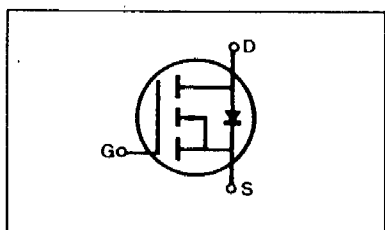


**IRF9240/9241/9242/9243**  
**IRFP9240/9241/9242/9243**  
**IRF9640/9641/9642/9643**

**P-CHANNEL**  
**POWER MOSFETS**

*Preliminary Specifications*

- 200 Volt, 0.5 Ohm SFET



**FEATURES**

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

**PRODUCT SUMMARY**

Part Number	$V_{DS}$	$R_{DS(on)}$	$I_D$
IRF/IRFP9240, IRF9640	-200V	0.5 $\Omega$	-11A
IRF/IRFP9241, IRF9641	-150V	0.5 $\Omega$	-11A
IRF/IRFP9242, IRF9642	-200V	0.7 $\Omega$	-9.0A
IRF/IRFP9243, IRF9643	-150V	0.7 $\Omega$	-9.0A

**PACKAGE STYLE**

Package Type	Part Number
TO-3	IRF9240/9241/9242/9243
TO-3P	IRFP9240/9241/9242/9243
TO-220	IRF9640/9641/9642/9643

**MAXIMUM RATINGS**

Characteristic	Symbol	IRF/IRFP				Unit
		9240 9640	9241 9641	9242 9642	9243 9643	
Drain-Source Voltage (1)	$V_{DS}$	-200	-150	-200	-150	Vdc
Drain-Gate Voltage ( $R_{GS}=1.0M\Omega$ ) (1)	$V_{DGR}$	-200	-150	-200	-150	vdc
Gate-Source Voltage	$V_{GS}$	$\pm 20$				Vdc
Continuous Drain Current $T_C=25^\circ C$	$I_D$	-11	-11	-9.0	-9.0	Adc
Continuous Drain Current $T_C=100^\circ C$	$I_D$	-7.0	-7.0	-6.0	-6.0	Adc
Drain Current—Pulsed (3)	$I_{DM}$	-44	-44	-36	-36	Adc
Gate Current—Pulsed	$I_{GM}$	$\pm 1.5$				Adc
Total Power Dissipation @ $T_C=25^\circ C$	$P_D$	125				Watts
Derate above $25^\circ C$		1.0				W/ $^\circ C$
Operating and Storage Junction Temperature Rangy	$T_J, T_{stg}$	-55 to 150				$^\circ C$
Maximum Lead Temp. for Soldering Purposes, 1/8" from case for 5 seconds	$T_L$	300				$^\circ C$

- Notes:** (1)  $T_J=25^\circ C$  to  $150^\circ C$   
(2) Pulse test: Pulse width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$   
(3) Repetitive rating: Pulse width limited by max. junction temperature



NJ Semi-Conductors reserves the right to change test conditions, parameter limits and package dimensions without notice. Information furnished by NJ Semi-Conductors is believed to be both accurate and reliable at the time of going to press. However, NJ Semi-Conductors assumes no responsibility for any errors or omissions discovered in its use. NJ Semi-Conductors encourages customers to verify that datasheets are current before placing orders.

