

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

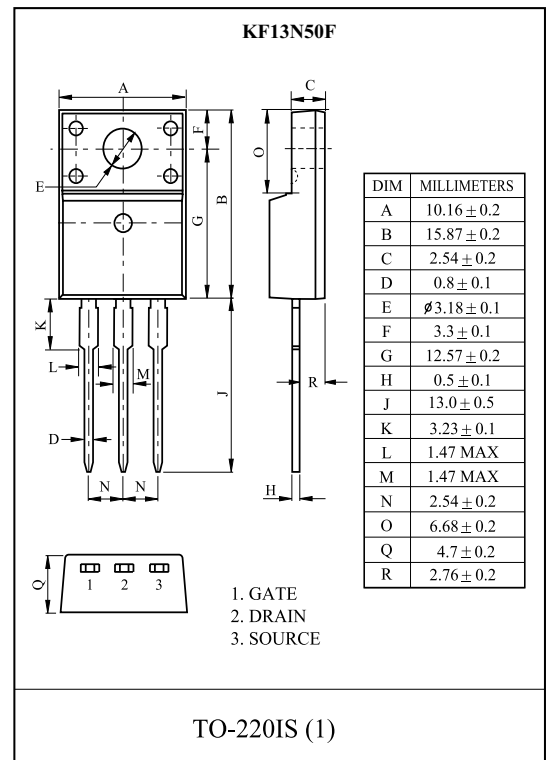
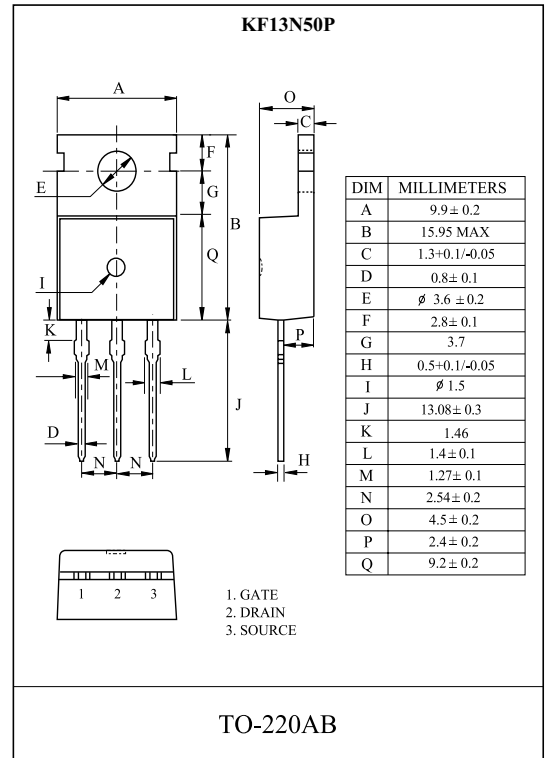
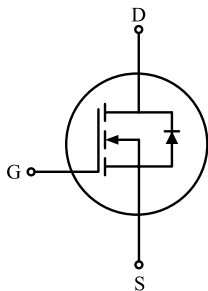
- $V_{DSS} = 500V$, $I_D = 13A$
- Drain-Source ON Resistance :
 $R_{DS(ON)} = 0.44$ (Max) @ $V_{GS} = 10V$
- Q_g (typ.) = 35nC

MAXIMUM RATING (Tc=25 °C)

CHARACTERISTIC	SYMBOL	RATING		UNIT
		KF13N50P	KF13N50F	
Drain-Source Voltage	V_{DSS}	500		V
Gate-Source Voltage	V_{GSS}	± 30		V
Drain Current	@Tc=25	13	13*	A
	@Tc=100	8	8*	
	Pulsed (Note1)	I_{DP}	40	
Single Pulsed Avalanche Energy (Note 2)	E_{AS}	860		mJ
Repetitive Avalanche Energy (Note 1)	E_{AR}	19.5		mJ
Peak Diode Recovery dv/dt (Note 3)	dv/dt	4.5		V/ns
Drain Power Dissipation	Tc=25	208	49.8	W
	Derate above 25	1.66	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}	0.6	2.51	/W
Thermal Resistance, Junction-to-Ambient	R_{thJA}	62.5	62.5	/W

* : Drain current limited by maximum junction temperature.

