Provisional Data Sheet No. PD-9.1614

International
IOR Rectifier

IRLF230

HEXFET® TRANSISTOR

N-CHANNEL

200Volt, 0.40 Ω, HEXFET

The Logic Level 'L' series of power MOSFETs are designed to be operated with level logic gate-to-source voltage of 5V. In addition to the well established characteristics of HEXFETs, they have the added advantage of providing low drive requirements to interface power loads to logic level IC's and microprocessors.

Fields of application include: high speed power applications such as switching regulators, switching converters, motor drivers, solenoid and relay drivers.

The HEXFET technology is the key to International Rectifier's advance line of logic level power MOSFET transistors. The efficient geometry and unique processing of the HEXFET achieve very low on-state resistance combine with high transconductance.

Product Summary

Part Number	BV_{DSS}	$R_{DS(on)}$	I_D
IRLF230	200V	0.40Ω	5.2A

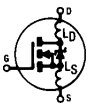
Features:

- Dynamic dv/dt Rating
- Logic Level Gate Drive
- $R_{DS(on)}$ Specific at V_{GS} = 4V & 5V
- 150°C Operating Temperature
- Fast Switching
- Ease of Paralleling

Absolute Maximum Ratings

	Parameter	IRLF230	Units
I_D @ V_{GS} = 5.0V, T_C = 25°C	Continuous Drain Current	5.2	A
I_D @ V_{GS} = 5.0V, T_C = 100°C	Continuous Drain Current	3.3	
I_{DM}	Pulsed Drain Current ①	20	
P_D @ T_C = 25°C	Max. Power Dissipation	25	W
	Linear Derating Factor	0.20	W/K ⑤
V_{GS}	Gate-to-Source Voltage	±10	V
dv/dt	Peak Diode Recovery dv/dt ③	4.2	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	0.98 (typical)	g

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

	Parameter	Min	Typ	Max	Units	Test Conditions
BV_{DSS}	Drain-to-Source Breakdown Voltage	200	—	—	V	V_{GS} =0 V, I_D = 250µA
$\Delta BV_{DSS}/\Delta T_J$	Temperature Coefficient of Breakdown Voltage	—	0.28	—	V/°C	Reference to 25°C, I_D = 250µA
$R_{DS(on)}$	Static Drain-to-Source On-State Resistance	—	—	0.40	Ω	V_{GS} = 5.0V, I_D = 3.1A ④
		—	—	0.50		V_{GS} = 4.0V, I_D = 2.6A
$V_{GS(th)}$	Gate Threshold Voltage	1.0	—	2.0	V	V_{DS} = V_{GS}, I_D = 250µA
g_{fs}	Forward Transconductance	4.5	—	—	S (℧)	V_{DS} > 15V, I_{DS} = 3.1A ④
I_{DSS}	Zero Gate Voltage Drain Current	—	—	25	µA	V_{DS}= 0.8 x Max Rating,V_{GS}=0V
		—	—	250		V_{DS} = 0.8 x Max Rating V_{GS} = 0V, T_J = 125°C
I_{GSS}	Gate-to-Source Leakage Forward	—	—	100	nA	V_{GS} = 10 V
I_{GSS}	Gate-to-Source Leakage Reverse	—	—	-100		V_{GS} = -10V
Q_g	Total Gate Charge	—	—	41	nC	V_{GS} = 5.0V, I_D = 5.2A
Q_{gs}	Gate-to-Source Charge	—	—	4.9		V_{DS} = Max Rating x 0.5
Q_{gd}	Gate-to-Drain ('Miller') Charge	—	—	21		
$t_{d(on)}$	Turn-On Delay Time	—	—	9.4	ns	V_{DD} = 100V, I_D = 5.2A, R_G = 6.0Ω
t_r	Rise Time	—	—	34		
$t_{d(off)}$	Turn-Off Delay Time	—	—	43		
t_f	Fall Time	—	—	26		
L_D	Internal Drain Inductance	—	5.0	—	nH	Measured from drain lead, 6mm (0.25 in) from package to center of die.
L_S	Internal Source Inductance	—	15	—		Measured from source lead, 6mm (0.25 in) from package to source bonding pad.
						Modified MOSFET symbol showing the internal inductances. 
C_{iss}	Input Capacitance	—	1100	—	pF	V_{GS} = 0V, V_{DS} = 25 V
C_{oss}	Output Capacitance	—	230	—		f = 1.0MHz
C_{rss}	Reverse Transfer Capacitance	—	61	—		

