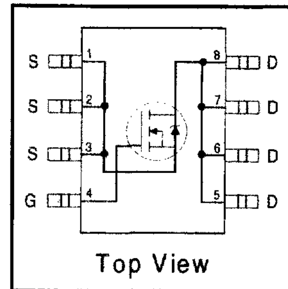
International
IOR Rectifier

PD - 9.1245B

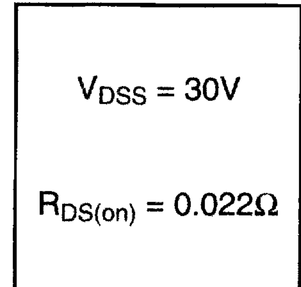
IRF7403

HEXFET® Power MOSFET

- Generation V Technology
- Ultra Low On-Resistance
- N-Channel Mosfet
- Surface Mount
- Available in Tape and Reel
- Dynamic dv/dt Rating
- Fast Switching



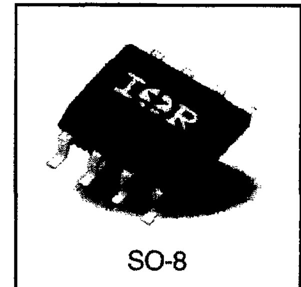
Top View



Description

Fifth Generation HEXFET® Power MOSFETs from International Rectifier utilize advanced processing techniques to achieve the lowest possible on-resistance per silicon area. This benefit, combined with the fast switching speed and ruggedized device design for which HEXFET Power MOSFETs are well known, provides the designer with an extremely efficient device for use in a wide variety of applications.

The SO-8 has been modified through a customized leadframe for enhanced thermal characteristics and multiple-die capability making it ideal in a variety of power applications. With these improvements, multiple devices can be used in an application with dramatically reduced board space. The package is designed for vapor phase, infrared, or wave soldering techniques. Power dissipation of greater than 0.8W is possible in a typical PCB mount application.


SO-8

Absolute Maximum Ratings

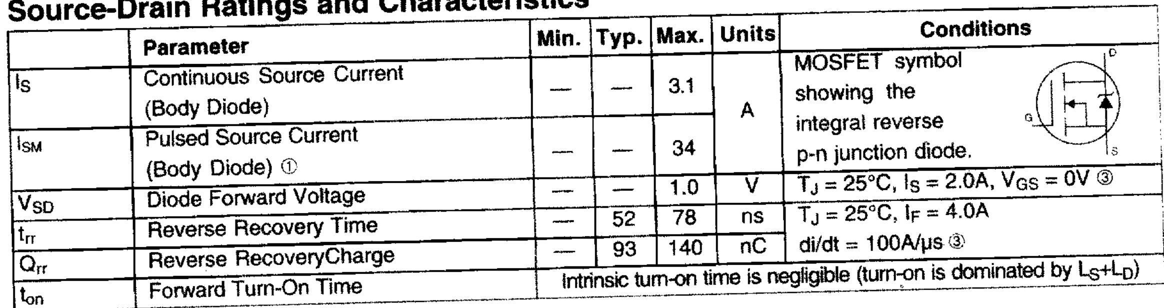
	Parameter	Max.	Units
I_D @ T_A = 25°C	10 Sec. Pulsed Drain Current, V_{GS} @ 10V	9.7	A
I_D @ T_A = 25°C	Continuous Drain Current, V_{GS} @ 10V	8.5	
I_D @ T_A = 70°C	Continuous Drain Current, V_{GS} @ 10V	5.4	
I_{DM}	Pulsed Drain Current ①	34	
P_D @T_A = 25°C	Power Dissipation	2.5	W
	Linear Derating Factor	0.02	W/°C
V_{GS}	Gate-to-Source Voltage	±20	V
dv/dt	Peak Diode Recovery dv/dt ②	5.0	V/ns
T_J, T_{STG}	Junction and Storage Temperature Range	-55 to + 150	°C

