

General Description

This Trench MOSFET has better characteristics, such as fast switching time, low on resistance, low gate charge and excellent avalanche characteristics. It is mainly suitable for DC/DC Converter, Synchronous Rectification and a load switch in battery powered applications

FEATURES

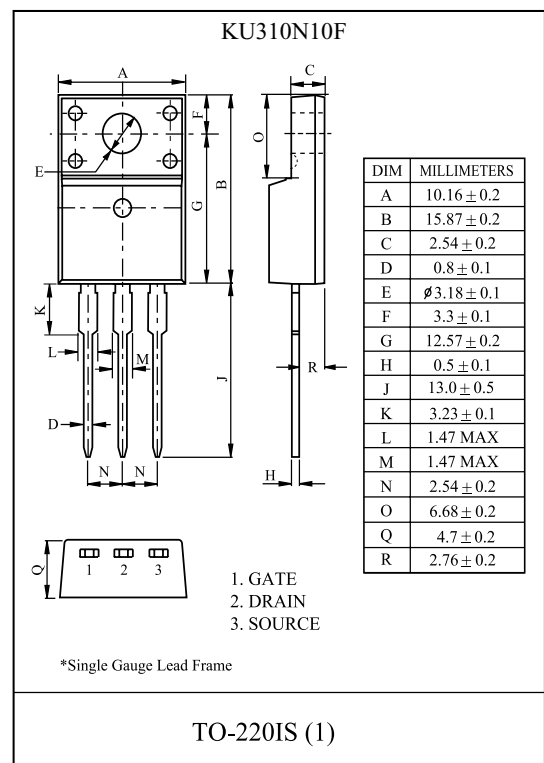
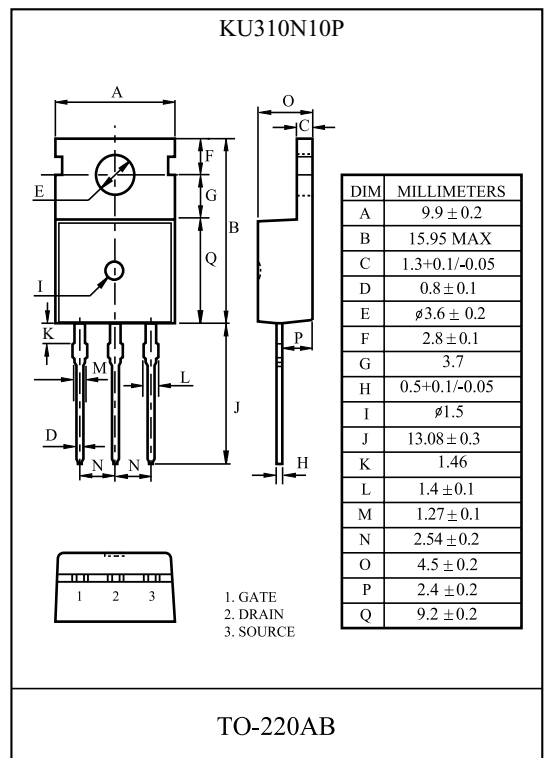
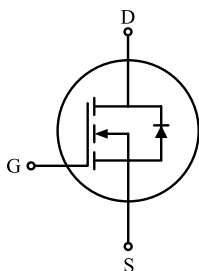
- $V_{DS} = 100V$, $I_D = 34A$
- Drain-Source ON Resistance :
 $R_{DS(ON)} = 31m\Omega (Max.) @ V_{GS} = 10V$

MAXIMUM RATING (Tc=25 °C)

CHARACTERISTIC		SYMBOL	RATING		UNIT
			KU310N10P	KU310N10F	
Drain-Source Voltage		V _{DSS}	100		V
Gate-Source Voltage		V _{GSS}	± 20		V
Drain Current	@T _C =25	I _D	34	23	A
	@T _C =100		21.5	15	
	Pulsed (Note1)	I _{DP}	110*		
Single Pulsed Avalanche Energy (Note 2)		E _{AS}	60		mJ
Repetitive Avalanche Energy (Note 1)		E _{AR}	2.3		mJ
Peak Diode Recovery dv/dt (Note 3)		dv/dt	4.5		V/ns
Drain Power Dissipation	Tc=25	P _D	83.3	38	W
	Derate above 25		0.67	0.3	W/
Maximum Junction Temperature		T _j	150		
Storage Temperature Range		T _{stg}	-55 ~ 150		
Thermal Characteristics					
Thermal Resistance, Junction-to-Case		R _{thJC}	1.5	3.3	/W
Thermal Resistance, Junction-to-Ambient		R _{thJA}	62.5		/W

* : Drain current limited by maximum junction temperature.

