

General Description

This planar stripe MOSFET has better characteristics, such as fast switching time, fast reverse recovery time, low on resistance, low gate charge and excellent avalanche characteristics. It is mainly suitable for electronic ballast and switching mode power supplies.

FEATURES

- $V_{DSS} = 500V$, $I_D = 5.0A$
- Drain-Source ON Resistance : $R_{DS(ON)} = 1.4$ @ $V_{GS} = 10V$
- $Q_g(\text{typ}) = 12nC$
- $t_{rr(\text{typ})} = 150ns$

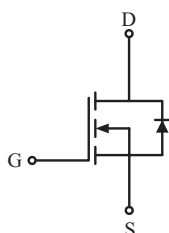
MAXIMUM RATING (Tc=25)

CHARACTERISTIC	SYMBOL	RATING		UNIT	
		KF5N50PR KF5N50PS	KF5N50FR KF5N50FS		
Drain-Source Voltage	V_{DSS}	500		V	
Gate-Source Voltage	V_{GSS}	± 30		V	
Drain Current	@T _C =25	I_D	5.0	5.0*	A
	@T _C =100		2.9	2.9*	
	Pulsed (Note1)		I_{DP}	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	20		V/ns	
Drain Power Dissipation	Tc=25	P_D	83	41.5	W
	Derate above 25		0.66	0.33	W/
Maximum Junction Temperature	T_j	150			
Storage Temperature Range	T_{stg}	-55 150			
Thermal Characteristics					
Thermal Resistance, Junction-to-Case	R_{thJC}	1.5	3.0	/W	
Thermal Resistance, Junction-to-Ambient	R_{thJA}	62.5	62.5	/W	

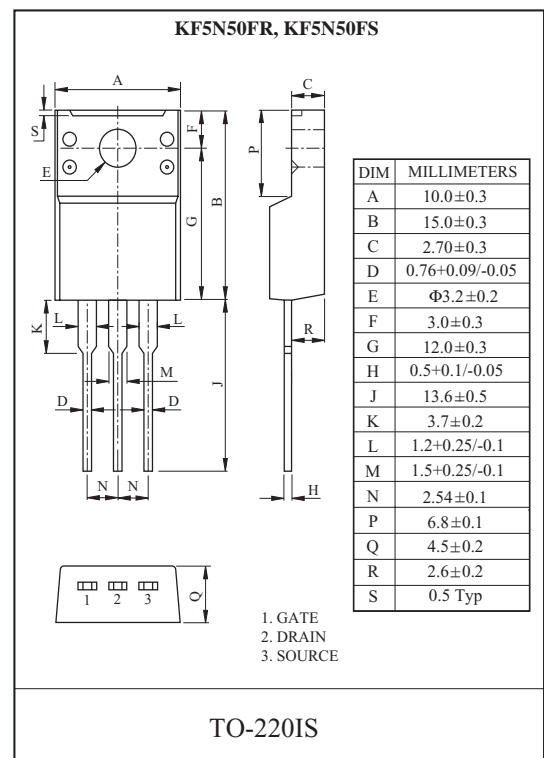
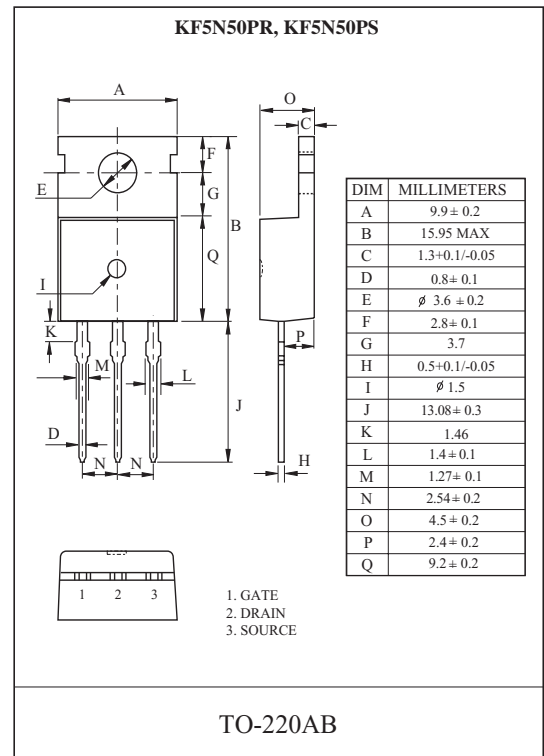
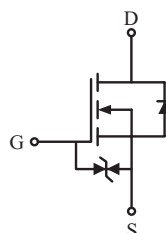
* : Drain current limited by maximum junction temperature.

