

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 active power factor correction and switching mode power supplies.

FEATURES

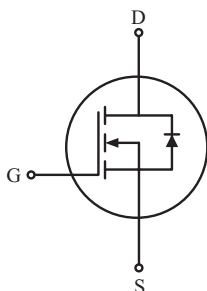
- $V_{DSS}=600V$, $I_D=12A$
- Drain-Source ON Resistance :
 $R_{DS(ON)}=0.6\Omega(\text{Max}) @V_{GS}=10V$
- $Q_g(\text{typ.})= 36nC$

MAXIMUM RATING (Tc=25°C)

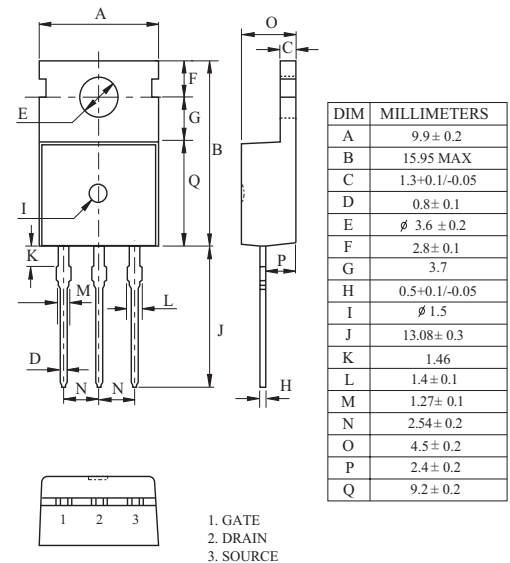
CHARACTERISTIC		SYMBOL	RATING		UNIT
			KF12N60P	KF12N60F	
Drain-Source Voltage		V _{DSS}	600		V
Gate-Source Voltage		V _{GSS}	±30		V
Drain Current	@T _C =25°C	I _D	12	12*	A
	@T _C =100°C		7.4	7.4*	
	Pulsed (Note1)	I _{DP}	33	33*	
Single Pulsed Avalanche Energy (Note 2)		E _{AS}	450		mJ
Repetitive Avalanche Energy (Note 1)		E _{AR}	17		mJ
Peak Diode Recovery dv/dt (Note 3)		dv/dt	4.5		V/ns
Drain Power Dissipation	Tc=25°C	P _D	215	49.8	W
	Derate above 25°C		1.72	0.4	W/°C
Maximum Junction Temperature		T _j	150		°C
Storage Temperature Range		T _{stg}	-55 150		°C
Thermal Characteristics					
Thermal Resistance, Junction-to-Case		R _{thJC}	0.58	2.51	°C/W
Thermal Resistance, Junction-to-Ambient		R _{thJA}	62.5	62.5	°C/W

* : Drain current limited by maximum junction temperature.

EQUIVALENT CIRCUIT

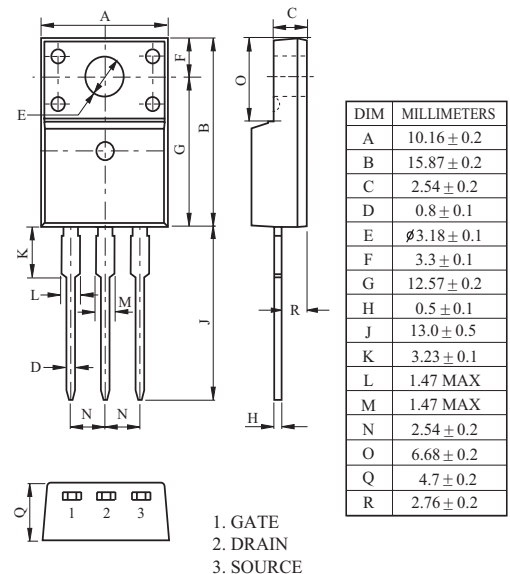


KF12N60P



TO-220AB

KF12N60F



TO-220IS (1)

