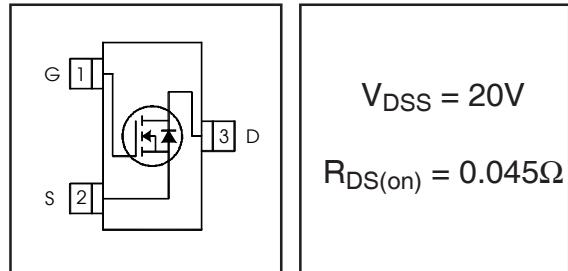


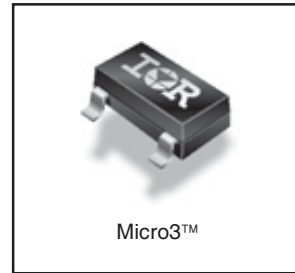
- Ultra Low On-Resistance
- N-Channel MOSFET
- SOT-23 Footprint
- Low Profile (<1.1mm)
- Available in Tape and Reel
- Fast Switching
- Lead-Free
- RoHS Compliant, Halogen-Free

HEXFET® Power MOSFET



**Description**

These N-Channel MOSFETs from International Rectifier utilize advanced processing techniques to achieve extremely low on-resistance per silicon area. This benefit, combined with the fast switching speed and ruggedized device design that HEXFET® power MOSFETs are well known for, provides the designer with an extremely efficient and reliable device for use in battery and load management.



A thermally enhanced large pad leadframe has been incorporated into the standard SOT-23 package to produce a HEXFET Power MOSFET with the industry's smallest footprint. This package, dubbed the Micro3™, is ideal for applications where printed circuit board space is at a premium. The low profile (<1.1mm) of the Micro3 allows it to fit easily into extremely thin application environments such as portable electronics and PCMCIA cards. The thermal resistance and power dissipation are the best available.

Base Part Number	Package Type	Standard Pack		Orderable Part Number
		Form	Quantity	
IRLML2502TRPbF	Micro3™ (SOT-23)	Tape and Reel	3000	IRLML2502TRPbF

**Absolute Maximum Ratings**

	Parameter	Max.	Units
$V_{DS}$	Drain- Source Voltage	20	V
$I_D @ T_A = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 4.5V$	4.2	A
$I_D @ T_A = 70^\circ C$	Continuous Drain Current, $V_{GS} @ 4.5V$	3.4	
$I_{DM}$	Pulsed Drain Current ①	33	
$P_D @ T_A = 25^\circ C$	Power Dissipation	1.25	W
$P_D @ T_A = 70^\circ C$	Power Dissipation	0.8	
	Linear Derating Factor	0.01	W/°C
$V_{GS}$	Gate-to-Source Voltage	$\pm 12$	V
$T_J, T_{STG}$	Junction and Storage Temperature Range	-55 to + 150	°C

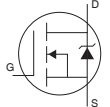
**Thermal Resistance**

	Parameter	Typ.	Max.	Units
$R_{\theta JA}$	Maximum Junction-to-Ambient③	75	100	°C/W

