

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

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

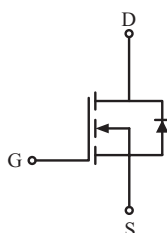
MAXIMUM RATING (Tc=25)

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	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

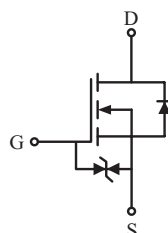
* : Drain current limited by maximum junction temperature.

PIN CONNECTION

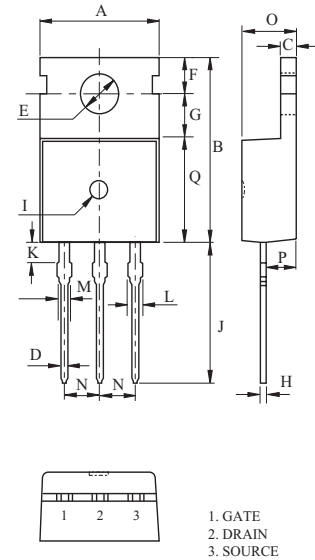
(KF5N50PR, KF5N50FR)



(KF5N50PS, KF5N50FS)



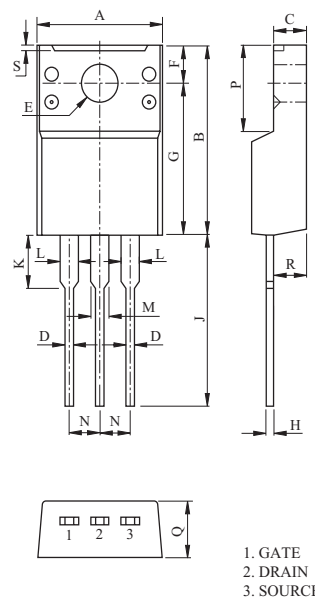
KF5N50PR, KF5N50PS



DIM	MILLIMETERS
A	9.9 ± 0.2
B	15.95 MAX
C	1.3+0.1/-0.05
D	0.8 ± 0.1
E	∅ 3.6 ± 0.2
F	2.8 ± 0.1
G	3.7
H	0.5+0.1/-0.05
I	∅ 1.5
J	13.08 ± 0.3
K	1.46
L	1.4 ± 0.1
M	1.27 ± 0.1
N	2.54 ± 0.2
O	4.5 ± 0.2
P	2.4 ± 0.2
Q	9.2 ± 0.2

TO-220AB

KF5N50FR, KF5N50FS



DIM	MILLIMETERS
A	10.0 ± 0.3
B	15.0 ± 0.3
C	2.70 ± 0.3
D	0.76+0.09/-0.05
E	∅ 3.2 ± 0.2
F	3.0 ± 0.3
G	12.0 ± 0.3
H	0.5+0.1/-0.05
J	13.6 ± 0.5
K	3.7 ± 0.2
L	1.2+0.25/-0.1
M	1.5+0.25/-0.1
N	2.54 ± 0.1
P	6.8 ± 0.1
Q	4.5 ± 0.2
R	2.6 ± 0.2
S	0.5 Typ

TO-220IS

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	$\Delta BV_{DSS}/\Delta T_j$	$I_D=250\mu A$, 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	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	$t_{d(on)}$	$V_{DD}=250V$ $R_L=50\Omega$ $R_G=25\Omega$ (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}	$dI_s/dt=100A/\mu s$		-	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 $T_j=25$.

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

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

Note 5) Essentially independent of operating temperature.

