

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.

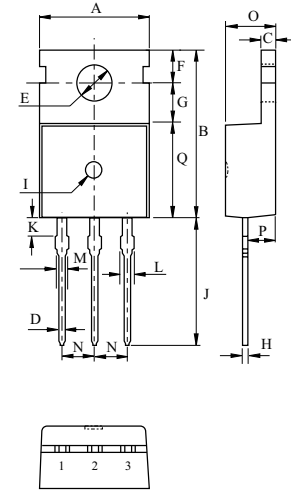
FEATURES

- $V_{DS(Min.)} = 600V$, $I_D = 4.5A$
- Drain-Source ON Resistance :
 $R_{DS(ON)} = 2.5 \Omega$ @ $V_{GS} = 10V$
- $Q_g(typ.) = 22nC$

MAXIMUM RATING (Ta=25 °C)

CHARACTERISTIC		SYMBOL	RATING		UNIT
			KHB4D5N60P	KHB4D5N60F	
Drain-Source Voltage		V _{DSS}	600		V
Gate-Source Voltage		V _{GSS}	±30		V
Drain Current	@T _C =25 ℃	I _D	4.5	4.5*	A
	@T _C =100 ℃		2.5	2.5*	
	Pulsed (Note1)	I _{DP}	16	16*	
Single Pulsed Avalanche Energy (Note 2)		E _{AS}	240		mJ
Repetitive Avalanche Energy (Note 1)		E _{AR}	10		mJ
Peak Diode Recovery dv/dt (Note 3)		dv/dt	5.5		V/ns
Drain Power Dissipation	Ta=25 ℃	P _D	100	33	W
	Derate above25 ℃		0.8	0.26	W/ ℃
Maximum Junction Temperature		T _j	150		℃
Storage Temperature Range		T _{stg}	-55~150		℃
Thermal Characteristics					
Thermal Resistance, Junction-to-Case		R _{thJC}	1.25	3.79	℃/W
Thermal Resistance, Case-to-Sink		R _{thCS}	0.5	-	℃/W
Thermal Resistance, Junction-to-Ambient		R _{thJA}	62.5	62.5	℃/W

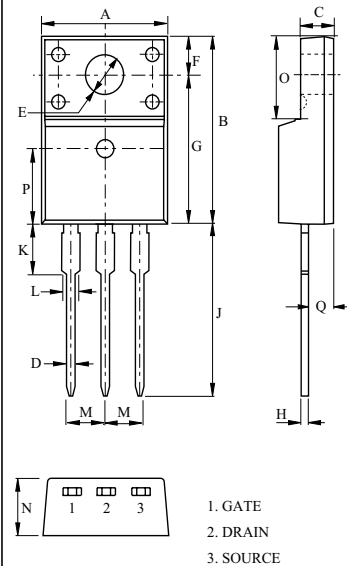
* : Drain current limited by maximum junction temperature.



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

1. GATE
2. DRAIN
3. SOURCE

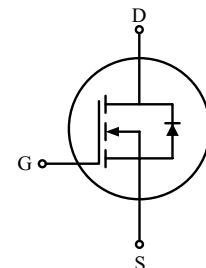
TO-220AB



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

1. GATE
2. DRAIN
3. SOURCE

TO-220IS



KHB4D5N60P/F

ELECTRICAL CHARACTERISTICS (Ta=25 °C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Static						
Drain-Source Breakdown Voltage	BV _{DSS}	I _D =250μA, V _{GS} =0V	600	-	-	V
Breakdown Voltage Temperature Coefficient	ΔBV _{DSS} / ΔT _j	I _D =250μA, Referenced to 25℃	-	0.65	-	V/℃
Drain Cut-off Current	I _{DSS}	V _{DS} =600V, V _{GS} =0V,	-	-	10	μA
Gate Threshold Voltage	V _{th}	V _{DS} =V _{GS} , I _D =250μA	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 =2.25A	-	2.0	2.5	Ω
Dynamic						
Total Gate Charge	Q _g	V _{DS} =480V, I _D =4.5A V _{GS} =10V (Note4,5)	-	22	29	nC
Gate-Source Charge	Q _{gs}		-	4.8	-	
Gate-Drain Charge	Q _{gd}		-	8.5	-	
Turn-on Delay time	t _{d(on)}	V _{DD} =300V R _L =67 Ω R _G =25 Ω (Note4,5)	-	20	50	ns
Turn-on Rise time	t _r		-	55	120	
Turn-off Delay time	t _{d(off)}		-	70	150	
Turn-off Fall time	t _f		-	55	120	
Input Capacitance	C _{iss}	V _{DS} =25V, V _{GS} =0V, f=1.0MHz	-	710	920	pF
Reverse Transfer Capacitance	C _{rss}		-	14	19	
Output Capacitance	C _{oss}		-	65	85	
Source-Drain Diode Ratings						
Continuous Source Current	I _S	V _{GS} <V _{th}	-	-	4.5	A
Pulsed Source Current	I _{SP}		-	-	16	
Diode Forward Voltage	V _{SD}	I _S =4.5A, V _{GS} =0V	-	-	1.4	V
Reverse Recovery Time	t _{rr}	I _S =4.5A, V _{GS} =0V,	-	330	-	ns
Reverse Recovery Charge	Q _{rr}	dI _S /dt=100A/μs	-	2.67	-	μC

