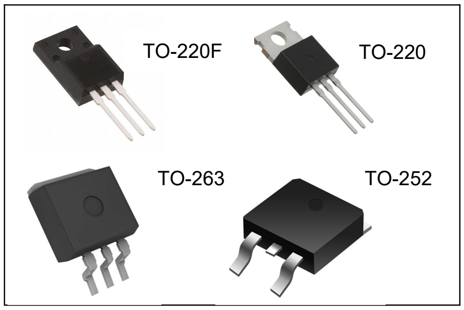
RONGTAI 容泰半导体（江苏）有限公司

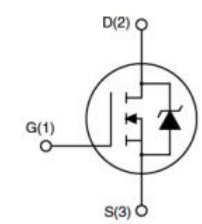
RTF2N65

General Description:

RTF2N65 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. The transistor can be used in various power switching circuit for system miniaturization and higher eficiency. The package form is TO-220F, which accords with the RoHS standard.

V_{DSS}	650	V
I_D	2	A
P_D (T_C=25℃)	35	W
$R_{DS(ON)}$ Typ	3.9	Ω





Features:

- **Fast Switching**
- **Low ON Resistance(Rdson≤5Ω)**
- **Low Gate Charge (Typical Data: 9nC)**
- **Low Reverse transfer capacitances(Typical: 6pF)**
- **100% Single Pulse avalanche energy Test**

Applications:

Power switch circuit of adaptor and charger.

Absolute （Tc= 25℃ unless otherwise specified）:

Symbol	Parameter	Rating	Units
V_{DSS}	Drain-to-Source Voltage	650	V
I_D	Continuous Drain Current	2	A
	Continuous Drain Current T_C = 100 °C	1.45	A
I_{DM} a1	Pulsed Drain Current	8	A
V_{GS}	Gate-to-Source Voltage	±30	V
E_{AS} a2	Single Pulse Avalanche Energy	68	mJ
E_{AR} a1	Avalanche Energy , Repetitive	6.4	mJ
I_{AR} a1	Avalanche Current	1.1	A
dv/dt a3	Peak Diode Recovery dv/dt	5.0	V/ns
P_D	Power Dissipation	35	W
	Derating Factor above 25°C	0.28	W/℃
$V_{ESD(G-S)}$	Gate source ESD (HBM-C= 100pF, R=1.5kΩ)	3000	V
T_J, T_{stg}	Operating Junction and Storage Temperature Range	150，－55 to 150	℃
T_L	Maximum Temperature for Soldering	300	℃

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Electrical Characteristics（Tc= 25℃ unless otherwise specified）:

OFF Characteristics

Symbol	Parameter	Test Conditions	Rating Min.	Rating Typ.	Rating Max.	Units
V_{DSS}	Drain to Source Breakdown Voltage	V_{GS}=0V, I_D=250μA	600	--	--	V
$\Delta BV_{DSS}/\Delta T_J$	Bvdss Temperature Coefficient	ID=250uA, Reference25℃	--	0.6	--	V/℃
I_{DSS}	Drain to Source Leakage Current	V_{DS} =650V, V_{GS}= 0V, T_a = 25℃	--	--	1	μA
		V_{DS} =520V, V_{GS}= 0V, T_a = 125℃	--	--	100	μA
$I_{GSS(F)}$	Gate to Source Forward Leakage	V_{GS} =+30V	--	--	100	nA
$I_{GSS(R)}$	Gate to Source Reverse Leakage	V_{GS} =-30V	--	--	-100	nA

ON Characteristics

Symbol	Parameter	Test Conditions	Rating Min.	Rating Typ.	Rating Max.	Units
$R_{DS(ON)}$	Drain-to- Source On-Resistance	V_{GS}= 10V,I_D= 1A	--	3.9	5.0	Ω
$V_{GS(TH)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250μA	2.0		4.0	V

