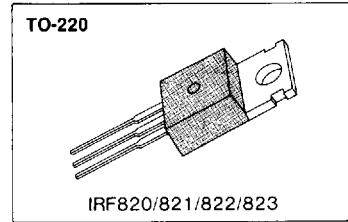


FEATURES

- 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
IRF820	500V	3.0Ω	2.5A
IRF821	450V	3.0Ω	2.5A
IRF822	500V	4.0Ω	2.2A
IRF823	450V	4.0Ω	2.2A

MAXIMUM RATINGS

Characteristics	Symbol	IRF820 IRF420	IRF821 IRF421	IRF822 IRF422	IRF823 IRF423	Unit
Drain-Source Voltage (1)	V_{DSS}	500	450	500	450	Vdc
Drain-Gate Voltage ($R_{GS}=1.0M\Omega$)(1)	V_{DGR}	500	450	500	450	Vdc
Gate-Source Voltage	V_{GS}	±20				Vdc
Continuous Drain Current $T_C=25^\circ C$	I_D	2.5	2.5	2.2	2.2	Adc
Continuous Drain Current $T_C=100^\circ C$	I_D	1.6	1.6	1.4	1.4	Adc
Drain Current—Pulsed (3)	I_{DM}	8.0	8.0	7.0	7.0	Adc
Gate Current—Pulsed	I_{GM}	±1.5				Adc
Single Pulsed Avalanche Energy (4)	E_{AS}	210				mJ
Avalanche Current	I_{AS}	2.5				A
Total Power Dissipation @ $T_C=25^\circ C$ Derate above $25^\circ C$	P_D	50 0.4				Watts W/ $^\circ C$
Operating and Storage Junction to Case	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) $L=60$ mH, $V_{dd}=50V$, $R_G=25\Omega$, Starting $T_J=25^\circ C$

IRF820/821/822/823

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

Symbol	Characteristic	Min	Typ	Max	Units	Test Conditions
BV _{DSS}	Drain-Source Breakdown Voltage IRF820 IRF822	500	—	—	V	V _{GS} =0V I _D =250μA
	IRF821 IRF823	450	—	—	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} =Max. Rating×0.8, V _{GS} =0V, T _C =125°C
I _{D(on)}	On-State Drain-Source Current (2) IRF820 IRF821	2.5	—	—	A	V _{DS} ≥10V, V _{GS} =10V
	IRF822 IRF823	2.0	—	—	A	
R _{DS(on)}	Static Drain-Source On-State Resistance (2) IRF820 IRF821	—	2.5	3.0	Ω	V _{GS} =10V, I _D =1.4A
	IRF822 IRF823	—	3.0	4.0	Ω	
g _{fs}	Forward Transconductance (2)	1.5	2.3	—	Ω	V _{DS} ≥10V, I _D =1.4A
C _{iss}	Input Capacitance	—	390	—	pF	V _{GS} =0V, V _{DS} =25V, f=1.0MHz
C _{oss}	Output Capacitance	—	52	—	pF	
C _{rss}	Reverse Transfer Capacitance	—	22	—	pF	
t _{d(on)}	Turn-On Delay Time	—	10	15	ns	V _{DD} =0.5BV _{DSS} , I _D =2.5A, Z _O =18Ω (MOSFET switching times are essentially independent of operating temperature)
t _r	Rise Time	—	12	18	ns	
t _{d(off)}	Turn-Off Delay Time	—	28	42	ns	
t _f	Fall Time	—	12	18	ns	
Q _g	Total Gate Charge (Gate-Source Plus Gate-Drain)	—	13	19	nC	V _{GS} =10V, I _D =2.5A, V _{DS} =0.8 Max. Rating (Gate charge is essentially independent of operating temperature.)
Q _{gs}	Gate-Source Charge	—	2.2	3.3	nC	
Q _{gd}	Gate-Drain ("Miller") Charge	—	6.8	10	nC	




THERMAL RESISTANCE

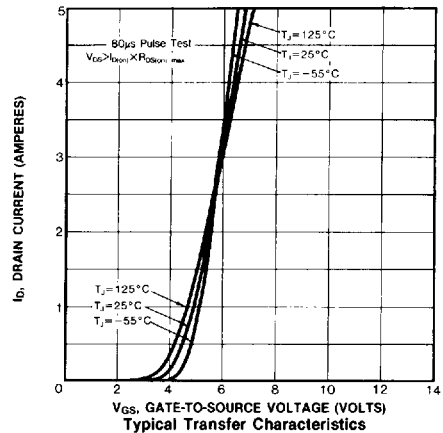
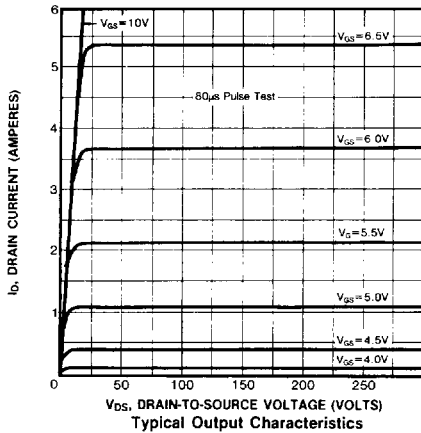
Symbol	Characteristic		IRF820-3	Unit	
R _{thJC}	Junction-to-Case	MAX	2.5	K/W	
R _{thCS}	Case-to-Sink	TYP	0.5	K/W	Mounting surface flat, smooth, and greased
R _{thJA}	Junction-to-Ambient	MAX	80	K/W	Free Air Operation

