Data Sheet No. PD-9.410A

T-39-13

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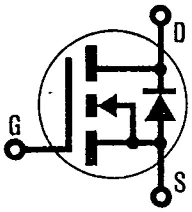
HEXFET® TRANSISTORS IRFH150

N-CHANNEL POWER MOSFETs



100 Volt, 0.06 Ohm HEXFET

The HEXFET® technology is the key to International Rectifier's advanced line of power MOSFET transistors. The efficient geometry and unique processing of the HEXFET design achieve very low on-state resistance combined with high transconductance and great device ruggedness.

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:

- Fast Switching
- Low Drive Current
- Ease of Paralleling
- Excellent Temperature Stability

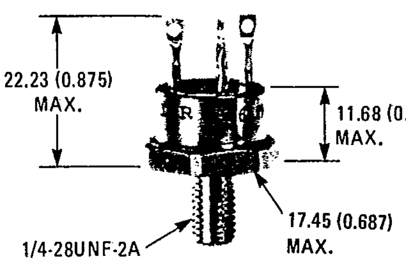
Product Summary

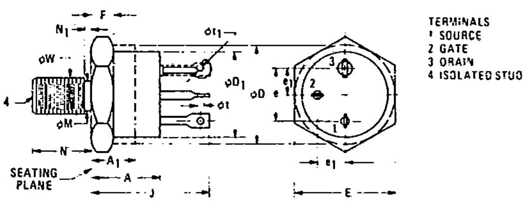
Part Number	V_{DS}	$R_{DS(on)}$	I_D
IRFH150	100V	0.06Ω	30A*

*Current limited by pin diameter

TO-61

CASE STYLE AND DIMENSIONS





Symbol	Inches Min	Inches Max.	Millimeters Min	Millimeters Max.	Notes	Symbol	Inches Min	Inches Max.	Millimeters Min	Millimeters Max.	Notes
A	0.325	0.460	8.26	11.68		J	0.640	0.875	16.26	22.23	
A_1		0.270		6.86	2	φM	0.220	0.249	5.59	6.32	
φD	0.610	0.687	15.49	17.45	2	N	0.422	0.455	10.72	11.56	
$φD_1$	0.570	0.610	14.48	15.49		N_1		0.090		2.29	
E	0.667	0.687	16.94	17.45		φt	0.055	0.072	1.19	1.83	
e	0.340	0.415	8.64	10.54	5	$φt_1$	0.046	0.077	1.17	1.96	4
e_1	0.170	0.213	4.32	5.41	5	φW	0.2225	0.2268	5.561	5.761	3
F	0.090	0.150	2.29	3.81	1						

NOTES
1. DIMENSION DOES NOT INCLUDE SEALING FLANGES.
2. PACKAGE CONTOUR OPTIONAL WITHIN DIMENSIONS SPECIFIED.
3. PITCH DIAMETER – THREAD 1/4 28 UNF-2A (COATED). REFERENCE (SCREW THREAD STANDARDS FOR FEDERAL SERVICES – HANDBOOK H 28).
4. THIS TERMINAL CAN BE FLATTENED AND PIERCED OR HOOK TYPE.
5. POSITION OF LEADS IN RELATION TO THE HEXAGON IS NOT CONTROLLED.

Conforms to JEDEC Outline TO-210AC (TO-61)
Dimensions in Millimeters and (Inches)

T-39-13

Absolute Maximum Ratings

Parameter		IRFH150	Units
V_{DS}	Drain - Source Voltage ①	100	V
V_{DGR}	Drain - Gate Voltage (R_{GS} = 20 KΩ) ①	100	V
I_D @ T_C = 25°C	Continuous Drain Current	30*	A
I_D @ T_C = 100°C	Continuous Drain Current	24	A
I_{DM}	Pulsed Drain Current ③	120	A
V_{GS}	Gate - Source Voltage	± 20	V
P_D @ T_C = 25°C	Max. Power Dissipation	150 (See Fig. 13)	W
	Linear Derating Factor	1.2 (See Fig. 13)	W/K ④
I_{LM}	Inductive Current, Clamped	(See Fig 14 and 15) L = 100μH 120	A
T_J T_{stg}	Operating Junction and Storage Temperature Range	-55 to 150	°C
	Lead Temperature	300 (0.063 in. (1.6mm) from case for 10s)	°C

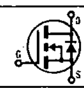
Electrical Characteristics @T_C = 25°C (Unless Otherwise Specified)

