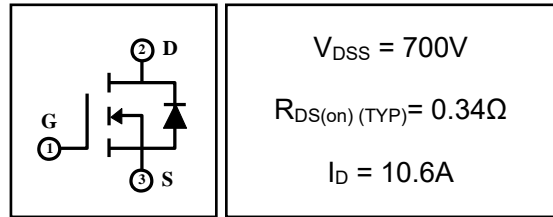


10.6A 700V N-channel Super Junction Power MOSFET

1 Description

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

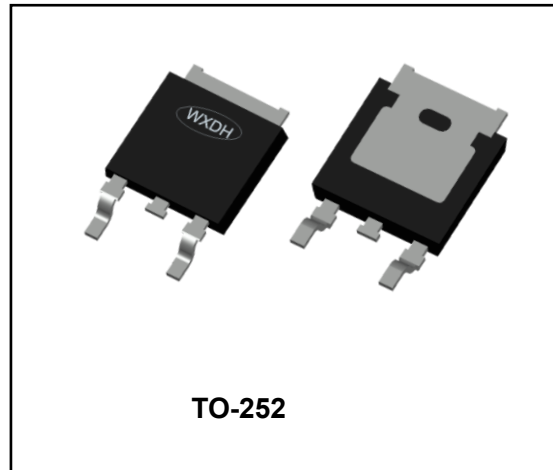


2 Features

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



4 Electrical Characteristics

4.1 Absolute Maximum Rating (Tc=25°C, unless otherwise noted)

Parameter	Symbol	Value	Units
Drian-to-Source Voltage	V_{DSS}	700	V
Gate-to-Source Voltage	V_{GSS}	±20	V
Continuous Drain Current	I_D	$T_C=25^\circ C$	10.6
		$T_C=100^\circ C$	7.6
Pulsed Drain Current ⁽¹⁾	I_{DM}	40	A
Single Pulse Avalanche Energy ⁽⁴⁾	E_{AS}	200	mJ
MOSFET dv/dt ruggedness, $V_{DS}=0\dots 400V$	dv/dt	50	V/ns
Reverse diode dv/dt, $V_{DS}=0\dots 400V, I_{DS}\leq I_D$	dv/dt	15	V/ns
Power Dissipation	P_{tot}	$T_a=25^\circ C$	3.13
		$T_C=25^\circ C$	60
Junction Temperature Range	T_j	-55~150	°C
Storage Temperature Range	T_{stg}	-55~150	°C

4.2 Thermal Characteristics

Parameter	Symbol	Rating	Unit
Thermal Resistance, Junction to Case-sink	R_{thJC}	2	°C/W
Thermal Resistance, Junction to Ambient	R_{thJA}	39.9	°C/W

