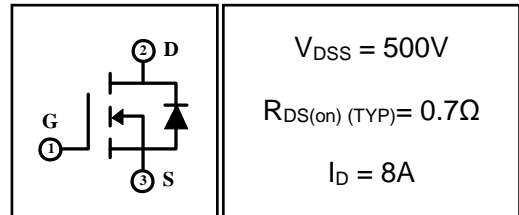


## 8A 500V N-channel Enhancement Mode Power MOSFET

### 1 Description

These, the silicon N-channel enhanced VDMOSFETs, is obtained by the self-aligned planar technology which reduce the conduction loss, improve switching performance and enhance the avalanche energy. Which accords with the RoHS standard.

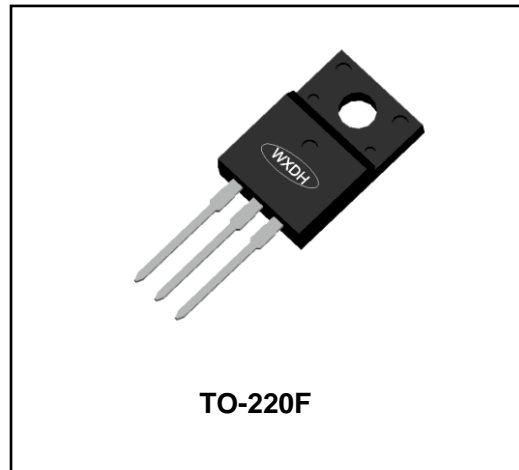


### 2 Features

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

### 3 Applications

- Used in various power switching circuit for system miniaturization and higher efficiency.
- Power switch circuit of adaptor and charger.



### 4 Electrical Characteristics

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

Parameter	Symbol	Value	Units
Drain-to-Source Voltage	$V_{DSS}$	500	V
Gate-to-Source Voltage	$V_{GSS}$	$\pm 30$	V
Continuous Drain Current	$I_D$	$T_C=25^\circ C$	8
		$T_C=100^\circ C$	5
Pulsed Drain Current <sup>(1)</sup>	$I_{DM}$	32	A
Single Pulse Avalanche Energy <sup>(4)</sup>	$E_{AS}$	440	mJ
Peak Diode Recovery $dv/dt$ <sup>(5)</sup>	$dv/dt$	5	V/ns
Power Dissipation	$P_{tot}$	$T_a=25^\circ C$	2
		$T_C=25^\circ C$	100
Isolation Voltage	$V_{ISO}$	2500	V
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	$R_{thJC}$	3.57	$^\circ C/W$
Thermal Resistance, Junction to Ambient	$R_{thJA}$	62.5	$^\circ C/W$