Thermal Resistance Ratings

	Parameter	Typ.	Max.	Units
$R_{\theta JA}$	Maximum Junction-to-Ambient	—	50	°C/W

Electrical Characteristics @ T_J = 25°C (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	30	—	—	V	V_{GS} = 0V, I_D = 250µA
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	0.024	—	V/°C	Reference to 25°C, I_D = 1mA
$R_{DS(ON)}$	Static Drain-to-Source On-Resistance	—	—	0.022	Ω	V_{GS} = 10V, I_D = 4.0A ③
		—	—	0.035		V_{GS} = 4.5V, I_D = 3.4A ③
$V_{GS(th)}$	Gate Threshold Voltage	1.0	—	—	V	V_{DS} = V_{GS}, I_D = 250µA
g_{fs}	Forward Transconductance	8.4	—	—	S	V_{DS} = 15V, I_D = 4.0A
I_{DSS}	Drain-to-Source Leakage Current	—	—	1.0	µA	V_{DS} = 24V, V_{GS} = 0V
		—	—	25		V_{DS} = 24V, V_{GS} = 0V, T_J = 125°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	—	—	57	nC	I_D = 4.0A
Q_{gs}	Gate-to-Source Charge	—	—	6.8		V_{DS} = 24V
Q_{gd}	Gate-to-Drain ("Miller") Charge	—	—	18		V_{GS} = 10V, see figure 6 and 12 ③
$t_{d(on)}$	Turn-On Delay Time	—	10	—	ns	V_{DD} = 15V
t_r	Rise Time	—	37	—		I_D = 4.0A
$t_{d(off)}$	Turn-Off Delay Time	—	42	—		R_G = 6.0Ω
t_f	Fall Time	—	40	—		R_D = 3.7Ω, see figure 10 ③
L_D	Internal Drain Inductance	—	2.5	—	nH	Between lead tip and center of die contact
L_S	Internal Source Inductance	—	4.0	—		
C_{iss}	Input Capacitance	—	1200	—	pF	V_{GS} = 0V
C_{oss}	Output Capacitance	—	450	—		V_{DS} = 25V
C_{rss}	Reverse Transfer Capacitance	—	160	—		f = 1.0MHz, see figure 5



Source-Drain Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	3.1	A	MOSFET symbol showing the integral reverse p-n junction diode.
I_{SM}	Pulsed Source Current (Body Diode) ①	—	—	34		
V_{SD}	Diode Forward Voltage	—	—	1.0	V	T_J = 25°C, I_S = 2.0A, V_{GS} = 0V ③
t_{rr}	Reverse Recovery Time	—	52	78	ns	T_J = 25°C, I_F = 4.0A
Q_{rr}	Reverse RecoveryCharge	—	93	140	nC	di/dt = 100A/µs ③
t_{on}	Forward Turn-On Time	Intrinsic turn-on time is negligible (turn-on is dominated by L_S+L_D)				

Notes:

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

② $I_{SD} \leq$ 4.0A, di/dt $\leq$ 180A/µs, $V_{DD} \leq V_{(BR)DSS}$, $T_J \leq$ 150°C

③ Pulse width $\leq$ 300µs; duty cycle $\leq$ 2%.

④ Surface mounted on FR-4 board, t $\leq$ 10sec.