EQUIVALENT CIRCUIT



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ELECTRICAL CHARACTERISTICS (T_c=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	BV _{DSS} / T _j	I _D =250 μA, Referenced to 25	-	0.63	-	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	2.5	-	4.5	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 =6.5A	-	0.35	0.44	Ω
Dynamic						
Total Gate Charge	Q _g	V _{DS} =400V, I _D =13A V _{GS} =10V (Note4,5)	-	35	-	nC
Gate-Source Charge	Q _{gs}		-	9	-	
Gate-Drain Charge	Q _{gd}		-	13	-	
Turn-on Delay time	t _{d(on)}	V _{DD} =250V I _D =13A R _G =25 (Note4,5)	-	28	-	ns
Turn-on Rise time	t _r		-	45	-	
Turn-off Delay time	t _{d(off)}		-	105	-	
Turn-off Fall time	t _f		-	55	-	
Input Capacitance	C _{iss}	V _{DS} =25V, V _{GS} =0V, f=1.0MHz	-	1700	-	pF
Output Capacitance	C _{oss}		-	210	-	
Reverse Transfer Capacitance	C _{rss}		-	15	-	
Source-Drain Diode Ratings						
Continuous Source Current	I _S	V _{GS} <V _{th}	-	-	13	A
Pulsed Source Current	I _{SP}		-	-	52	
Diode Forward Voltage	V _{SD}	I _S =13A, V _{GS} =0V	-	-	1.4	V
Reverse Recovery Time	t _{rr}	I _S =13A, V _{GS} =0V, dI _S /dt=100A/μs	-	360	-	ns
Reverse Recovery Charge	Q _{rr}		-	4.4	-	μC

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

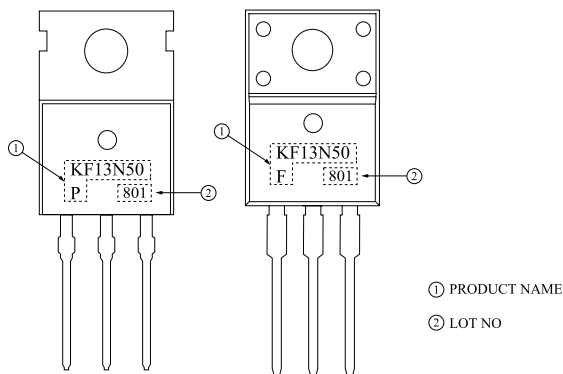
Note 2) L=6.0mH, I_S=13A, V_{DD}=50V, R_G=25 Ω, Starting T_j=25 °C.

Note 3) I_S 13A, dI/dt 200A/μs, V_{DD} BV_{DSS}, Starting T_j=25 °C.

Note 4) Pulse Test : Pulse width 300 μs, Duty Cycle 2%.

Note 5) Essentially independent of operating temperature.