Marking

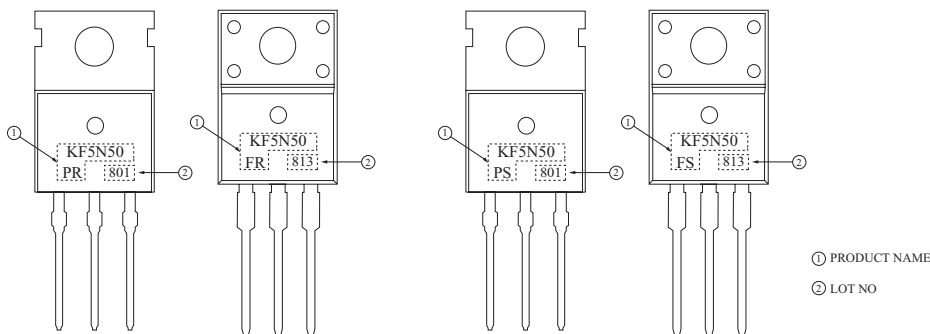


Fig1. $I_D - V_{DS}$

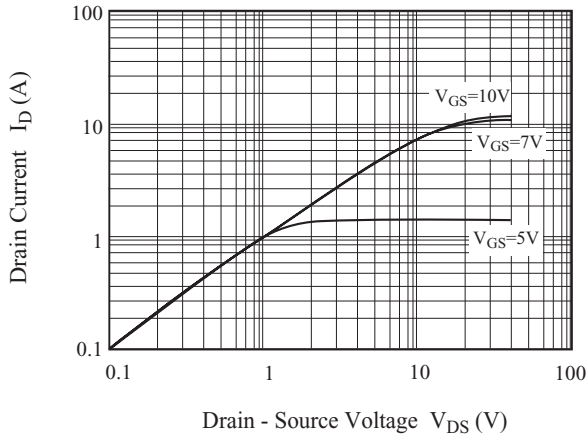


Fig2. $I_D - V_{GS}$

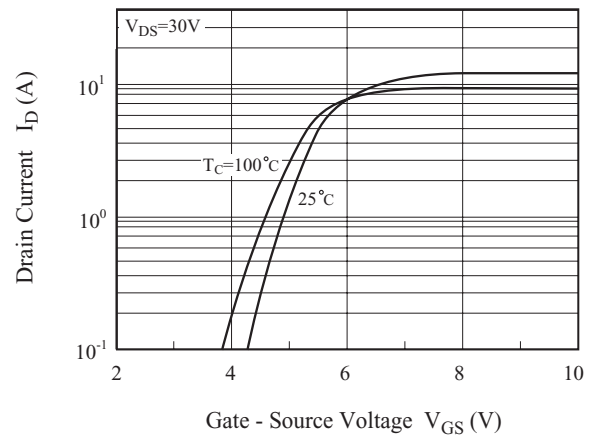


Fig3. $BV_{DSS} - T_j$

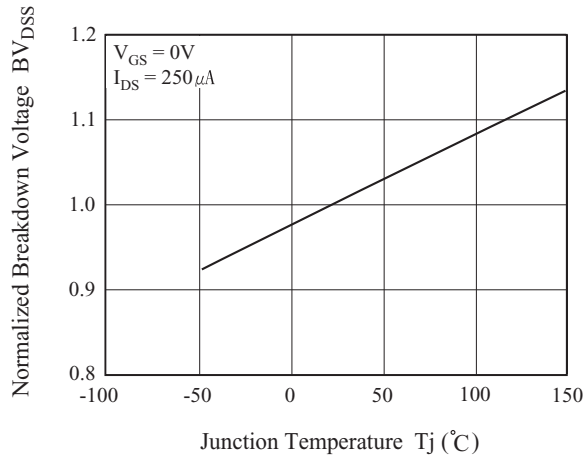