**4.3 Electrical Characteristics** (T<sub>c</sub>=25°C, unless otherwise noted)

Parameter	Symbol	Test Condition	Value			Units
			Min	Typ	Max	
<b>Off Characteristics</b>						
Drain-to-Source Breakdown Voltage	BV <sub>DSS</sub>	I <sub>D</sub> =250μA, V <sub>GS</sub> =0V	500	--	--	V
Drain-to-Source Leakage Current	I <sub>DSS</sub>	V <sub>DS</sub> =500V, V <sub>GS</sub> =0V, T <sub>C</sub> =25°C	--	--	1	μA
		V <sub>DS</sub> =400V, V <sub>GS</sub> =0V, T <sub>C</sub> =125°C	--	--	100	μA
Gate-to-Source Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =±30V	--	--	±100	nA
<b>On Characteristics</b>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	2.0	--	4.0	V
Drain-to-Source on-state Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =4A	--	0.7	0.9	Ω
Forward Transfer Conductance	g <sub>fs</sub>	V <sub>DS</sub> =15V, I <sub>D</sub> =4A	--	7	--	S
<b>Dynamic Characteristics</b>						
Input Capacitance	C <sub>iss</sub>	V <sub>GS</sub> =0V, V <sub>DS</sub> =25V, f=1.0MHz	--	1136	--	pF
Output Capacitance	C <sub>oss</sub>		--	112	--	
Reverse Transfer Capacitance	C <sub>rss</sub>		--	7	--	
<b>Switching Characteristics</b>						
Turn-on Delay Time	t <sub>d(on)</sub>	I <sub>D</sub> =8A, V <sub>DD</sub> =250V, R <sub>G</sub> =10Ω	--	18	--	nS
Turn-on Rise Time	t <sub>r</sub>		--	20	--	
Turn-off Delay Time	t <sub>d(off)</sub>		--	44	--	
Turn-off Fall Time	t <sub>f</sub>		--	15	--	
Total Gate Charge	Q <sub>g</sub>	I <sub>D</sub> =8A, V <sub>DD</sub> =400V, V <sub>GS</sub> =10V	--	24	--	nC
Gate-to-Source Charge	Q <sub>gs</sub>		--	5	--	
Gate-to-Drain("Miller") Charge	Q <sub>gd</sub>		--	9	--	
<b>Drain-Source Diode Characteristics</b>						
Diode Forward Voltage <sup>(3)</sup>	V <sub>FSD</sub>	V <sub>GS</sub> =0V, I <sub>S</sub> =8A	--	--	1.5	V
Diode Forward Current	I <sub>S</sub>		--	--	8	A
Reverse Recovery Time <sup>(3)</sup>	t <sub>rr</sub>	T <sub>J</sub> =25°C, I <sub>F</sub> =8A, di <sub>F</sub> /dt=100A/μS, V <sub>GS</sub> =0V	--	374	--	nS
Reverse Recovery Charge <sup>(3)</sup>	Q <sub>rr</sub>		--	1830	--	nC

**Notes:**

- 1: Repetitive rating, pulse width limited by maximum junction temperature.
- 2: Surface mounted on FR4 Board, t<sub>s</sub>≤10sec.
- 3: Pulse width ≤ 300μs, duty cycle ≤ 2%.
- 4: L=10mH, I<sub>D</sub>=9.4A, V<sub>DD</sub>=50V, V<sub>GATE</sub>=500V, Start T<sub>J</sub>=25°C.
5. I<sub>SD</sub>=8A, di/dt≤100A/μs, V<sub>DD</sub>≤BV<sub>DSS</sub>, Start T<sub>J</sub>=25°C.

