

**REPETITIVE AVALANCHE AND dv/dt RATED
 HEXFET[®] TRANSISTORS
 THRU-HOLE (TO-204AA/AE)**

**IRF450
 JANTX2N6770
 JANTXV2N6770
 500V, N-CHANNEL**

Product Summary

Part Number	BVDSS	RDS(on)	Id
IRF450	500V	0.400Ω	12A

The HEXFET[®] technology is the key to International Rectifier's advanced line of power MOSFET transistors. The efficient geometry and unique processing of this latest "State of the Art" design achieves: very low on-state resistance combined with high transconductance; superior reverse energy and diode recovery dv/dt capability.

The HEXFET transistors also feature all of the well established advantages of MOSFETs such as voltage control, very fast switching, ease of paralleling and temperature stability of the electrical parameters.

They are well suited for applications such as switching power supplies, motor controls, inverters, choppers, audio amplifiers and high energy pulse circuits.



Features:

- Repetitive Avalanche Ratings
- Dynamic dv/dt Rating
- Hermetically Sealed
- Simple Drive Requirements
- Ease of Paralleling

Absolute Maximum Ratings

	Parameter		Units
I _D @ V _{GS} = 0V, T _C = 25°C	Continuous Drain Current	12	A
I _D @ V _{GS} = 0V, T _C = 100°C	Continuous Drain Current	7.75	
I _{DM}	Pulsed Drain Current ①	48	
P _D @ T _C = 25°C	Max. Power Dissipation	150	W
	Linear Derating Factor	1.2	W/°C
V _{GS}	Gate-to-Source Voltage	±20	V
EAS	Single Pulse Avalanche Energy ②	750	mJ
I _{AR}	Avalanche Current ③	12	A
E _{AR}	Repetitive Avalanche Energy ④	15	mJ
dv/dt	Peak Diode Recovery dv/dt ⑤	3.5	V/ns
T _J	Operating Junction	-55 to 150	°C
T _{STG}	Storage Temperature Range		
	Lead Temperature	300 (0.063 in. (1.6mm) from case for 10s)	
	Weight	11.5 (typical)	g

For footnotes refer to the last page

Electrical Characteristics @ T_j = 25°C (Unless Otherwise Specified)

	Parameter	Min	Typ	Max	Units	Test Conditions
B _V DSS	Drain-to-Source Breakdown Voltage	500	—	—	V	V _{GS} = 0V, I _D = 1.0mA
ΔB _V DSS/ΔT _J	Temperature Coefficient of Breakdown Voltage	—	0.78	—	V/°C	Reference to 25°C, I _D = 1.0mA
R _{DS(on)}	Static Drain-to-Source On-State Resistance	—	—	0.4 0.5	Ω	V _{GS} = 10V, I _D = 7.75A () V _{GS} = 10V, I _D = 12A ()
V _{GS(th)}	Gate Threshold Voltage	2.0	—	4.0	V	V _{DS} = V _{GS} , I _D = 250μA
g _{fs}	Forward Transconductance	5.5	—	—	S	V _{DS} > 15V, I _{DS} = 7.75A ()
I _{DSS}	Zero Gate Voltage Drain Current	—	—	25 250	μA	V _{DS} = 400V, V _{GS} = 0V V _{DS} = 400V V _{GS} = 0V, T _J = 125°C
I _{GSS}	Gate-to-Source Leakage Forward	—	—	100	nA	V _{GS} = 20V
I _{GSS}	Gate-to-Source Leakage Reverse	—	—	-100	nA	V _{GS} = -20V
Q _g	Total Gate Charge	55	—	120	nC	V _{GS} = 10V, I _D = 12A V _{DS} = 250V
Q _{gs}	Gate-to-Source Charge	5.0	—	19	nC	
Q _{gd}	Gate-to-Drain ('Miller') Charge	27	—	70	nC	
t _{d(on)}	Turn-On Delay Time	—	—	35	ns	V _{DD} = 250V, I _D = 12A, V _{GS} = 10V, R _G = 2.35Ω
t _r	Rise Time	—	—	190		
t _{d(off)}	Turn-Off Delay Time	—	—	170		
t _f	Fall Time	—	—	130		
L _S + L _D	Total Inductance	—	6.1	—	nH	Measured from drain lead (6mm/ 0.25in. from package) to source lead (6mm/0.25in. from package)
C _{iss}	Input Capacitance	—	2700	—	pF	V _{GS} = 0V, V _{DS} = 25V f = 1.0MHz
C _{oss}	Output Capacitance	—	600	—		
C _{rss}	Reverse Transfer Capacitance	—	240	—		

