

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

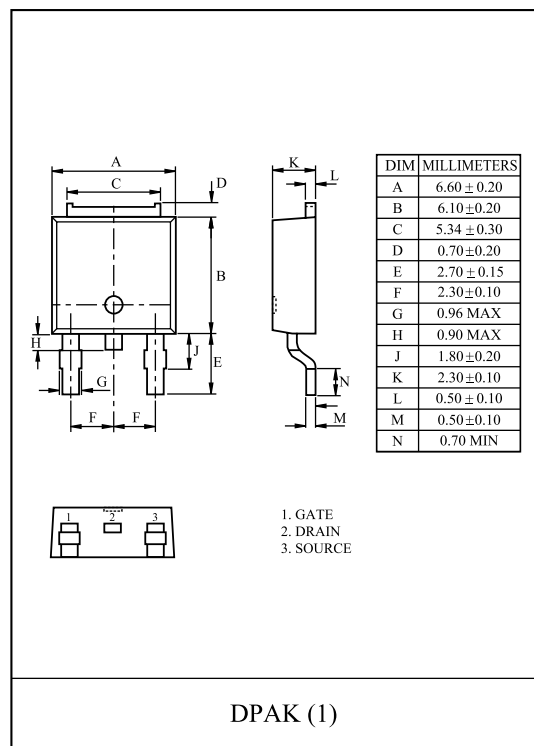
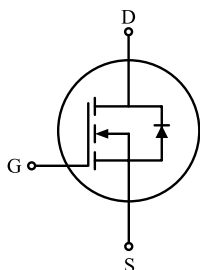
- $V_{DS} = 100V$, $I_D = 27A$
- Drain-Source ON Resistance :
 $R_{DS(ON)} = 31m\Omega (Max.) @ V_{GS} = 10V$

MAXIMUM RATING ($T_c = 25^\circ C$)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Drain-Source Voltage		V_{DS}	100	V
Gate-Source Voltage		V_{GS}	± 20	V
Drain Current	@ $T_c = 25$	I_D	27	A
	@ $T_c = 100$		17	
	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	$T_c = 25$	P_D	52	W
	Derate above 25		0.42	W/
Maximum Junction Temperature		T_j	150	
Storage Temperature Range		T_{stg}	-55 ~ 150	
Thermal Characteristics				
Thermal Resistance, Junction-to-Case		R_{thJC}	2.4	/W
Thermal Resistance, Junction-to-Ambient		R_{thJA}	110	/W

* : Drain current limited by maximum junction temperature.

PIN CONNECTION



KU310N10D

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	ΔBV _{DSS} /ΔT _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 =13.5A	-	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 =13.5A, 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

