

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 DC/DC converters and switching mode power supplies.

FEATURES

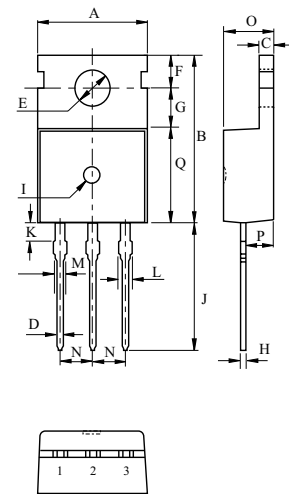
- $V_{DSS}=200V$, $I_D=19A$
- Drain-Source ON Resistance : $R_{DS(ON)}=0.18 \Omega$ @ $V_{GS} = 10V$
- $Q_g(\text{typ.})=35nC$

MAXIMUM RATING (Tc=25℃)

CHARACTERISTIC		SYMBOL	RATING		UNIT
			KHB019N20P1	KHB019N20F1	
Drain-Source Voltage		V _{DSS}	200		V
Gate-Source Voltage		V _{GSS}	±30		V
Drain Current	@T _C =25 ℃	I _D	19	19*	A
	@T _C =100 ℃		12.1	12.1*	
	Pulsed (Note1)	I _{DP}	76	76*	
Single Pulsed Avalanche Energy (Note 2)		E _{AS}	250		mJ
Repetitive Avalanche Energy (Note 1)		E _{AR}	14		mJ
Peak Diode Recovery dv/dt (Note 3)		dv/dt	4.5		V/ns
Drain Power Dissipation	Tc=25 ℃	P _D	140	50	W
	Derate above 25 ℃		1.12	0.4	W/ ℃
Maximum Junction Temperature		T _j	150		℃
Storage Temperature Range		T _{stg}	-55~150		℃
Thermal Characteristics					
Thermal Resistance, Junction-to-Case		R _{thJC}	0.89	2.5	℃/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.

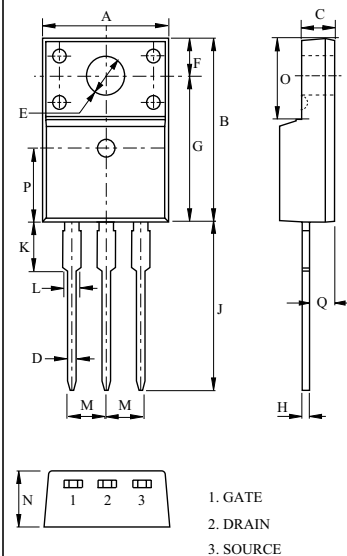
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DIM	MILLIMETERS
A	9.9 ± 0.2
B	15.95 MAX
C	1.3 ± 0.1/-0.05
D	0.8 ± 0.1
E	∅ 3.6 ± 0.2
F	2.8 ± 0.1
G	3.7
H	0.5 ± 0.1/-0.05
I	∅ 1.5
J	13.08 ± 0.3
K	1.46
L	1.4 ± 0.1
M	1.27 ± 0.1
N	2.54 ± 0.2
O	4.5 ± 0.2
P	2.4 ± 0.2
Q	9.2 ± 0.2

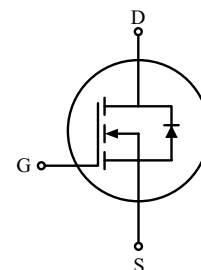
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DIM	MILLIMETERS
A	10.16 ± 0.2
B	15.87 ± 0.2
C	2.54 ± 0.2
D	0.8 ± 0.1
E	∅ 3.18 ± 0.1
F	3.3 ± 0.1
G	12.57 ± 0.2
H	0.5 ± 0.1
J	13.0 MAX
K	3.23 ± 0.1
L	1.47 MAX
M	2.54 ± 0.2
N	4.7 ± 0.2
O	6.68 ± 0.2
P	6.5
Q	2.76 ± 0.2