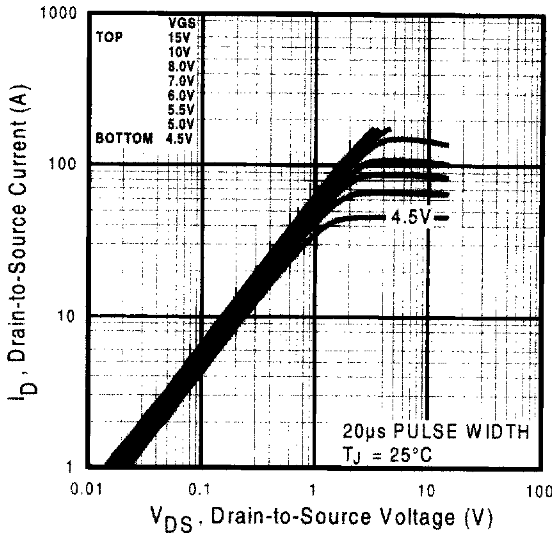


Fig 1. Typical Output Characteristics

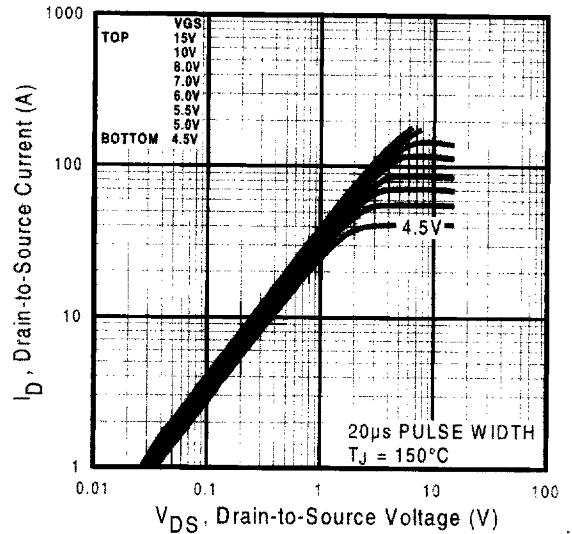


Fig 2. Typical Output Characteristics

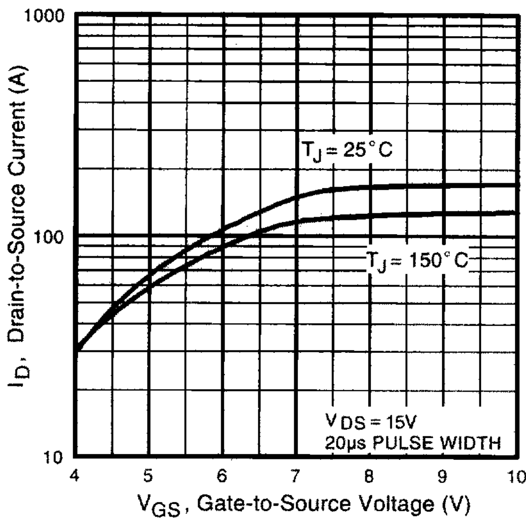


Fig 3. Typical Transfer Characteristics

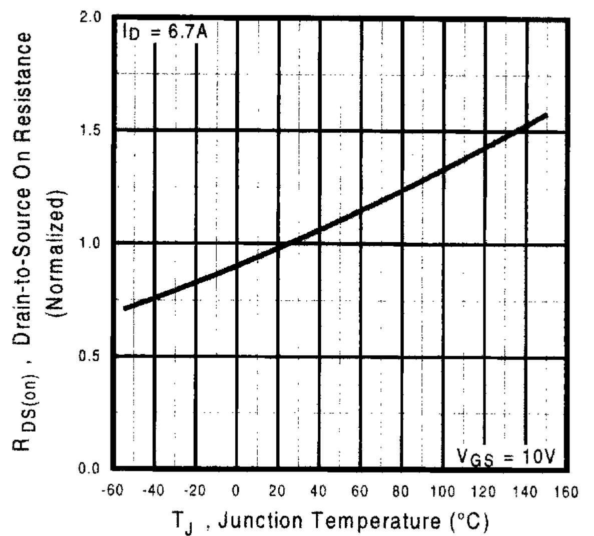


Fig 4. Normalized On-Resistance Vs. Temperature

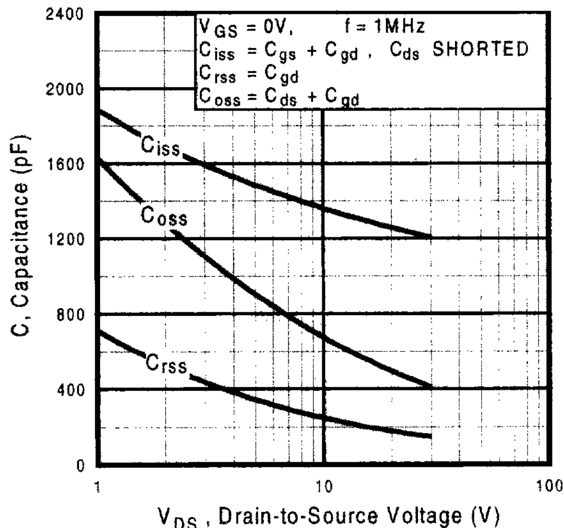


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

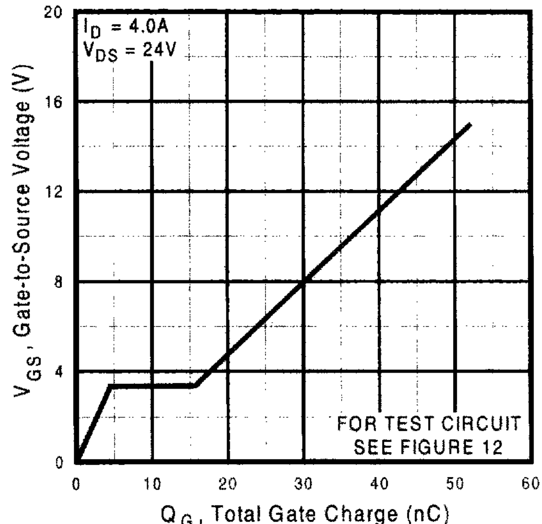