Pulse width tp≤300μs,δ≤2%

Dynamic Characteristics

Symbol	Parameter	Test Conditions	Rating Min.	Rating Typ.	Rating Max.	Units
g_{fs}	Forward Trans conductance	V_{DS}= 15V, I_D =2A		2.6	--	S
C_{iss}	Input Capacitance	V_{GS} = 0V V_{DS} = 25V f = 1.0MHz	--	290		pF
C_{oss}	Output Capacitance		--	31		
C_{rss}	Reverse Transfer Capacitance		--	6		

Resistive Switching Characteristics

Symbol	Parameter	Test Conditions	Rating Min.	Rating Typ.	Rating Max.	Units
$t_{d(ON)}$	Turn-on Delay Time	I_D =2A V_{DD} = 325V R_G =9.1Ω	--	8	--	ns
t_r	Rise Time		--	6	--	
$t_{d(OFF)}$	Turn-Off Delay Time		--	30	--	
t_f	Fall Time		--	11	--	
Q_g	Total Gate Charge	I_D =2A V_{DD} =325V V_{GS} = 10V	--	9		nC
Q_{gs}	Gate to Source Charge		--	1.5		
Q_{gd}	Gate to Drain ("Miller") Charge		--	4		

Source-Drain Diode Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min .	Typ .	Max .	
I_S	Continuous Source Current (Body Diode)		--	--	2	A
I_{SM}	Maximum Pulsed Current (Body Diode)		--	--	8	A
V_{SD}	Diode Forward Voltage	I_S=2.0A,V_{GS}=0V	--	--	1.5	V
trr	Reverse Recovery Time	I_S=2 .0A,T_j = 25°C dI$_F$/dt=100A/us, V_{GS}=0V	--	425	--	ns
Qrr	Reverse Recovery Charge		--	1140	--	nC
Pulse width tp≤300μs,δ≤2%						

Symbol	Parameter	Typ .	Units
$R_{\theta JC}$	Junction- to- Case	3 .57	℃/ W
$R_{\theta JA}$	Junction- to- Ambient	62	℃/ W

a1 ： Repetitive rating; pulse width limited by maximum junction temperature

a2 ： L= 10mH, I_D=3 .7A, Start T_J=25℃

a3 ： I_{SD} =2A, di/dt ≤100A/us, V_{DD}≤BV_{DS}, Start T_J=25℃

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Characteristics Curve:

