

## 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

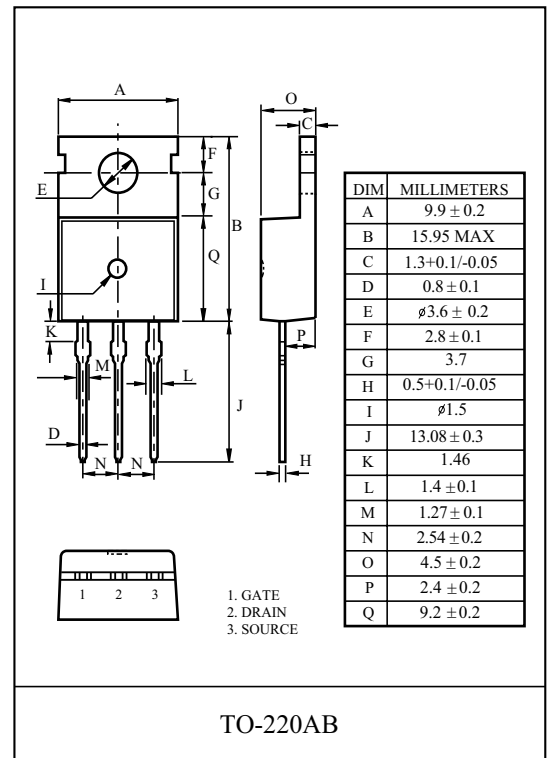
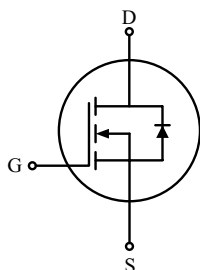
- $V_{DSS}=60V$ ,  $I_D=160A$
- Drain-Source ON Resistance :  
 $R_{DS(ON)}=3.5m$  (Max.) @  $V_{GS}=10V$

## MAXIMUM RATING (Tc=25 )

CHARACTERISTIC	SYMBOL	RATING	UNIT
Drain-Source Voltage	$V_{DSS}$	60	V
Gate-Source Voltage	$V_{GSS}$	$\pm 20$	V
Drain Current	@Tc=25	160*	A
	@Tc=100	101	
	Pulsed (Note1)	480*	
Single Pulsed Avalanche Energy (Note 2)	$E_{AS}$	960	mJ
Repetitive Avalanche Energy (Note 1)	$E_{AR}$	12	mJ
Peak Diode Recovery dv/dt (Note 3)	dv/dt	4.5	V/ns
Drain Power Dissipation	Tc=25	167	W
	Derate above 25	1.33	W/
Maximum Junction Temperature	$T_j$	150	
Storage Temperature Range	$T_{stg}$	-55 ~ 150	
<b>Thermal Characteristics</b>			
Thermal Resistance, Junction-to-Case	$R_{thJC}$	0.75	/W
Thermal Resistance, Junction-to-Ambient	$R_{thJA}$	62.5	/W

\* : Drain current limited by maximum junction temperature.  
Calculated continuous Current based on maximum allowable junction temperature

## PIN CONNECTION



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## ELECTRICAL CHARACTERISTICS (Tc=25 )