Fig4. $R_{DS(ON)} - I_D$

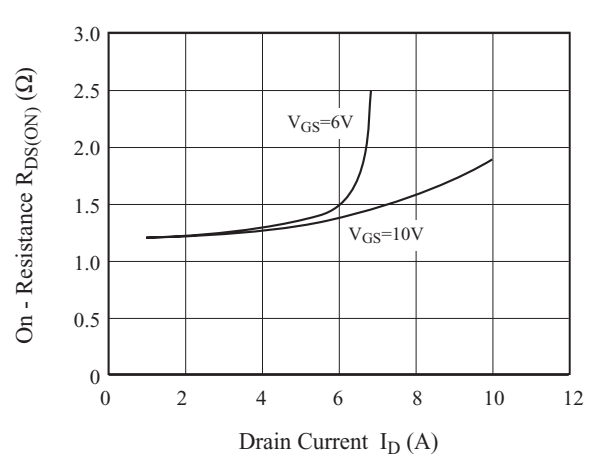


Fig5. $I_S - V_{SD}$

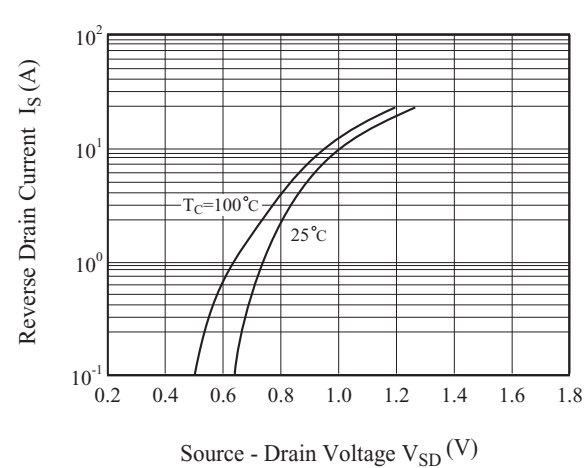


Fig6. $R_{DS(ON)} - T_j$

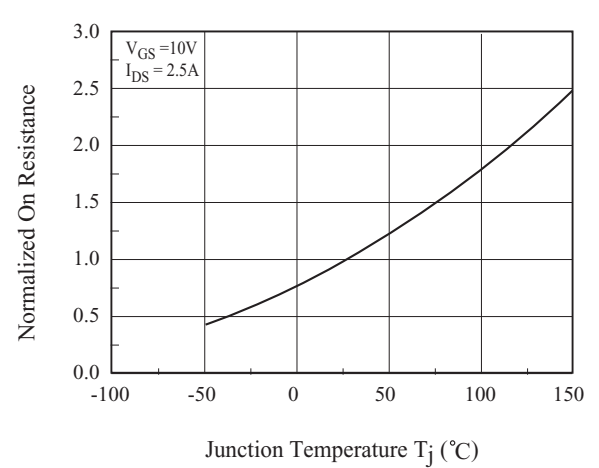


Fig 7. C - V_{DS}