Parameter		Type	Min.	Typ.	Max.	Units	Test Conditions
BV_{DSS}	Drain - Source Breakdown Voltage	IRFH150	100	–	–	V	V_{GS} = 0V, I_D = 250μA
$V_{GS(th)}$	Gate Threshold Voltage	IRFH150	2.0	–	4.0	V	V_{DS} = V_{GS}, I_D = 250μA
I_{GSS}	Gate - Source Leakage Forward	IRFH150	–	–	100	nA	V_{GS} = 20V
I_{GSS}	Gate - Source Leakage Reverse	IRFH150	–	–	-100	nA	V_{GS} = -20V
I_{DSS}	Zero Gate Voltage Drain Current	IRFH150	–	–	250	μA	V_{DS} = Max. Rating, V_{GS} = 0V
			–	–	1000	μA	V_{DS} = Max. Rating x 0.8, V_{GS} = 0V, T_C = 125°C
$V_{DS(on)}$	On-State Voltage ②	IRFH150	–	–	1.80	V	V_{GS} = 10V, I_D = 30A
$R_{DS(on)}$	Static Drain-Source On-State Resistance ②	IRFH150	–	0.045	0.06	Ω	V_{GS} = 10V, I_D = 24A
g_{fs}	Forward Transconductance ②	IRFH150	9.0	13	–	S (℧)	V_{DS} > $I_{D(on)}$ x $R_{DS(on)}$ max., I_D = 24A
C_{iss}	Input Capacitance	IRFH150	–	2000	3000	pF	V_{GS} = 0V, V_{DS} = 25V, f = 1.0 MHz See Fig. 10
C_{oss}	Output Capacitance	IRFH150	–	1000	1500	pF	
C_{rss}	Reverse Transfer Capacitance	IRFH150	–	350	500	pF	
C_{dc}	Drain-to-Case Capacitance	IRFH150	–	9.0	12	pF	V_{DC} = 25V, f = 1 MHz
$t_{d(on)}$	Turn-On Delay Time	IRFH150	–	–	35	ns	V_{DD} ≃ 25V, I_D = 24A, Z_o = 4.7Ω See Fig. 16 (MOSFET switching times are essentially independent of operating temperature.)
t_r	Rise Time	IRFH150	–	–	100	ns	
$t_{d(off)}$	Turn-Off Delay Time	IRFH150	–	–	125	ns	
t_f	Fall Time	IRFH150	–	–	100	ns	

Thermal Resistance

R_{thJC}	Junction-to-Case	IRFH150	–	–	0.83	K/W ④	
R_{thCS}	Case-to-Sink	IRFH150	–	0.4	–	K/W ④	Mounting surface flat, smooth, and greased.
R_{thJA}	Junction-to-Ambient	IRFH150	–	–	40	K/W ④	Typical socket mount
T	Mounting torque	Min.	2.26 (20)			N • m (lbf • in.)	Non-lubricated threads
		Max.	3.39 (30*)				

Source-Drain Diode Ratings and Characteristics

I_S	Continuous Source Current (Body Diode)	IRFH150	–	–	30	A	Modified MOSFET symbol showing the integral reverse P-N junction rectifier. 
I_{SM}	Pulse Source Current (Body Diode) ③	IRFH150	–	–	120	A	
V_{SD}	Diode Forward Voltage ②	IRFH150	–	–	1.9	V	T_C = 25°C, I_S = 30A, V_{GS} = 0V
t_{rr}	Reverse Recovery Time	IRFH150	–	600	–	ns	T_J = 150°C, I_F = 30A, dI_F/dt = 100A/μs
Q_{RR}	Reverse Recovered Charge	IRFH150	–	3.3	–	μC	T_J = 150°C, I_F = 30A, dI_F/dt = 100A/μs
t_{on}	Forward Turn-on Time	IRFH150	Intrinsic turn-on time is negligible. Turn-on speed is substantially controlled by L_S + L_D.				

①T_J = 25°C to 150°C. ②Pulse Test: Pulse width ≤ 300μs, Duty Cycle ≤ 2%. ③Repetitive Rating: Pulse width limited by max. junction temperature. See Transient Thermal Impedance Curve (Fig. 5).