**5 Typical characteristics diagrams**

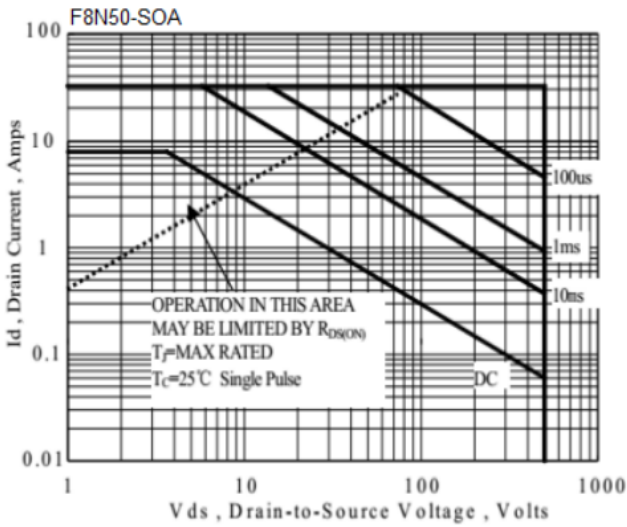


Figure 1 Maximum Forward Bias Safe Operating Area

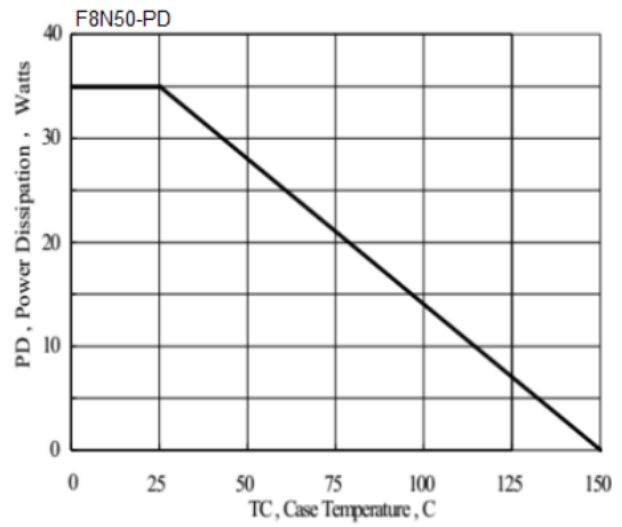


Figure 2 Maximum Power Dissipation vs Case Temperature

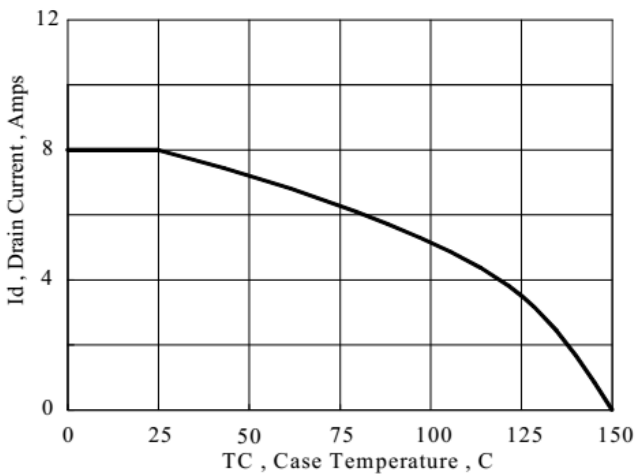


Figure 3 Maximum Continuous Drain Current vs Case Temperature

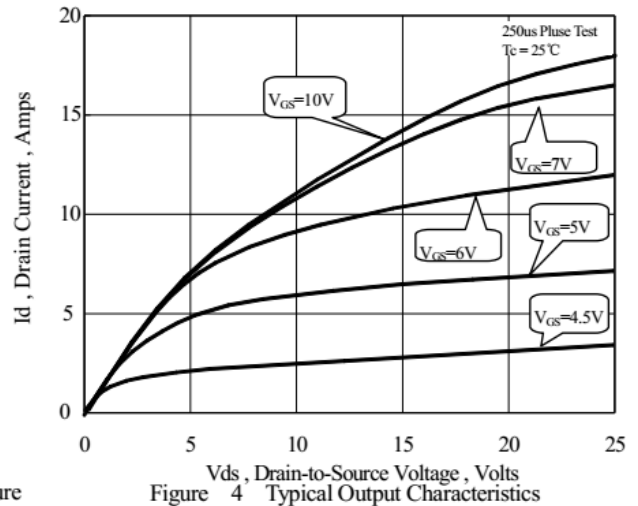


