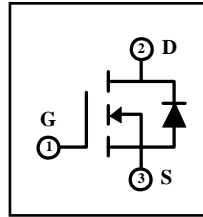


21A 650V N-channel Super Junction Power MOSFET

1 Description

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



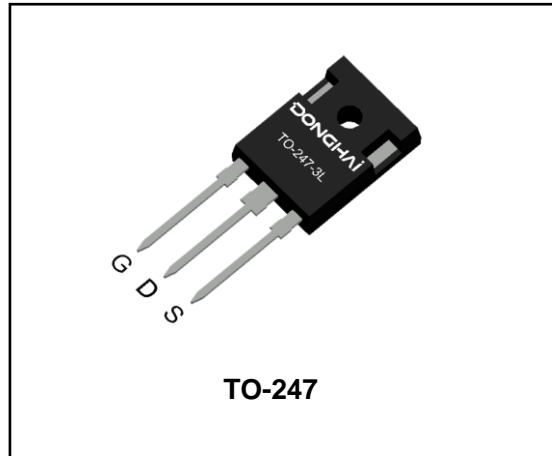
$V_{DSS} = 650V$
$R_{DS(on)} (TYP) = 150m\Omega$
$I_D = 21A$

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).



4 Electrical Characteristics

4.1 Absolute Maximum Rating ($T_C=25^\circ C$, unless otherwise noted)

Parameter	Symbol	Value	Units
Drain-to-Source Voltage	V_{DSS}	650	V
Gate-to-Source Voltage	V_{GS}	± 30	V
Continuous Drain Current	I_D	$T_C=25^\circ C$	21
		$T_C=100^\circ C$	13.2
Pulsed Drain Current ⁽¹⁾	I_{DM}	63	A
Single Pulse Avalanche Energy ⁽⁴⁾	E_{AS}	484	mJ
Repetitive Avalanche Energy ⁽⁴⁾	E_{AR}	0.7	mJ
Repetitive Avalanche Current ⁽⁴⁾	I_{AR}	3.5	A
Power Dissipation	P_{tot}	$T_a=25^\circ C$	3
		$T_C=25^\circ C$	151
Junction Temperature Range	T_j	-55 ~ 150	$^\circ C$
Storage Temperature Range	T_{stg}	-55 ~ 150	$^\circ C$
Maximum Temperature for soldering	T_L	300	$^\circ C$

4.2 Thermal Characteristics

Parameter	Symbol	Typ	Unit
Thermal Resistance, Junction to Case-sink	R_{thJC}	0.83	$^\circ C/W$
Thermal Resistance, Junction to Ambient	R_{thJA}	41.7	$^\circ C/W$

4.3 Electrical Characteristics (T_c=25°C, unless otherwise noted)

Parameter	Symbol	Test Condition	Value			Units
			Min	Typ	Max	
Off Characteristics						
Drain-to-Source Breakdown Voltage	BV _{DSS}	I _D =250μA, V _{GS} =0V	650	--	--	V
Drain-to-Source Leakage Current	I _{DSS}	V _{DS} =650V, V _{GS} =0V, T _C =25°C	--	--	1	μA
		V _{DS} =520V, V _{GS} =0V, T _C =125°C	--	--	100	μA
Gate-to-Source Leakage Current	I _{GSS}	V _{GS} =±30V	--	--	±100	nA
On Characteristics						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	2.5	--	4	V
Drain-to-Source on-state Resistance	R _{DS(on)}	V _{GS} =10V, I _D =10.5A	--	150	170	mΩ
Forward Transfer Conductance	g _{fs}	V _{DS} =10V, I _D =10.5A	--	23	--	S
Dynamic Characteristics						
Input Capacitance	C _{iss}	V _{GS} =0V, V _{DS} =50V, f=1.0MHz	--	1840	--	pF
Output Capacitance	C _{oss}		--	197	--	
Reverse Transfer Capacitance	C _{rss}		--	8	--	
Switching Characteristics						
Turn-on Delay Time	t _{d(on)}	I _D =21A, V _{DD} =400V, V _{GS} =10V, R _G =25Ω	--	66	--	ns
Turn-on Rise Time	t _r		--	27	--	
Turn-off Delay Time	t _{d(off)}		--	167	--	
Turn-off Fall Time	t _f		--	21	--	
Total Gate Charge	Q _g	I _D =21A, V _{DD} =520V, V _{GS} =10V	--	54	--	nC
Gate-to-Source Charge	Q _{gs}		--	12	--	
Gate-to-Drain("Miller") Charge	Q _{gd}		--	18	--	
Drain-Source Diode Characteristics						
Diode Forward Voltage ⁽³⁾	V _{FSD}	V _{GS} =0V, I _S =21A	--	--	1.2	V
Diode Forward Current	I _S		--	--	21	A
Reverse Recovery Time ⁽³⁾	t _{rr}	T _J =25°C, I _F =21A, dl _F /dt=100A/μS, V _{GS} =0V	--	336	--	ns
Reverse Recovery Charge ⁽³⁾	Q _{rr}		--	3400	--	nC