KF12N60P/F

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	600	-	-	V
Breakdown Voltage Temperature Coefficient	Δ BV _{DSS} / Δ T _j	I _D =250 μA, Referenced to 25°C	-	0.63	-	V/°C
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 =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 =6A	-	0.51	0.6	Ω
Dynamic						
Total Gate Charge	Q _g	V _{DS} =480V, I _D =12A V _{GS} =10V (Note4,5)	-	36	-	nC
Gate-Source Charge	Q _{gs}		-	8.5	-	
Gate-Drain Charge	Q _{gd}		-	13.5	-	
Turn-on Delay time	t _{d(on)}	V _{DD} =300V I _D =12A R _G =25Ω (Note4,5)	-	30	-	ns
Turn-on Rise time	t _r		-	40	-	
Turn-off Delay time	t _{d(off)}		-	115	-	
Turn-off Fall time	t _f		-	55	-	
Input Capacitance	C _{iss}	V _{DS} =25V, V _{GS} =0V, f=1.0MHz	-	1445	-	pF
Output Capacitance	C _{oss}		-	185	-	
Reverse Transfer Capacitance	C _{rss}		-	20	-	
Source-Drain Diode Ratings						
Continuous Source Current	I _S	V _{GS} <V _{th}	-	-	12	A
Pulsed Source Current	I _{SP}		-	-	48	
Diode Forward Voltage	V _{SD}	I _S =12A, V _{GS} =0V	-	-	1.4	V
Reverse Recovery Time	t _{rr}	I _S =12A, V _{GS} =0V,	-	370	-	ns
Reverse Recovery Charge	Q _{rr}	dI _S /dt=100A/ μs	-	4.6	-	μC

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

Note 2) L = 5.7mH, $I_S=12\text{A}$, $V_{DD}=50\text{V}$, $R_G=25\Omega$, Starting $T_j=25^\circ\text{C}$.

Note 3) $I_S \leq 12\text{A}$, $dI/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, Starting $T_j=25^\circ\text{C}$.

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

Note 5) Essentially independent of operating temperature.

