

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

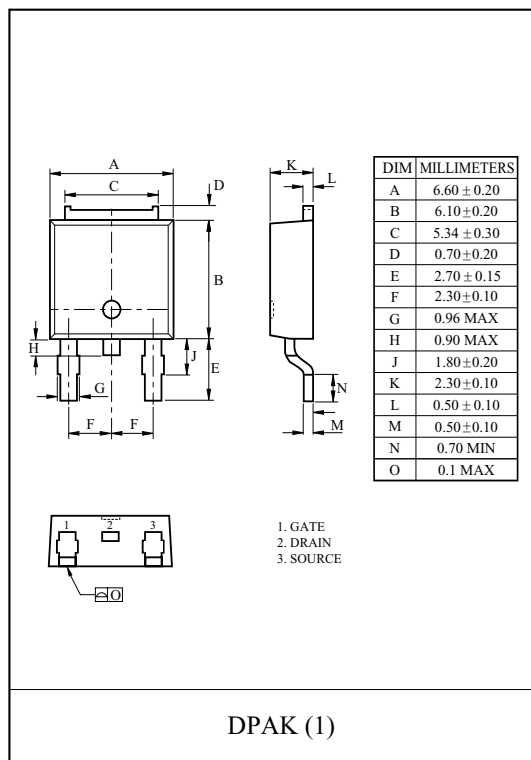
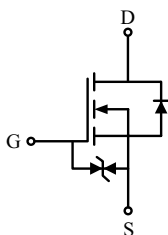
- $V_{DS} = 525V$, $I_D = 4.1A$
- Drain-Source ON Resistance : $R_{DS(ON)} = 1.5\Omega$ (Max) @ $V_{GS} = 10V$
- $Q_g(\text{typ}) = 12nC$
- $t_{tr}(\text{typ}) = 150ns$ (KF5N53DS)
- $t_{rr}(\text{typ}) = 300ns$ (KF5N53DZ)

MAXIMUM RATING (Tc=25 °C)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Drain-Source Voltage		V_{DS}	525	V
Gate-Source Voltage		V_{GS}	± 30	V
Drain Current	@T _C =25	I_D	4.1	A
	@T _C =100		2.6	
	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	59.5	W
	Derate above 25		0.48	W/
Maximum Junction Temperature		T_j	150	
Storage Temperature Range		T_{stg}	-55 150	
Thermal Characteristics				
Thermal Resistance, Junction-to-Case		R_{thJC}	2.1	/W
Thermal Resistance, Junction-to-Ambient		R_{thJA}	110	/W

PIN CONNECTION

(KF5N53DZ/DS)



KF5N53DZ/DS

ELECTRICAL CHARACTERISTICS (Tc=25)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Static							
Drain-Source Breakdown Voltage		BV _{DSS}	I _D =250μA , V _{GS} =0V	525	-	-	V
Breakdown Voltage Temperature Coefficient		Δ BV _{DSS} / Δ T _j	I _D =250μA, Referenced to 25	-	0.57	-	V/
Drain Cut-off Current		I _{DSS}	V _{DS} =525V, V _{GS} =0V,	-	-	10	μA
Gate Threshold Voltage		V _{th}	V _{DS} =V _{GS} , I _D =250μA	2.5	-	4.5	V
Gate Leakage Current		I _{GSS}	V _{GS} = ± 25V, V _{DS} =0V	-	-	± 10	μA
Drain-Source ON Resistance		R _{DS(ON)}	V _{GS} =10V, I _D =2.15A	-	1.35	1.5	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 I _D =5A R _G =25 Ω (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 =4.1A, V _{GS} =0V	-	-	1.4	V
Reverse Recovery Time	KF5N53DZ	t _{rr}	I _S =5A, V _{GS} =0V, dIs/dt=100A/μs	-	300	-	ns
	KF5N53DS			-	150	-	
Reverse Recovery Charge	KF5N53DZ	Q _{rr}		-	2.0	-	μC
	KF5N53DS			-	0.42	-	