Notes:

- 1: Repetitive rating, pulse width limited by maximum junction temperature.
- 2: Surface mounted on FR4 Board, t_s≤10sec.
- 3: Pulse width ≤ 300μs, duty cycle ≤ 2%.
- 4: L=10mH, I_D=9.84A, V_{DD}=50V, V_{GS}=10V, R_G=25Ω, V_{GATE}=650V, Start T_J=25°C.

5 Typical characteristics diagrams

Figure 1. Output Characteristics

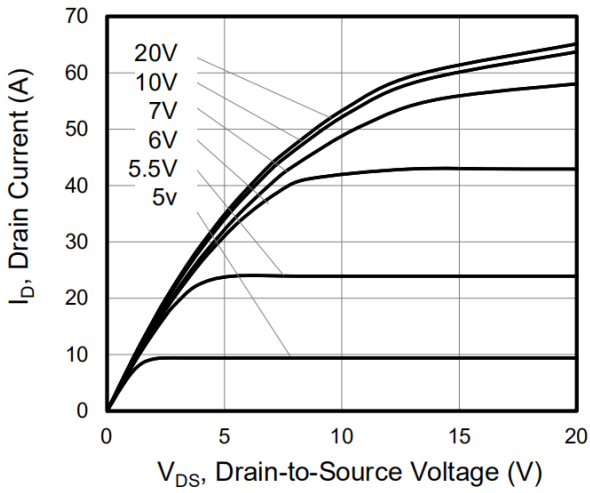


