POWER MOSFE<u>I</u>S

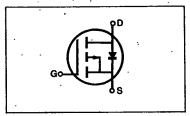
IRFP9130/9131/9132/9133 IRF9530/9531/9532/9533

Preliminary Specifications

98

7964142 0005405 7

-100 Volt, 0.30 Ohm SFET



FEATURES

- . Low Rps(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	Vos	R _{DS(on)}	ΊD
IRF/IRFP9130, IRF9530	-100V	0.30Ω	-12A
IRF/IRFP9131, [RF9531	-60V	0.30Ω	-12A
IRF/IRFP9132, IRF9532	-100V	0.40Ω	-10A
IRF/IRFP9133, IRF9533	-60V	0.40Ω	-10A

PACKAGE STYLE

Package Type	Part Number
TO-3	IRF9130/9131/9132/9133
TO-3P	IRFP9130/9131/9132/9133
. TO-220	IRF9530/9531/9532/9533

MAXIMUM RATINGS

			IRF/	IRFP		}
Characteristic .	Symbol	9130 9530	9131 9531	9132 9532	9133 9533	Unit
Drain-Source Voltage (1)	V _{DSS}	-100	-60	-100	60	Vdc
Drain-Gate Voltage (R _{GS} =1.0MΩ) (1)	V _{DGR}	-100	60	- 100	-60	Vdc
Gate-Source Voltage	VGS	±20				Vdc
Continuous Drain Current T _C =25°C	ما	-12	-12	-10	-10	Adc
Continuous Drain Current T _C =100°C	Ю	-7.5	-7.5	-6.5	-6.5	Adc
Drain Current—Pulsed (3)	IDM	-48	-48	-40	-40	Adc
Gate Current—Pulsed	I _{GM}		±	1.5		Adc
Total Power Dissipation @ T _C =25°C Derate above 25°C	P _D		-	75 .6		Watts W/°C
Operating and Storage Junction Temperature Rangy	T _J , Tstg	-55 to 150		· 	°C	
Maximum Lead Temp. for Soldering Purposes, 1/8" from case for 5 seconds	TL		3	00		°C

Notes: (1) TJ=25°C to 150°C

(2) Pulse test: Pulse width≤300μs, Duty Cycle≤2%
 (3) Repetitive rating: Pulse width limited by max. junction temperature

