

### 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

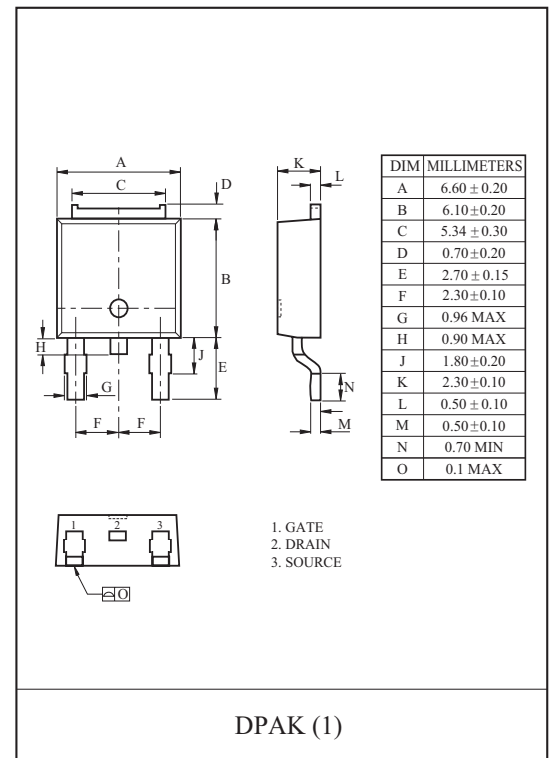
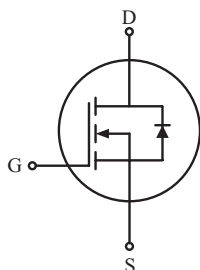
- $V_{DSS} = 100V$ ,  $I_D = 27A$
- Drain-Source ON Resistance :  
 $R_{DS(ON)} = 31m \text{ (Max.) @ } V_{GS} = 10V$

### MAXIMUM RATING (Tc=25 °C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Drain-Source Voltage	$V_{DSS}$	100	V
Gate-Source Voltage	$V_{GSS}$	$\pm 20$	V
Drain Current	@Tc=25	27	A
	@Tc=100	17	
	Pulsed (Note1)	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	52	W
	Derate above 25	0.42	W/°C
Maximum Junction Temperature	$T_j$	150	
Storage Temperature Range	$T_{stg}$	-55 ~ 150	
<b>Thermal Characteristics</b>			
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
<b>Static</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$I_D=250\ \mu A, V_{GS}=0V$	100	-	-	V
Breakdown Voltage Temperature Coefficient	$BV_{DSS}/T_j$	$I_D=5mA$ , Referenced to 25	-	0.10	-	V/
Drain Cut-off Current	$I_{DSS}$	$V_{DS}=100V, V_{GS}=0V$ ,	-	-	10	$\mu A$
Gate Threshold Voltage	$V_{th}$	$V_{DS}=V_{GS}, I_D=250\ \mu A$	2.0	-	4.0	V
Gate Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	$\pm 100$	nA
Drain-Source ON Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=13.5A$	-	25	31	m
<b>Dynamic</b>						
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	$t_{d(on)}$	$V_{DD}=50V$ $I_D=34A$ $R_G=25$ (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	-	
<b>Source-Drain Diode Ratings</b>						
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	$t_{rr}$	$I_S=34A, V_{GS}=0V$ , $dI_S/dt=300A/\mu s$	-	53	-	ns
Reverse Recovery Charge	$Q_{rr}$		-	0.11	-	$\mu C$

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

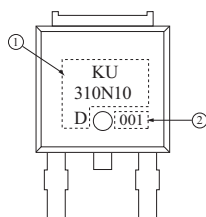
Note 2)  $L=35\ \mu H, I_S=34A, V_{DD}=80V, R_G=25$  , Starting  $T_j=25$  .

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

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

Note 5) Essentially independent of operating temperature.

