

### 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, electronic lamp ballasts based on half bridge topology and switching mode power supplies.

### FEATURES

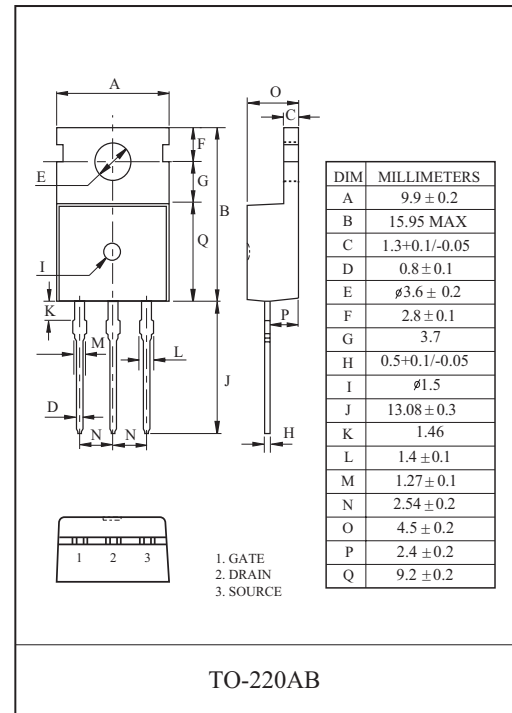
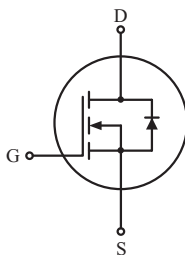
- $V_{DSS} = 60V$ ,  $I_D = 50A$
- Drain-Source ON Resistance :  
 $R_{DS(ON)} = 17m\ \Omega$  (Max.) @  $V_{GS} = 10V$
- $Qg$ (typ.) = 39.5nC

### MOSFET MAXIMUM RATING (Ta=25 °C Unless otherwise noted)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Drain-Source Voltage		$V_{DSS}$	60	V
Gate-Source Voltage		$V_{GSS}$	± 20	V
Drain Current	@T <sub>C</sub> =25	$I_D^*$	50	A
	@T <sub>C</sub> =100		32	
	Pulsed (Note1)	$I_{DP}$	170	
Single Pulsed Avalanche Energy (Note 2)		$E_{AS}$	330	mJ
Repetitive Avalanche Energy (Note 1)		$E_{AR}$	9	mJ
Peak Diode Recovery dv/dt (Note 3)		dv/dt	4.5	V/ns
Drain Power Dissipation	T <sub>c</sub> =25	$P_D$	96	W
	Derate above 25		0.77	W/
Maximum Junction Temperature		$T_j$	150	
Storage Temperature Range		$T_{stg}$	-55 150	
<b>Thermal Characteristics</b>				
Thermal Resistance, Junction-to-Case		$R_{thJC}$	1.3	/W
Thermal Resistance, Junction-to-Ambient		$R_{thJA}$	62.5	/W

\* : Drain current limited by maximum junction temperature.

### PIN CONNECTION



# KF50N06P

## ELECTRICAL CHARACTERISTICS (Tc=25 )

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
<b>Static</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$I_D=250\ \mu A, V_{GS}=0V$	60	-	-	V
Breakdown Voltage Temperature Coefficient	$BV_{DSS}/T_j$	$I_D=250\ \mu A$ , Referenced to 25	-	0.08	-	V/
Drain Cut-off Current	$I_{DSS}$	$V_{DS}=60V, V_{GS}=0V$ ,	-	-	10	$\mu A$
Gate Threshold Voltage	$V_{th}$	$V_{DS}=V_{GS}, I_D=250\ \mu A$	2	-	4	V
Gate Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	$\pm 100$	nA
Drain-Source ON Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=25A$	-	14.2	17.0	m
<b>Dynamic</b>						
Total Gate Charge	$Q_g$	$V_{DS}=48V, I_D=50A$ $V_{GS}=10V$ (Note4,5)	-	39.5	-	nC
Gate-Source Charge	$Q_{gs}$		-	8	-	
Gate-Drain Charge	$Q_{gd}$		-	16	-	
Turn-on Delay time	$t_{d(on)}$	$V_{DD}=30V$ $I_D=50A$ $R_G=25$ (Note4,5)	-	30	-	ns
Turn-on Rise time	$t_r$		-	100	-	
Turn-off Delay time	$t_{d(off)}$		-	80	-	
Turn-off Fall time	$t_f$		-	64	-	
Input Capacitance	$C_{iss}$	$V_{DS}=25V, V_{GS}=0V, f=1.0MHz$	-	1560	-	pF
Output Capacitance	$C_{oss}$		-	405	-	
Reverse Transfer Capacitance	$C_{rss}$		-	76	-	
<b>Source-Drain Diode Ratings</b>						
Continuous Source Current	$I_S$	$V_{GS}<V_{th}$	-	-	50	A
Pulsed Source Current	$I_{SP}$		-	-	200	
Diode Forward Voltage	$V_{SD}$	$I_S=50A, V_{GS}=0V$	-	-	1.4	V
Reverse Recovery Time	$t_{rr}$	$I_S=50A, V_{GS}=0V$ , $dI_S/dt=100A/\mu s$	-	72	-	ns
Reverse Recovery Charge	$Q_{rr}$		-	185	-	nC