91

IRF9130/9131/9132/9133 IRFP9130/9131/9132/9133 IRF9530/9531/9532/0532 DE 7964142 0005406 9

P-CHANNEL **POWER MOSFETS** T-39-21

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

Characteristic	Symbol	Type	Min	Тур	Max	Units	Test Conditions
Drain-Source Breakdown	BV _{DSS}	IRF9130/2 IRFP9130/2 IRF9530/2	-100	_		v	V _{GS} =0V
Voltage	21033	IRF9131/3 IRFP9131/3 IRF9531/3	-60	_	_	٧	I _D =250μΑ
Gate Threshold Voltage	V _{GS(th)}	ALL	-2.0	-	-4.0	V	V _{DS} =V _{GS} , I _D =-250μA
Gate-Source Leakage Forward	lass	ALL		_	-100	nΑ	V _{GS} =-20V
Gate-Source Leakage Reverse	lass	ALL	_	1	100	nΑ	V _{GS} =20V
Zero Gate Voltage	Ipss	·ALL	-	-	-250	μΑ	V _{DS} =Max. Rating, V _{GS} =0V
Drain Current			_	1	-1000	μΑ	V _{DS} =Max. Rating×0.8, V _{GS} =0V, T _C =125°C
On-State Drain-Source	I _{D(on)}	IRF9130/1 IRFP9130/1 IRF9530/1	-12	_	_	A	V _{DS} >I _{D(on)} ×R _{DS(on) max.} , V _{GS} =-10V
Current (2)	10(011)	IRF9132/3 IRFP9132/3 IRF9532/3	-10	_	_	. A	VDS / ID(on) / Y (DS(on) max.) VGS / Y (VV
Static Drain-Source On-State	R _{DS(on)}	IRF9130/2 IRFP9132/2 IRF9530/2	_		0.30	Ω	V _{GS} =-10V, I _D =-6.5A
Resistance (2)	103(01)	IRF9131/3 IRFP9131/3 IRF9531/3	-	_	0.40	Ω	VGS 10,4, ID 0.0A
Forward Transconductance (2)	g fs	ALL	2.0	_	_	ន	V _{DS} >I _{D(on)} ×R _{DS(on) max.} , I _D =-6.5A
Input Capacitance	Ciss	ALL	_	_	700	рF	
Output Capacitance	Coss	ALL	_	_	450	pF	V _{GS} =0V, V _{DS} =-25V, f=1.0MHz
Reverse Transfer Capacitance	Cres	ALL	_	_	200	рF	
Turn-On Delay Time	t _{d(on)}	ALL	-	_	60	ns	
Rise Time	Tr	ALL.	_	-	140	ns	$V_{DD}=0.5BV_{DSS}$, $I_{D}=-6.5A$, $Z_{O}=50\Omega$
Turn-Off Delay Time	t _{d(off)}	ALL	_]	_	140	ns	(MOSFET switching times are essentially independent of operating temperature.)
Fall Time :	tí	ALL	_	_	140	ns	, , , , , , ,
Total Gate Charge (Gate-Source Plus Gate-Drain)	Qg	ALL	-	_	45	nC	V _{GS} =-15V, I _D =-15A, V _{DS} =0.8 Max.
Gate-Source Charge	Qgs	ALL	_	_	20	nC	Rating (Gate charge is essentially independent of operating temperature.)
Gate-Drain ("Miller") Charge	Q _{gd}	ALL		_	25	пC	

THERMAL RESISTANCE

Junction-to-Case	RthJC	ALL	. —	_	1.67	K/W	
Case-to-Sink	R _{thCS}	ALL	_	1.0	-	K/W	Mounting surface flat, smooth, and greased
Junction-to-Ambient	RthJA	IRFPXXXX IRF95XX	_	_	80	k/W	Free Air Operation
		IRF91XX	_	-	30	K/W	·

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





980 05407

4142 SAMSUNG SEMICONDUCTOR INC IRF9130/9131/9132/9133 IRFP9130/9131/9132/9133 IRF9530/9531/9532/9533

7964142 0005407 0 P-CHANNEL ::--**POWER MOSFETS**

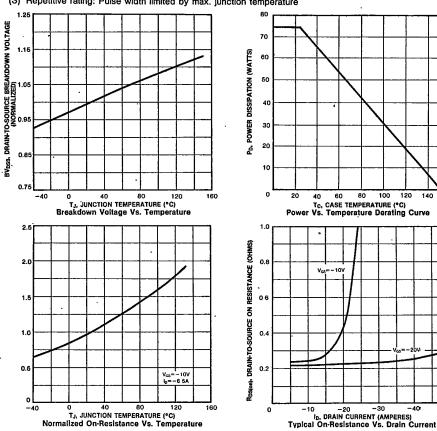
T-39-21

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Characteristic	Symbol	Туре	Min	Тур	Max	Units	Test Conditions
Continuous Source Current		IRF9130/1 IRFP9130/1 IRF9530/1	-	_	-12	Α	·
(Body Diode)	, . l	(RF9132/3 (RFP9132/3 (RF9532/3	_	_	-10	А	Modified MOSFET symbol .
Pulse Source Current	Ism	IRF9130/1 IRFP9130/1 IRF9530/1	З	_	-48	А	reverse P-N junction rectifier
(Body Diode) (3)	·om	IRF9132/3 IRFP9132/3 IRF9532/3	•	-	-40	A	. '
Diode Forward Voltage (2)	·Vsp	IRF9130/1 IRFP9130/1 IRF9530/1	-	_	-6.3	v	T _C =25°C, I _S =-12A, V _{GS} =0V
Sisse Formula Voltage (2)	420	IRF9132/3 IRFP9132/3 IRF9532/3	_	_	-6.0	v	T _C =25°C, I _S =-10A, V _{GS} =0V
Reverse Recovery Time	trr	ALL	'	_	_	ns	T _J =150°C, I _F =-12A, dI _F /dt=100A/μs