Source-Drain Diode Ratings and Characteristics

	Parameter	Min	Typ	Max	Units	Test Conditions
I_S	Continuous Source Current (Body Diode)	—	—	5.2	A	Modified MOSFET symbol showing the integral reverse p-n junction rectifier. 
I_{SM}	Pulse Source Current (Body Diode) ①	—	—	20		
V_{SD}	Diode Forward Voltage	—	—	2.0	V	T_j = 25°C, I_S = 5.2A, V_{GS} = 0V ④
t_{rr}	Reverse Recovery Time	—	—	250	ns	T_j = 25°C, I_F = 5.2A, di/dt ≤ 100A/µs
Q_{RR}	Reverse Recovery Charge	—	—	1.7	µC	V_{DD} ≤ 50V ④
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	—	—	5.0	K/W	
R_{thJA}	Junction-to-Ambient	—	—	175		Typical socket mount

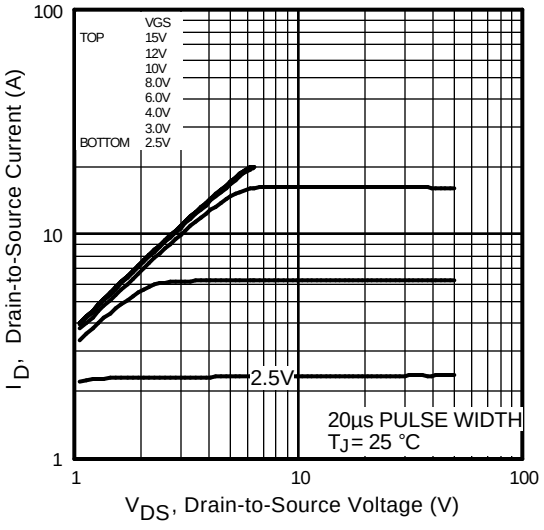


Fig 1. Typical Output Characteristics

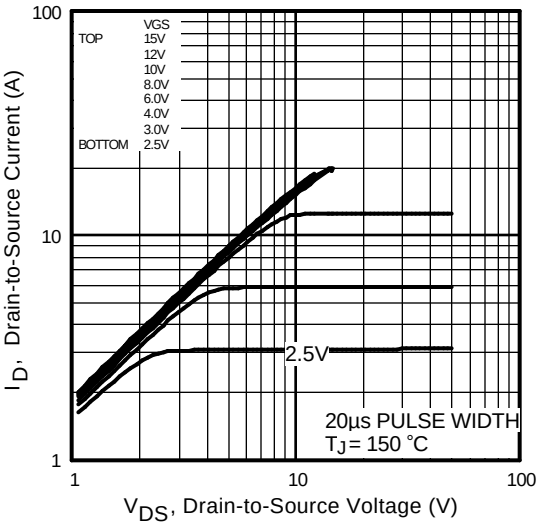


Fig 2. Typical Output Characteristics

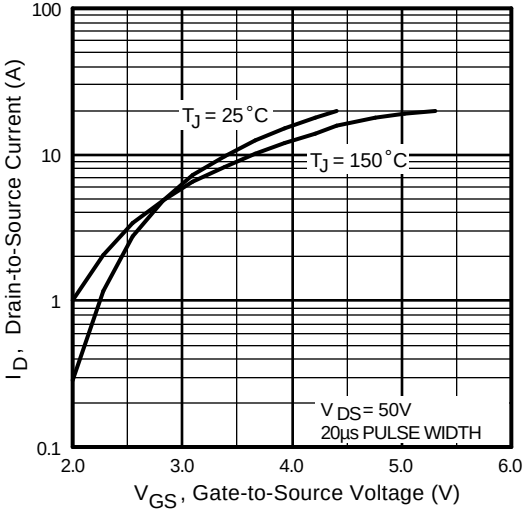


Fig 3. Typical Transfer Characteristics

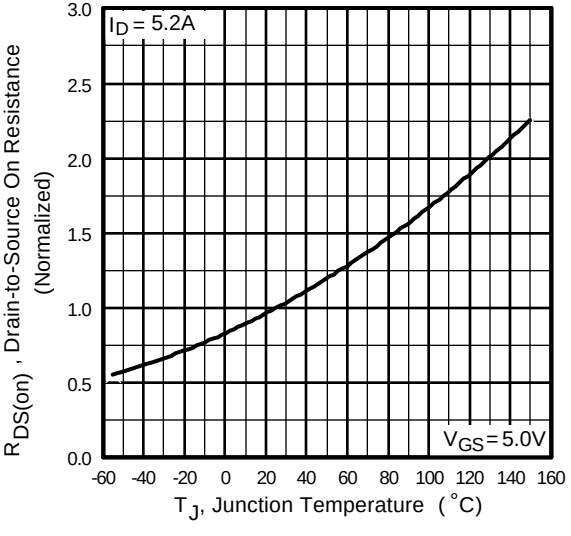


Fig 4. Normalized On-Resistance Vs. Temperature

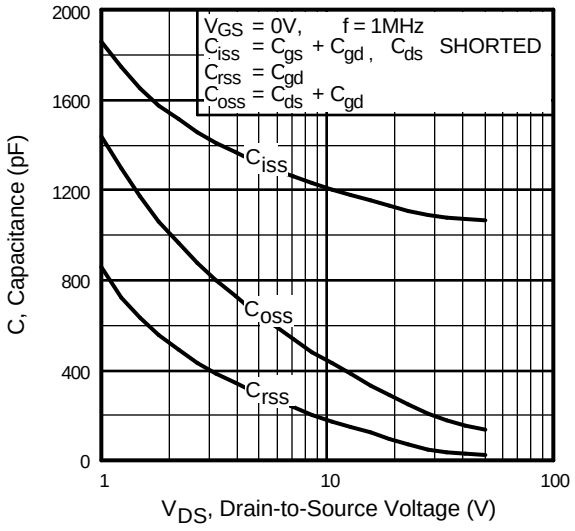


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

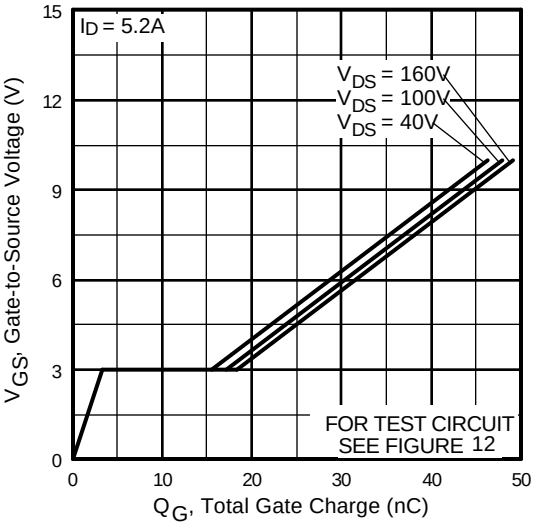


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

