

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

- $V_{DS} = 500V$, $I_D = 5.0A$
- Drain-Source ON Resistance : $R_{DS(ON)} = 1.4\Omega$ @ $V_{GS} = 10V$
- $Q_g(\text{typ}) = 12nC$

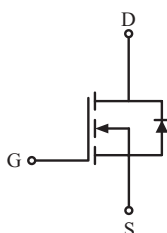
MAXIMUM RATING (Tc=25°C)

CHARACTERISTIC		SYMBOL	RATING		UNIT
			KF5N50P KF5N50PZ	KF5N50F KF5N50FZ	
Drain-Source Voltage		V _{DSS}	500		V
Gate-Source Voltage		V _{GSS}	±30		V
Drain Current	@T _C =25°C	I _D	5.0	5.0*	A
	@T _C =100°C		2.9	2.9*	
	Pulsed (Note1)	I _{DP}	13	13*	
Single Pulsed Avalanche Energy (Note 2)		E _{AS}	270		mJ
Repetitive Avalanche Energy (Note 1)		E _{AR}	8.6		mJ
Peak Diode Recovery dv/dt (Note 3)		dv/dt	4.5		V/ns
Drain Power Dissipation	T _C =25°C	P _D	83	41.5	W
	Derate above 25°C		0.66	0.33	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}	1.5	3.0	°C/W
Thermal Resistance, Junction-to-Ambient		R _{thJA}	62.5	62.5	°C/W

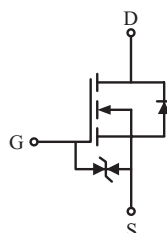
* : Drain current limited by maximum junction temperature.

PIN CONNECTION

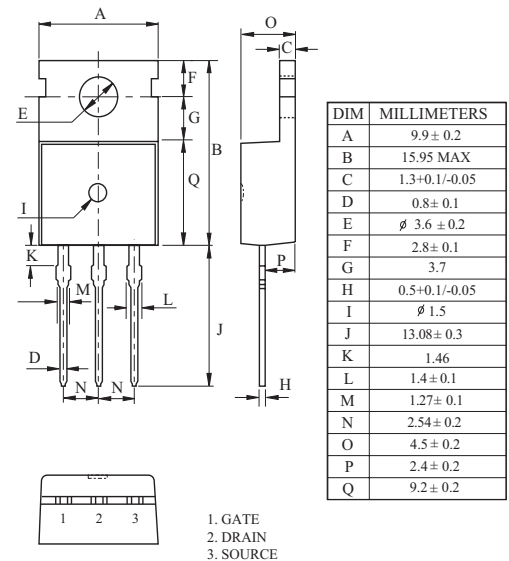
(KF5N50P, KF5N50F)



(KF5N50PZ, KF5N50FZ)