Marking

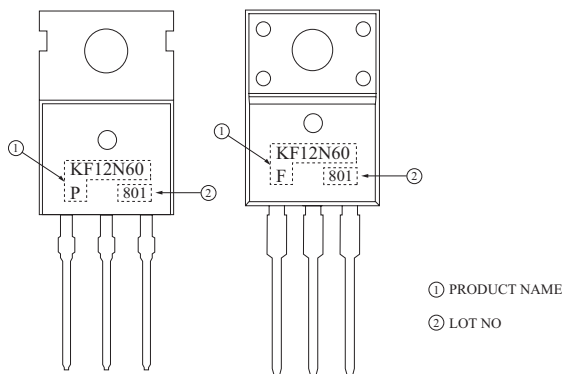


Fig1. $I_D - V_{DS}$

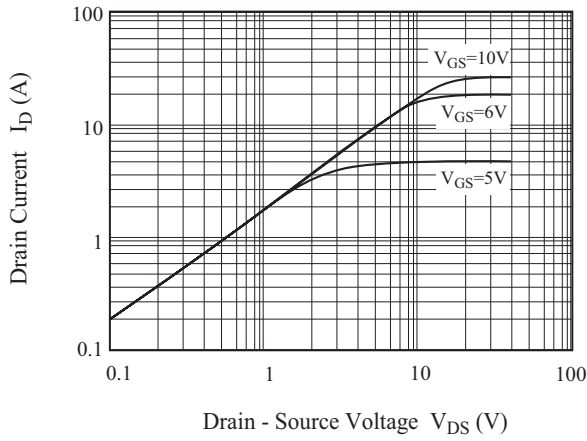


Fig2. $I_D - V_{GS}$

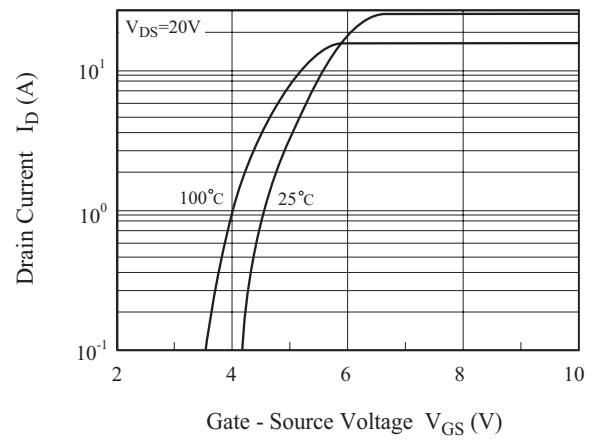


Fig3. $BV_{DSS} - T_j$

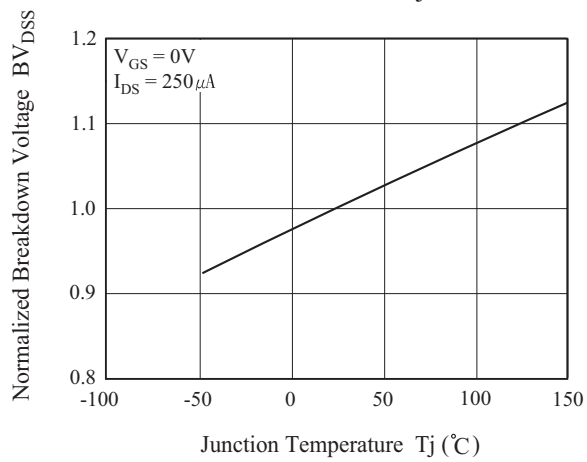


Fig4. $R_{DS(ON)} - I_D$

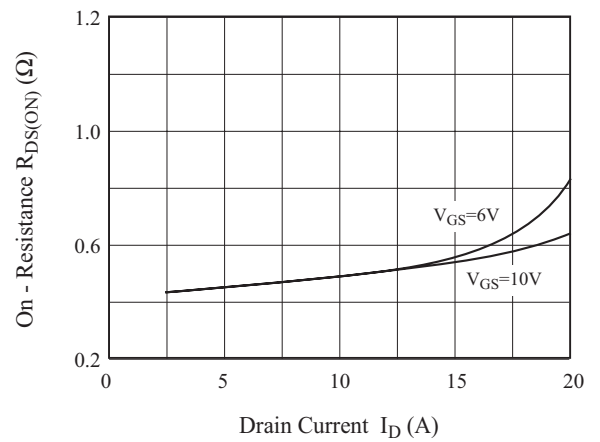


Fig5. $I_S - V_{SD}$

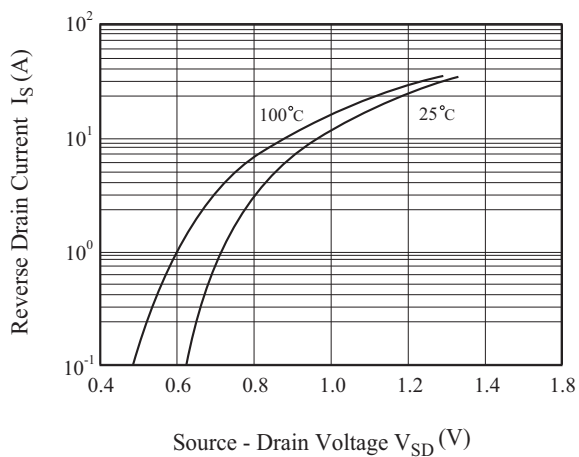
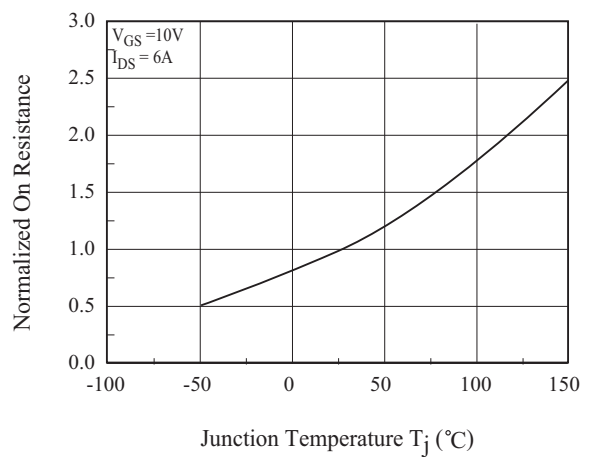