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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 =250μA, V _{GS} =0V	200	-	-	V
Breakdown Voltage Temperature Coefficient	ΔBV _{DSS} / ΔT _j	I _D =250μA, Referenced to 25 °C	-	0.18	-	V/°C
Drain Cut-off Current	I _{DSS}	V _{DS} =200V, V _{GS} =0V,	-	-	±10	μA
Gate Threshold Voltage	V _{th}	V _{DS} =V _{GS} , I _D =250 μA	2	-	4	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 =9.5A	-	0.14	0.18	Ω
Dynamic						
Total Gate Charge	Q _g	V _{DS} =160V, I _D =19A V _{GS} =10V (Note4,5)	-	35	44	nC
Gate-Source Charge	Q _{gs}		-	4.8	-	
Gate-Drain Charge	Q _{gd}		-	18	-	
Turn-on Delay time	t _{d(on)}	V _{DD} =100V R _L =5 Ω R _G =25 Ω (Note4,5)	-	12	30	ns
Turn-on Rise time	t _r		-	33	70	
Turn-off Delay time	t _{d(off)}		-	130	270	
Turn-off Fall time	t _f		-	75	160	
Input Capacitance	C _{iss}	V _{DS} =25V, V _{GS} =0V, f=1.0MHz	-	900	1170	pF
Reverse Transfer Capacitance	C _{rss}		-	213	277	
Output Capacitance	C _{oss}		-	80	104	
Source-Drain Diode Ratings						
Continuous Source Current	I _S	V _{GS} <V _{th}	-	-	19	A
Pulsed Source Current	I _{SP}		-	-	76	
Diode Forward Voltage	V _{SD}	I _S =19A, V _{GS} =0V	-	-	1.5	V
Reverse Recovery Time	t _{rr}	I _S =19A, V _{GS} =0V,	-	215	-	ns
Reverse Recovery Charge	Q _{rr}	dI _S /dt=100A/μs	-	2	-	μC

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

Note 2) $L=1mH$, $I_S=19A$, $V_{DD}=50V$, $R_G=25\Omega$, Starting $T_j=25^\circ C$.

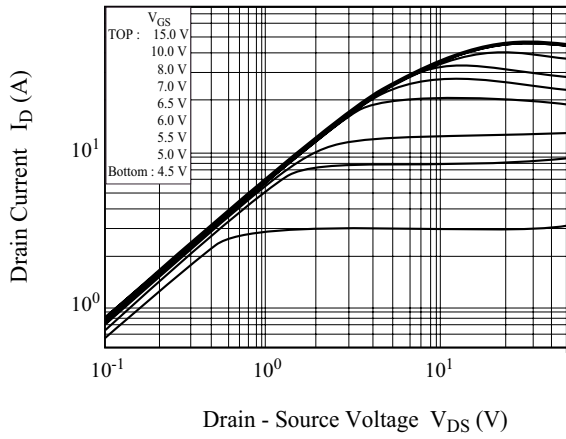
Note 3) $I_S \leq 19A$, $dI/dt \leq 200A/\mu s$, $V_{DD} \leq BV_{DSS}$, Starting $T_j=25^\circ C$.

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

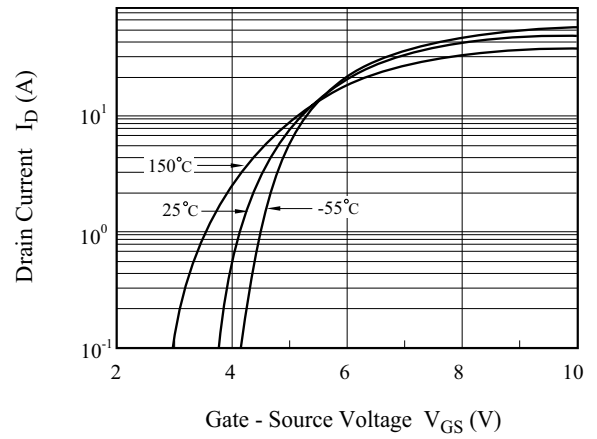
Note 5) Essentially independent of operating temperature.

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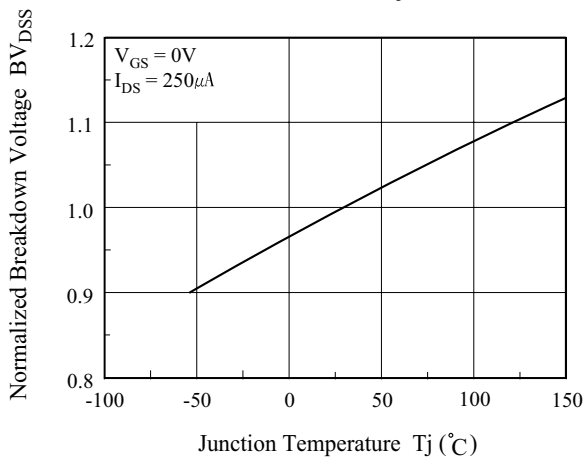
$I_D - V_{DS}$



