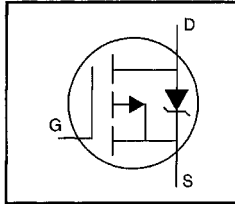


### HEXFET® Power MOSFET

- Dynamic dv/dt Rating
- Repetitive Avalanche Rated
- For Automatic Insertion
- End Stackable
- P-Channel
- Fast Switching
- Ease of Paralleling



$$V_{DSS} = -200V$$

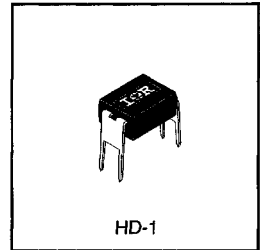
$$R_{DS(on)} = 1.5\Omega$$

$$I_D = -0.56A$$

### Description

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 extreme device ruggedness.

The 4-pin DIP package is a low cost machine-insertable case style which can be stacked in multiple combinations on standard 0.1 inch pin centers. The dual drain serves as a thermal link to the mounting surface for power dissipation levels up to 1 watt.



DATA SHEETS

### Absolute Maximum Ratings

	Parameter	Max.	Units
$I_D @ T_C = 25^\circ C$	Continuous Drain Current, $V_{GS} @ -10 V$	-0.56	A
$I_D @ T_C = 100^\circ C$	Continuous Drain Current, $V_{GS} @ -10 V$	-0.36	
$I_{DM}$	Pulsed Drain Current ①	-4.5	
$P_D @ T_C = 25^\circ C$	Power Dissipation	1.0	W
	Linear Derating Factor	0.0083	W/°C
$V_{GS}$	Gate-to-Source Voltage	$\pm 20$	V
$E_{AS}$	Single Pulse Avalanche Energy ②	420	mJ
$I_{AR}$	Avalanche Current ①	-0.56	A
$E_{AR}$	Repetitive Avalanche Energy ①	0.10	mJ
dv/dt	Peak Diode Recovery dv/dt ③	-5.0	V/ns
$T_J$	Operating Junction and	-55 to +150	°C
$T_{STG}$	Storage Temperature Range		
	Soldering Temperature, for 10 seconds	300 (1.6mm from case)	

### Thermal Resistance

	Parameter	Min.	Typ.	Max.	Units
$R_{\theta JA}$	Junction-to-Ambient	—	—	120	°C/W

## Electrical Characteristics @ $T_J = 25^\circ\text{C}$ (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Test Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	-200	—	—	V	$V_{GS}=0V, I_D=-250\mu A$
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	-0.22	—	$V/^\circ\text{C}$	Reference to $25^\circ\text{C}, I_D=-1\text{mA}$
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	—	1.5	$\Omega$	$V_{GS}=10V, I_D=-0.34A$ ④
$V_{GS(th)}$	Gate Threshold Voltage	-2.0	—	-4.0	V	$V_{DS}=V_{GS}, I_D=-250\mu A$
$g_{fs}$	Forward Transconductance	0.55	—	—	S	$V_{DS}=-50V, I_D=-0.35A$ ④
$I_{DSS}$	Drain-to-Source Leakage Current	—	—	-100	$\mu A$	$V_{DS}=-200V, V_{GS}=0V$
		—	—	-500		$V_{DS}=-160V, V_{GS}=0V, T_J=125^\circ\text{C}$
$I_{GSS}$	Gate-to-Source Forward Leakage	—	—	-100	nA	$V_{GS}=-20V$
	Gate-to-Source Reverse Leakage	—	—	100		$V_{GS}=20V$
$Q_g$	Total Gate Charge	—	—	15	nC	$I_D=-2.1A$
$Q_{gs}$	Gate-to-Source Charge	—	—	3.2		$V_{DS}=-160V$
$Q_{gd}$	Gate-to-Drain ("Miller") Charge	—	—	8.4		$V_{GS}=-10V$ See Fig. 6 and 13 ④
$t_{d(on)}$	Turn-On Delay Time	—	8.8	—	ns	$V_{DD}=100V$
$t_r$	Rise Time	—	27	—		$I_D=-3.9A$
$t_{d(off)}$	Turn-Off Delay Time	—	7.3	—		$R_G=18\Omega$
$t_f$	Fall Time	—	19	—		$R_D=24\Omega$ See Figure 10 ④
$L_D$	Internal Drain Inductance	—	4.0	—		nH
$L_S$	Internal Source Inductance	—	6.0	—		
$C_{iss}$	Input Capacitance	—	340	—	pF	$V_{GS}=0V$
$C_{oss}$	Output Capacitance	—	110	—		$V_{DS}=-25V$
$C_{rss}$	Reverse Transfer Capacitance	—	33	—		$f=1.0\text{MHz}$ See Figure 5