Marking



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Fig1. $I_D - V_{DS}$

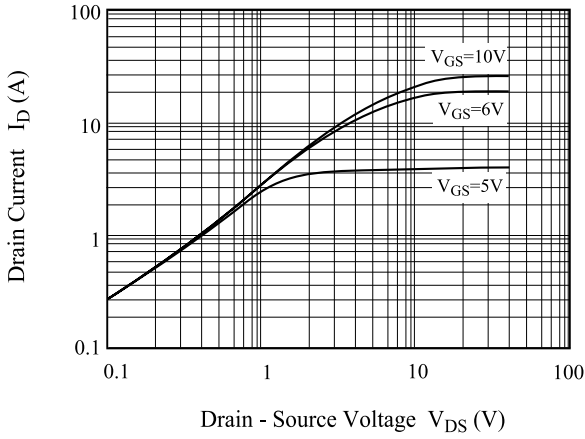


Fig2. $I_D - V_{GS}$

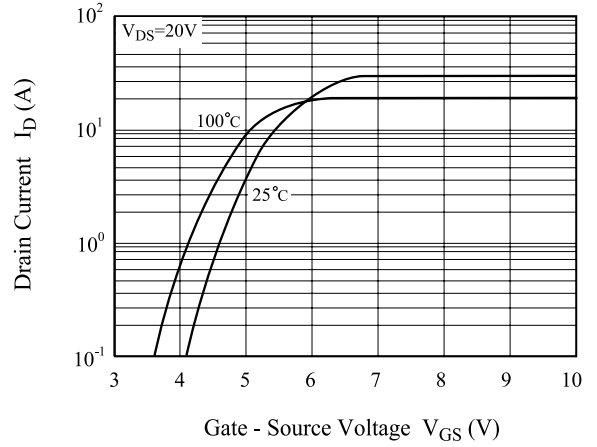


Fig3. $BV_{DSS} - T_j$

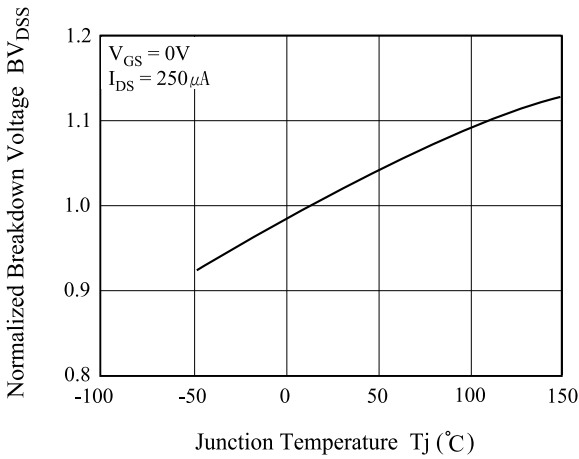


Fig4. $R_{DS(ON)} - I_D$

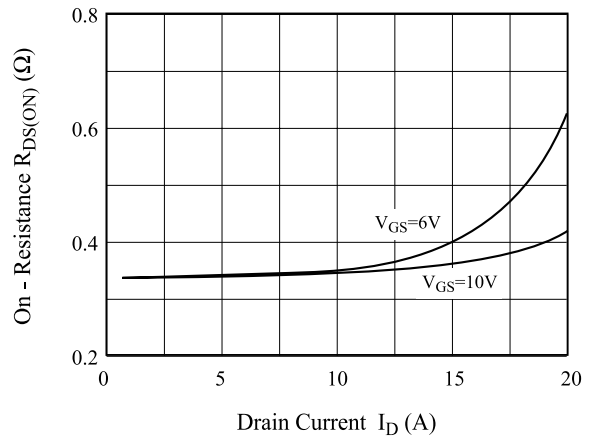


Fig5. $I_S - V_{SD}$

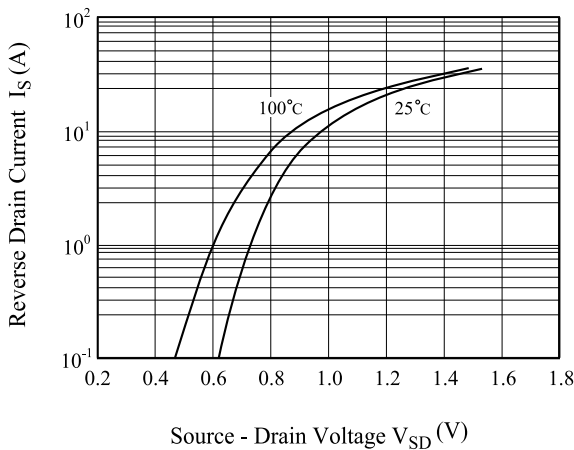
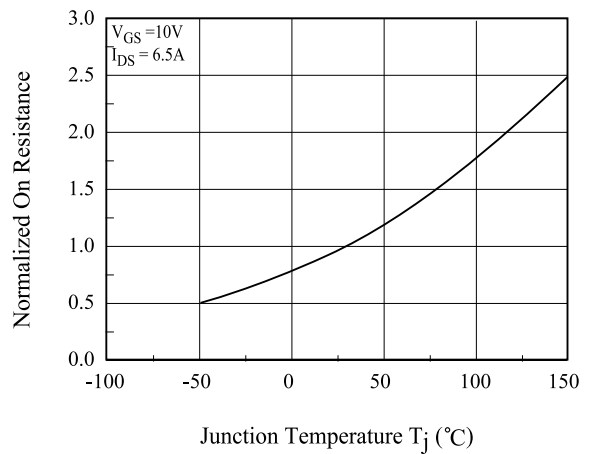