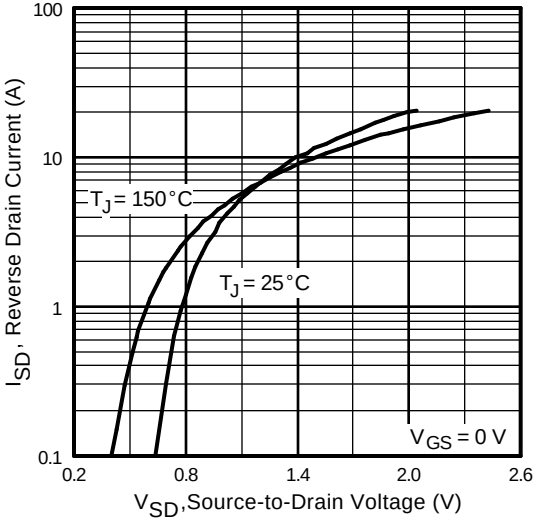


Fig 7. Typical Source-Drain Diode Forward Voltage

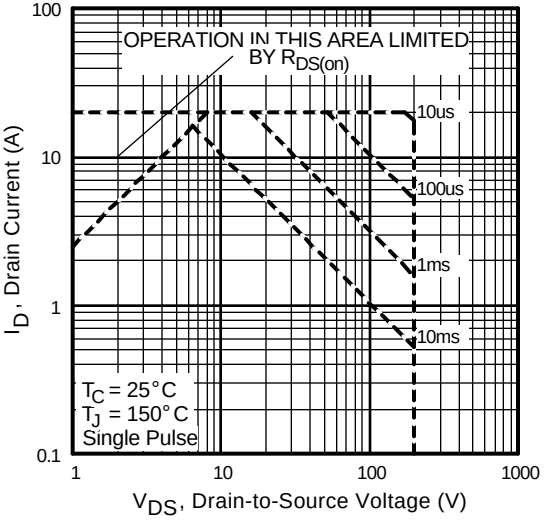


Fig 8. Maximum Safe Operating Area

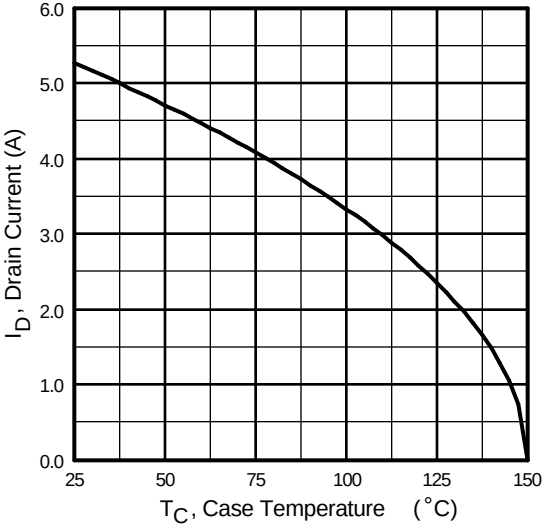


Fig 9. Maximum Drain Current Vs. Case Temperature

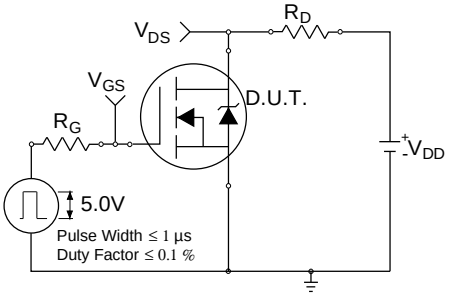


Fig 10a. Switching Time Test Circuit

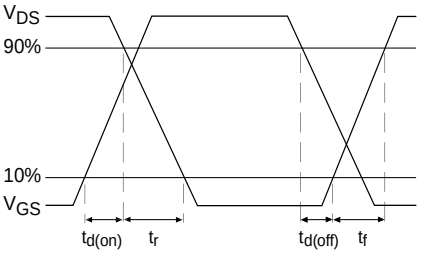


Fig 10b. Switching Time Waveforms

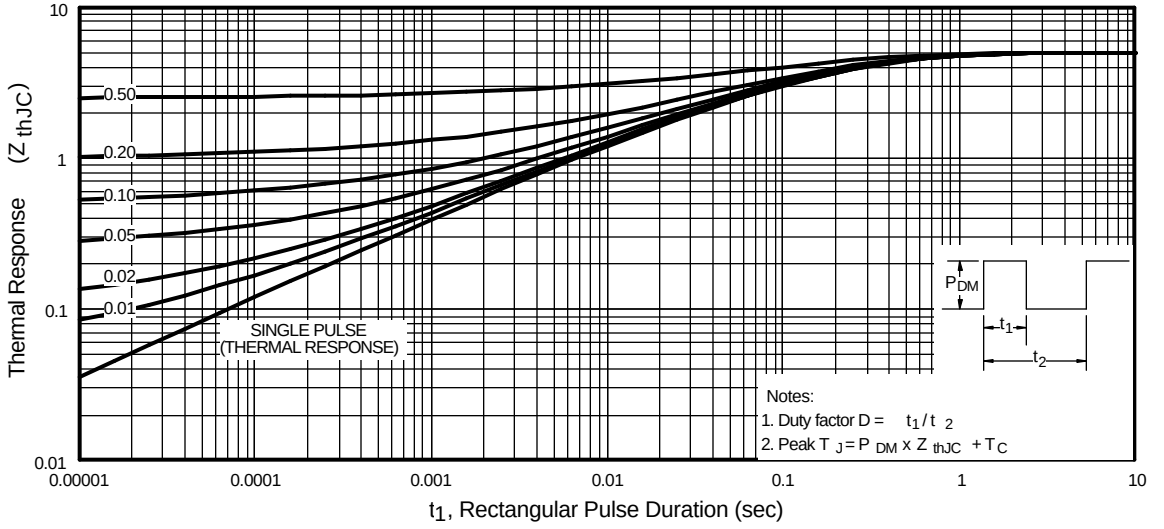


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Case

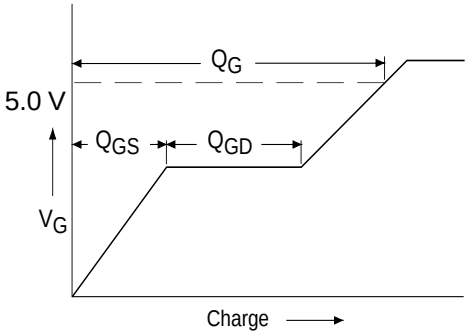


Fig 12a. Basic Gate Charge Waveform