Fig6. $R_{DS(ON)} - T_j$



KF12N60P/F

Fig 7. C - V_{DS}

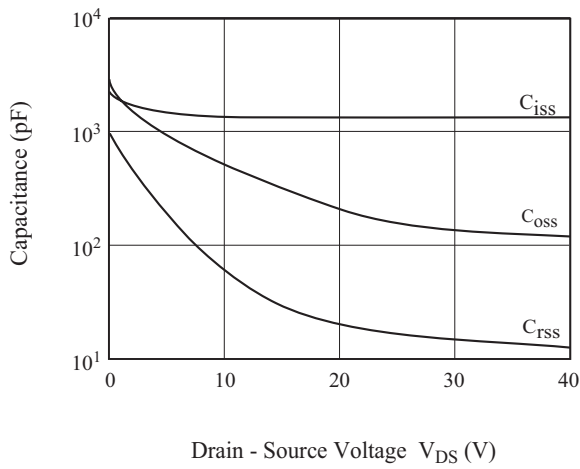


Fig8. Q_g - V_{GS}

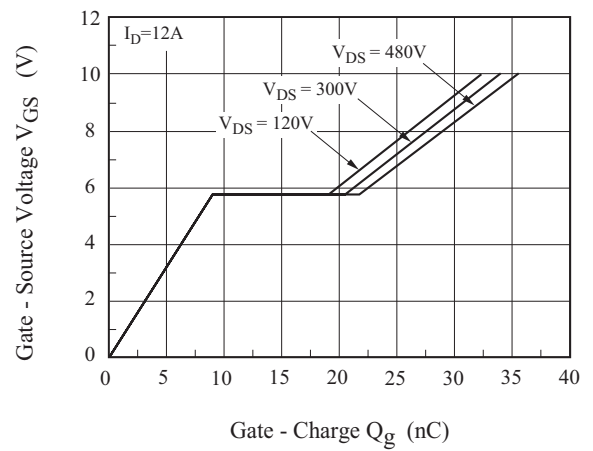


Fig9. Safe Operation Area