*Current limited by pin diameter. ④ K/W = °C/W, W/K = W/°C

IRFH150 Device

T-39-13

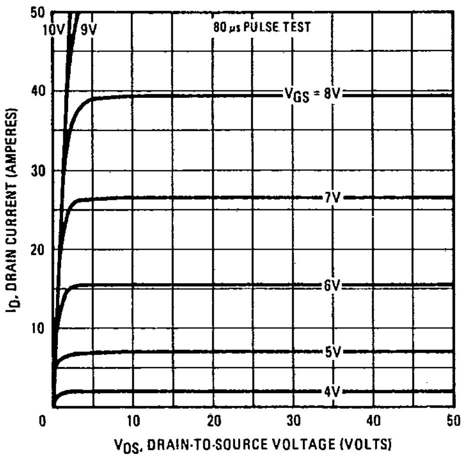


Fig. 1 — Typical Output Characteristics

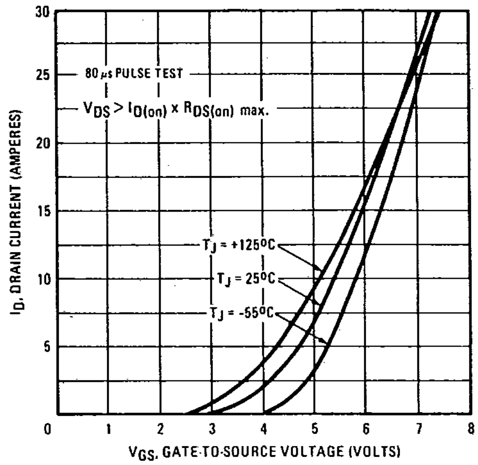


Fig. 2 — Typical Transfer Characteristics

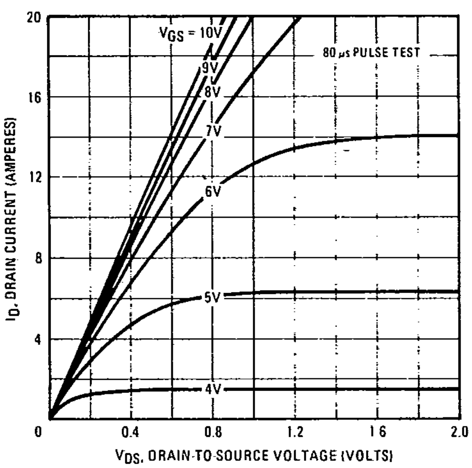


Fig. 3 — Typical Saturation Characteristics

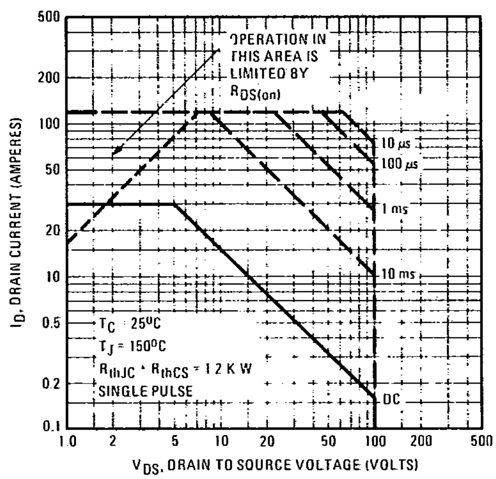


Fig. 4 — Maximum Safe Operating Area

TO-61

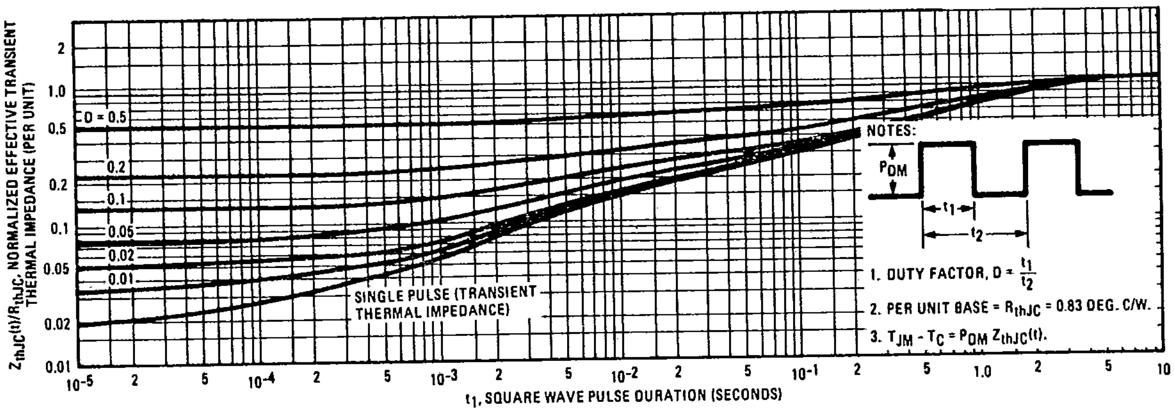


Fig. 5 – Maximum Effective Transient Thermal Impedance, Junction-to-Case Vs. Pulse Duration

