turn-on Rise Time	t_r		--	78	--	
Turn-off Delay Time	$t_{d(off)}$		--	280	--	
Turn-off Fall Time	t_f		--	67	--	
Total Gate Charge	Q_g	$I_D=35\text{A}, V_{DD}=480\text{V},$ $V_{GS}=10\text{V}$	--	94	--	nC
Gate-to-Source Charge	Q_{gs}		--	25	--	
Gate-to-Drain("Miller") Charge	Q_{gd}		--	34	--	
Drain-Source Diode Characteristics						
Diode Forward Voltage ⁽³⁾	V_{FSD}	$V_{GS}=0\text{V}, I_S=70\text{A}$	--	--	1.3	V
Diode Forward Current	I_S		--	--	70	A
Reverse Recovery Time ⁽³⁾	t_{rr}	$T_j=25^{\circ}\text{C}, I_F=35\text{A},$ $dI_F/dt=100\text{A}/\mu\text{S}, V_{RR}=400\text{V}$	--	137	--	nS
Reverse Recovery Charge ⁽³⁾	Q_{rr}		--	1.073	--	μC

Notes:

- 1: Repetitive rating, pulse width limited by maximum junction temperature.
- 2: Surface mounted on FR4 Board, $t \leq 10\text{sec}$.
- 3: Pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.
4. $L=10\text{mH}, I_D=4.2\text{A}, V_{DD}=100\text{V}, V_{GS}=10\text{V}, R_G=25\Omega, V_{GATE}=650\text{V}, \text{Start } T_j=25^{\circ}\text{C}$.

