

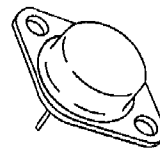
**IRF430-433/IRF830-833
 MTM/MTP4N45/4N50
 N-Channel Power MOSFETs,
 4.5 A, 450 V/500 V**

Description

These devices are n-channel, enhancement mode, power MOSFETs designed especially for high voltage, high speed applications, such as off-line switching power supplies, UPS, AC and DC motor controls, relay and solenoid drivers.

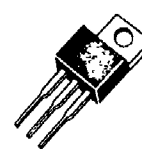
- V_{GS} Rated at ± 20 V
- Silicon Gate for Fast Switching Speeds
- I_{DSS} , $V_{DS(on)}$, SOA and $V_{GS(th)}$ Specified at Elevated Temperature
- Rugged

TO-204AA



IRF430
 IRF431
 IRF432
 IRF433
 MTM4N45
 MTM4N50

TO-220AB



IRF830
 IRF831
 IRF832
 IRF833
 MTP4N45
 MTP4N50

Maximum Ratings

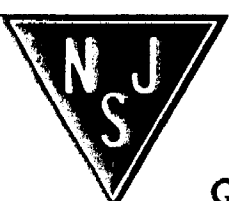
Symbol	Characteristic	Rating IRF430/432 IRF830/832 MTM/MTP4N50	Rating IRF431/433 IRF831/833 MTM/MTP4N45	Unit
V_{DSS}	Drain to Source Voltage	500	450	V
V_{DGR}	Drain to Gate Voltage $R_{GS} = 20 \text{ k}\Omega$	500	450	V
V_{GS}	Gate to Source Voltage	± 20	± 20	V
T_J, T_{stg}	Operating Junction and Storage Temperature	-55 to +150	-55 to +150	$^{\circ}\text{C}$
T_L	Maximum Lead Temperature for Soldering Purposes, 1/8" From Case for 5 s	275	275	$^{\circ}\text{C}$

Maximum On-State Characteristics

		IRF430/431 IRF830/831	IRF432/433 IRF832/833	MTM/MTP4N45 MTM/MTP4N45	
$R_{DS(on)}$	Static Drain-to-Source On Resistance	1.5	2.0	1.5	Ω
I_D	Drain Current				A
	Continuous	4.5	4.0	4.0	
	Pulsed	18	16	10	

Maximum Thermal Characteristics

$R_{\theta JC}$	Thermal Resistance, Junction to Case	1.67	1.67	1.67	$^{\circ}\text{C}/\text{W}$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	60	60	60	$^{\circ}\text{C}/\text{W}$
P_D	Total Power Dissipation at $T_C = 25^{\circ}\text{C}$	75	75	75	W



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IRF430-433/IRF830-833

Electrical Characteristics (T_C = 25°C unless otherwise noted)

Symbol	Characteristic	Min	Max	Unit	Test Conditions
Off Characteristics					
V _{(BR)DSS}	Drain Source Breakdown Voltage ¹ IRF430/432/830/832 IRF431/433/831/833	500		V	V _{GS} = 0 V, I _D = 250 μA
		450			
I _{DSS}	Zero Gate Voltage Drain Current		250	μA	V _{DS} = Rated V _{DSS} , V _{GS} = 0 V
			1000	μA	V _{DS} = 0.8 x Rated V _{DSS} , V _{GS} = 0 V, T _C = 125°C
I _{GSS}	Gate-Body Leakage Current IRF430-433 IRF830-833			nA	V _{GS} = ± 20 V, V _{DS} = 0 V
			± 100		
			± 500		

On Characteristics

V _{GS(th)}	Gate Threshold Voltage	2.0	4.0	V	I _D = 250 μA, V _{DS} = V _{GS}
R _{DS(on)}	Static Drain-Source On-Resistance ² IRF430/431/830/831 IRF432/433/832/833			Ω	V _{GS} = 10 V, I _D = 2.5 A
			1.5		
			2.0		
g _{fs}	Forward Transconductance	2.5		S (Ω)	V _{DS} = 10 V, I _D = 2.5 A

Dynamic Characteristics

C _{iss}	Input Capacitance		800	pF	V _{DS} = 25 V, V _{GS} = 0 V f = 1.0 MHz
C _{oss}	Output Capacitance		200	pF	
C _{rss}	Reverse Transfer Capacitance		60	pF	

