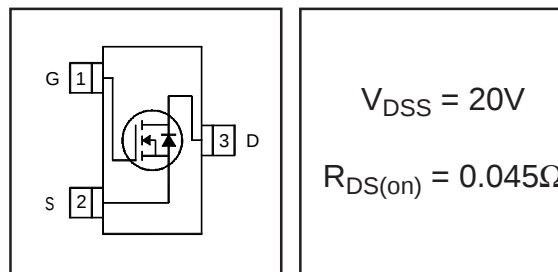


IRLML2502

HEXFET® Power MOSFET

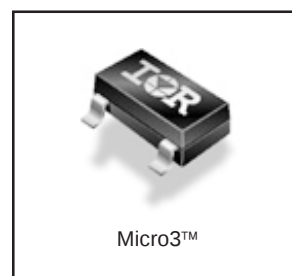
- Ultra Low On-Resistance
- N-Channel MOSFET
- SOT-23 Footprint
- Low Profile (<1.1mm)
- Available in Tape and Reel
- Fast Switching



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.



Absolute Maximum Ratings

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

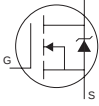
Thermal Resistance

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

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

	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	20	—	—	V	$V_{GS} = 0V, I_D = 250\mu A$
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	0.01	—	V/ $^\circ\text{C}$	Reference to $25^\circ\text{C}, I_D = 1mA$
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	0.035	0.045	Ω	$V_{GS} = 4.5V, I_D = 4.2A$ ②
		—	0.050	0.080		$V_{GS} = 2.5V, I_D = 3.6A$ ②
$V_{GS(th)}$	Gate Threshold Voltage	0.60	—	1.2	V	$V_{DS} = V_{GS}, I_D = 250\mu A$
g_{fs}	Forward Transconductance	5.8	—	—	S	$V_{DS} = 10V, I_D = 4.0A$
I_{DSS}	Drain-to-Source Leakage Current	—	—	1.0	μA	$V_{DS} = 16V, V_{GS} = 0V$
		—	—	25		$V_{DS} = 16V, V_{GS} = 0V, T_J = 70^\circ\text{C}$
I_{GSS}	Gate-to-Source Forward Leakage	—	—	-100	nA	$V_{GS} = -12V$
	Gate-to-Source Reverse Leakage	—	—	100		$V_{GS} = 12V$
Q_g	Total Gate Charge	—	8.0	12	nC	$I_D = 4.0A$
Q_{gs}	Gate-to-Source Charge	—	1.8	2.7		$V_{DS} = 10V$
Q_{gd}	Gate-to-Drain ("Miller") Charge	—	1.7	2.6		$V_{GS} = 5.0V$ ②
$t_{d(on)}$	Turn-On Delay Time	—	7.5	—	ns	$V_{DD} = 10V$
t_r	Rise Time	—	10	—		$I_D = 1.0A$
$t_{d(off)}$	Turn-Off Delay Time	—	54	—		$R_G = 6\Omega$
t_f	Fall Time	—	26	—		$R_D = 10\Omega$ ②
C_{iss}	Input Capacitance	—	740	—	pF	$V_{GS} = 0V$
C_{oss}	Output Capacitance	—	90	—		$V_{DS} = 15V$
C_{rss}	Reverse Transfer Capacitance	—	66	—		$f = 1.0MHz$