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

Note 2) L = 55mH, $I_S=4.5A$, $V_{DD}=50V$, $R_G = 25\Omega$, Starting $T_j = 25\text{ °C}$.

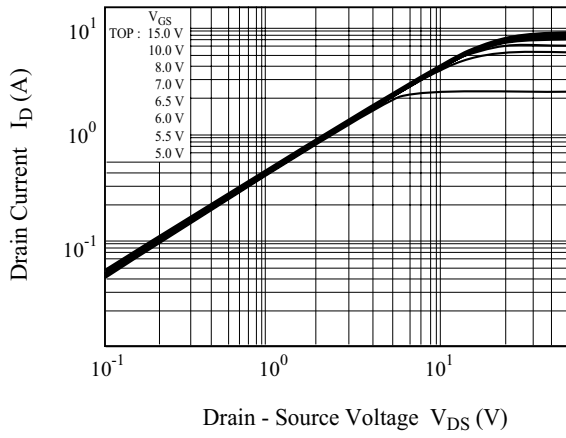
Note 3) $I_S \leq 4.5A$, $dI/dt \leq 300A/\mu s$, $V_{DD} \leq BV_{DSS}$, Starting $T_j = 25\text{ °C}$.

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

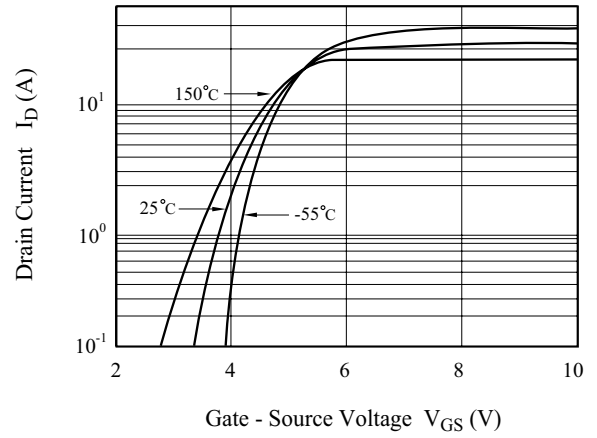
Note 5) Essentially independent of operating temperature.

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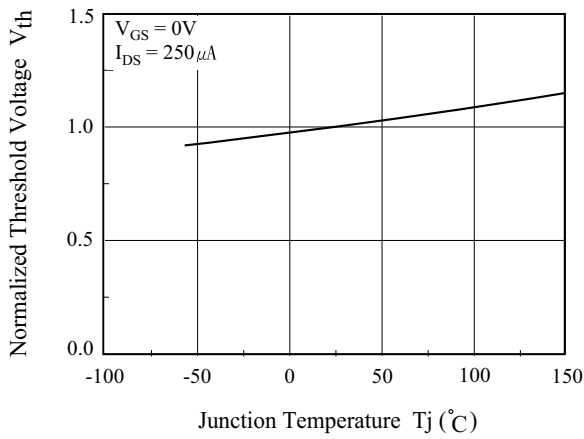
$I_D - V_{DS}$