## Source-Drain Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Test Conditions
$I_S$	Continuous Source Current (Body Diode)	—	—	-0.56	A	MOSFET symbol showing the integral reverse p-n junction diode.
$I_{SM}$	Pulsed Source Current (Body Diode) ①	—	—	-4.5		
$V_{SD}$	Diode Forward Voltage	—	—	-6.3	V	$T_J=25^\circ\text{C}, I_S=-0.56A, V_{GS}=0V$ ④
$t_{rr}$	Reverse Recovery Time	—	150	300	ns	$T_J=25^\circ\text{C}, I_F=-3.9A$
$Q_{rr}$	Reverse Recovery Charge	—	0.97	2.0	$\mu\text{C}$	$di/dt=100A/\mu\text{s}$ ④

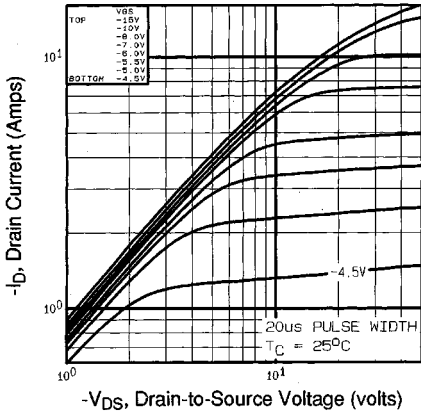
### Notes:

① Repetitive rating; pulse width limited by max. junction temperature (See Figure 11)

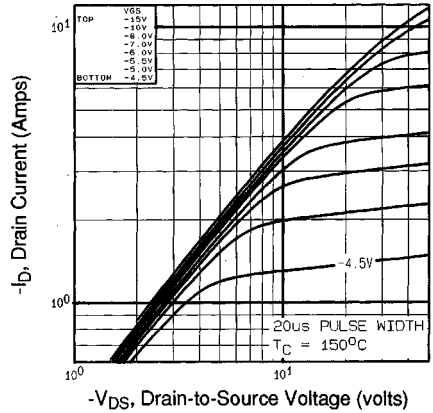
③  $I_{SD} \leq 3.9A, di/dt \leq 95A/\mu\text{s}, V_{DD} \leq V_{(BR)DSS}, T_J \leq 150^\circ\text{C}$

②  $V_{DD} = -50V$ , starting  $T_J = 25^\circ\text{C}$ ,  $L = 130\text{mH}$   
 $R_G = 25\Omega, I_{AS} = -2.2A$  (See Figure 12)

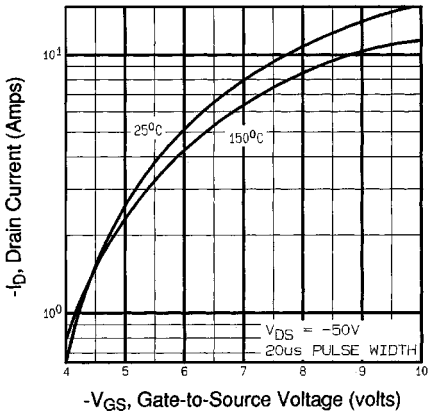
④ Pulse width  $\leq 300\mu\text{s}$ ; duty cycle  $\leq 2\%$ .