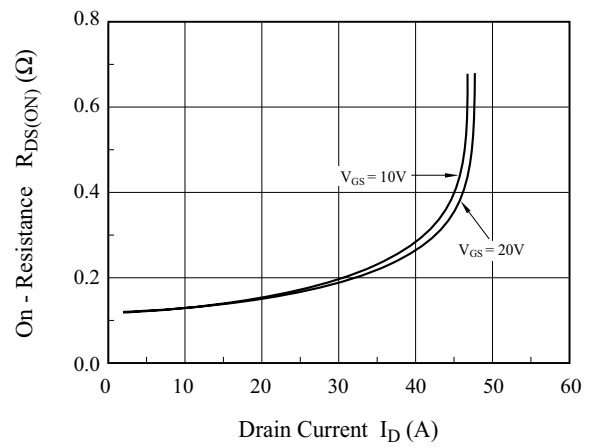
$I_D - V_{GS}$



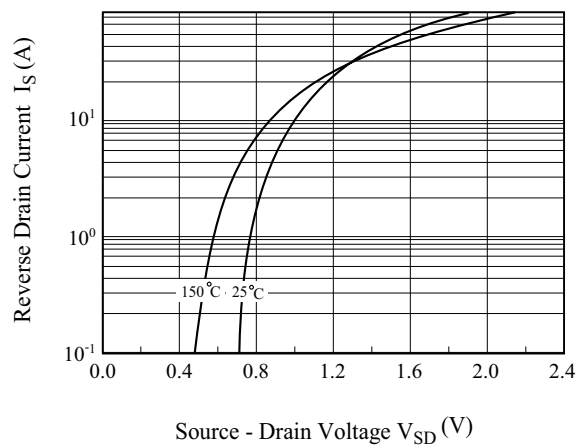
$BV_{DSS} - T_j$



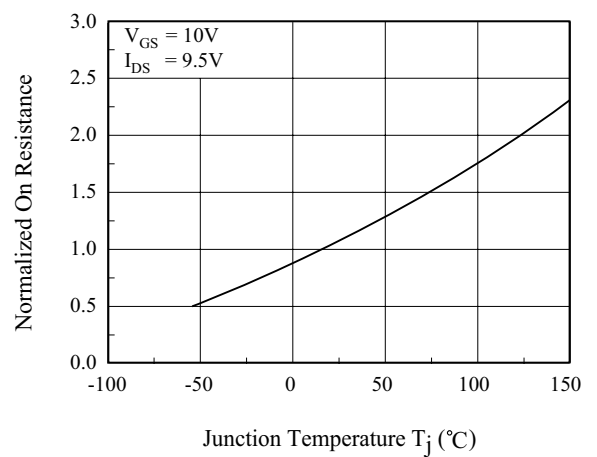
$R_{DS(ON)} - I_D$



$I_S - V_{SD}$

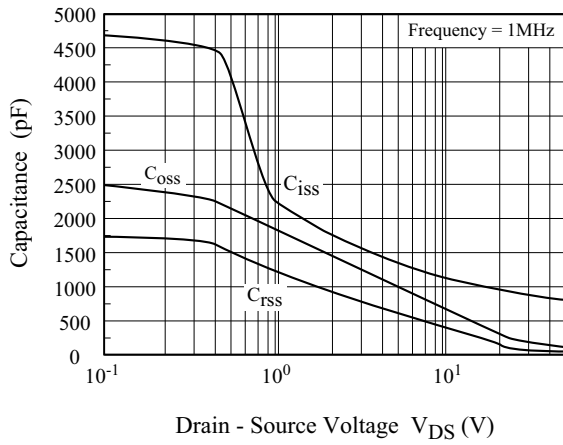


$R_{DS(ON)} - T_j$

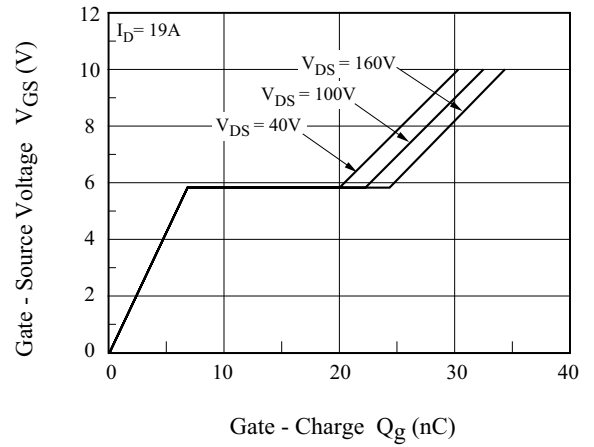


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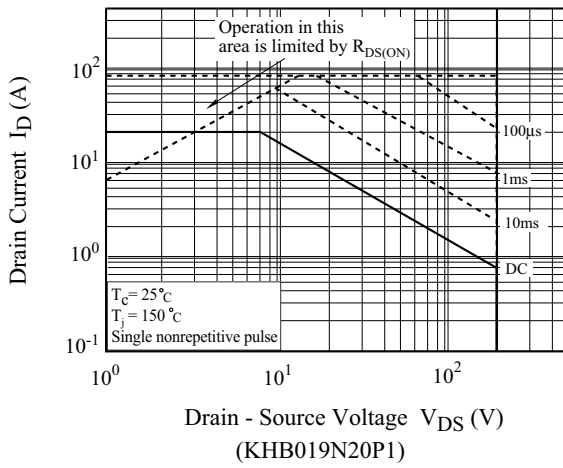
C - V_{DS}