Switching Characteristics (T_C = 25°C, Figures 12, 13)

t _{d(on)}	Turn-On Delay Time		30	ns	V _{DD} = 225 V, I _D = 2.5 A V _{GS} = 10 V, R _{GEN} = 15 Ω R _{GS} = 15 Ω
t _r	Rise Time		30	ns	
t _{d(off)}	Turn-Off Delay Time		55	ns	
t _f	Fall Time		30	ns	
Q _g	Total Gate Charge		30	nC	V _{GS} = 10 V, I _D = 7.0 A V _{DS} = 180 V

Symbol	Characteristic	Typ	Max	Unit	Test Conditions
Source-Drain Diode Characteristics					
V _{SD}	Diode Forward Voltage IRF430/431/830/831		1.4	V	I _S = 4.5 A; V _{GS} = 0 V
	IRF432/433/832/833		1.3	V	I _S = 4.0 A; V _{GS} = 0 V
t _{rr}	Reverse Recovery Time	600		ns	I _S = 4.5 A; di _S /dt = 100 A/μS

Notes

- T_J = +25°C to +150°C
- Pulse test: Pulse width ≤ 80 μs, Duty cycle ≤ 1%

MTM/MTP4N45/4N50

Electrical Characteristics ($T_C = 25^\circ\text{C}$ unless otherwise noted)

Symbol	Characteristic	Min	Max	Unit	Test Conditions
Off Characteristics					
$V_{(BR)DSS}$	Drain Source Breakdown Voltage ¹ MTM/MTP4N50 MTM/MTP4N45			V	$V_{GS} = 0\text{ V}$, $I_D = 5.0\text{ mA}$
		500			
		450			
I_{DSS}	Zero Gate Voltage Drain Current		0.25	mA	$V_{DS} = 0.85 \times \text{Rated } V_{DSS}$, $V_{GS} = 0\text{ V}$
			2.5	mA	$V_{DS} = 0.85 \times \text{Rated } V_{DSS}$, $V_{GS} = 0\text{ V}$, $T_C = 100^\circ\text{C}$
I_{GSS}	Gate-Body Leakage Current		± 500	nA	$V_{GS} = \pm 20\text{ V}$, $V_{DS} = 0\text{ V}$
On Characteristics					
$V_{GS(th)}$	Gate Threshold Voltage	2.0	4.5	V	$I_D = 1.0\text{ mA}$, $V_{DS} = V_{GS}$
		1.5	4.0	V	$I_D = 1.0\text{ mA}$, $V_{DS} = V_{GS}$, $T_C = 100^\circ\text{C}$
$R_{DS(on)}$	Static Drain-Source On-Resistance ²		1.5	Ω	$V_{GS} = 10\text{ V}$, $I_D = 2.0\text{ A}$
$V_{DS(on)}$	Drain-Source On-Voltage ²		3.0	V	$V_{GS} = 10\text{ V}$, $I_D = 2.0\text{ A}$
			7.0	V	$V_{GS} = 10\text{ V}$, $I_D = 4.0\text{ A}$
			6.0	V	$V_{GS} = 10\text{ V}$, $I_D = 4.0\text{ A}$, $T_C = 100^\circ\text{C}$
g_{fs}	Forward Transconductance	2.0		S (2)	$V_{DS} = 10\text{ V}$, $I_D = 2.0\text{ A}$
Dynamic Characteristics					
C_{iss}	Input Capacitance		1200	pF	$V_{DS} = 25\text{ V}$, $V_{GS} = 0\text{ V}$ $f = 1.0\text{ MHz}$
C_{oss}	Output Capacitance		300	pF	
C_{rss}	Reverse Transfer Capacitance		80	pF	
Switching Characteristics ($T_C = 25^\circ\text{C}$, Figures 12, 13)³					
$t_{d(on)}$	Turn-On Delay Time		50	ns	$V_{DD} = 25\text{ V}$, $I_D = 2.0\text{ A}$ $V_{GS} = 10\text{ V}$, $R_{GEN} = 50\ \Omega$ $R_{GS} = 50\ \Omega$
t_r	Rise Time		100	ns	
$t_{d(off)}$	Turn-Off Delay Time		200	ns	
t_f	Fall Time		100	ns	
Q_g	Total Gate Charge		60	nC	$V_{GS} = 10\text{ V}$, $I_D = 7.0\text{ A}$ $V_{DD} = 180\text{ V}$

Notes

1. $T_J = +25^\circ\text{C}$ to $+150^\circ\text{C}$
2. Pulse test: Pulse width $\leq 80\ \mu\text{s}$, Duty cycle $\leq 1\%$
3. Switching time measurements performed on LEM TR-58 test equipment.