Figure 4 Typical Output Characteristics

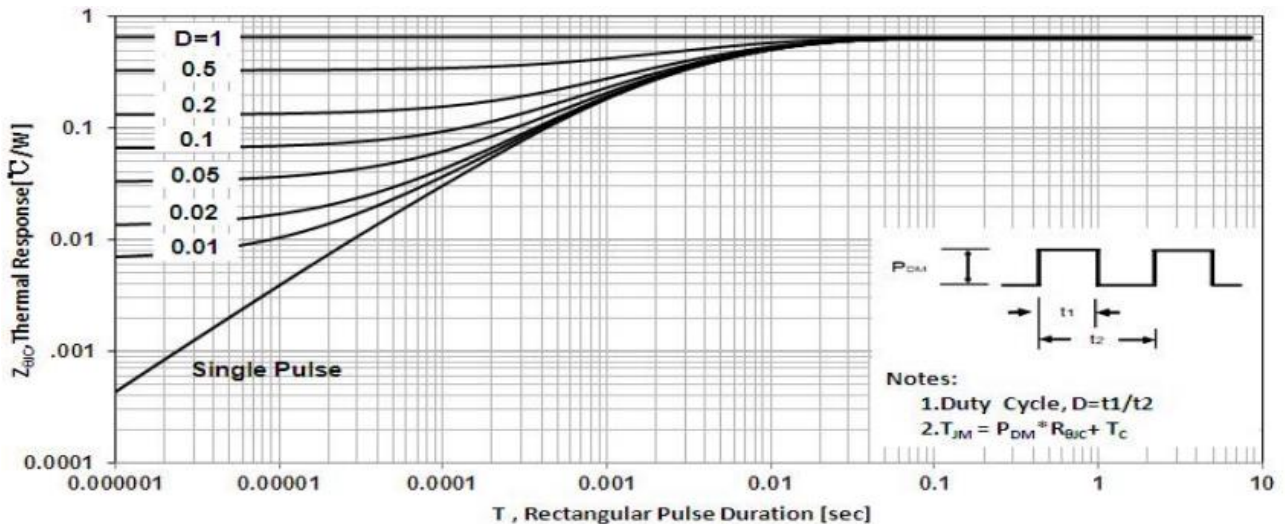


Figure 5 Maximum Effective Thermal Impedance . Junction to Case

**5 Typical characteristics diagrams(continues)**

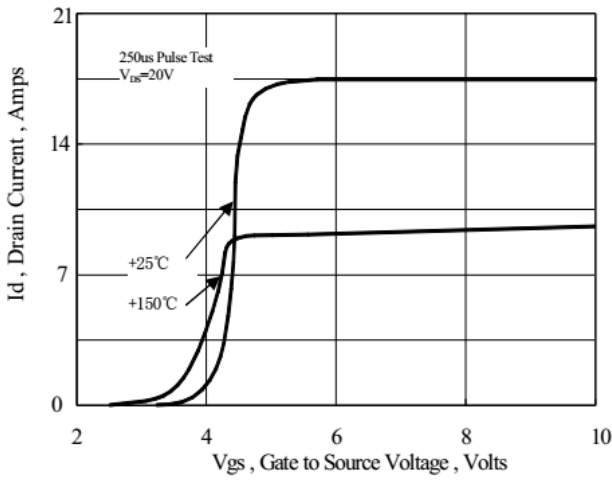


Figure 6 Typical Transfer Characteristics

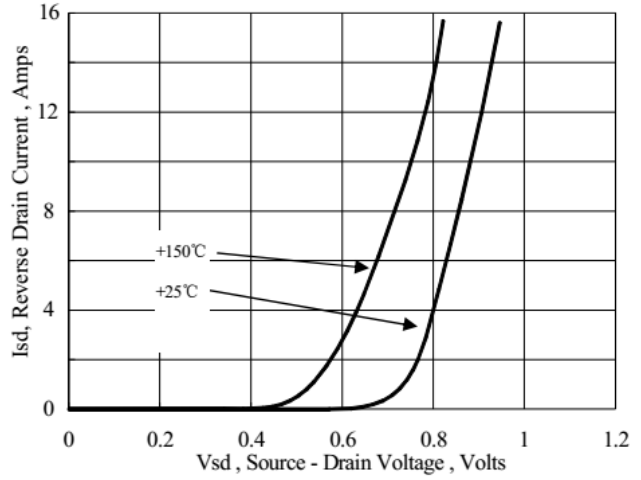