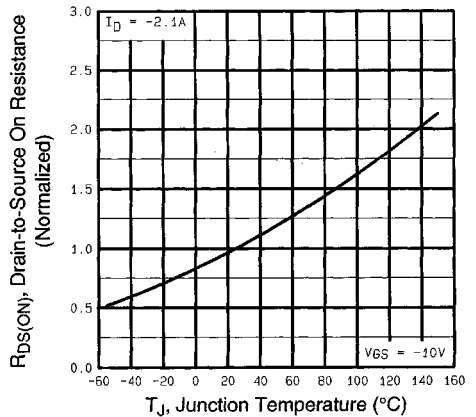
**Fig 1.** Typical Output Characteristics,  $T_C=25^\circ\text{C}$



**Fig 2.** Typical Output Characteristics,  $T_C=150^\circ\text{C}$

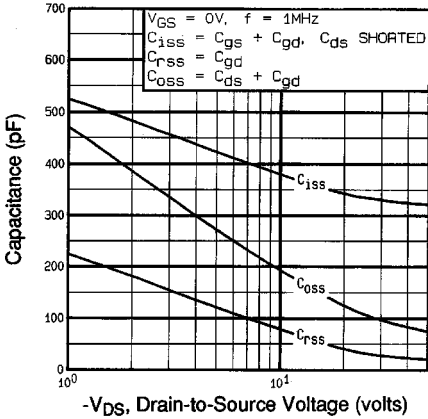


**Fig 3.** Typical Transfer Characteristics

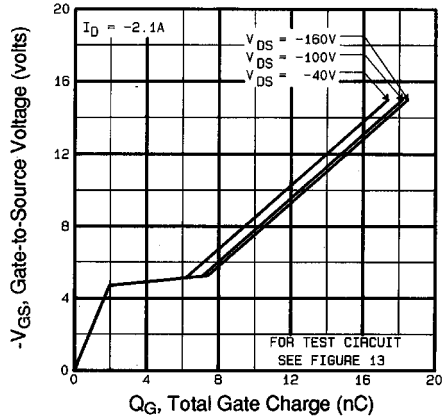


**Fig 4.** Normalized On-Resistance Vs. Temperature

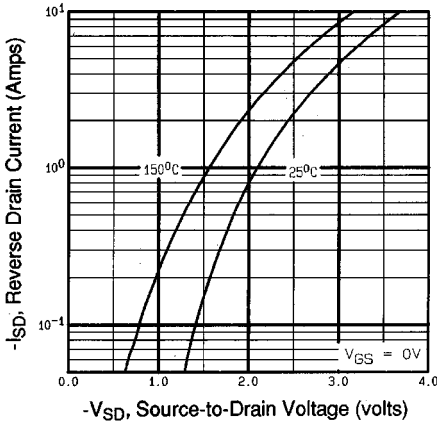
DATA SHEETS



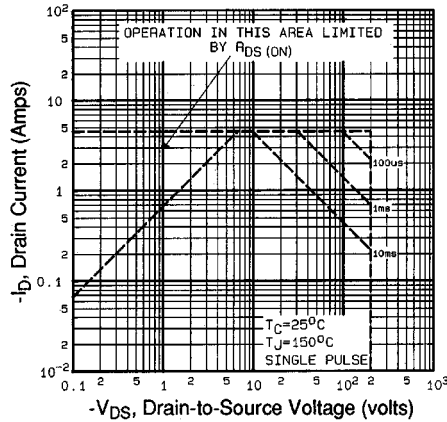
**Fig 5.** Typical Capacitance Vs. Drain-to-Source Voltage



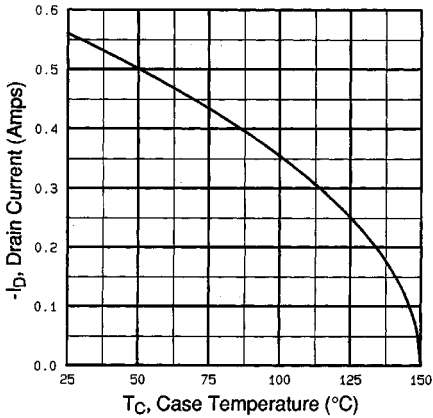
**Fig 6.** Typical Gate Charge Vs. Gate-to-Source Voltage



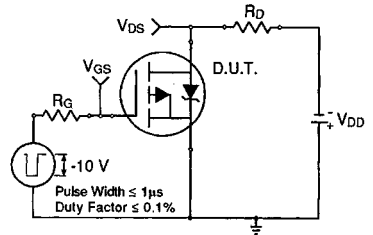
**Fig 7.** Typical Source-Drain Diode Forward Voltage