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

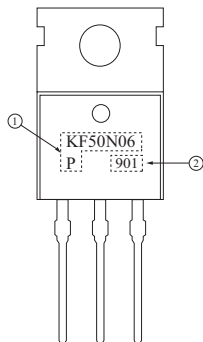
Note 2)  $L=132\ \mu H, I_S=50A, V_{DD}=30V, R_G=25$  , Starting  $T_j=25$  .

Note 3)  $I_S=50A, dI/dt=200A/\mu s, V_{DD}=BV_{DSS}$ , Starting  $T_j=25$  .

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

Note 5) Essentially independent of operating temperature.

## Marking



① PRODUCT NAME

② LOT NO

Fig1.  $I_D - V_{DS}$

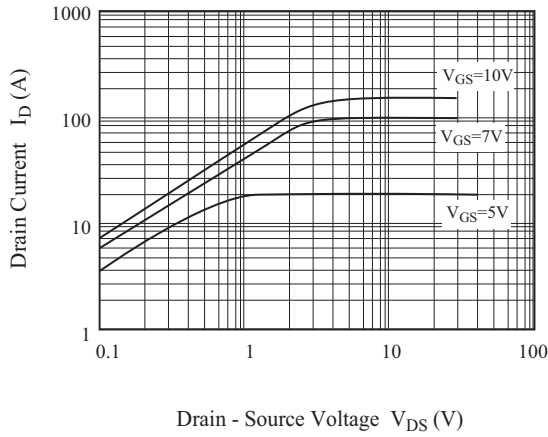


Fig2.  $I_D - V_{GS}$

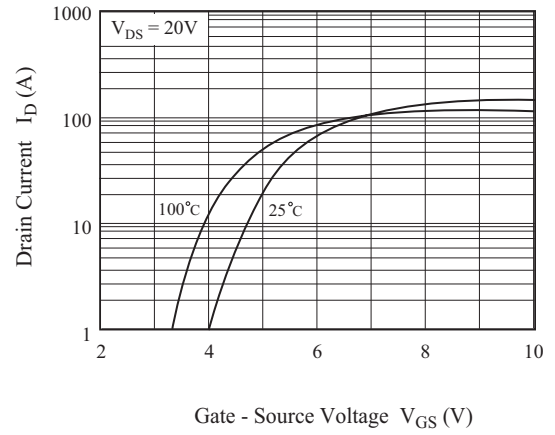


Fig3.  $BV_{DSS} - T_j$

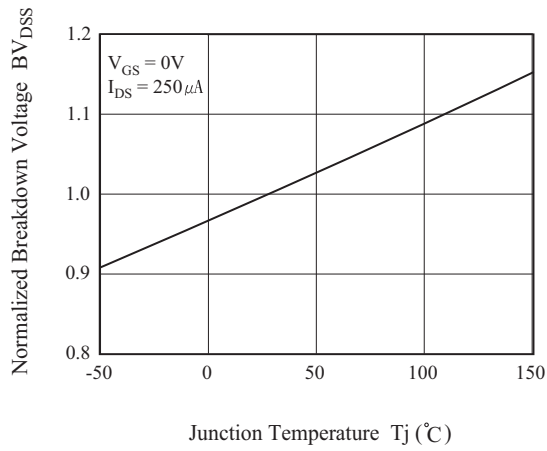


Fig4.  $R_{DS(ON)} - I_D$

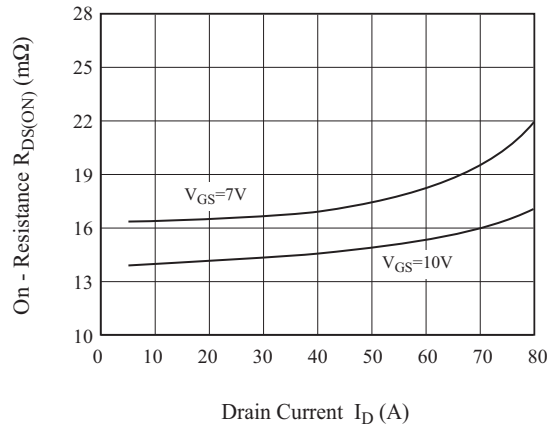


Fig5.  $I_S - V_{SD}$

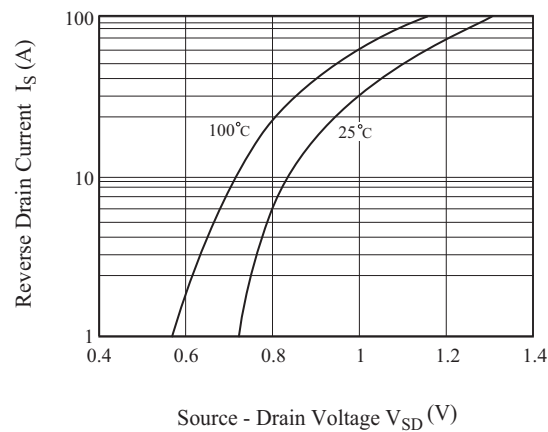
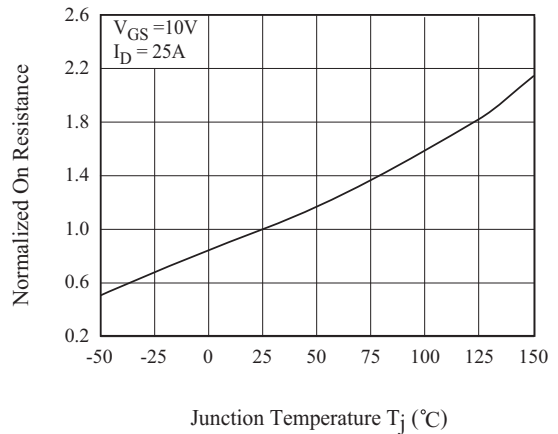