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

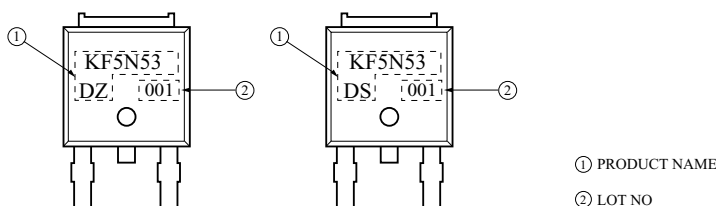


Fig1. $I_D - V_{DS}$

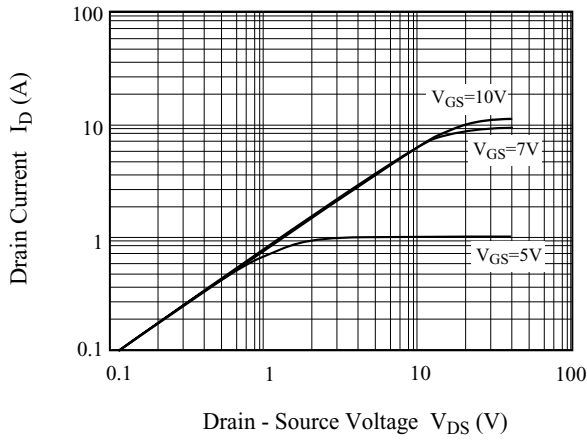


Fig2. $I_D - V_{GS}$

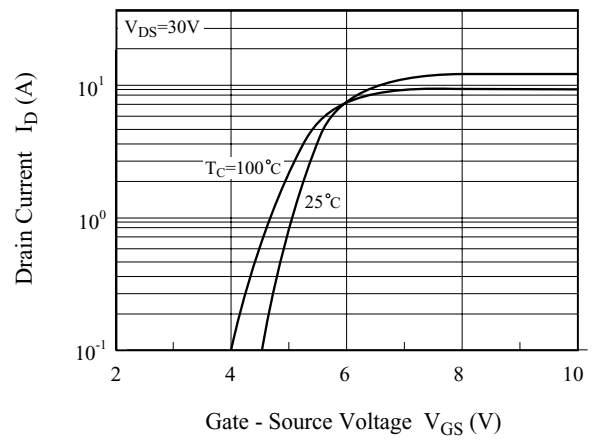


Fig3. $BV_{DSS} - T_j$

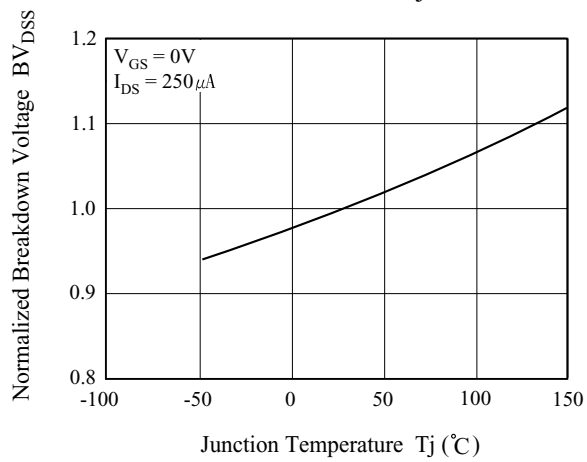


Fig4. $R_{DS(ON)} - I_D$

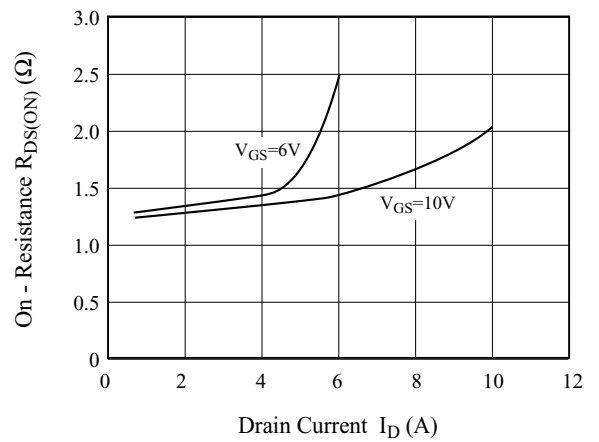


Fig5. $I_S - V_{SD}$

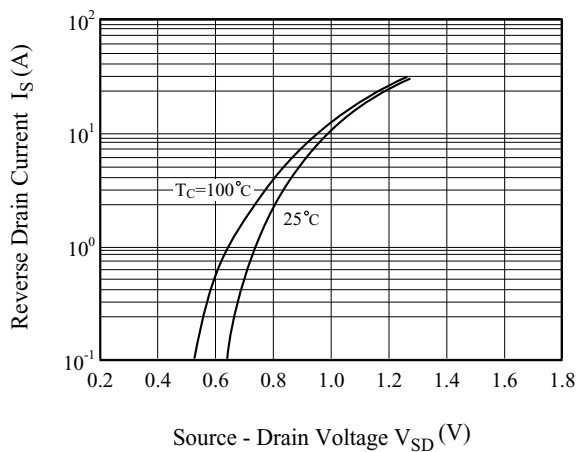
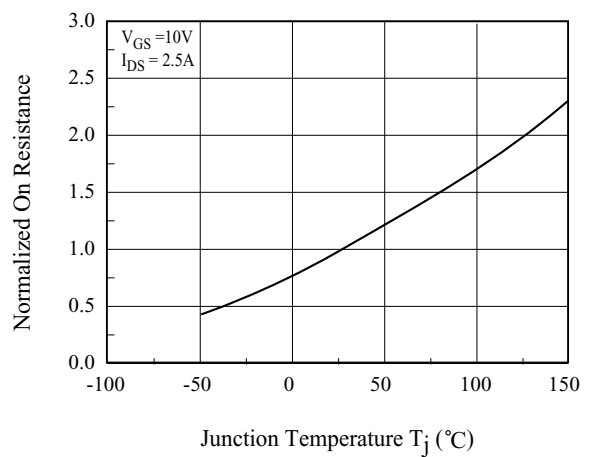