PIN CONNECTION

(KF5N50PR, KF5N50FR)



(KF5N50PS, KF5N50FS)



KF5N50PR/FR/PS/FS

ELECTRICAL CHARACTERISTICS (Tc=25)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Static						
Drain-Source Breakdown Voltage	BV_{DSS}	$I_D=250\mu A, V_{GS}=0V$	500	-	-	V
Breakdown Voltage Temperature Coefficient	BV_{DSS}/T_j	$I_D=250\mu A$, Referenced to 25	-	0.55	-	V/
Drain Cut-off Current	I_{DSS}	$V_{DS}=500V, V_{GS}=0V$,	-	-	10	μA
Gate Threshold Voltage	V_{th}	$V_{DS}=V_{GS}, I_D=250\mu A$	2.0	-	4.0	V
Gate Leakage Current	I_{GSS}	KF5N50PR/FR $V_{GS}=\pm 30V, V_{DS}=0V$	-	-	± 100	nA
		KF5N50PS/FS $V_{GS}=\pm 25V, V_{DS}=0V$	-	-	± 10	μA
Drain-Source ON Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=2.5A$	-	1.15	1.4	
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	$t_{d(on)}$	$V_{DD}=250V$ $R_L=50$ $R_G=25$ (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}	$I_S=5A, V_{GS}=0V$, $dI_S/dt=100A/\mu s$	-	150	-	ns
Reverse Recovery Charge	Q_{rr}		-	0.42	-	μC

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

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

Note 3) $I_S=5A, dI/dt=100A/\mu s, V_{DD}=BV_{DSS}$, Starting $T_j=25$.

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

Note 5) Essentially independent of operating temperature.