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

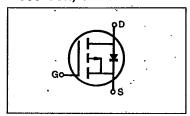


IRF9140/9141/9142/9143 IRFP9140/9141/9142/9143 IRF9540/9541/9542/9543

P-CHANNEL POWER MOSFETS

Preliminary Specifications

-100 Volt, 0.2 Ohm SFET



FEATURES

- Low Ros(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	Vos	R _{DS(on)}	ID
IRF/IRFP9140, IRF9540	-100V	0.20	-19A
IRF/IRFP9141, IRF9541	-60V	0.2Ω	-19A
IRF/IRFP9142, IRF9542	-100V	0.30	-15A
IRF/IRFP9143, IRF9543	-60V	0.3Ω	. –15A

PACKAGE STYLE

Package Type	Part Number
то-з	IRF9140/9141/9142/9143
то-зр	IRFP9140/9141/9142/9143
TO-220	IRF9540/9541/9542/9543

MAXIMUM RATINGS

			IRF/	IRFP	•	
Characteristic .	Symbol	9140 9540	9141 9541	9142 9542	9143 9543	Unit
Drain-Source Voltage (1)	V _{DSS}	-100	.–60	-100	-60	Vdc
Drain-Gate Voltage (R _{GS} =1.0MΩ) (1)	V _{DGR}	-100	-60	-100	-60	Vdc
Gate-Source Voltage	V _{GS}	V _{GS} ±20				
Continuous Drain Current T _C =25°C	lo	-19	-19	-15	-15	Adc
Continuous Drain Current T _C =100°C	ΙD	-12	-12	-10	-10	Adc
Drain Current—Pulsed (3)	l _{DM}	-76	-76	-60	-60	Adc
Gate Current—Pulsed	I _{GM}			Adc		
Total Power Dissipation @ T _C =25°C Derate above 25°C	P _D		Watts W/°C			
Operating and Storage Junction Temperature Range	T _J , Tstg	-55 to 150				°C
Maximum Lead Temp. for Soldering Purposes, 1/8" from case for 5 seconds	· TL		3	00		°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 max. junction temperature