PIN CONNECTION



KU310N10P/F

ELECTRICAL CHARACTERISTICS (Tc=25)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Static						
Drain-Source Breakdown Voltage	BV _{DSS}	I _D =250 μA, V _{GS} =0V	100	-	-	V
Breakdown Voltage Temperature Coefficient	Δ BV _{DSS} / Δ T _j	I _D =5mA, Referenced to 25	-	0.10	-	V/
Drain Cut-off Current	I _{DSS}	V _{DS} =100V, V _{GS} =0V,	-	-	10	μA
Gate Threshold Voltage	V _{th}	V _{DS} =V _{GS} , I _D =250 μA	2.0	-	4.0	V
Gate Leakage Current	I _{GSS}	V _{GS} = ± 20V, V _{DS} =0V	-	-	± 100	nA
Drain-Source ON Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =17A	-	25	31	mΩ
Dynamic						
Total Gate Charge	Q _g	V _{DS} =80V, I _D =34A V _{GS} =10V (Note4,5)	-	49	-	nC
Gate-Source Charge	Q _{gs}		-	10	-	
Gate-Drain Charge	Q _{gd}		-	14	-	
Turn-on Delay time	t _{d(on)}	V _{DD} =50V I _D =34A R _G =25 Ω (Note4,5)	-	30	-	ns
Turn-on Rise time	t _r		-	32	-	
Turn-off Delay time	t _{d(off)}		-	115	-	
Turn-off Fall time	t _f		-	40	-	
Input Capacitance	C _{iss}	V _{DS} =25V, V _{GS} =0V, f=1.0MHz	-	2230	-	pF
Output Capacitance	C _{oss}		-	170	-	
Reverse Transfer Capacitance	C _{rss}		-	85	-	
Source-Drain Diode Ratings						
Continuous Source Current	I _S	V _{GS} <V _{th}	-	-	34	A
Pulsed Source Current	I _{SP}		-	-	136	
Diode Forward Voltage	V _{SD}	I _S =34A, V _{GS} =0V	-	-	1.4	V
Reverse Recovery Time	t _{rr}	I _S =34A, V _{GS} =0V,	-	53	-	ns
Reverse Recovery Charge	Q _{rr}	dI _S /dt=300A/ μs	-	0.11	-	μC

Note 1) Repetivity rating : Pulse width limited by junction temperature.

Note 2) $L=35\mu H$, $I_S=34A$, $V_{DD}=80V$, $R_G=25\Omega$, Starting $T_j=25$.

Note 3) $I_S \leq 34A$, $dI/dt \leq 200A/\mu s$, $V_{DD} \leq BV_{DSS}$, Starting $T_j=25$.

Note 4) Pulse Test : Pulse width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.

Note 5) Essentially independent of operating temperature.