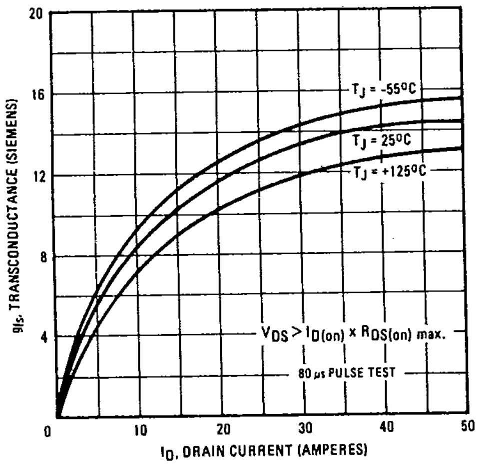


Fig. 6 – Typical Transconductance Vs. Drain Current

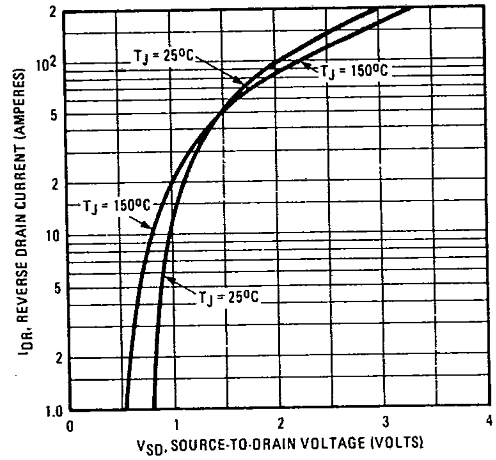


Fig. 7 – Typical Source-Drain Diode Forward Voltage

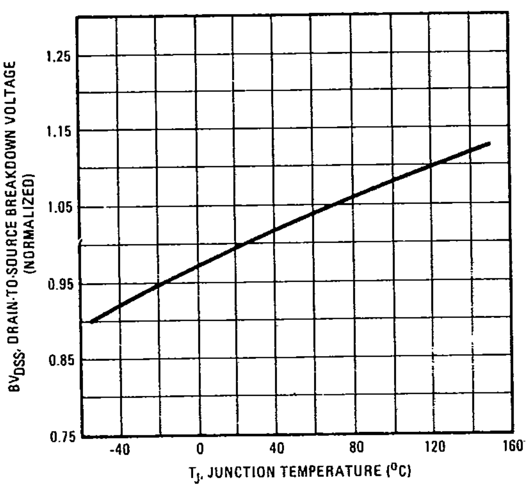


Fig. 8 – Breakdown Voltage Vs. Temperature

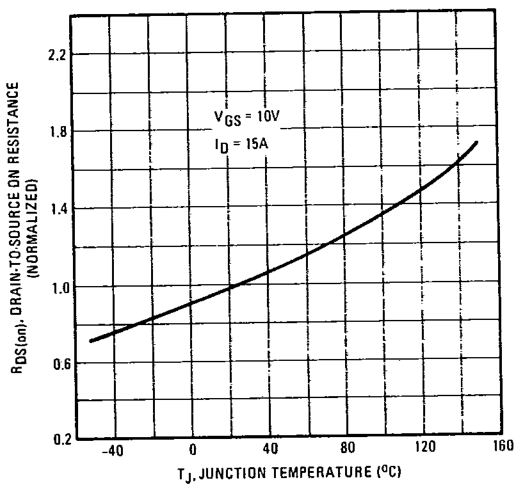


Fig. 9 – Normalized On-Resistance Vs. Temperature

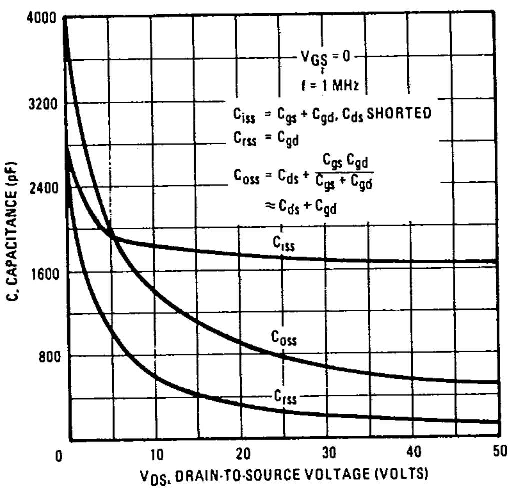


Fig. 10 – Typical Capacitance Vs. Drain-to-Source Voltage

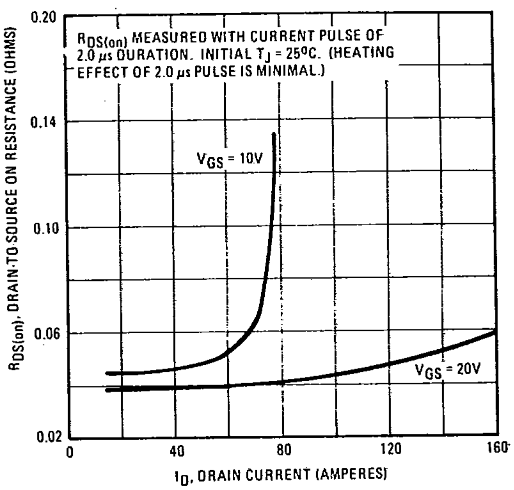