Fig6. $R_{DS(ON)} - T_j$



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Fig 7. C - V_{DS}

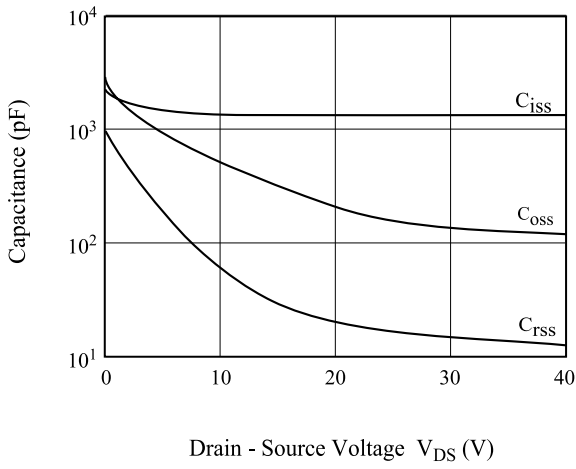


Fig8. Q_g- V_{GS}

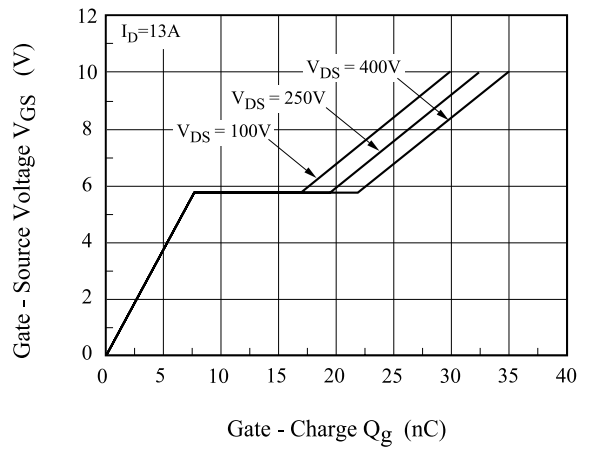


Fig9. Safe Operation Area

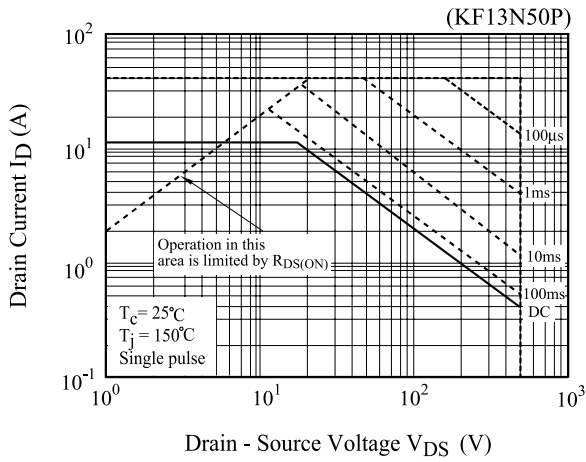


Fig10. Safe Operation Area

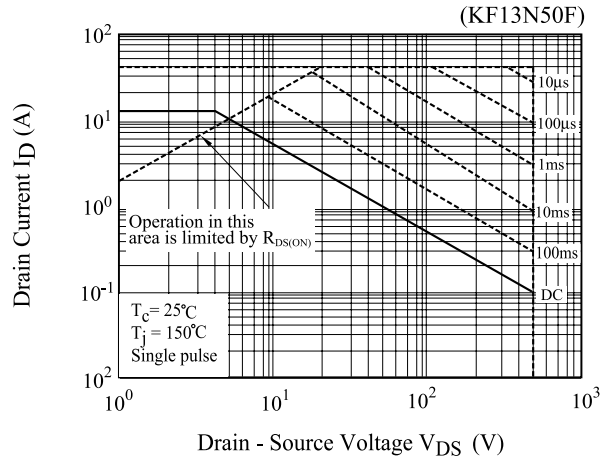
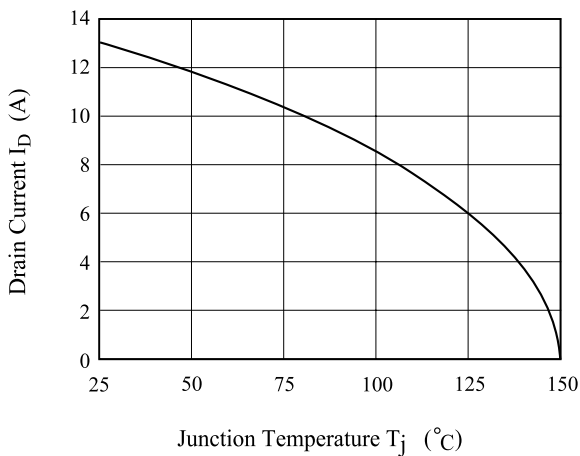


Fig11. I_D - T_j



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Fig12. Transient Thermal Response Curve

