

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 electronic ballast and switching mode power supplies.

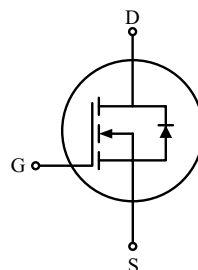
FEATURES

- $V_{DS} = 500V$, $I_D = 5.0A$
- Drain-Source ON Resistance :
 $R_{DS(ON)} = 1.5 \Omega$ @ $V_{GS} = 10V$
- $Q_g(\text{typ.}) = 21nC$

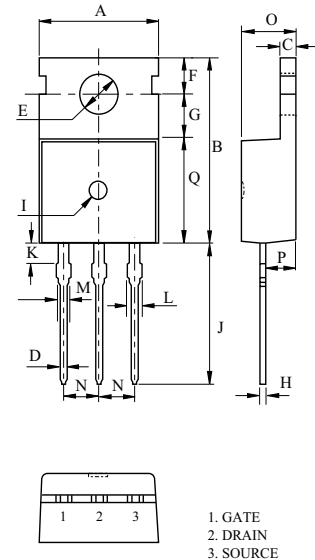
MAXIMUM RATING (Tc=25℃)

CHARACTERISTIC		SYMBOL	RATING		UNIT
			KHB5D0N50P	KHB5D0N50F	
Drain-Source Voltage		V _{DSS}	500		V
Gate-Source Voltage		V _{GSS}	±30		V
Drain Current	@T _C =25℃	I _D	5.0	5.0*	A
	@T _C =100℃		2.9	2.9*	
	Pulsed (Note1)	I _{DP}	20	20*	
Single Pulsed Avalanche Energy (Note 2)		E _{AS}	390		mJ
Repetitive Avalanche Energy (Note 1)		E _{AR}	9.2		mJ
Peak Diode Recovery dv/dt (Note 3)		dv/dt	3.5		V/ns
Drain Power Dissipation	T _C =25℃	P _D	73	38	W
	Derate above 25℃		0.74	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}	1.71	3.31	℃/W
Thermal Resistance, Case-to-Sink		R _{thCS}	0.5	-	℃/W
Thermal Resistance, Junction-to-Ambient		R _{thJA}	62.5	62.5	℃/W

* : Drain current limited by maximum junction temperature.



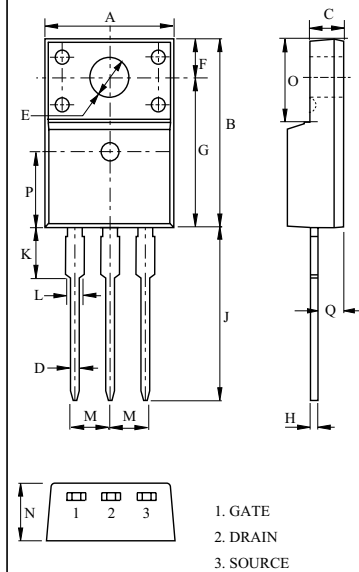
KHB5D0N50P



DIM	MILLIMETERS
A	9.9 ± 0.2
B	15.95 MAX
C	1.3 ± 0.1/-0.05
D	0.8 ± 0.1
E	∅ 3.6 ± 0.2
F	2.8 ± 0.1
G	3.7
H	0.5 ± 0.1/-0.05
I	∅ 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

KHB5D0N50F



DIM	MILLIMETERS
A	10.16 ± 0.2
B	15.87 ± 0.2
C	2.54 ± 0.2
D	0.8 ± 0.1
E	∅ 3.18 ± 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