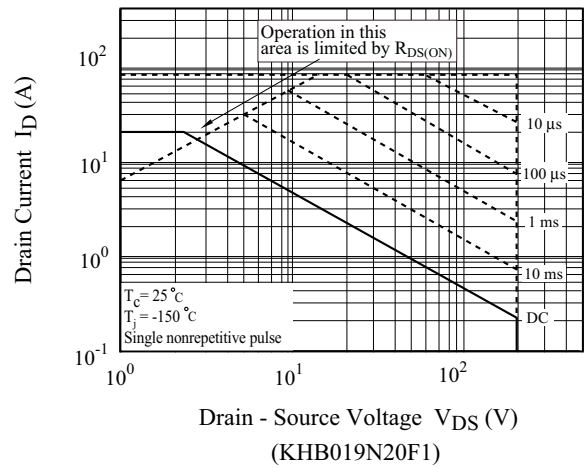
Q_g - V_{GS}



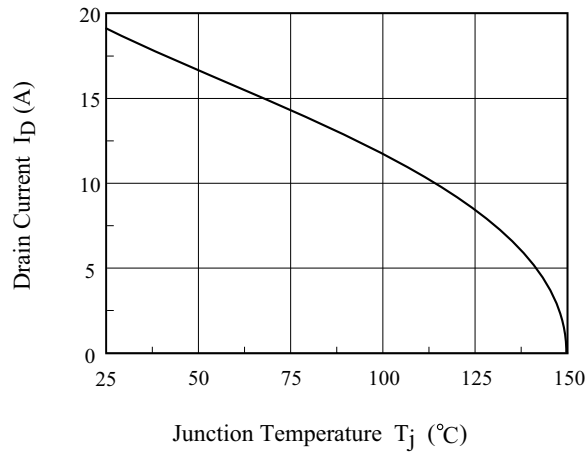
Safe Operation Area



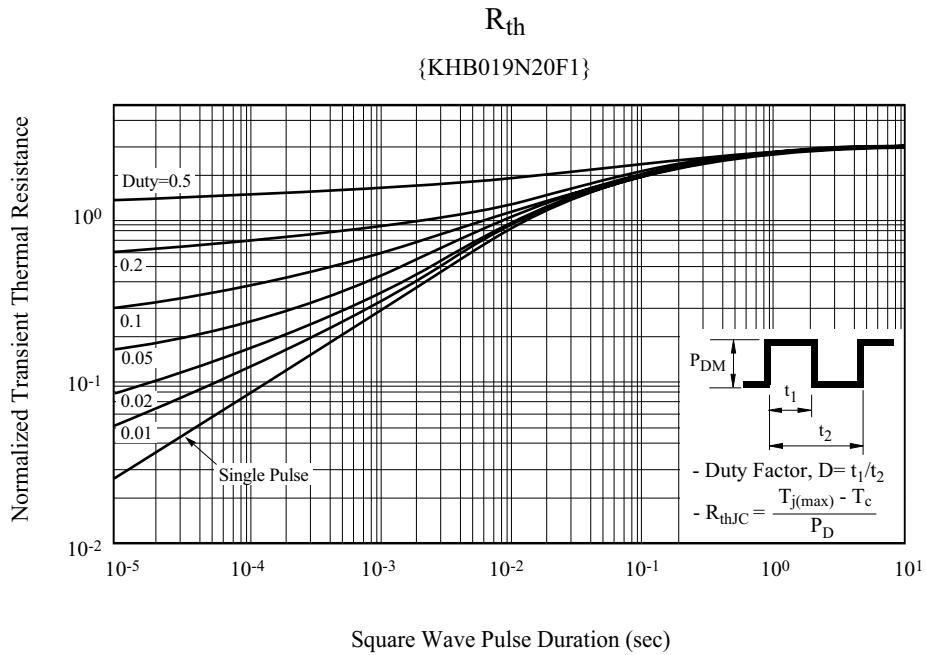