Marking

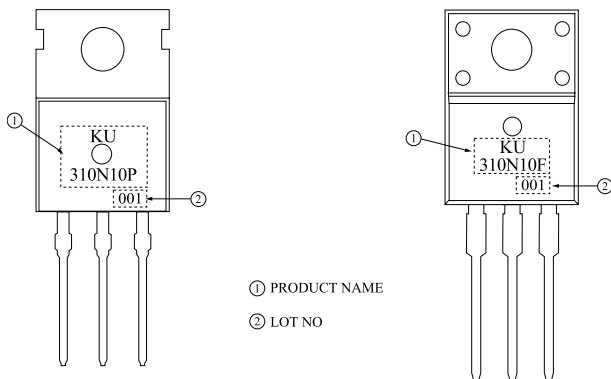


Fig1. $I_D - V_{DS}$

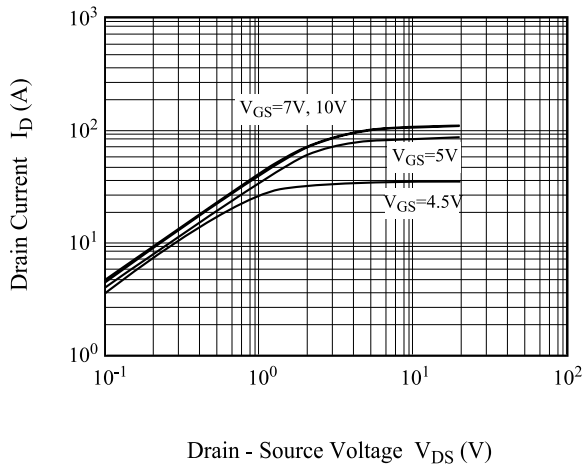


Fig2. $I_D - V_{GS}$

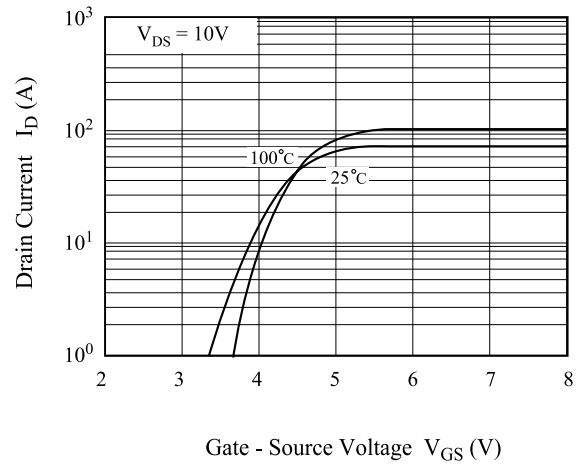


Fig3. $BV_{DSS} - T_j$

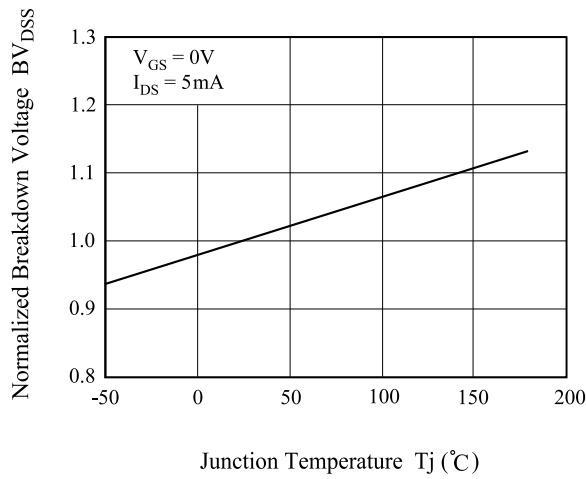


Fig4. $R_{DS(ON)} - T_j$

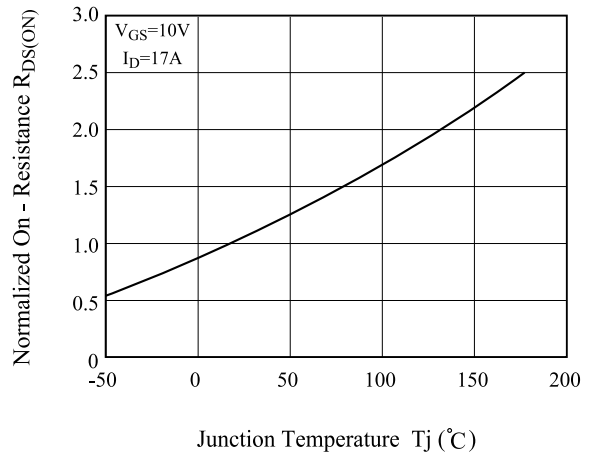


Fig5. $I_S - V_{SD} - I$

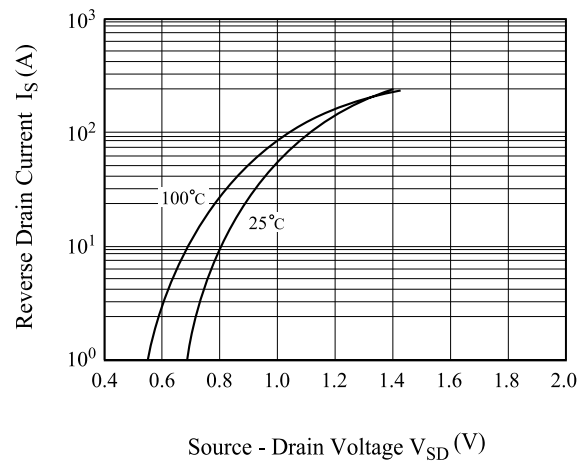
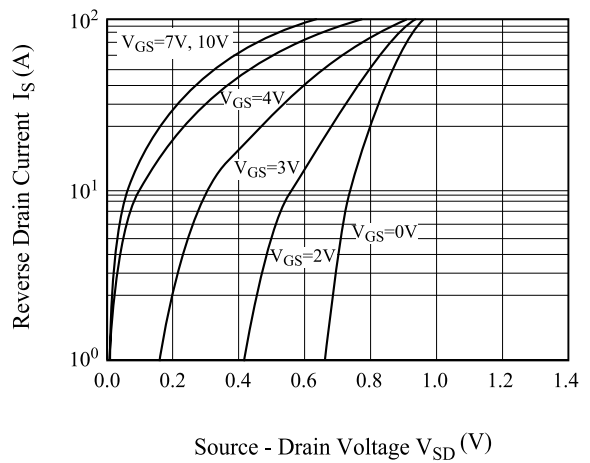