Marking

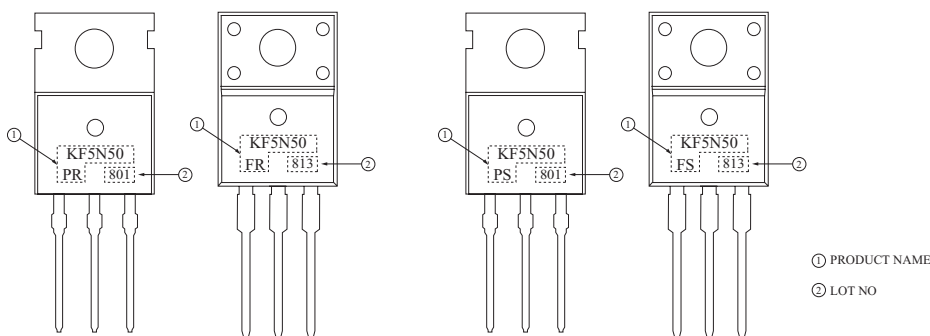


Fig1. $I_D - V_{DS}$

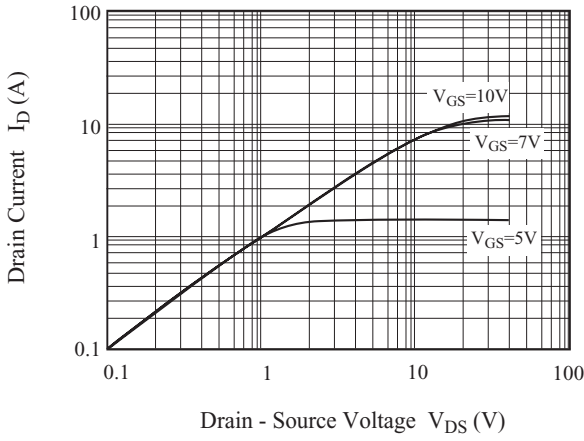


Fig2. $I_D - V_{GS}$

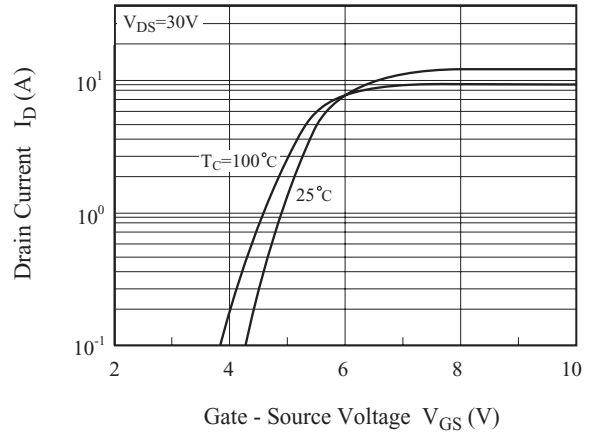


Fig3. $BV_{DSS} - T_j$

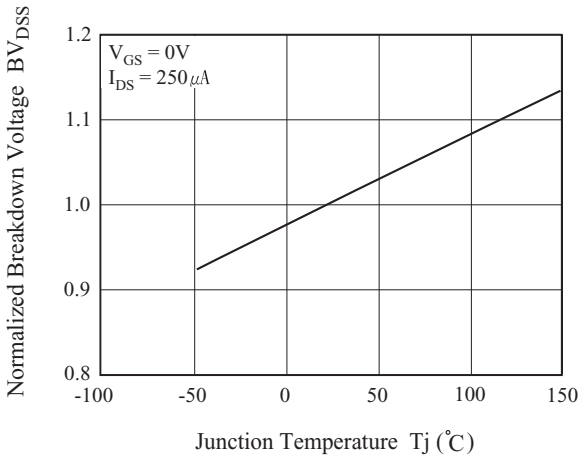


Fig4. $R_{DS(ON)} - I_D$

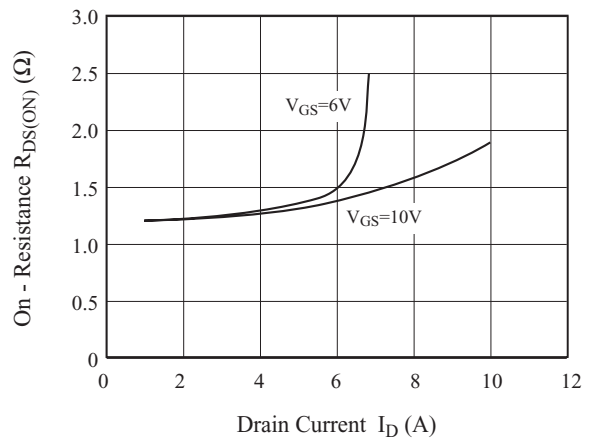


Fig5. $I_S - V_{SD}$

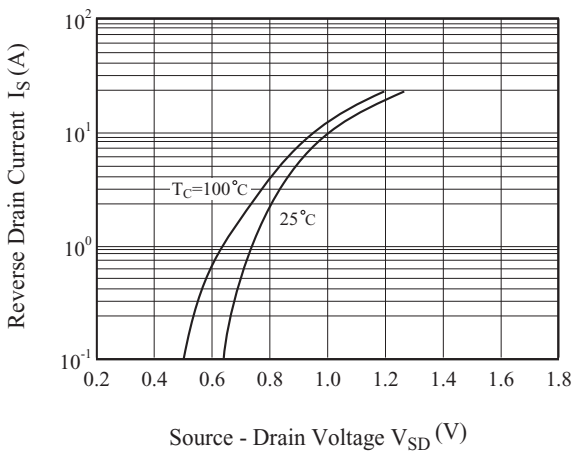
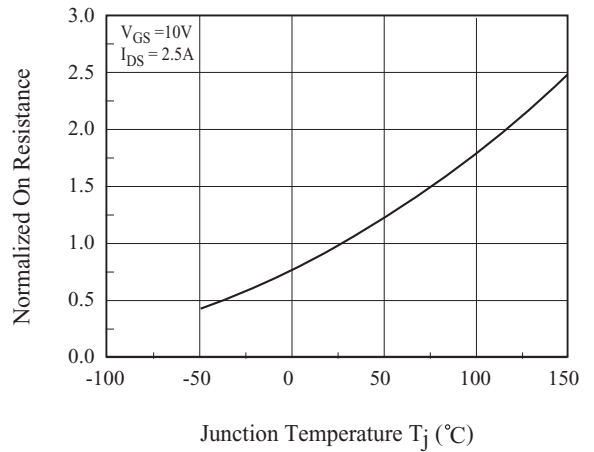