5 Typical characteristic curves

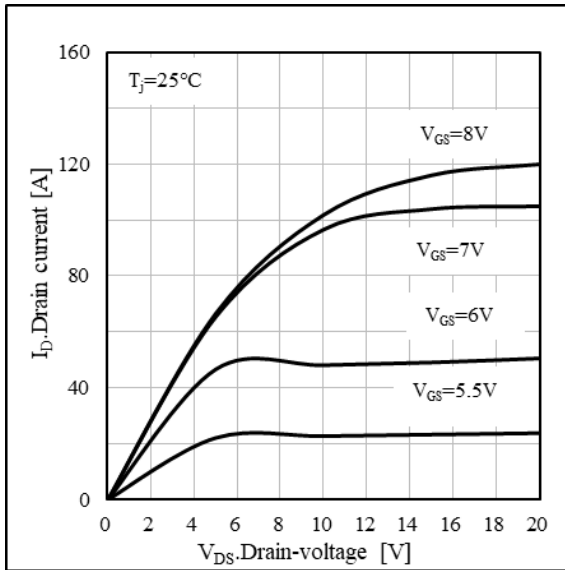


Fig1. Typical output characteristic

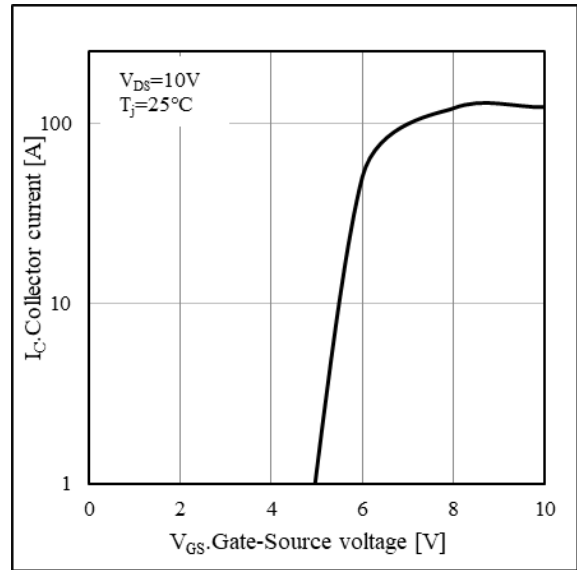


Fig2. Typical transfer characteristic

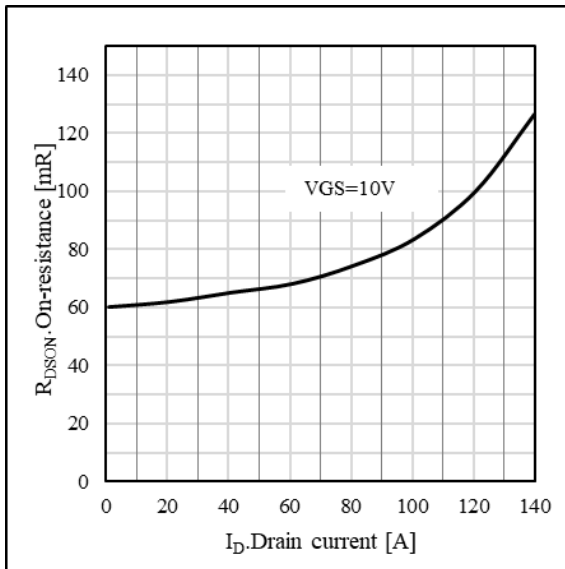


Fig3. Drain-source in-state resistance