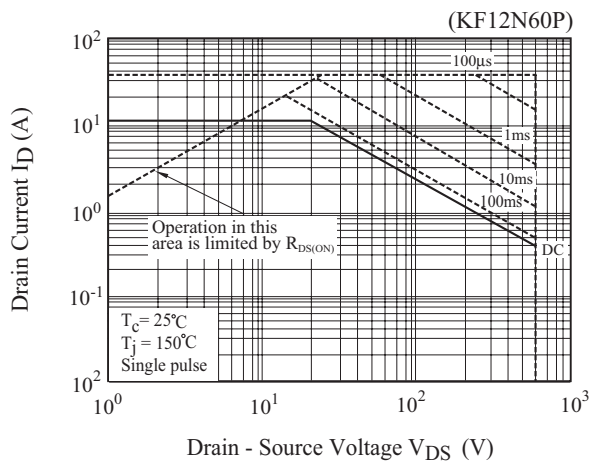


Fig10. Safe Operation Area

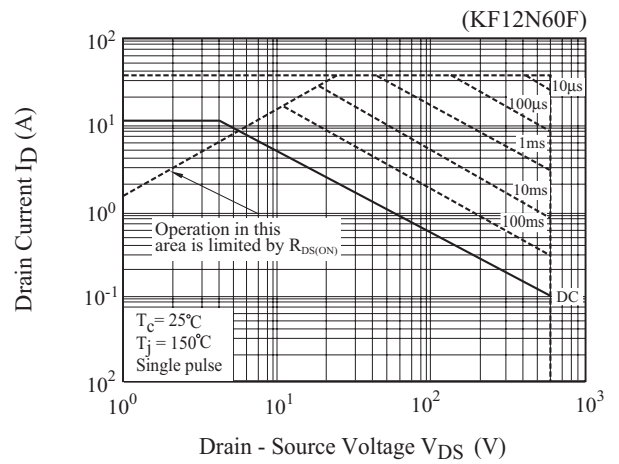


Fig11. I_D - T_j

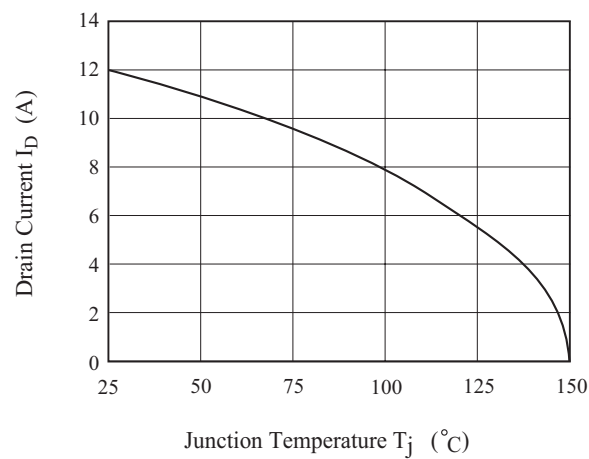


Fig12. Transient Thermal Response Curve