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ELECTRICAL CHARACTERISTICS (Tc=25 °C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Static						
Drain-Source Breakdown Voltage	BV _{DSS}	I _D =250 μA, V _{GS} =0V	500	-	-	V
Breakdown Voltage Temperature Coefficient	ΔBV _{DSS} / ΔT _j	I _D =250 μA, Referenced to 25 °C	-	0.6	-	V/°C
Drain Cut-off Current	I _{DSS}	V _{DS} =500V, 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} =±30V, V _{DS} =0V	-	-	±100	nA
Drain-Source ON Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =2.5A	-	1.24	1.5	Ω
Dynamic						
Total Gate Charge	Q _g	V _{DS} =400V, I _D =5A V _{GS} =10V (Note4,5)	-	21	25	nC
Gate-Source Charge	Q _{gs}		-	3.6	4.4	
Gate-Drain Charge	Q _{gd}		-	8.3	13	
Turn-on Delay time	t _{d(on)}	V _{DD} =250V R _L =50 Ω R _G =25 Ω (Note4,5)	-	-	40	ns
Turn-on Rise time	t _r		-	-	50	
Turn-off Delay time	t _{d(off)}		-	-	200	
Turn-off Fall time	t _f		-	-	75	
Input Capacitance	C _{iss}	V _{DS} =25V, V _{GS} =0V, f=1.0MHz	-	820	1100	pF
Output Capacitance	C _{oss}		-	90	115	
Reverse Transfer Capacitance	C _{rss}		-	12.7	21	
Source-Drain Diode Ratings						
Continuous Source Current	I _S	V _{GS} <V _{th}	-	-	5	A
Pulsed Source Current	I _{SP}		-	-	20	
Diode Forward Voltage	V _{SD}	I _S =5A, V _{GS} =0V	-	-	1.5	V
Reverse Recovery Time	t _{rr}	I _S =5A, V _{GS} =0V,	-	330	-	ns
Reverse Recovery Charge	Q _{rr}	dI _S /dt=100A/ μs	-	2.93	-	μC

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

Note 2) $L=21.5mH$, $I_S=5A$, $V_{DD}=50V$, $R_G=25\Omega$, Starting $T_j=25\text{ }^\circ\text{C}$.

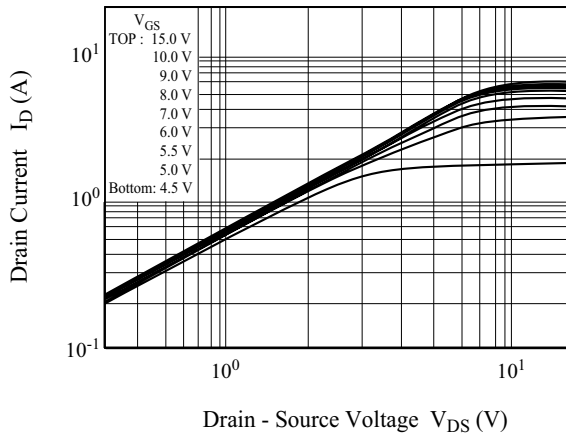
Note 3) $I_S\leq 5A$, $dI/dt\leq 100A/\mu s$, $V_{DD}\leq BV_{DSS}$, Starting $T_j=25\text{ }^\circ\text{C}$.

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

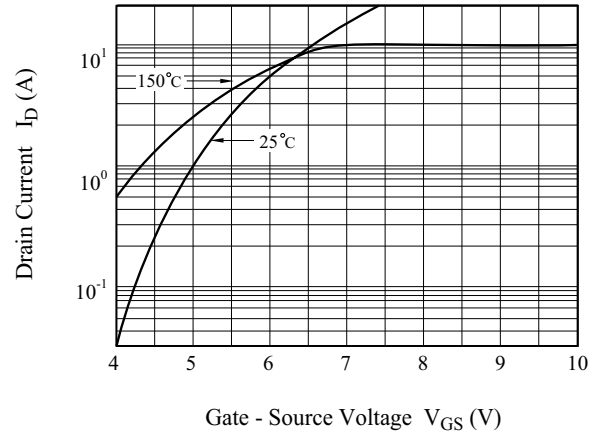
Note 5) Essentially independent of operating temperature.

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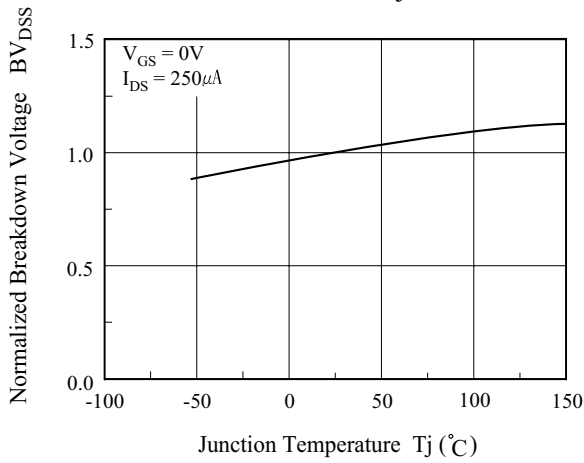
$I_D - V_{DS}$