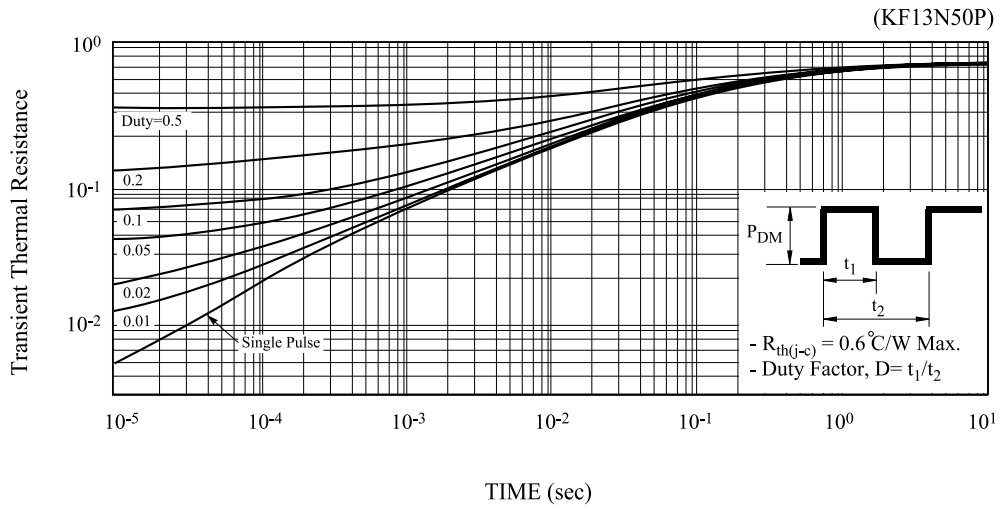


Fig13. Transient Thermal Response Curve

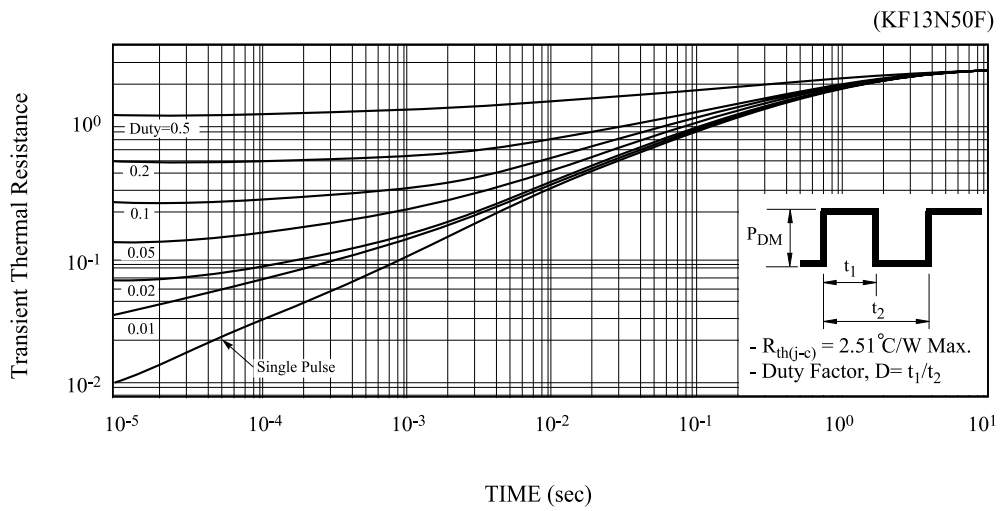