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

Parameter	Symbol	Test Condition	Value			Units
			Min	Typ	Max	
Off Characteristics						
Drain-to-Source Breakdown Voltage	BV_{DSS}	$I_D=250\mu\text{A}, V_{GS}=0\text{V}$	700	--	--	V
Drain-to-Source Leakage Current	I_{DSS}	$V_{DS}=700\text{V}, V_{GS}=0\text{V}, T_C=25^\circ\text{C}$	--	--	1	μA
		$V_{DS}=700\text{V}, V_{GS}=0\text{V}, T_C=150^\circ\text{C}$	--	--	100	μA
Gate-to-Source Leakage Current	I_{GSS}	$V_{GS}=\pm 20\text{V}$	--	--	± 100	nA
On Characteristics						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$	2	3	4	V
Drain-to-Source on-state Resistance	$R_{DS(on)}$	$V_{GS}=10\text{V}, I_D=3.4\text{A}$	--	0.34	0.42	Ω
Dynamic Characteristics						
Input Capacitance	C_{iss}	$V_{GS}=0\text{V}, V_{DS}=400\text{V}, f=1.0\text{MHz}$	--	915	--	pF
Output Capacitance	C_{oss}		--	92.3	--	
Reverse Transfer Capacitance	C_{rss}		--	26.7	--	
Switching Characteristics						
Turn-on Delay Time	$t_{d(on)}$	$I_D=4.8\text{A}, V_{DD}=325\text{V}, V_{GS}=10\text{V}, R_G=25\Omega$	--	18.7	--	nS
Turn-on Rise Time	t_r		--	31.3	--	
Turn-off Delay Time	$t_{d(off)}$		--	70.1	--	
Turn-off Fall Time	t_f		--	34	--	
Total Gate Charge	Q_g	$I_D=4.8\text{A}, V_{DD}=520\text{V}, V_{GS}=10\text{V}$	--	19.6	--	nC
Gate-to-Source Charge	Q_{gs}		--	5.84	--	
Gate-to-Drain("Miller") Charge	Q_{gd}		--	5.91	--	
Drain-Source Diode Characteristics						
Diode Forward Voltage ⁽³⁾	V_{FSD}	$V_{GS}=0\text{V}, I_S=4.8\text{A}$	--	0.83	1.2	V
Diode Forward Current	I_S		--	--		A
Reverse Recovery Time ⁽³⁾	t_{rr}	$T_J=25^\circ\text{C}, I_F=4.8\text{A}, dl_F/dt=100\text{A}/\mu\text{S}, V_{RR}=400\text{V}$	--	248	--	nS
Reverse Recovery Charge ⁽³⁾	Q_{rr}		--	2120	--	nC

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: $L=10\text{mH}, I_D=4.7\text{A}, V_{DD}=50\text{V}, V_{GS}=10\text{V}, R_G=25\Omega, V_{GATE}=700\text{V}$, Start $T_J=25^\circ\text{C}$.