IRF9140/9141/9142/9143 IRFP9140/9141/9142/9143 IRF9540/9541/9542/9543

POWER MOSFETS

T-39-23

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

Characteristic	Symbol	Туре	Min	Тур	Max	Units	Test Conditions
Drain-Source Breakdown	BVpss	IRF9140/2 IRFP9140/2 IRF9540/2	-100		- .	٧	V _{GS} =0V
Voltage	DVDSS	IRF9141/3 IRFP9141/2 IRF9541/3	- <u>6</u> 0	_		٧	I _D =-250μA
Gate Threshold Voltage	V _{GS(th)}	ALL	-2.0	_	-4.0	V	V _{DS} =V _{GS} , I _D =-250μA
Gate-Source Leakage Forward	lgss	ALL.		_	-100	nA	V _{GS} =-20V
Gate-Source Leakage Reverse	lass	ALL	, 1	-	100	nΑ	V _{GS} =20V
Zero Gate Voltage	lann	ALL	ı		-250	μΑ	V _{DS} =Max. Rating, V _{GS} =0V
Drain Current	loss	\\			∸1000	μΑ	V _{DS} =Max. Rating×0.8, V _{GS} =0V, T _C =125°C
On-State Drain-Source	1	IRF9140/1 IRFP9140/1 IRF9540/1	- 19	- .		Α.	V _{DS} >I _{D(on)} ×R _{DS(on) max.} , V _{GS} =-10V
Current(2)	I _{D(on)}	IRF9142/3 IRFP9142/3 IRF9542/3	-15	_		A	·
Static Drain-Source On-State	D	IRF9140/1 IRFP9140/1 IRF9540/1	_	-	0.2	. 0	V _{GS} =-10V, I _D =-10A
Resistance (2)	R _{DS(on)}	IRF9142/3 IRFP9142/3 IRF9542/3	-	_	0.3	Ω	
Forward Transconductance (2)	g _{fs}	ALL	5.0				$V_{DS}>I_{D(on)}\times R_{DS(on) \text{ max.}}$, $I_D=-10A$
Input Capacitance	Ciss	ALL		Ī —	1300	pF	
Output Capacitance	Coss	ALL	_	_	700	pF	V _{GS} =0V, V _{DS} =-25V, f=1.0MHz
Reverse Transfer Capacitance	Crss	ALL	_	–	400	pF:	
Turn-On Delay Time	t _{d(on)}	ALL		<u> </u>	30	пѕ	
Rīse Time ,	tr	ALL	_		15	ns	V _{DD} =0.5BV _{DSS} , I _D =-10A, Z _O =4.7Ω, (MOSFET switching times are essentially
Turn-Off Delay Time	t _{d(off)}	ALL	Ī —	_	20	ns	independent of operating temperature.)
Fall Time	tf	ALL		<u> </u>	12	ns	· ·
Total Gate Charge (Gate-Source Plus Gate-Drain	Q _g	ALL	_	_	90	nC	V _{GS} =-15V,I _D =-24A, V _{DS} =0.8 Max. Rating (Gate charge is essentially independent
Gate-Source Charge	Q _{gs}	ALL	_	_	30	nC	of operating temperature.)
Gate-Drain ("Miller") Charge	Q _{gd}	ALL	-	_	60	nC	

THERMAL RESISTANCE

Junction-to-Case	RthJC	ALL	_	_	1.0	K/W	·
Case-to-Sink	RthCS	ALL	_	0.1		k/w	Mounting surface flat, smooth, and greased
Junction-to-Ambient	ļ	IRFPXXXX IRF95XX	. –	-	80	K/W	Free Air Operation
I	RthJA	IRF91XX	_	Τ	30	K/W	

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

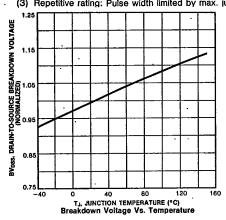
P-CHANNEL POWER MOSFETS

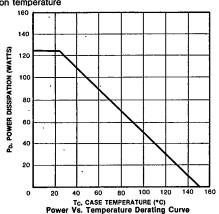
IRF9140/9141/9142/9143 IRFP9140/9141/9142/9143 IRF9540/9541/9542/9543

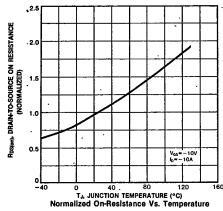
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

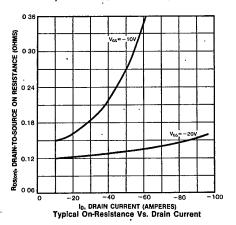
Characteristic	Symbol	Туре	Min	Тур	Max	Units	Test Conditions
Continuous Source Current	ls	IRF9140/1 IRFP9140/1 IRF9540/1	_	-	-19	A	
(Body Diode)	18	RF9142/3 IRFP9142/3 IRF9542/3	_	-	-15	A	Modified MOSFET symbol
Pulse Source Current	Ism	IRF9140/1 IRFP9140/1 IRF9540/1	Į.	_	-76	A	reverse P-N junction rectifier
(Body Diode) (3)	ism.	IRF9142/3 IRFP9142/3 IRF9542/3	-	_	-60	. А	,
Diode Forward Voltage (2)	V _{SD}	IRF9140/1 IRFP9140/1 IRF9540/1	_	_	-4.2	٧	T _C =25°C, I _S =-19A, V _{GS} =0V
Divide Poliward Voltage (2)	. VSD	IRF9142/3 IRFP9142/3 IRF9542/3	-	_	-4.0	v	T _C =25°C, I _S =-15A, V _{GS} =0V
Reverse Recovery Time	tır	ALL	_	- '		ns	T _J =150°C, I _F =-19A, dI _F /dt=100A/μs