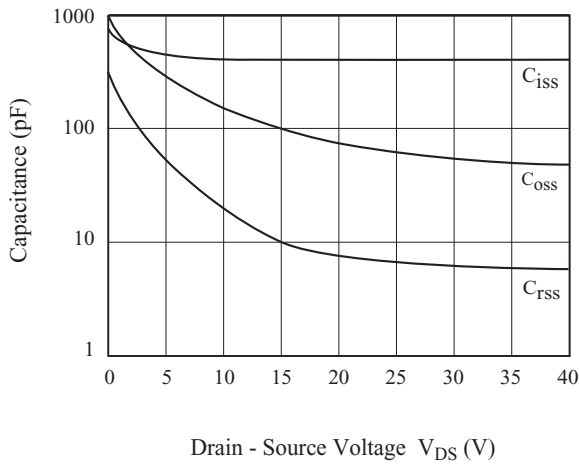


Fig8. Q_g - V_{GS}

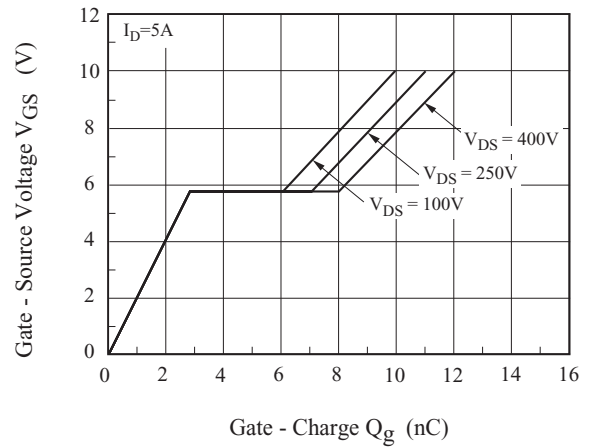


Fig9. Safe Operation Area

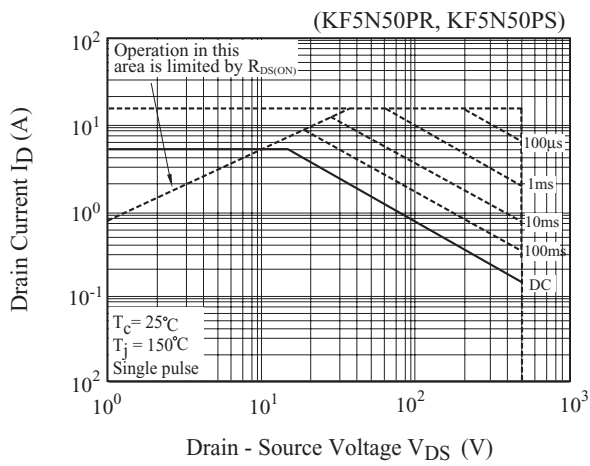


Fig10. Safe Operation Area

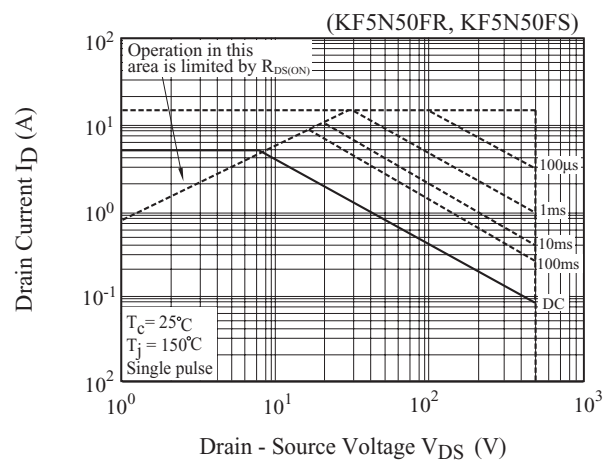


Fig11. I_D - T_j