Fig6. $I_S - V_{SD} - II$



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Fig7. $R_{DS(ON)}$ - I_D

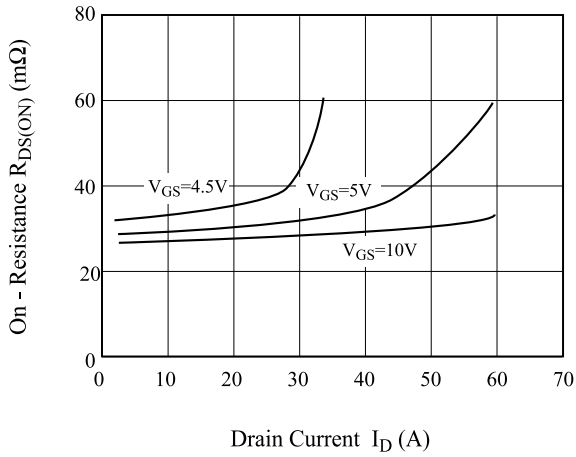


Fig8. I_D - T_j

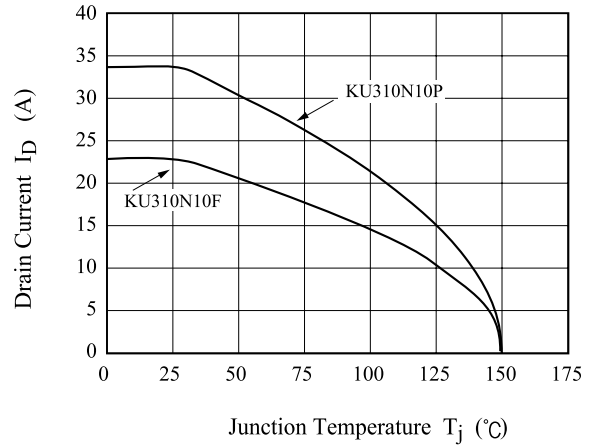


Fig 9. C - V_{DS}