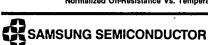
Notes: (1) T_J=25°C to 150°C (2) Pulse test: Pulse width≼300µs, Duty Cycle≤2% (3) Repetitive rating: Pulse width limited by max. junction temperature









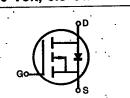


IRF9230/9231/9232/9233 DE 7964142 0005417 3 IRFP9230/9231/9232/9233 P-CHANNEL IRF9630/9631/9632/9633

POWER MOSFETS

Preliminary Specifications

-200 Volt, 0.8 Ohm SFET



PRODUCT SUMMARY

Part Number	V _{DS}	R _{DS(on)}	l _D
IRF/IRFP9230, IRF9630	-200V	0.80	-6.5A
IRF/IRFP9231, IRF9631	-150V	0.80	-6.5A
IRF/IRFP9232, IRF9632	-200V	1.20	-5.5A
IRF/IRFP9233, IRF9633	-150V	1.2Ω	-5.5A

7964142 SAMSUNG SEMICONDUCTOR INC

98D 05417

FEATURES • Low RDS(on)

- Improved inductive ruggedness
- Fast switching times
- Rugged polysilicon gate cell structure
- Low input capacitance
- Extended safe operating area
 Improved high temperature reliability

PACKAGE STYLE

Package Type	Part Number						
TO-3	IRF9230/9231/9232/9233						
то-зр	IRFP9230/9231/9232/9233						
TO-220	IRF9630/9631/9632/9633						

MAXIMUM RATINGS

			IRF/	IRFP		
Characteristic	Symbol	9230 9630	9231 9631	9232 9632	9233 9633	Unit
Drain-Source Voltage (1)	V _{DSS}	-200	-150	-200	-150	Vdc
Drain-Gate Voltage (R _{GS} =1.0MΩ) (1)	V _{DGR}	-200	-150	-200	-150	Vdc
Gate-Source Voltage	V _{GS}		±	20 '		Vdc
Continuous Drain Current Tc=25°C	lo	-6.5	-6.5	-5.5	-5.5	Adc
Continuous Drain Current T _C =100°C	lo	-4.0	-4.0	-3.5	-3.5	Adc
Drain Current—Pulsed (3)	l _{DM}	-26	-26	-22	-22	Adc
Gate Current—Pulsed	I _{GM}	. ±1.5				Adc
Total Power Dissipation @ T _C =25°C Derate above 25°C	PD	75 0.6				Watts W/°C
Operating and Storage Junction Temperature Rangy	T _J , Tstg	-55 to 150				°C
Maximum Lead Temp. for Soldering Purposes, 1/8" from case for 5 seconds	T _L 300				°c	

Notes: (1) TJ=25°C to 150°C

(1) Pulse test: Pulse width≼300µs, Duty Cycle≼2%
(3) Repetitive rating: Pulse width limited by max. junction temperature

