

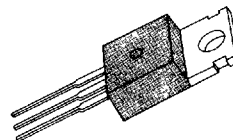
FEATURES

- 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

PRODUCT SUMMARY

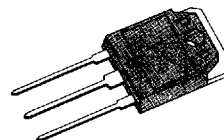
Part Number	V_{DS}	$R_{DS(on)}$	I_D
IRF9640/IRFP9240	-200V	0.5 Ω	-11A
IRF9641/IRFP9241	-150V	0.5 Ω	-11A
IRF9642/IRFP9242	-200V	0.7 Ω	-9.0A
IRF9643/IRFP9243	-150V	0.7 Ω	-9.0A

TO-220



IRF9640/9641/9642/9643

TO-3P



IRFP9240/9241/9242/9243

MAXIMUM RATINGS

Characteristic	Symbol	IRF9640 IRFP9240	IRF9641 IRFP9241	IRF9642 IRFP9242	IRF9643 IRFP9243	Unit
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}	± 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	-37	Adc
Gate Current—Pulsed	I_{GM}	± 1.5				Adc
Single Pulsed Avalanche Energy (4)	E_{AS}	380				mJ
Avalanche Current	I_{AS}	-11				A
Total Power Dissipation @ $T_C=25^\circ C$ Derate above $25^\circ C$	P_D	125 1.0				Watts W/ $^\circ C$
Operating and Storage Junction Temperature Range	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 with limited by max. junction temperature

(4) $L=7mH$, $V_{ds}=-50V$, $R_G=25\Omega$, Starting $T_J=25^\circ C$

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

P-CHANNEL POWER MOSFETS

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

Symbol	Characteristic	Min	Typ	Max	Units	Test Conditions
BV _{DSS}	Drain-Source Breakdown Voltage IRF9640/IRFP9240 IRF9642/IRFP9242	-200	—	—	V	V _{GS} =0V I _D =-250μA
	IRF9641/IRFP9241 IRF9643/IRFP9243	-150	—	—	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 _{OSS}	Zero Gate Voltage Drain Current	—	—	250	μA	V _{DS} =Max. Rating, V _{GS} =0V
		—	—	1000	μA	V _{DS} =Max. Rating×0.8, V _{GS} =0V, T _C =125°C
I _{D(on)}	On-State Drain-Source Current (2) IRF9640/IRFP9240 IRF9641/IRFP9241	-11	—	—	A	V _{DS} ≤-7.7V, V _{GS} =-10V
	IRF9642/IRFP9242 IRF9643/IRFP9243	-9.0	—	—	A	
R _{DS(on)}	Static Drain-Source On-State Resistance (2) IRF9640/IRFP9240 IRF9642/IRFP9241	—	0.44	0.5	Ω	V _{GS} =-10V, I _D =-6.0A
	IRF9642/IRFP9242 IRF9643/IRFP9243	—	0.5	0.7	Ω	
g _{fs}	Forward Transconductance (2)	4.0	4.7	—	Ω	V _{DS} ≤-50V, I _D =-6.0A
C _{iss}	Input Capacitance	—	1542	—	pF	V _{GS} =0V, V _{DS} =-25V, f=1.0MHz
C _{oss}	Output Capacitance	—	230	—	pF	
C _{rss}	Reverse Transfer Capacitance	—	115	—	pF	
t _{d(on)}	Turn-On Delay Time	—	—	30	ns	V _{DD} =0.5BV _{DSS} , I _D =-6.0A, Z _O =4.7Ω (MOSFET switching times are essentially independent of operating temperature)
t _r	Rise Time	—	—	15	ns	
t _{d(off)}	Turn-Off Delay Time	—	—	18	ns	
t _f	Fall Time	—	—	12	ns	
Q _g	Total Gate Charge (Gate-Source Plus Gate-Drain)	—	—	90	nC	V _{GS} =-15V, I _D =-22A, V _{DS} =0.8 Max. Rating (Gate charge is essentially independent of operating temperature.)
Q _{gs}	Gate-Source Charge	—	—	30	nC	
Q _{gd}	Gate-Drain ("Miller") Charge	—	—	60	nC	