Fig6. $R_{DS(ON)} - T_j$



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Fig 7. C - V_{DS}

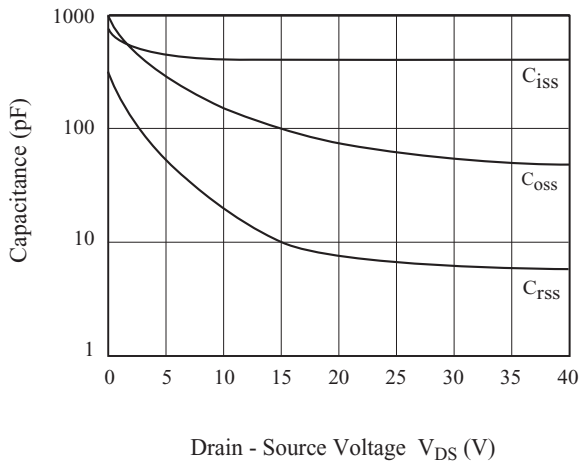


Fig8. Q_g- V_{GS}

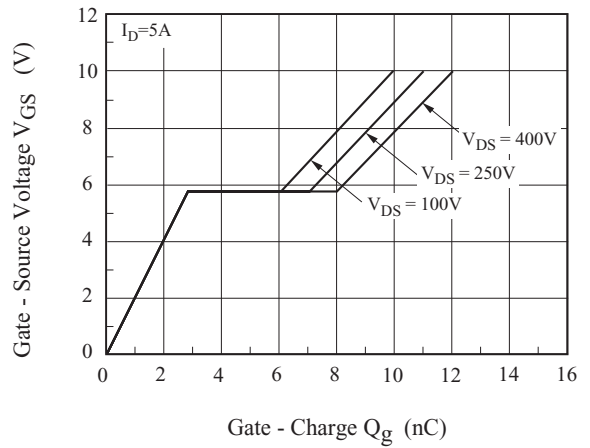


Fig9. Safe Operation Area

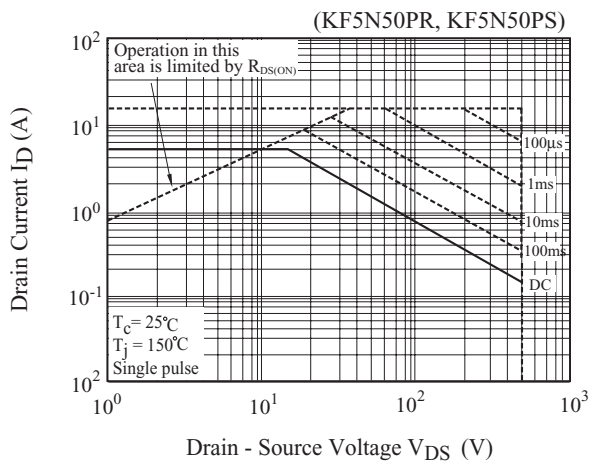


Fig10. Safe Operation Area

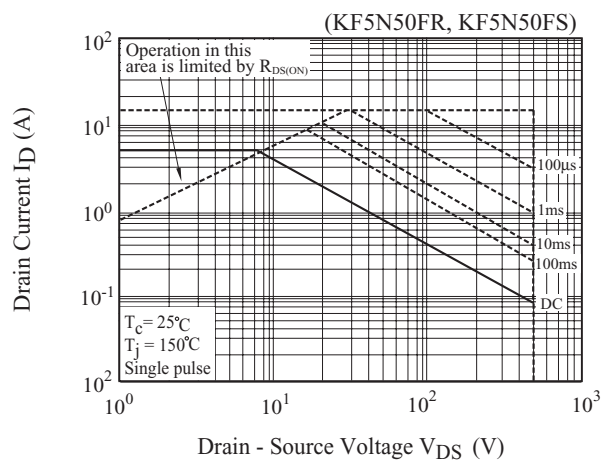
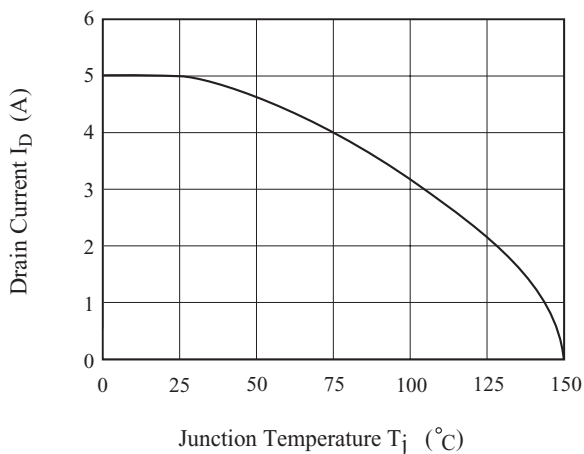


Fig11. I_D - T_j



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Fig12. Transient Thermal Response Curve

