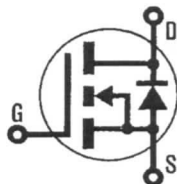


HEXFET® TRANSISTORS IRFZ20

**N-Channel
50 Volt
Power MOSFETs**



IRFZ22

**50 Volt, 0.1 Ohm HEXFET
TO-220AB Plastic Package**

Product Summary

Part Number	V _{DS}	R _{DS(on)}	I _D
IRFZ20	50V	0.10Ω	15A
IRFZ22	50V	0.12Ω	14A

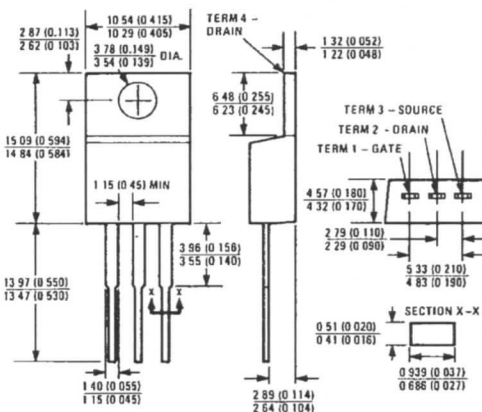
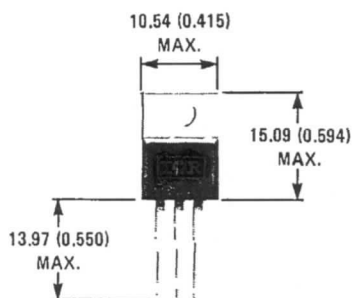
The HEXFET transistors also offer all of the well established advantages of MOSFETs such as voltage control, very fast switching, ease of paralleling, and temperature stability of the electrical parameters.

They are well suited for applications such as switching power supplies, motor controls, inverters, choppers, audio amplifiers, high energy pulse circuits, and in systems that are operated from low voltage batteries, such as automotive, portable equipment, etc.

Features:

- Extremely Low R_{DS(on)}
- Compact Plastic Package
- Fast Switching
- Low Drive Current
- Ease of Paralleling
- Excellent Temperature Stability
- Parts Per Million Quality

CASE STYLE AND DIMENSIONS



Case Style TO-220AB
Dimensions in Millimeters and (Inches)



NJ Semi-Conductors reserves the right to change test conditions, parameter limits and package dimensions without notice. Information furnished by NJ Semi-Conductors is believed to be both accurate and reliable at the time of going to press. However, NJ Semi-Conductors assumes no responsibility for any errors or omissions discovered in its use. NJ Semi-Conductors encourages customers to verify that datasheets are current before placing orders.

Quality Semi-Conductors

Absolute Maximum Ratings

Parameter	IRFZ20	IRFZ22	Units
V_{DS} Drain - Source Voltage ①	50	50	V
V_{DGR} Drain - Gate Voltage ($R_{GS} = 20\text{ k}\Omega$) ①	50	50	V
I_D @ $T_C = 25^\circ\text{C}$ Continuous Drain Current	15	14	A
I_D @ $T_C = 100^\circ\text{C}$ Continuous Drain Current	10	9.0	A
I_{DM} Pulsed Drain Current ②	60	56	A
V_{GS} Gate - Source Voltage	± 20		V
P_D @ $T_C = 25^\circ\text{C}$ Max. Power Dissipation	40 (See Fig. 14)		W
Linear Derating Factor	0.32 (See Fig. 14)		W/K ③
I_{LM} Inductive Current, Clamped	(See Fig. 15 and 16) $L = 100\mu\text{H}$		A
T_J Operating Junction and Storage Temperature Range	-55 to 150		$^\circ\text{C}$
T_{stg} Lead Temperature	300 (0.063 in. (1.6mm) from case for 10s)		$^\circ\text{C}$

Electrical Characteristics @ $T_C = 25^\circ\text{C}$ (Unless Otherwise Specified)