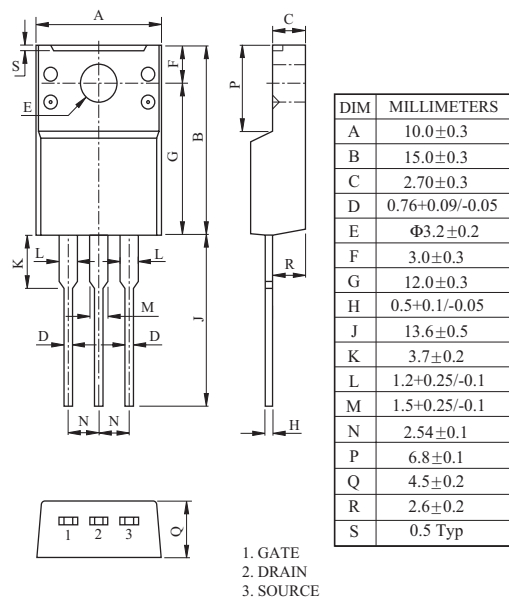


KF5N50P, KF5N50PZ



TO-220AB

KF5N50F, KF5N50FZ



TO-220IS

KF5N50P/F/PZ/FZ

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		500	-	-	V
Breakdown Voltage Temperature Coefficient	Δ BV _{DSS} / Δ T _j	I _D =250μA, Referenced to 25°C		-	0.55	-	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 =250μA		2.0	-	4.0	V
Gate Leakage Current	I _{GSS}	KF5N50P/F	V _{GS} =±30V, V _{DS} =0V	-	-	±100	nA
		KF5N50PZ/FZ	V _{GS} =±25V, V _{DS} =0V	-	-	±10	μA
Drain-Source ON Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =2.5A		-	1.15	1.4	Ω
Dynamic							
Total Gate Charge	Q _g	V _{DS} =400V, I _D =5A V _{GS} =10V (Note4,5)		-	12	-	nC
Gate-Source Charge	Q _{gs}			-	2.4	-	
Gate-Drain Charge	Q _{gd}			-	5.4	-	
Turn-on Delay time	t _{d(on)}	V _{DD} =250V R _L =50Ω R _G =25Ω (Note4,5)		-	22.5	-	ns
Turn-on Rise time	t _r			-	29	-	
Turn-off Delay time	t _{d(off)}			-	58	-	
Turn-off Fall time	t _f			-	18	-	
Input Capacitance	C _{iss}	V _{DS} =25V, V _{GS} =0V, f=1.0MHz		-	430	-	pF
Output Capacitance	C _{oss}			-	71	-	
Reverse Transfer Capacitance	C _{rss}			-	7.5	-	
Source-Drain Diode Ratings							
Continuous Source Current	I _S	V _{GS} <V _{th}		-	-	5	A
Pulsed Source Current	I _{SP}			-	-	20	
Diode Forward Voltage	V _{SD}	I _S =5A, V _{GS} =0V		-	-	1.4	V
Reverse Recovery Time	t _{rr}	I _S =5A, V _{GS} =0V,		-	150	-	ns
Reverse Recovery Charge	Q _{rr}	dIs/dt=100A/μs		-	0.42	-	μC

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

Note 2) $L=19.5mH$, $I_S=5A$, $V_{DD}=50V$, $R_G=25\Omega$, Starting $T_j=25^\circ C$.

Note 3) $I_S \leq 5A$, $dI/dt \leq 100A/\mu s$, $V_{DD} \leq BV_{DSS}$, 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.