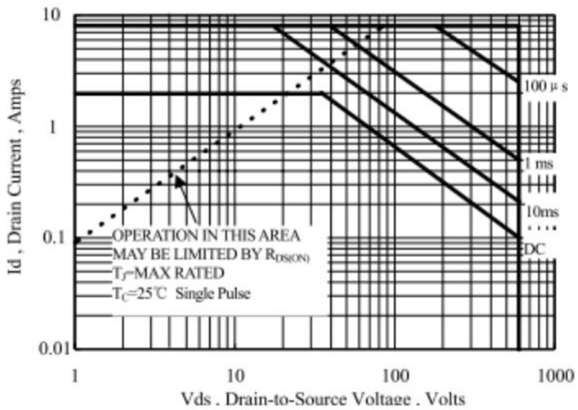

Figure 1 Maximun Forward Bias Safe Operating Area

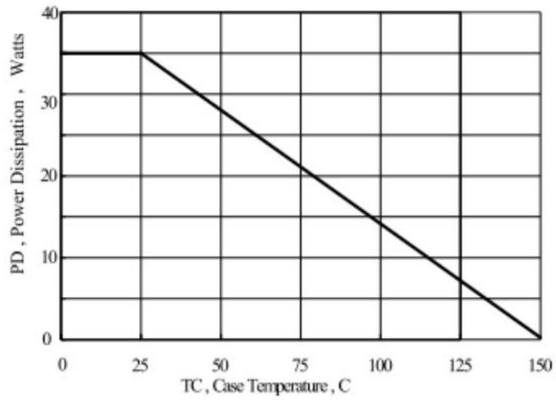

Figure 2 Maximun Power Dissipation vs Case Temperature

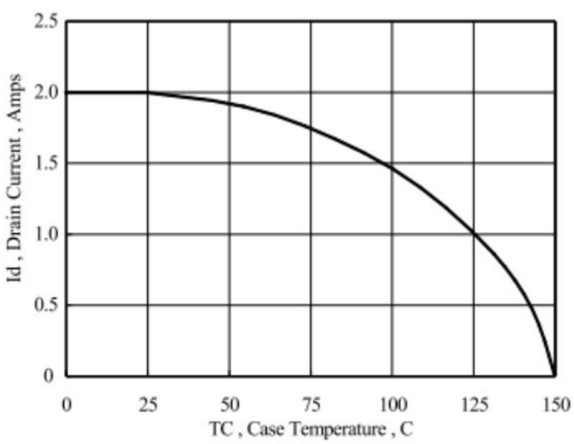

Figure 3 Maximum Continuous Drain Current vs Case Temperature