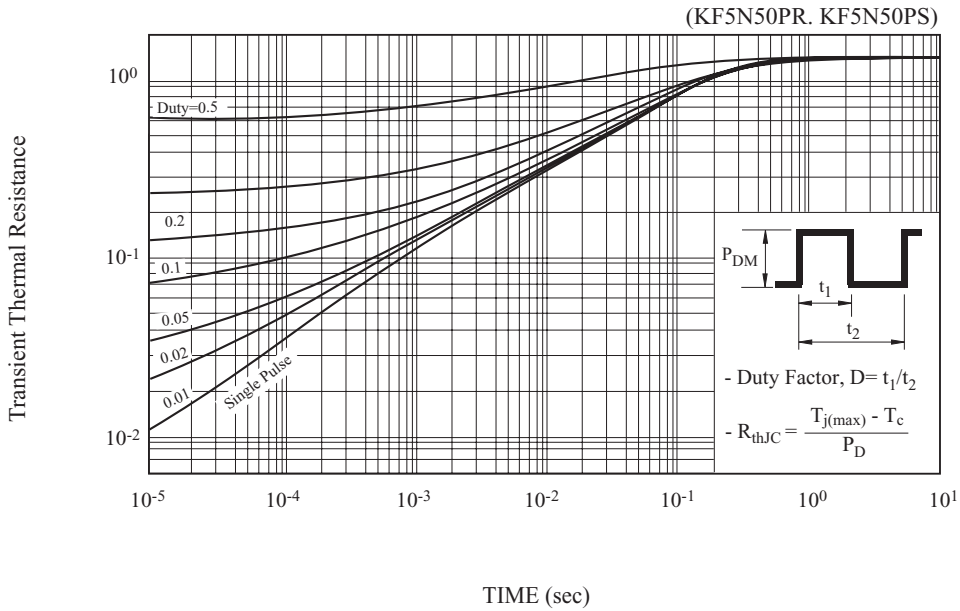


Fig13. Transient Thermal Response Curve

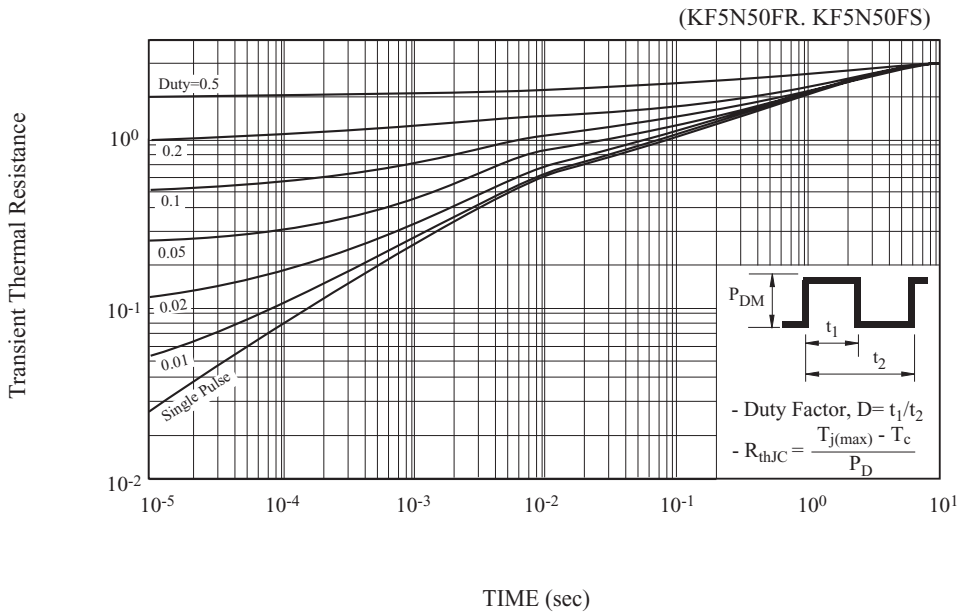