Marking

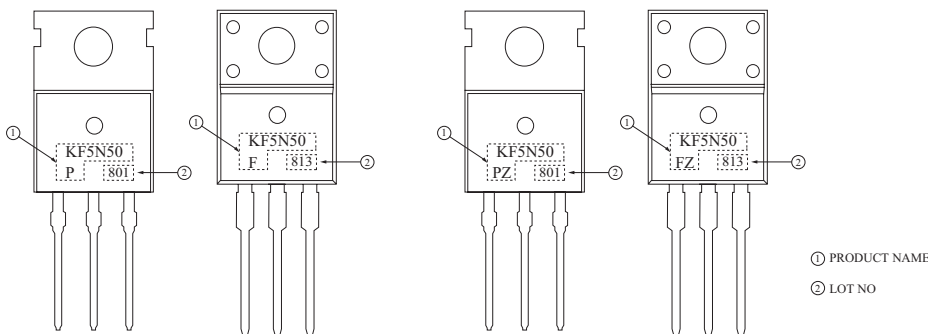


Fig1. $I_D - V_{DS}$

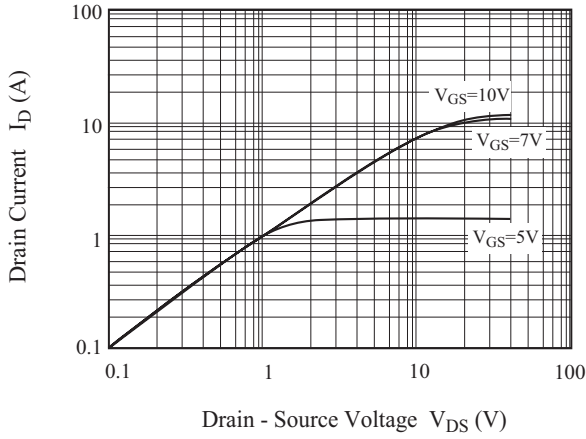


Fig2. $I_D - V_{GS}$

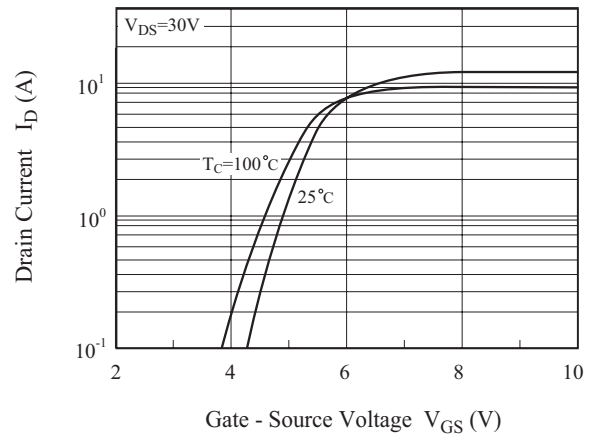


Fig3. $BV_{DSS} - T_j$

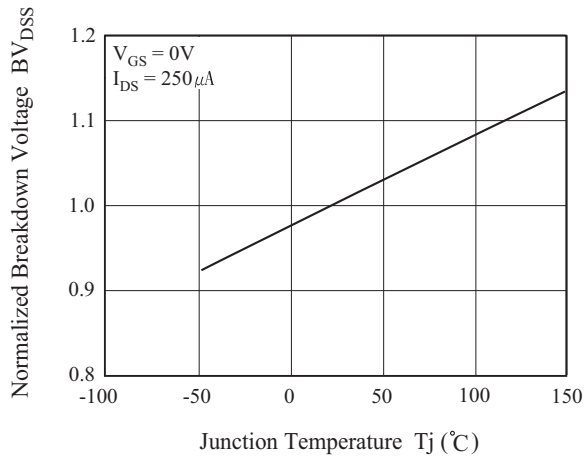