Figure 7 Typical Body Diode Transfer Characteristics

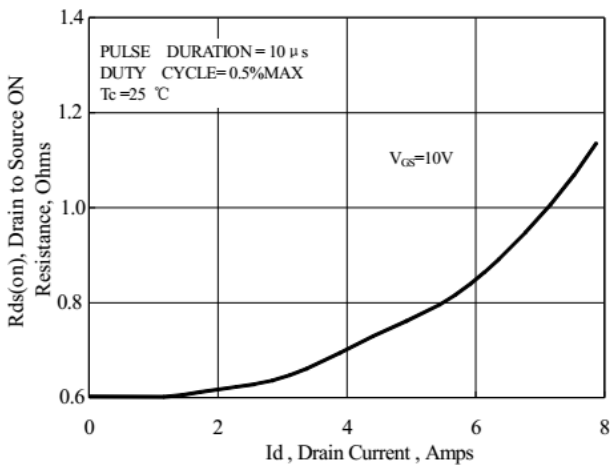


Figure 8 Typical Drain to Source ON Resistance vs Drain Current

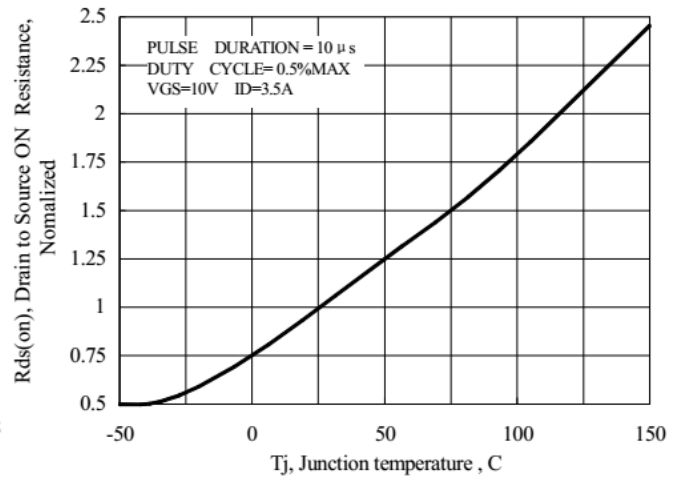


Figure 9 Typical Drain to Source on Resistance vs Junction Temperature

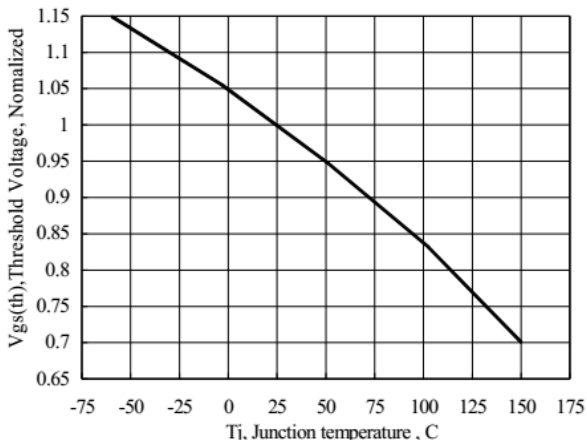


Figure 10 Typical Threshold Voltage vs Junction Temperature