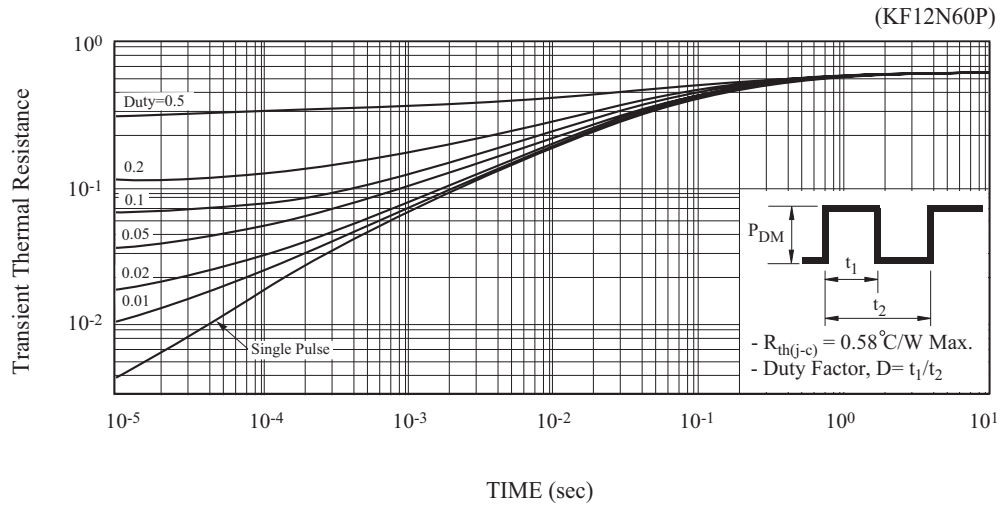


Fig13. Transient Thermal Response Curve

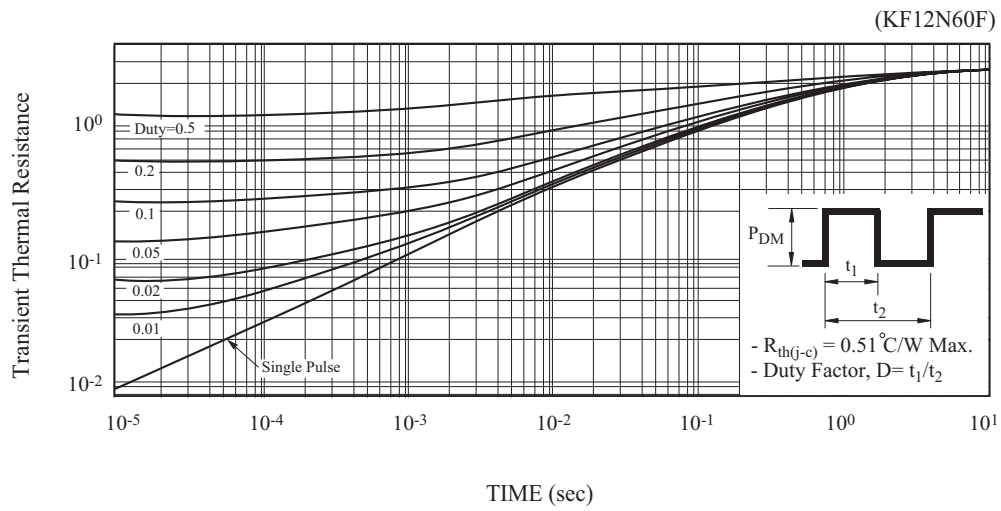


Fig14. Gate Charge

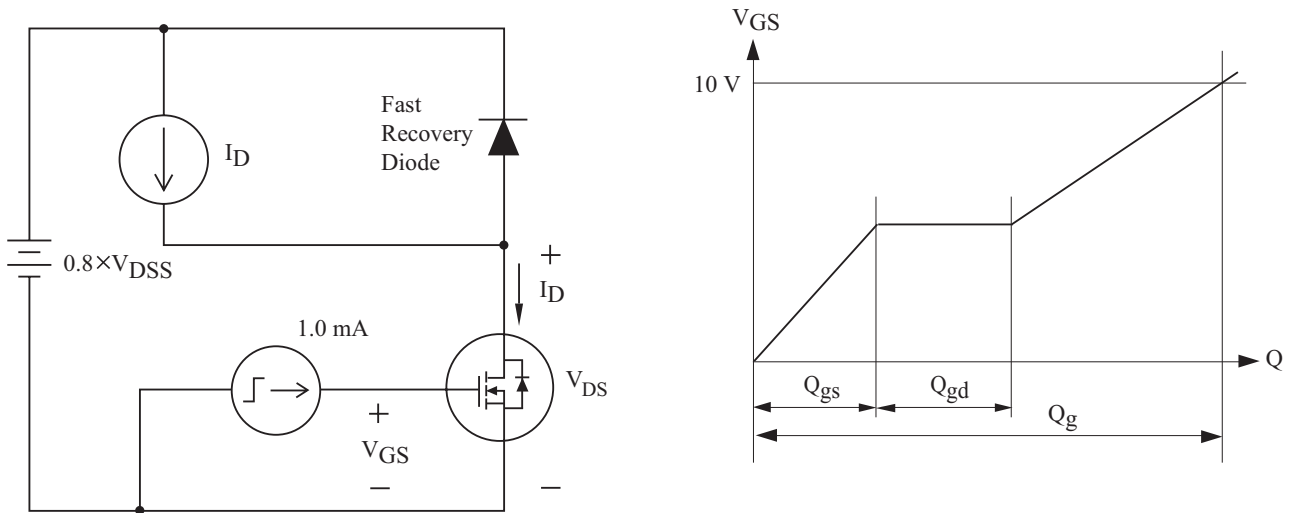