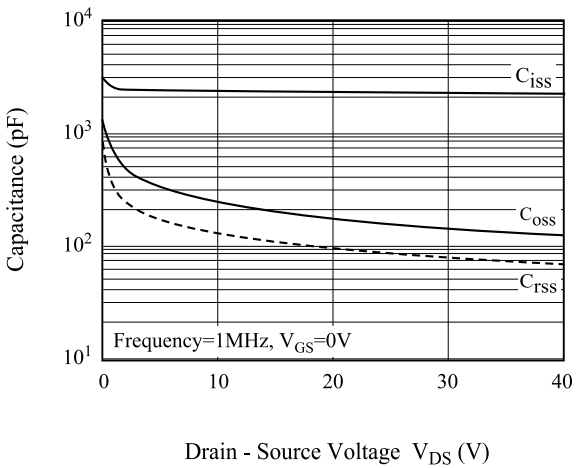


Fig10. Q_g - V_{GS}

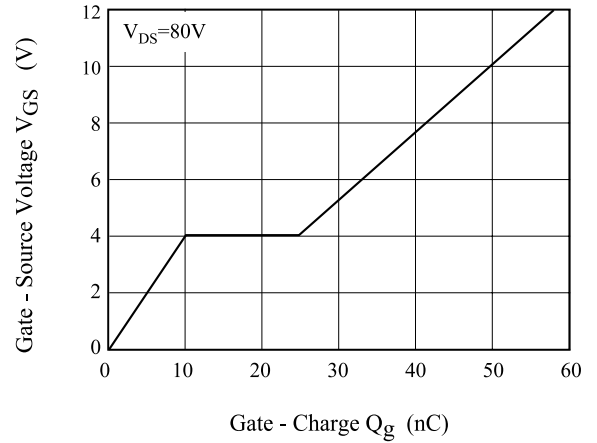


Fig11. Safe Operation Area

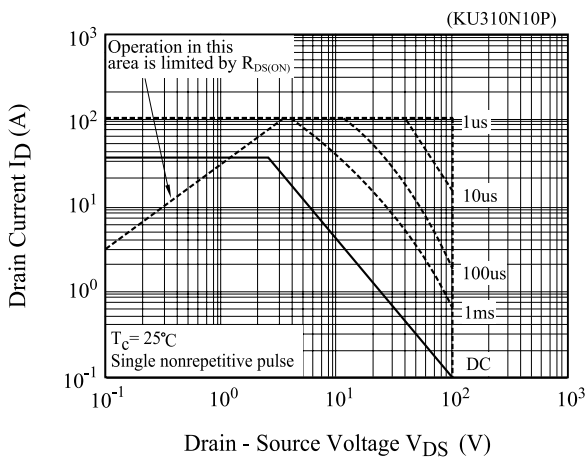


Fig12. Safe Operation Area

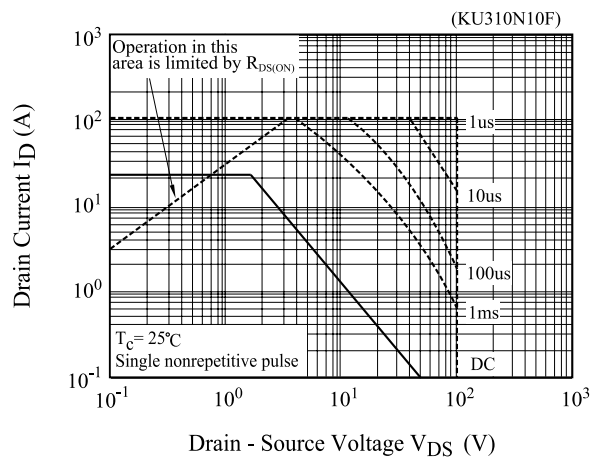


