New Jersey Semi-Conductor Products, Inc.

20 STERN AVE.
SPRINGFIELD, NEW JERSEY 07081
U.S.A.

TELEPHONE: (973) 376-2922
(212) 227-6005
FAX: (973) 376-8960

IRFF220

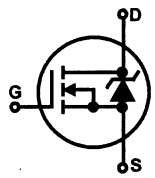
3.5A, 200v, 0.800Ohm, N-Channel Power Mosfet

Features

3.5A, 200V
Single Pulse Avalanche Energy Rated
Nanosecond Switching Speeds
High Input Impedance

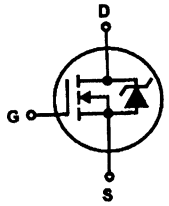
rDS(ON) = 0.800Ohm
SOA is Power Dissipation Limited
Linear Transfer Characteristics

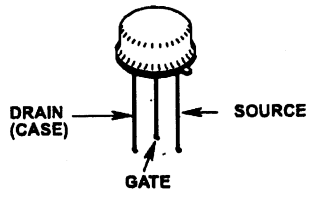
Source to Drain Diode Specifications

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNITS
Continuous Source to Drain Current	I_{SD}	Modified MOSFET Symbol Showing the Integral Reverse P-N Junction Rectifier 	-	-	3.5	A
Pulse Source to Drain Current (Note 3)	I_{SDM}		-	-	14	A
Source to Drain Diode Voltage (Note 2)	V_{SD}	$T_J = 25^oC$, $I_{SD} = 3.5A$, $V_{GS} = 0V$	-	-	2.0	V
Reverse Recovery Time	t_{rr}	$T_J = 150^oC$, $I_{SD} = 3.5A$, $dI_{SD}/d_t = 100A/\mu s$	-	350	-	ns
Reverse Recovered Charge	Q_{RR}	$T_J = 150^oC$, $I_{SD} = 3.5A$, $dI_{SD}/d_t = 100A/\mu s$	-	2.3	-	µC

NOTES:

2. Pulse test: pulse width ≤ 300µs, duty cycle ≤ 2%.





Quality Semi-Conductors

Absolute Maximum Ratings $T_C = 25^oC$, Unless Otherwise Specified

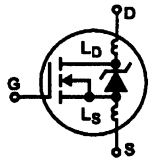
		IRFF220	UNITS
Drain to Source Voltage (Note 1)	V_{DS}	200	V
Drain to Gate Voltage (R_{GS} = 20kΩ) (Note 1)	V_{DGR}	200	V
Continuous Drain Current	I_D	3.5	A
Pulsed Drain Current (Note 3)	I_{DM}	14	A
Gate to Source Voltage	V_{GS}	±20	V
Maximum Power Dissipation	P_D	20	W
Linear Derating Factor		0.16	W/°C
Single Pulse Avalanche Energy Rating (Note 4)	E_{AS}	85	mJ
Operating and Storage Temperature	T_J, T_{STG}	-55 to 150	°C
Maximum Temperature for Soldering			
Leads at 0.063in (1.6mm) from Case for 10s	T_L	300	°C
Package Body for 10s, See Techbrief 334	T_{pkg}	260	°C

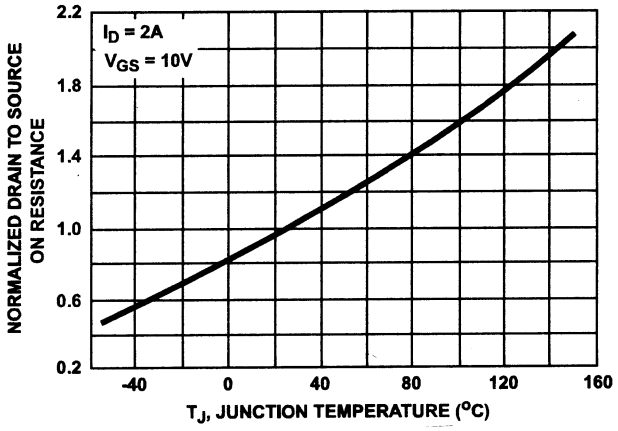
CAUTION: Stresses above those listed in "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress only rating and operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied.

