KHB3D0N70P/F

N CHANNEL MOS FIELD EFFECT TRANSISTOR

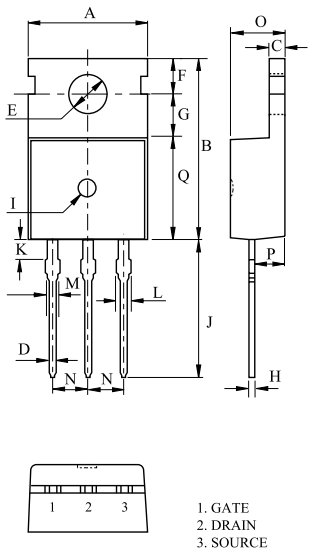
General Description

This planar stripe MOSFET has better characteristics, such as fast switching time, low on resistance, low gate charge and excellent avalanche characteristics. It is mainly suitable for switch mode power supplies.

FEATURES

- V_{DSS}= 700V, I_D= 3A
- Drain-Source ON Resistance
  : $R_{DS(ON)}$= 3.5Ω @V_{GS} = 10V
- Qg(typ.) = 20.5nC

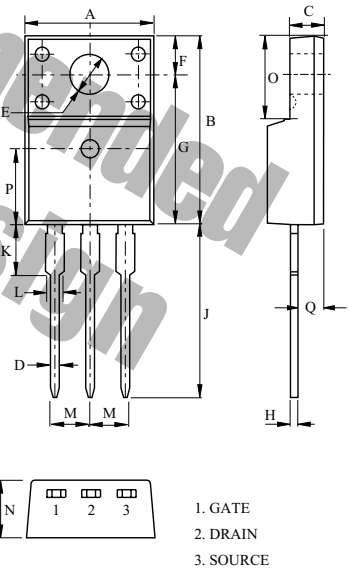
KHB3D0N70P



DIM	MILLIMETERS
A	9.9 ± 0.2
B	15.95 MAX
C	1.3+0.1/-0.05
D	0.8± 0.1
E	ø 3.6 ± 0.2
F	2.8± 0.1
G	3.7
H	0.5+0.1/-0.05
I	ø 1.5
J	13.08± 0.3
K	1.46
L	1.4 ± 0.1
M	1.27± 0.1
N	2.54 ± 0.2
O	4.5 ± 0.2
P	2.4 ± 0.2
Q	9.2 ± 0.2

TO-220AB

KHB3D0N70F



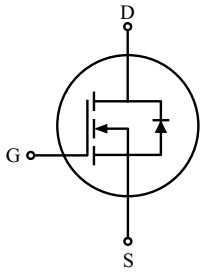
DIM	MILLIMETERS
A	10.16 ± 0.2
B	15.87 ± 0.2
C	2.54 ± 0.2
D	0.8 ± 0.1
E	ø3.18 ± 0.1
F	3.3 ± 0.1
G	12.57 ± 0.2
H	0.5 ± 0.1
J	13.0 MAX
K	3.23 ± 0.1
L	1.47 MAX
M	2.54 ± 0.2
N	4.7 ± 0.2
O	6.68 ± 0.2
P	6.5
Q	2.76 ± 0.2

TO-220IS

MAXIMUM RATING (Tc=25℃)

CHARACTERISTIC		SYMBOL	RATING		UNIT
			KHB3D0N70P	KHB3D0N70F	
Drain-Source Voltage		V_{DSS}	700		V
Gate-Source Voltage		V_{GSS}	±30		V
Drain Current	@T_C=25℃	I_D	3.0	3.0*	A
	Pulsed (Note1)	I_{DP}	12	12*	
Single Pulsed Avalanche Energy (Note 2)		E_{AS}	345		mJ
Repetitive Avalanche Energy (Note 1)		E_{AR}	8.0		mJ
Peak Diode Recovery dv/dt (Note 3)		dv/dt	4.0		V/ns
Drain Power Dissipation	Tc=25℃	P_D	113	50	W
	Derate above25℃		0.91	0.34	W/℃
Maximum Junction Temperature		T_j	150		℃
Storage Temperature Range		T_{stg}	-55 150		℃
Thermal Characteristics					
Thermal Resistance, Junction-to-Case		R_{thJC}	1.1	2.5	℃/W
Thermal Resistance, Junction-to-Ambient		R_{thJA}	62.5	62.5	℃/W

* : Drain current limited by maximum junction temperature.