IRF9230/9231/9232/9233 IRFP9230/9231/9232/9233 IRF9630/9631/9632/9633



7964142 SAMSUNG SEMICONDUCTOR INC

98D 05418

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

Characteristic	Symbol	Туре	Min	Тур	Max	Units	Test Conditions	
Drain-Source Breakdown	BVpss	IRF9230/2 IRFP9230/2 IRF9630/2	-200	-	-	٧.	V _{GS} =0V	
Voltage	DVDSS	IRF9231/3 IRFP9231/3 IRF9631/3	-150	-	-	v	i _D =-250μA	
Gate Threshold Voltage	V _{GS(th)}	ALL	-2.0	_	-4.0	V	V _{DS} =V _{GS} , I _D =-250μA	
Gate-Source Leakage Forward	IGSS	ALL		_	-100	nA	V _{GS} =-20V	
Gate-Source Leakage Reverse	loss	ALL		-	100	nA	V _{GS} =20V	
Zero Gate Voltage	· lana	ALL	1	_	-250	μΑ	V _{DS} =Max. Rating, V _{GS} =0V	
Drain Current	· loss.	ALL	_	1	-1000	μΑ	V _{DS} =Max. Rating×0.8, V _{GS} =0V, T _C =125°C	
On-State Drain-Source	lm	IRF9230/1 IRFP9230/1 IRF9630/1	-6.5		_	A	V _{DS} >I _{D(on)} ×R _{DS(on) max.} , V _{GS} =−10V	
Current (2)	ID(on)	IRF9232/3 IRFP9232/3 IRF9632/3	-5.5	_	_	. A	180 Blant Colon man 60	
Static Drain-Source On-State	Page 1	IRF9230/1 IRFP9230/1 IRF9630/1	-	_	0.8	Ω	Vos=-10V. In=-3.5A	
Resistance (2)	R _{DS(on)}	IRF9232/3 IRFP9232/3 IRF9632/3		_	1.2	Ω	1	
Forward Transconductance (2)	Q fs	ALL	2.2	_		8	$V_{DS}>I_{D(on)}\times R_{DS(on) \text{ max.}}, I_D=-3.5A$	
Input Capacitance	Ciss	ALL	-	_	650	pF		
Output Capacitance	Coss	ALL	_	_	300	pF	V _{GS} =0V, V _{DS} =-25V, f=1.0MHz	
Reverse Transfer Capacitance	Crss	ALL	_	-	90	рF		
Turn-On Delay Time ,	t _{d(on)}	ALL		-	50	ns		
Rise Time	tr	ALL	-	-	100	ns'	$V_{DD}=0.5BV_{DSS}$, $I_{D}=-3.5A$, $Z_{O}=50\Omega$, (MOSFET switching times are essentially	
Turn-Off Delay Time	t _{d(off)}	ALL	_	-	100	ns	independent of operating temperature.)	
Fall Time	· t _f	ALL	_	-	80	ns	1	
Total Gate Charge (Gate-Source Plus Gate-Drain)	Qg	ALL	_	-	45	nC	V _{GS} =-15V, I _D =-8.0A, V _{DS} =0.8 Max.	
Gate-Source Charge	Q _{gs}	ALL		-	20	nC	Rating (Gate charge is essentially independent of operating temperature.)	
Gate-Drain ("Miller") Charge	Q _{gd}	ALL	_	-	25	пС		

THERMAL RESISTANCE

Junction-to-Case	RthJC	ALL	_	-	1.67	K/W	
Case-to-Sink	R _{thCS}	ALL	_	1.0	· `	K/W	Mounting surface flat, smooth, and greased
Junction-to-Ambient		IRFPXXXX — — 80 K/W	K/W Free Air Operation				
	RthJA	IRF92XX	_	-	30	K/W	