Fig6. $R_{DS(ON)} - T_j$



KF5N53DZ/DS

Fig 7. C - V_{DS}

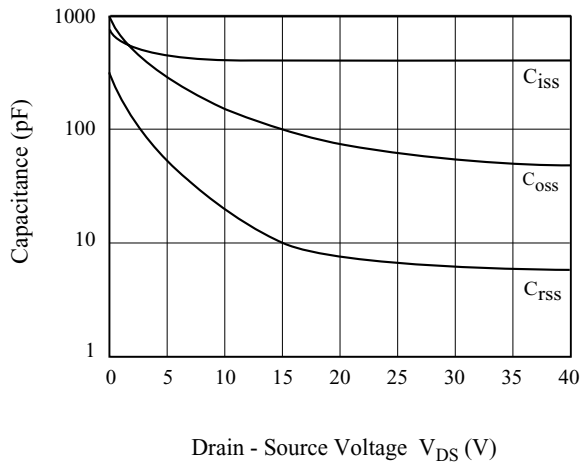


Fig8. Q_g - V_{GS}

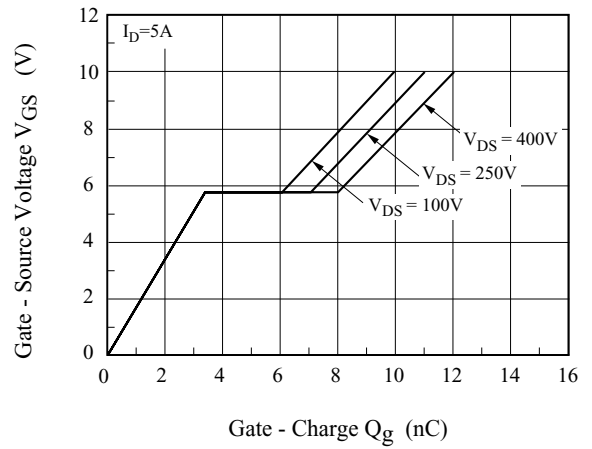


Fig9. Safe Operation Area

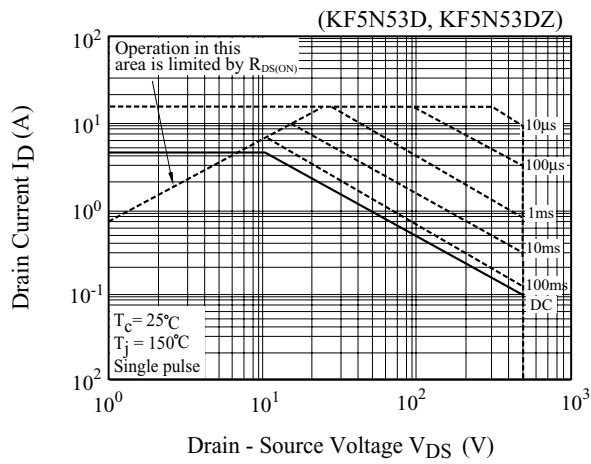