Figure 2. Transfer Characteristics

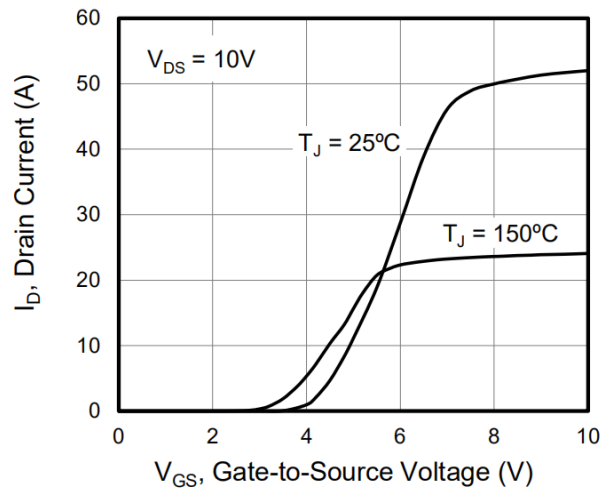


Figure 3. On-Resistance vs. Drain Current

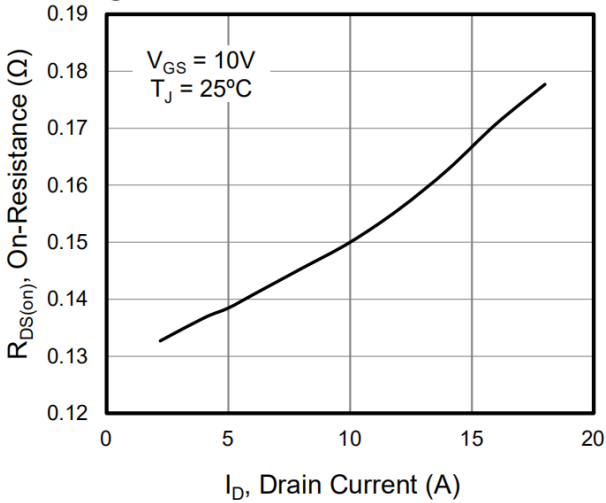


Figure 4. Capacitance

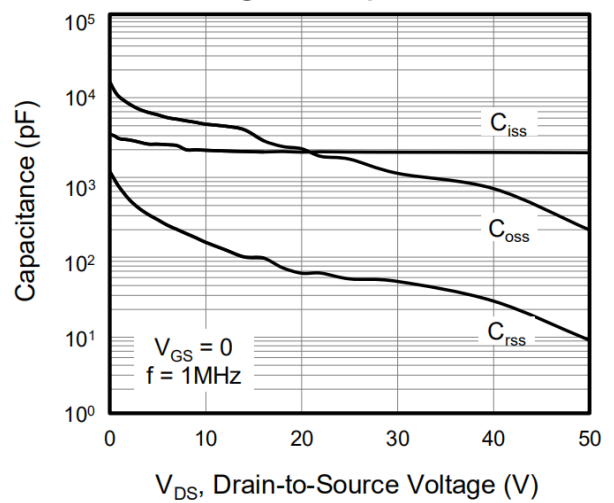


Figure 5. Gate Charge

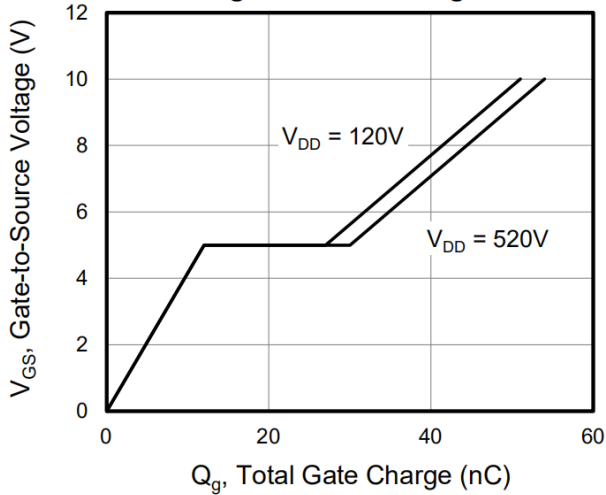
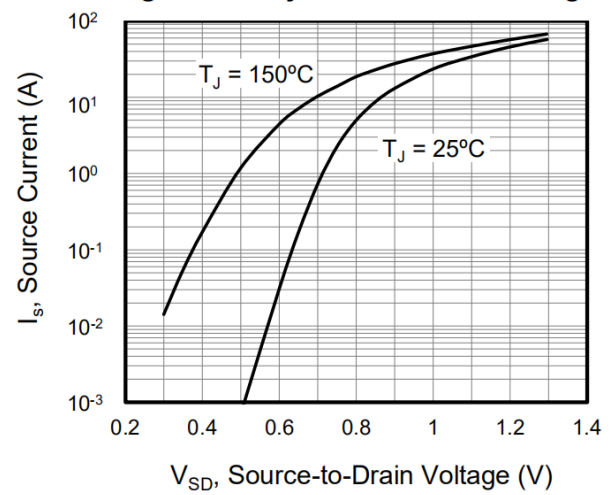