## Marking



① PRODUCT NAME

② LOT NO

# KU310N10D

Fig1.  $I_D - V_{DS}$

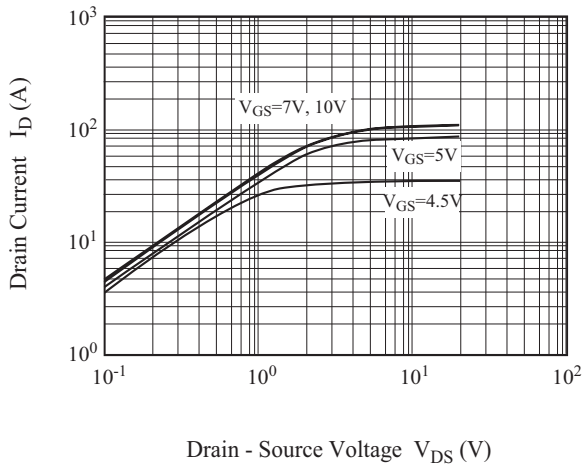


Fig2.  $I_D - V_{GS}$

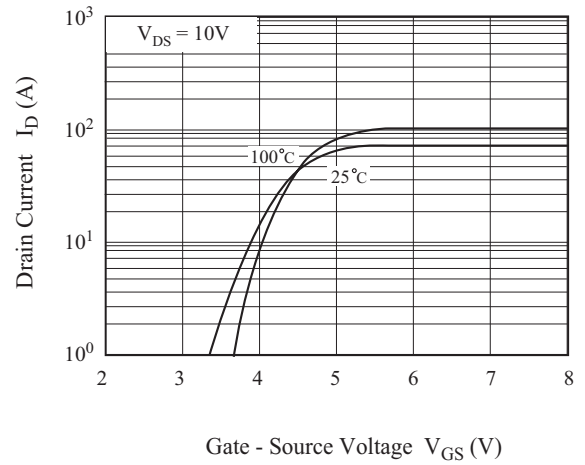


Fig3.  $BV_{DSS} - T_j$

