

General Description

It is mainly suitable for low voltage applications such as automotive, DC/DC converters and a load switch in battery powered applications

FEATURES

- $V_{DSS} = 60V$, $I_D = 60A$
- Drain-Source ON Resistance :
- $R_{DS(ON)} = 14m\Omega$ (Max.) @ $V_{GS} = 10V$

MOSFET MAXIMUM RATING (Ta=25°C Unless otherwise noted)

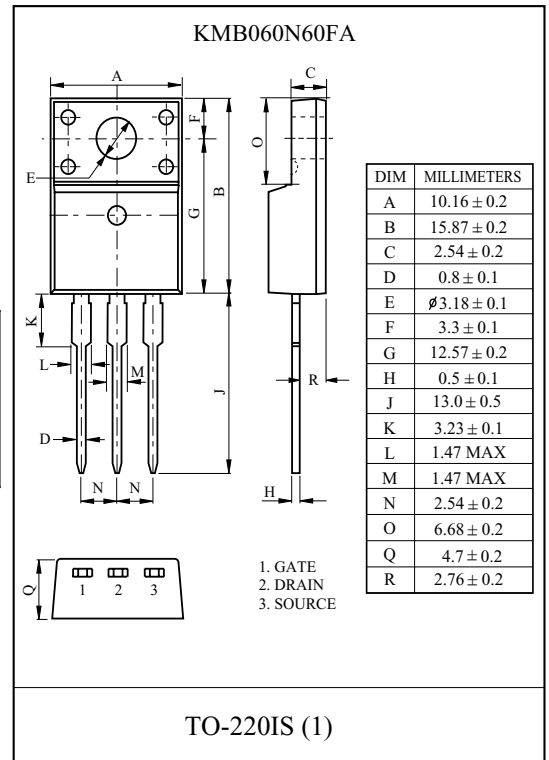
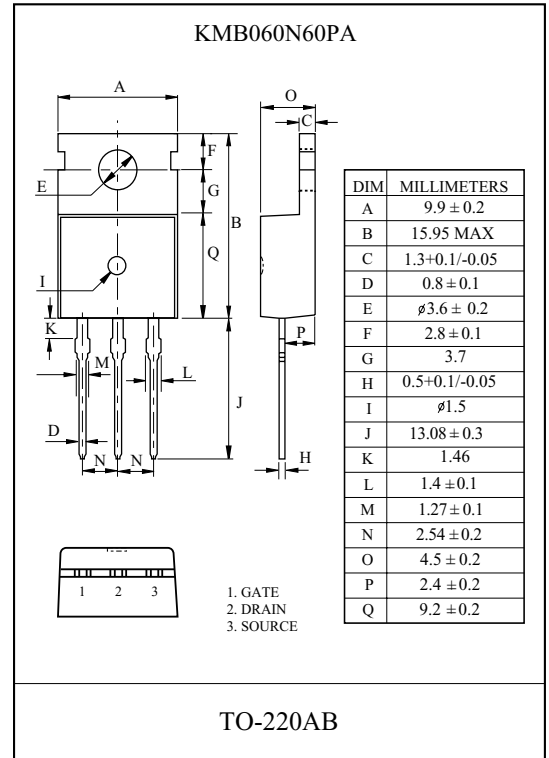
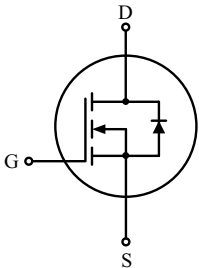
CHARACTERISTIC	SYMBOL	RATING		UNIT	
		KMB060N60PA	KMB060N60FA		
Drain-Source Voltage	V_{DSS}	60		V	
Gate-Source Voltage	V_{GSS}	± 25		V	
Drain Current	DC	I_D^*	60	60*	A
	Pulsed (Note 1)	I_{DP}	240	240*	A
Drain-Source Diode Forward Current	I_S	60		A	
Drain Power Dissipation	P_D^*	25°C	150	51	W
Maximum Junction Temperature	T_j	-55 ~ 175		°C	
Storage Temperature Range	T_{stg}	-55 ~ 175		°C	

Note1) Pulse Test : Pulse width $\leq 10\mu s$ Duty cycle $\leq 1\%$
 *Drain Current limited by maximum junction temperature