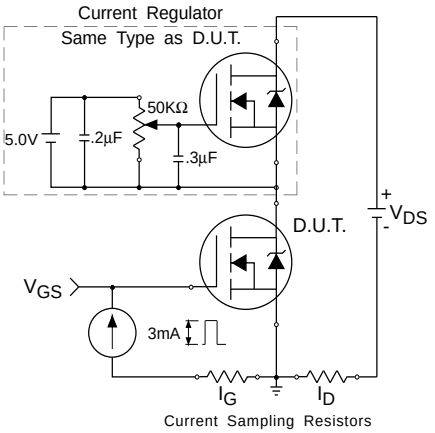


Fig 12b. Gate Charge Test Circuit

Notes:

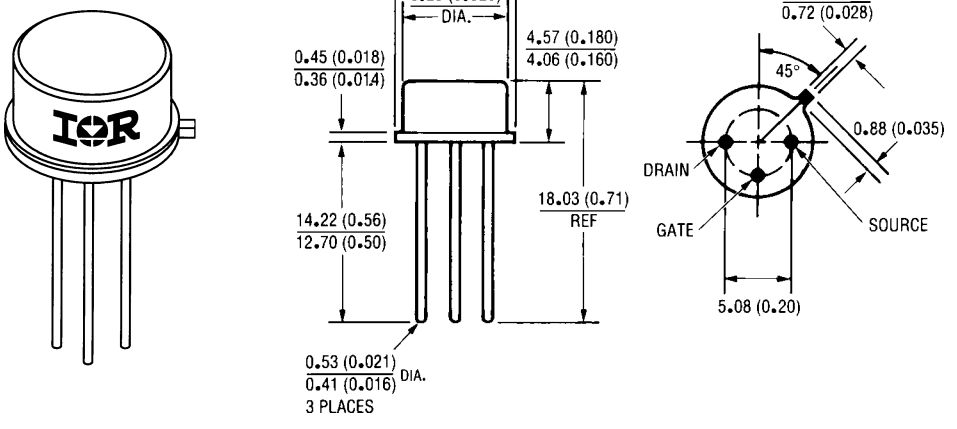
① Repetitive Rating; Pulse width limited by maximum junction temperature. Refer to current HEXFET reliability report.

② K/W = °C/W

③ $I_{SD} \leq 5.2A$, $di/dt \leq 270$ A/μs, $V_{DD} \leq BV_{DSS}$, $T_J \leq 150°C$ Suggested $R_G = 2.35\Omega$

④ Pulse width ≤ 300 μs; Duty Cycle ≤ 2%

Case Outline and Dimensions — TO-205AF (Modified TO-39)



All dimensions are shown millimeters (inches)

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