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
<b>Static</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$I_D=250\ \mu A, V_{GS}=0V$	60	-	-	V
Breakdown Voltage Temperature Coefficient	$BV_{DSS}/T_j$	$I_D=5mA$ , Referenced to 25	-	0.06	-	V/
Drain Cut-off Current	$I_{DSS}$	$V_{DS}=60V, V_{GS}=0V$ ,	-	-	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	$R_{DS(ON)}$	$V_{GS}=10V, I_D=80A$	-	2.9	3.5	m
<b>Dynamic</b>						
Total Gate Charge	$Q_g$	$V_{DS}=48V, I_D=80A$ $V_{GS}=10V$ (Note4,5)	-	200	-	nC
Gate-Source Charge	$Q_{gs}$		-	35	-	
Gate-Drain Charge	$Q_{gd}$		-	70	-	
Turn-on Delay time	$t_{d(on)}$	$V_{DD}=30V$ $I_D=80A$ $R_G=25$ (Note4,5)	-	110	-	ns
Turn-on Rise time	$t_r$		-	150	-	
Turn-off Delay time	$t_{d(off)}$		-	460	-	
Turn-off Fall time	$t_f$		-	280	-	
Input Capacitance	$C_{iss}$	$V_{DS}=25V, V_{GS}=0V, f=1.0MHz$	-	8400	-	pF
Output Capacitance	$C_{oss}$		-	960	-	
Reverse Transfer Capacitance	$C_{rss}$		-	520	-	
<b>Source-Drain Diode Ratings</b>						
Continuous Source Current	$I_S$	$V_{GS}<V_{th}$	-	-	150	A
Pulsed Source Current	$I_{SP}$		-	-	600	
Diode Forward Voltage	$V_{SD}$	$I_S=150A, V_{GS}=0V$	-	-	1.4	V
Reverse Recovery Time	$t_{rr}$	$I_S=80A, V_{GS}=0V$ , $dI_S/dt=300A/\mu s$	-	65	-	ns
Reverse Recovery Charge	$Q_{rr}$		-	0.18	-	$\mu C$

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

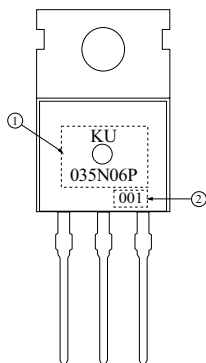
Note 2)  $L=100\ \mu H, I_S=80A, V_{DD}=48V, R_G=25$  , Starting  $T_j=25$  .

Note 3)  $I_S=80A, dI/dt=200A/\mu s, V_{DD}=BV_{DSS}$ , 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