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	700	-	-	V
Breakdown Voltage Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_j$	I_D=250 μA, Referenced to 25℃	-	1	-	V/℃
Gate Threshold Voltage	V_{th}	V_{DS}=V_{GS}, I_D=250 μA	2.0	-	4.0	V
Drain Cut-off Current	I_{DSS}	V_{DS}=700V, V_{GS}=0V,	-	-	10	μA
Gate Leakage Current	I_{GSS}	V_{GS}=±30V, V_{DS}=0V	-	-	±100	nA
Drain-Source ON Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=1.5A	-	3.0	3.5	Ω
Dynamic						
Total Gate Charge	Q_g	V_{DS}=560V, I_D=3.0A V_{GS}=10V (Note4, 5)	-	20.5	25.6	nC
Gate-Source Charge	Q_{gs}		-	3	-	
Gate-Drain Charge	Q_{gd}		-	10.5	-	
Turn-on Delay time	$t_{d(on)}$	V_{DD}=350V, R_G=25Ω I_D=3.0A (Note4, 5)	-	11.5	33	ns
Turn-on Rise time	t_r		-	48.5	107	
Turn-off Delay time	$t_{d(off)}$		-	50	110	
Turn-off Fall time	t_f		-	57.5	125	
Input Capacitance	C_{iss}	V_{DS}=25V, V_{GS}=0V, f=1.0MHz	-	642	835	pF
Output Capacitance	C_{oss}		-	67.2	87.4	
Reverse Transfer Capacitance	C_{rss}		-	10.2	13.3	
Source-Drain Diode Ratings						
Continuous Source Current	I_S	V_{GS}<V_{th}	-	-	3.0	A
Pulsed Source Current	I_{SP}		-	-	12	
Diode Forward Voltage	V_{SD}	I_S=3.0A, V_{GS}=0V	-	-	1.6	V
Reverse Recovery Time	t_{rr}	I_S=3.0A, V_{DD}=350V, dIs/dt=100A/μs (Note 4)	-	730	-	ns
Reverse Recovery Charge	Q_{rr}		-	3.2	-	μC

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

Note 2) L =71mH, I_S=3.0A, V_{DD}=50V, R_G=25Ω, Starting T_j=25℃.

Note 3) I_S ≤3.0A, dI/dt≤200A/μs, V_{DD}≤BV_{DSS}, Starting T_j=25℃.

Note 4) Pulse Test : Pulse width ≤ 300μs, Duty Cycle ≤ 2%.

Note 5) Essentially independent of operating temperature.