Thermal Characteristics

CHARACTERISTIC	SYMBOL	RATING		UNIT
		KMB060N60PA	KMB060N60FA	
Thermal Resistance, Junction-to-Ambient	R_{thJA}	62.5		°C/W
Thermal Resistance, Junction-to-Case	R_{thJC}	1.0	2.9	°C/W

Equivalent Circuit



KMB060N60PA/FA

MOSFET Electrical Characteristics (Ta=25 °C Unless otherwise noted)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Static						
Drain-Source Breakdown Voltage	BV_{DSS}	$I_D=250\mu A, V_{GS}=0V$	60	-	-	V
Drain Cut-off Current	I_{DSS}	$V_{DS}=60V, V_{GS}=0V,$	-	-	1	μA
Gate Leakage Current	I_{GSS}	$V_{GS}=\pm 15V, V_{DS}=0V$	-	-	± 100	nA
Gate Threshold Voltage	V_{th}	$V_{DS}=V_{GS}, I_D=250\mu A$	2.0	-	4.0	V
Drain-Source ON Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=30A$	-	11.5	14	m Ω
Forward Transconductance	g_{FS}	$V_{DS}=15V, I_D=30A$	-	20	-	S
Dynamic						
Input Capacitance	C_{iss}	$V_{DS}=25V, V_{GS}=0V, f=1.0MHz$	-	2000	-	pF
Output Capacitance	C_{oss}		-	360	-	
Reverse Transfer Capacitance	C_{rss}		-	125	-	
Total Gate Charge	Q_g	$V_{DS}=48V, V_{GS}=4.5V,$ $I_D=30A$ (Note1,2)	-	70	-	nC
Gate-Source Charge	Q_{gs}		-	15	-	
Gate-Drain Charge	Q_{gd}		-	20	-	
Turn-On Delay Time	$t_{d(on)}$	$V_{DD}=30V, I_D=30A, R_G=25\Omega$	-	35	-	ns
Turn-On Rise Time	t_r		-	220	-	
Turn-Off Delay Time	$t_{d(off)}$		-	55	-	
Turn-Off Fall Time	t_f		-	30	-	

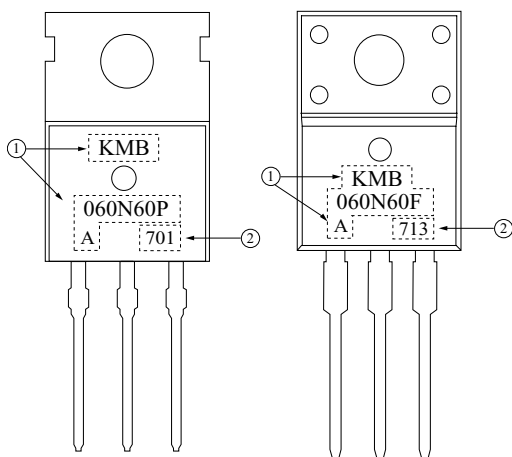
Note 1) Pulse Test : Pulse width $\leq 10\mu s$, Duty Cycle $\leq 1\%$.

Note 2) Essentially Independent of Operating Temperature.

DIODE Electrical Characteristics (Ta=25 °C Unless otherwise noted)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Diode Forward Voltage	V_{SD}	$I_{SD}=60A, V_{GS}=0V$	-	-	1.5	V
Reverse Recovery Time	T_{rr}	$V_{GS}=0V, I_S=60A, dI_F/dt=100A/\mu s$	-	110	-	ns

