

HEXFET® TRANSISTOR

IRLF230

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	0.40 Ω	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

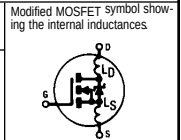
Absolute Maximum Ratings

	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

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

	Parameter	Min	Typ	Max	Units	Test Conditions
B _V D _{SS}	Drain-to-Source Breakdown Voltage	200	—	—	V	V _{GS} = 0 V, I _D = 250μA
ΔB _V D _{SS} /ΔT _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 (r)	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.
C _{iss}	Input Capacitance	—	1100	—	pF	V _{GS} = 0V, V _{DS} = 25 V f = 1.0MHz
C _{oss}	Output Capacitance	—	230	—		
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 V _{DD} ≤ 50V ④
Q _{RR}	Reverse Recovery Charge	—	—	1.7	μC	
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

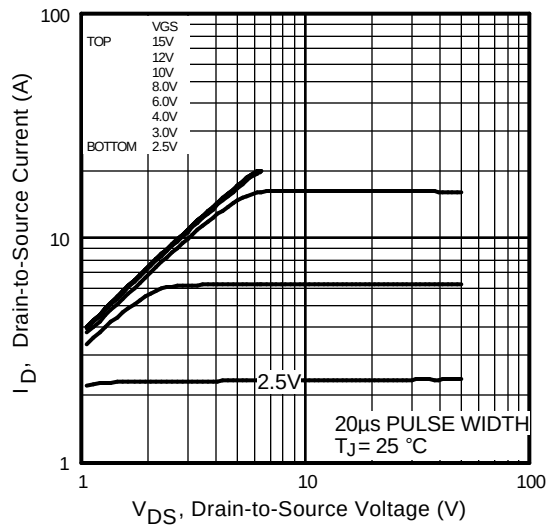


Fig 1. Typical Output Characteristics

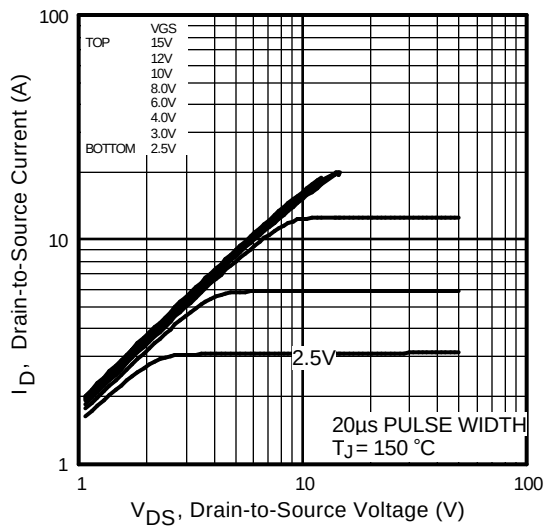


Fig 2. Typical Output Characteristics

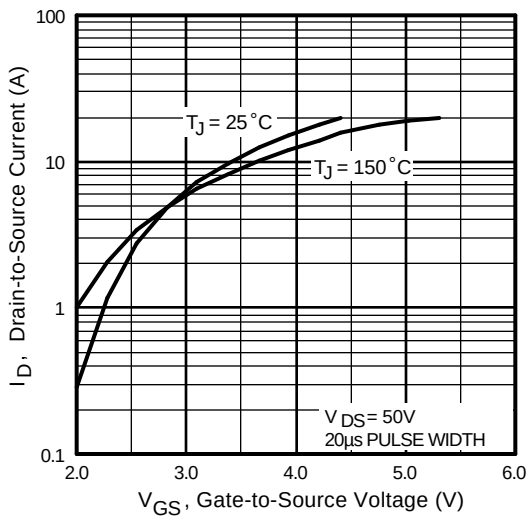


Fig 3. Typical Transfer Characteristics

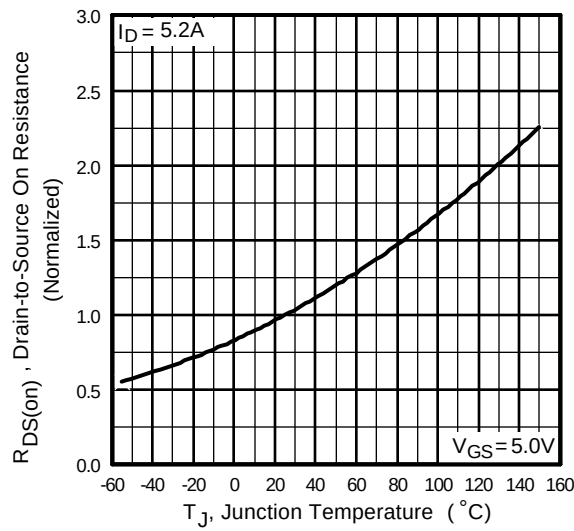


Fig 4. Normalized On-Resistance Vs. Temperature

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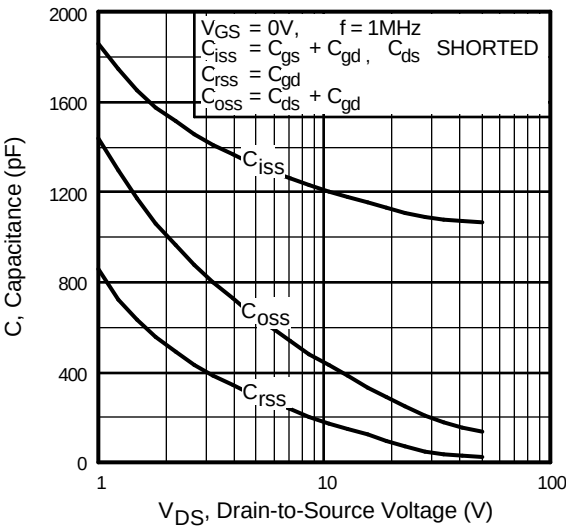


