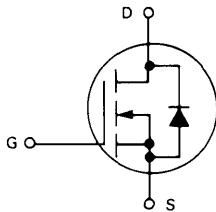


IRF450
IRF451
IRF452

**N-CHANNEL ENHANCEMENT-MODE SILICON GATE
 TMOS POWER FIELD EFFECT TRANSISTOR**

These TMOS Power FETs are designed for high voltage, high speed power switching applications such as switching regulators, converters, solenoid and relay drivers.

- Silicon Gate for Fast Switching Speeds
- Low $r_{DS(on)}$ to Minimize On-Losses. Specified at Elevated Temperature
- Rugged — SOA is Power Dissipation Limited
- Source-to-Drain Diode Characterized for Use With Inductive Loads



MAXIMUM RATINGS

Rating	Symbol	IRF			Unit
		450	451	452	
Drain-Source Voltage	V_{DSS}	500	450	500	Vdc
Drain-Gate Voltage ($R_{GS} = 1.0 M\Omega$)	V_{DGR}	500	450	500	Vdc
Gate-Source Voltage	V_{GS}	± 20			Vdc
Drain Current Continuous Pulsed	I_D	13	12		Adc
	I_{DM}	52	48		
Total Power Dissipation @ $T_C = 25^\circ C$ Derate above $25^\circ C$	P_D	150 1.2			Watts W/ $^\circ C$
Operating and Storage Temperature Range	T_J, T_{stg}	-55 to 150			$^\circ C$

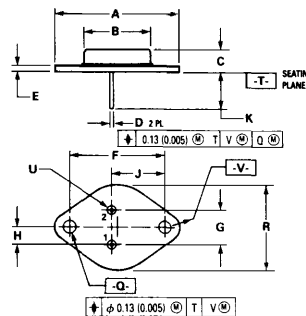
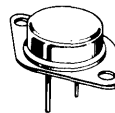
THERMAL CHARACTERISTICS

Thermal Resistance Junction to Case Junction to Ambient	$R_{\theta JC}$	0.83	$^\circ C/W$
	$R_{\theta JA}$	30	
Maximum Lead Temp. for Soldering Purposes, 1/8" from Case for 5 Seconds	T_L	300	$^\circ C$

See the MTH13N45 Designer's Data Sheet for a complete set of design curves for the product on this data sheet.

The Designer's Data Sheet permits the design of most circuits entirely from the information presented. Limit curves — representing boundaries on device characteristics — are given to facilitate "worst case" design.

Part Number	V_{DSS}	$r_{DS(on)}$	I_D
IRF450	500 V	0.4 Ω	13 A
IRF451	450 V	0.4 Ω	13 A
IRF452	500 V	0.5 Ω	12 A



STYLE 1:
 PIN 1: BASE
 2: EMITTER
 CASE COLLECTOR

- NOTES:
 1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
 2. CONTROLLING DIMENSION: INCH.
 3. ALL RULES AND NOTES ASSOCIATED WITH REFERENCED TO-204AA OUTLINE SHALL APPLY.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	—	39.37	—	1.550
B	—	21.08	—	0.830
C	6.35	8.25	0.250	0.325
D	0.97	1.09	0.038	0.043
E	1.40	1.77	0.055	0.070
F	30.15 BSC		1.187 BSC	
G	10.92 BSC		0.430 BSC	
H	5.46 BSC		0.215 BSC	
J	16.89 BSC		0.665 BSC	
K	11.18	12.19	0.440	0.480
Q	3.84	4.19	0.151	0.165
R	26.67		1.050	
U	4.83	5.33	0.190	0.210
V	3.84	4.19	0.151	0.165

CASE 1-06
TO-204AA

IRF450-452

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

Characteristic	Symbol	Min	Max	Unit	
OFF CHARACTERISTICS					
Drain-Source Breakdown Voltage (V _{GS} = 0, I _D = 0.25 mA)	IRF451 IRF450, IRF452	V _{(BR)DSS}	450 500	— —	Vdc
Zero Gate Voltage Drain Current (V _{DS} = Rated V _{DSS} , V _{GS} = 0) (V _{DS} = 0.8 Rated V _{DSS} , V _{GS} = 0, T _J = 125°C)		I _{DSS}	— —	0.25 1.00	mAdc
Gate-Body Leakage Current, Forward (V _{GSF} = 20 Vdc, V _{DS} = 0)		I _{GSSF}	—	100	nAdc
Gate-Body Leakage Current, Reverse (V _{GSR} = 20 Vdc, V _{DS} = 0)		I _{GSSR}	—	100	nAdc
ON CHARACTERISTICS*					
Gate Threshold Voltage (V _{DS} = V _{GS} , I _D = 0.25 mA)		V _{GS(th)}	2.0	4.0	Vdc
Static Drain-Source On-Resistance (V _{GS} = 10 Vdc, I _D = 7.0 Adc)	IRF450, IRF451 IRF452	r _{DS(on)}	— —	0.4 0.5	Ohm
On-State Drain Current (V _{GS} = 10 V) (V _{DS} ≥ 5.2 Vdc) (V _{DS} ≥ 6.0 Vdc)	IRF450, IRF451 IRF452	I _{D(on)}	13 12	— —	Adc
Forward Transconductance (V _{DS} ≥ 5.2 V, I _D = 7.0 A) (V _{DS} ≥ 6.0 V, I _D = 7.0 A)	IRF450, IRF451 IRF452	g _{FS}	6.0 6.0	— —	mhos
DYNAMIC CHARACTERISTICS					
Input Capacitance	(V _{DS} = 25 V, V _{GS} = 0, f = 1.0 MHz)	C _{iss}	—	3000	pF
Output Capacitance		C _{oss}	—	600	
Reverse Transfer Capacitance		C _{rss}	—	200	
SWITCHING CHARACTERISTICS*					
Turn-On Delay Time	(V _{DD} ≈ 200 V, I _D = 7.0 Apk, R _{gen} = 4.7 Ohms)	t _{d(on)}	—	35	ns
Rise Time		t _r	—	50	
Turn-Off Delay Time		t _{d(off)}	—	150	
Fall Time		t _f	—	70	
Total Gate Charge	(V _{GS} = 10 V, V _{DS} = 0.8 × Rated V _{DSS} , I _D = Rated I _D)	Q _g	110 (Typ)	120	nC
Gate-Source Charge		Q _{gs}	50 (Typ)	—	
Gate-Drain Charge		Q _{gd}	60 (Typ)	—	
SOURCE DRAIN DIODE CHARACTERISTICS*					
Forward On-Voltage	(I _S = Rated I _D , V _{GS} = 0)	V _{SD}	—	1.3 ⁽¹⁾	Vdc
Forward Turn-On Time		t _{on}	Limited by stray inductance		
Reverse Recovery Time		t _{rr}	1200 (Typ)	—	ns
INTERNAL PACKAGE INDUCTANCE					
Internal Drain Inductance (Measured from the contact screw on the header closer to the source pin and the center of the die)		L _d	5 (Typ)	—	nH
Internal Source Inductance (Measured from the source pin 0.25" from the package to the source bond pad)		L _s	12.5 (Typ)	—	nH

*Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%.

(1) Add 0.1 V for IRF450 and IRF451.