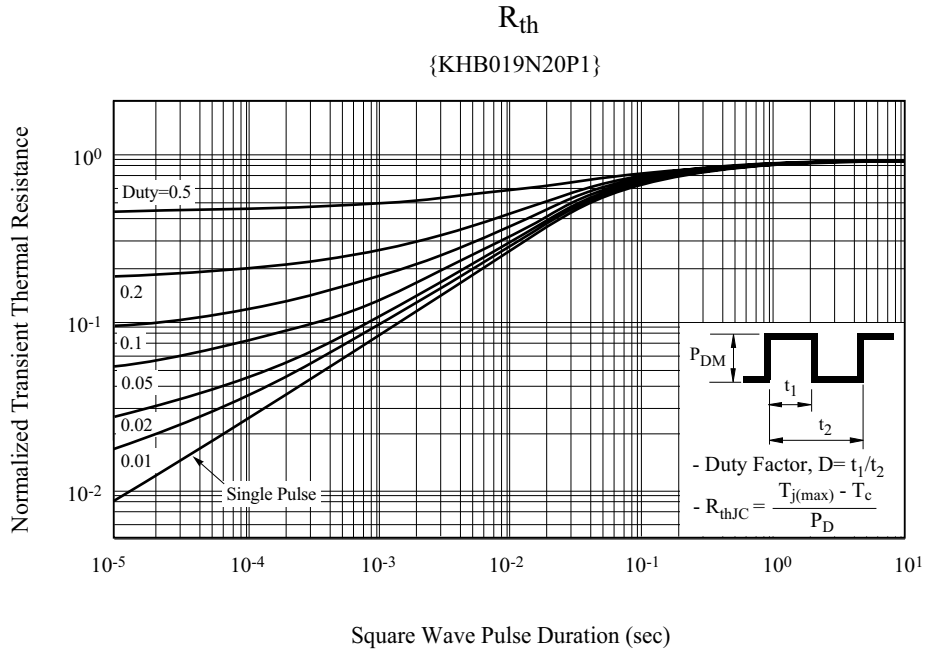
Safe Operation Area



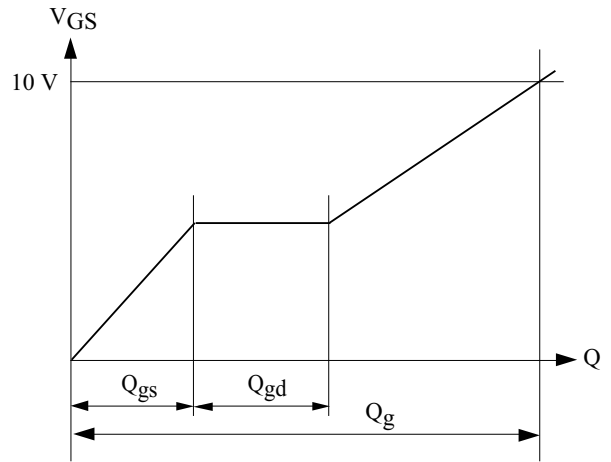
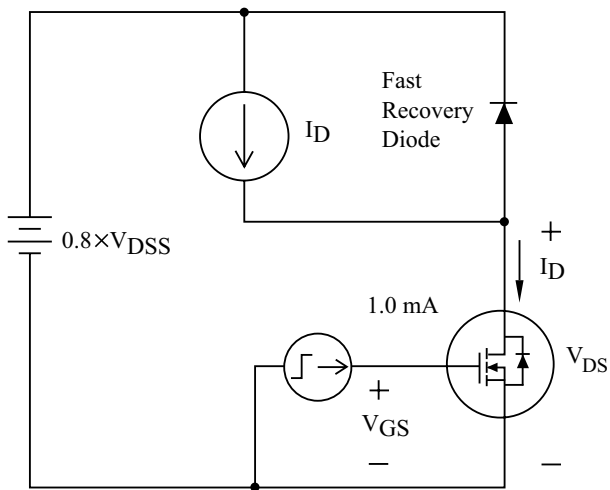
I_D - T_j