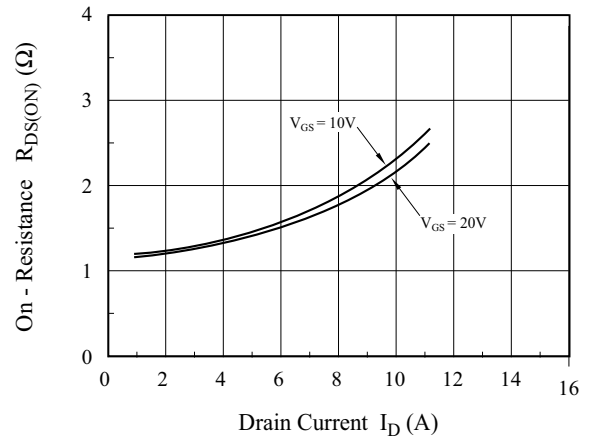
$I_D - V_{GS}$



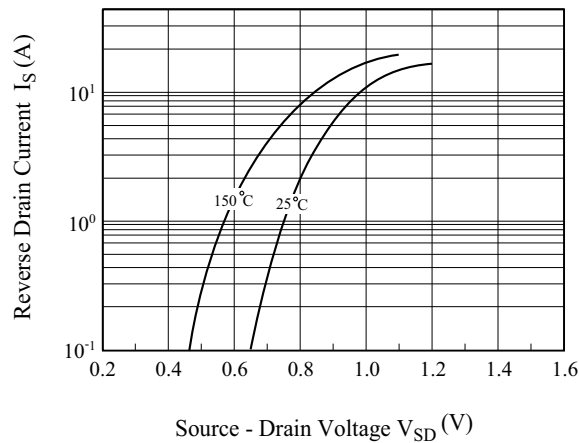
$BV_{DSS} - T_j$



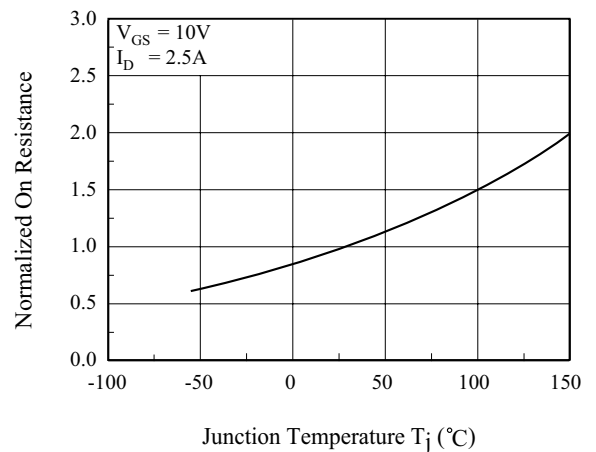
$R_{DS(ON)} - I_D$



$I_{DR} - V_{SD}$

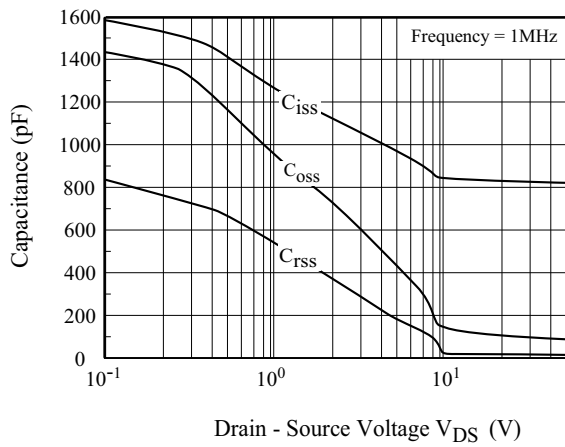


$R_{DS(ON)} - T_j$

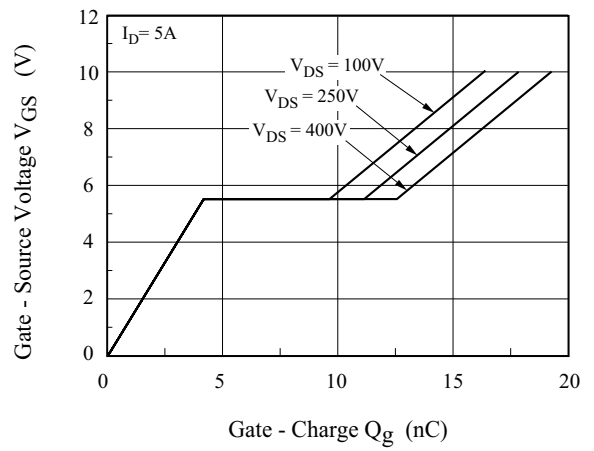


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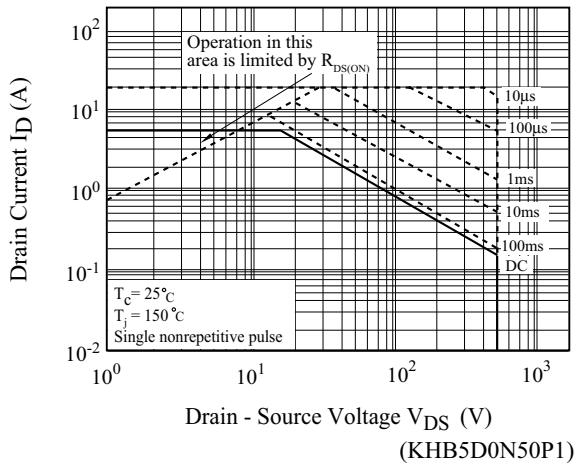
$C - V_{DS}$