Fig. 11 – Typical On-Resistance Vs. Drain Current

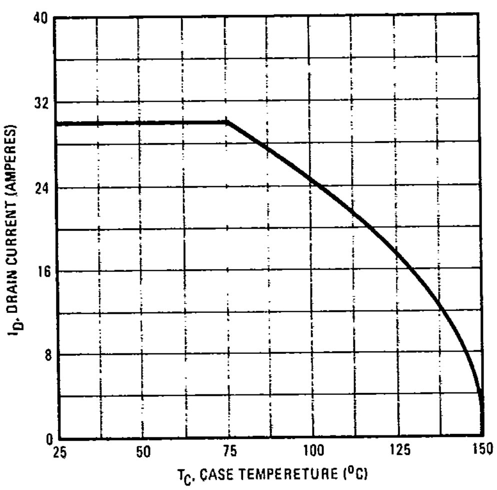


Fig. 12 – Maximum Drain Current Vs. Case Temperature

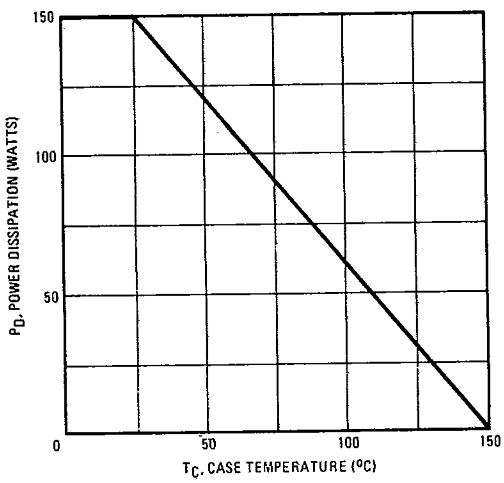


Fig. 13 – Power Vs. Temperature Derating Curve

TO-61

IRFH150 Device

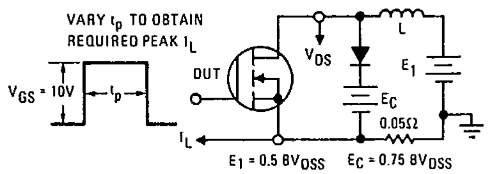


Fig. 14 – Clamped Inductive Test Circuit

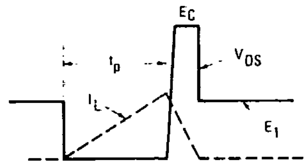


Fig. 15. – Clamped Inductive Waveforms

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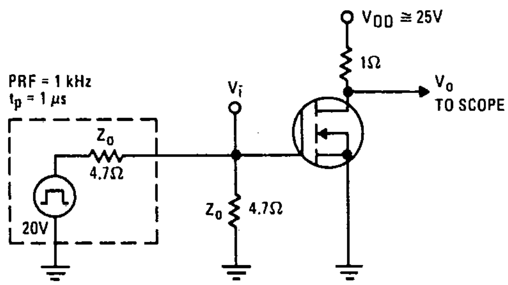

Fig. 16 – Switching Time Test Circuit