Source-Drain Ratings and Characteristics

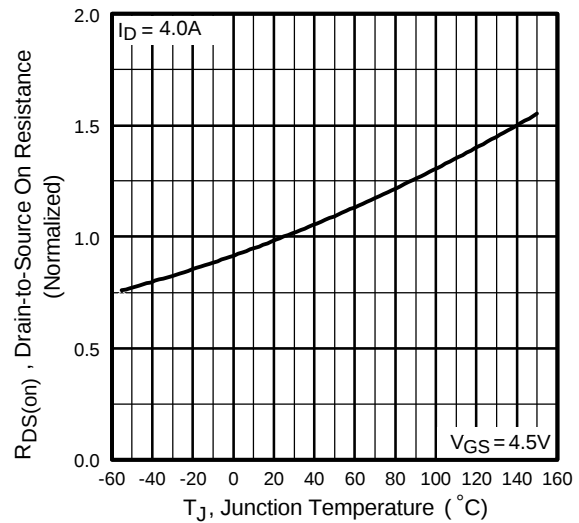
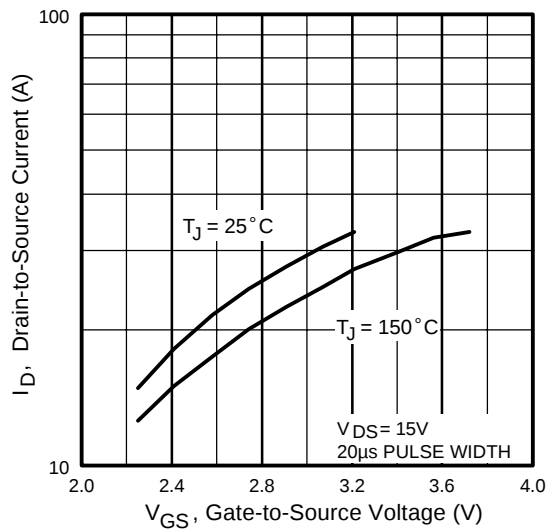
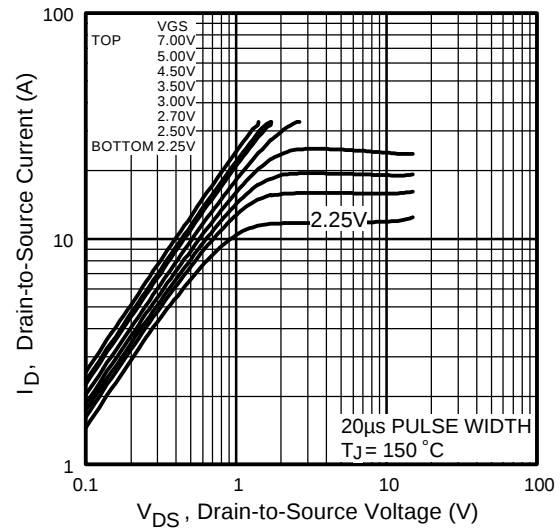
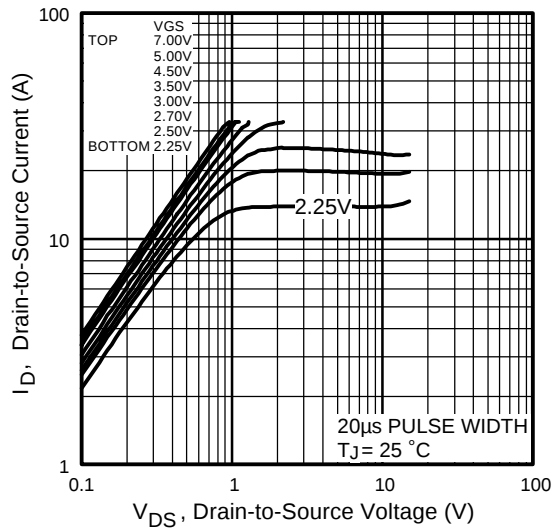
	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	1.3	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I_{SM}	Pulsed Source Current (Body Diode) ①	—	—	33		
V_{SD}	Diode Forward Voltage	—	—	1.2	V	$T_J = 25^\circ\text{C}, I_S = 1.3A, V_{GS} = 0V$ ②
t_{rr}	Reverse Recovery Time	—	16	24	ns	$T_J = 25^\circ\text{C}, I_F = 1.3A$
Q_{rr}	Reverse Recovery Charge	—	8.6	13	nC	$di/dt = 100A/\mu s$ ②

Notes:

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

③ Surface mounted on FR-4 board, $t \leq 5sec.$

② Pulse width $\leq 300\mu s$; duty cycle $\leq 2\%$.