Marking



① PRODUCT NAME

② LOT NO

KMB060N60PA/FA

Fig 1. $I_D - V_{DS}$

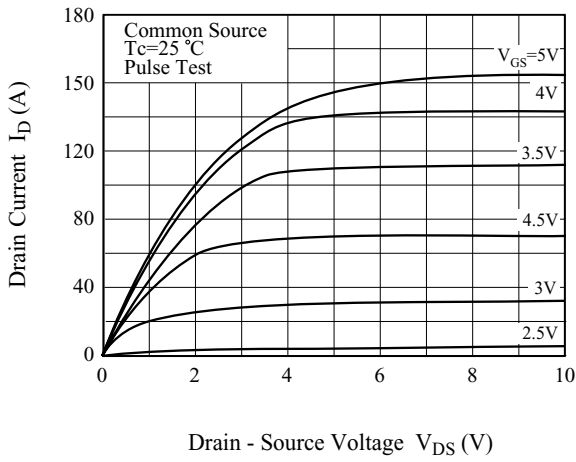


Fig 2. $R_{DS(ON)} - I_D$

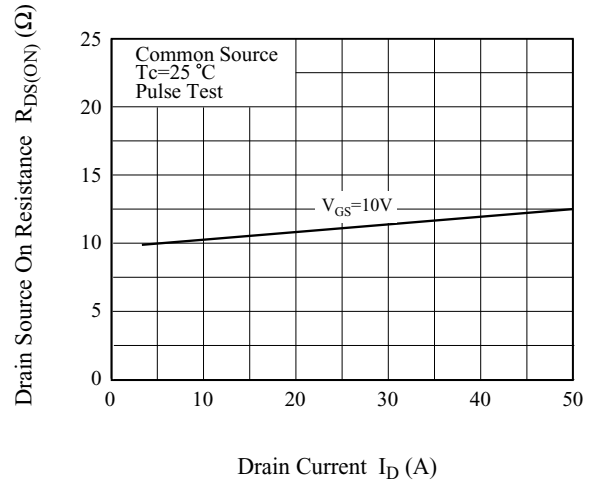


Fig 3. $I_D - V_{GS}$

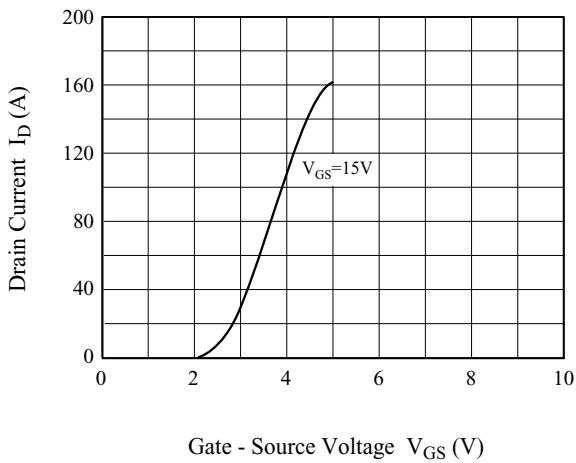


Fig 4. $R_{DS(ON)} - T_j$

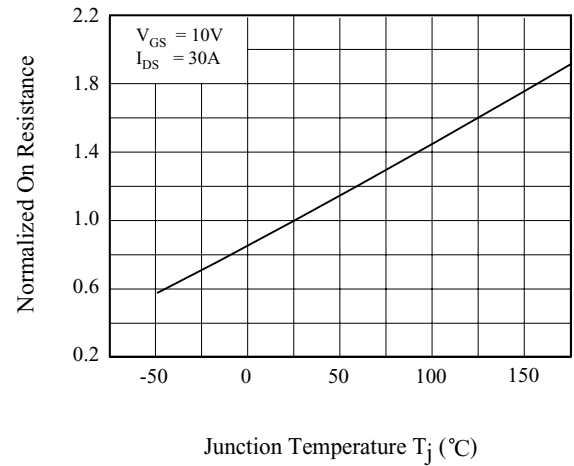


Fig 5. $V_{th} - T_j$

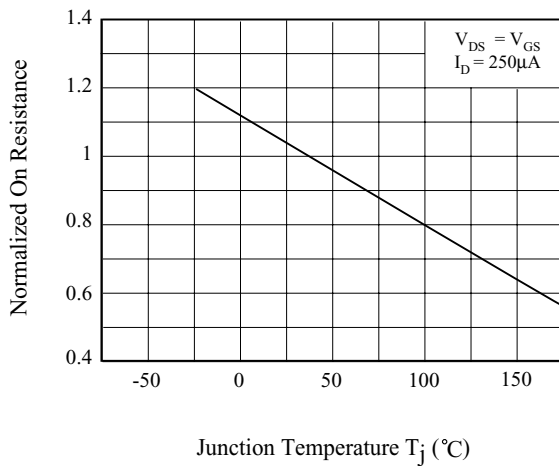
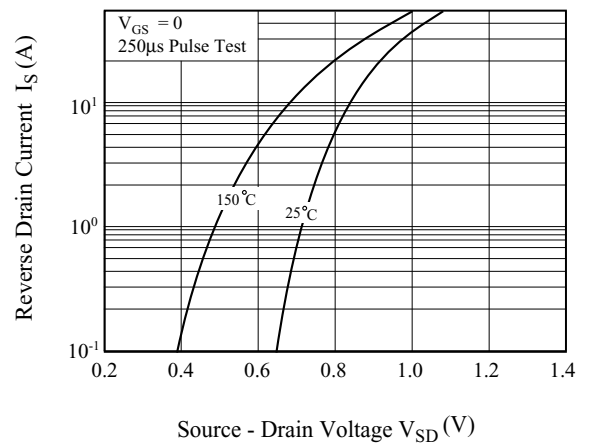


