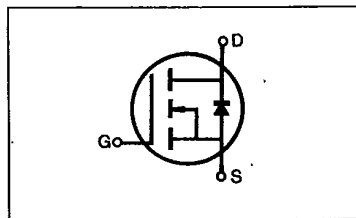
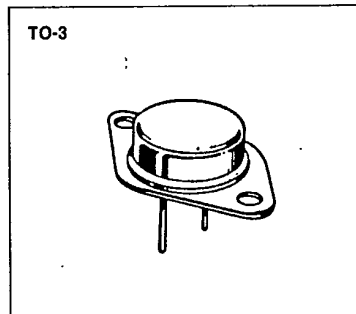


**IRF430/431/432/433****N-CHANNEL  
POWER MOSFETS****FEATURES**

- Low  $R_{DS(on)}$  at high voltage
- Improved inductive ruggedness
- Excellent high voltage stability
- Fast switching times
- Rugged polysilicon gate cell structure
- Low input capacitance
- Extended safe operating area
- Improved high temperature reliability
- TO-3 package (High voltage)

**PRODUCT SUMMARY**

Part Number	$V_{DS}$	$R_{DS(on)}$	$I_D$
IRF330	500V	1.5 $\Omega$	4.5A
IRF331	450V	1.5 $\Omega$	4.5A
IRF332	500V	2.0 $\Omega$	4.0A
IRF333	450V	2.0 $\Omega$	4.0A

**MAXIMUM RATINGS**

Characteristic	Symbol	IRF430	IRF431	IRF432	IRF433	Unit
Drain-Source Voltage (1)	$V_{DS}$	500	450	500	450	Vdc
Drain-Gate Voltage ( $R_{GS}=1.0M\Omega$ ) (1)	$V_{DGR}$	500	450	500	450	Vdc
Gate-Source Voltage	$V_{GS}$	$\pm 20$				Vdc
Continuous Drain Current $T_C=25^\circ C$	$I_D$	4.5	4.5	4.0	4.0	Adc
Continuous Drain Current $T_C=100^\circ C$	$I_D$	3.0	3.0	2.5	2.5	Adc
Drain Current—Pulsed (3)	$I_{DM}$	18	18	16	16	Adc
Gate Current—Pulsed	$I_{GM}$	$\pm 1.5$				Adc
Total Power Dissipation @ $T_C=25^\circ C$ Derate above $25^\circ C$	$P_D$	75 0.6				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 width limited by max. junction temperature

## IRF430/431/432/433

N-CHANNEL  
POWER MOSFETSELECTRICAL CHARACTERISTICS (T<sub>C</sub>=25°C unless otherwise specified)

Characteristic	Symbol	Type	Min	Typ	Max	Units	Test Conditions
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	IRF430 IRF432	500	—	—	V	V <sub>DS</sub> =0V
		IRF431 IRF433	450	—	—	V	I <sub>D</sub> =250μA
Gate Threshold Voltage	V <sub>GS(th)</sub>	ALL	2.0	—	4.0	V	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA
Gate-Source Leakage Forward	I <sub>GSS</sub>	ALL	—	—	100	nA	V <sub>GS</sub> =20V
Gate-Source Leakage Reverse	I <sub>GSS</sub>	ALL	—	—	-100	nA	V <sub>GS</sub> =-20V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	ALL	—	—	250	μA	V <sub>DS</sub> =Max. Rating, V <sub>GS</sub> =0V
			—	—	1000	μA	V <sub>DS</sub> =Max. Rating×0.8, V <sub>GS</sub> =0V, T <sub>C</sub> =125°C
On-State Drain-Source Current (2)	I <sub>D(on)</sub>	IRF430 IRF431	4.5	—	—	A	V <sub>DS</sub> >I <sub>D(on)</sub> ×R <sub>DS(on)</sub> max., V <sub>GS</sub> =10V
		IRF432 IRF433	4.0	—	—	A	
Static Drain-Source On-State Resistance (2)	R <sub>DS(on)</sub>	IRF430 IRF431	—	0.95	1.5	Ω	V <sub>GS</sub> =10V, I <sub>D</sub> =2.5A
		IRF432 IRF433	—	1.4	2.0	Ω	
Forward Transconductance (2)	g <sub>fs</sub>	ALL	2.5	3.2	—	S	V <sub>DS</sub> >I <sub>D(on)</sub> ×R <sub>DS(on)</sub> max., I <sub>D</sub> =2.5A
Input Capacitance	C <sub>iss</sub>	ALL	—	720	800	pF	V <sub>GS</sub> =0V, V <sub>DS</sub> =25V, f=1.0MHz
Output Capacitance	C <sub>oss</sub>	ALL	—	110	200	pF	
Reverse Transfer Capacitance	C <sub>rss</sub>	ALL	—	50	60	pF	
Turn-On Delay Time	t <sub>d(on)</sub>	ALL	—	—	30	ns	V <sub>DD</sub> =0.5BV <sub>DSS</sub> , I <sub>D</sub> =2.5A, Z <sub>Θ</sub> =15 Ω (MOSFET switching times are essentially independent of operating temperature.)
Rise Time	t <sub>r</sub>	ALL	—	—	30	ns	
Turn-Off Delay Time	t <sub>d(off)</sub>	ALL	—	—	55	ns	
Fall Time	t <sub>f</sub>	ALL	—	—	30	ns	
Total Gate Charge (Gate-Source Plus Gate-Drain)	Q <sub>g</sub>	ALL	—	22	30	nC	V <sub>GS</sub> =10V, I <sub>D</sub> =6.0A, V <sub>DS</sub> =0.8 Max. Rating (Gate charge is essentially independent of operating temperature.)
Gate-Source Charge	Q <sub>gs</sub>	ALL	—	4.2	—	nC	
Gate-Drain ("Miller") Charge	Q <sub>gd</sub>	ALL	—	17.8	—	nC	