THERMAL RESISTANCE

Symbol	Characteristic		IRF9640-3	IRFP9240-3	Unit	
R _{thJC}	Junction-to-Case	MAX	1.0	1.0	K/W	
R _{thCS}	Case-to-Sink	TYP	0.5	0.24	K/W	Mounting surface flat, smooth, and greased
R _{thJA}	Junction-to-Ambient	MAX	80	40	K/W	Free Air Operation

Notes: (1) T_J=25°C to 150°C

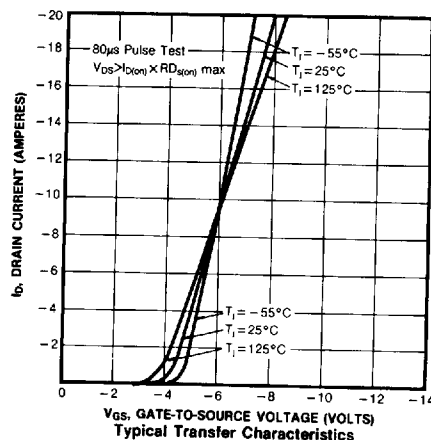
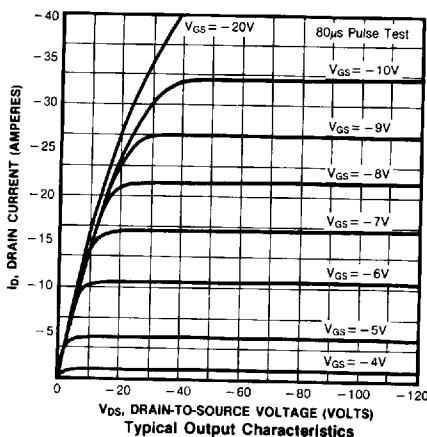
(2) Pulse test: Pulse width≤300μs, Duty Cycle≤2%