Fig14. Gate Charge

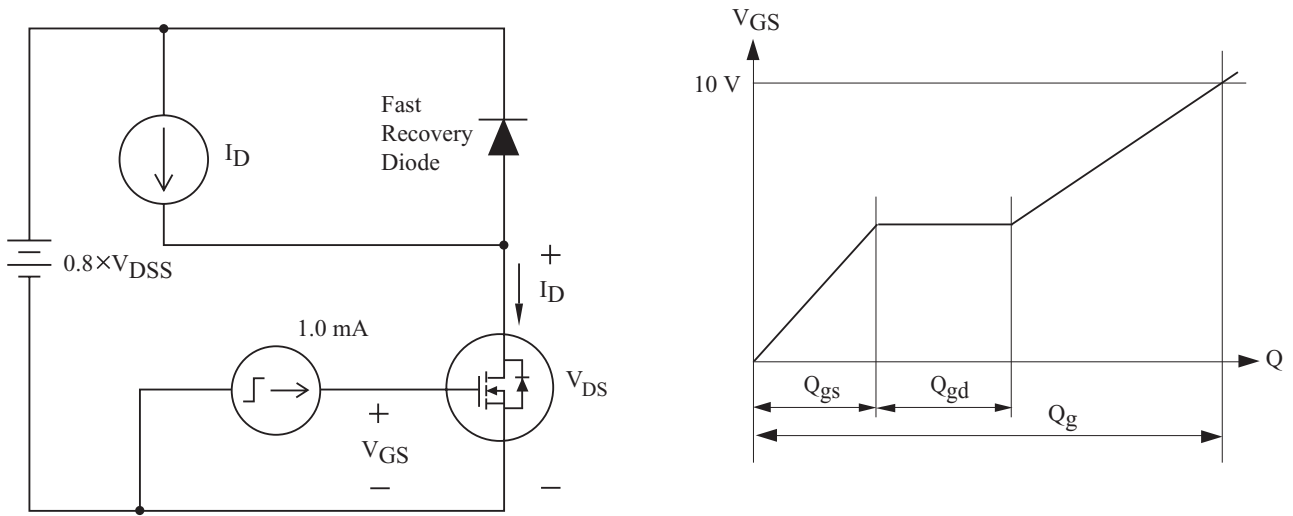


Fig15. Single Pulsed Avalanche Energy

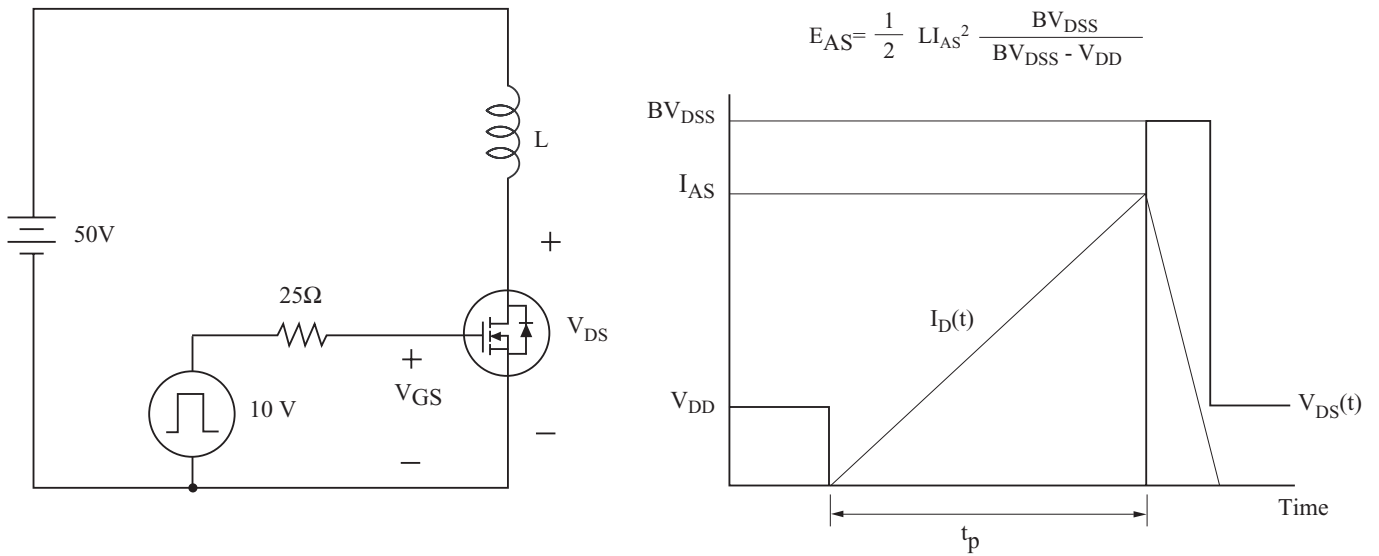