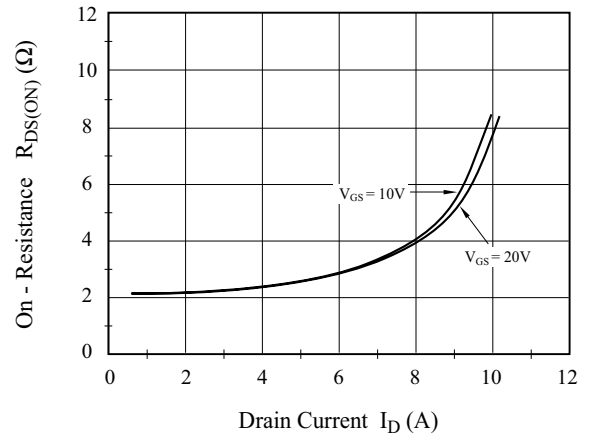
$I_D - V_{GS}$



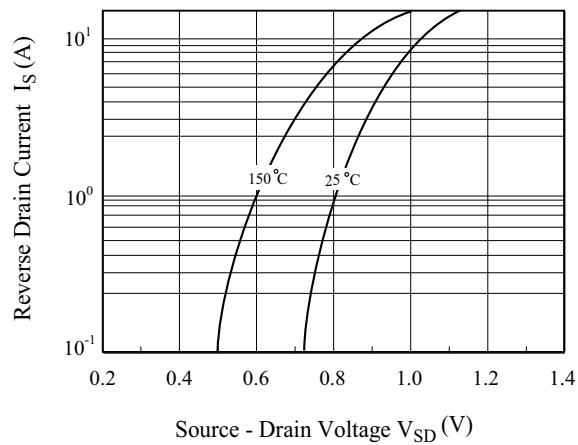
$V_{th} - T_j$



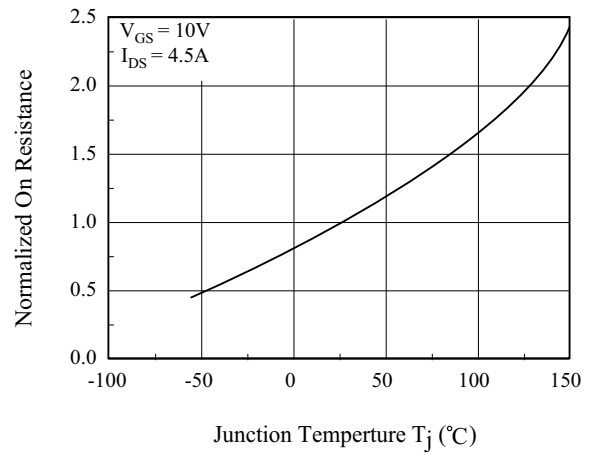
$R_{DS(ON)} - I_D$



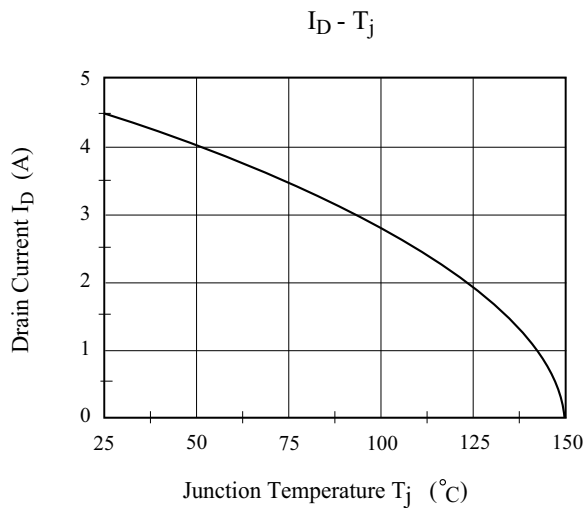