Fig1.  $I_D - V_{DS}$

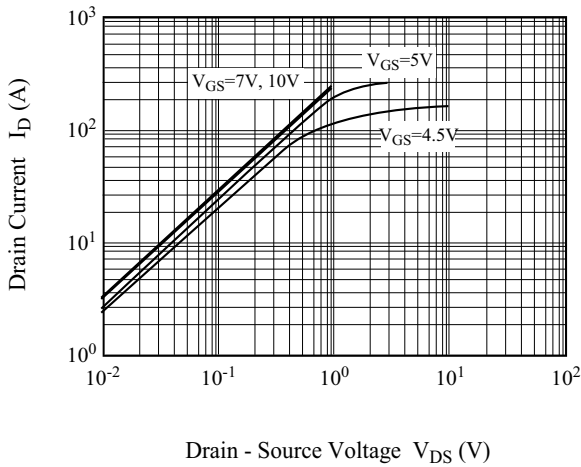


Fig2.  $I_D - V_{GS}$

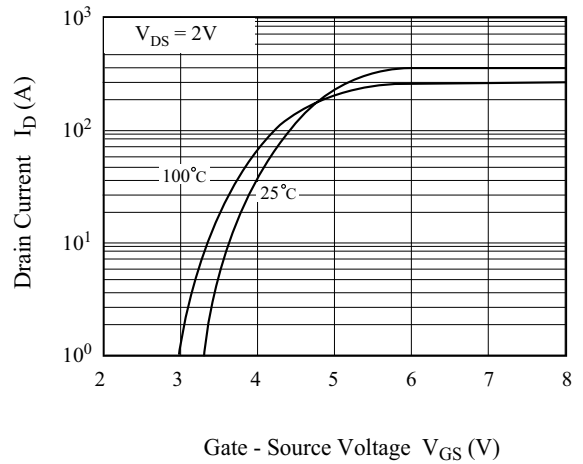


Fig3.  $BV_{DSS} - T_j$

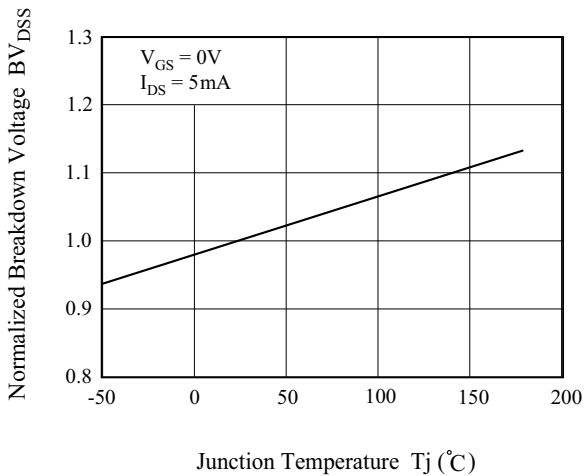


Fig4.  $R_{DS(ON)} - I_D$

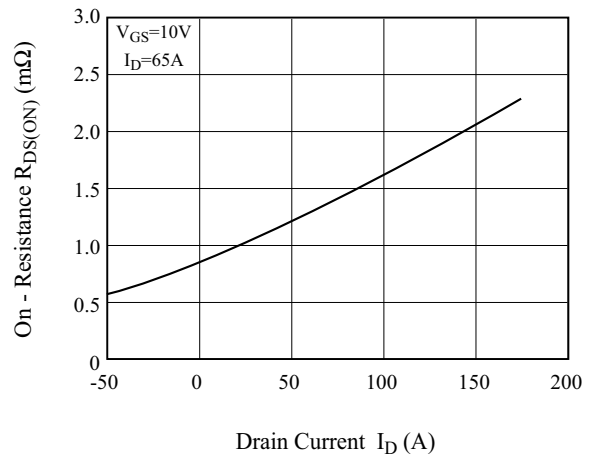


Fig5.  $I_S - V_{SD} - I$

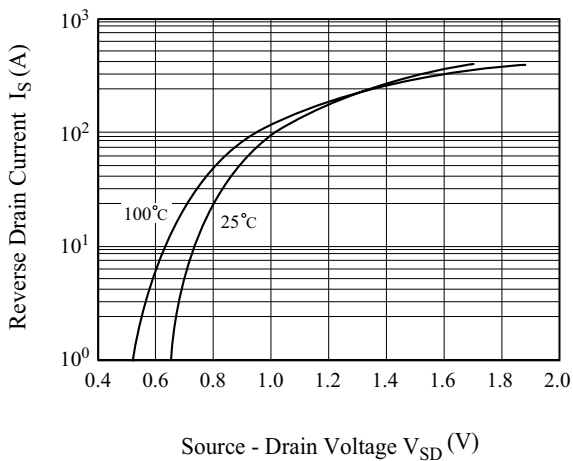
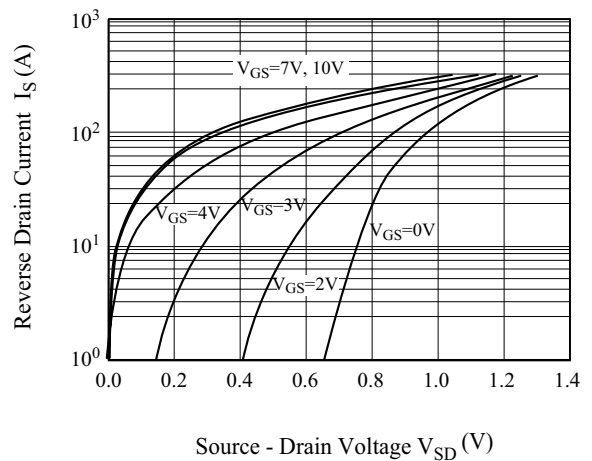