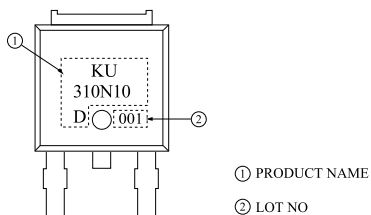


Fig1. $I_D - V_{DS}$

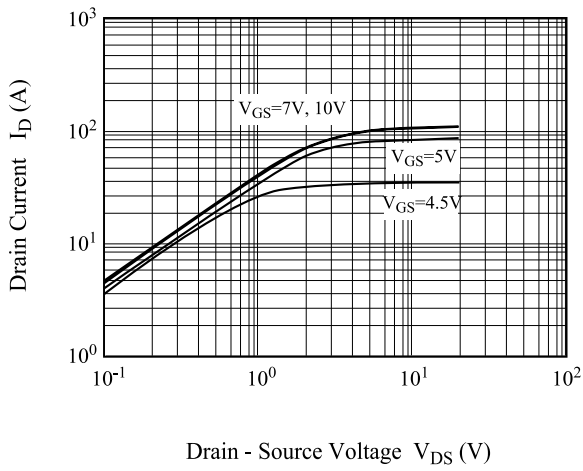


Fig2. $I_D - V_{GS}$

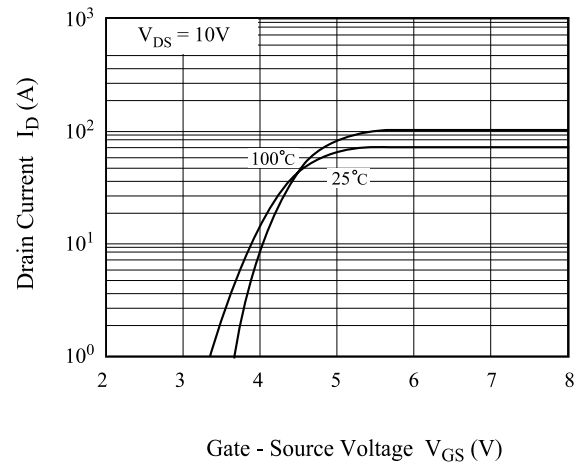


Fig3. $BV_{DSS} - T_j$

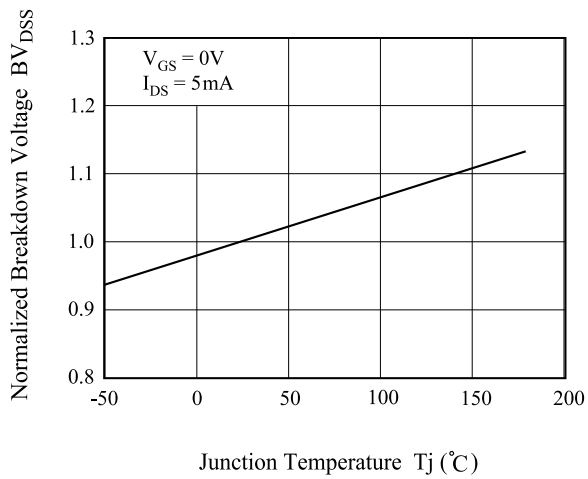


Fig4. $R_{DS(ON)} - T_j$