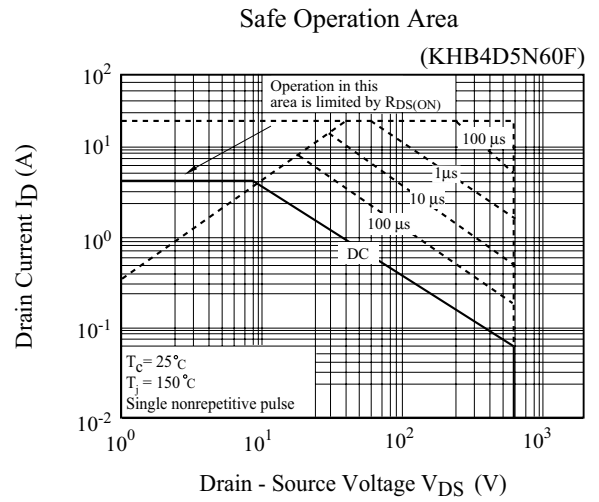
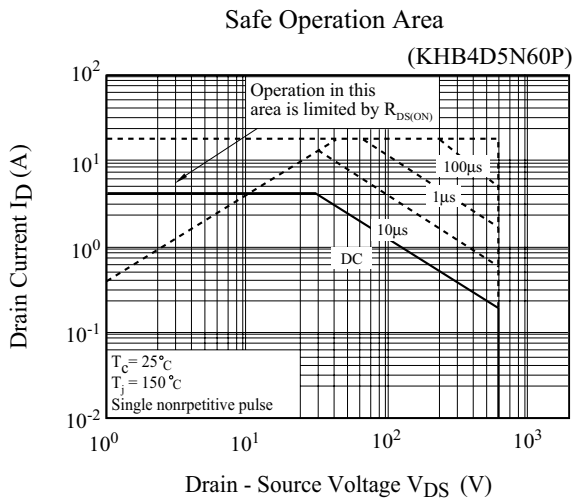
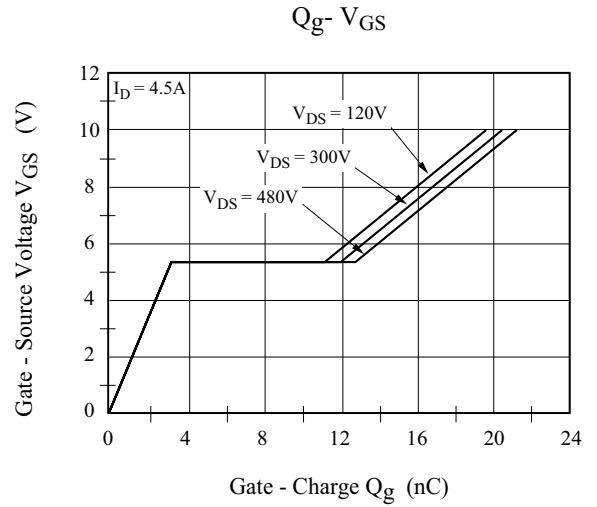
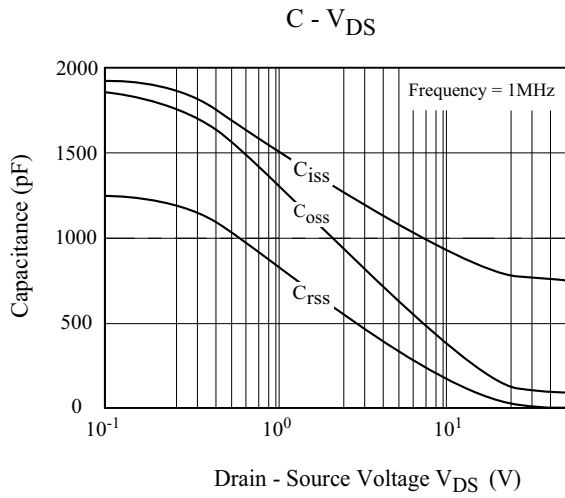
$I_S - V_{SD}$