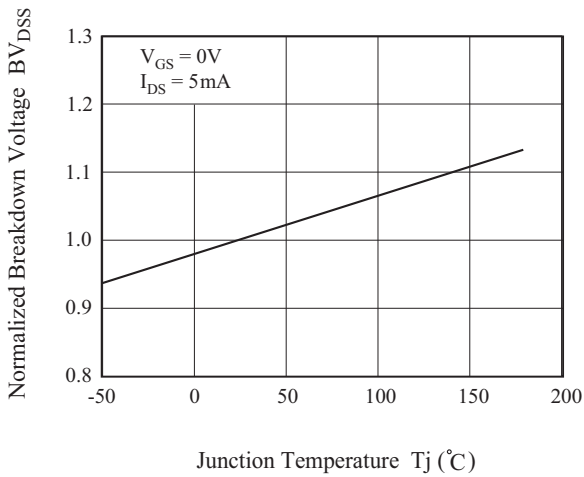


Fig4.  $R_{DS(ON)} - T_j$

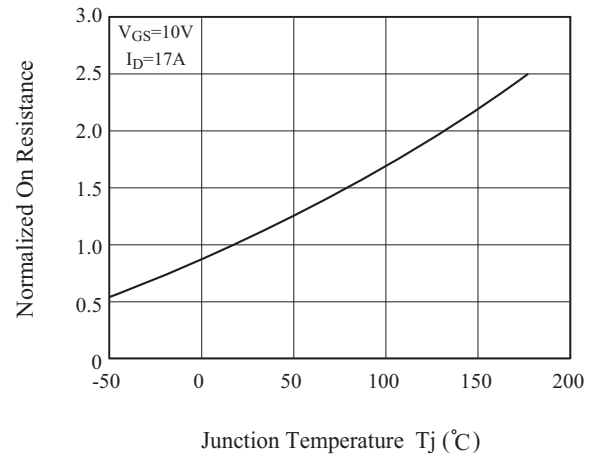


Fig5.  $I_S - V_{SD} - I$

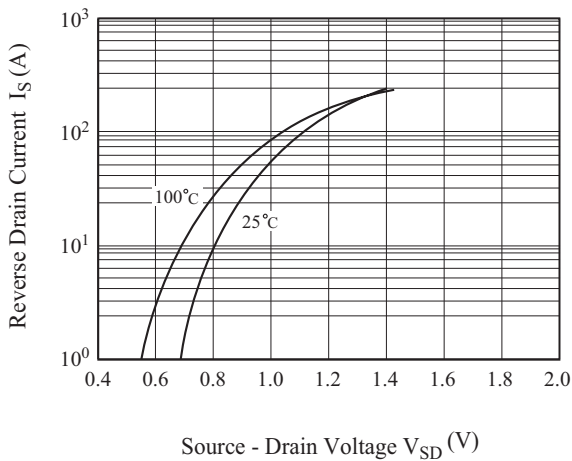
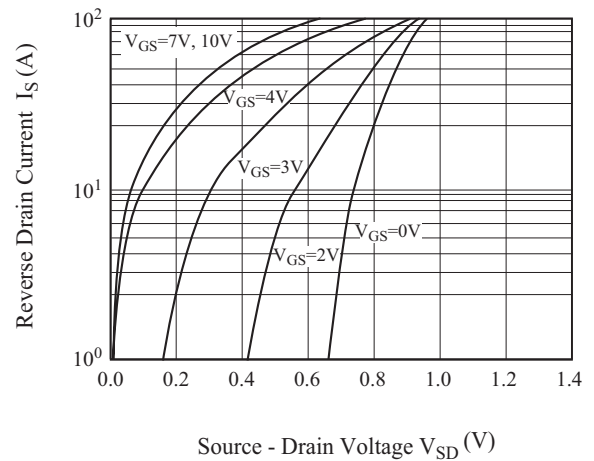