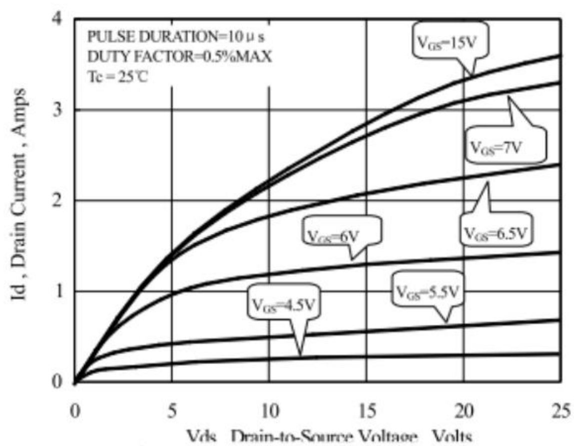

Figure 4 Typical Output Characteristics

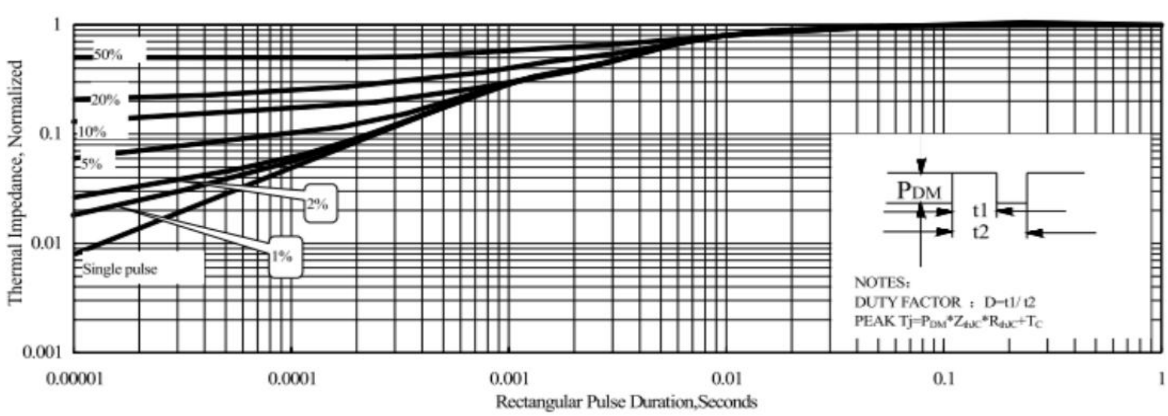

Figure 5 Maximum Effective Thermal Impendance , Junction to Case

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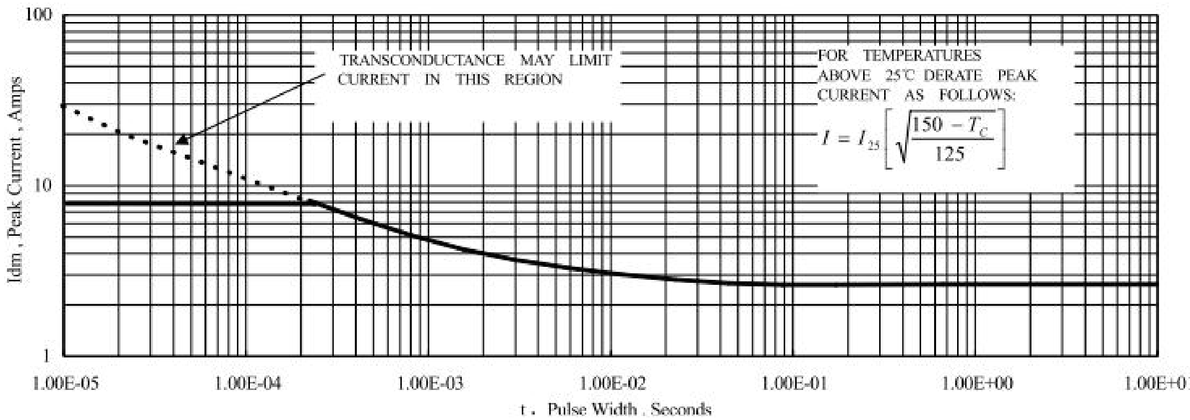