Fig6.  $R_{DS(ON)} - T_j$



# KF50N06P

Fig 7. C - V<sub>DS</sub>

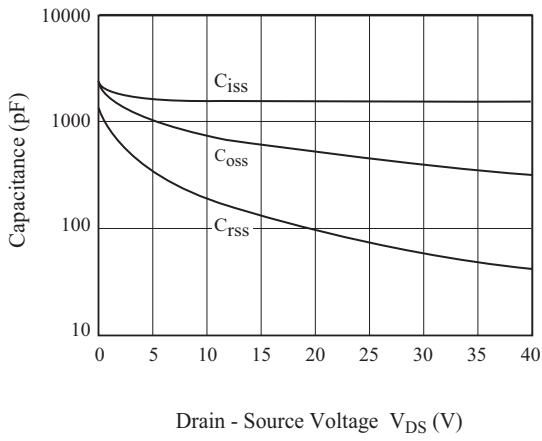


Fig 8. Q<sub>g</sub> - V<sub>DS</sub>

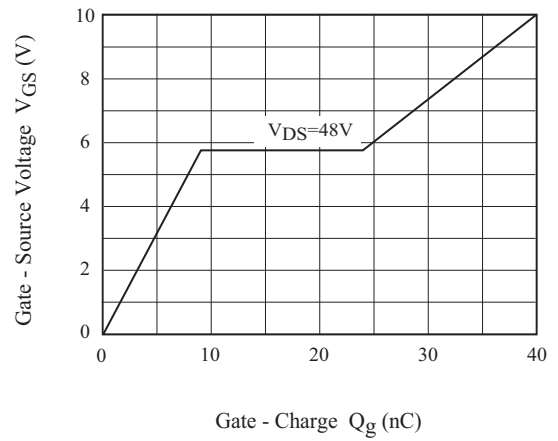


Fig 9. Safe Operation Area