**Electrical Characteristics @ T<sub>J</sub> = 25°C (unless otherwise specified)**

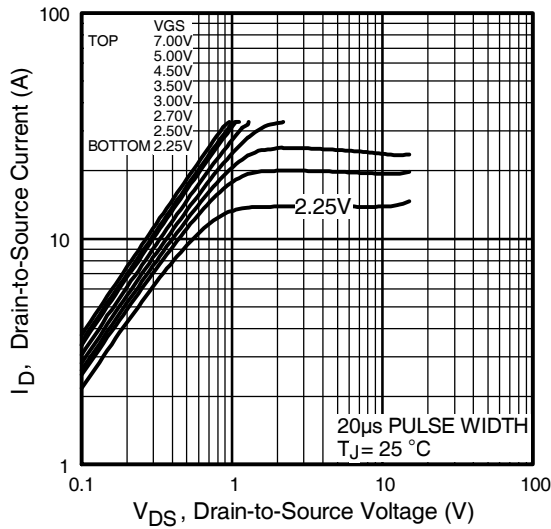
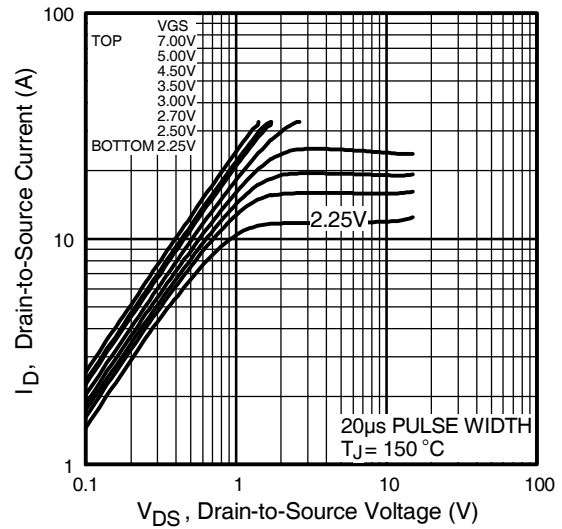
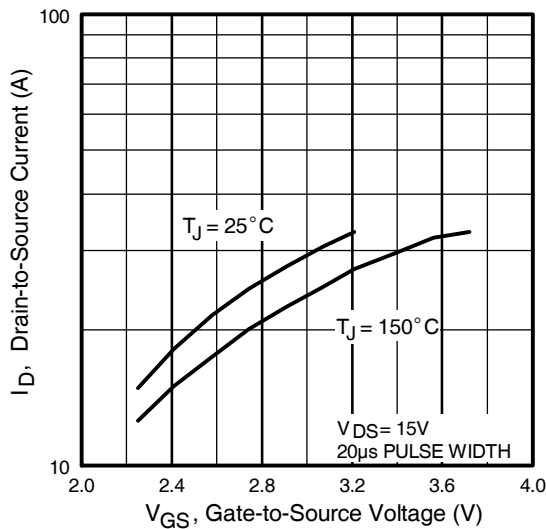
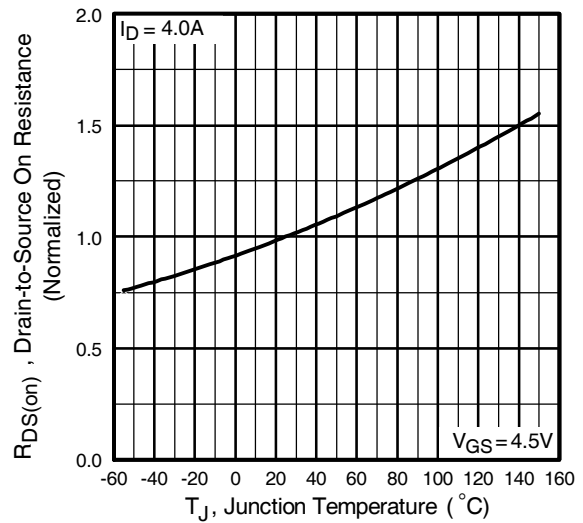
	Parameter	Min.	Typ.	Max.	Units	Conditions
V <sub>(BR)DSS</sub>	Drain-to-Source Breakdown Voltage	20	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA
ΔV <sub>(BR)DSS</sub> /ΔT <sub>J</sub>	Breakdown Voltage Temp. Coefficient	—	0.01	—	V/°C	Reference to 25°C, I <sub>D</sub> = 1.0mA
R <sub>DS(on)</sub>	Static Drain-to-Source On-Resistance	—	0.035	0.045	Ω	V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 4.2A ②
		—	0.050	0.080		V <sub>GS</sub> = 2.5V, I <sub>D</sub> = 3.6A ②
V <sub>GS(th)</sub>	Gate Threshold Voltage	0.60	—	1.2	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA
ΔV <sub>GS(th)</sub>	Gate Threshold Voltage Coefficient	—	-3.2	—	mV/°C	
g <sub>fs</sub>	Forward Transconductance	5.8	—	—	S	V <sub>DS</sub> = 10V, I <sub>D</sub> = 4.0A
I <sub>DSS</sub>	Drain-to-Source Leakage Current	—	—	1.0	μA	V <sub>DS</sub> = 16V, V <sub>GS</sub> = 0V
		—	—	25		V <sub>DS</sub> = 16V, V <sub>GS</sub> = 0V, T <sub>J</sub> = 70°C
I <sub>GSS</sub>	Gate-to-Source Forward Leakage	—	—	100	nA	V <sub>GS</sub> = 12V
	Gate-to-Source Reverse Leakage	—	—	-100		V <sub>GS</sub> = -12V
Q <sub>g</sub>	Total Gate Charge	—	8.0	12	nC	I <sub>D</sub> = 4.0A
Q <sub>gs</sub>	Gate-to-Source Charge	—	1.8	2.7		V <sub>DS</sub> = 10V
Q <sub>gd</sub>	Gate-to-Drain ("Miller") Charge	—	1.7	2.6		V <sub>GS</sub> = 5.0V ②
t <sub>d(on)</sub>	Turn-On Delay Time	—	7.5	—	ns	V <sub>DD</sub> = 10V
t <sub>r</sub>	Rise Time	—	10	—		I <sub>D</sub> = 1.0A
t <sub>d(off)</sub>	Turn-Off Delay Time	—	54	—		R <sub>G</sub> = 6Ω
t <sub>f</sub>	Fall Time	—	26	—		R <sub>D</sub> = 10Ω ②
C <sub>iss</sub>	Input Capacitance	—	740	—	pF	V <sub>GS</sub> = 0V
C <sub>oss</sub>	Output Capacitance	—	90	—		V <sub>DS</sub> = 15V
C <sub>rss</sub>	Reverse Transfer Capacitance	—	66	—		f = 1.0MHz