## THERMAL RESISTANCE

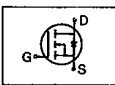
Junction-to-Case	R <sub>thJC</sub>	ALL	—	—	1.67	K/W	
Case-to-Sink	R <sub>thCS</sub>	ALL	—	0.1	—	K/W	Mounting surface flat, smooth, and greased
Junction-to-Ambient	R <sub>thJA</sub>	ALL	—	—	30	K/W	Free Air Operation

Notes: (1) T<sub>J</sub>=25°C to 150°C

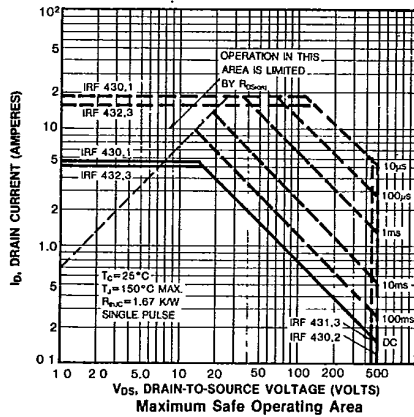
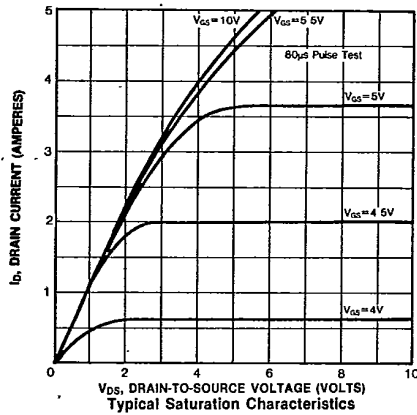
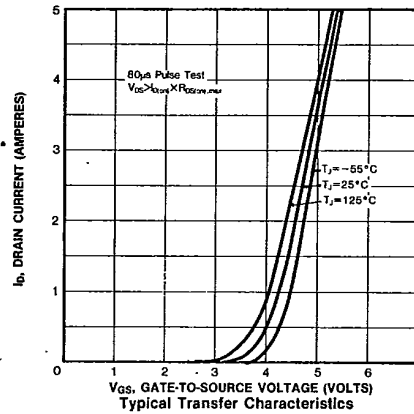
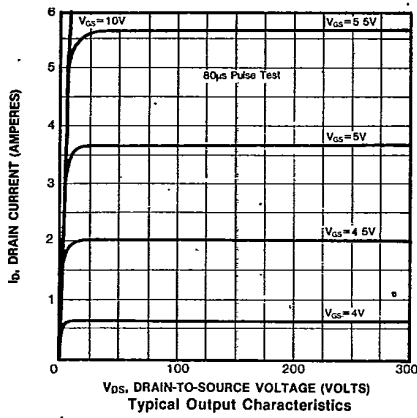
(2) Pulse test: Pulse width≤300μs, Duty Cycle≤2%