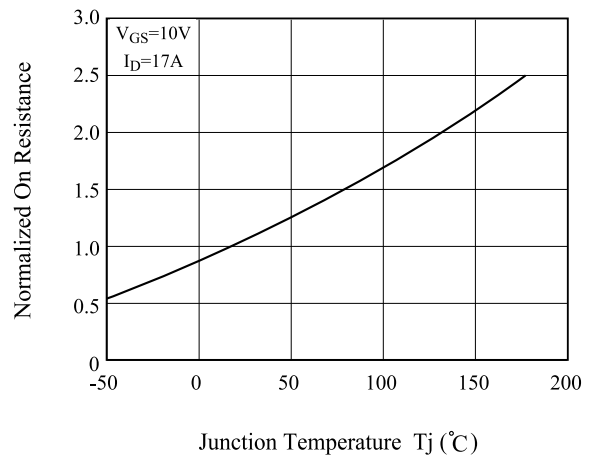


Fig5. $I_S - V_{SD} - I$

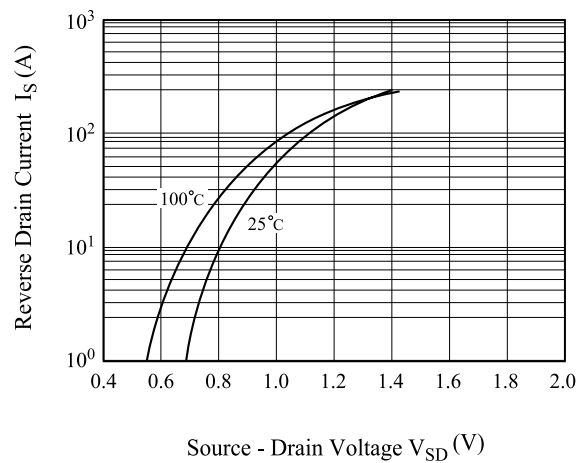


Fig6. $I_S - V_{SD} - II$

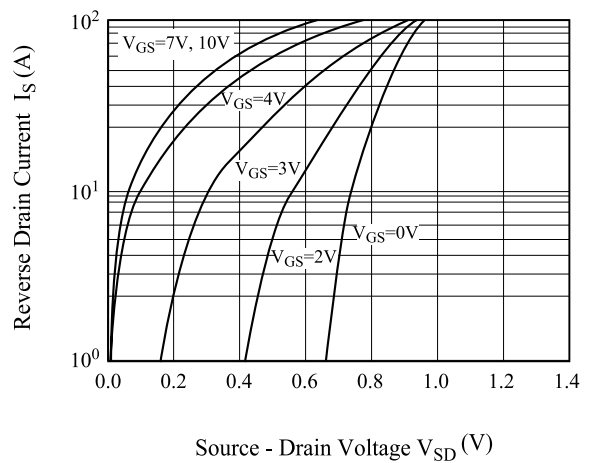


Fig7. $R_{DS(ON)} - I_D$

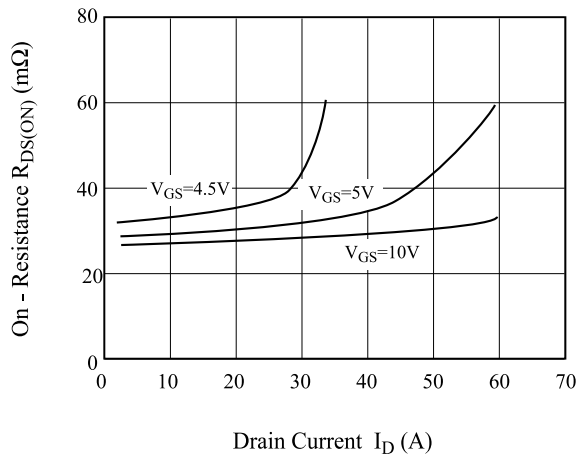


Fig8. $I_D - T_j$

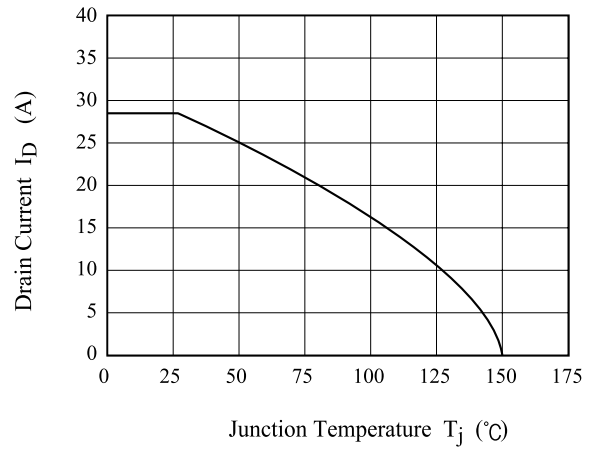