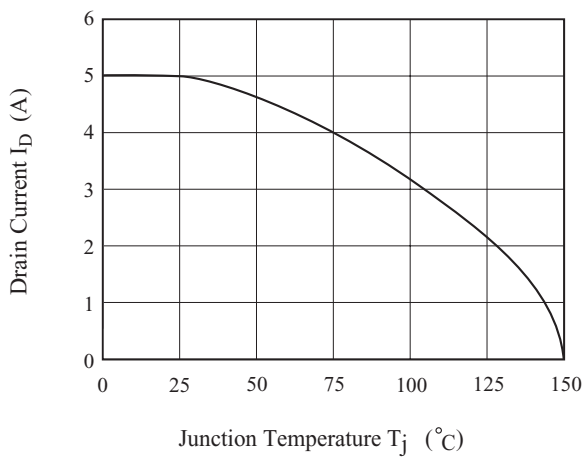


Fig12. Transient Thermal Response Curve

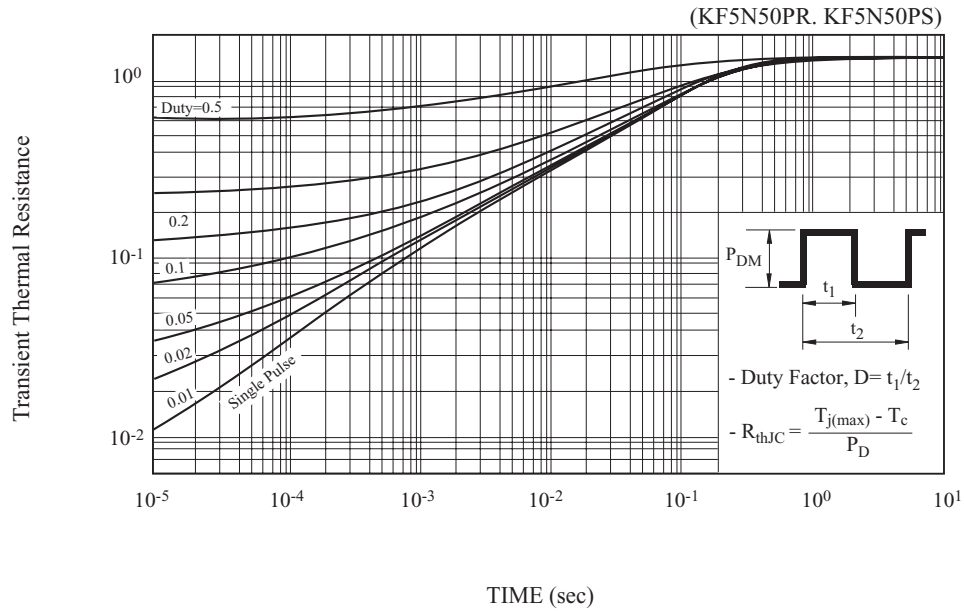


Fig13. Transient Thermal Response Curve

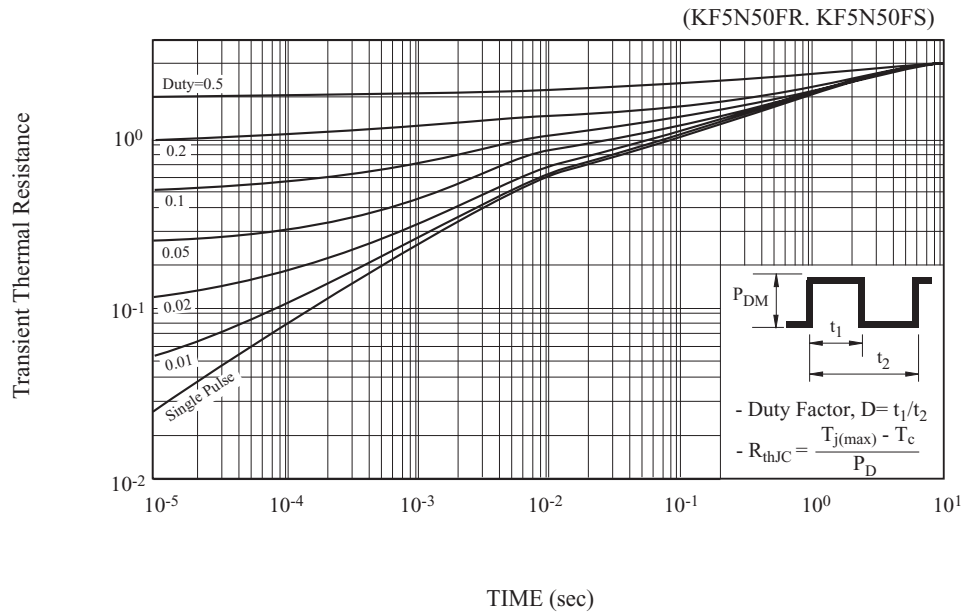


Fig14. Gate Charge