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

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

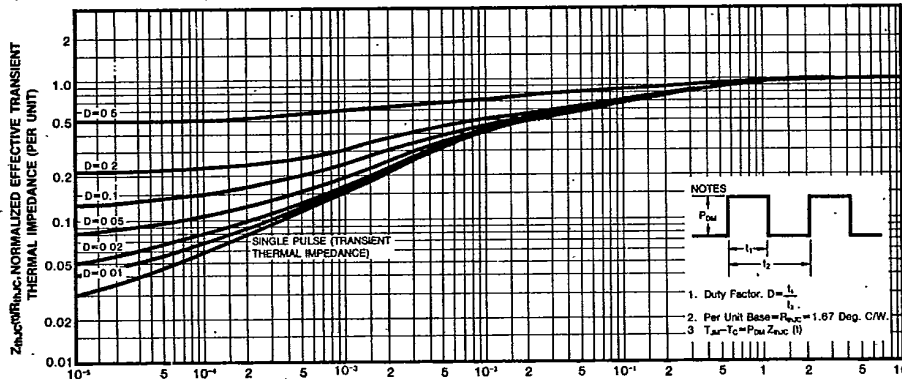
Characteristic	Symbol	Type	Min	Typ	Max	Units	Test Conditions
Continuous Source Current (Body Diode)	$I_S$	IRF430	—	—	4.5	A	Modified MOSFET symbol showing the integral reverse P-N junction rectifier 
		IRF431	—	—	4.5	A	
		IRF432 IRF433	—	—	4.0	A	
Pulse Source Current (Body Diode) (3)	$I_{SM}$	IRF430	—	—	18	A	
		IRF431	—	—	18	A	
		IRF432 IRF433	—	—	16	A	
Diode Forward Voltage (2)	$V_{SD}$	IRF430	—	—	1.4	V	$T_C=25^\circ\text{C}$ , $I_S=4.5\text{A}$ , $V_{GS}=0\text{V}$
		IRF431	—	—	1.4	V	$T_C=25^\circ\text{C}$ , $I_S=4.5\text{A}$ , $V_{GS}=0\text{V}$
		IRF432 IRF433	—	—	1.3	V	$T_C=25^\circ\text{C}$ , $I_S=4.0\text{A}$ , $V_{GS}=0\text{V}$
Reverse Recovery Time	$t_{rr}$	ALL	—	800	—	ns	$T_J=150^\circ\text{C}$ , $I_F=4.5\text{A}$ , $dI_F/dt=100\text{A}/\mu\text{s}$

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

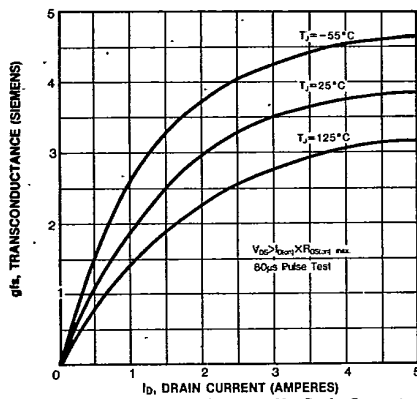


IRF430/431/432/433

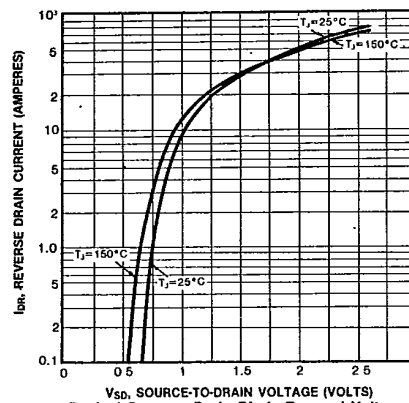
N-CHANNEL  
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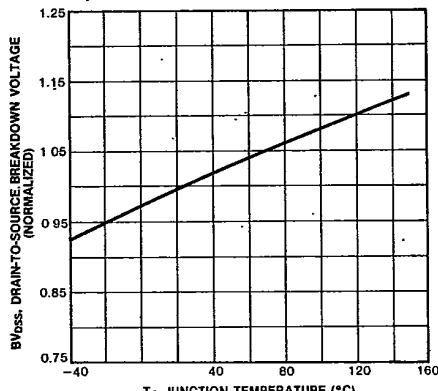
11. SQUARE WAVE PULSE DURATION (SECONDS)  
Maximum Effective Transient Thermal Impedance Junction-to-Case Vs. Pulse Duration



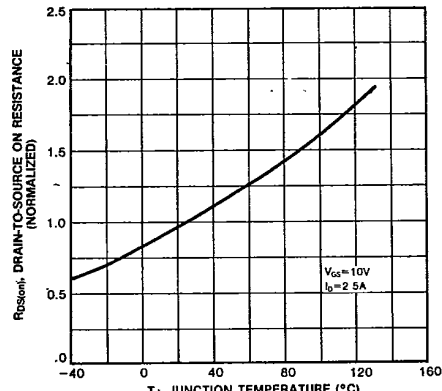
Typical Transconductance Vs. Drain Current



Typical Source-Drain Diode Forward Voltage



Breakdown Voltage Vs. Temperature



Normalized On-Resistance Vs. Temperature

**IRF430/431/432/433**

**N-CHANNEL  
POWER MOSFETS**