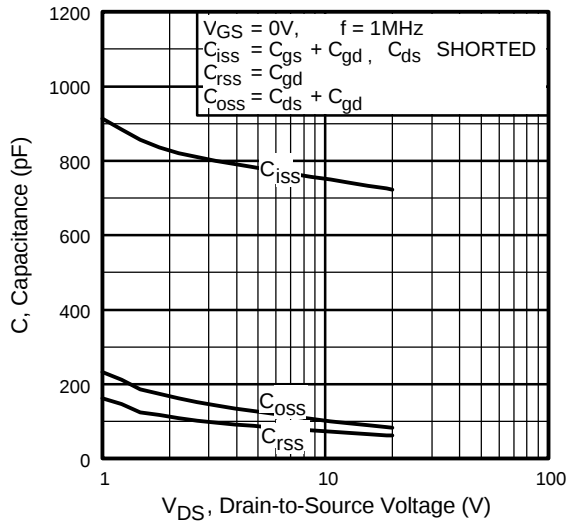


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

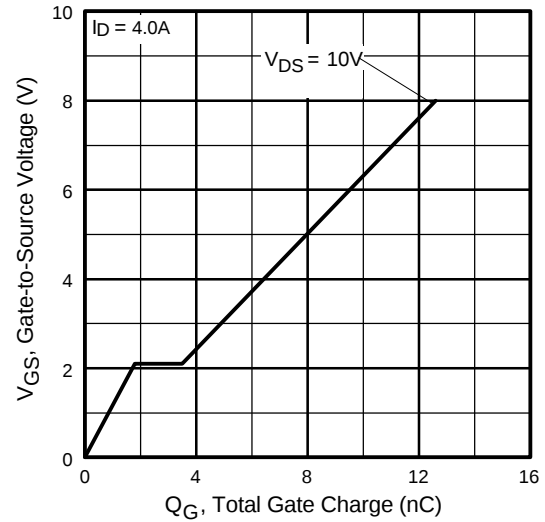


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

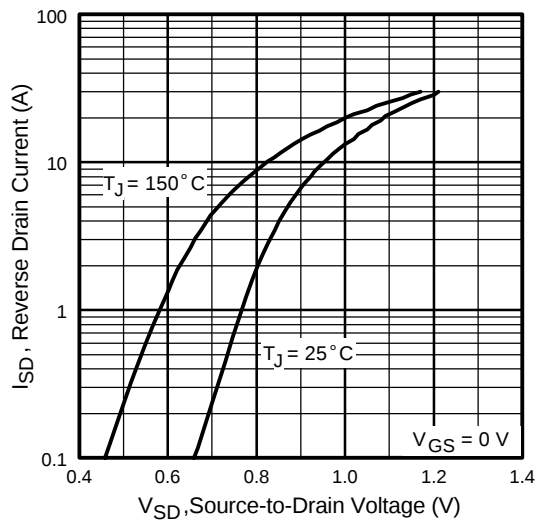


Fig 7. Typical Source-Drain Diode Forward Voltage

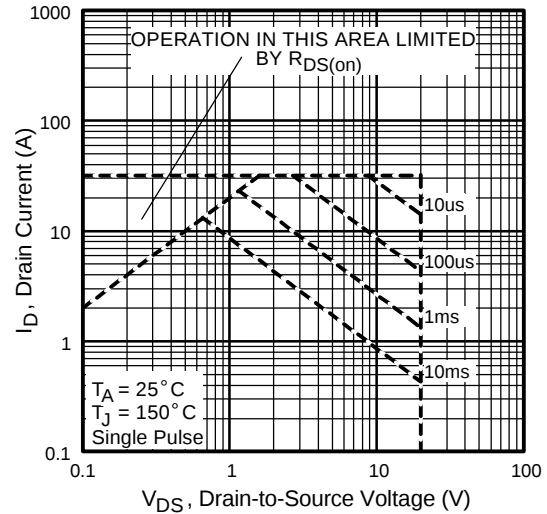


Fig 8. Maximum Safe Operating Area

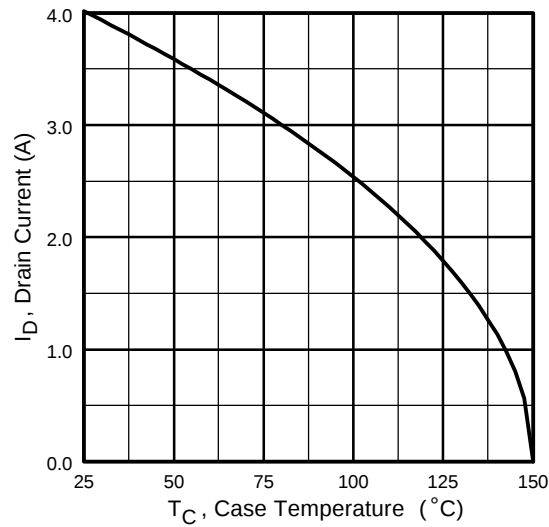


Fig 9. Maximum Drain Current Vs. Case Temperature