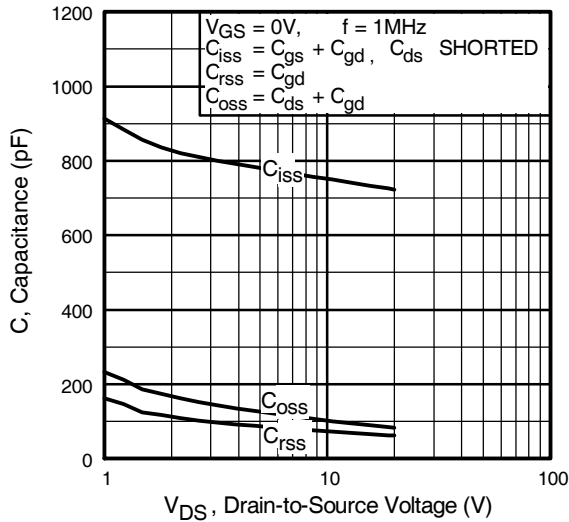
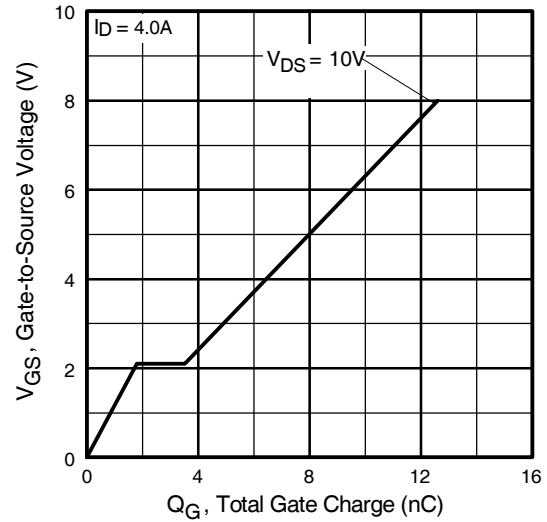
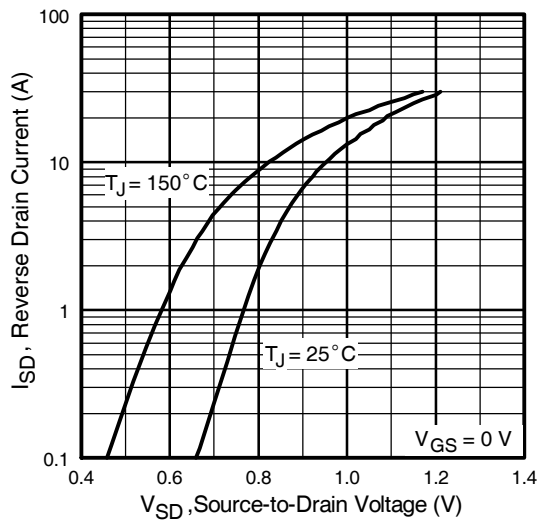
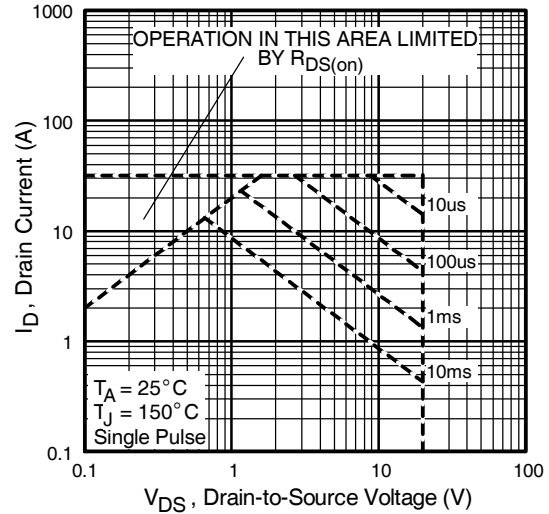
**Source-Drain Rating and Characteristics**