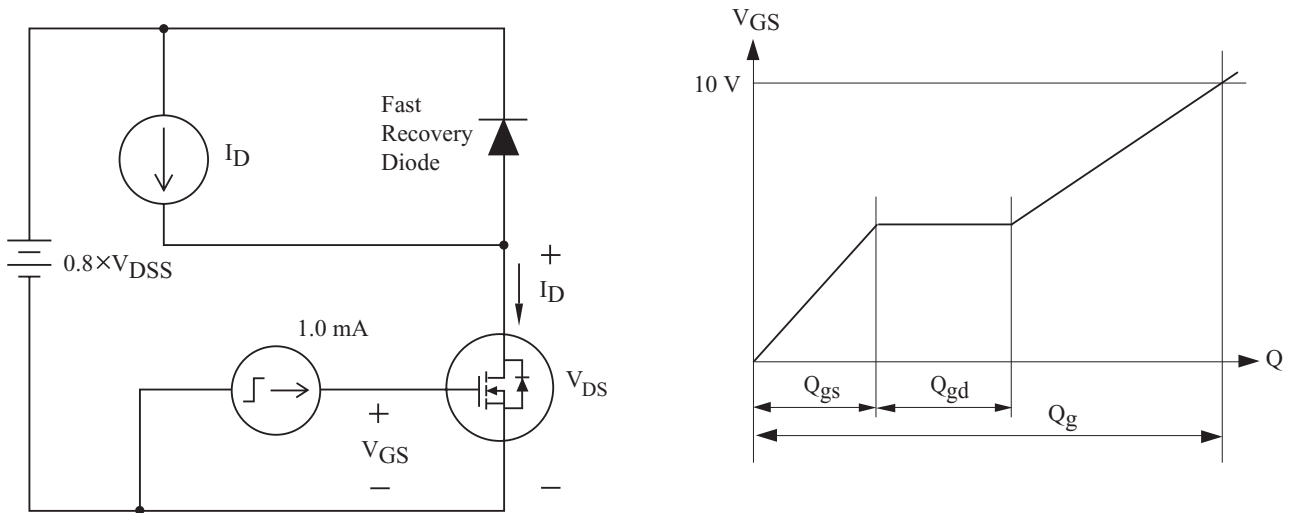


Fig15. Single Pulsed Avalanche Energy

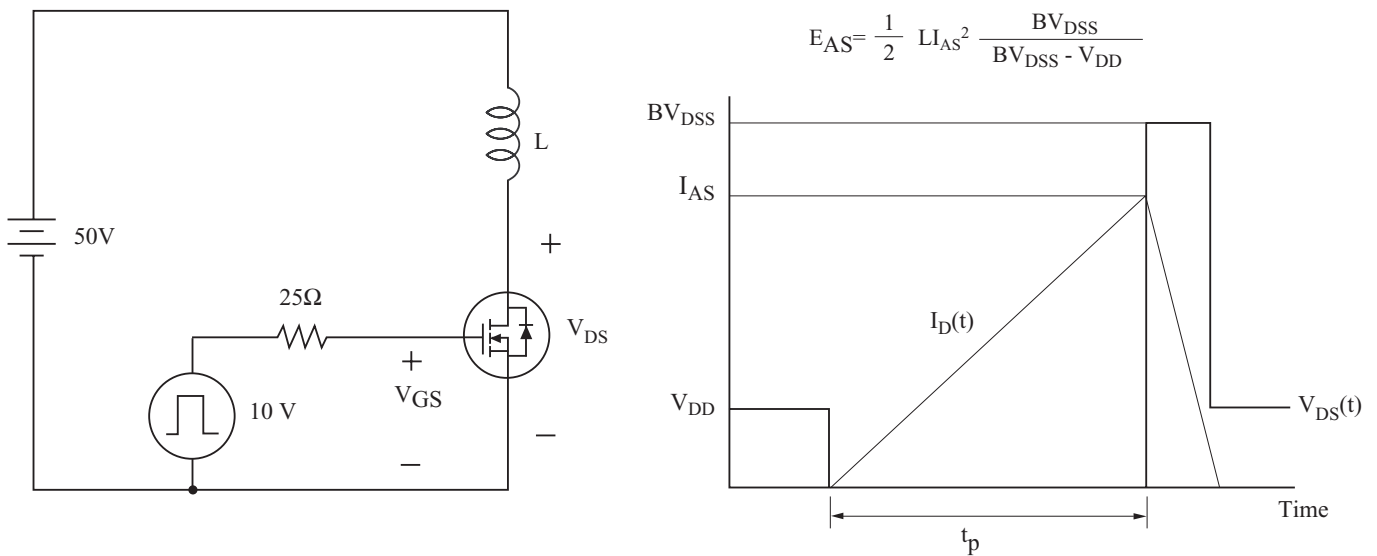


Fig16. Resistive Load Switching

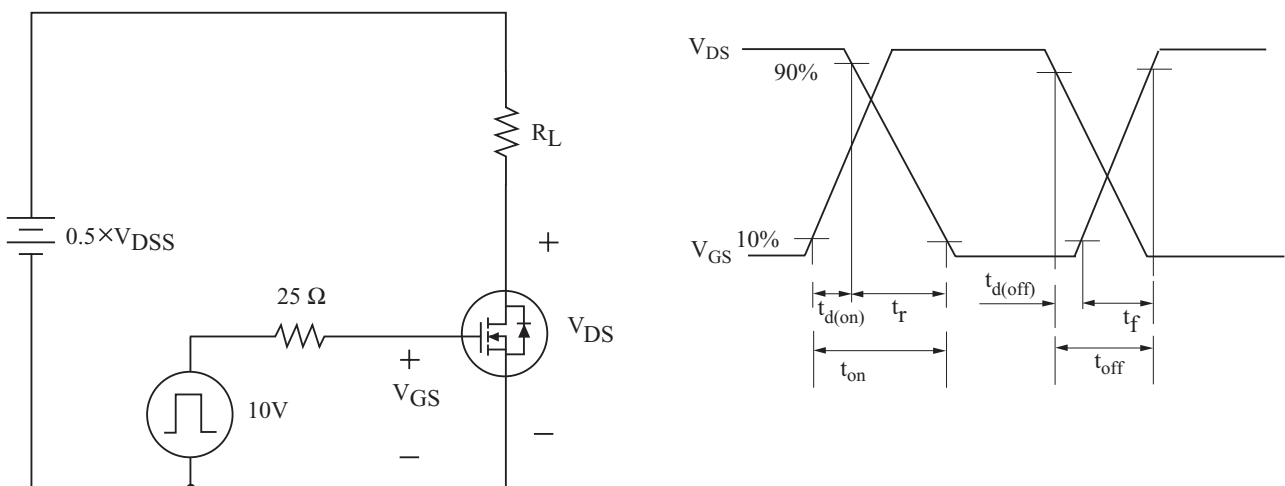


Fig17. Source - Drain Diode Reverse Recovery and dv/dt