Parameter	Type	Min.	Typ.	Max.	Units	Test Conditions
BV_{DSS} Drain - Source Breakdown Voltage	IRFZ20	50	—	—	V	$V_{GS} = 0\text{V}$ $I_D = 250\mu\text{A}$
	IRFZ22	50	—	—	V	
$V_{GS(th)}$ Gate Threshold Voltage	ALL	2.0	—	4.0	V	$V_{DS} = V_{GS}$, $I_D = 250\mu\text{A}$
I_{GSS} Gate-Source Leakage Forward	ALL	—	—	500	nA	$V_{GS} = 20\text{V}$
I_{GSS} Gate-Source Leakage Reverse	ALL	—	—	-500	nA	$V_{GS} = -20\text{V}$
I_{DSS} Zero Gate Voltage Drain Current	ALL	—	—	250	μA	$V_{DS} = \text{Max. Rating}$, $V_{GS} = 0\text{V}$
		—	—	1000	μA	$V_{DS} = \text{Max. Rating} \times 0.8$, $V_{GS} = 0\text{V}$, $T_C = 125^\circ\text{C}$
$I_{D(on)}$ On-State Drain Current ②	IRFZ20	15	—	—	A	$V_{DS} > I_{D(on)} \times R_{DS(on)max}$, $V_{GS} = 10\text{V}$
	IRFZ22	14	—	—	A	
$R_{DS(on)}$ Static Drain-Source On-State Resistance ②	IRFZ20	—	0.080	0.100	Ω	$V_{GS} = 10\text{V}$, $I_D = 9.0\text{A}$
	IRFZ22	—	0.110	0.120	Ω	
g_{fs} Forward Transconductance ②	ALL	5.0	6.0	—	S (Ω)	$V_{DS} > I_{D(on)} \times R_{DS(on)max}$, $I_D = 9.0\text{A}$
C_{iss} Input Capacitance	ALL	—	560	860	pF	$V_{GS} = 0\text{V}$, $V_{DS} = 25\text{V}$, $f = 1.0\text{ MHz}$
C_{oss} Output Capacitance	ALL	—	250	350	pF	See Fig. 10
C_{rss} Reverse Transfer Capacitance	ALL	—	60	100	pF	
$t_{d(on)}$ Turn-On Delay Time	ALL	—	15	30	ns	$V_{DD} \approx 25\text{V}$, $I_D = 9.0\text{A}$, $Z_\theta = 500$
t_r Rise Time	ALL	—	45	90	ns	See Fig. 17
$t_{d(off)}$ Turn-Off Delay Time	ALL	—	20	40	ns	(MOSFET switching times are essentially independent of operating temperature.)
t_f Fall Time	ALL	—	15	30	ns	
Q_g Total Gate Charge (Gate-Source Plus Gate-Drain)	ALL	—	12	17	nC	$V_{GS} = 10\text{V}$, $I_D = 20\text{A}$, $V_{DS} = 0.8\text{ Max. Rating}$. See Fig. 18 for test circuit. (Gate charge is essentially independent of operating temperature.)
Q_{gs} Gate-Source Charge	ALL	—	9.0	—	nC	
Q_{gd} Gate-Drain ("Miller") Charge	ALL	—	3.0	—	nC	
L_D Internal Drain Inductance	ALL	—	3.5	—	nH	Measured from the contact screw on tab to center of die. Modified MOSFET symbol showing the internal device inductances.
		—	4.5	—	nH	Measured from the drain lead, 6mm (0.25 in.) from package to center of die.
L_S Internal Source Inductance	ALL	—	7.5	—	nH	Measured from the source lead, 6mm (0.25 in.) from package to source bonding pad.

Thermal Resistance

R_{thJC} Junction-to-Case	ALL	—	—	3.12	K/W ④	
R_{thCS} Case-to-Sink	ALL	—	1.0	—	K/W ④	Mounting surface flat, smooth, and greased.
R_{thJA} Junction-to-Ambient	ALL	—	—	80	K/W ④	Typical socket mount

Source-Drain Diode Ratings and Characteristics

I_S Continuous Source Current (Body Diode)	IRFZ20	—	—	16	A	Modified MOSFET symbol showing the integral reverse P-N junction rectifier.
	IRFZ22	—	—	14	A	
I_{SM} Pulse Source Current (Body Diode) ⑤	IRFZ20	—	—	60	A	
	IRFZ22	—	—	56	A	
V_{SD} Diode Forward Voltage ⑥	IRFZ20	—	—	1.5	V	$T_C = 25^\circ\text{C}$, $I_S = 15\text{A}$, $V_{GS} = 0\text{V}$
	IRFZ22	—	—	1.4	V	$T_C = 25^\circ\text{C}$, $I_S = 14\text{A}$, $V_{GS} = 0\text{V}$
t_{rr} Reverse Recovery Time	ALL	—	100	—	ns	$T_J = 150^\circ\text{C}$, $I_F = 15\text{A}$, $dI_F/dt = 100\text{A}/\mu\text{s}$
Q_{RR} Reverse Recovered Charge	ALL	—	0.4	—	μC	$T_J = 150^\circ\text{C}$, $I_F = 15\text{A}$, $dI_F/dt = 100\text{A}/\mu\text{s}$
t_{on} Forward Turn-on Time	ALL	Intrinsic turn-on time is negligible. Turn-on speed is substantially controlled by $L_S + L_D$.				