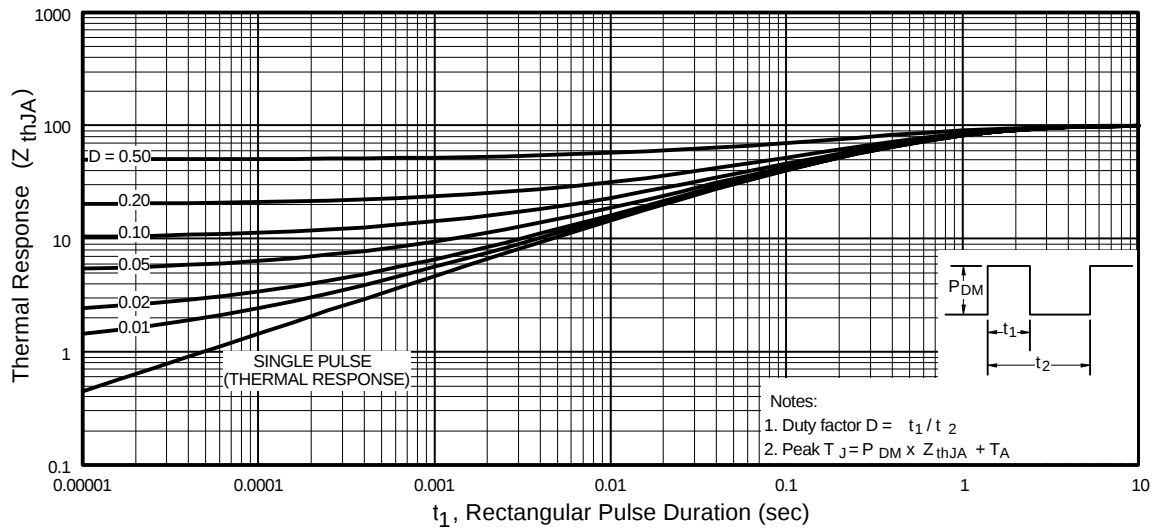


Fig 10. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

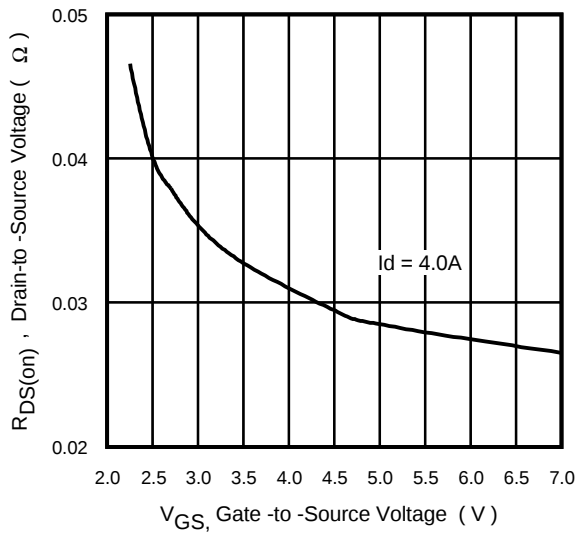


Fig 11. On-Resistance Vs. Gate Voltage

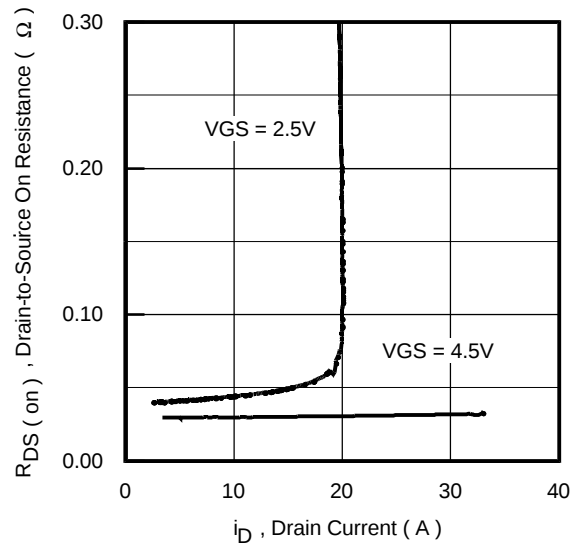
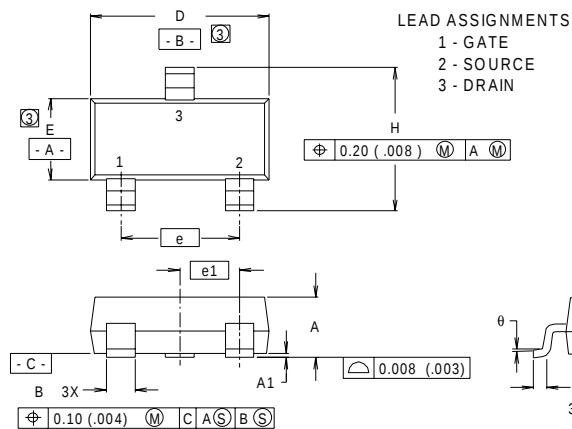


Fig 12. On-Resistance Vs. Drain Current

Micro3™ Package Outline

Dimensions are shown in millimeters (inches)

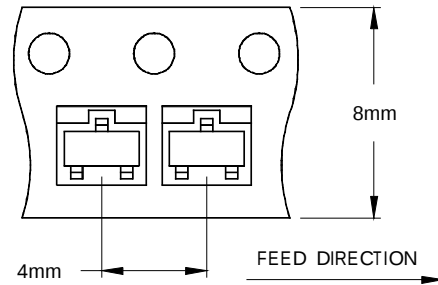


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International
IR Rectifier

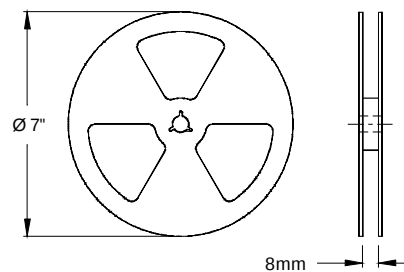
Micro3™ Tape & Reel Information

Dimensions are shown in millimeters (inches)



NOTES:

1. OUTLINE CONFORMS TO EIA-481 & EIA-541.



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International
IR Rectifier

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Data and specifications subject to change without notice. 5/00