Fig 6. $I_{DR} - V_{DSF}$



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Fig 7. $Q_g - V_{DS}$

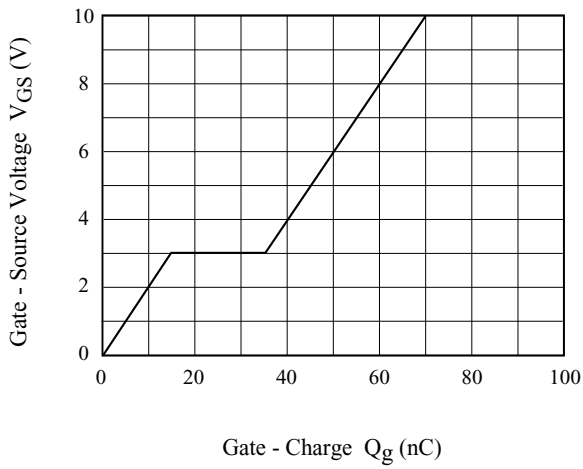


Fig 8. $C - V_{DS}$

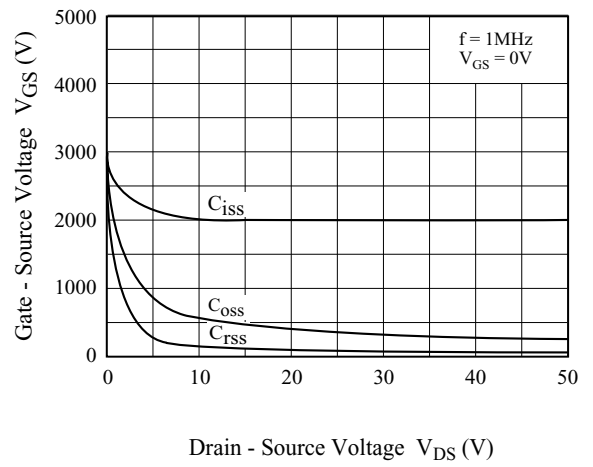


Fig 9. Safe Operation Area

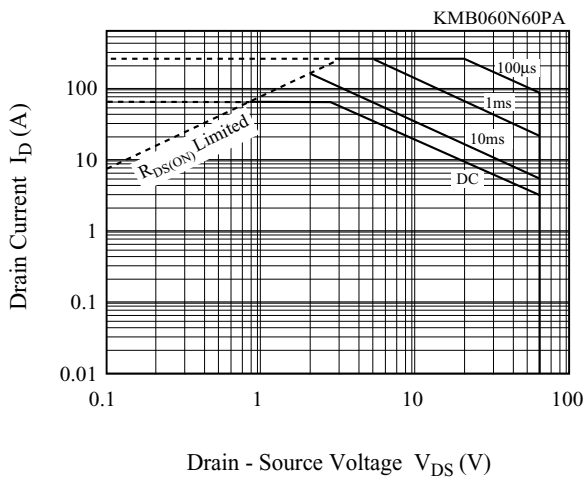
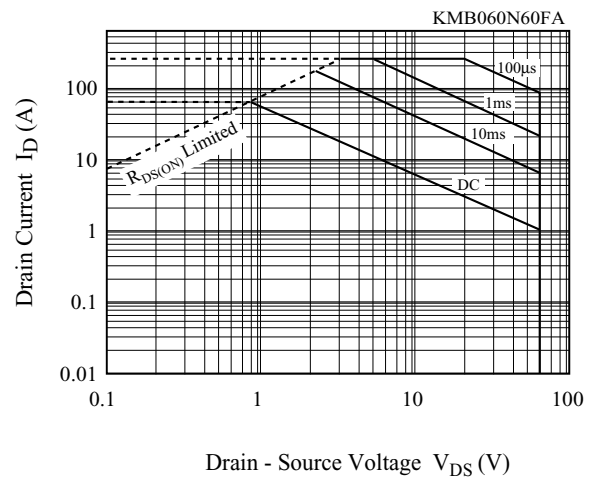


Fig 10. Safe Operation Area



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Fig 11. R_{th} of KMB060N60PA