Fig4. $R_{DS(ON)} - I_D$

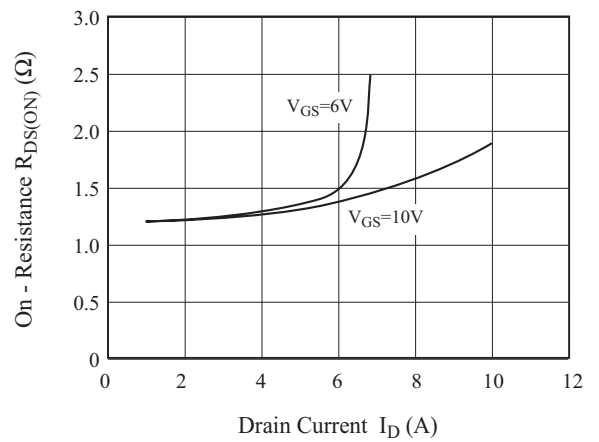


Fig5. $I_S - V_{SD}$

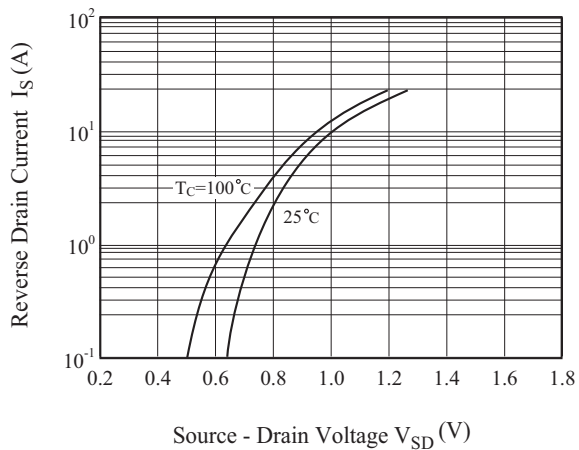


Fig6. $R_{DS(ON)} - T_j$

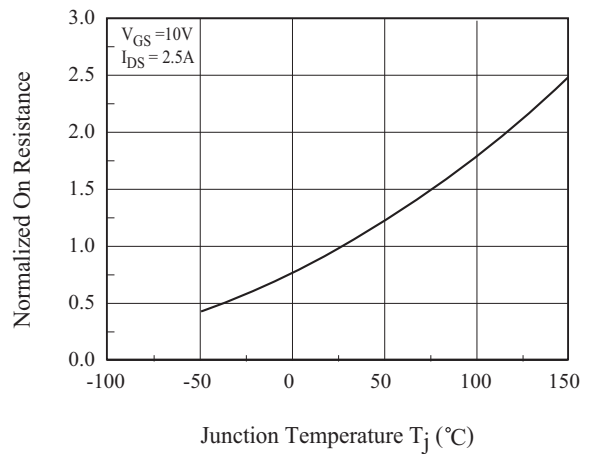


Fig 7. C - V_{DS}

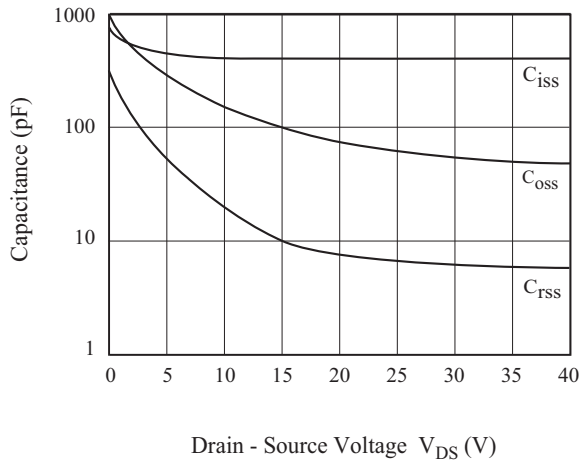