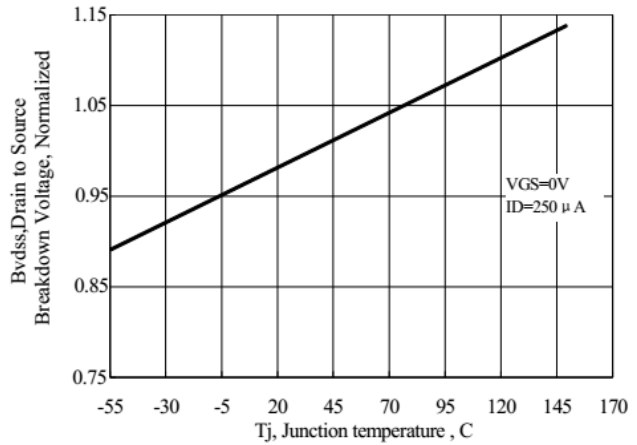


Figure 11 Typical Breakdown Voltage vs Junction Temperature

**5 Typical characteristics diagrams(continues)**

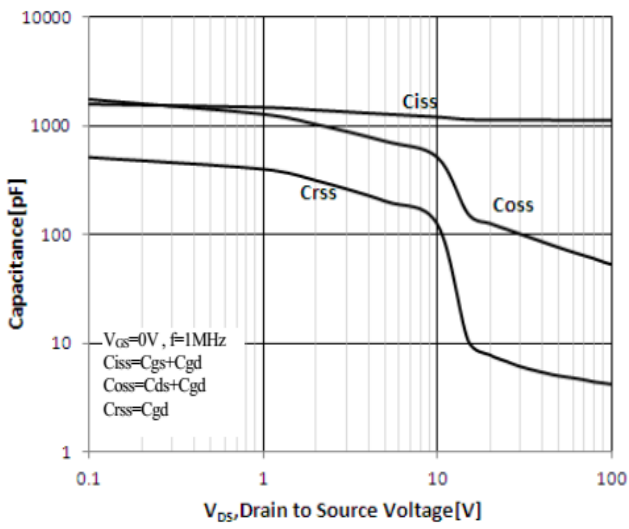


Figure 12 Typical Capacitance vs Drain to Source Voltage

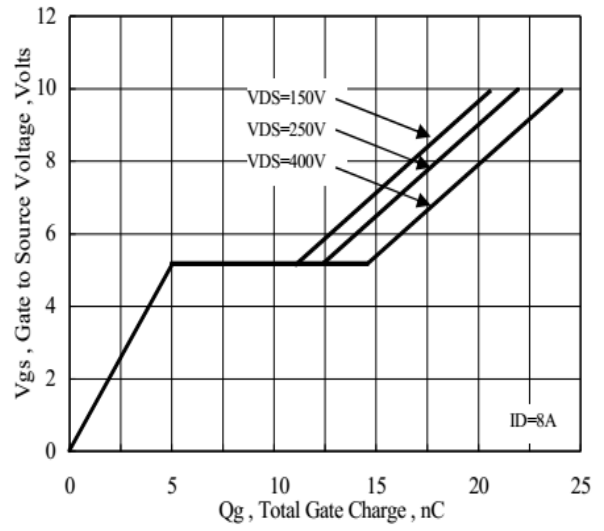
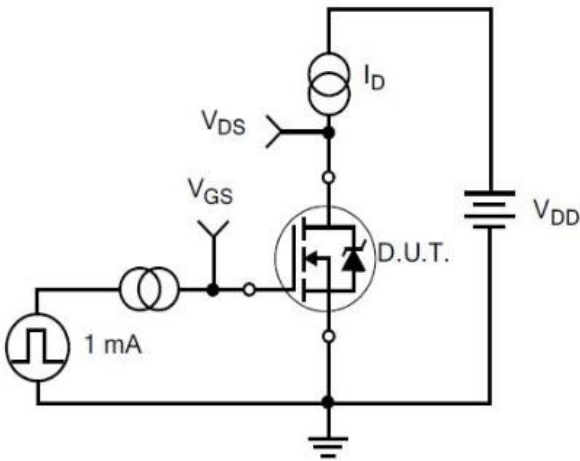
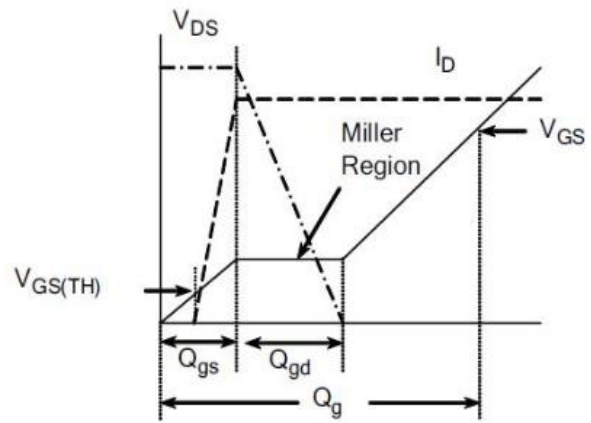


