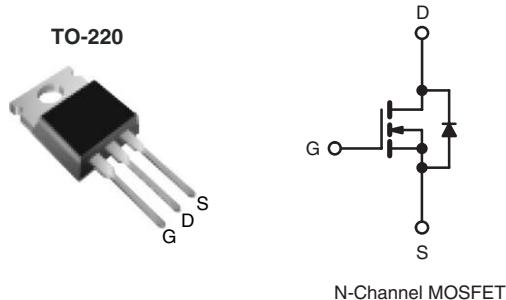


Power MOSFET

PRODUCT SUMMARY		
V _{DS} (V)	500	
R _{DS(on)} (Ω)	V _{GS} = 10 V	0.26
Q _g (Max.) (nC)	120	
Q _{gs} (nC)	34	
Q _{gd} (nC)	54	
Configuration	Single	



FEATURES

- Low Gate Charge Q_g Results in Simple Drive Requirement
- Improved Gate, Avalanche and Dynamic dV/dt Ruggedness
- Fully Characterized Capacitance and Avalanche Voltage and Current
- Low R_{DS(on)}
- Lead (Pb)-free Available



RoHS*
COMPLIANT

APPLICATIONS

- Switch Mode Power Supply (SMPS)
- Uninterruptible Power Supply
- High Speed Power Switching
- Hard Switched and High Frequency Circuits

ORDERING INFORMATION	
Package	TO-220
Lead (Pb)-free	IRFB18N50KPbF SiHFB18N50K-E3
SnPb	IRFB18N50K SiHFB18N50K

ABSOLUTE MAXIMUM RATINGS T _C = 25 °C, unless otherwise noted				
PARAMETER	SYMBOL	LIMIT	UNIT	
Drain-Source Voltage	V _{DS}	500		
Gate-Source Voltage	V _{GS}	± 30		V
Continuous Drain Current	V _{GS} at 10 V	T _C = 25 °C	I _D	17
		T _C = 100 °C	I _D	11
Pulsed Drain Current ^a	I _{DM}	68		
Linear Derating Factor		1.8		W/°C
Single Pulse Avalanche Energy ^b	E _{AS}	370		mJ
Repetitive Avalanche Current ^a	I _{AR}	17		A
Repetitive Avalanche Energy ^a	E _{AR}	22		mJ
Maximum Power Dissipation	P _D	220		W
Peak Diode Recovery dV/dt ^c	dV/dt	7.8		V/ns
Operating Junction and Storage Temperature Range	T _J , T _{stg}	- 55 to + 150		°C
Soldering Recommendations (Peak Temperature)	for 10 s	300 ^d		
Mounting Torque	6-32 or M3 screw	10		N

Notes

a. Repetitive rating; pulse width limited by maximum junction temperature.

b. Starting T_J = 25 °C, L = 2.5 mH, R_G = 25 Ω, I_{AS} = 17 A.

c. I_{SD} ≤ 17 A, dI/dt ≤ 376 A/μs, V_{DD} ≤ V_{DS}, T_J ≤ 150 °C.

d. 1.6 mm from case.

IRFB18N50K, SiHFB18N50K

Thermal Resistance Ratings

PARAMETER	SYMBOL	TYP.	MAX.	UNIT
Maximum Junction-to-Ambient ^a	R _{thJA}	-	58	°C/W
Case-to-Sink, Flat, Greased Surface	R _{thCS}	0.50	-	
Maximum Junction-to-Case (Drain) ^a	R _{thJC}	-	0.56	

Note

a. R_{th} is measured at T_J approximately 90 °C.

Specifications T_J = 25 °C, unless otherwise noted

PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNIT
Static							
Drain-Source Breakdown Voltage	V _{DS}	V _{GS} = 0 V, I _D = 250 μA		500	-	-	V
V _{DS} Temperature Coefficient	ΔV _{DS} /T _J	Reference to 25 °C, I _D = 1 mA		-	0.59	-	V/°C
Gate-Source Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA		3.0	-	5.0	V
Gate-Source Leakage	I _{GSS}	V _{GS} = ± 30 V		-	-	± 100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 500 V, V _{GS} = 0 V		-	-	50	μA
		V _{DS} = 400 V, V _{GS} = 0 V, T _J = 125 °C		-	-	250	
Drain-Source On-State Resistance	R _{DS(on)}	V _{GS} = 10 V	I _D = 10 A ^b	-	0.26	0.29	Ω
Forward Transconductance	g _{fs}	V _{DS} = 50 V, I _D = 10 A		6.4	-	-	S
Dynamic							
Input Capacitance	C _{iss}	V _{GS} = 0 V, V _{DS} = 25 V, f = 1.0 MHz, see fig. 5		-	2830	-	pF
Output Capacitance	C _{oss}			-	330	-	
Reverse Transfer Capacitance	C _{rss}			-	38	-	
Output Capacitance	C _{oss}	V _{GS} = 0 V	V _{DS} = 1.0 V, f = 1.0 MHz	-	3310	-	nC
			V _{DS} = 400 V, f = 1.0 MHz	-	93	-	
Effective Output Capacitance	C _{oss eff.}		V _{DS} = 0 V to 400 V ^c	-	155	-	
Total Gate Charge	Q _g	I _D = 17 A, V _{DS} = 400 V, see fig. 6 and 13 ^b		-	-	120	ns
Gate-Source Charge	Q _{gs}			-	-	34	
Gate-Drain Charge	Q _{gd}			-	-	54	
Turn-On Delay Time	t _{d(on)}	V _{GS} = 10 V		-	22	-	ns
Rise Time	t _r			-	60	-	
Turn-Off Delay Time	t _{d(off)}			-	45	-	
Fall Time	t _f			-	30	-	
Drain-Source Body Diode Characteristics							
Continuous Source-Drain Diode Current	I _S	MOSFET symbol showing the integral reverse p - n junction diode		-	-	17	A
Pulsed Diode Forward Current ^a	I _{SM}			-	-	68	
Body Diode Voltage	V _{SD}	T _J = 25 °C, I _S = 17 A, V _{GS} = 0 V ^b		-	-	1.5	V
Body Diode Reverse Recovery Time	t _{rr}	T _J = 25 °C, I _F = 17 A, dI/dt = 100 A/μs ^b		-	520	780	ns
Body Diode Reverse Recovery Charge	Q _{rr}			-	5.3	8.0	μC
Forward Turn-On Time	t _{on}	Intrinsic turn-on time is negligible (turn-on is dominated by L _S and L _D)					