5 Typical characteristics diagrams

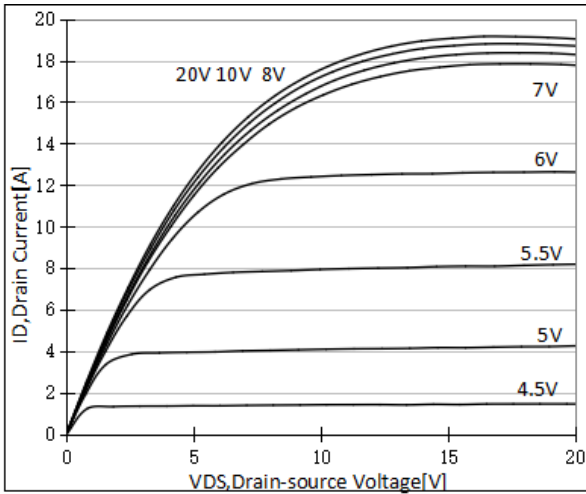


Figure 1 Output Characteristics

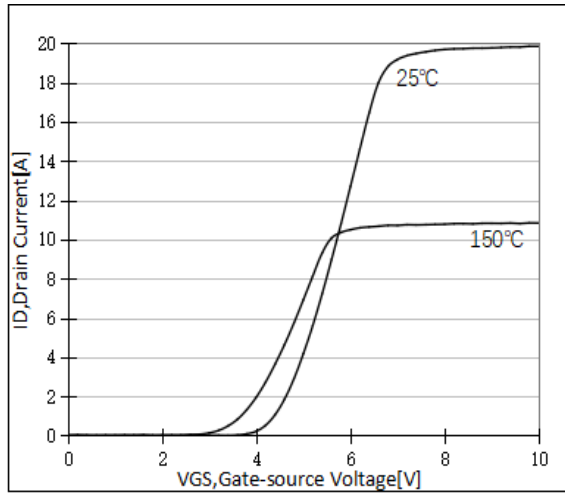


Figure 2 Transfer Characteristics

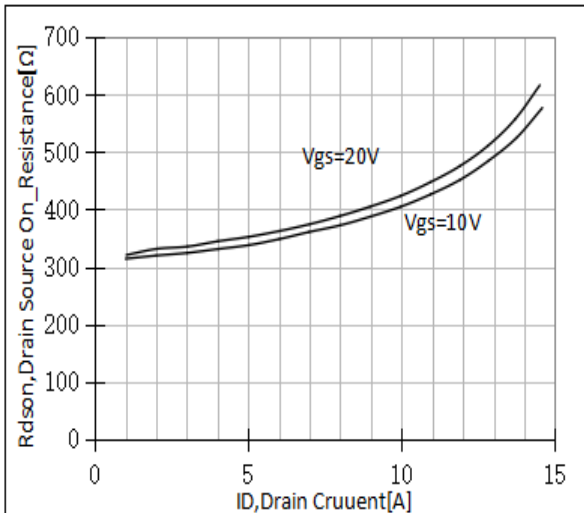


Figure 3 Rdson vs Drain Current

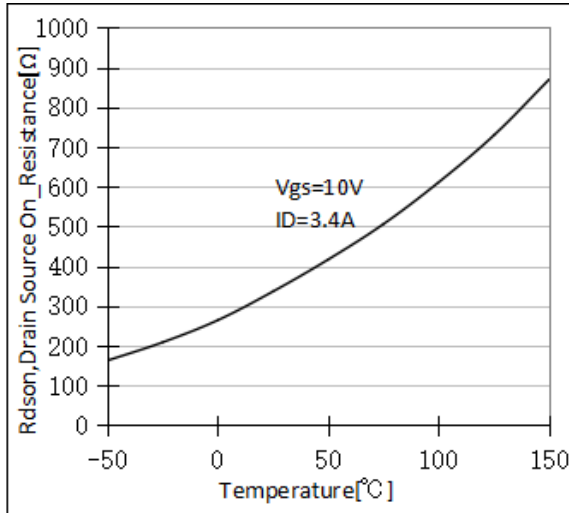