Fig1. I_D - V_{DS}

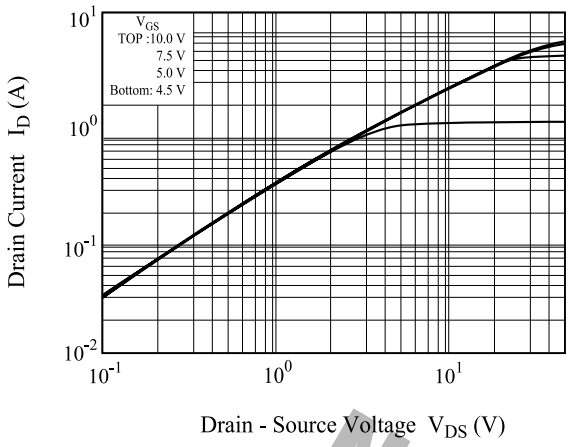


Fig2. I_D - V_{GS}

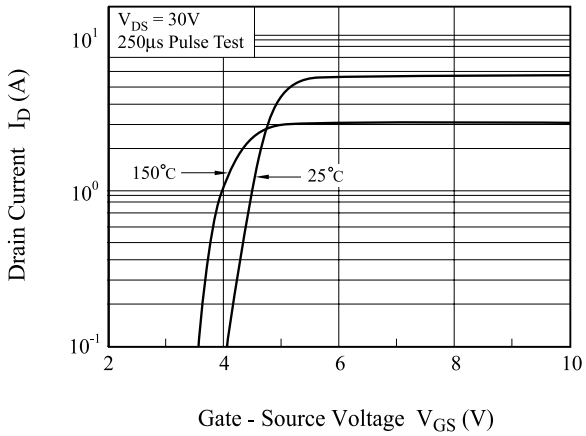


Fig3. BV_{DSS} - T_j

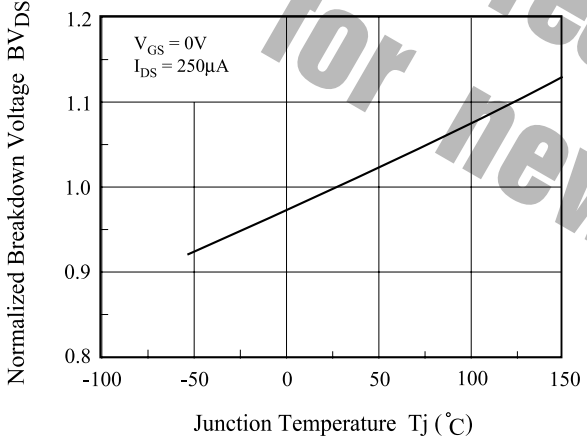


Fig4. $R_{DS(ON)}$ - I_D

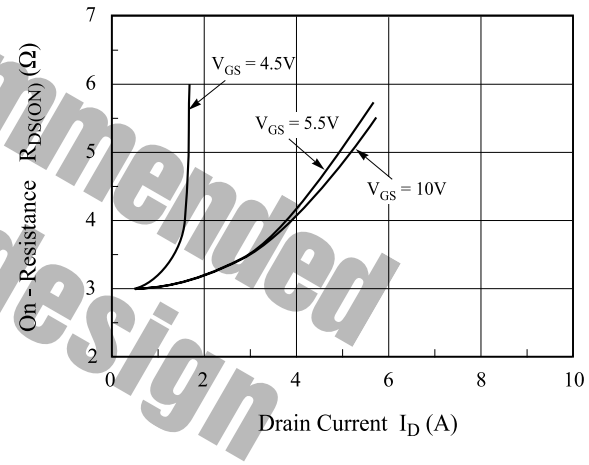


Fig5. I_S - V_{SD}