Figure 6. Body Diode Forward Voltage



5 Typical characteristics diagrams(continues)

Figure 7. On-Resistance vs. Junction Temperature

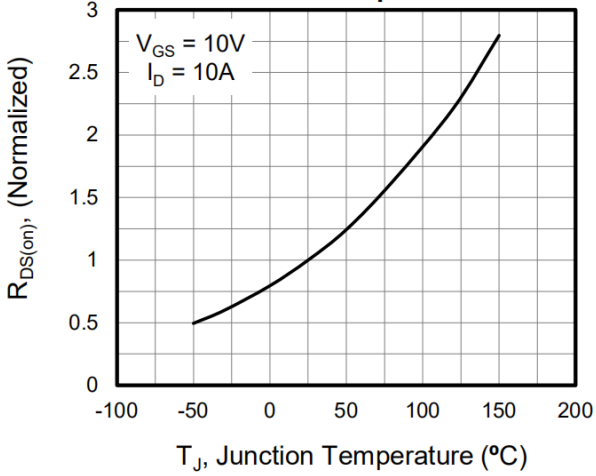


Figure 8. Threshold Voltage vs. Junction Temperature

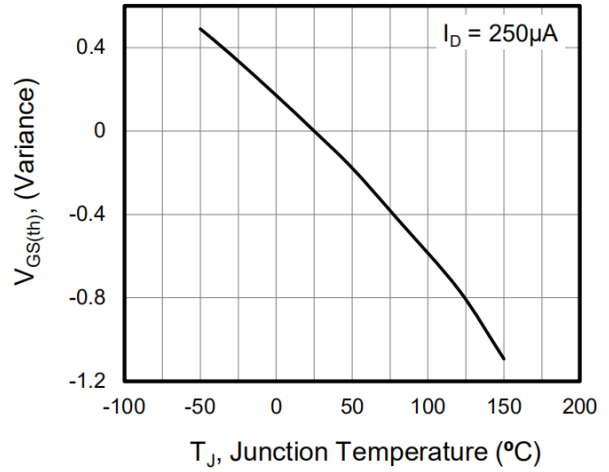


Figure 9. Transient Thermal Impedance TO-220/TO-3PN

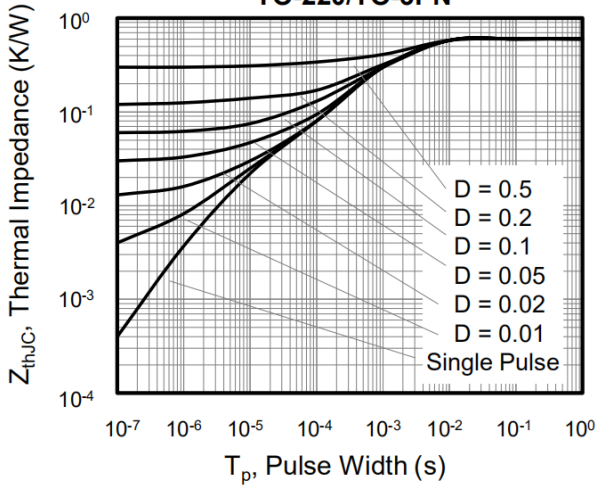
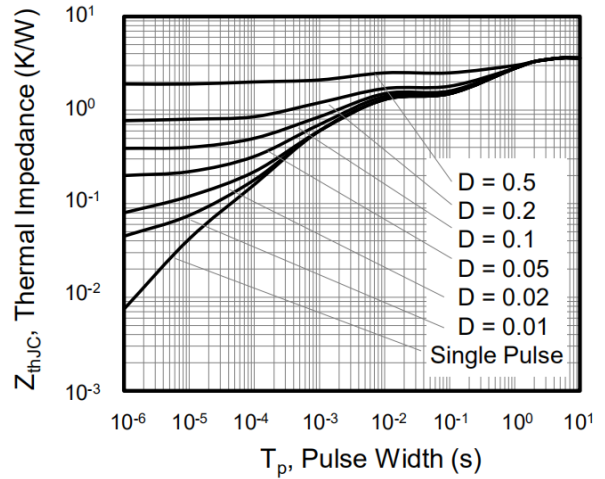
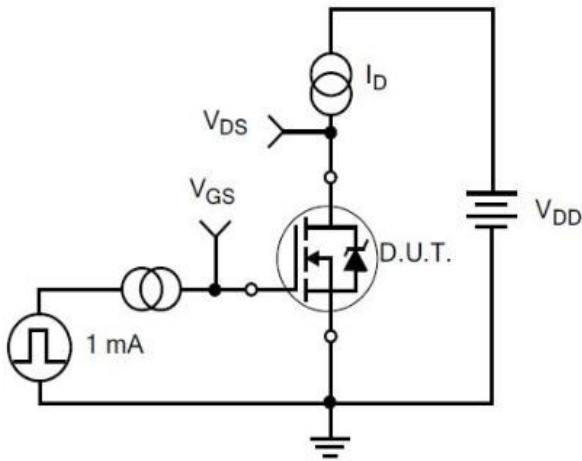