Fig8. Q_g - V_{GS}

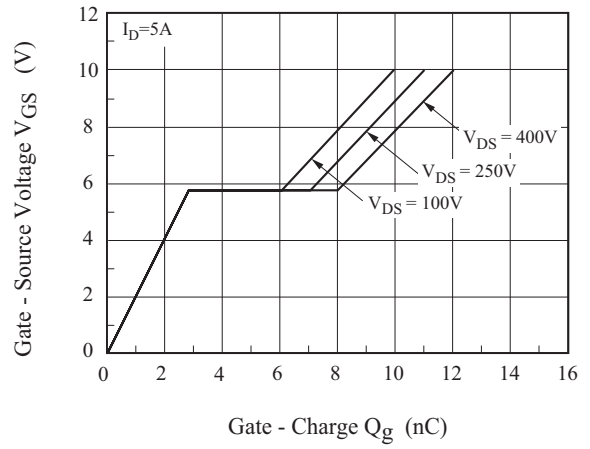


Fig9. Safe Operation Area

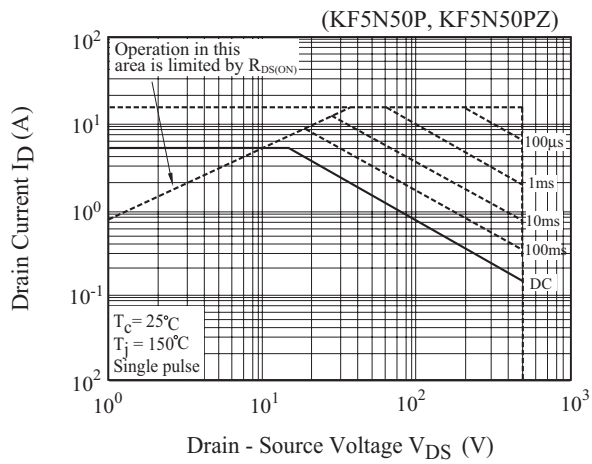


Fig10. Safe Operation Area

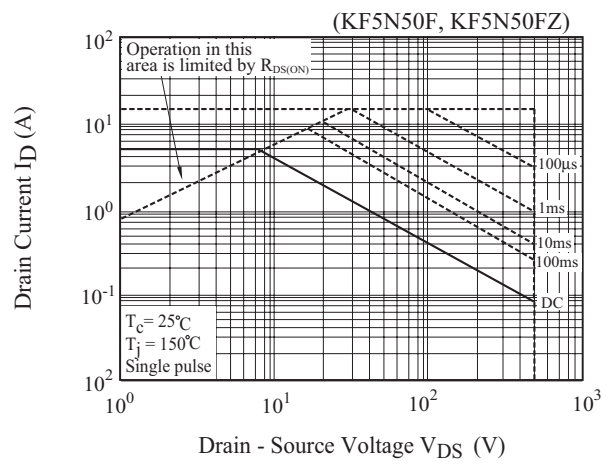
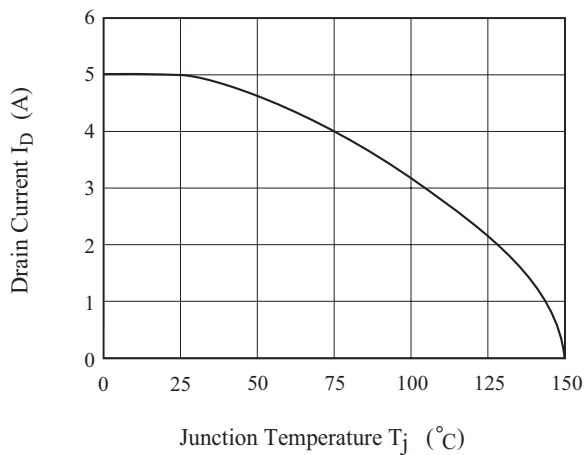