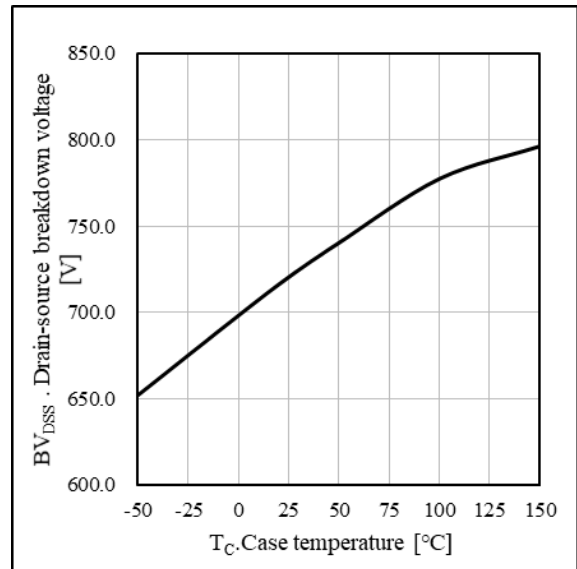


Fig4. Drain-source breakdown voltage

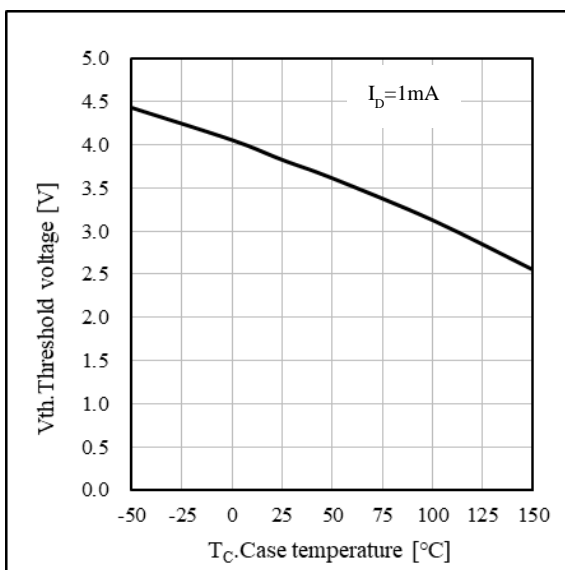


Fig5. Threshold voltage

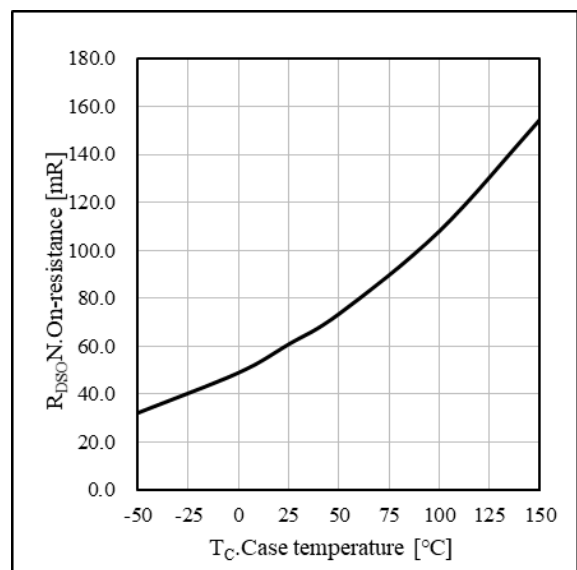


Fig6. Drain-source on-state resistance

5 Typical characteristic curves(continue)