Fig15. Single Pulsed Avalanche Energy

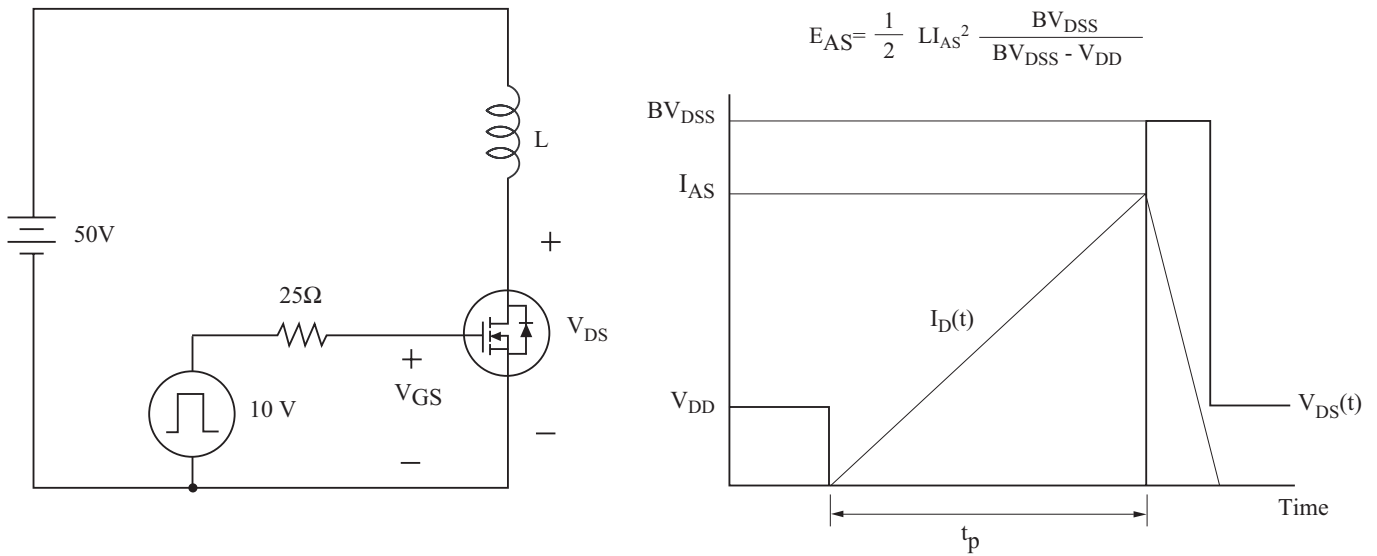


Fig16. Resistive Load Switching

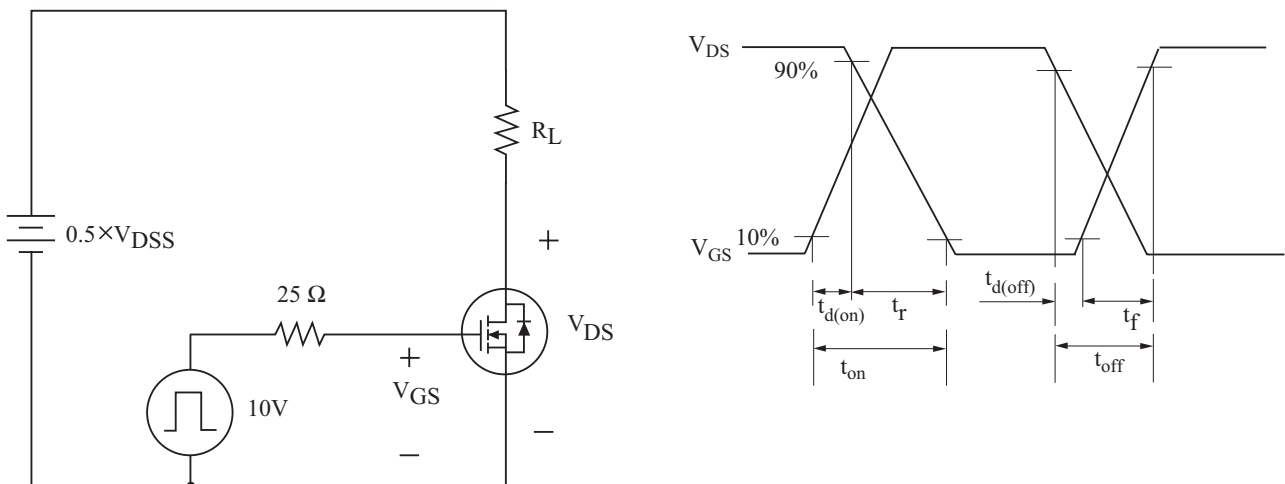


Fig17. Source - Drain Diode Reverse Recovery and dv/dt