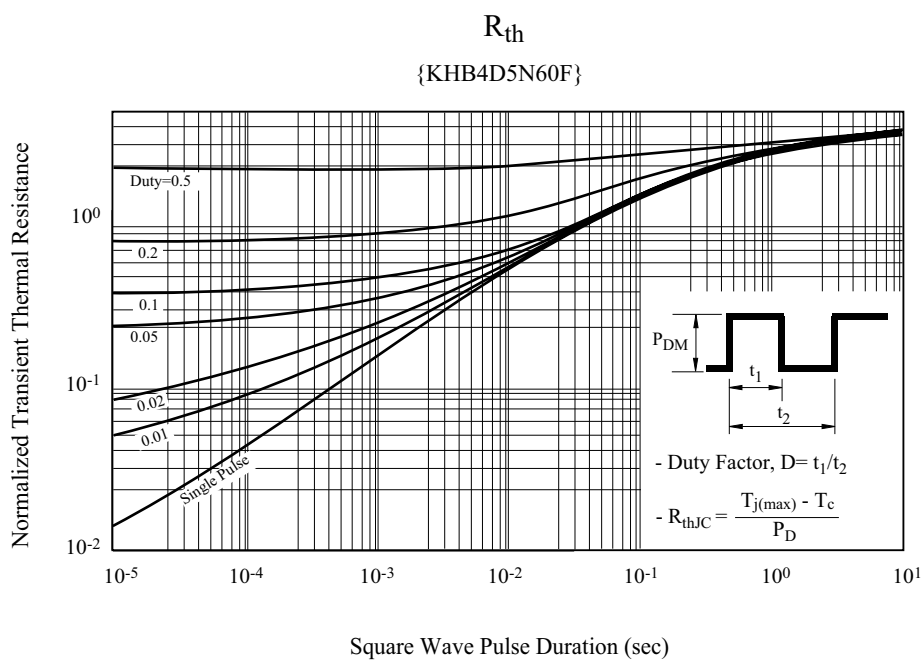
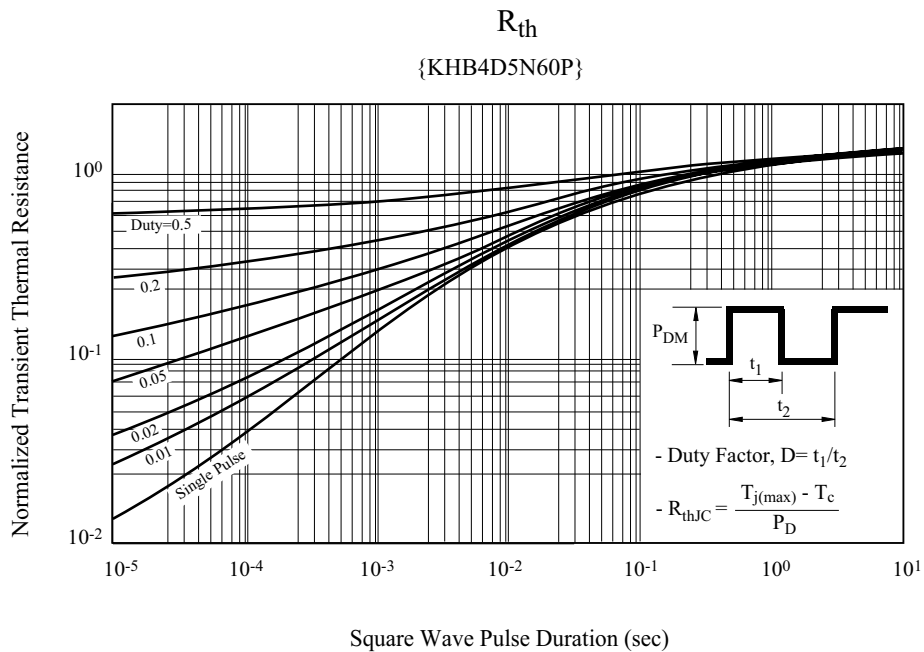
$R_{DS(ON)} - T_j$



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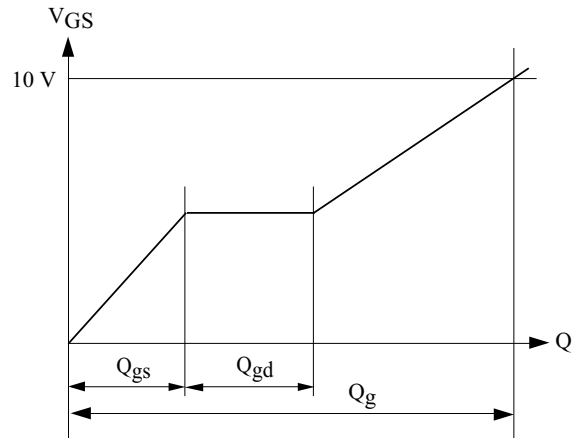
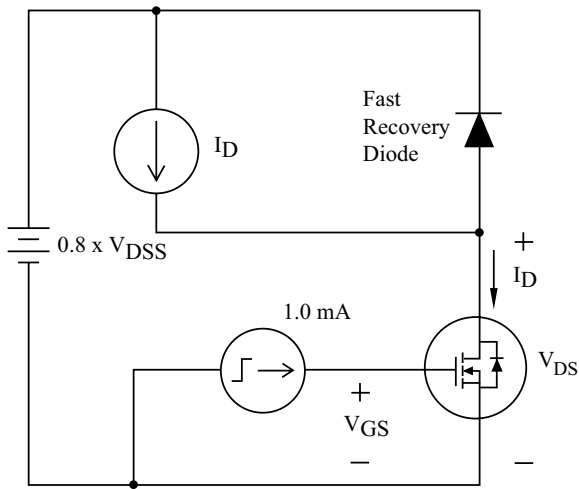