**IRF9240/9241/9242/9243**  
**IRFP9240/9241/9242/9243**  
**IRF9640/9641/9642/9643**

**P-CHANNEL**  
**POWER MOSFETS**

**ELECTRICAL CHARACTERISTICS** ( $T_C=25^\circ\text{C}$  unless otherwise specified)

Characteristic	Symbol	Type	Min	Typ	Max	Units	Test Conditions
Drain-Source Breakdown Voltage	$BV_{DSS}$	IRF9240/2 IRFP9240/2 IRF9640/2	-200	—	—	V	$V_{GS}=0V$
		IRF9241/3 IRFP9241/3 IRF9641/3	-150	—	—	V	$I_D = -250\mu A$
Gate Threshold Voltage	$V_{GS(th)}$	ALL	-2.0	—	-4.0	V	$V_{DS}=V_{GS}$ , $I_D = -250\mu A$
Gate-Source Leakage Forward	$I_{GSS}$	ALL	—	—	-100	nA	$V_{GS} = -20V$
Gate-Source Leakage Reverse	$I_{GSS}$	ALL	—	—	100	nA	$V_{GS} = 20V$
Zero Gate Voltage Drain Current	$I_{DSS}$	ALL	—	—	-250	$\mu A$	$V_{DS} = \text{Max. Rating}$ , $V_{GS} = 0V$
		ALL	—	—	-1000	$\mu A$	$V_{DS} = \text{Max. Rating} \times 0.8$ , $V_{GS} = 0V$ , $T_C = 125^\circ\text{C}$
On-State Drain-Source Current (2)	$I_{D(on)}$	IRF9240/1 IRFP9240/1 IRF9640/1	-11	—	—	A	$V_{DS} > I_{D(on)} \times R_{DS(on) \text{ max.}}$ , $V_{GS} = -10V$
		IRF9642 IRF9643	-9.0	—	—	A	
Static Drain-Source On-State Resistance (2)	$R_{DS(on)}$	IRF9240/1 IRFP9240/1 IRF9640/1	—	—	0.5	$\Omega$	$V_{GS} = -10V$ , $I_D = -6.0A$
		IRF9242/3 IRFP9242/3 IRF9642/3	—	—	0.7	$\Omega$	
		ALL	—	—	—	—	
Forward Transconductance (2)	$g_{fs}$	ALL	4.0	—	—	S	$V_{DS} > I_{D(on)} \times R_{DS(on) \text{ max.}}$ , $I_D = -6.0A$
Input Capacitance	$C_{iss}$	ALL	—	—	1300	pF	
Output Capacitance	$C_{oss}$	ALL	—	—	450	pF	$V_{GS} = 0V$ , $V_{DS} = -25V$ , $f = 1.0\text{MHz}$
Reverse Transfer Capacitance	$C_{rss}$	ALL	—	—	250	pF	
Turn-On Delay Time	$t_{d(on)}$	ALL	—	—	30	ns	
Rise Time	$t_r$	ALL	—	—	15	ns	$V_{DD} = 0.5BV_{DSS}$ , $I_D = -6.0A$ , $Z_\theta = 4.7\Omega$ , (MOSFET switching times are essentially independent of operating temperature.)
Turn-Off Delay Time	$t_{d(off)}$	ALL	—	—	18	ns	
Fall Time	$t_f$	ALL	—	—	12	ns	
Total Gate Charge (Gate-Source Plus Gate-Drain)	$Q_g$	ALL	—	—	90	nC	$V_{GS} = -15V$ , $I_D = -22A$ , $V_{DS} = 0.8 \text{ Max. Rating}$ (Gate charge is essentially independent of operating temperature.)
Gate-Source Charge	$Q_{gs}$	ALL	—	—	30	nC	
Gate-Drain ("Miller") Charge	$Q_{gd}$	ALL	—	—	60	nC	

**THERMAL RESISTANCE**

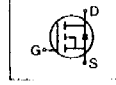
Junction-to-Case	$R_{thJC}$	ALL	—	—	1.0	K/W	
Case-to-Sink	$R_{thCS}$	ALL	—	1.0	—	K/W	Mounting surface flat, smooth, and greased
Junction-to-Ambient	$R_{thJA}$	IRFPXXXX IRF96XX	—	—	80		Free Air Operation
		IRF92XX	—	—	30	K/W	

- Notes:** (1)  $T_J = 25^\circ\text{C}$  to  $150^\circ\text{C}$   
(2) Pulse test: Pulse width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$   
(3) Repetitive rating: Pulse width limited by max. junction temperature

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**SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS**

Characteristic	Symbol	Type	Min	Typ	Max	Units	Test Conditions
Continuous Source Current (Body Diode)	$I_S$	IRF9240/1 IRFP9240/1 IRF9640/1	—	—	-11	A	Modified MOSFET symbol showing the integral reverse P-N junction rectifier 
		IRF9242/3 IRFP9242/3 IRF9642/3	—	—	-9.0	A	
Pulse Source Current (Body Diode) (3)	$I_{SM}$	IRF9240/1 IRFP9240/1 IRF9640/1	—	—	-44	A	
		IRF9242/3 IRFP9242/3 IRF9642/3	—	—	-36	A	
Diode Forward Voltage (2)	$V_{SD}$	IRF9240/1 IRFP9240/1 IRF9640/1	—	—	-4.6	V	$T_C=25^\circ\text{C}$ , $I_S=-11\text{A}$ , $V_{GS}=0\text{V}$
		IRF9242/3 IRFP9242/3 IRF9642/3	—	—	-4.4	V	$T_C=25^\circ\text{C}$ , $I_S=-9.0\text{A}$ , $V_{GS}=0\text{V}$
Reverse Recovery Time	$t_{rr}$	ALL	—	—	—	ns	$T_J=150^\circ\text{C}$ , $I_F=-11\text{A}$ , $dI_F/dt=100\text{A}/\mu\text{s}$

Notes: (1)  $T_J=25^\circ\text{C}$  to  $150^\circ\text{C}$  (2) Pulse test: Pulse width  $\leq 300\mu\text{s}$ , Duty Cycle  $\leq 2\%$   
 (3) Repetitive rating: Pulse width limited by max. junction temperature