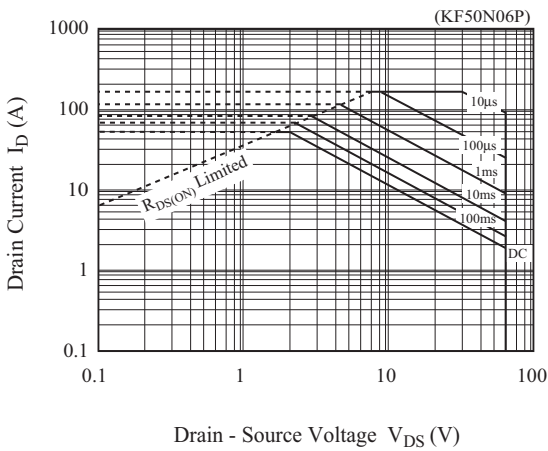


Fig 10. I<sub>D</sub> - T<sub>C</sub>

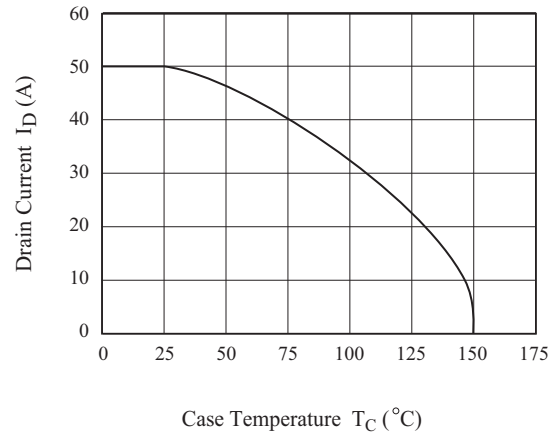


Fig 11. R<sub>th</sub> of KF50N06P

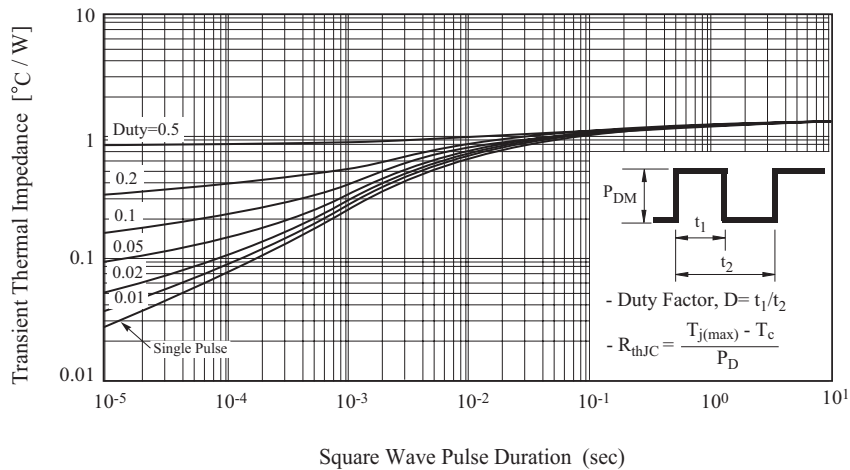


Fig12. Gate Charge

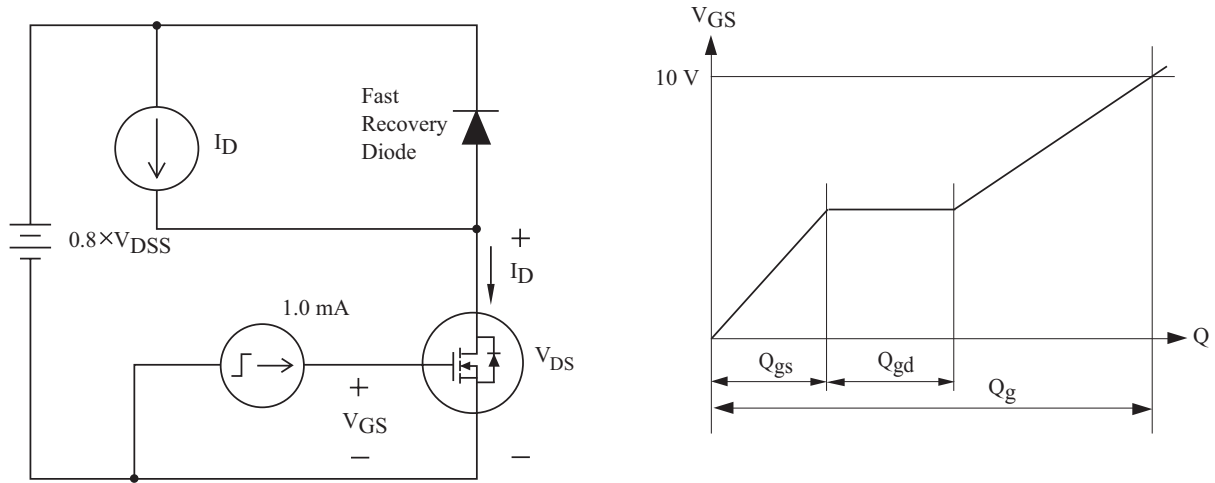