Figure 13 Typical Gate Charge vs Gate to Source Voltage

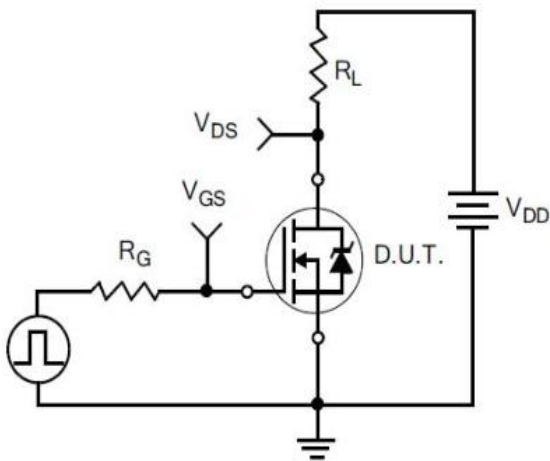
**6 Typical Test Circuit and Waveform**



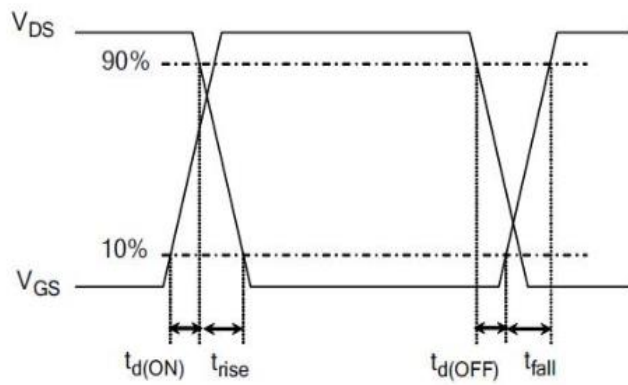
1) Gate Charge Test Circuit



2) . Gate Charge Waveform

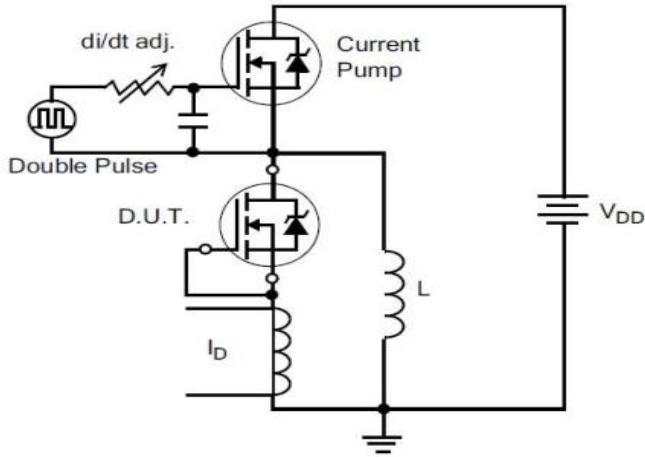


3) Resistive Switching Test Circuit

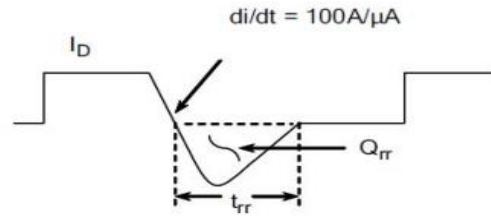


4) Resistive Switching Waveforms

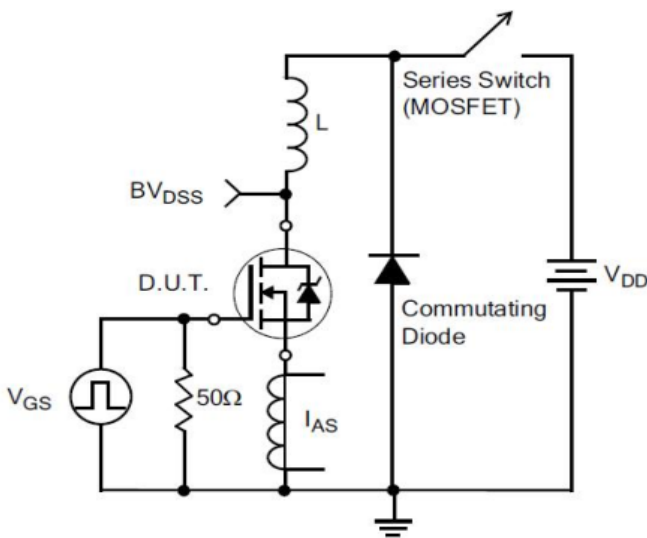
**6 Typical Test Circuit and Waveform(continues)**