- 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) IRF820 IRF821	—	—	2.5	A	Modified MOSFET symbol showing the integral reverse P-N junction rectifier 
	IRF822 IRF823	—	—	2.2	A	
I _{SM}	Pulse Source Current(Body Diode)(3) IRF820 IRF821	—	—	8.0	A	
	IRF822 IRF823	—	—	7.0	A	
V _{SD}	Diode Forward Voltage (2) IRF820 IRF821	—	—	1.6	V	T _C =25°C, I _S =2.5A, V _{GS} =0V
	IRF822 IRF823	—	—	1.5	V	T _C =25°C, I _S =2.2A, V _{GS} =0V
t _{rr}	Reverse Recovery Time	—	270	540	ns	T _J =25°C, I _F =2.5A, 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 with limited by max. junction temperature

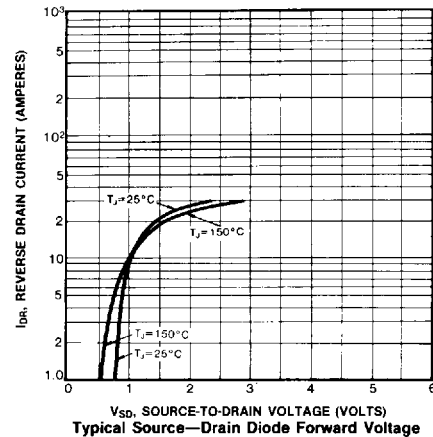
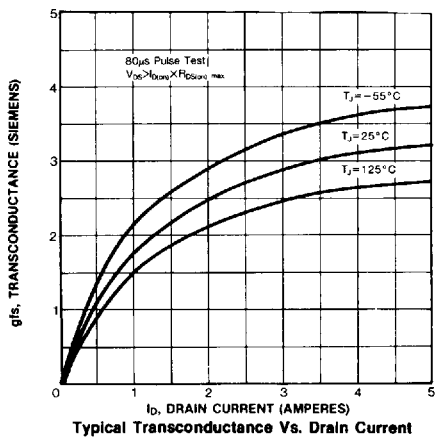
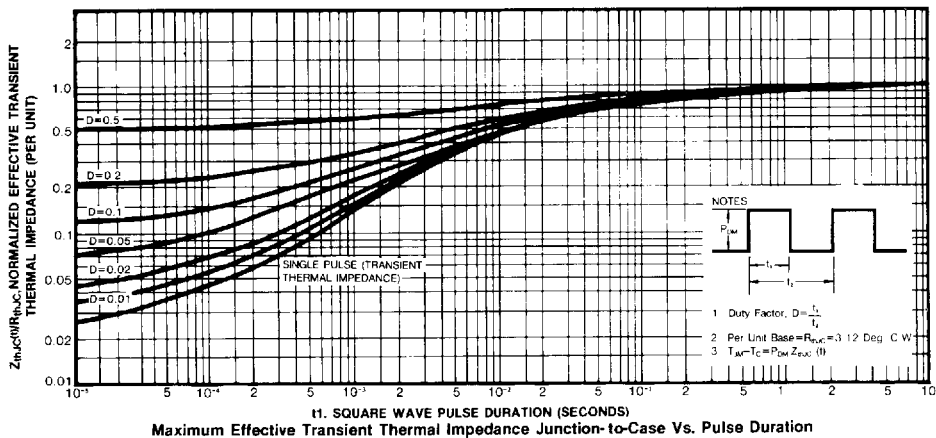
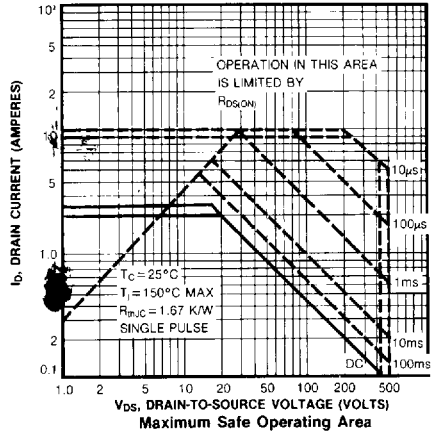
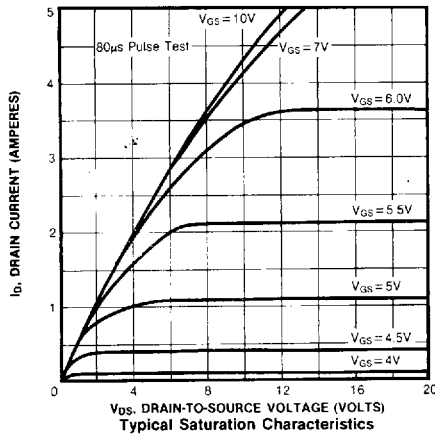