Figure 4 Rdson vs Temperature

5 Typical characteristics diagrams(continues)

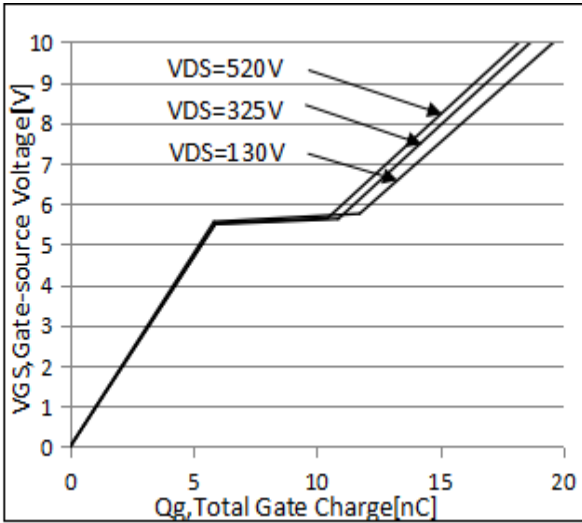


Figure 5 Gate Charge

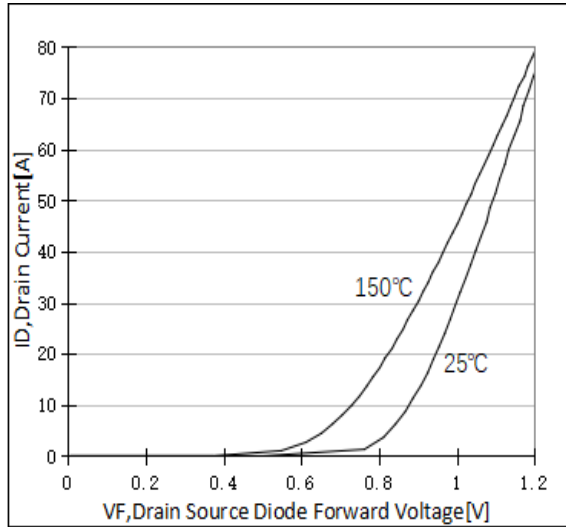


Figure 6 Drain Source Diode Forward

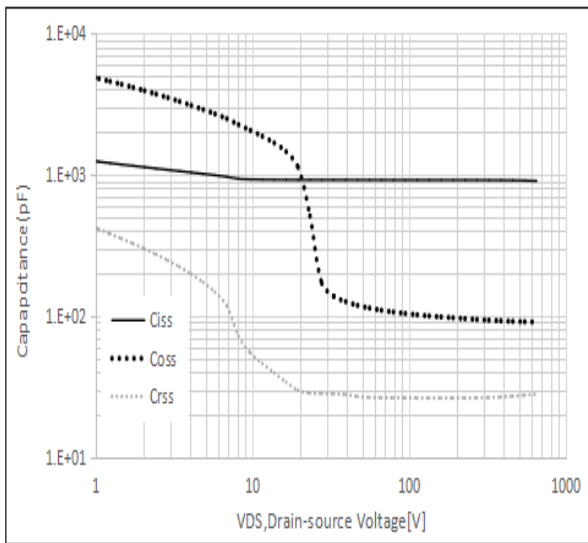


Figure 7 Capacitance vs Vds