Fig6.  $I_S - V_{SD} - II$



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

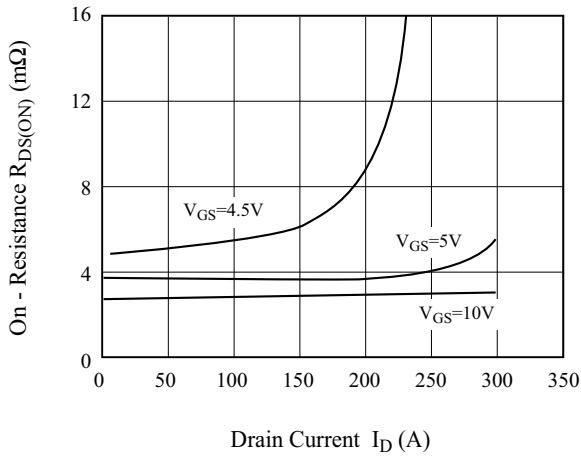


Fig8.  $I_D - T_j$

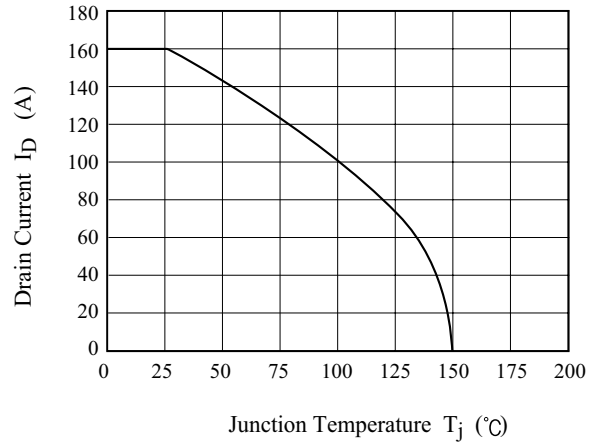


Fig 9.  $C - V_{DS}$

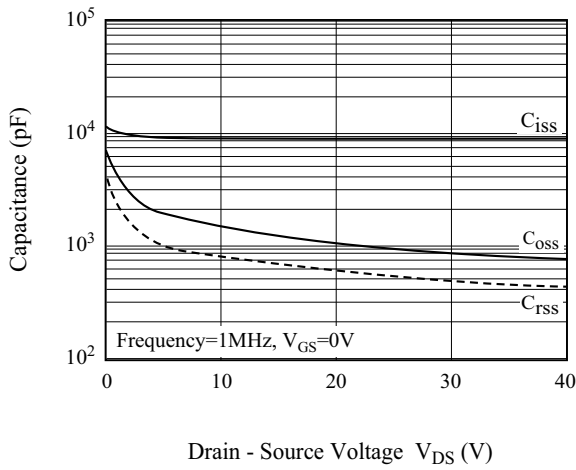


Fig10.  $Q_g - V_{GS}$

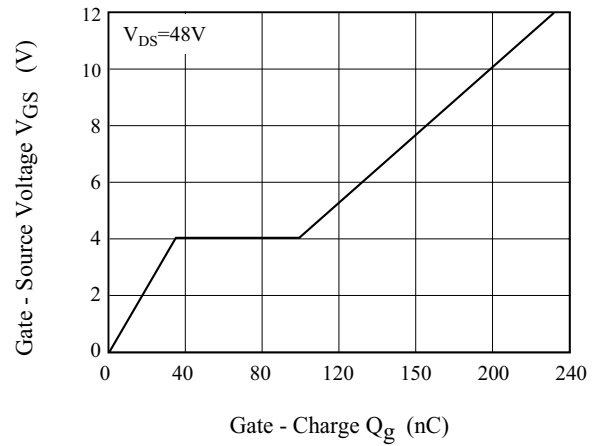
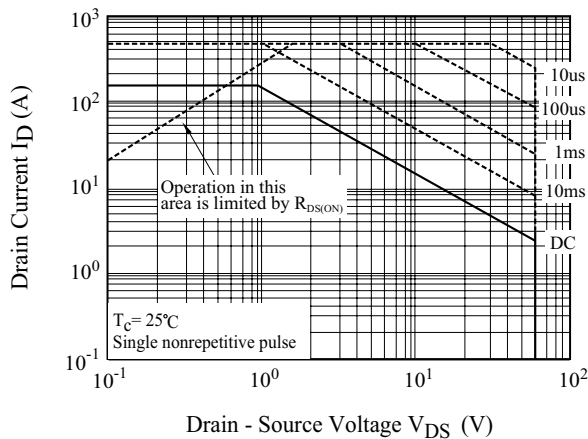


Fig11. Safe Operation Area



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Fig12. Transient Thermal Response Curve