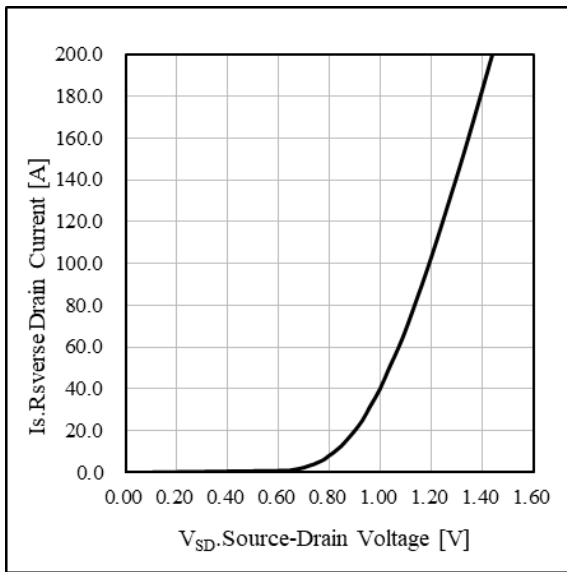


Fig7. Forward characteristic of body diode

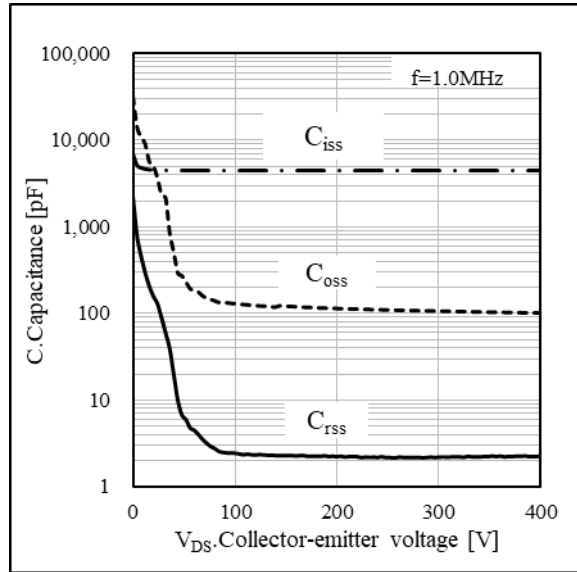


Fig8. Typical capacitance

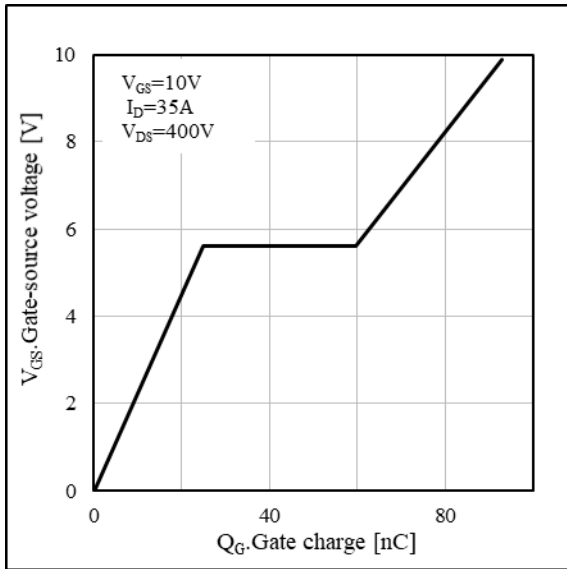


Fig9. Typical gate charge

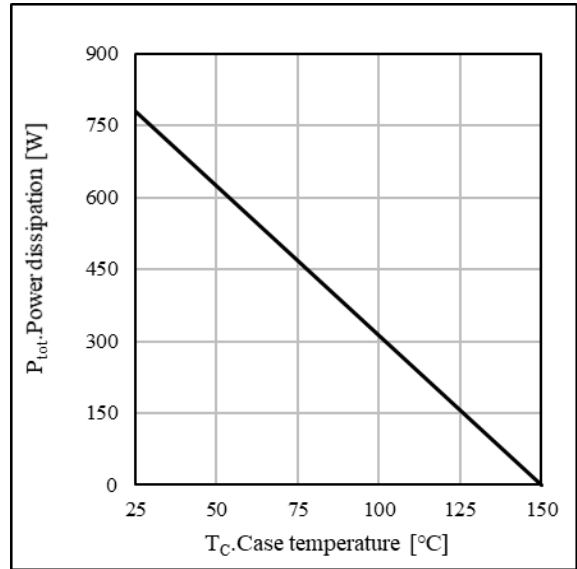


