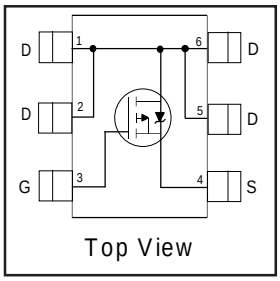
International
IOR Rectifier

PD- 93759

IRLMS4502

HEXFET® Power MOSFET

- Ultra Low On-Resistance
- P-Channel MOSFET
- Surface Mount
- Available in Tape & Reel



Top View

V_{DSS} = -12V

$R_{DS(on)}$ = 0.042Ω

Description

These P-Channel MOSFETs from International Rectifier utilize advanced processing techniques to achieve extremely low on-resistance per silicon area. This benefit provides the designer with an extremely efficient device for use in battery and load management applications.

The Micro6™ package with its customized leadframe produces a HEXFET® power MOSFET with $R_{DS(on)}$ 60% less than a similar size SOT-23. This package is ideal for applications where printed circuit board space is at a premium. It's unique thermal design and $R_{DS(on)}$ reduction enables a current-handling increase of nearly 300% compared to the SOT-23.


Micro6™

Absolute Maximum Ratings

	Parameter	Max.	Units
V_{DS}	Drain- Source Voltage	-12	V
I_D @ T_A = 25°C	Continuous Drain Current, V_{GS} @ -4.5V	-5.5	A
I_D @ T_A= 70°C	Continuous Drain Current, V_{GS} @ -4.5V	-4.4	
I_{DM}	Pulsed Drain Current ①	-44	
P_D @T_A = 25°C	Power Dissipation	1.7	W
P_D @T_A = 70°C	Power Dissipation	1.1	
	Linear Derating Factor	0.013	W/°C
E_{AS}	Single Pulse Avalanche Energy④	28	mJ
V_{GS}	Gate-to-Source Voltage	± 12	V
T_J, T_{STG}	Junction and Storage Temperature Range	-55 to + 150	°C

Thermal Resistance

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

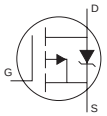
9/10/99

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

	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	-12	—	—	V	V_{GS} = 0V, I_D = -250µA
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	-0.003	—	V/°C	Reference to 25°C, I_D = -1mA
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	—	0.042	Ω	V_{GS} = -4.5V, I_D = -5.5A ②
		—	—	0.075		V_{GS} = -2.5V, I_D = -4.7A ②
$V_{GS(th)}$	Gate Threshold Voltage	-0.60	—	—	V	V_{DS} = V_{GS}, I_D = -250µA
g_{fs}	Forward Transconductance	8.8	—	—	S	V_{DS} = -10V, I_D = -5.5A
I_{DSS}	Drain-to-Source Leakage Current	—	—	-1.0	µA	V_{DS} = -12V, V_{GS} = 0V
		—	—	-25		V_{DS} = -9.6V, V_{GS} = 0V, T_J = 125°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	—	22	33	nC	I_D = -5.5A
Q_{gs}	Gate-to-Source Charge	—	3.9	5.8		V_{DS} = -10V
Q_{gd}	Gate-to-Drain ("Miller") Charge	—	11	16		V_{GS} = -5.0V ②
$t_{d(on)}$	Turn-On Delay Time	—	18	—	ns	V_{DD} = -6.0V
t_r	Rise Time	—	460	—		I_D = -1.0A
$t_{d(off)}$	Turn-Off Delay Time	—	130	—		R_G = 4.5Ω
t_f	Fall Time	—	250	—		R_D = 6.0Ω ②
C_{iss}	Input Capacitance	—	1820	—	pF	V_{GS} = 0V
C_{oss}	Output Capacitance	—	1110	—		V_{DS} = -10V
C_{rss}	Reverse Transfer Capacitance	—	1070	—		f = 1.0kHz

Source-Drain Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	-1.7	A	MOSFET symbol showing the integral reverse p-n junction diode.
I_{SM}	Pulsed Source Current (Body Diode) ①	—	—	-44		
V_{SD}	Diode Forward Voltage	—	—	-1.2	V	T_J = 25°C, I_S = -1.7A, V_{GS} = 0V ③
t_{rr}	Reverse Recovery Time	—	31	46	ns	T_J = 25°C, I_F = -5.5A
Q_{rr}	Reverse Recovery Charge	—	21	32	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.