NOTE:

1. $T_J = 25^oC$ to 125^oC.

Electrical Specifications $T_C = 25^oC$, Unless Otherwise Specified

PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNITS
Drain to Source Breakdown Voltage	BV_{DSS}	V_{GS} = 0V, I_D = 250μA (Figure 10)		200	-	-	V
Gate to Threshold Voltage	$V_{GS(TH)}$	V_{GS} = V_{DS}, I_D = 250μA		2.0	-	4.0	V
Zero-Gate Voltage Drain Current	I_{DSS}	V_{DS} = Rated BV_{DSS}, V_{GS} = 0V		-	-	25	μA
		V_{DS} = 0.8 x Rated BV_{DSS}, V_{GS} = 0V, T_J = 125°C		-	-	250	μA
On-State Drain Current (Note 2)	$I_{D(ON)}$	V_{DS} > $I_{D(ON)}$ x $r_{DS(ON)MAX}$, V_{GS} = 10V (Figure 7)		3.5	-	-	A
Gate to Source Leakage Forward	I_{GSS}	V_{GS} = ±20V		-	-	±100	nA
Drain to Source On Resistance (Note 2)	$r_{DS(ON)}$	V_{GS} = 10V, I_D = 2.0A (Figures 8, 9)		-	0.5	0.800	Ω
Forward Transconductance (Note 2)	g_{fs}	V_{DS} > $I_{D(ON)}$ x $r_{DS(ON)MAX}$, I_D = 2.0A (Figure 12)		1.5	2.25	-	S
Turn-On Delay Time	$t_{d(ON)}$	V_{DD} = 0.5 x Rated BV_{DSS}, R_G = 9.1Ω, V_{GS} = 10V, I_D ≈ 3.5A (Figures 17, 18) R_L = 27.4Ω for V_{DSS} = 100V, R_L = 20.3Ω for V_{DSS} = 75V, MOSFET Switching Times are Essentially Independent of Operating Temperature		-	20	40	ns
Rise Time	t_r			-	30	60	ns
Turn-Off Delay Time	$t_{d(OFF)}$			-	50	100	ns
Fall Time	t_f			-	30	60	ns
Total Gate Charge (Gate to Source + Gate to Drain)	$Q_{g(TOT)}$	V_{GS} = 10V, I_D = 3.5A, V_{DS} = 0.8 x Rated BV_{DSS}, $I_{g(REF)}$ = 1.5mA (Figures 14, 19, 20) Gate Charge is Essentially Independent of Operating Temperature		-	11	15	nC
Gate to Source Charge	Q_{gs}			-	5.0	-	nC
Gate to Drain "Miller" Charge	Q_{gd}			-	6.0	-	nC
Input Capacitance	C_{ISS}	V_{GS} = 0V, V_{DS} = 25V, f = 1.0MHz (Figure 11)		-	450	-	pF
Output Capacitance	C_{OSS}			-	150	-	pF
Reverse Transfer Capacitance	C_{RSS}			-	40	-	pF
Internal Drain Inductance	L_D	Measured from the Drain Lead, 5mm (0.2in) from Header to Center of Die	Modified MOSFET Symbol Showing the Internal Device Inductances	-	5.0	-	nH
Internal Source Inductance	L_S	Measured from the Source Lead, 5mm (0.2in) from Header and Source Bonding Pad		-	15	-	nH
Junction to Case	$R_{\theta JC}$			-	-	6.25	°C/W
Junction to Ambient	$R_{\theta JA}$	Free Air Operation		-	-	175	°C/W


I_D = 2A
V_{GS} = 10V
NORMALIZED DRAIN TO SOURCE ON RESISTANCE
2.2
1.8
1.4
1.0
0.6
0.2
-40
0
40
80
120
160
T_J, JUNCTION TEMPERATURE (°C)