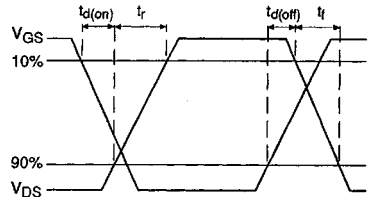
**Fig 8.** Maximum Safe Operating Area



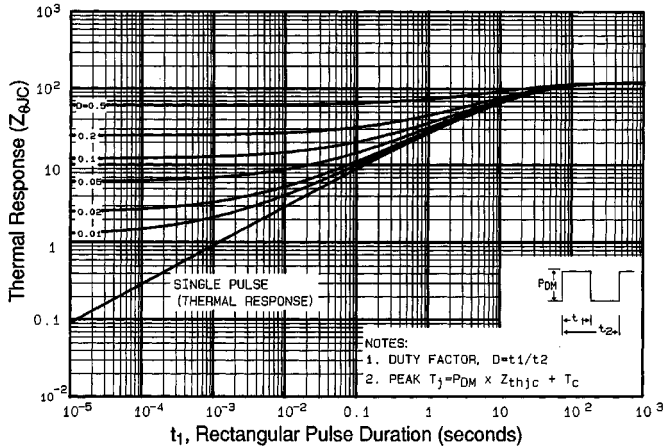
**Fig 9.** Maximum Drain Current Vs. Case Temperature



**Fig 10a.** Switching Time Test Circuit

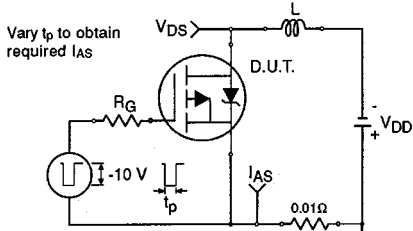


**Fig 10b.** Switching Time Waveforms

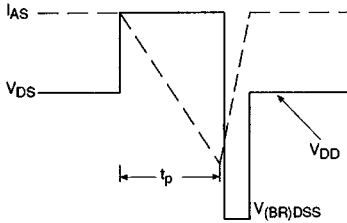


**Fig 11.** Maximum Effective Transient Thermal Impedance, Junction-to-Case

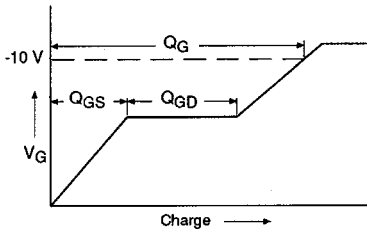
DATA SHEETS



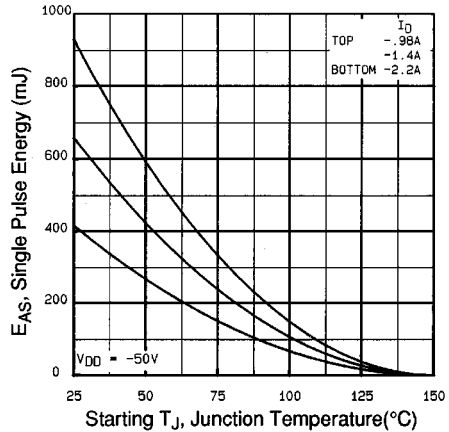
**Fig 12a.** Unclamped Inductive Test Circuit



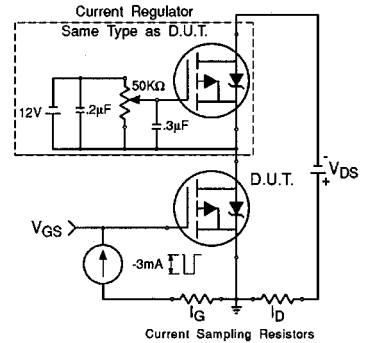
**Fig 12b.** Unclamped Inductive Waveforms



**Fig 13a.** Basic Gate Charge Waveform



**Fig 12c.** Maximum Avalanche Energy Vs. Drain Current



**Fig 13b.** Gate Charge Test Circuit

**Appendix A:** Figure 14, Peak Diode Recovery  $dv/dt$  Test Circuit – See page 1506

**Appendix B:** Package Outline Mechanical Drawing – See page 1507

**Appendix C:** Part Marking Information – See page 1515