Fig11. I_D - T_j



KF5N50P/F/PZ/FZ

Fig12. Transient Thermal Response Curve

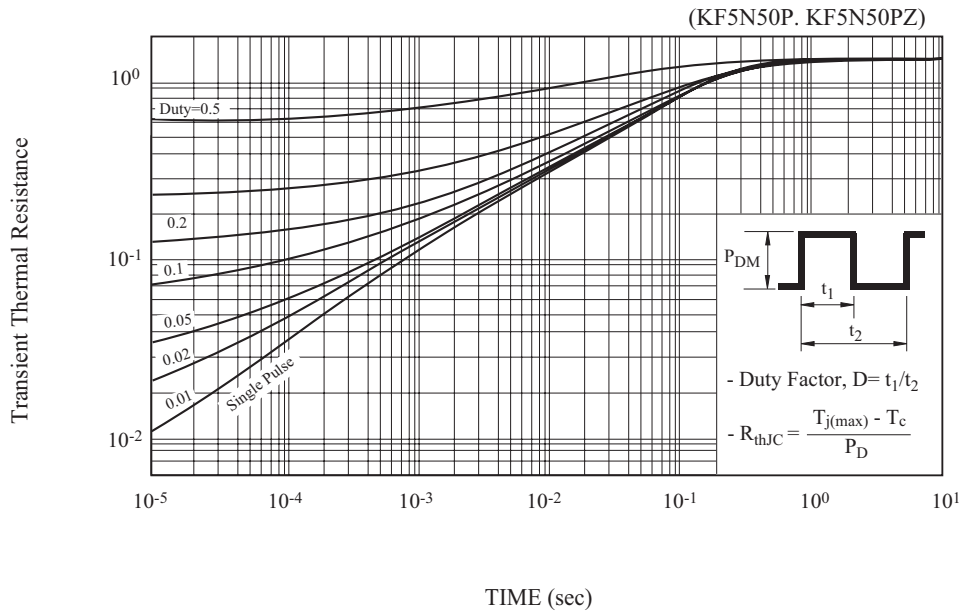


Fig13. Transient Thermal Response Curve

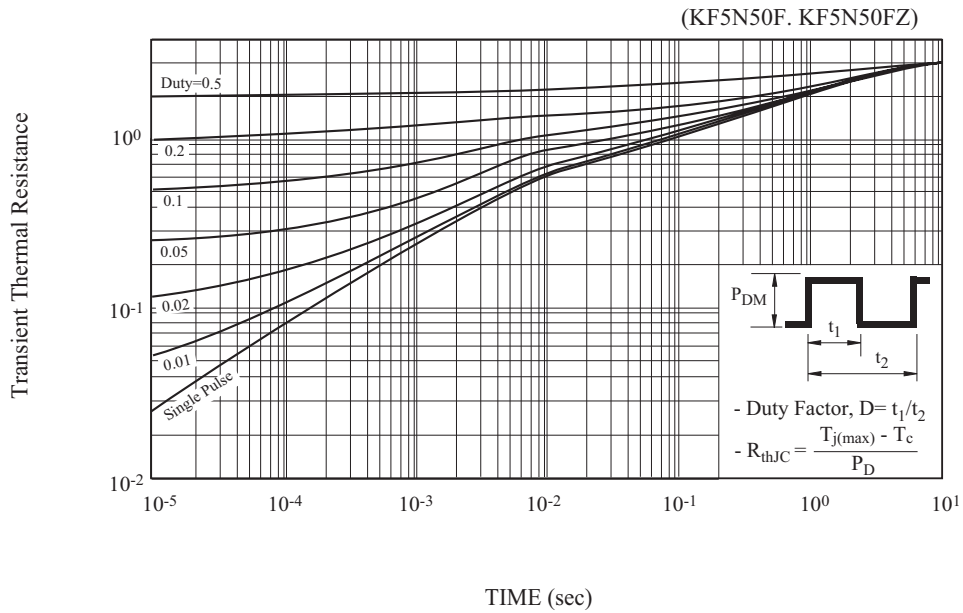


Fig14. Gate Charge