Fig10. I_D - T_j

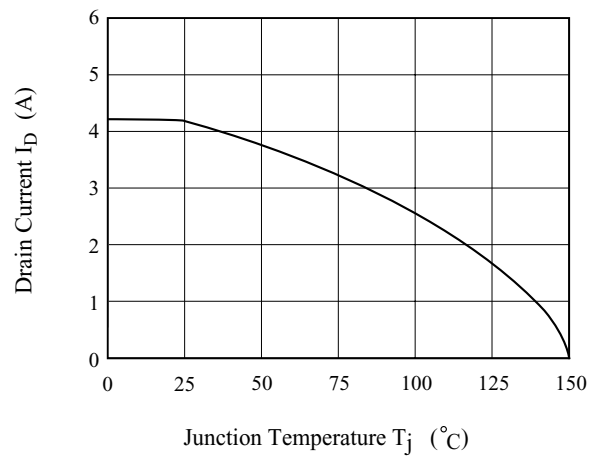


Fig11. Transient Thermal Response Curve

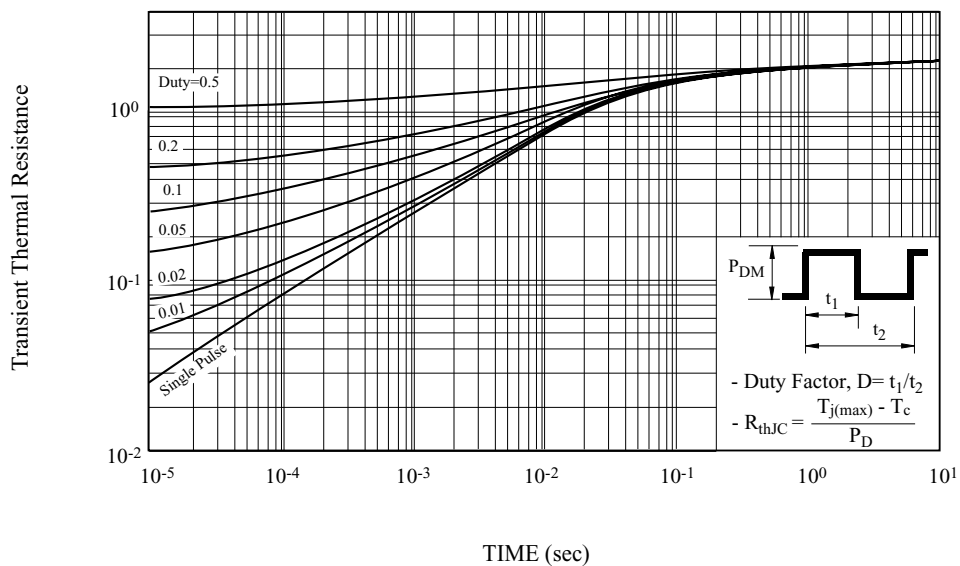


Fig12. Gate Charge

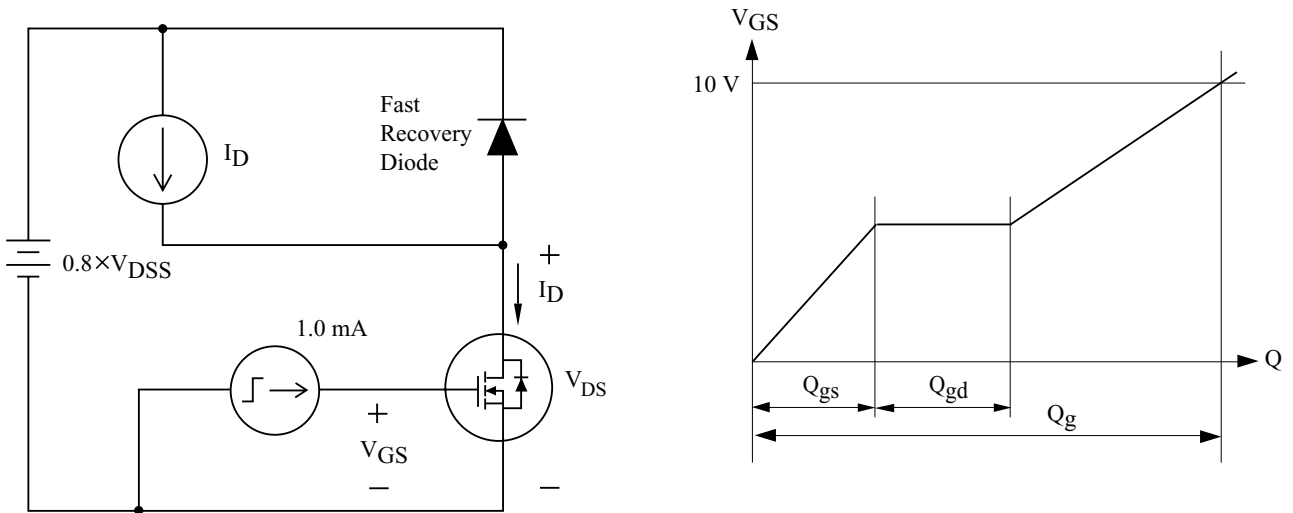