Fig14. Gate Charge

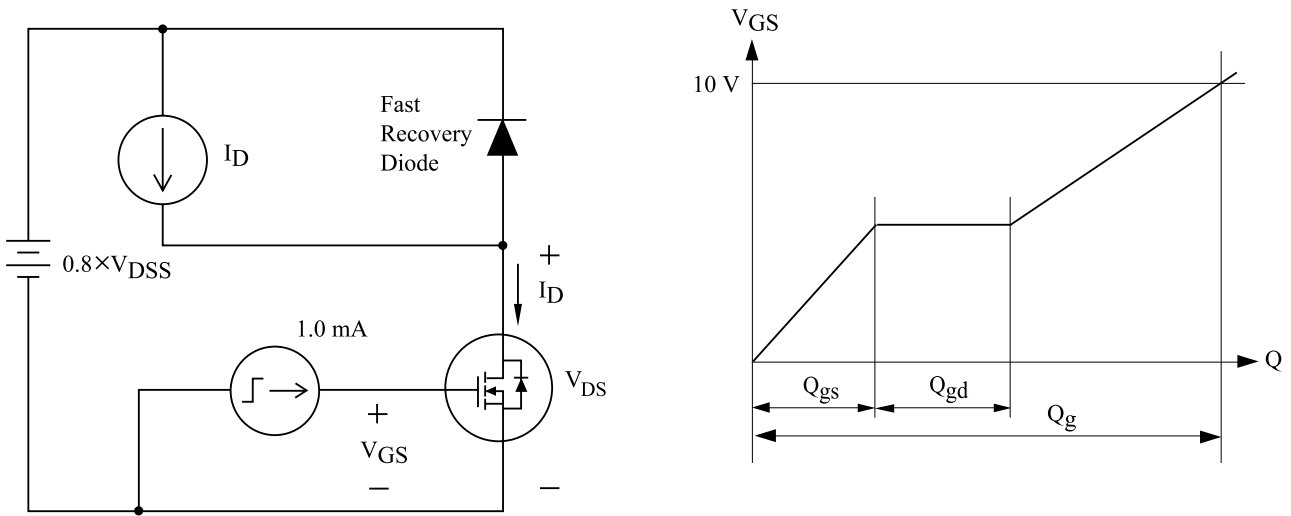


Fig15. Single Pulsed Avalanche Energy

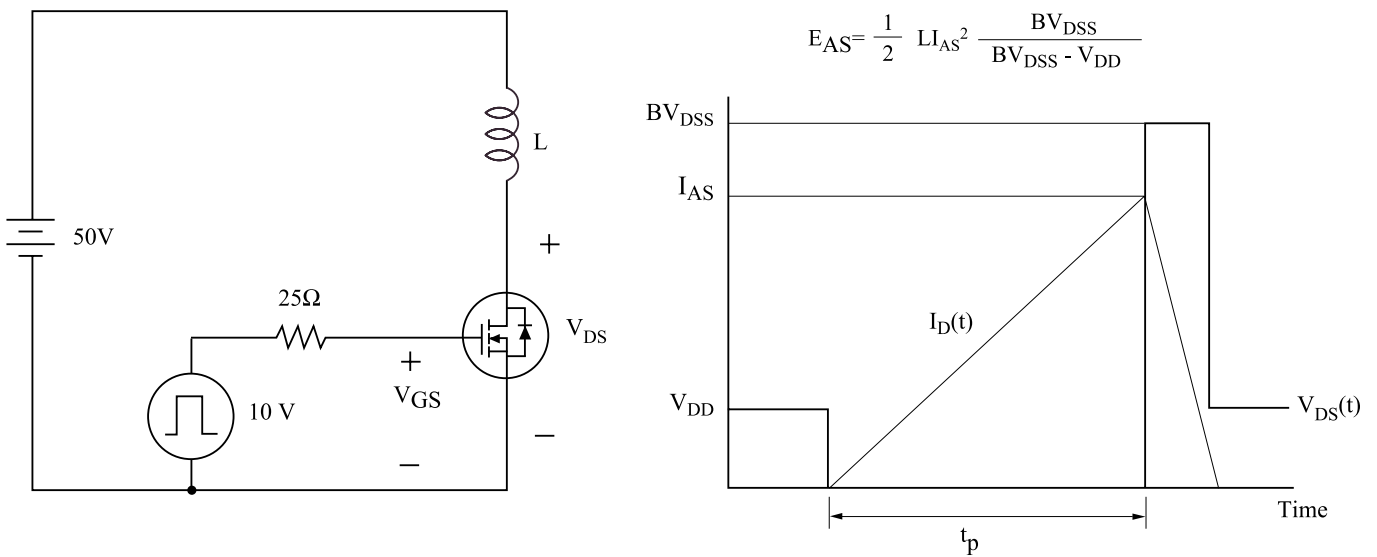