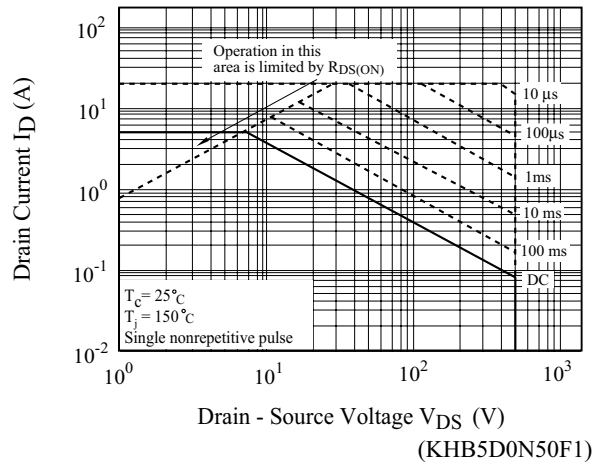
$Q_g - V_{GS}$



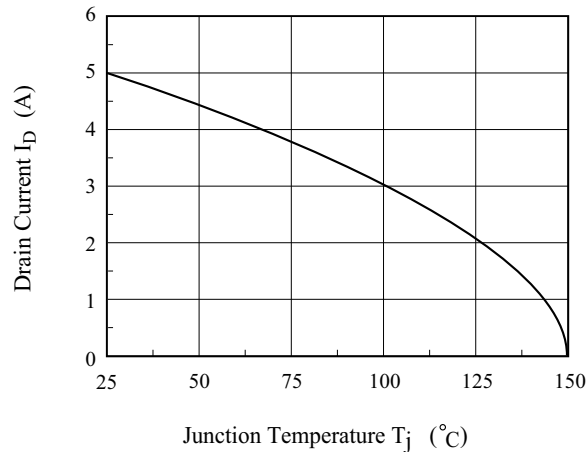
Safe Operation Area



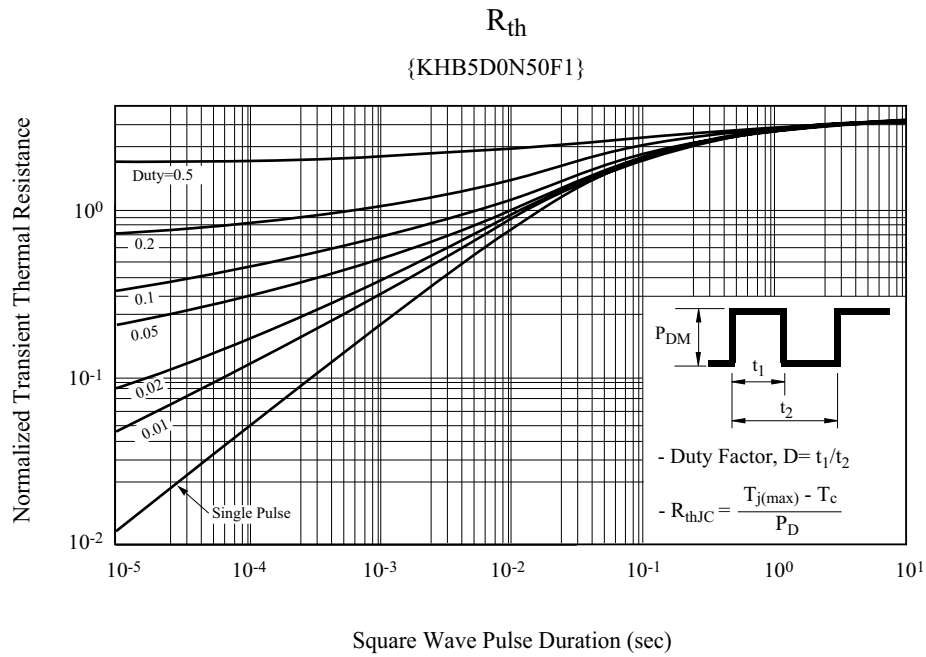