	Parameter	Min.	Typ.	Max.	Units	Conditions
I <sub>S</sub>	Continuous Source Current (Body Diode)	—	—	1.3	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I <sub>SM</sub>	Pulsed Source Current (Body Diode) ①	—	—	33		
V <sub>SD</sub>	Diode Forward Voltage	—	—	1.2	V	T <sub>J</sub> = 25°C, I <sub>S</sub> = 1.3A, V <sub>GS</sub> = 0V ②
t <sub>rr</sub>	Reverse Recovery Time	—	16	24	ns	T <sub>J</sub> = 25°C, I <sub>F</sub> = 1.3A
Q <sub>rr</sub>	Reverse Recovery Charge	—	8.6	13	nC	di/dt = 100A/μs ②

**Notes:**

- ① Repetitive rating; pulse width limited by max. junction temperature. ( See fig. 11 )
- ② Pulse width ≤ 300μs; duty cycle ≤ 2%.
- ③ Surface mounted on FR-4 board, t ≤ 5sec.


**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

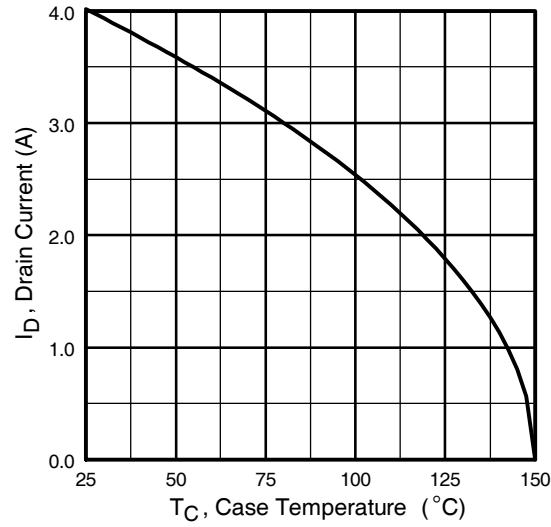


Fig 9. Maximum Drain Current Vs. Case Temperature

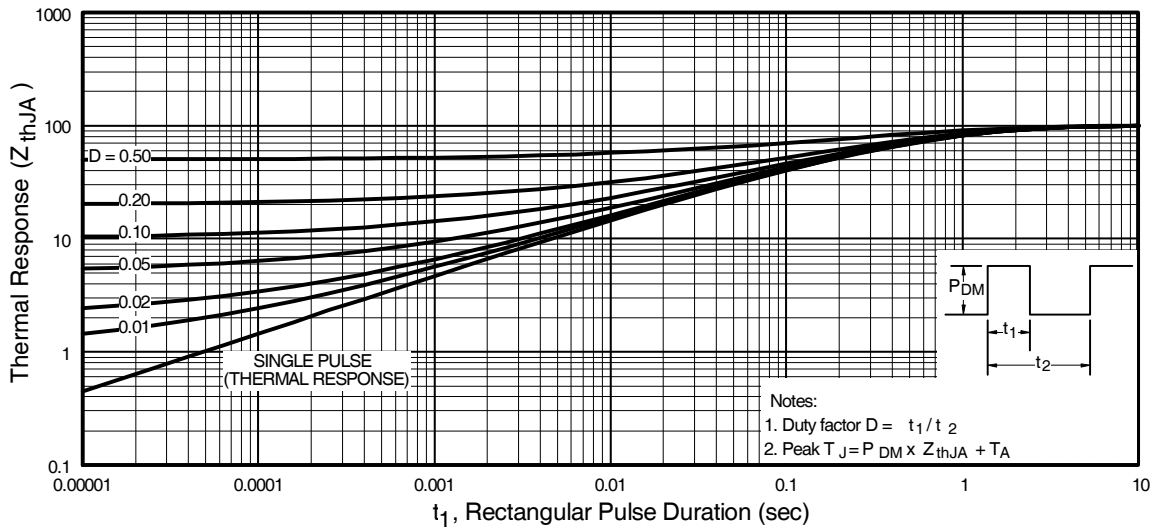
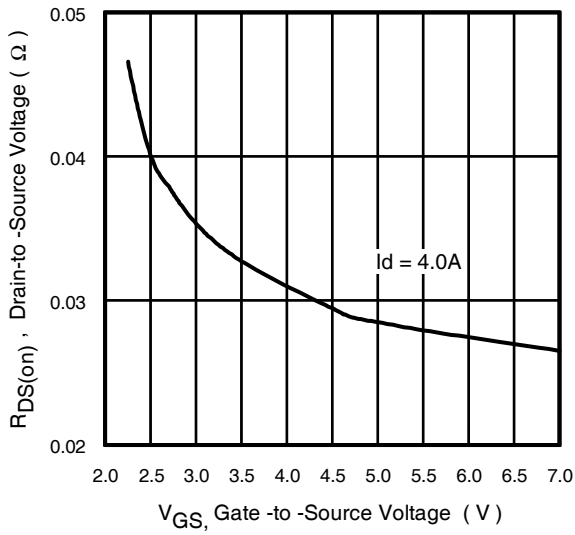
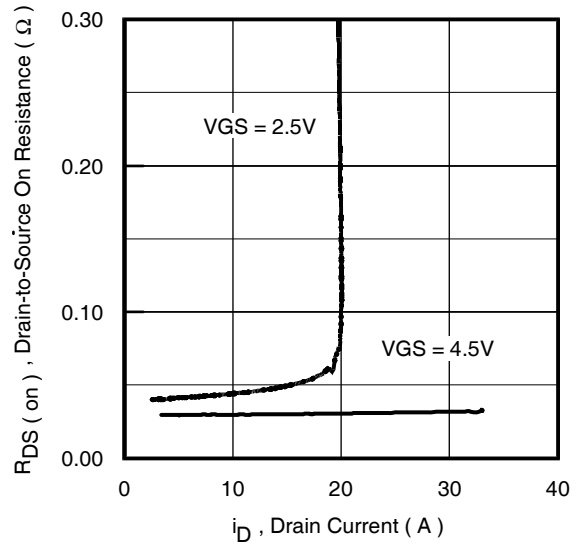
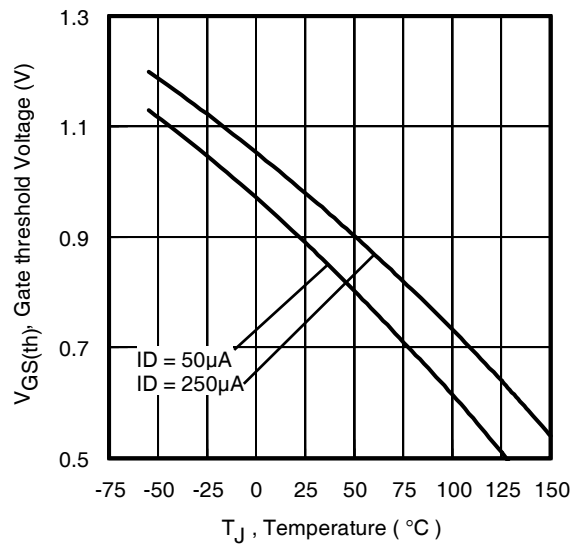


Fig 10. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient


**Fig 11.** On-Resistance Vs. Gate Voltage

**Fig 12.** On-Resistance Vs. Drain Current

**Fig 13.** Threshold Voltage Vs. Temperature







**Qualification information<sup>†</sup>**

Qualification level	Consumer (per JEDEC JESD47F <sup>††</sup> guidelines)	
Moisture Sensitivity Level	Micro3™ (SOT-23)	MSL1 (per JEDEC J-STD-020D <sup>††</sup> )
RoHS compliant	Yes	

<sup>†</sup> Qualification standards can be found at International Rectifier's web site: <http://www.irf.com/product-info/reliability>

<sup>††</sup> Applicable version of JEDEC standard at the time of product release

**Revision History**

Date	Comment
4/24/2014	<ul style="list-style-type: none"> <li>• Updated data sheet with new IR corporate template.</li> <li>• Updated package outline &amp; part marking on page 7.</li> <li>• Added Qualification table -Qual level "Consumer" on page 9.</li> <li>• Added bullet point in the Benefits "RoHS Compliant, Halogen -Free" on page 1.</li> </ul>