Fig10. Power dissipation temperature

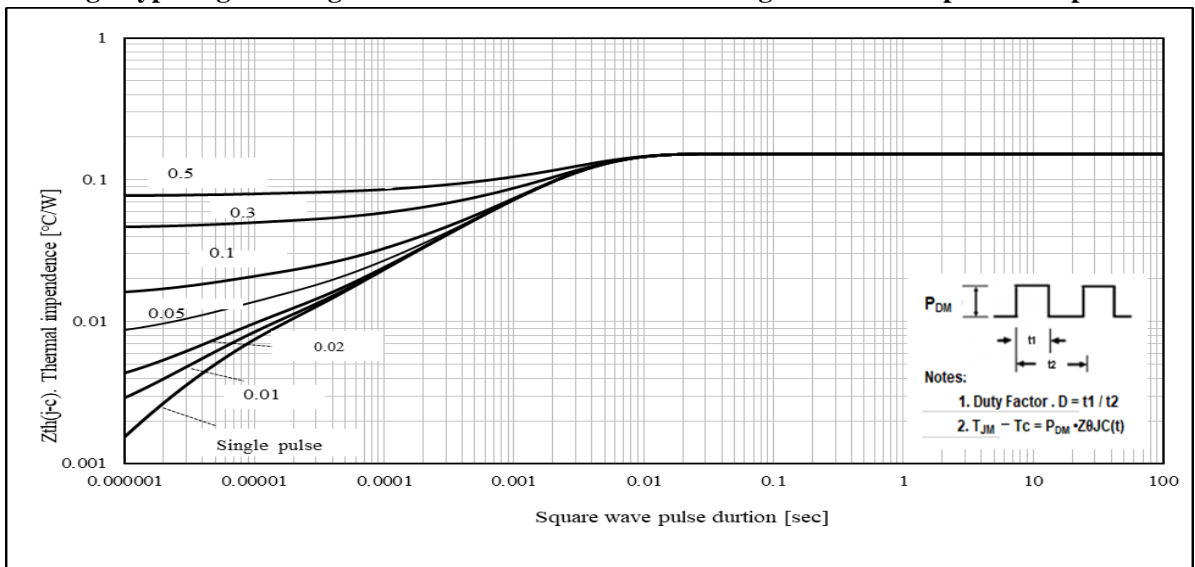


Fig11. Max. transient thermal impedance

5 Typical characteristic curves(continue)

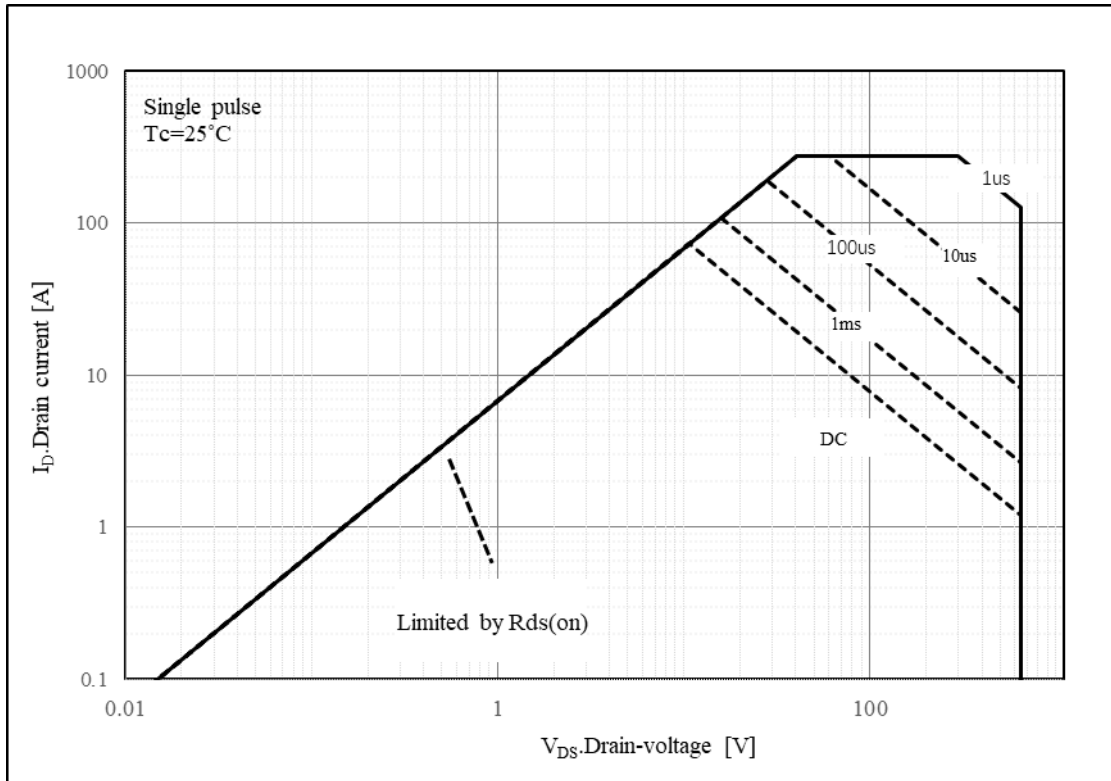
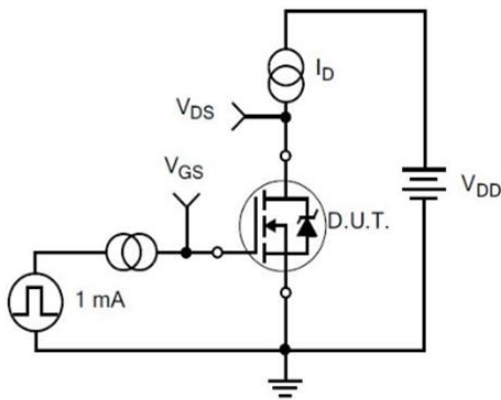
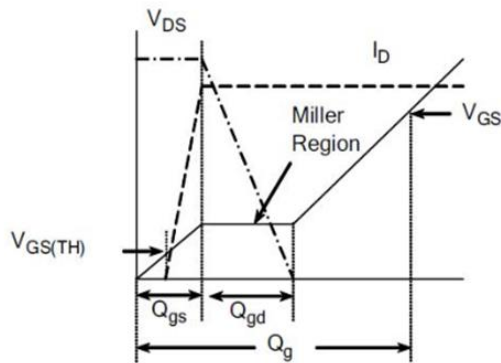