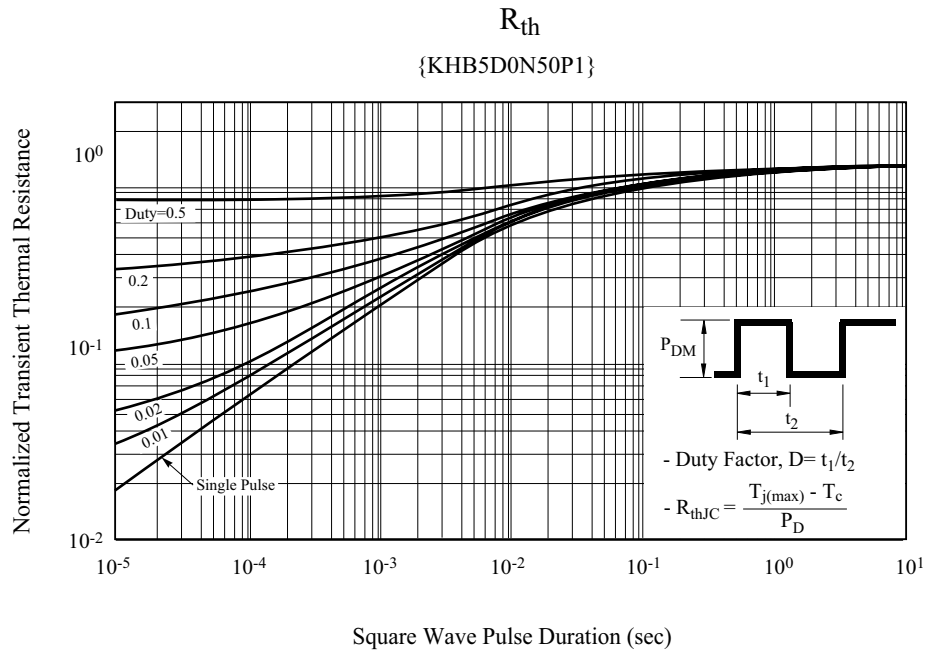
Safe Operation Area



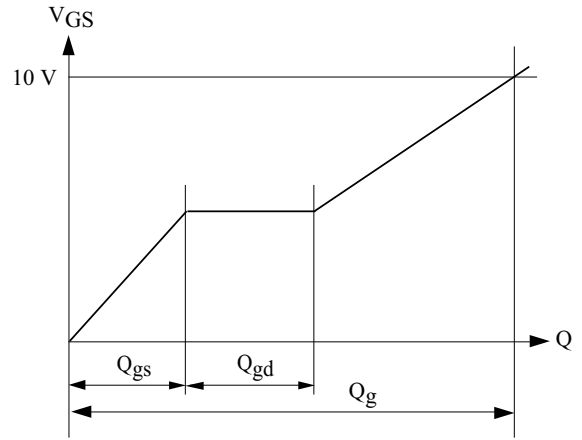
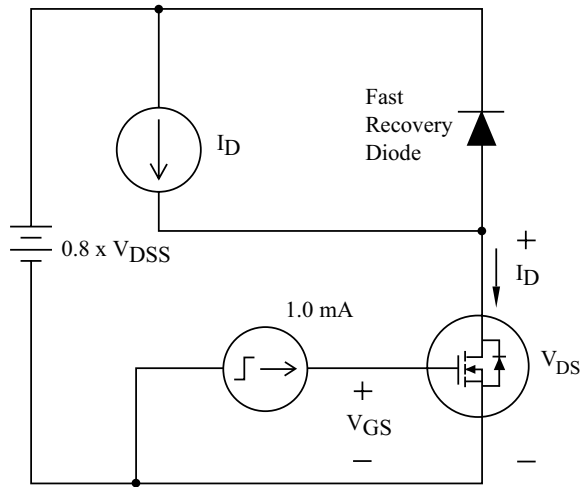
$I_D - T_j$