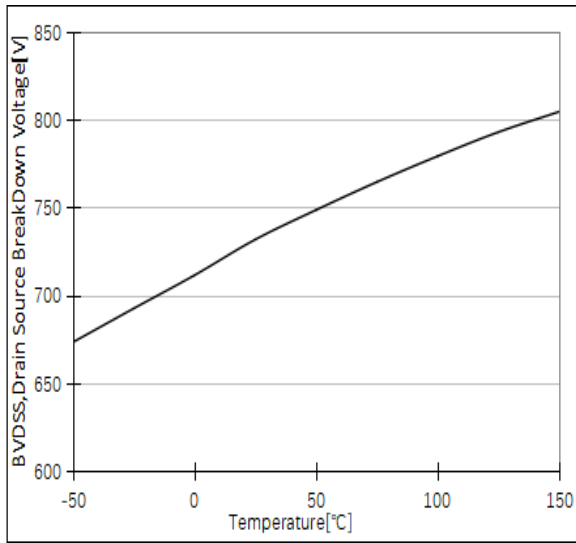


Figure 8 BVDSS vs Temperature

5 Typical characteristics diagrams(continues)

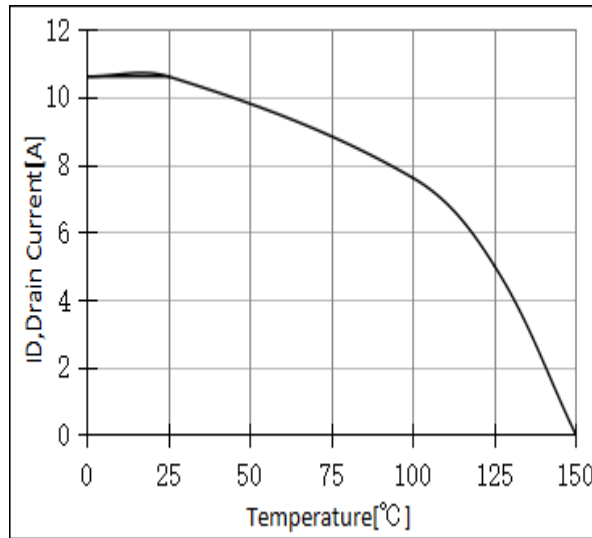


Figure 9. ID Current De-rating

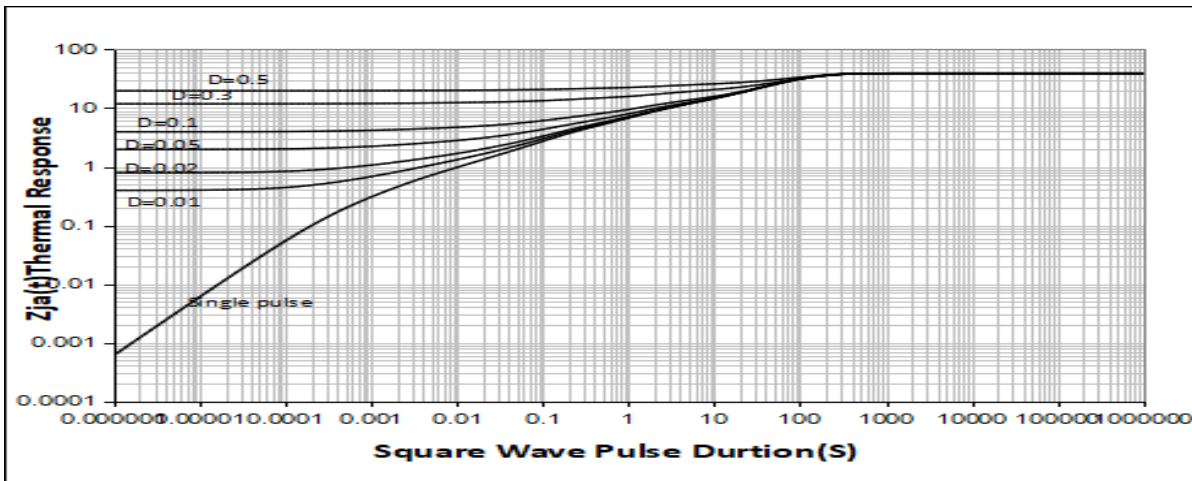
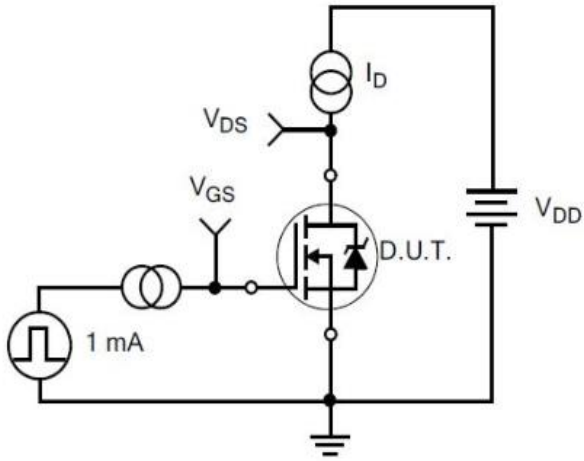
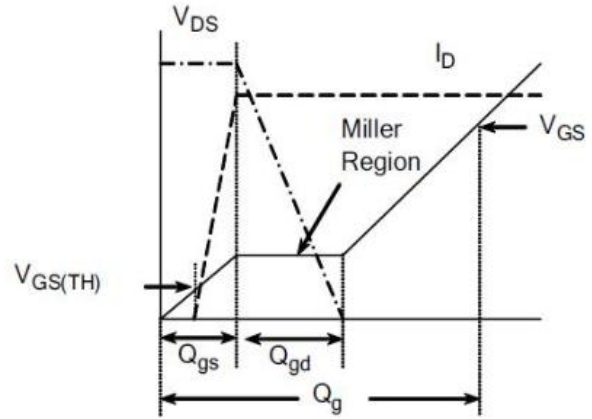