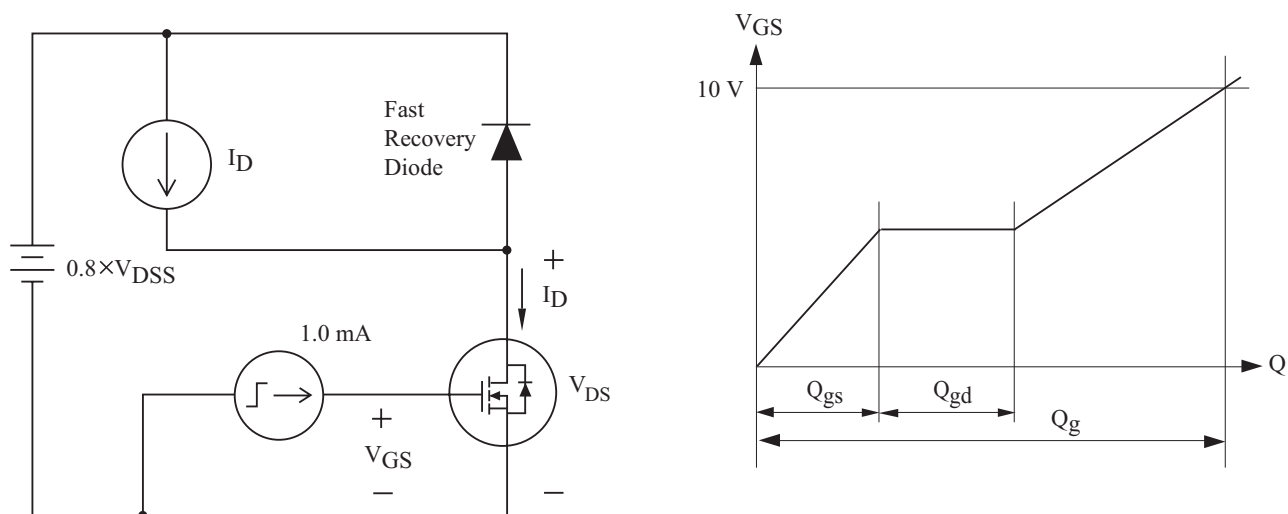


Fig15. Single Pulsed Avalanche Energy

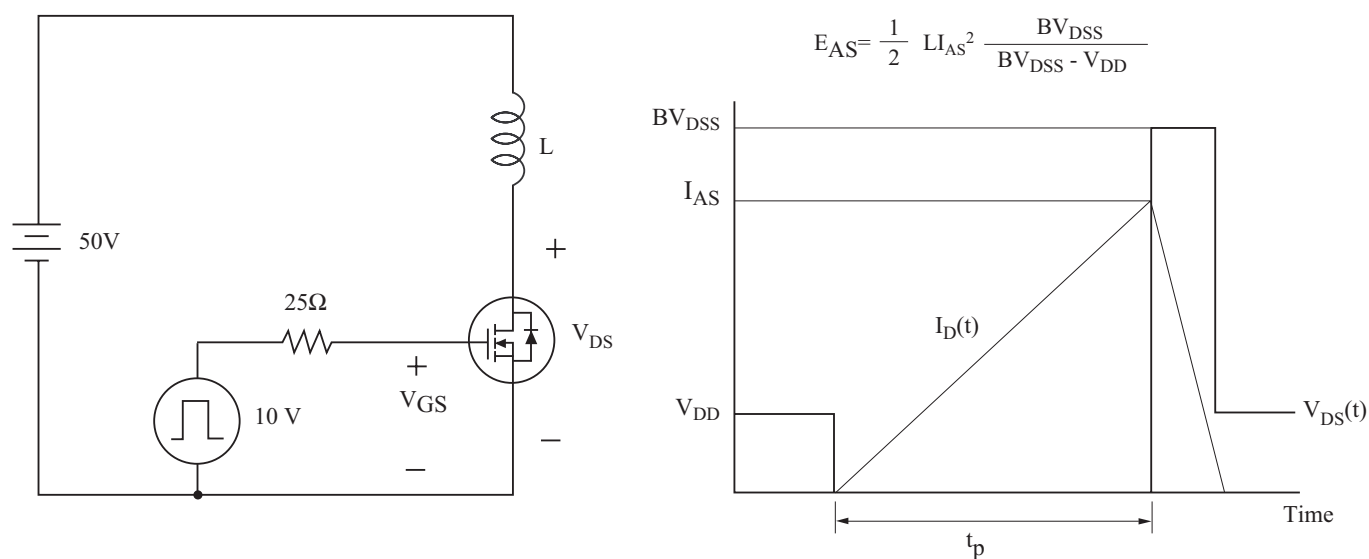


Fig16. Resistive Load Switching

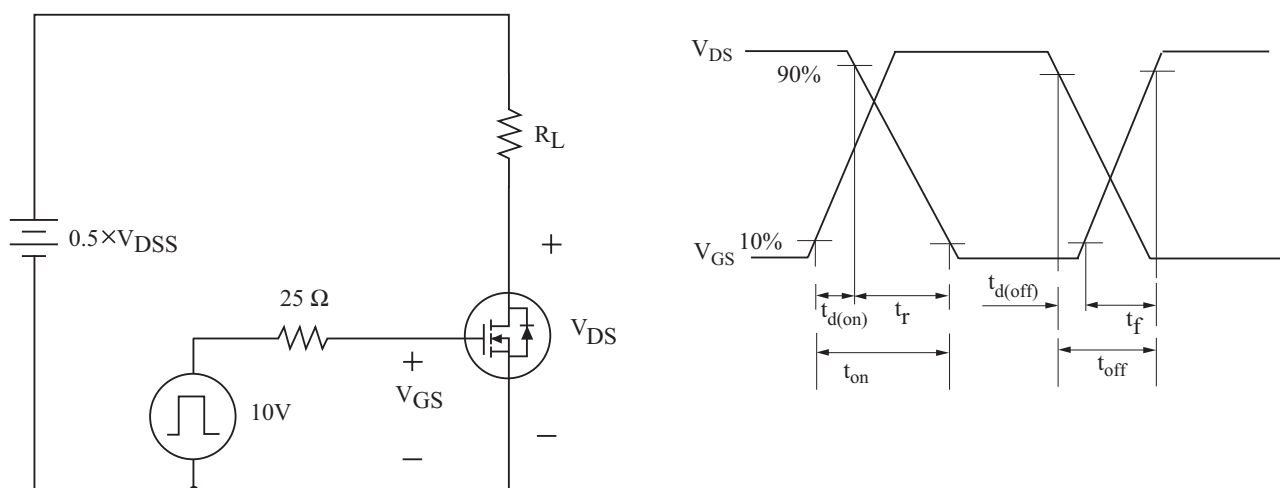


Fig17. Source - Drain Diode Reverse Recovery and dv/dt