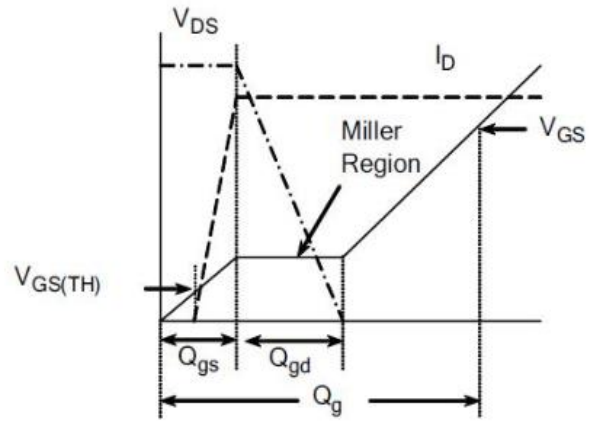
Figure 10. Transient Thermal Impedance TO-220F



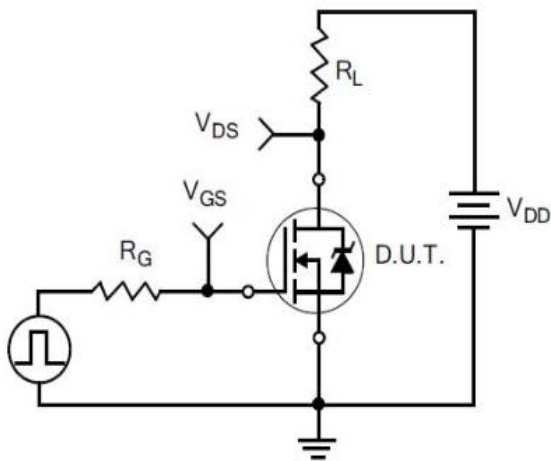
6 Typical Test Circuit and Waveform



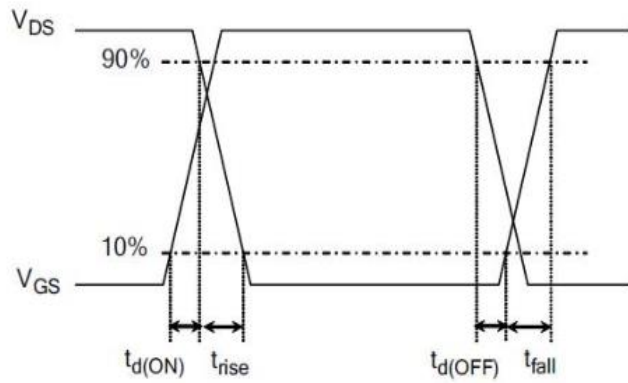
1) Gate Charge Test Circuit



2) . Gate Charge Waveform