Fig 10. Normalized Maximum Transient Thermal Impedance

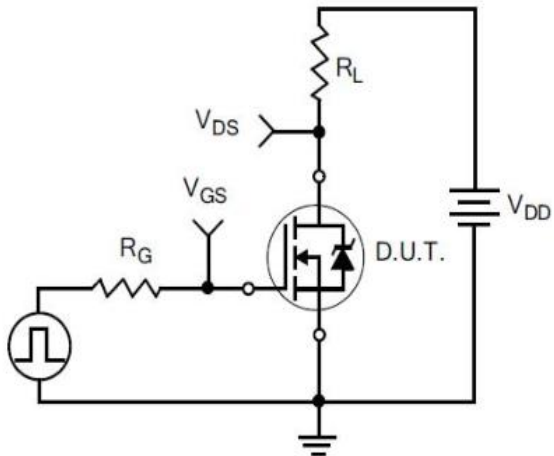
6 Typical Test Circuit and Waveform



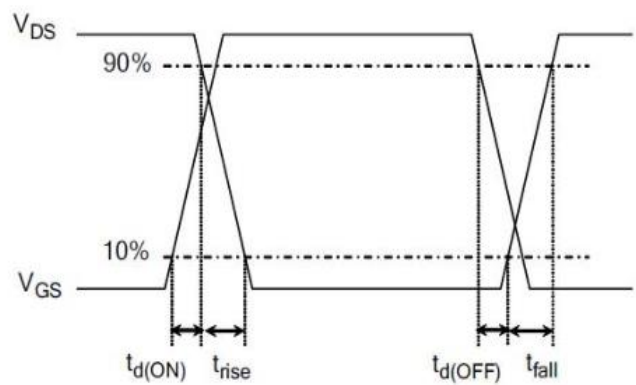
1) Gate Charge Test Circuit



2) Gate Charge Waveform

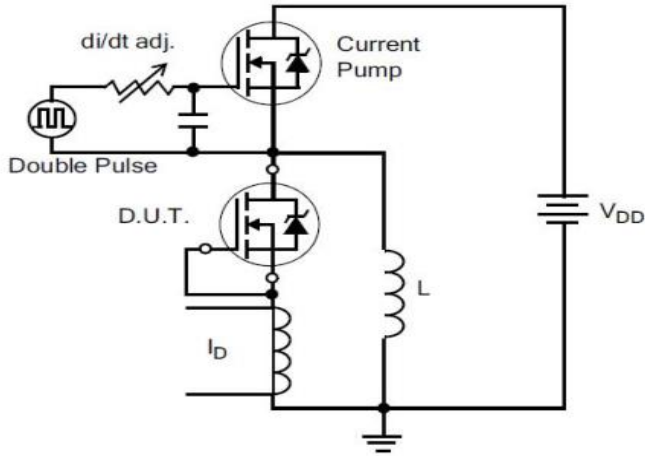


3) Resistive Switching Test Circuit

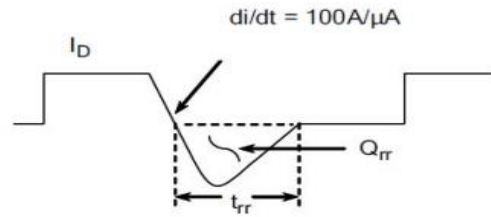


4) Resistive Switching Waveforms

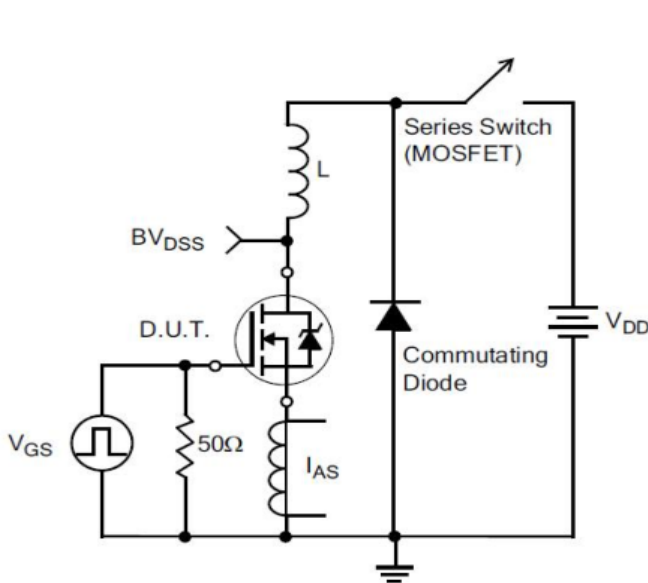
6 Typical Test Circuit and Waveform(continues)