Fig6.  $I_S - V_{SD} - II$



# KU310N10D

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

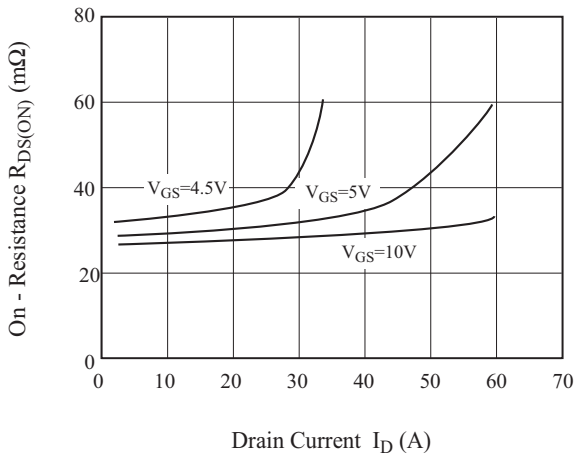


Fig8.  $I_D - T_j$

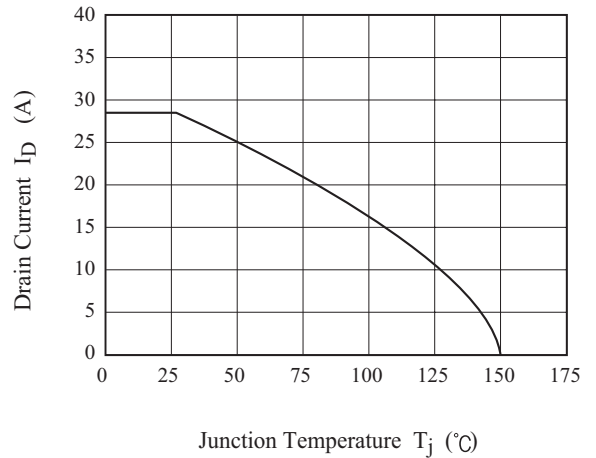


Fig 9.  $C - V_{DS}$

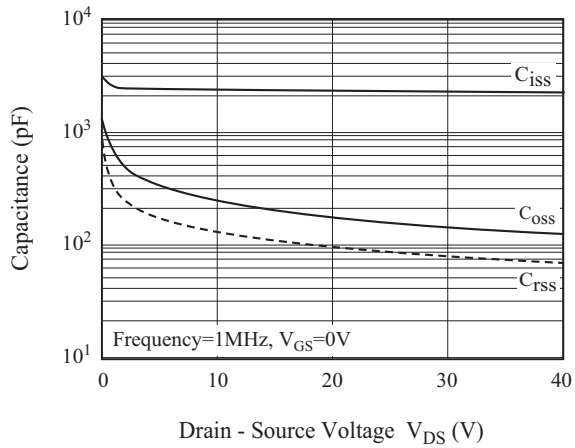