Fig16. Resistive Load Switching

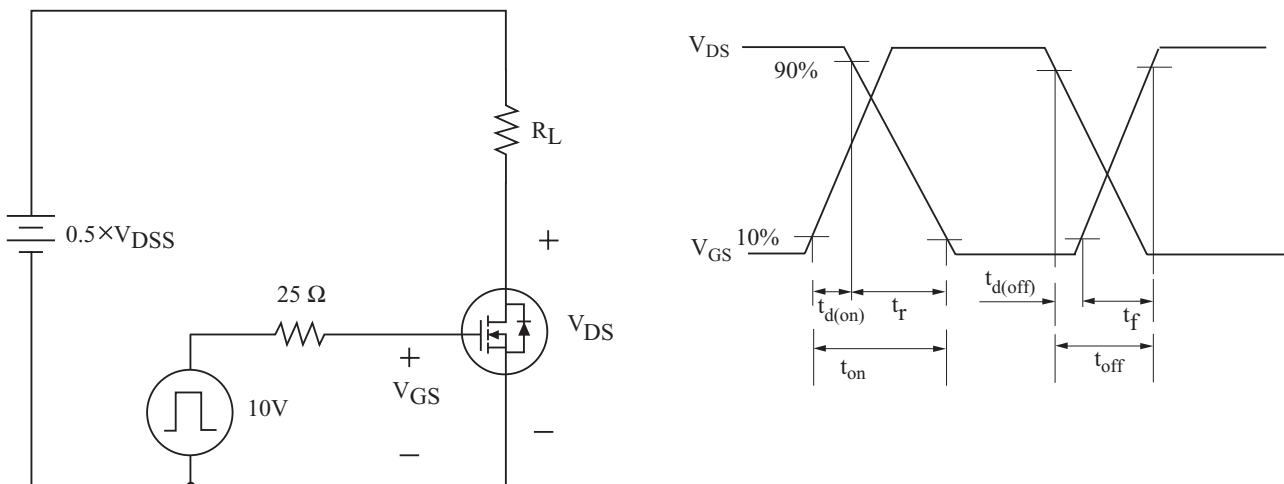


Fig17. Source - Drain Diode Reverse Recovery and dv/dt