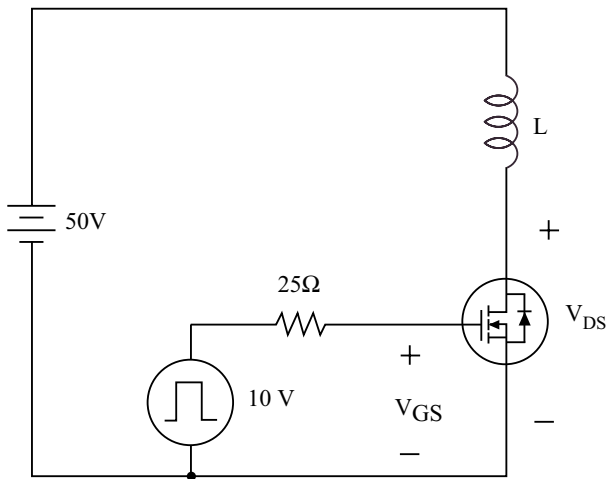
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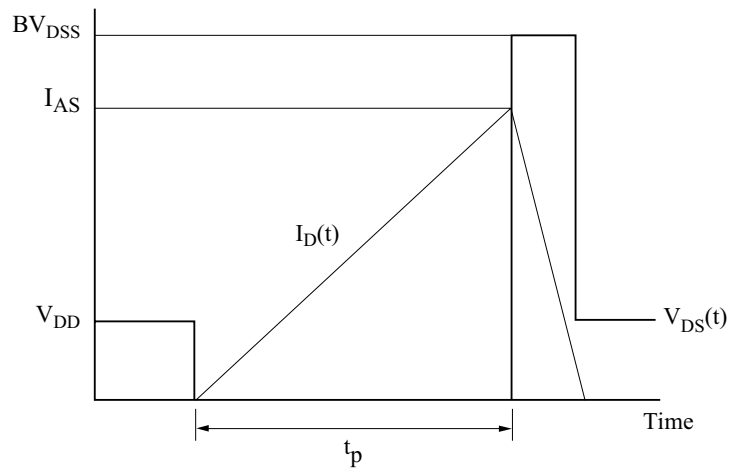
- Gate Charge



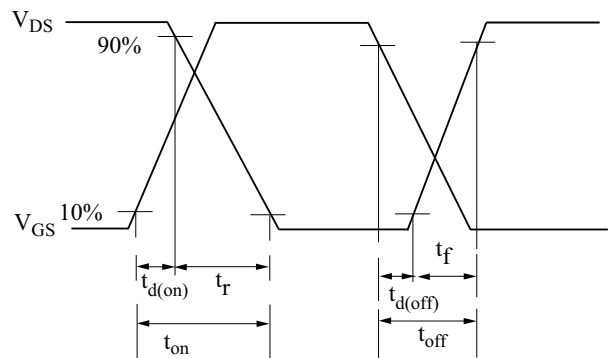
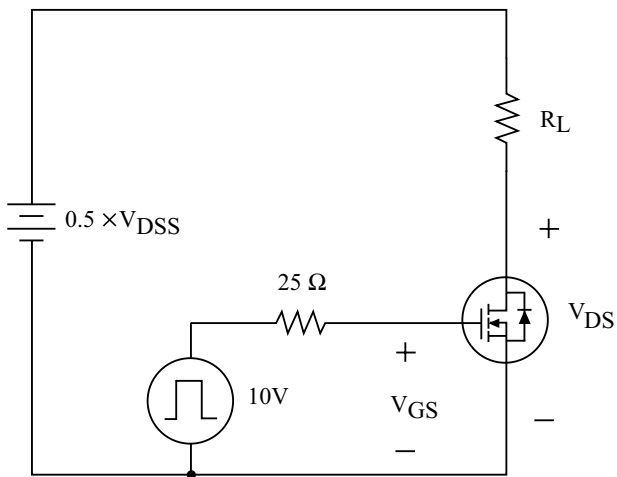
- Single Pulsed Avalanche Energy



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



- Resistive Load Switching



- Source - Drain Diode Reverse Recovery and dv/dt