Source-Drain Diode Ratings and Characteristics

	Parameter	Min	Typ	Max	Units	Test Conditions
I _S	Continuous Source Current (Body Diode)	—	—	12	A	
I _{SM}	Pulse Source Current (Body Diode)	—	—	48		
V _{SD}	Diode Forward Voltage	—	—	1.7	V	T _J = 25°C, I _S = 12A, V _{GS} = 0V ()
t _{rr}	Reverse Recovery Time	—	—	1600	ns	T _J = 25°C, I _F = 12A, di/dt ≤ 100A/μs
Q _{RR}	Reverse Recovery Charge	—	—	14	μC	V _{DD} ≤ 50V ()
t _{on}	Forward Turn-On Time	Intrinsic turn-on time is negligible. Turn-on speed is substantially controlled by L _S + L _D .				

Thermal Resistance

	Parameter	Min	Typ	Max	Units	Test Conditions
R _{thJC}	Junction to Case	—	—	0.83	°C/W	Typical socket mount
R _{thJA}	Junction to Ambient	—	—	30		

Note: Corresponding Spice and Saber models are available on the International Rectifier Website.

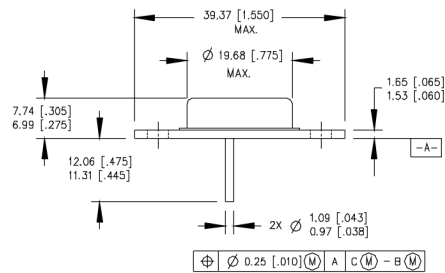
For footnotes refer to the last page

Foot Notes:

-) Repetitive Rating; Pulse width limited by maximum junction temperature.
- ($V_{DD} = 50V$, starting $T_J = 25^\circ C$,
 Peak $I_L = 12A, V_{GS} = 10V, L = 10.4mH$.

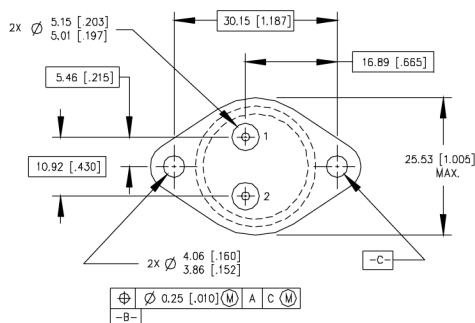
-) $ISD \leq 12, di/dt \leq 130A/\mu s,$
 $V_{DD} \leq 500V, T_J \leq 150^\circ C$
 Suggested $RG = 2.35 \Omega$
- (Pulse width $\leq 300 \mu s$; Duty Cycle $\leq 2\%$

Case Outline and Dimensions —TO-204AA (Modified TO-3)



PIN ASSIGNMENTS

- HEXFET
 1 - SOURCE
 2 - GATE
 3 - DRAIN (CASE)



NOTES:

1. DIMENSIONING & TOLERANCING PER ANSI Y14.5M-1982.
2. CONTROLLING DIMENSION : INCH.
3. DIMENSIONS ARE SHOWN IN MILLIMETERS [INCHES].
4. OUTLINE CONFORMS TO JEDEC OUTLINE TO-204-AA.