Fig16. Resistive Load Switching

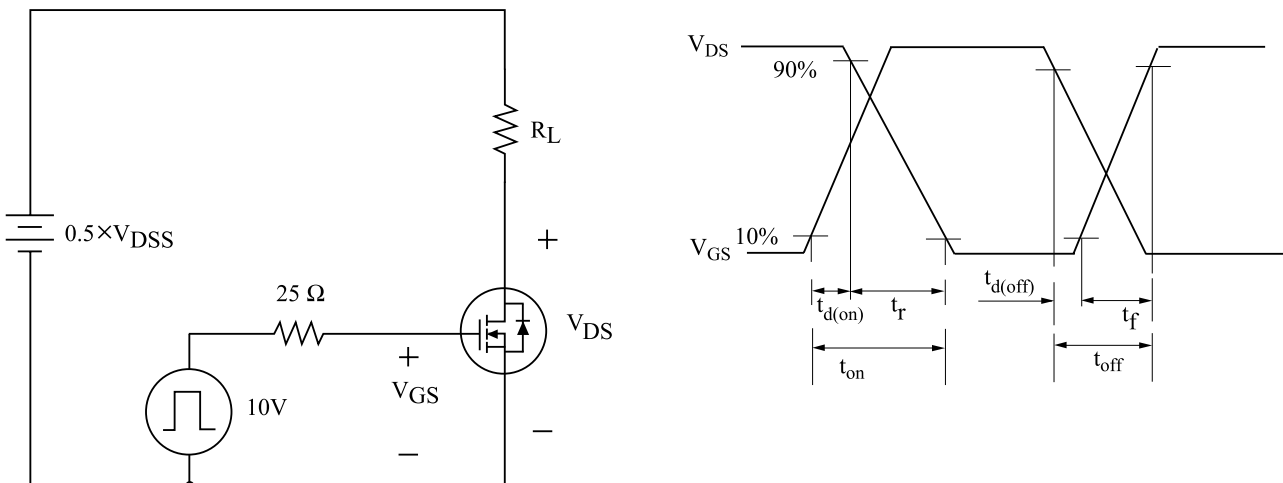


Fig17. Source - Drain Diode Reverse Recovery and dv/dt