Notes

a. Repetitive rating; pulse width limited by maximum junction temperature (see fig. 11).

b. Pulse width ≤ 300 μs; duty cycle ≤ 2 %.

c. C_{oss eff.} is a fixed capacitance that gives the same charging time as C_{oss} while V_{DS} is rising from 0 to 80 % V_{DS}.

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

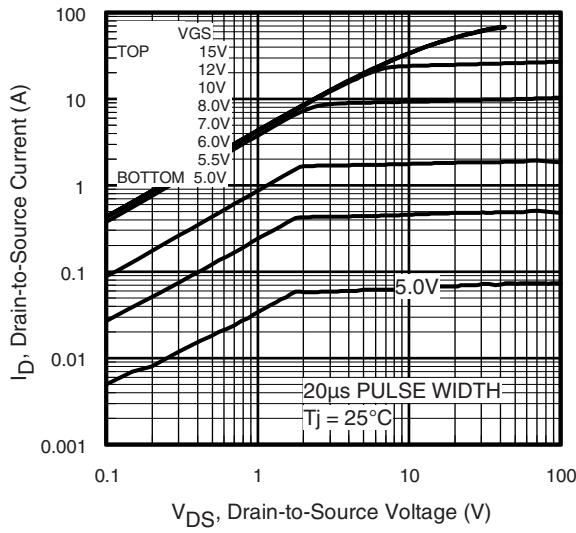


Fig. 1 - Typical Output Characteristics

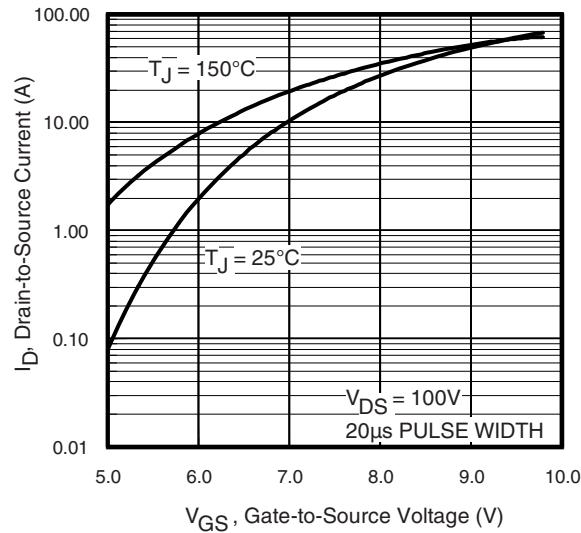


Fig. 3 - Typical Transfer Characteristics

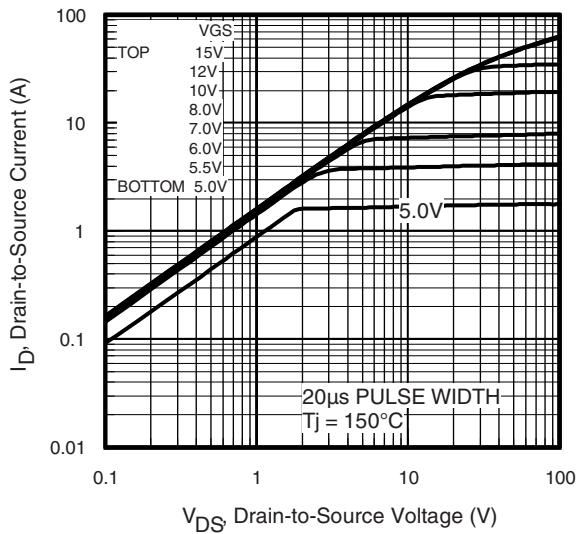


Fig. 2 - Typical Output Characteristics

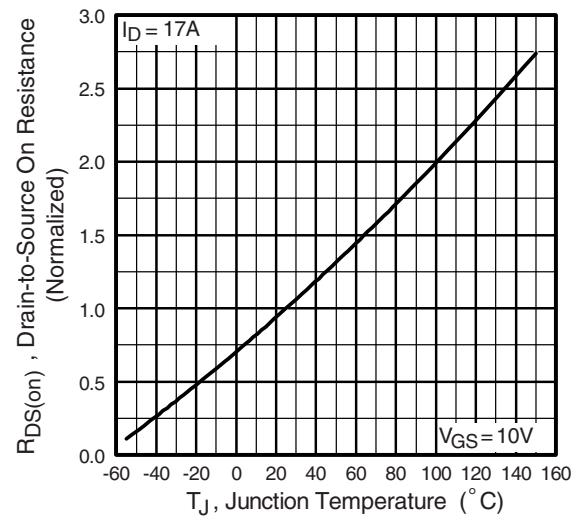


Fig. 4 - Normalized On-Resistance vs. Temperature