Fig13. Single Pulsed Avalanche Energy

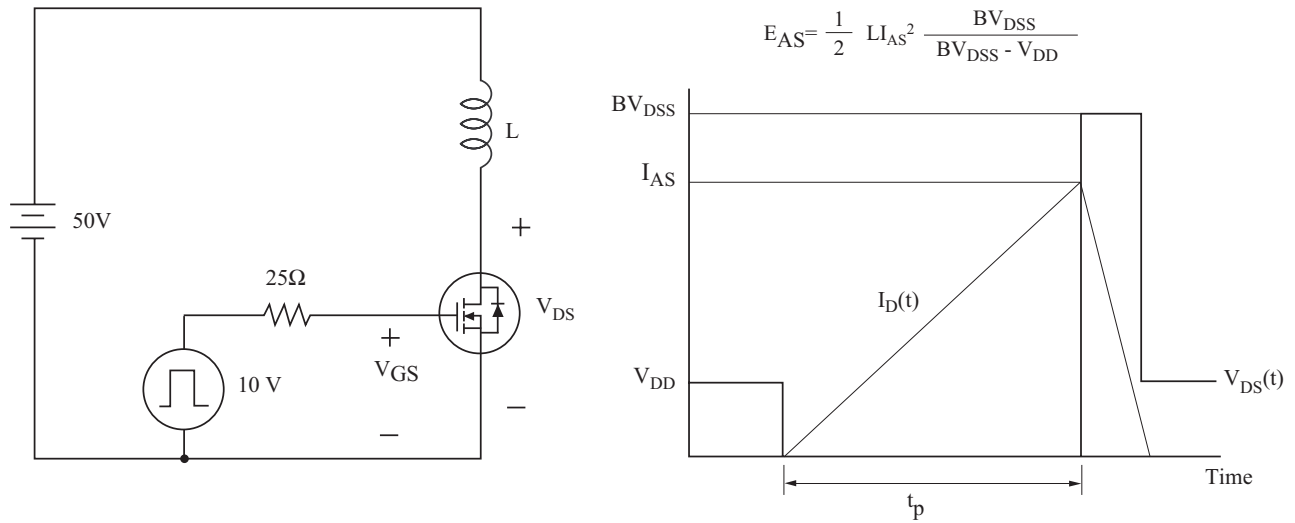


Fig14. Resistive Load Switching

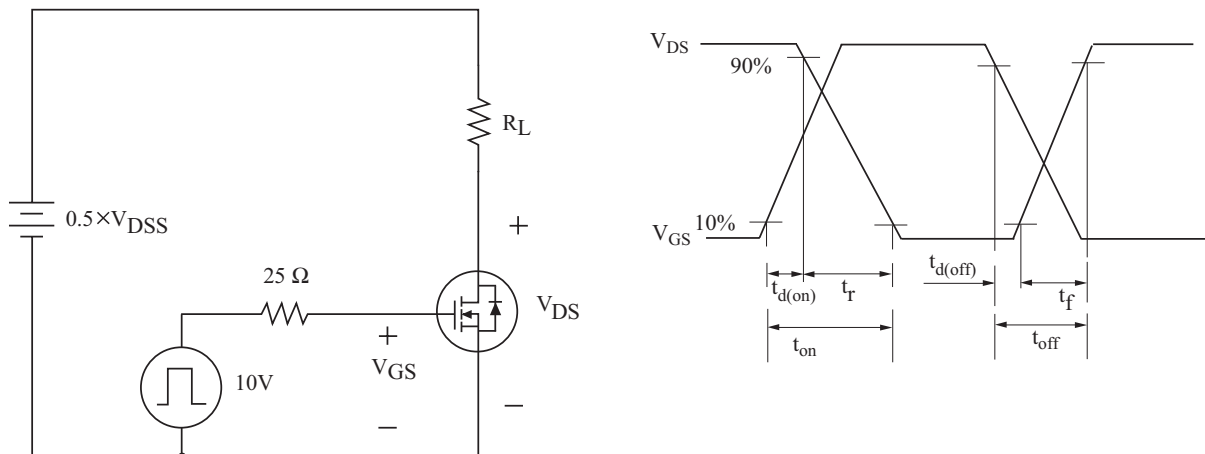


Fig15. Source - Drain Diode Reverse Recovery and  $dv/dt$