④ Starting T_J = 25°C, L = 1.8mH
R_G = 25Ω, I_{AS} = -5.5A. (See Figure 12)

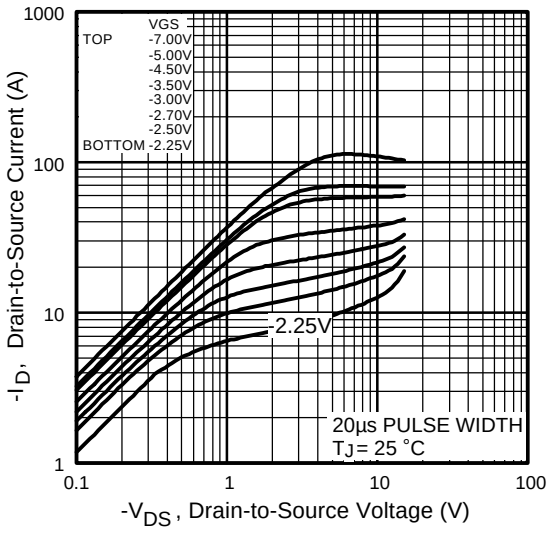


Fig 1. Typical Output Characteristics

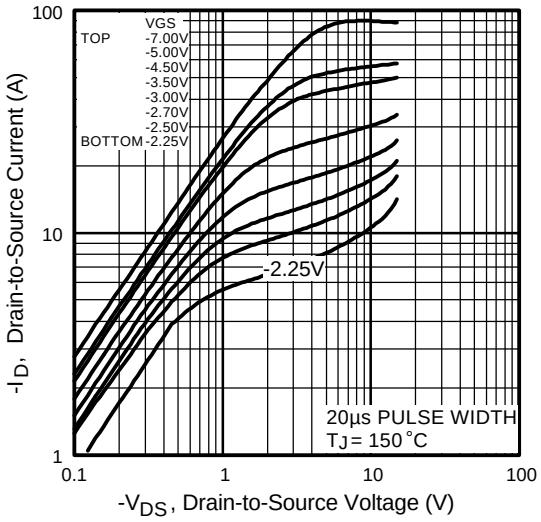


Fig 2. Typical Output Characteristics

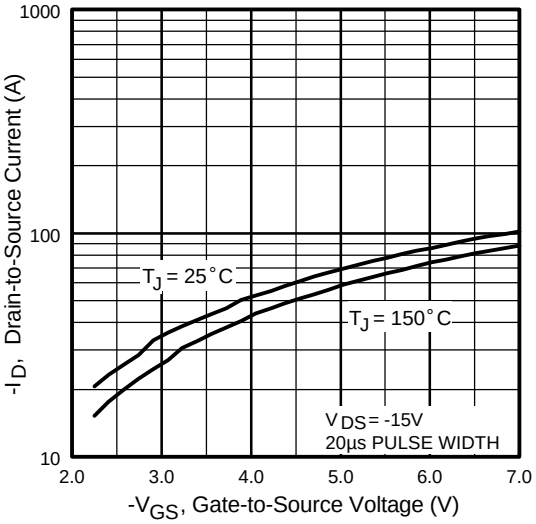


Fig 3. Typical Transfer Characteristics

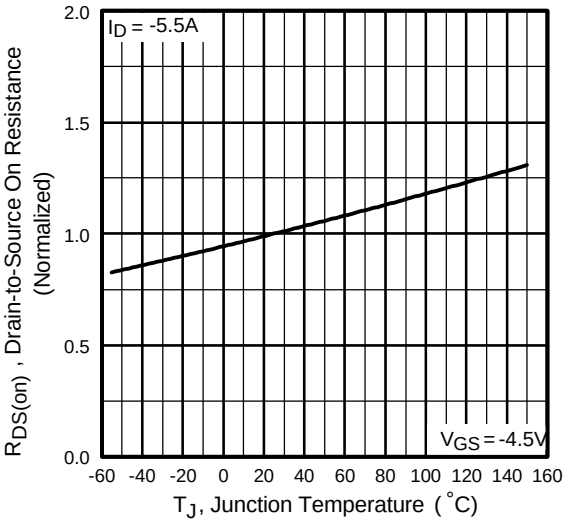