Figure 6 Maximun Peak Current Capability

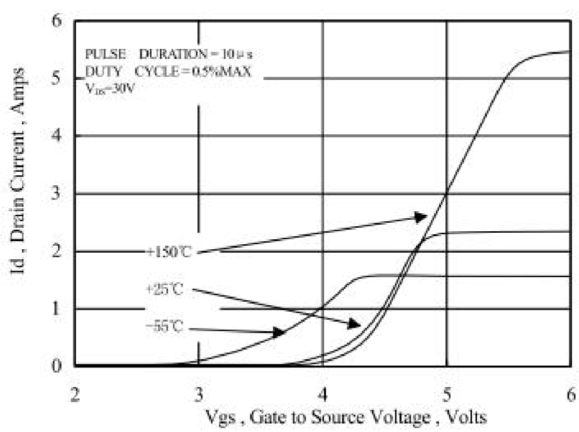

Figure 7 Typical Transfer Characteristics

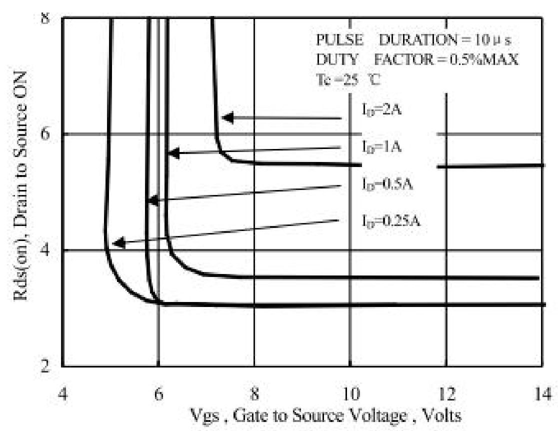

Figure 8 Typical Drain to Source ON Resistance vs Gate Voltage

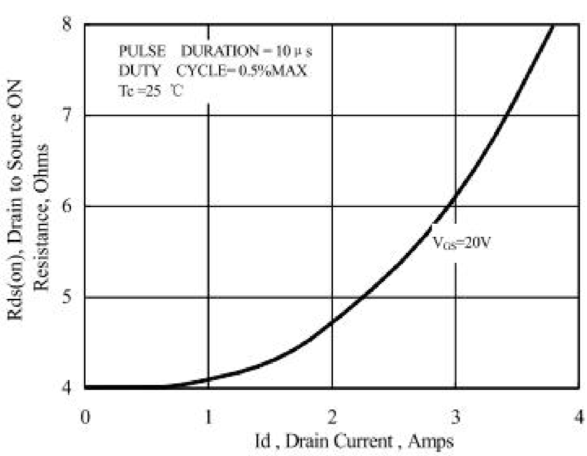

Figure 9 Typical Drain to Source ON Resistance
vs Drain Current

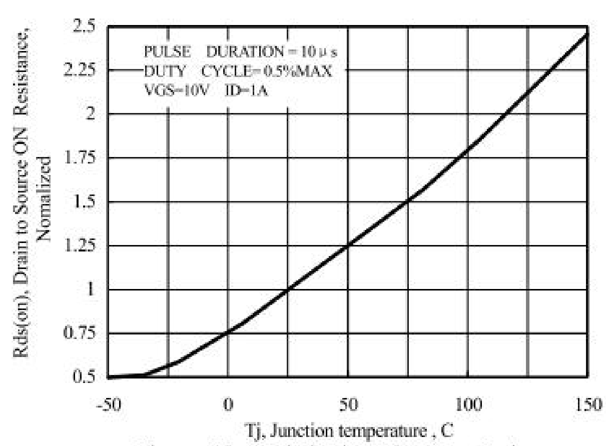

Figure 10 Typical Drian to Source on Resistance
vs Junction Temperature

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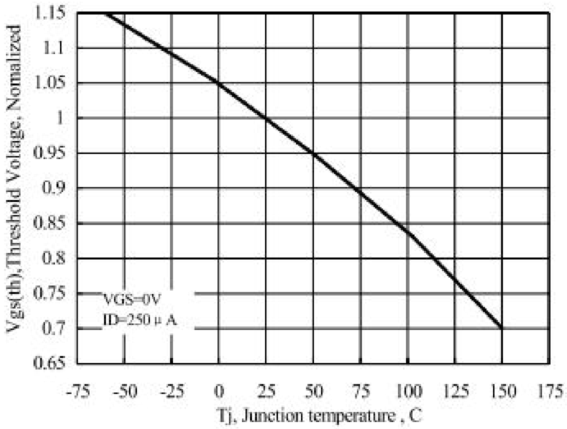