Fig 9. C - V_{DS}

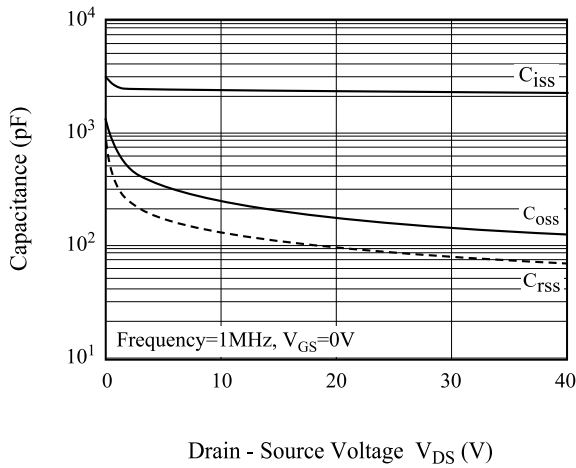


Fig10. $Q_g - V_{GS}$

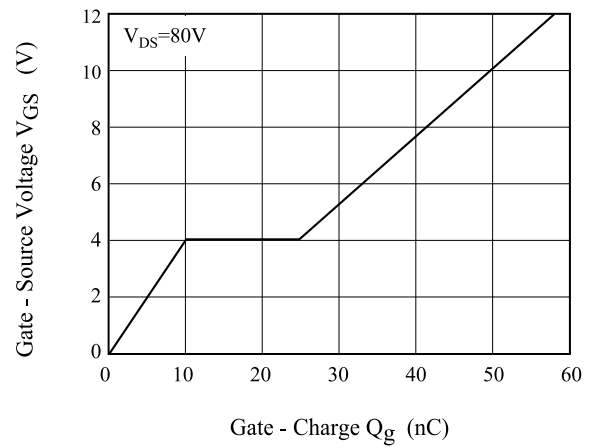


Fig11. Safe Operation Area

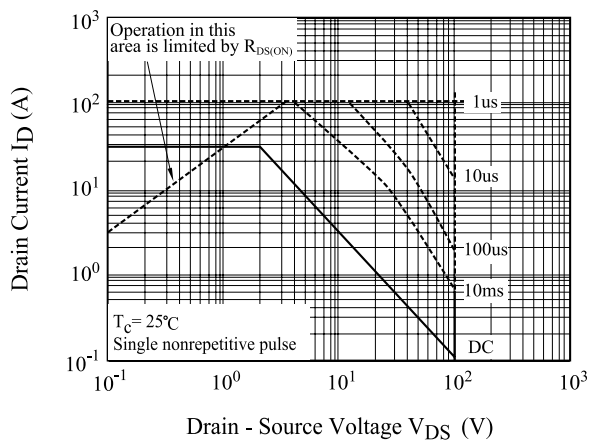


Fig12. Transient Thermal Response Curve

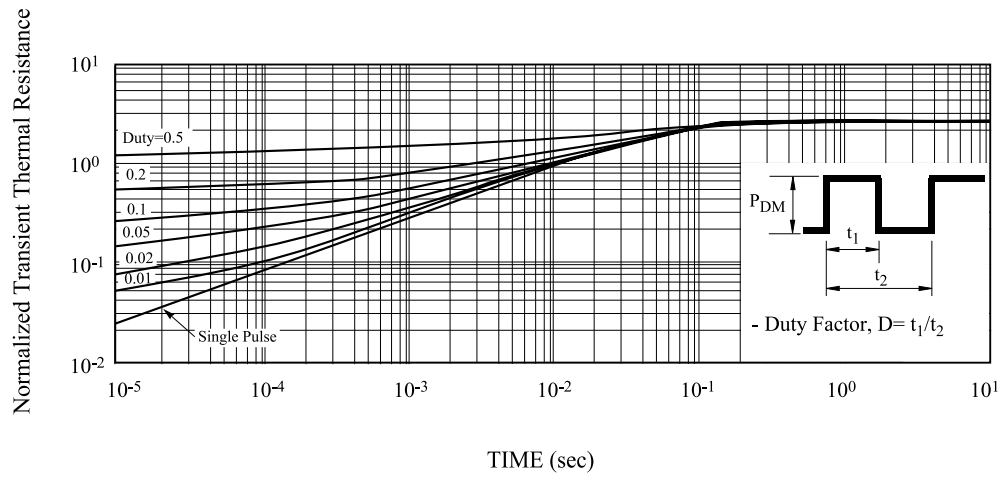