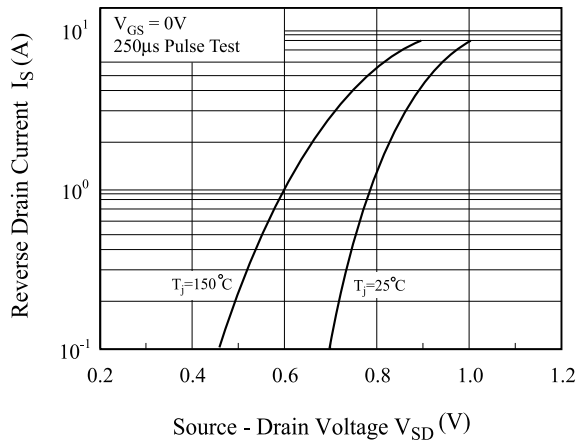


Fig6. $R_{DS(ON)}$ - T_j

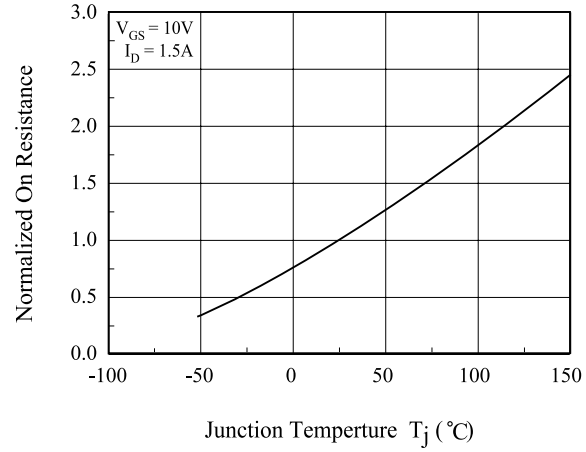


Fig7. C - V_{DS}

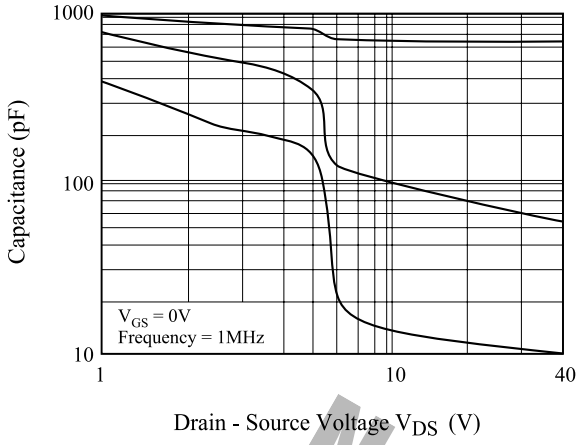


Fig8. Q_g- V_{GS}

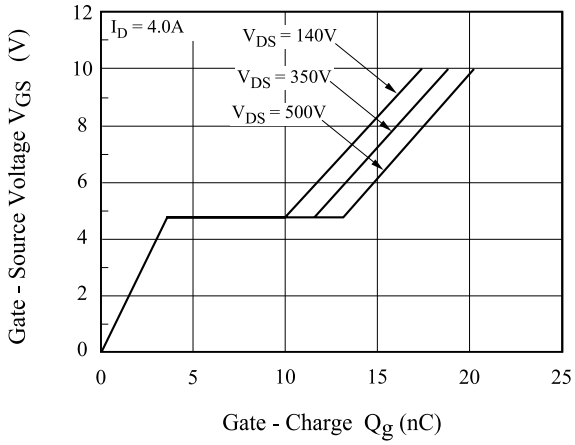


Fig9. Safe Operation Area

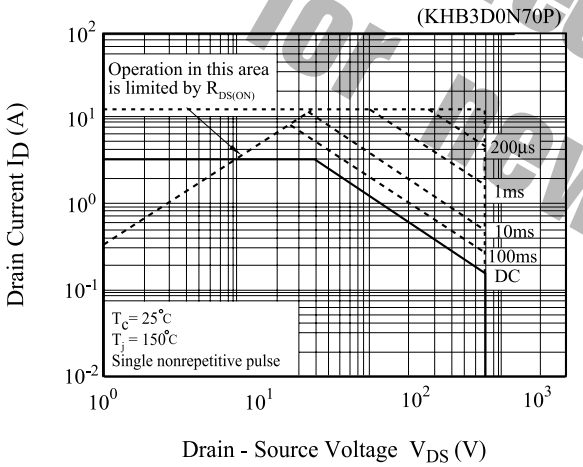


Fig10. Safe Operation Area