Fig10.  $Q_g - V_{GS}$

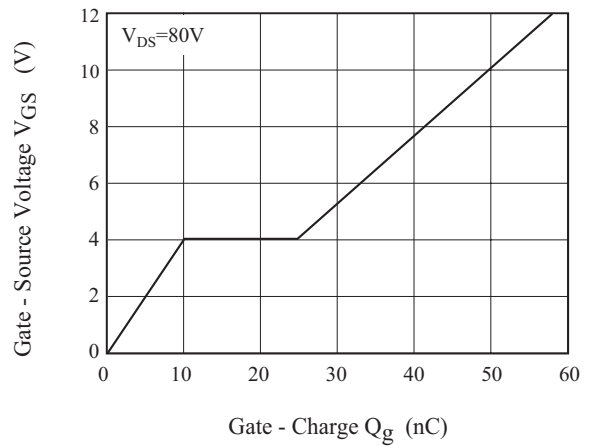


Fig11. Safe Operation Area

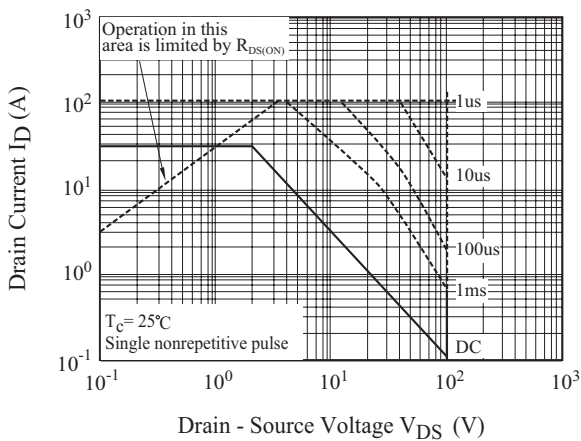


Fig12. Transient Thermal Response Curve

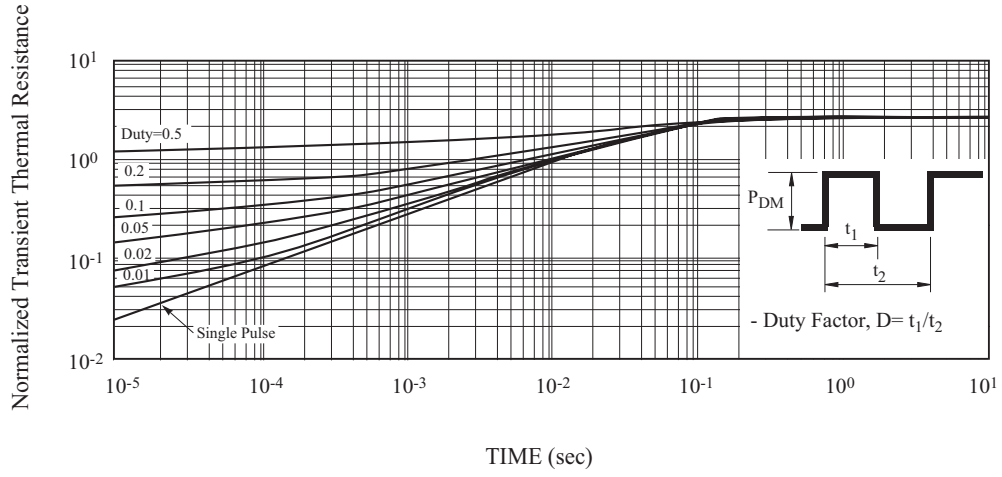


Fig13. Gate Charge