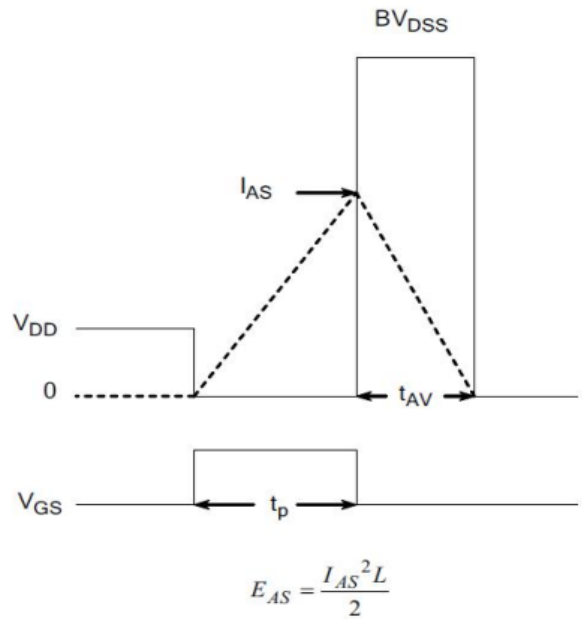
5) Diode Reverse Recovery Test Circuit



6) Diode Reverse Recovery Waveform



7) . Unclamped Inductive Switching Test Circuit



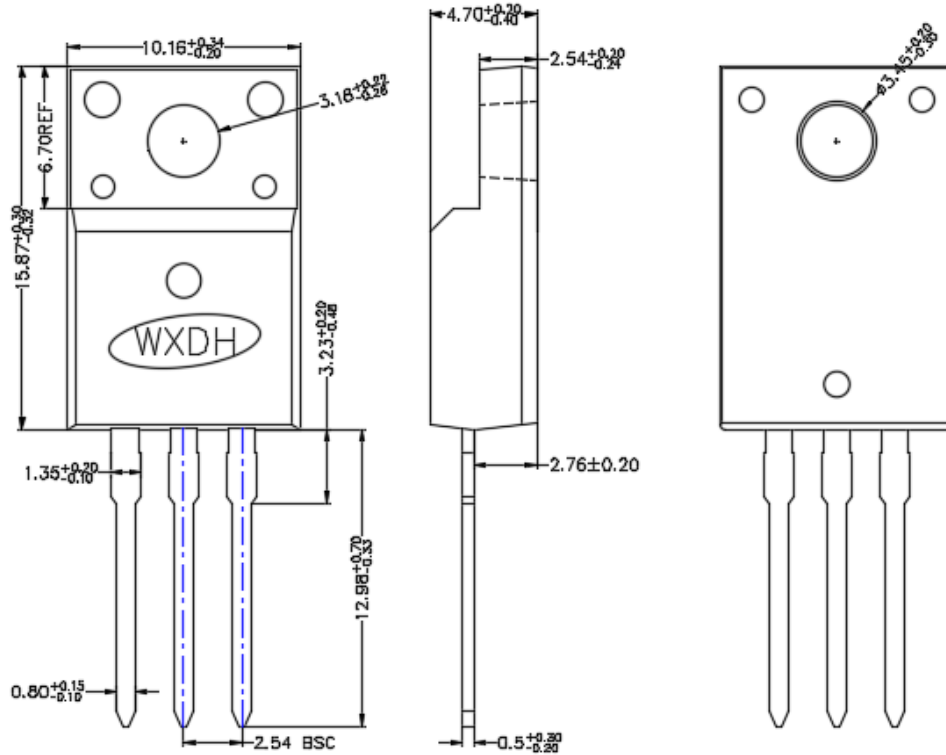
8) Unclamped Inductive Switching Waveforms

**7 Product Specifications and Packaging Models**

Product Model	Package Type	Mark Name	RoHS	Package	Quantity
F8N50	TO-220F	F8N50	Pb-free	Tube	1000/box

## 8 Dimensions

### TO-220F 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
2017.03.14	1.0	Original	8