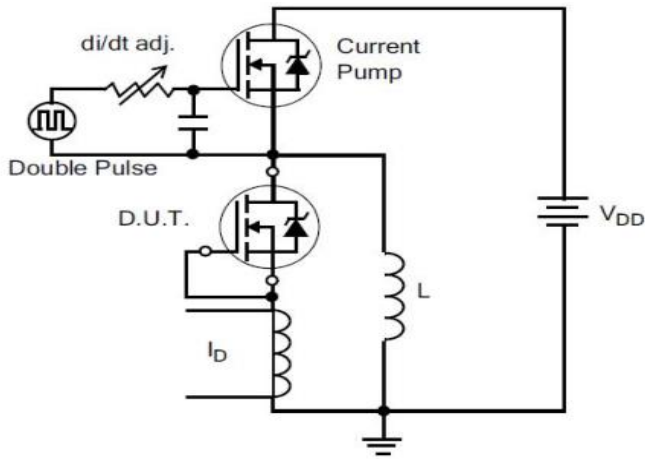


3) Resistive Switching Test Circuit

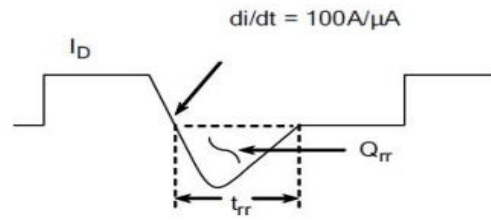


4) Resistive Switching Waveforms

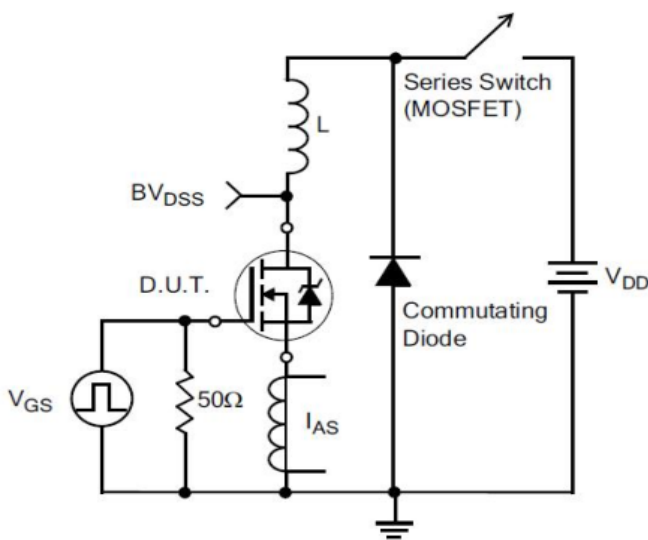
6 Typical Test Circuit and Waveform(continues)