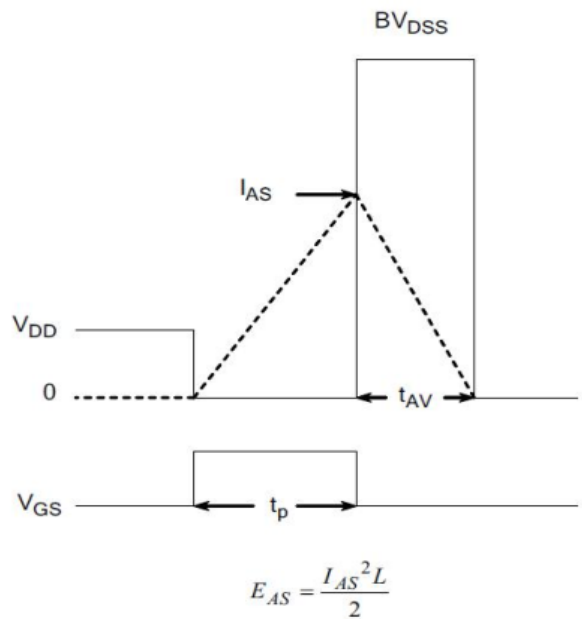
5) Diode Reverse Recovery Test Circuit



6) Diode Reverse Recovery Waveform

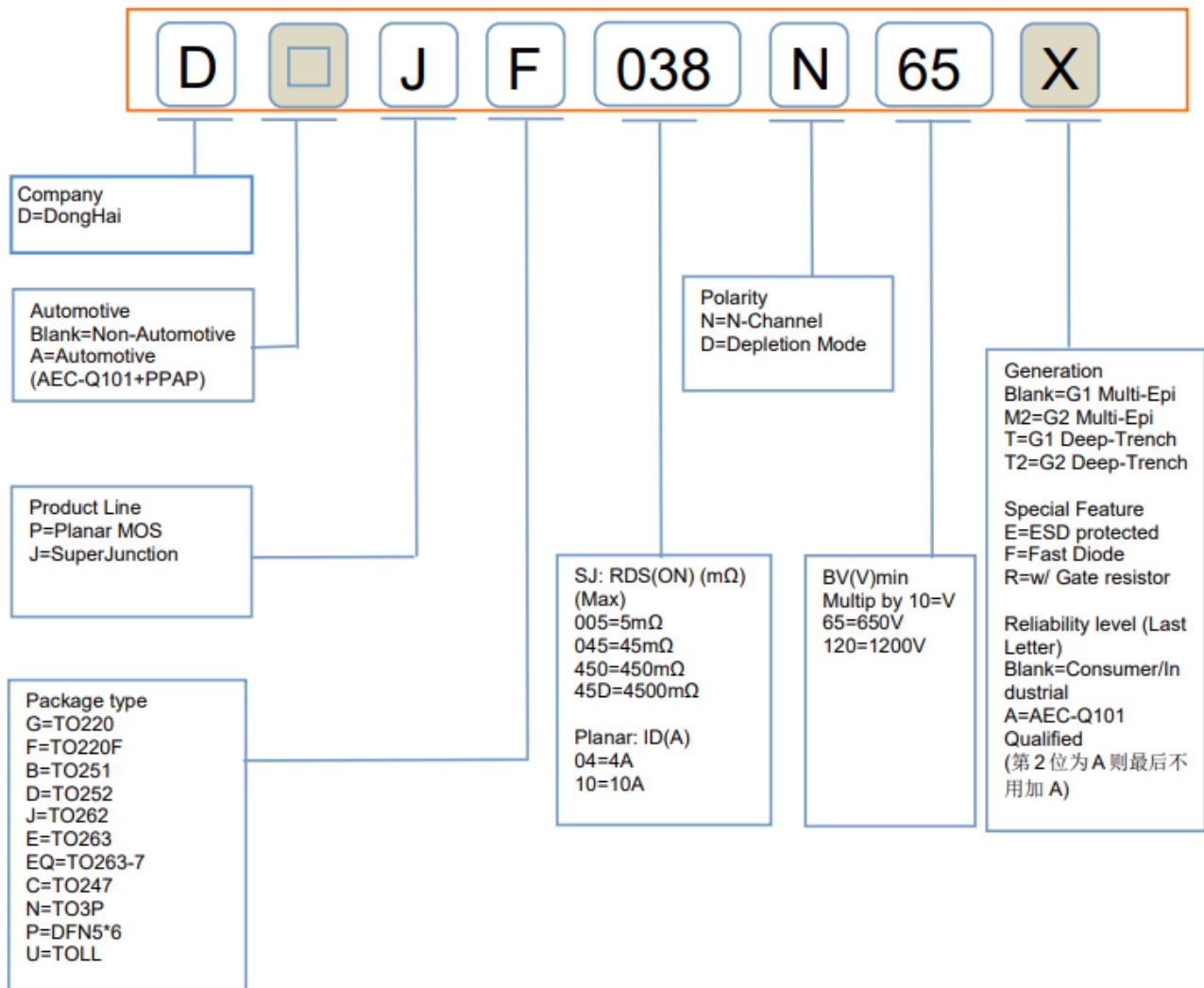


7) . Unclamped Inductive Switching Test Circuit



8) Unclamped Inductive Switching Waveforms

7 Product Names Rules

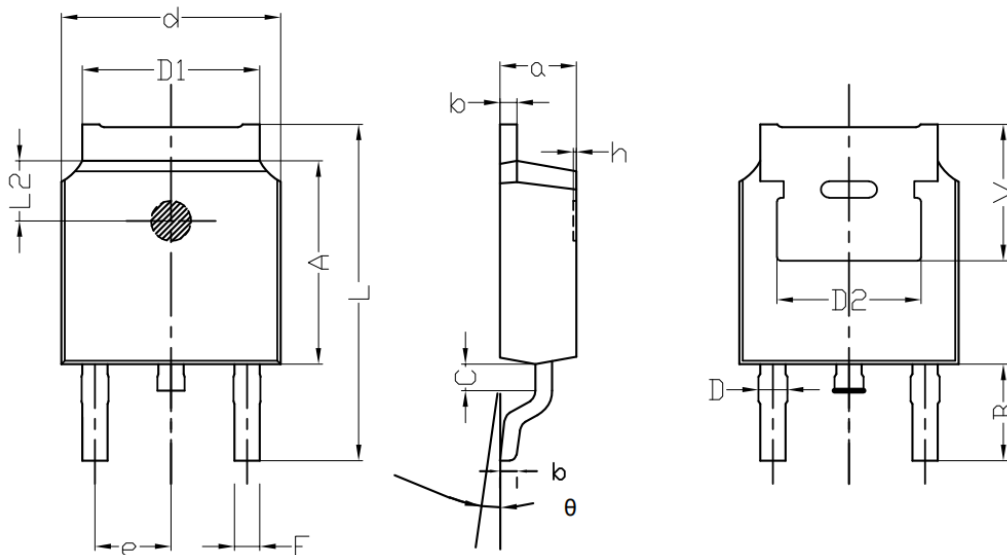


8 Product Specifications and Packaging Models

Product Model	Package Type	Mark Name	RoHS	Package	Quantity
DJD420N70T	TO-252B	DJD420N70T	Pb-free	Tape & Reel	2500/box

9 Dimensions

TO-252B PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	min.	max.	min.	max.
a	2.20	2.40	0.087	0.095
b	0.46	0.58	0.018	0.023
c	0.70	0.90	0.028	0.035
D	0.80	1.00	0.032	0.039
d	6.30	6.70	0.248	0.264
D1	5.00	5.50	0.197	0.217
D2	TYP 4.83		TYP 0.190	
A	5.80	6.20	0.228	0.244
e	2.19	2.39	0.086	0.094
L	9.40	10.40	0.370	0.409
B	2.6	3.2	0.102	0.126
L2	1.5	1.8	0.059	0.071
θ	0	8	0	8
h	0	0.3	0	0.012
V	5.25	5.85	0.207	0.230
E	0.6	0.8	0.024	0.032

10 Attentions

- Jiangsu Donghai Semiconductor Technology 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.

11 Appendix

Revision history:

Date	REV.	Description	Page
2023.04.17	1.0	Original	10