Fig13. Transient Thermal Response Curve

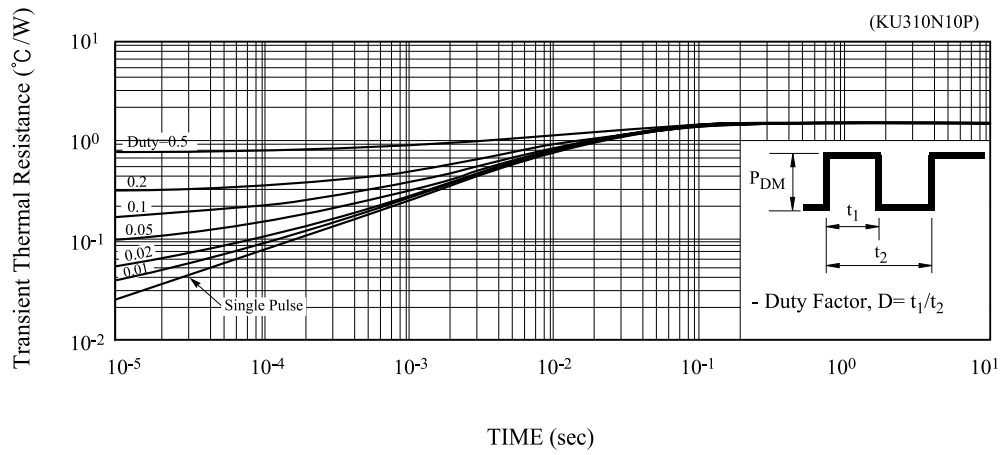


Fig14. Transient Thermal Response Curve

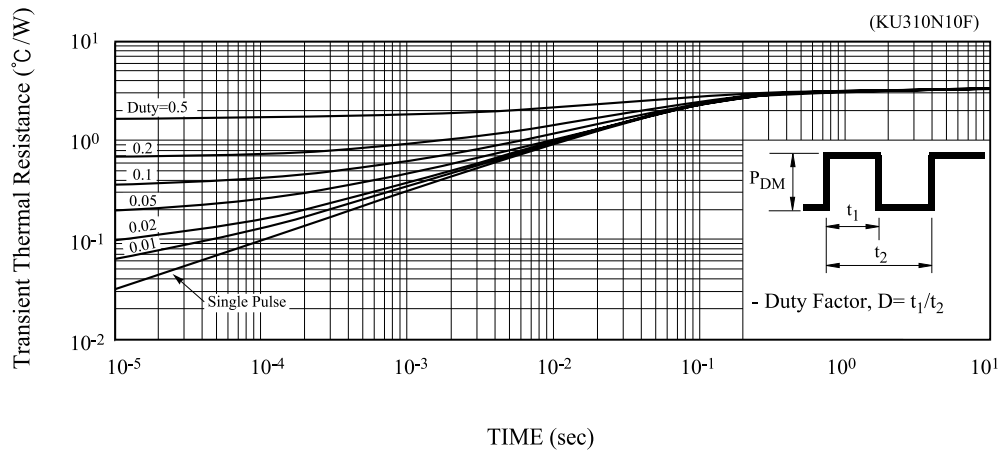


Fig15. Gate Charge

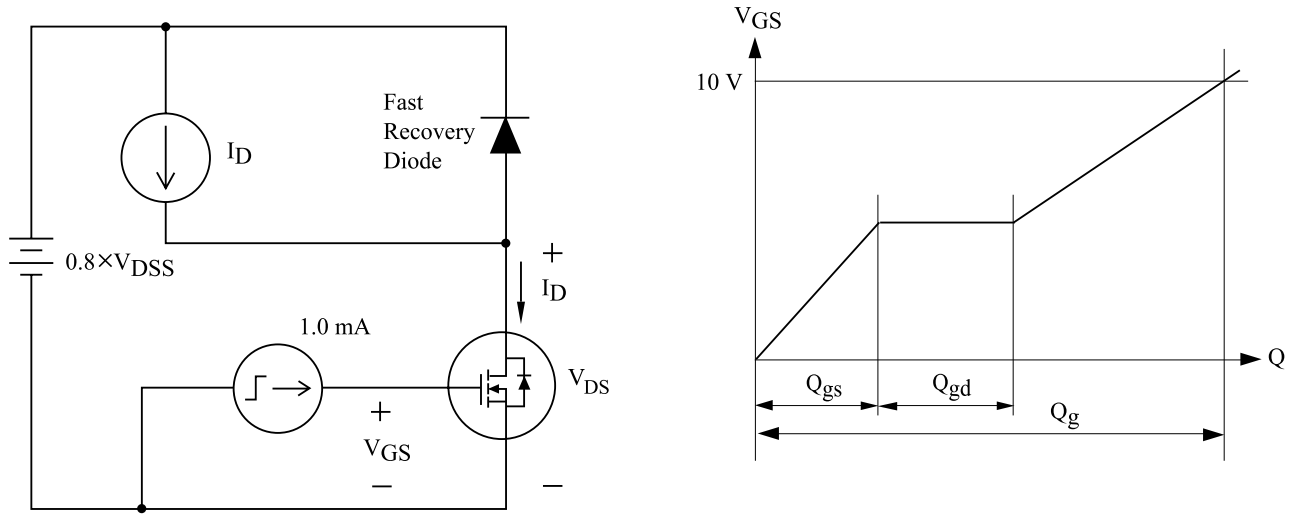