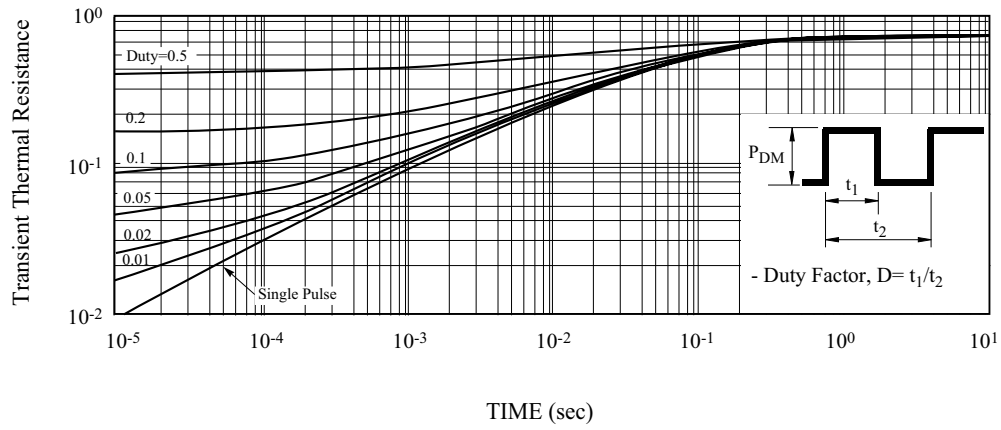


Fig13. Gate Charge

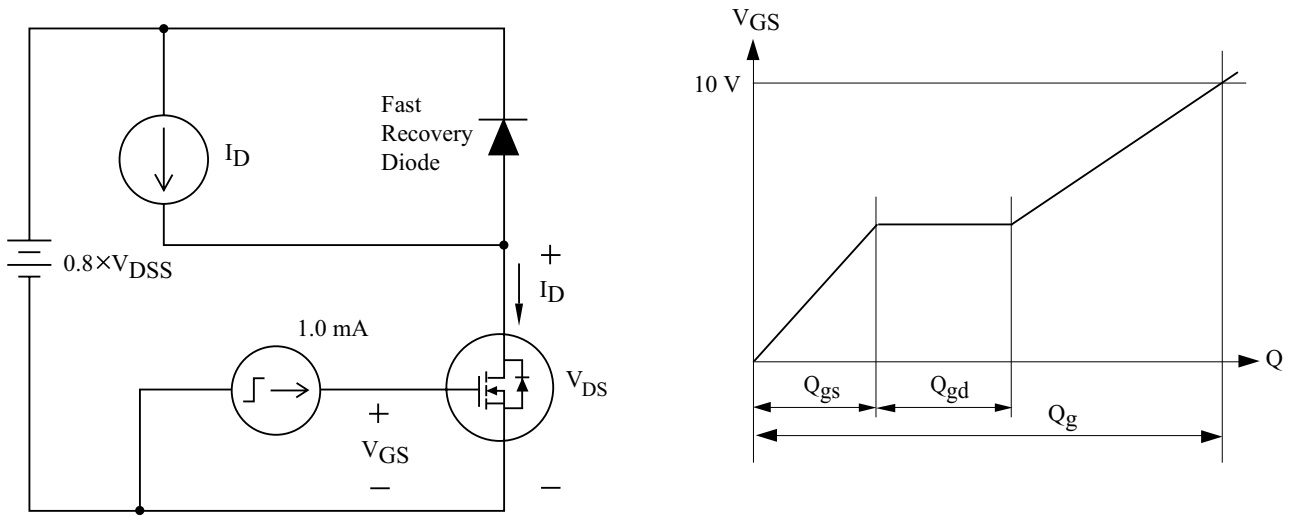


Fig14. Single Pulsed Avalanche Energy