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





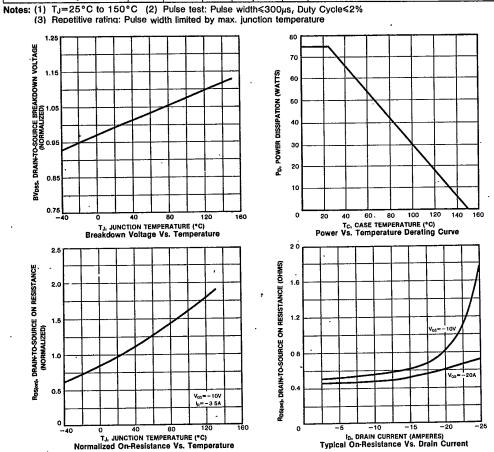
P-CHANNEL

POWER MOSFETS 98D 05419

7964142 SAMSUNG SEMICONDUCTOR INC SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

T-39-21

Characteristic	Symbol	Type	Min	Тур	Max	Units	Test Conditions
Continuous Source Current		IRF9230/1 IRFP9230/1 IRF9630/1	-	-	-6.5	A	
(Body Diode)	ls .	IRF9232/3 IRFP9232/3 IRF9632/3	-	-	-5.5	·A	Modified MOSFET symbol
Pulse Source Current	Ism	IRF9230/1 IRFP9230/1 IRF9630/1	_	-	-26	A	reverse P-N junction rectifier
(Body Diode) (3)	ISM	IRF9232/3 IRFP9232/3 IRF9632/3	_	-	-22	A	
Diode Forward Voltage (2)	. V _{SD}	IRF9230/1 IRFP9230/1 IRF9630/1	-	_	-6.5	V	T _C =25°C, I _S =-6.5A, V _{GS} =0V
blode Forward Vollage (2)	VSD.	IRF9232/3 IRF99232/3 IRF9632/3	_	_	-6.3	v	T _C =25°C, I _S =-5.5A, V _{GS} =0V
Reverse Recovery Time	trr	ALL	_	_	_	ns	$T_J=150$ °C, $I_F=-6.5A$, $dI_F/dt=100A/\mu s$



1964745 0002450 3

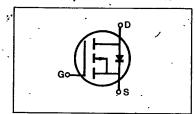
IRF9240/9241/9242/9243 IRFP9240/9241/9242/9243¹ IRF9640/9641/9642/9643

POWER MOSFETS

Preliminary Specifications

7964142 0005420 3

-200 Volt, 0.5 Ohm SFET



FEATURES

- Low RDS(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	Vos	R _{DS(on)}	l _D
IRF/IRFP9240, IRF9640	-200V	0.5Ω	-11A
IRF/IRFP9241, IRF9641	-150V	0.5Ω	-11A
IRF/IRFP9242, IRF9642	-200V	0.7Ω	-9.0A
IRF/IRFP9243, IRF9643	-150V	0.7Ω	-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

		IRF/IRFP						
Characteristic	Symbol	9240 9640	9241 9641	9242 9642	9243 9643	Unit		
Drain-Source Voltage (1)	V _{DSS}	-200	-150	-200	-150	Vdc		
Drain-Gate Voltage (R _{GS} =1.0MΩ) (1)	V _{DGR}	-200	-150	-200	-150	Vac		
Gate-Source Voltage	V _{GS}		±	20		Vdc		
Continuous Drain Current T _C =25°C	ĺD	-11	-11	-9.0	-9.0	Adc		
Continuous Drain Current T _C =100°C	l _D	-7.0	-7.0	-6.0	-6.0	Adc		
Drain Current—Pulsed (3)	IDM	-44	-44	-36	-36	Adc		
Gate Current—Pulsed	IGM		±.	1.5	,	Adc		
Total Power Dissipation @ T _C =25°C Derate above 25°C	P _D .	P _D ,			-	Watts W/°C		
Operating and Storage Junction Temperature Rangy	T _J , Tstg			°C				
Maximum Lead Temp. for Soldering Purposes, 1/8" from case for 5 seconds	TL		°C					

Notes: (1) T_J=25°C to 150°C

(1) 13-23 3 to 130 0
(2) Pulse test: Pulse width≤300μs, Duty Cycle≤2%
(3) Repetitive rating: Pulse width limited by max. junction temperature