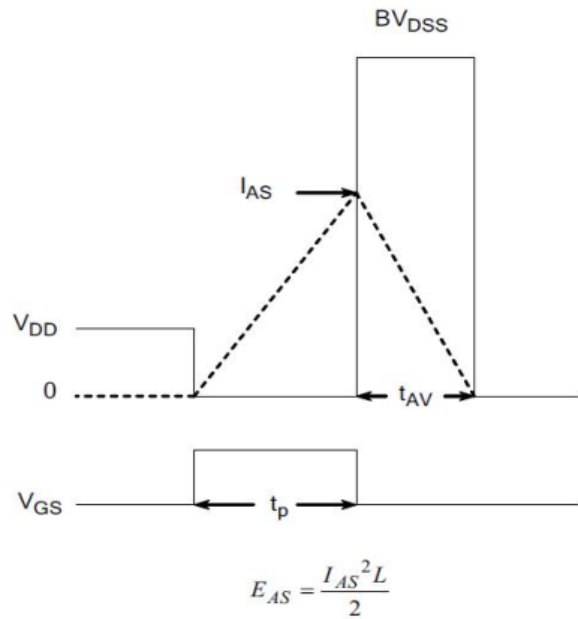
5) Diode Reverse Recovery Test Circuit



6) Diode Reverse Recovery Waveform



7) . Unclamped Inductive Switching Test Circuit



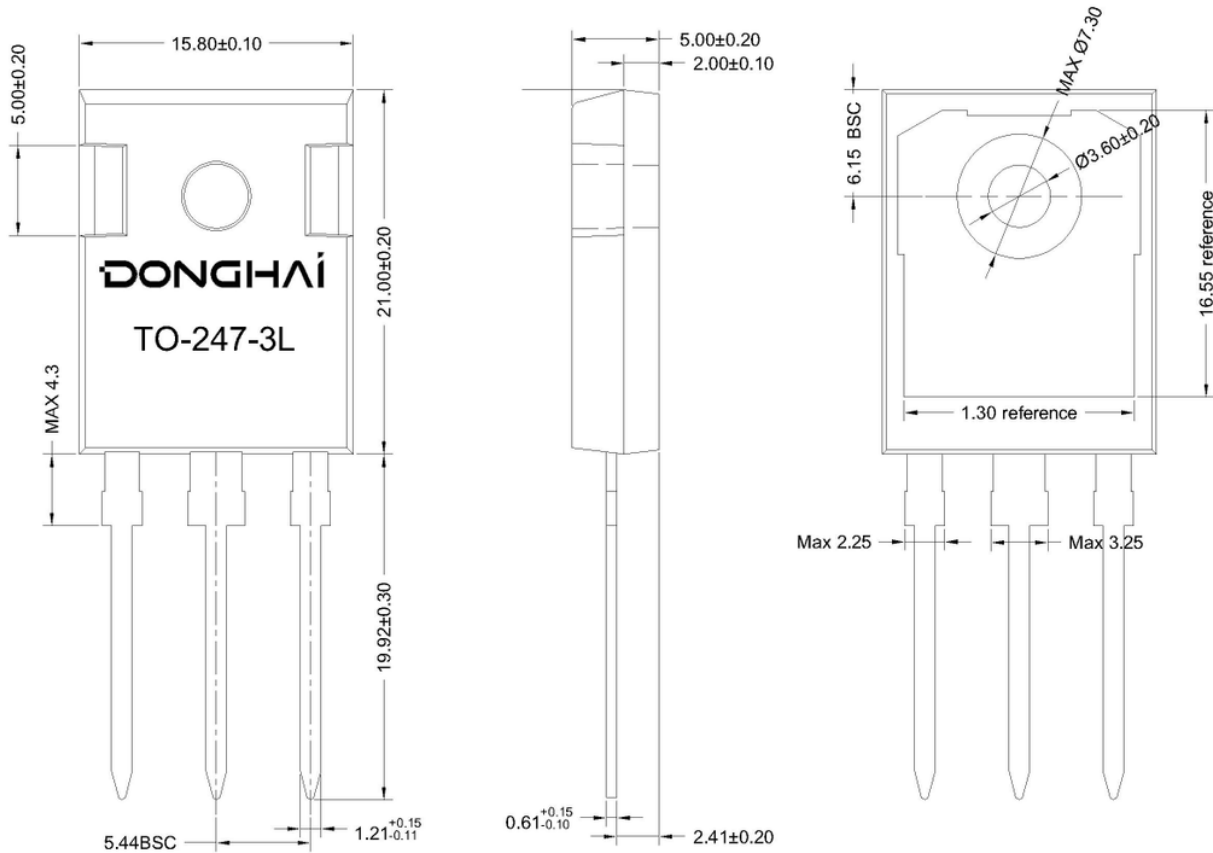
8) Unclamped Inductive Switching Waveforms

7 Product Specifications and Packaging Models

Product Model	Package Type	Mark Name	RoHS	Package	Quantity
DHSJ21N65W	TO-247	DHSJ21N65W	Pb-free	Tube	300/box

8 Dimensions

TO-247 PACKAGE OUTLINE



9 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.

10 Appendix

Revision history:

Date	REV.	Description	Page
2017.06.14	1.0	Original	7