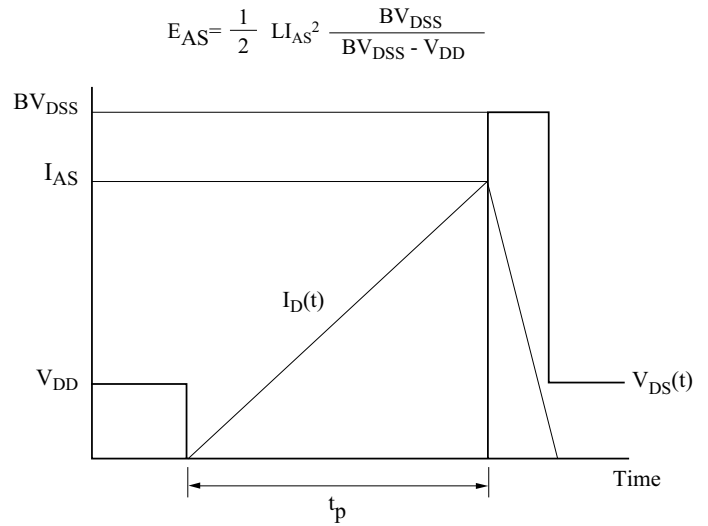
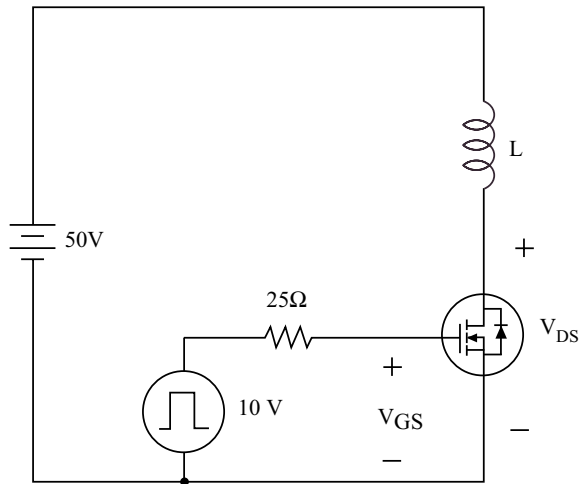
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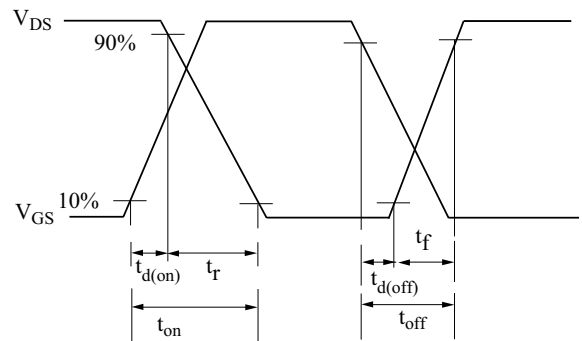
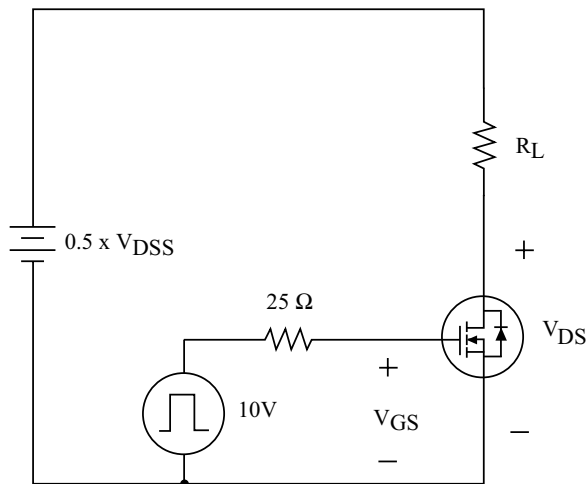
- Gate Charge



- Single Pulsed Avalanche Energy



- Resistive Load Switching



- Source - Drain Diode Reverse Recovery and dv/dt