Fig16. Single Pulsed Avalanche Energy

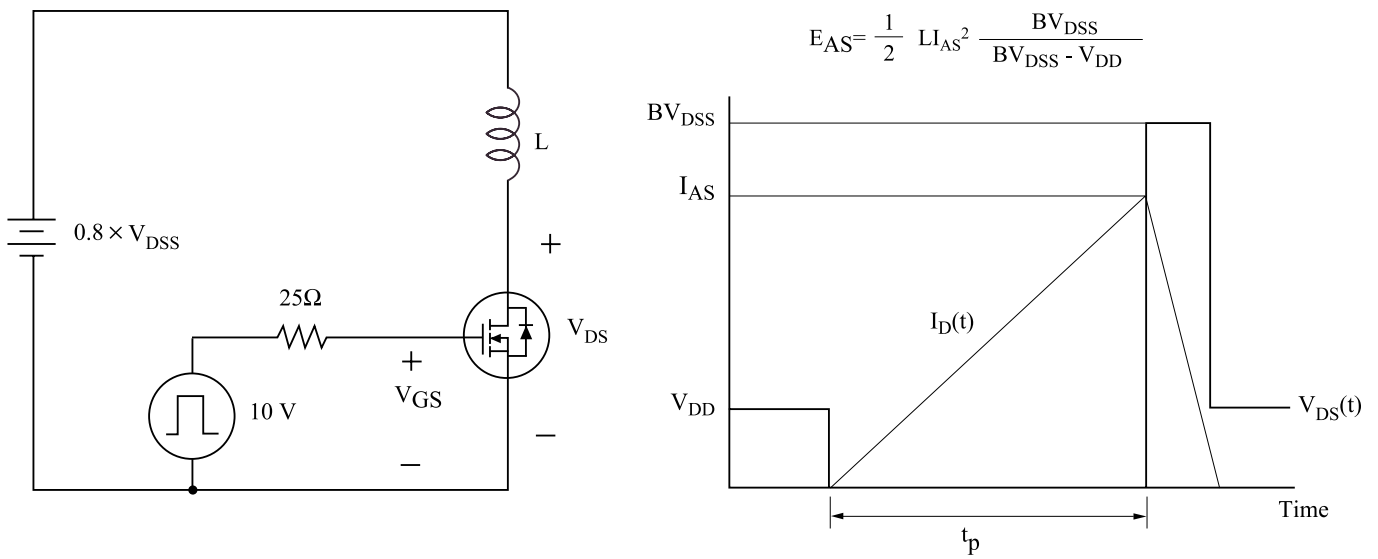


Fig17. Resistive Load Switching

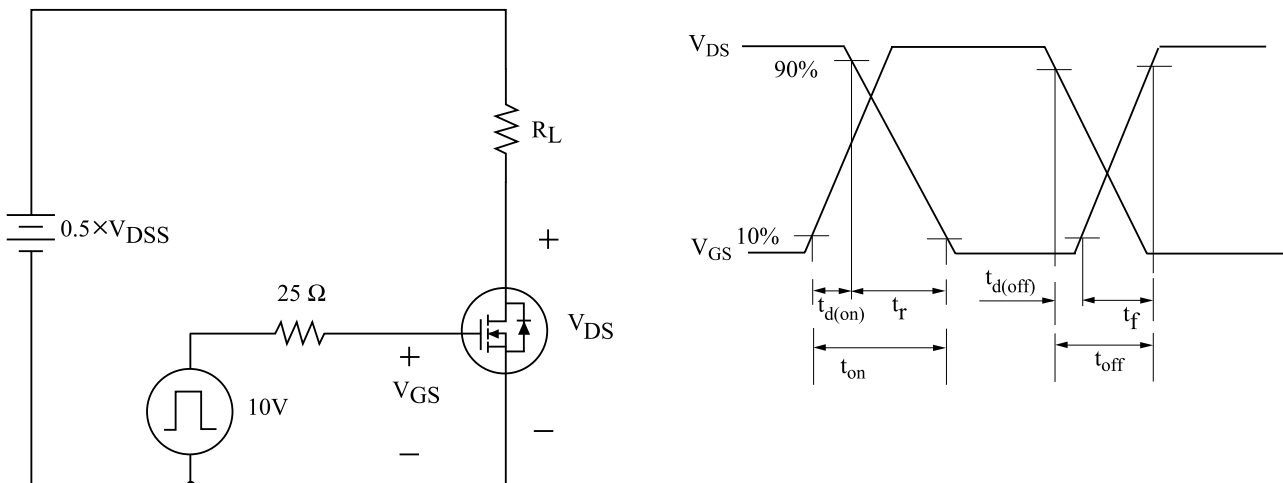


Fig18. Source - Drain Diode Reverse Recovery and dv/dt