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

P-CHANNEL **POWER MOSFETS** T-39-83

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

Characteristic	Symbol	Туре	Min	Тур	Max	Units	Test Conditions	
Drain-Source Breakdown	BVDSS	IRF9240/2 IRF99240/2 IRF9640/2	-200	_	-	V	V _{GS} =0V	
Voltage	0.4033	IRF9241/3 IRF99241/3 IRF9641/3	-150	_	-	V	I _D =-250μA	
Gate Threshold Voltage	V _{GS(th)}	ALL	-2.0		-4.0	٧	V _{DS} =V _{GS} , I _D =-250μA	
Gate-Source Leakage Forward	lgss	ALL	_	_	100	nA	V _{GS} =-20V	
Gate-Source Leakage Reverse	lgss	ALL	_	1	100	nΑ	V _{GS} =20V	
Zero Gate Voltage	loss	ALL	-	1	-250	μΑ	V _{DS} =Max. Rating, V _{GS} =0V	
Drain Current				_	-1000	μΑ	V _{DS} =Max. Rating×0.8, V _{GS} =0V, T _C =125°C	
On-State Drain-Source	I _{D(on)}	IRF9240/1 IRFP9240/1 IRF9640/1	-11	_	_	A	Vooler VP V - 40V	
Current (2)	-	IRF9642 IRF9643	-9.0	-	 ·	Α	$V_{DS}>I_{D(on)}\times R_{DS(on) \text{ max.}}, V_{GS}=-10V$	
Static Drain-Source On-State		IRF9240/1 IRFP9240/1 IRF9640/1	-	_	0.5	Ω		
Resistance (2)	R _{DS(on)}	IRF9242/3 IRFP9242/3 IRF9642/3	-	_	0.7	Ω	$V_{GS} = -10V$, $I_D = -6.0A$	
Forward Transconductance (2)	9fs	ALL	4.0	-	· _	8	$V_{DS}>I_{D(on)}\times R_{DS(on) \text{ max.}}$, $I_D=-6.0A$	
nput Capacitance	Ciss	ALL	-	-	1300	pF		
Output Capacitance	Coss	ALL	- 1	_	450	ρF	V _{GS} =0V, V _{DS} =-25V, f=1.0MHz	
Reverse Transfer Capacitance	Crss	ALL	-	_	250	pF		
urn-On Delay Time	t _{d(on)}	ALL	_	-1	30	ns		
Rise Time	t _r	ALL	_		15	ns	$V_{DD} = 0.5BV_{DSS}$, $I_D = -6.0A$, $Z_O = 4.7\Omega$,	
urn-Off Delay Time	t _{d(off)}	ALL	_		18	ns i	(MOSFET switching times are essentially independent of operating temperature.)	
all Time .	tr	ALL	_	_	12	ns		
otal Gate Charge Gate-Source Plus Gate-Drain)	Qg.	ALL	-	-	90		V _{GS} =-15V, I _D =-22A, V _{DS} =0.8 Max. Rating (Gate charge is essentially independent of operating temperature.)	
ate-Source Charge	Qgs	ALL	_	_	30			
iate-Drain ("Miller") Charge	Q _{gd}	ALL	_	_	60	nC		

THERMAL RESISTANCE

Junction-to-Case	RthJC	ALL	_	_	1.0	K/W	
Case-to-Sink	Rthcs	ALL -		1.0	_	K/W	Mounting surface flat, smooth, and greased
Junction-to-Ambient	Rinja	IRFPXXXX IRF96XX	_	-	80		Free Air Operation
	TIUDA	IRF92XX	_	_	.30	K/W	

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

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

P-CHĀNNEL **POWER MOSFETS**

98

7964342 0005422 7 CHARACTERISTICS

Characteristic ·	Symbol	Туре	Min	Тур	Max	Units	Test Conditions
Continuous Source Current	İ	IRF9240/1 IRFP9240/1 IRF9640/1	_	-	-11	Α	
(Body Diode)	Is	IRF9242/3 IRFP9242/3 IRF9642/3	_	_	-9.0	Α	Modified MOSFET symbol showing the integral
Pulse Source Current		IRF9240/1 IRFP9240/1 IRF9640/1		-	-44	Α	reverse P·N junction rectifier
(Body Diode) (3)	ISM	IRF9242/3 IRFP9242/3 IRF9642/3	_	-	-36	A	
Diode Forward Voltage (2)		IRF9240/1 IRFP9240/1 IRF9640/1	_	-	-4.6	٧	T _C =25°C, I _S =-11A, V _{GS} =0V
Sidd tottad Vollage (2)		IRF9242/3 IRFP9242/3 IRF9642/3	_	-	-4.4	. v	T _C =25°C, I _S =-9.0A, V _{GS} =0V
Reverse Recovery Time	trr	ALL.		_	_	ns	T _J =150°C, I _F =-11A, dI _F /dt=100A/μs

Notes: (1) T_J=25°C to 150°C (2) Pulse test: Pulse width≤300µs, Duty Cycle≤2%