(3) Repetitive rating: Pulse width limited by max. junction temperature

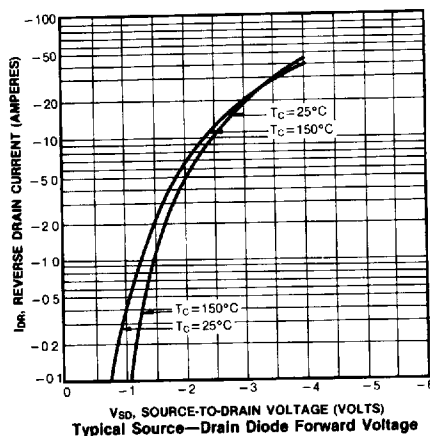
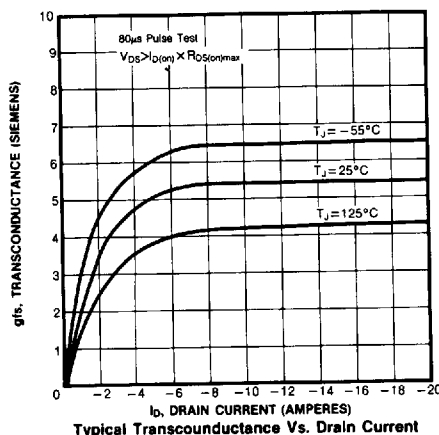
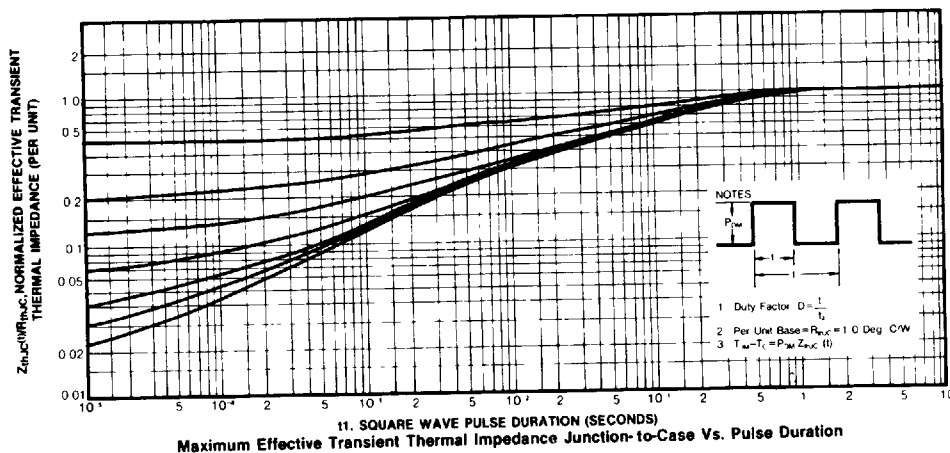
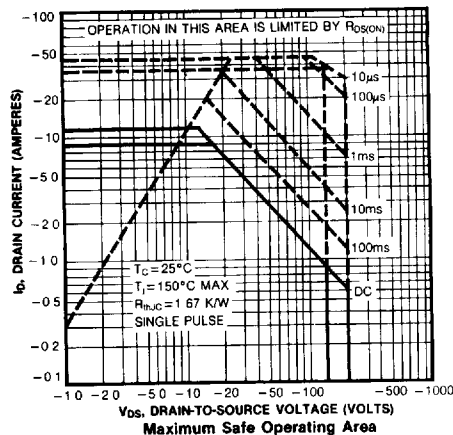
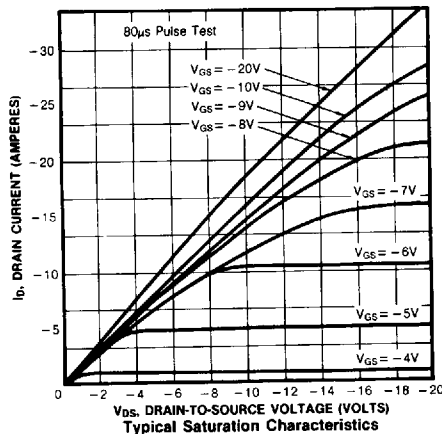
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Symbol	Characteristic	Min	Typ	Max	Units	Test Conditions
I_S	Continuous Source Current (Body Diode) IRF9640/IRFP9240 IRF9641/IRFP9241	—	—	-11	A	Modified MOSFET symbol showing the integral reverse P-N junction rectifier 
	IRF9642/IRFP9242 IRF9643/IRFP9243	—	—	-9	A	
I_{SM}	Pulse Source Current (Body Diode) (3) IRF9640/IRFP9240 IRF9641/IRFP9241	—	—	-44	A	$T_C=25^\circ\text{C}$, $I_S=-11\text{A}$, $V_{GS}=0\text{V}$
	IRF9642/IRFP9242 IRF9643/IRFP9243	—	—	-36	A	
V_{SD}	Diode Forward Voltage (2) IRF9640/IRFP9240 IRF9641/IRFP9241	—	—	-4.6	A	$T_C=25^\circ\text{C}$, $I_S=-9.0\text{A}$, $V_{GS}=0\text{V}$
	IRF9642/IRFP9242 IRF9643/IRFP9243	—	—	-4.4	A	
t_{rr}	Reverse Recovery Time	—	270	—	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°C (2) Pulse test: Pulse width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$
(3) Repetitive rating. Pulse with limited by max. junction temperature