Fig13. Single Pulsed Avalanche Energy

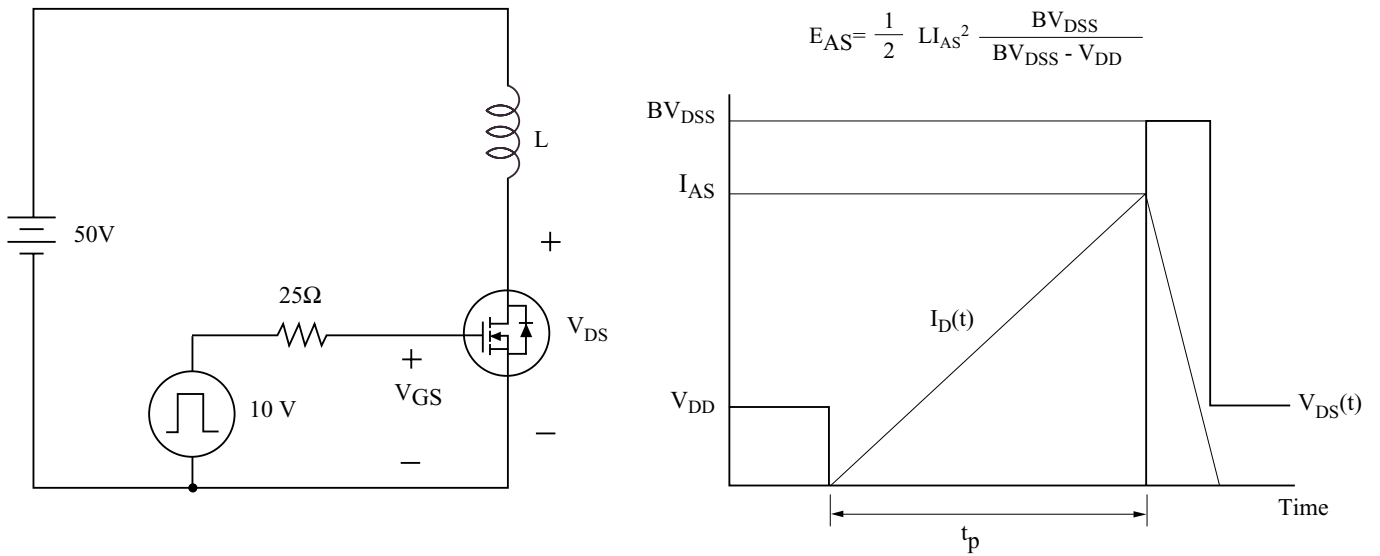


Fig14. Resistive Load Switching

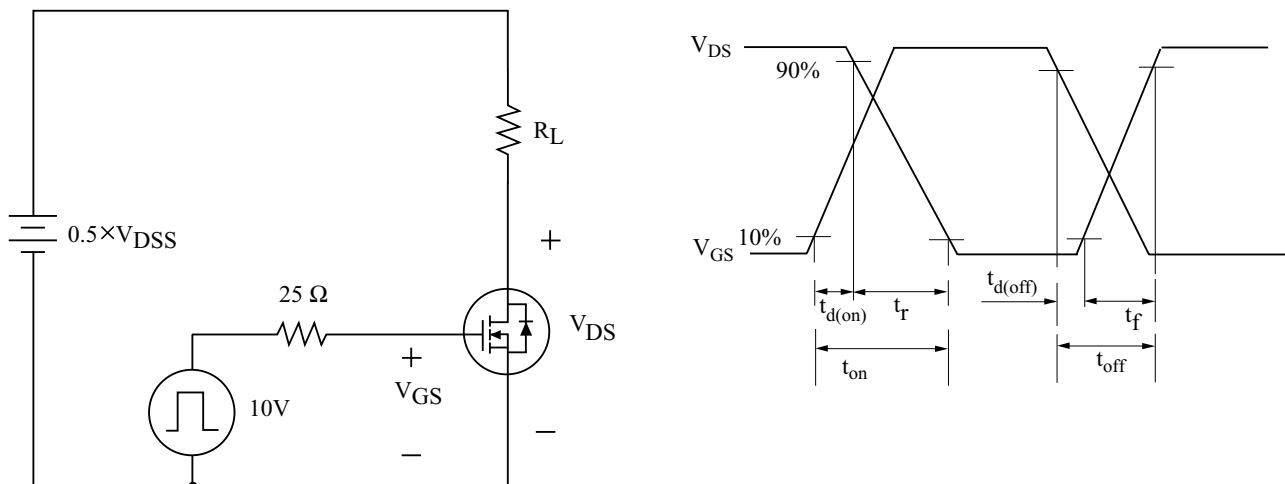


Fig15. Source - Drain Diode Reverse Recovery and dv/dt