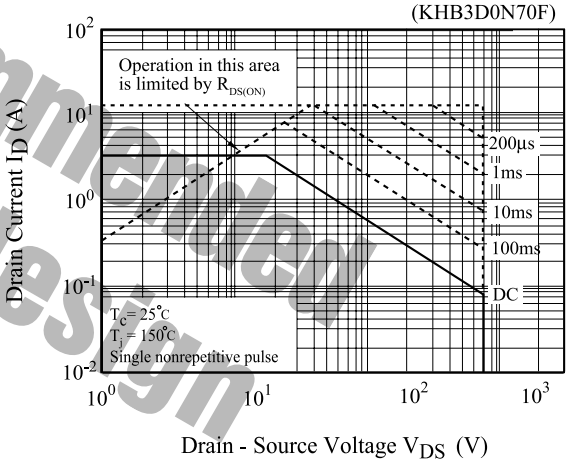


Fig11. I_D - T_C

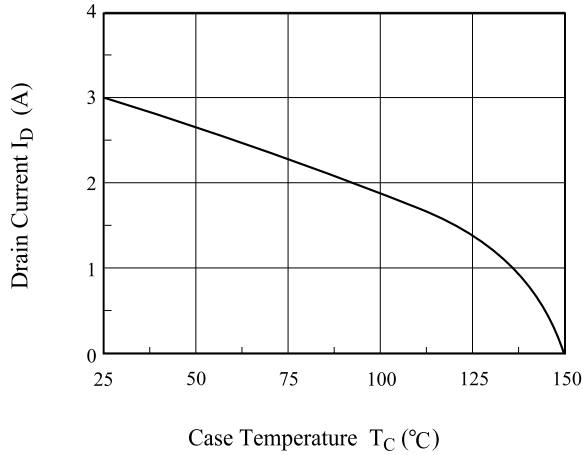


Fig12. Transient Thermal Response Curve

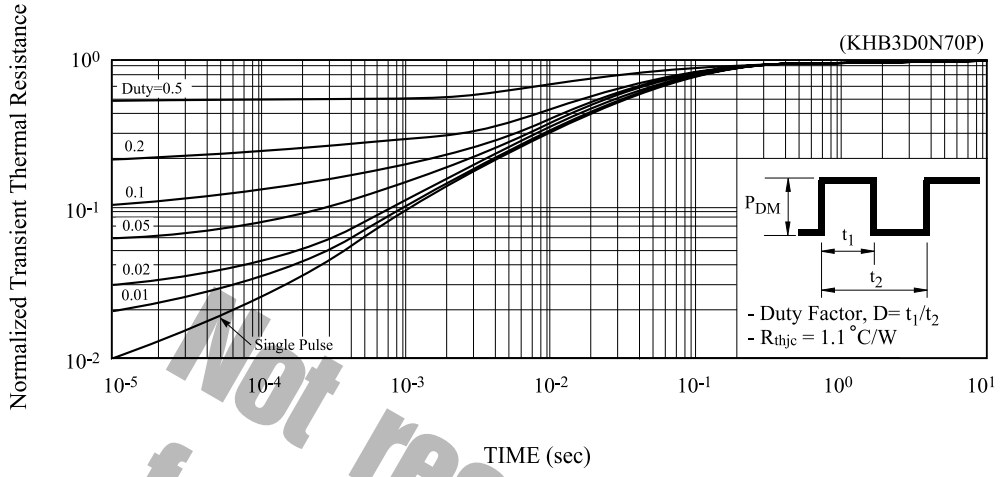


Fig13. Transient Thermal Response Curve

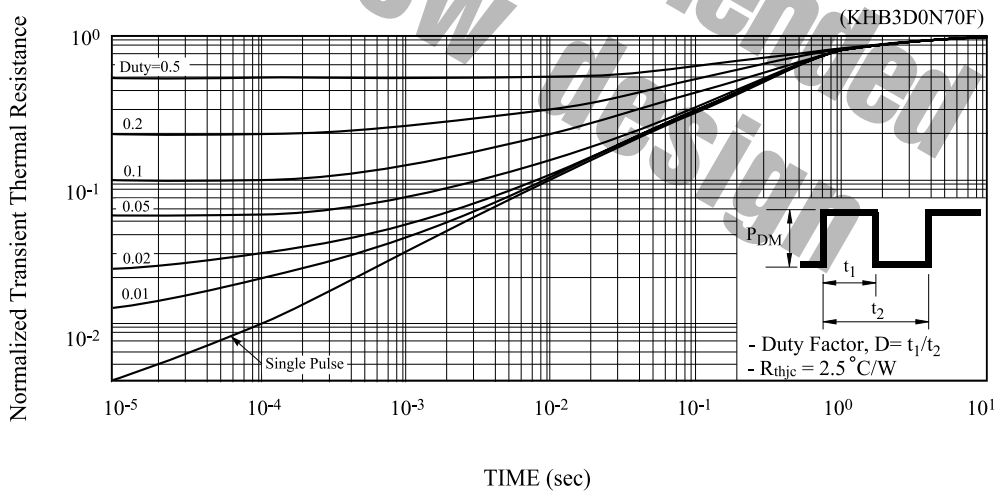


Fig14. Gate Charge