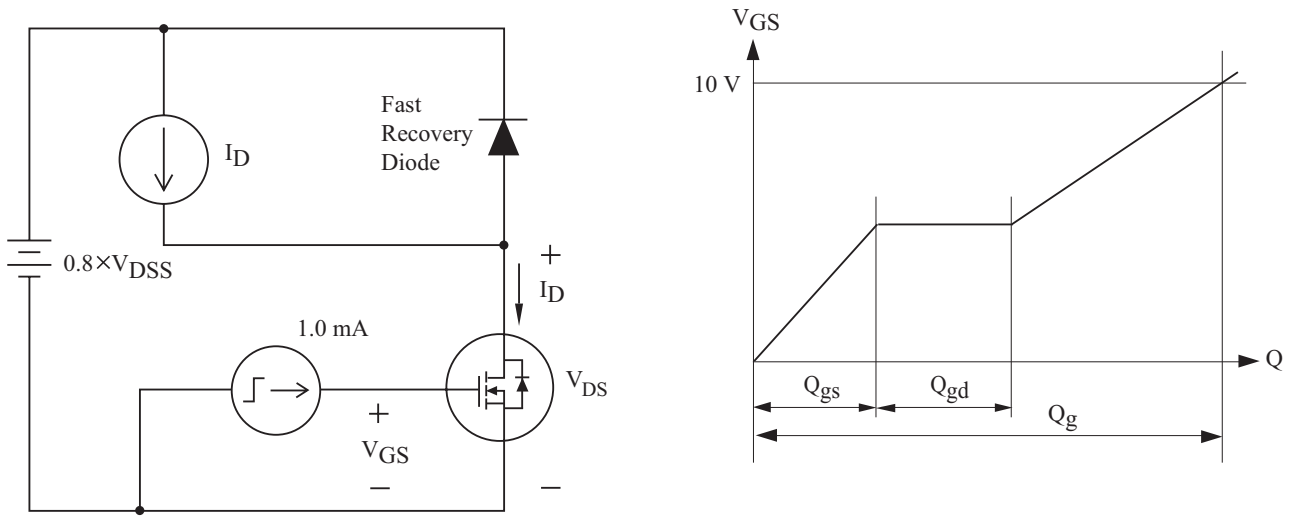


Fig14. Single Pulsed Avalanche Energy

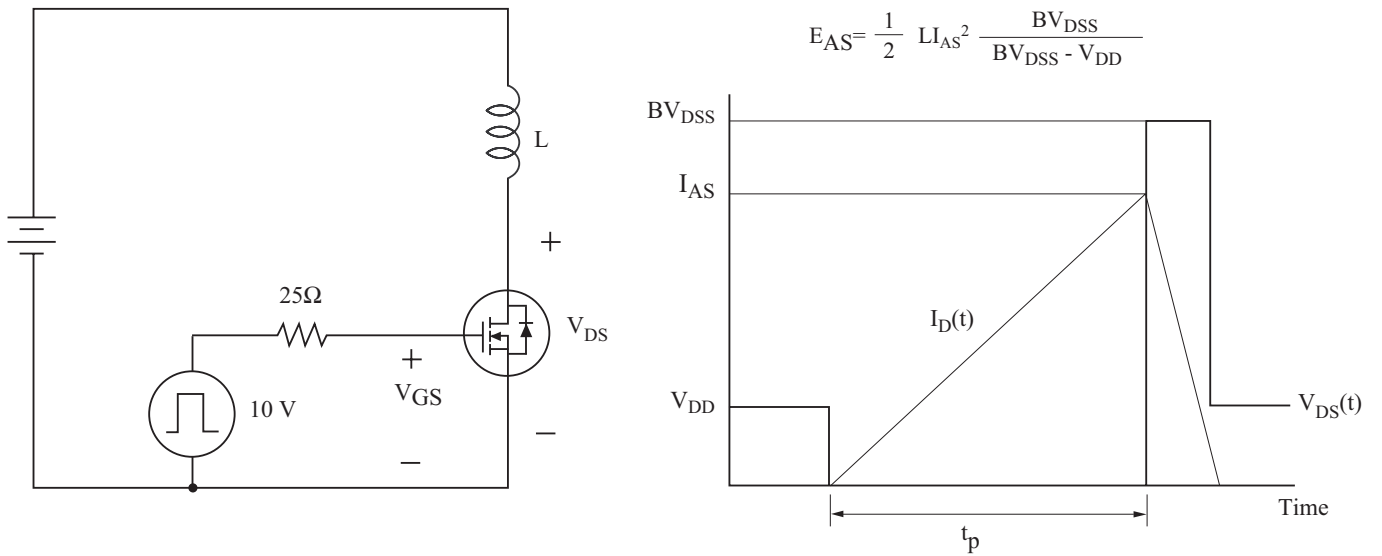


Fig15. Resistive Load Switching

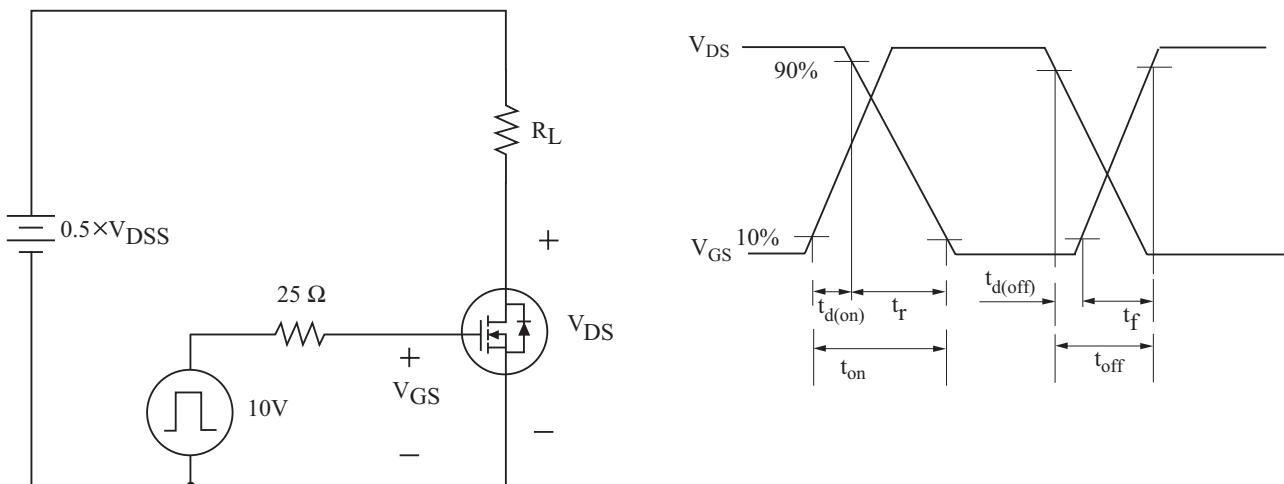


Fig16. Source - Drain Diode Reverse Recovery and  $dv/dt$