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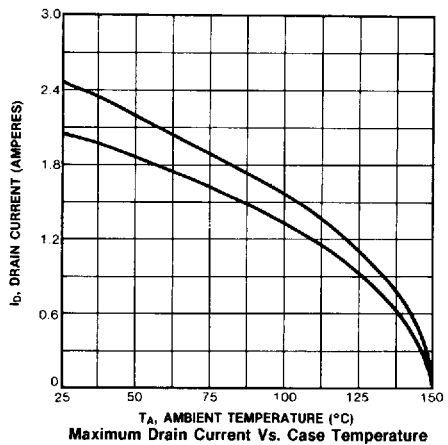
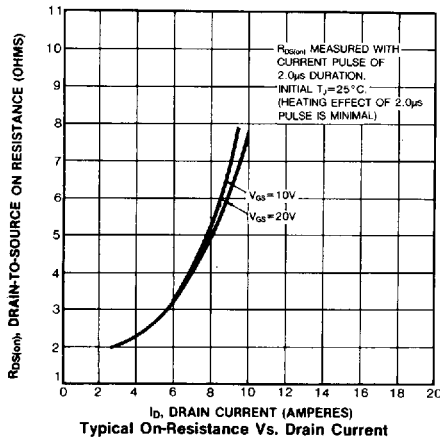
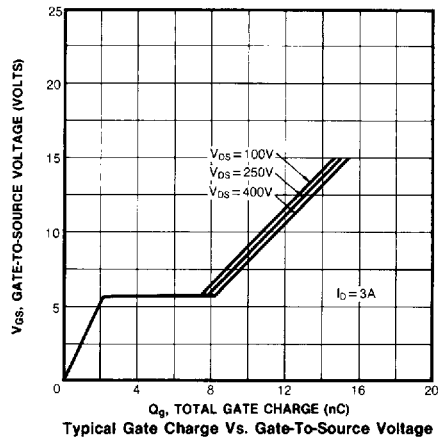
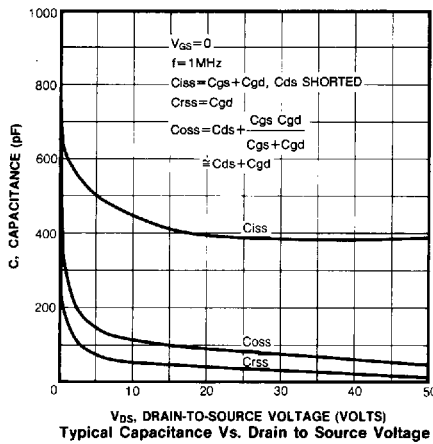
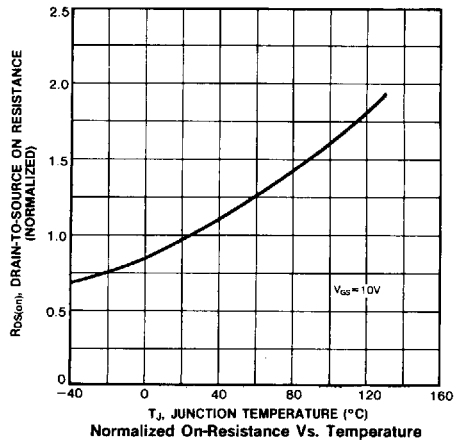
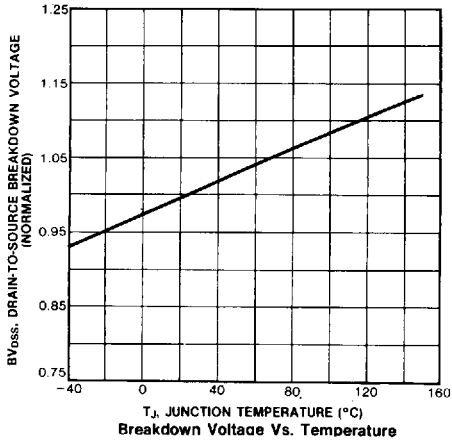
IRF820/821/822/823

N-CHANNEL POWER MOSFETS



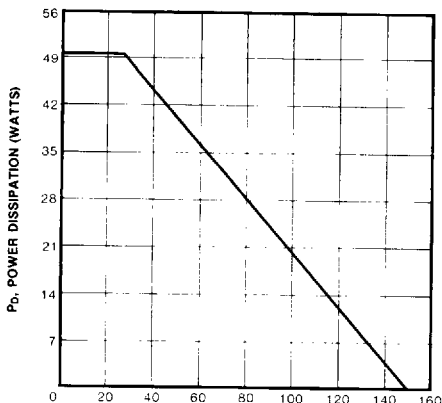
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IRF820/821/822/823

**N-CHANNEL
POWER MOSFETS**



T_c CASE TEMPERATURE (°C)
Power Vs. Temperature Derating Curve

4