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

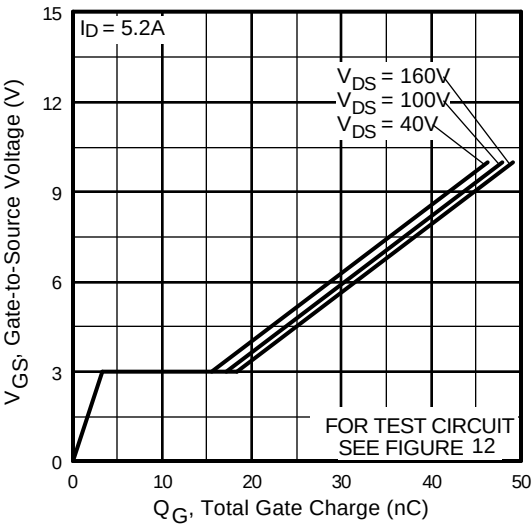


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

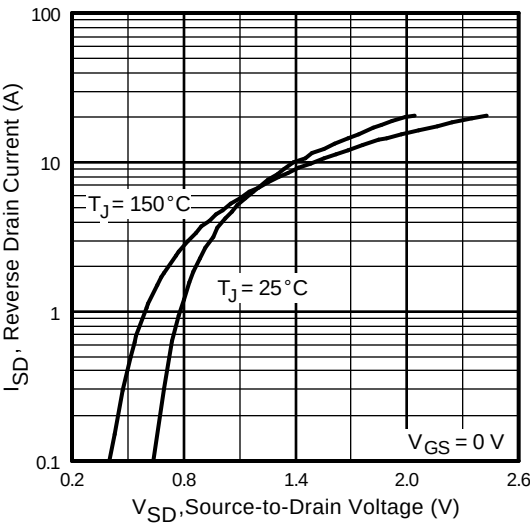


Fig 7. Typical Source-Drain Diode Forward Voltage

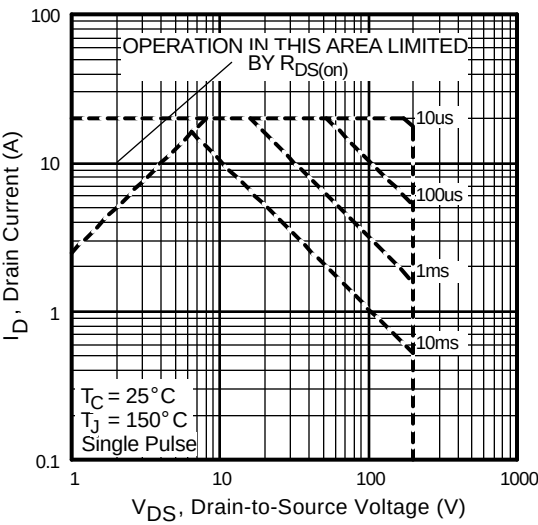


Fig 8. Maximum Safe Operating Area

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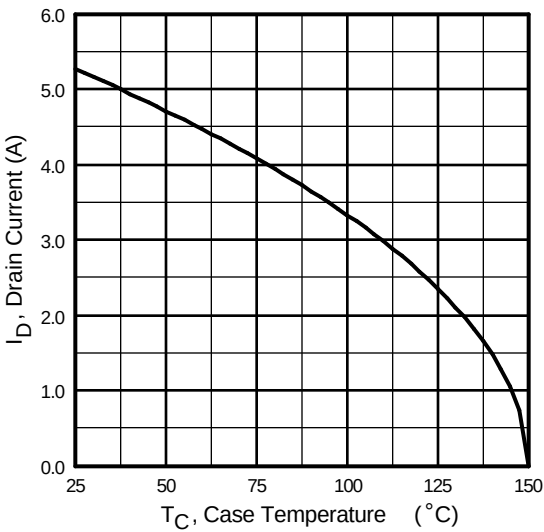