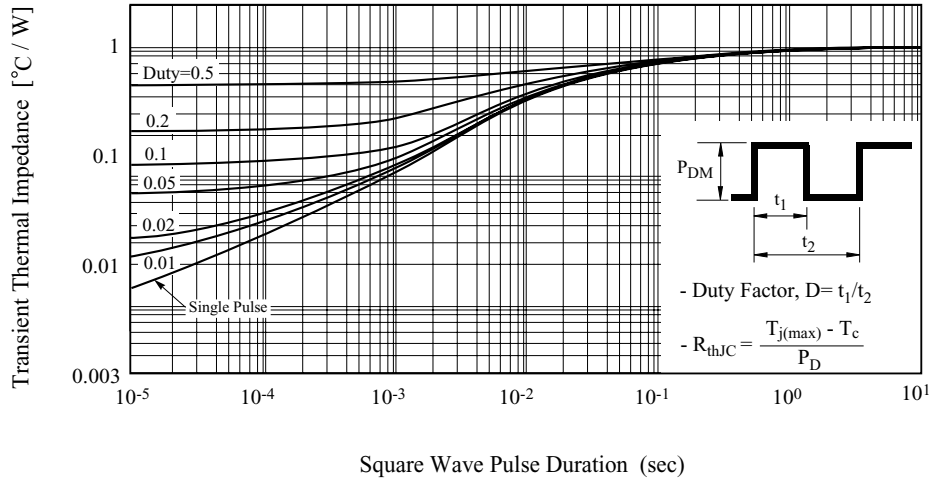
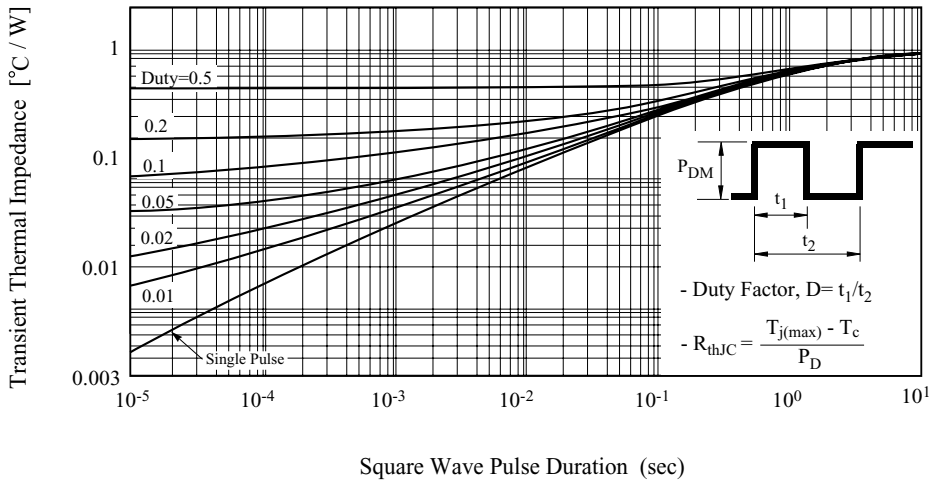
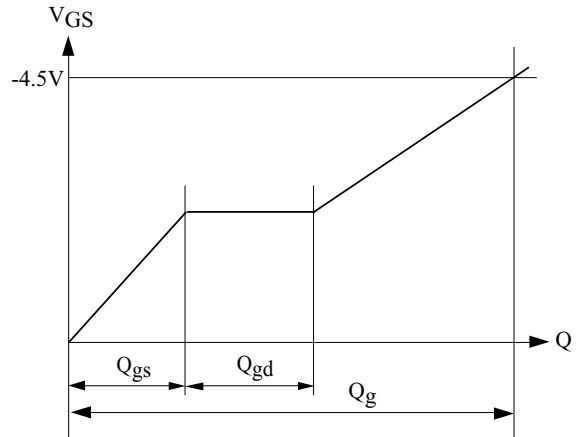
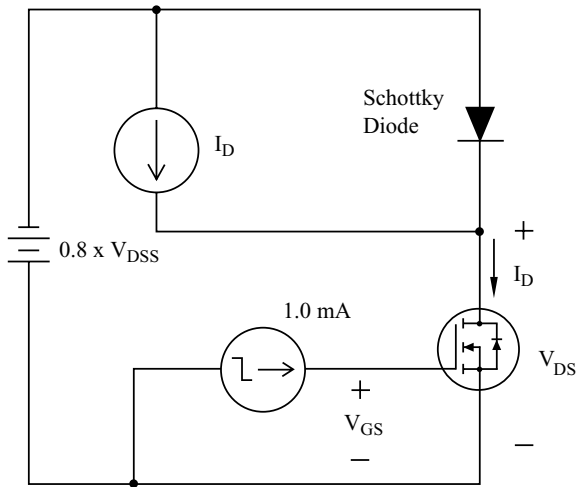