Fig13. Gate Charge

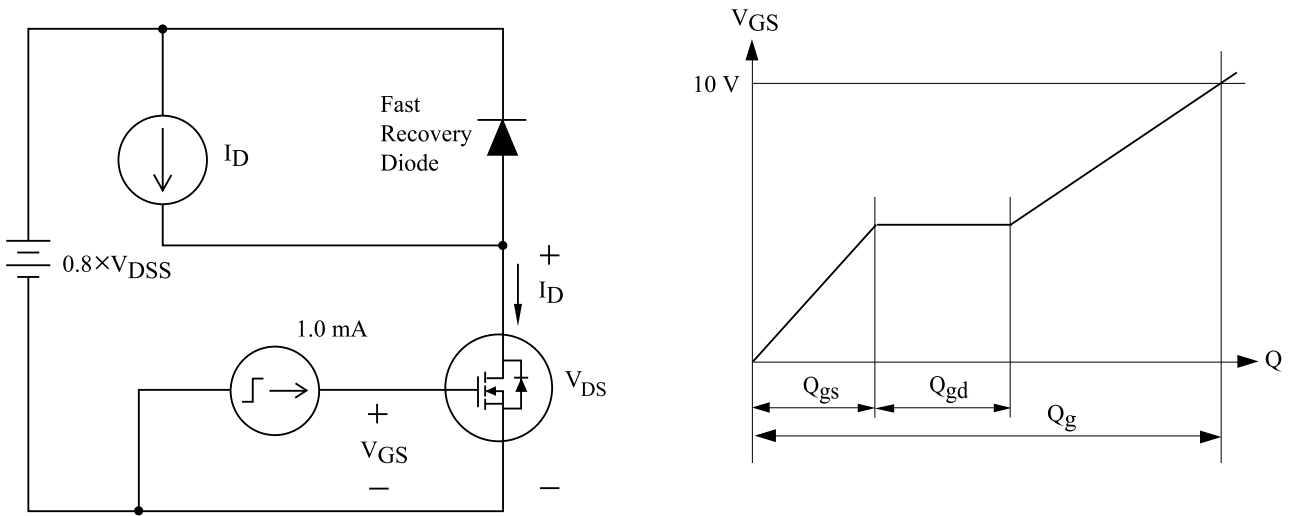


Fig14. Single Pulsed Avalanche Energy

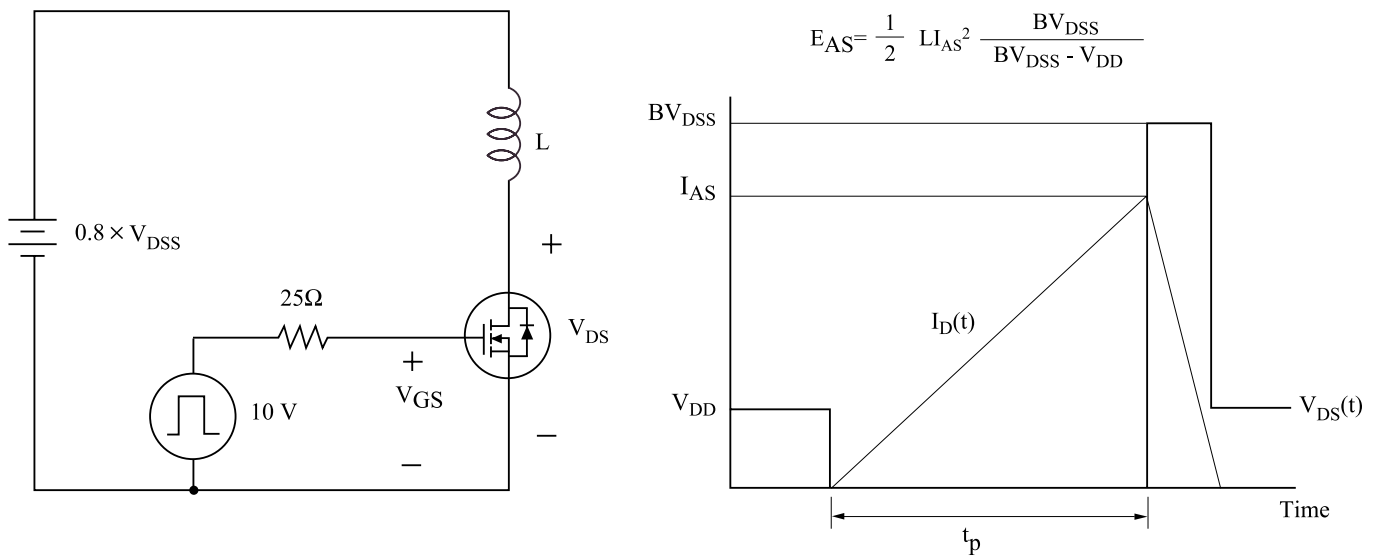


Fig15. Resistive Load Switching

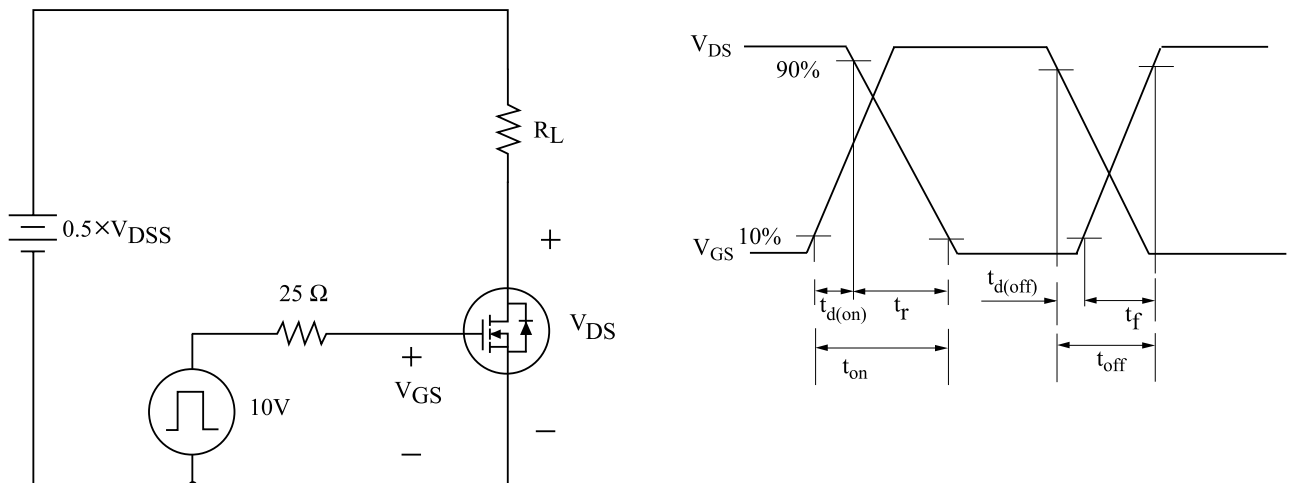


Fig16. Source - Drain Diode Reverse Recovery and dv/dt