Fig 9. Maximum Drain Current Vs. Case Temperature

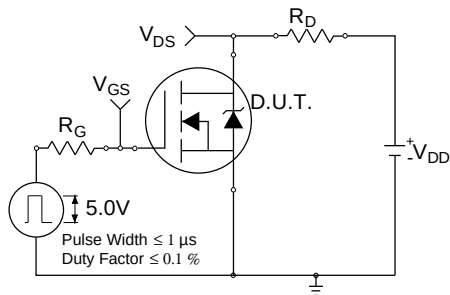


Fig 10a. Switching Time Test Circuit

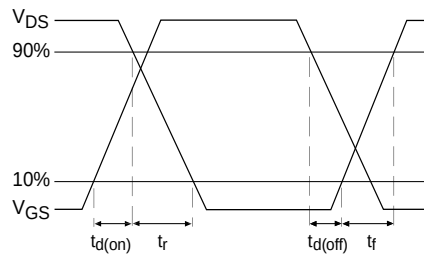


Fig 10b. Switching Time Waveforms

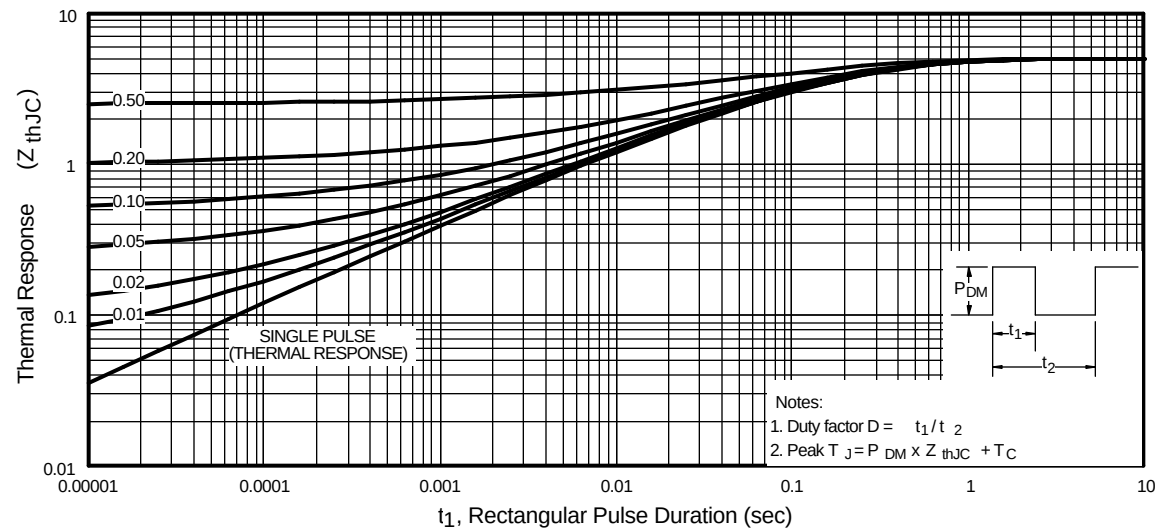


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Case

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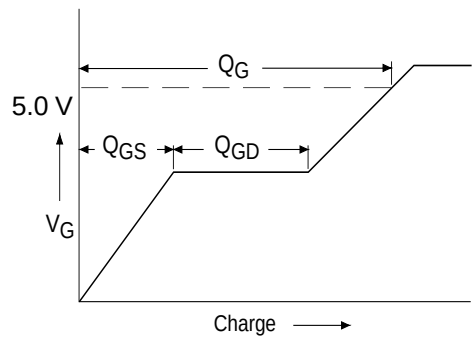


Fig 12a. Basic Gate Charge Waveform

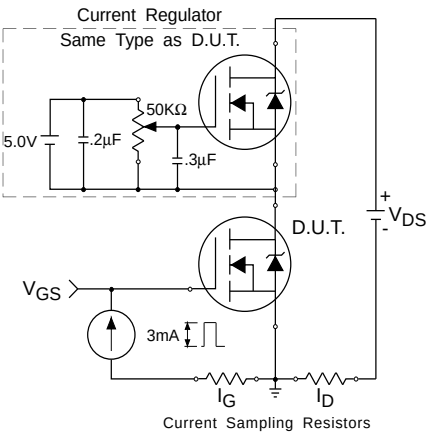


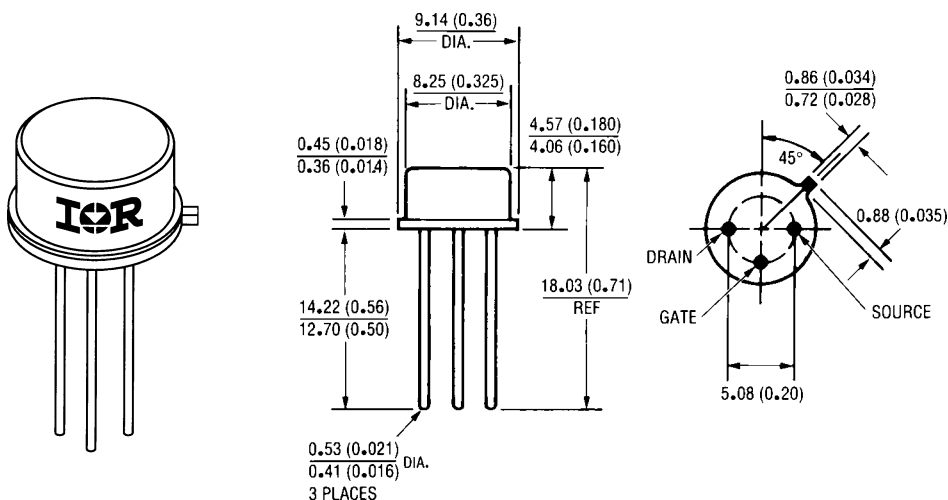
Fig 12b. Gate Charge Test Circuit

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Notes:

- ① Repetitive Rating; Pulse width limited by maximum junction temperature.
Refer to current HEXFET reliability report.
- ② $K/W = ^\circ C/W$
- ③ $I_{SD} \leq 5.2A$, $di/dt \leq 270 A/\mu s$,
 $V_{DD} \leq BVD_{SS}$, $T_J \leq 150^\circ C$
Suggested $R_G = 2.35\Omega$
- ④ Pulse width $\leq 300 \mu s$; Duty Cycle $\leq 2\%$

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



All dimensions are shown millimeters (inches)

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Data and specifications subject to change without notice.

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