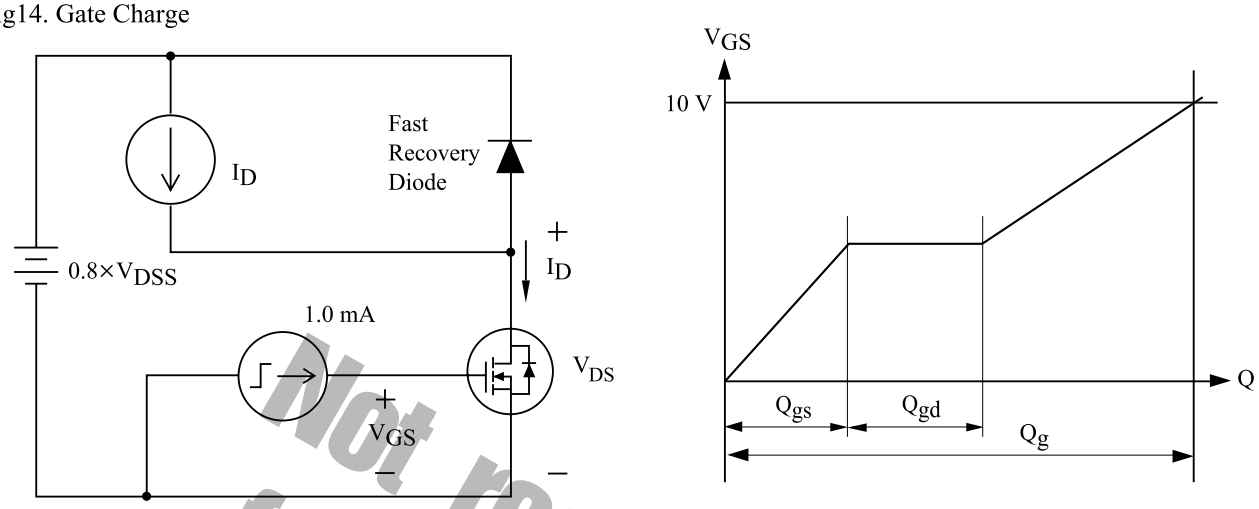


Fig15. Single Pulsed Avalanche Energy

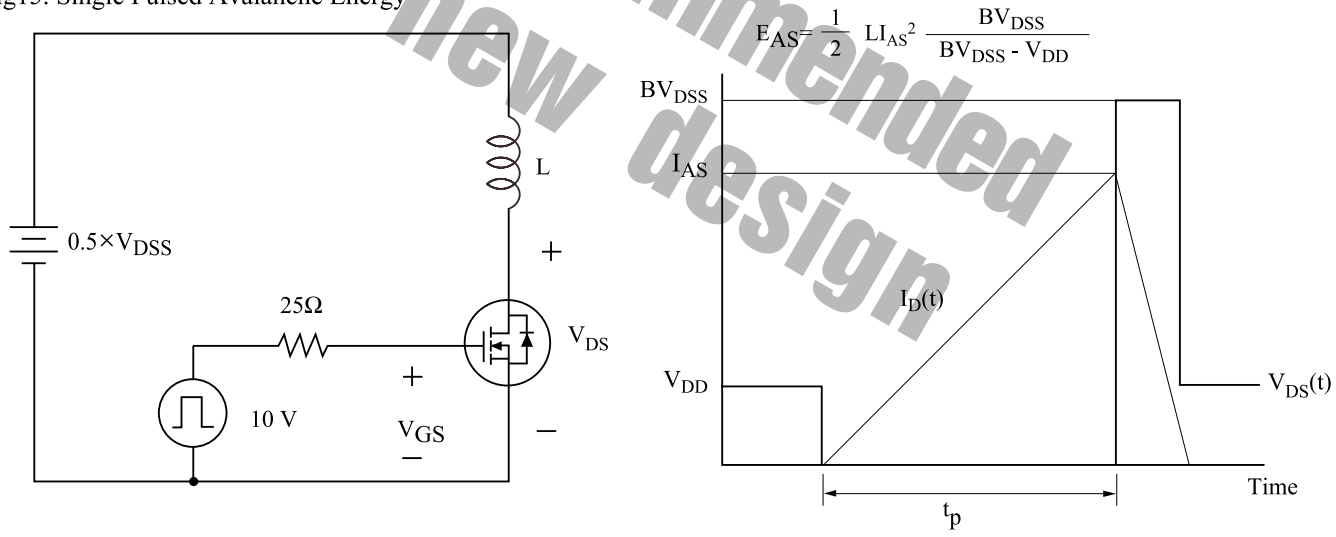
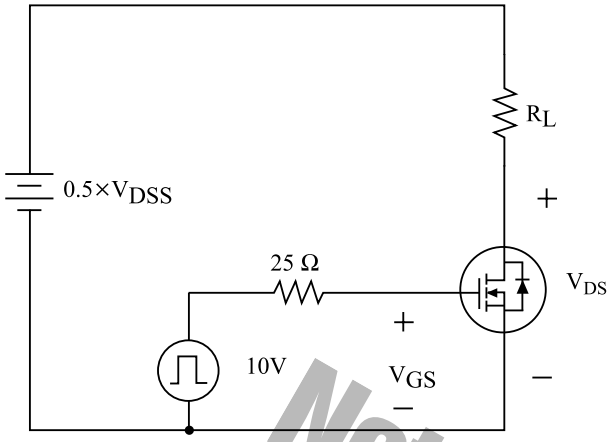


Fig16. Resistive Load Switching



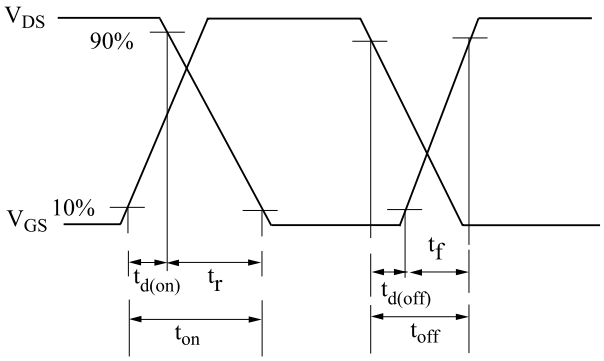


Fig17. Source - Drain Diode Reverse Recovery and dv /dt