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

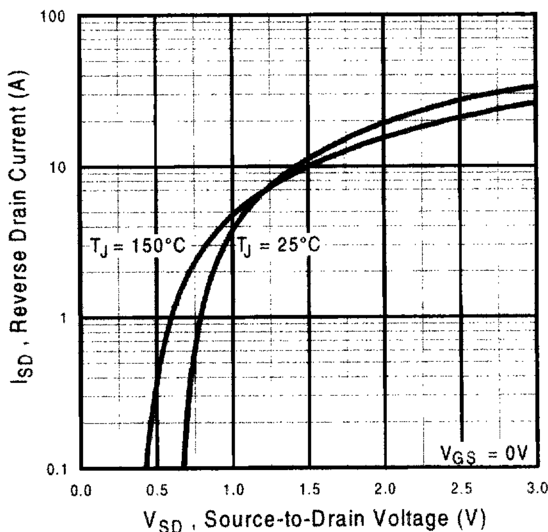


Fig 7. Typical Source-Drain Diode Forward Voltage

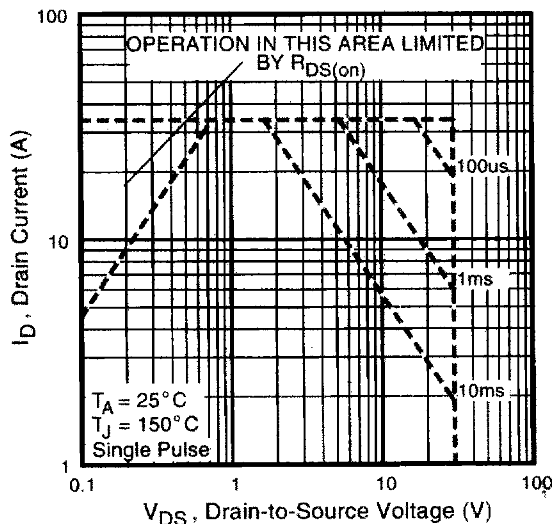


Fig 8. Maximum Safe Operating Area

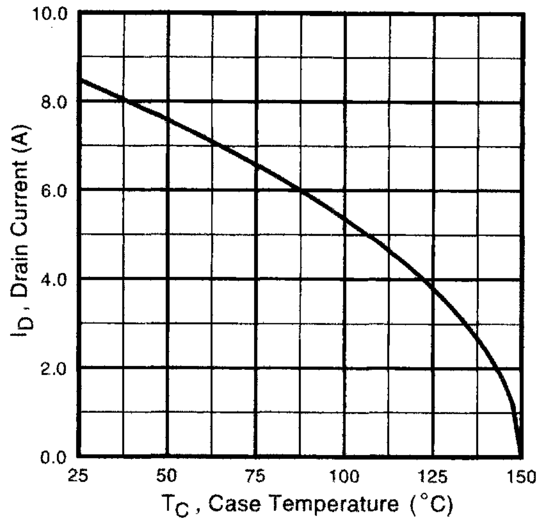


Fig 9. Maximum Drain Current Vs. Ambient Temperature

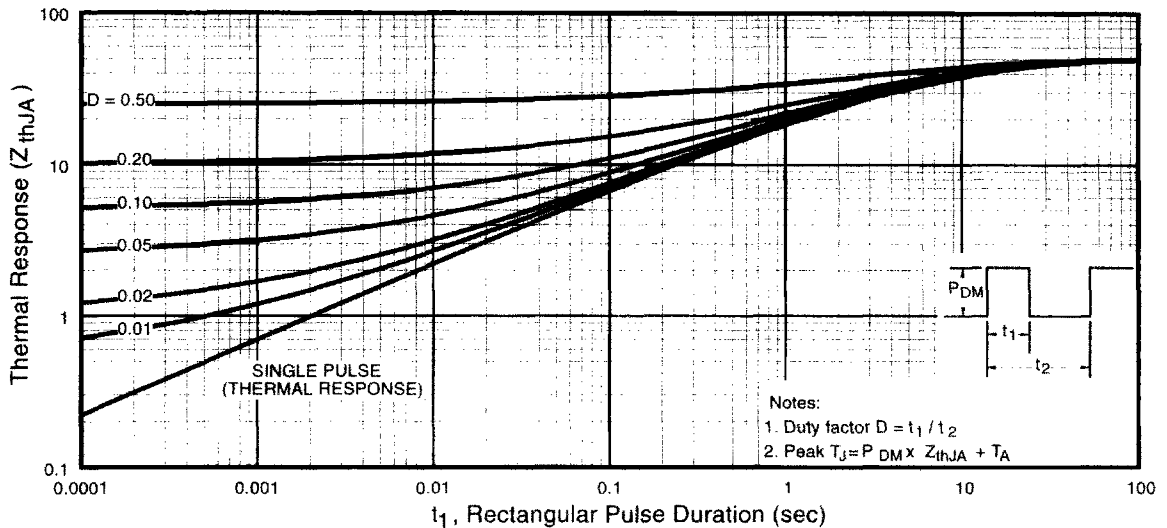


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

Mechanical drawings, Appendix A
Part marking information, Appendix B
Test Circuit diagrams, Appendix C