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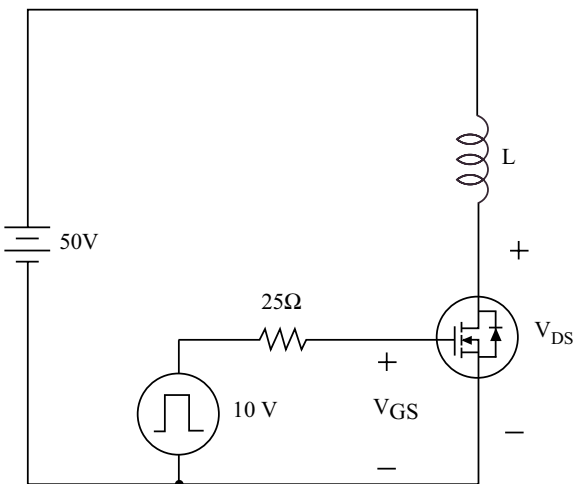


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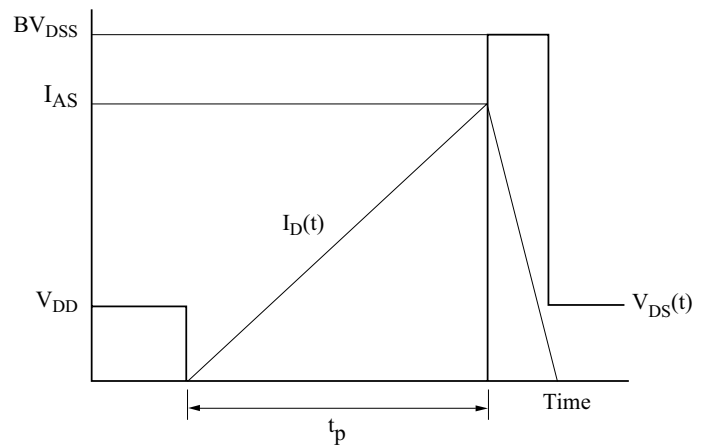
- Gate Charge



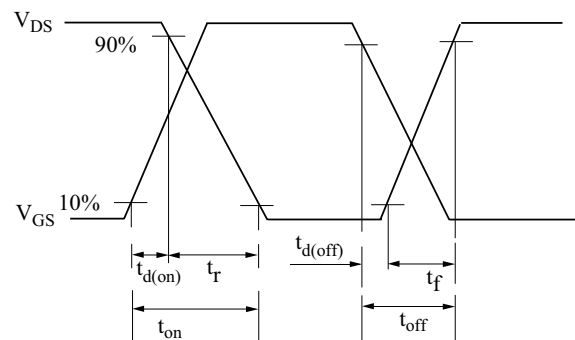
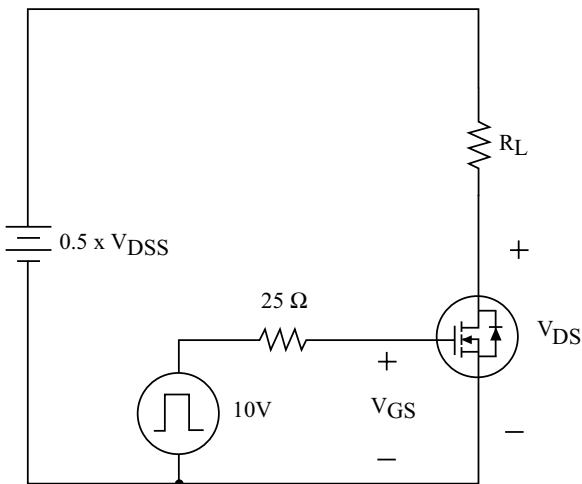
- Single Pulsed Avalanche Energy



$$E_{AS} = \frac{1}{2} L I_{AS}^2 \frac{BV_{DS}}{BV_{DS} - V_{DD}}$$



- Resistive Load Switching



- Source - Drain Diode Reverse Recovery and dv/dt