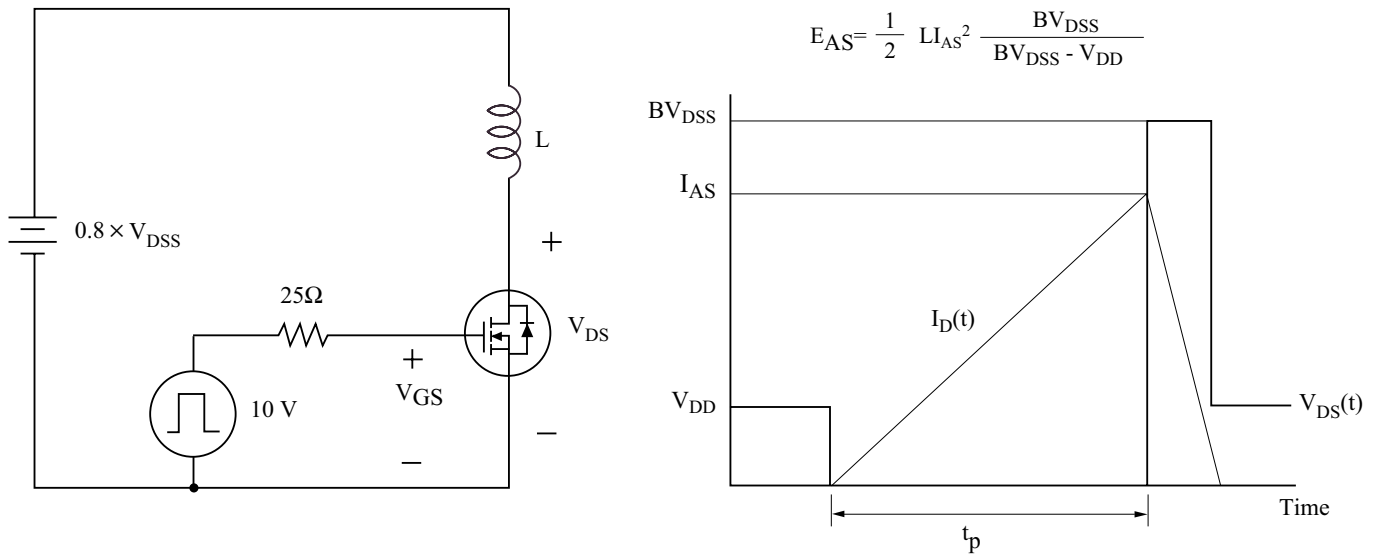


Fig15. Resistive Load Switching

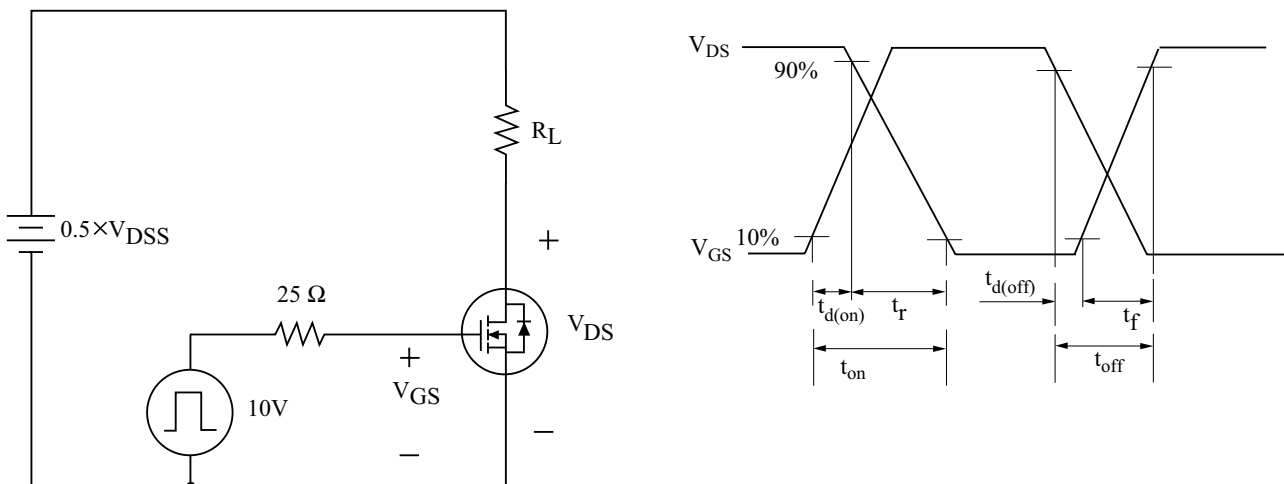


Fig16. Source - Drain Diode Reverse Recovery and  $dv/dt$