Fig 12. R_{th} of KMB060N60FA

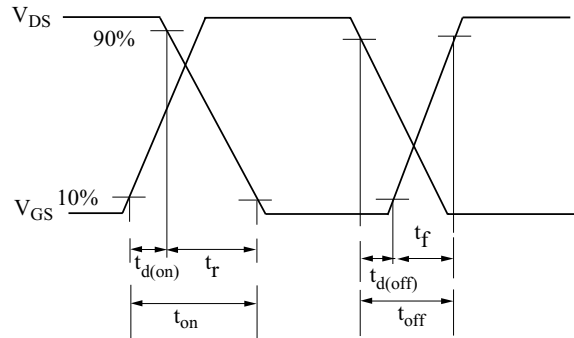
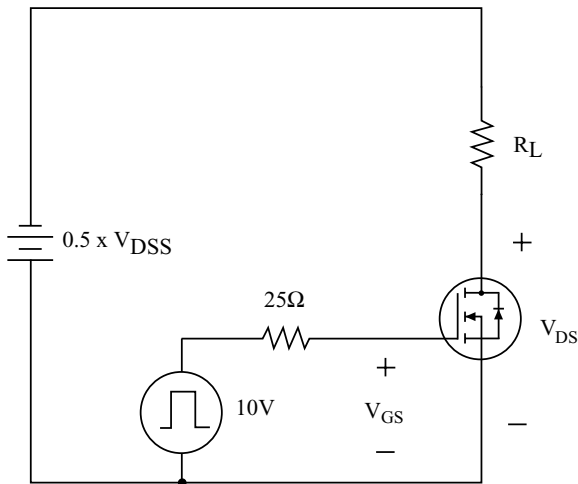


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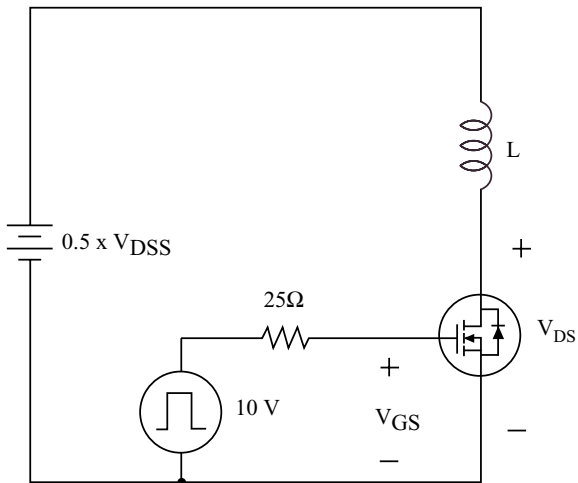
- Gate Charge



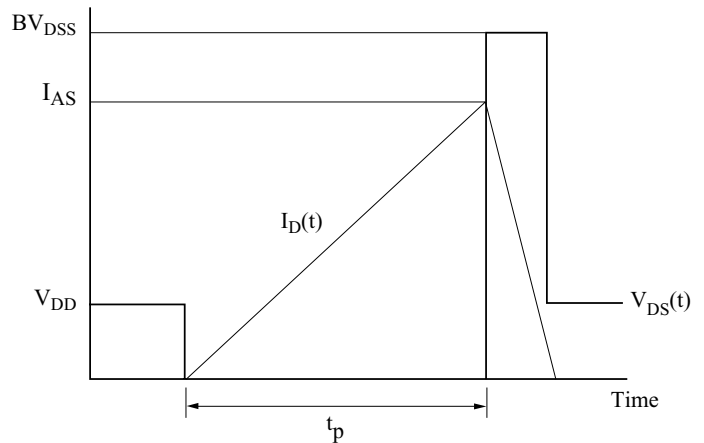
- Resistive Load Switching



- Single Pulsed Avalanche Energy



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



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- Source - Drain Diode Reverse Recovery and dv/dt