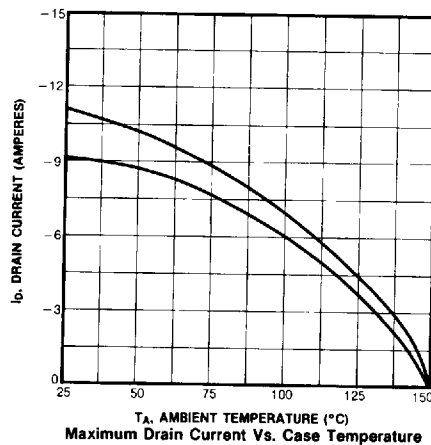
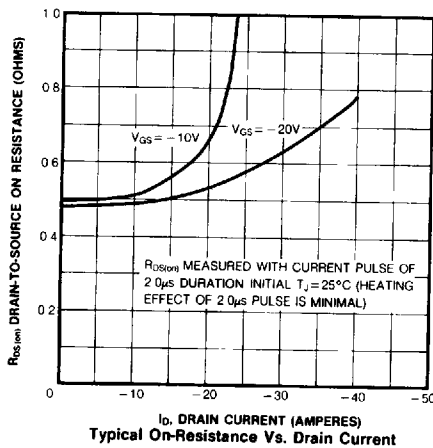
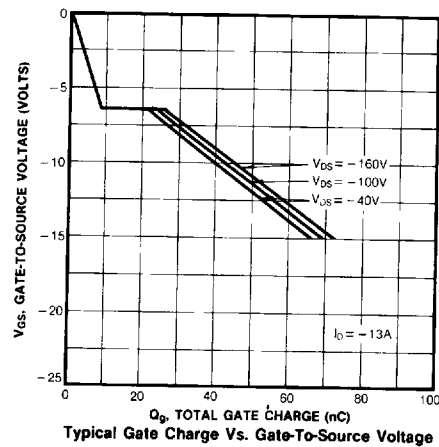
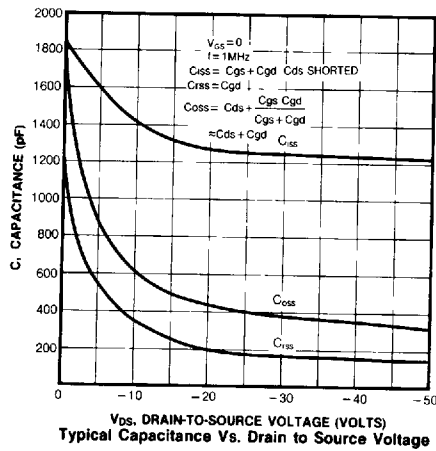
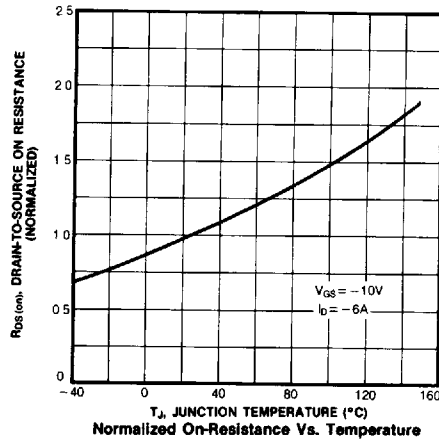
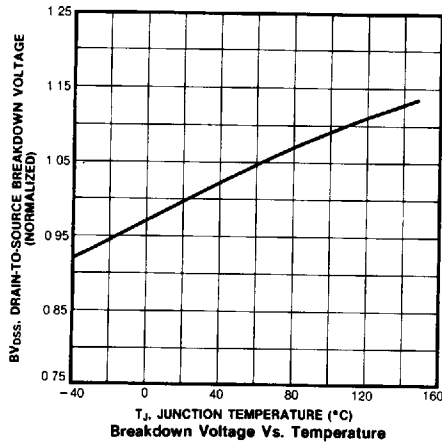


**P-CHANNEL
 POWER MOSFETS**



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

P-CHANNEL
POWER MOSFETS



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

P-CHANNEL
POWER MOSFETS