Figure 11 Typical Theshold Voltage vs Junction Temperature

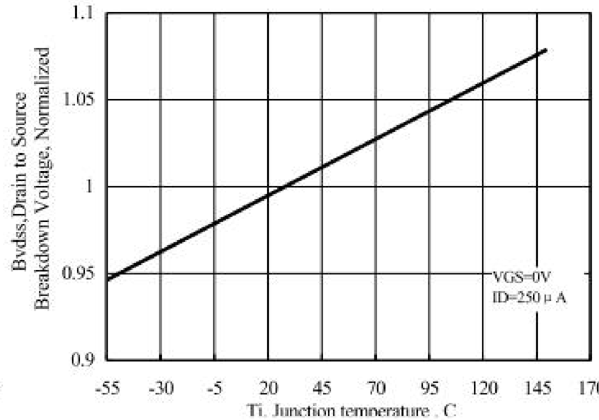

Figure 12 Typical Breakdown Voltage vs Junction Temperature

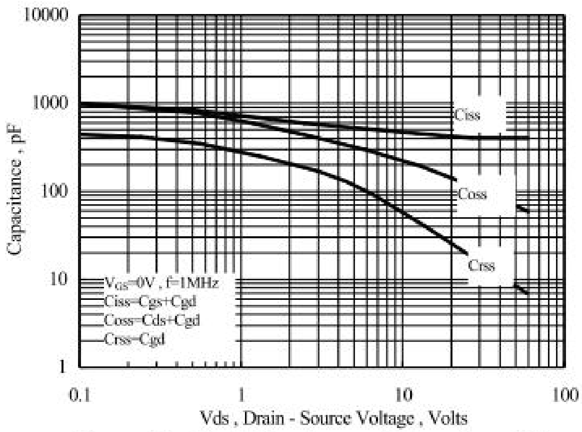

Figure 13 Typical Capacitance vs Drain to Source Voltage

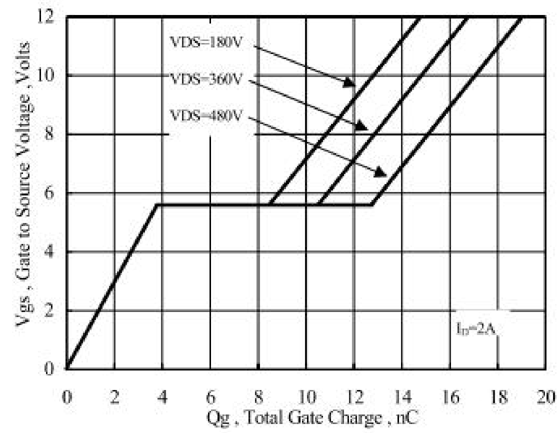

Figure 14 Typical Gate Charge vs Gate to Source Voltage

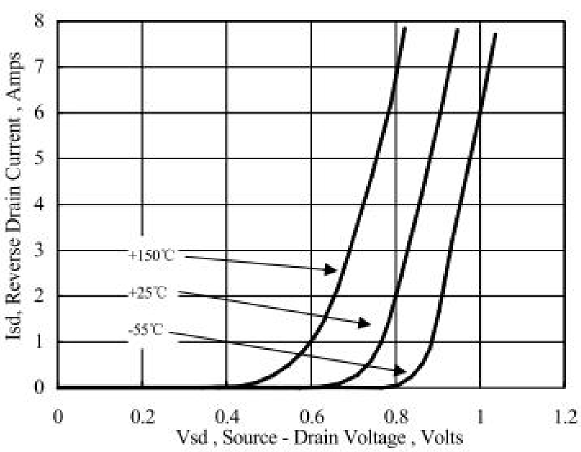

Figure 15 Typical Body Diode Transfer Characteristics

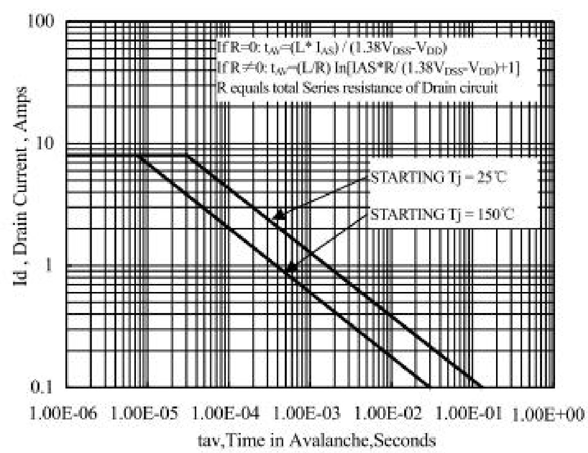

Figure 16 Unclamped Inductive Switching Capability

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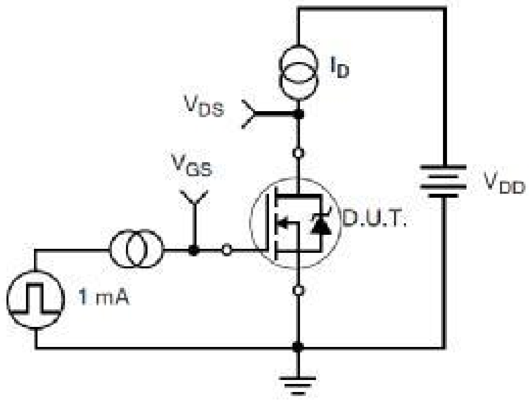