Fig12. Safe operation area

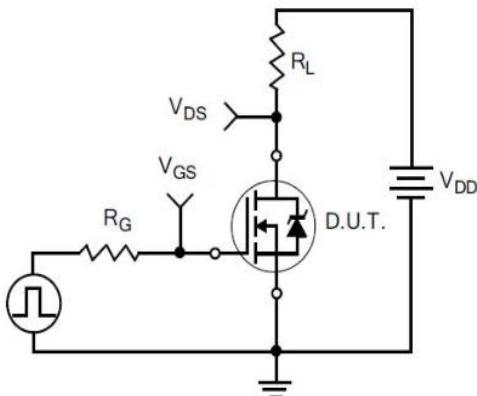
6 Typical Test Circuit and Waveform



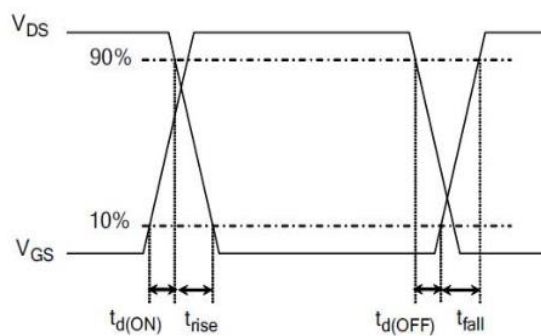
1) Gate Charge Test Circuit



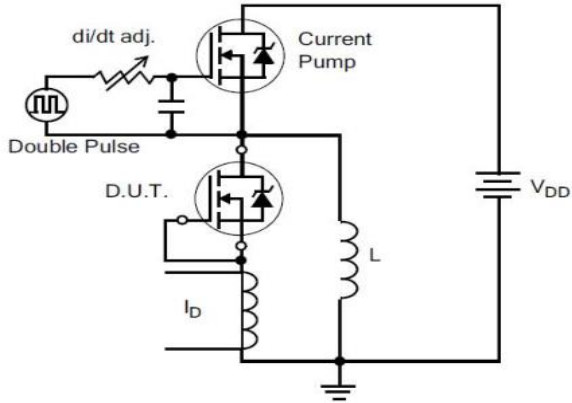
2) Gate Charge Waveform



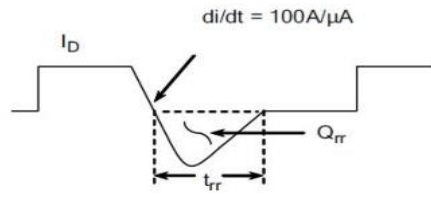
3) Resistive Switching Test Circuit



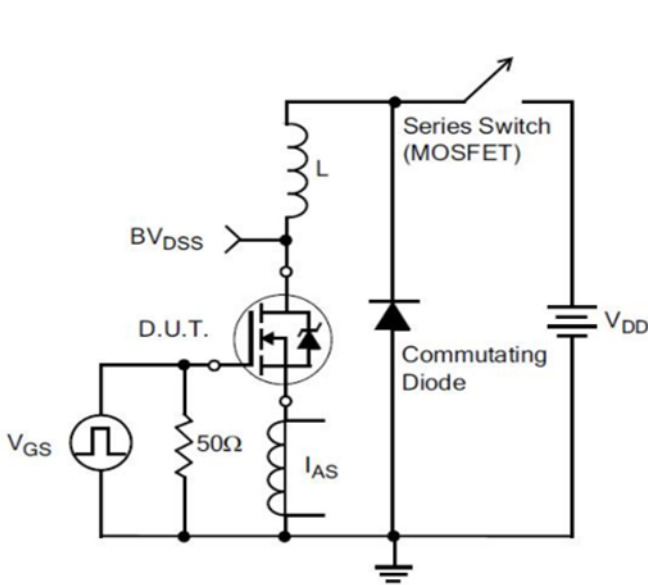
4) Resistive Switching Waveforms



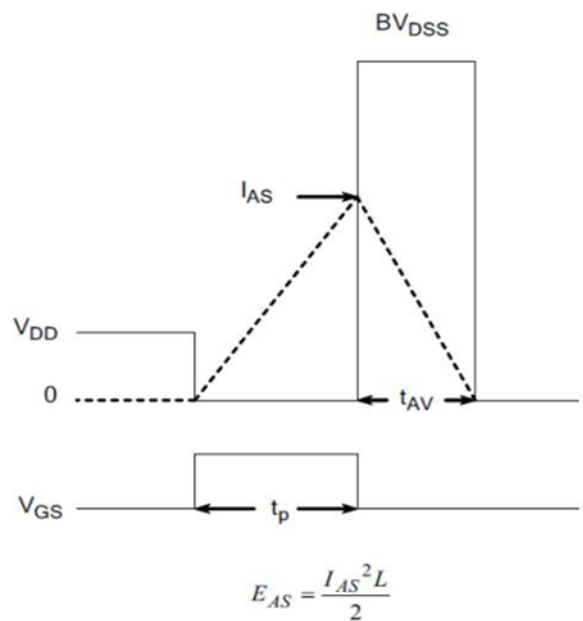
5) Diode Reverse Recovery Test Circuit



6) Diode Reverse Recovery Waveform



7) . Unclamped Inductive Switching Test Circuit



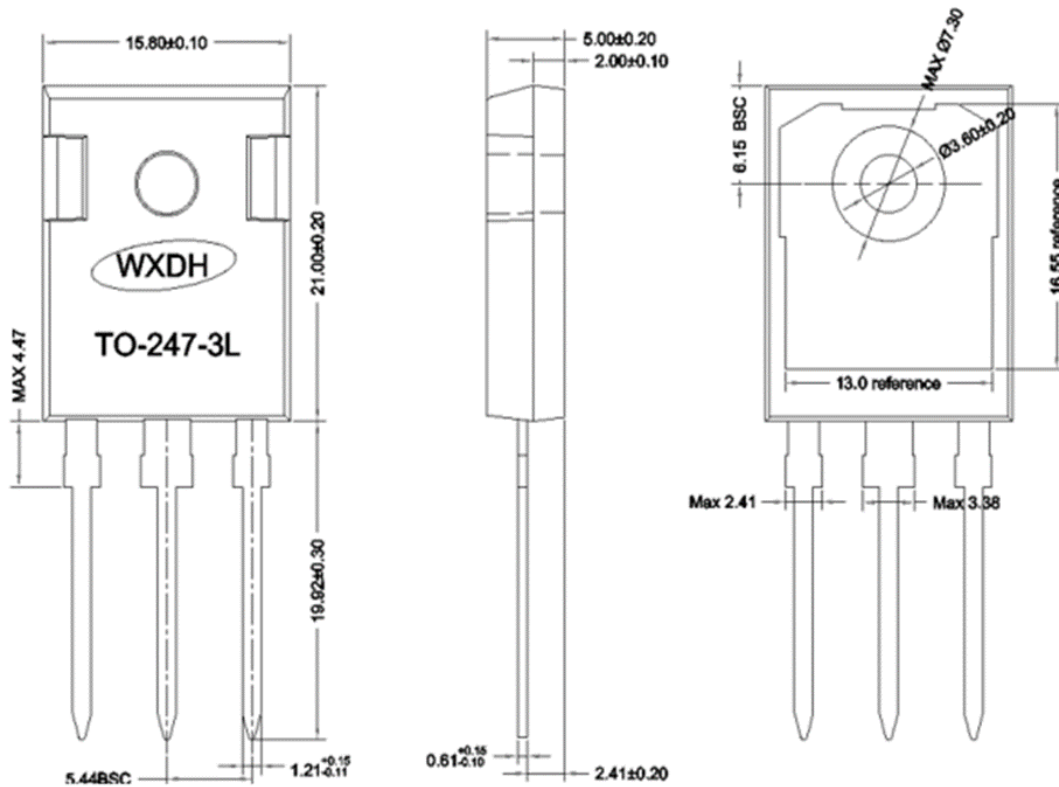
8) Unclamped Inductive Switching Waveforms

7 Product Specifications and Packaging Models

Product Model	Package Type	Mark Name	RoHS	Package	Quantity
DJC070N65M2	TO-247	DJC070N65M2	Pb-free	Tube	30

8 Dimensions (TO-247-3L)

*Dimensions in mm



9 Attentions

- Jiangsu Donghai Semiconductor CO.,LTD. reserves the right to change the specification without prior notice! The customer should obtain the latest version of the information before making the order and verify that the information is complete and up to date.
- It is the responsibility of the purchaser for any failure or failure of any semiconductor product under certain conditions. It is the responsibility of the purchaser to comply with safety standards and to take safety measures in the system design and machine manufacturing of Donghai products in order to avoid potential risk of failure. Injury or property damage.
- Product promotion is endless, our company will be dedicated to provide customers with better products.

10 Appendix

Revision history:

Date	REV.	Description	Page
2024.03.7	1.0	Original	7