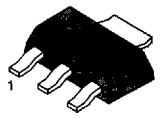
FEATURES

- **Lower $R_{DS(ON)}$**
- **Improved inductive ruggedness**
- **Fast switching times**
- **Rugged polysilicon gate cell structure**
- **Lower input capacitance**
- **Extended safe operating area**
- **Improved high temperature reliability**

SOT-223



1. Gate 2. Drain 3. Source

PRODUCT SUMMARY

Part Number	BV_{DSS}	$R_{DS(on)}$	I_D
IRFM014	60V	0.2Ω	2.7A
IRFM010	50V	0.2Ω	2.7A

ABSOLUTE MAXIMUM RATINGS

Characteristic	Symbol	IRFM014	IRFM010	Unit
Drain-Source Voltage (1)	V_{DSS}	60	50	Vdc
Drain-Gate Voltage (R_{GS}=1.0MΩ)(1)	V_{DGR}	60	50	Vdc
Gate-Source Voltage	V_{GS}	±20		Vdc
Continuous Drain Current T_C=25°C	I_D	2.7		Adc
Continuous Drain Current T_C=100°C	I_D	1.7		Adc
Drain Current - Pulsed (3)	I_{DM}	22		Adc
Single Pulsed Avalanche Energy (4)	E_{AS}	100		mJ
Avalanche Current	I_{AS}	2.7		A
Total Power Dissipation at T_C=25 °C Derate above 25 °C	P_D	3.125 0.025		Watts W/ °C
Operating and Storage Junction Temperature Range	T_J, T_{STG}	-55 to +150		°C
Maximum Lead Temp. for Soldering Purposes, 1/8" from case for 5 seconds	T_L	300		°C

Notes : (1) T_J=25°C to 150°C
(2) Pulse test : Pulse width ≤ 300μs, Duty Cycle ≤ 2%
(3) Repetitive rating : Pulse width limited by junction temperature
(4) L=16mH, V_{DD}=25V, R_G=25Ω, Starting T_J=25°C

ELECTRICAL CHARACTERISTICS (T_C=25°C unless otherwise specified)

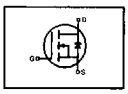
Symbol	Characteristic	Min	Typ	Max	Units	Test Conditions
BV_{DSS}	Drain-Source Breakdown Voltage					
	IRFM014	60	-	-	V	V_{GS}=0V, I_D=250μA
	IRFM010	50	-	-	V	
$V_{GS(th)}$	Gate Threshold Voltage	2.0	-	4.0	V	V_{DS}=V_{GS}, I_D=250μA
I_{GSS}	Gate-Source Leakage Forward	-	-	100	nA	V_{GS}=20V
I_{GSS}	Gate-Source Leakage Reverse	-	-	-100	nA	V_{GS}=-20V
I_{DSS}	Zero Gate Voltage Drain Current	-	-	250	μA	V_{DS}=Max. Rating, V_{GS}=0V
		-	-	1000	μA	V_{DS}=0.8 Max. Rating, V_{GS}=0V, T_C=150°C
$R_{DS(on)}$	Static Drain-Source On Resistance(2)	-	-	0.2	Ω	V_{GS}=10V, I_D=1.4A
g_{fs}	Forward Transconductance (2)	1.9	-	-	℧	V_{DS}=25V, I_D=1.4A
C_{iss}	Input Capacitance	-	300	-	pF	V_{GS}=0V, V_{DS}=25V, f=1MHz
C_{oss}	Output Capacitance	-	160	-	pF	
C_{rss}	Reverse Transfer Capacitance	-	29	-	pF	
$t_{d(on)}$	Turn-On Delay Time	-	10	-	ns	V_{DD}=0.5 BV_{DSS}, I_D=2.7A, Z_O=24Ω (MOSFET switching times are essentially independent of operating temperature)
t_r	Rise Time	-	50	-	ns	
$t_{d(off)}$	Turn-Off Delay Time	-	13	-	ns	
t_f	Fall Time	-	19	-	ns	
Q_g	Total Gate Charge (Gate-Source Plus Gate-Drain)	-	-	11	nC	V_{GS}=10V, I_D=2.7A, V_{DS}=0.8 Max. Rating (Gate charge is essentially independent of operating temperature)
Q_{gs}	Gate-Source Charge	-	3.1	-	nC	
Q_{gd}	Gate-Drain ("Miller") Charge	-	5.8	-	nC	

THERMAL RESISTANCE

Symbol	Characteristics		IRFM014	Units	Remark
R_{thJC}	Juntion-to-case	MAX	40	K/W	
R_{thJA}	Junction-to-Ambient	MAX	60	K/W	Free Air Operation

Notes : (1) T_J=25°C to 150°C
(2) Pulse test : Pulse width≤300μs, Duty Cycle≤2%
(3) Repetitive rating : Pulse width limited by max. junction temperature

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Symbol	Characteristic	Min	Typ	Max	Units	Test Conditions
I_S	Continuous Source Current (Body Diode)	-	-	2.7	A	Modified MOSFET symbol showing the integral reverse P-N junction rectifier 
I_{SM}	Pulse Source Current (Body Diode) (3)	-	-	22	A	
V_{SD}	Diode Forward Voltage (2)	-	-	1.6	V	T_J=25°C, I_S=2.7A, V_{GS}=0V
t_{rr}	Reverse Recovery Time	-	70	140	ns	T_J=25°C, I_F=2.7A, dI_F/dt=100A/μS

Notes : (1) T_J=25°C to150°C
(2) Pulse test : Pulse width ≤ 300μs, Duty Cycle ≤ 2%
(3) Repetitive rating : Pulse width limited by max. junction temperature