Figure 17. Gate Charge Test Circuit

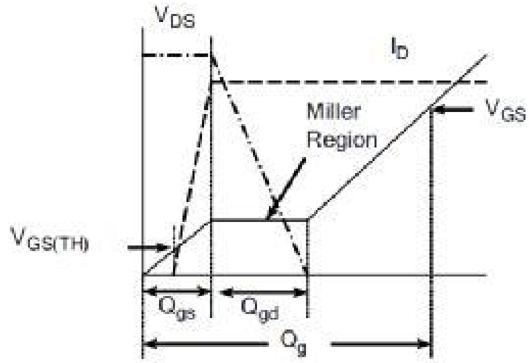

Figure 18. Gate Charge Waveform

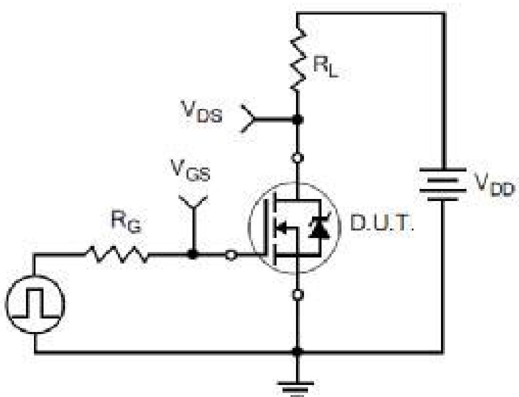

Figure 19. Resistive Switching Test Circuit

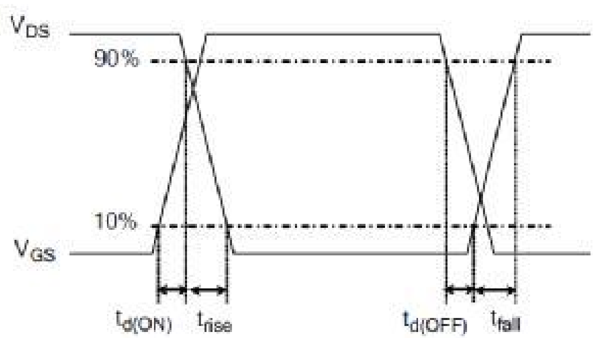

Figure 20. Resistive Switching Waveforms

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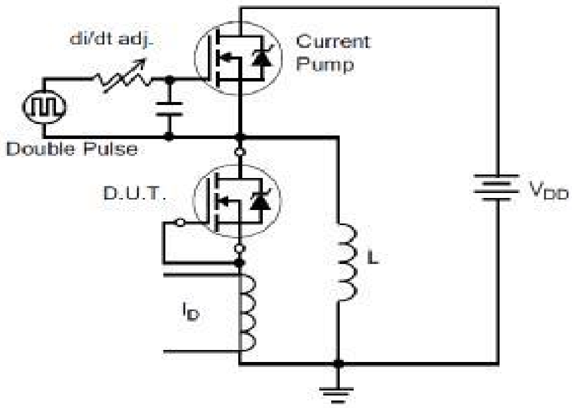

Figure 21. Diode Reverse Recovery Test Circuit

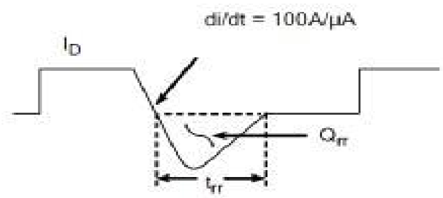

Figure 22. Diode Reverse Recovery Waveform

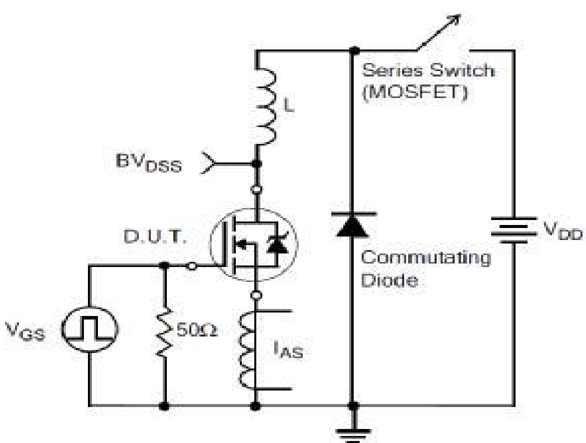

Figure 23. Unclamped Inductive Switching Test Circuit

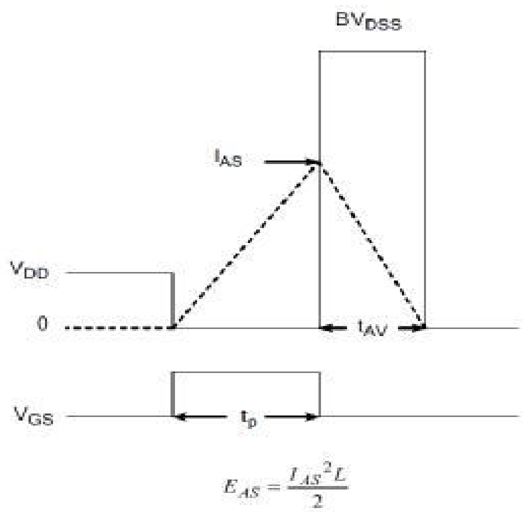

Figure 24. Unclamped Inductive Switching Waveforms