Fig 4. Normalized On-Resistance Vs. Temperature

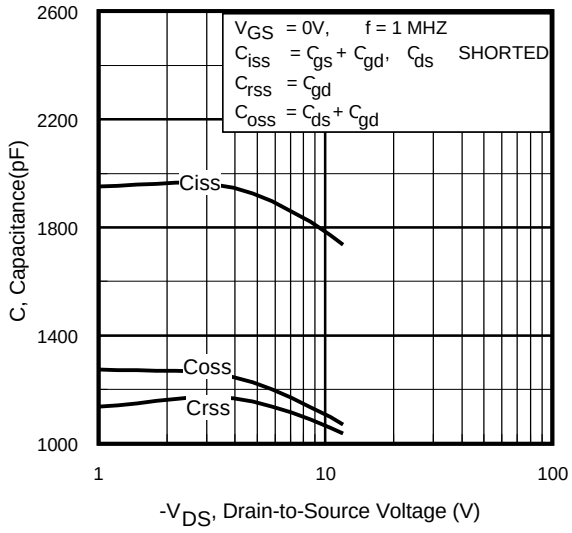


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

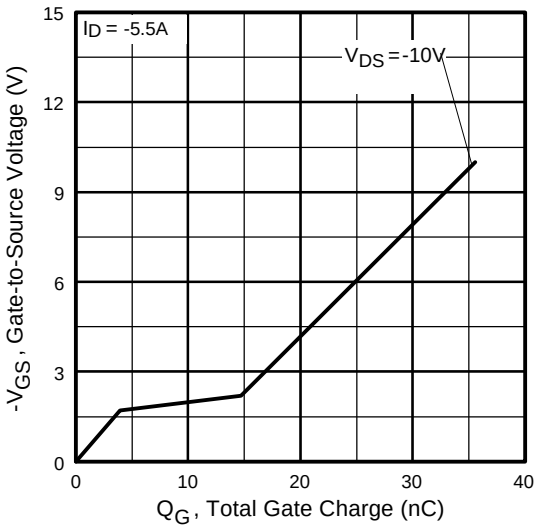


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

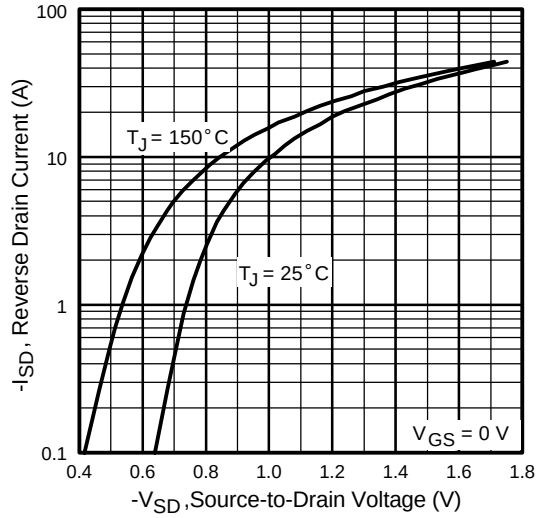


Fig 7. Typical Source-Drain Diode Forward Voltage

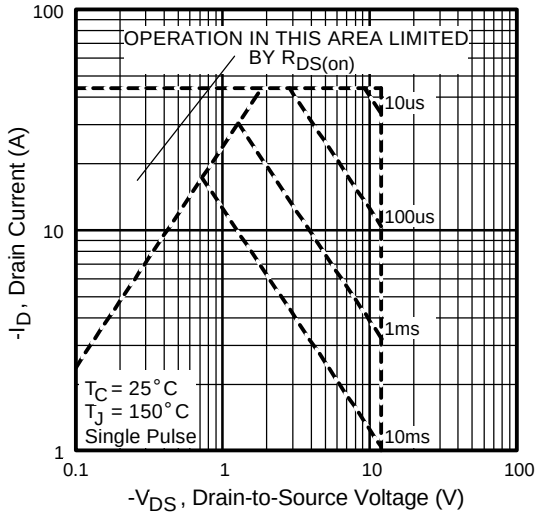


Fig 8. Maximum Safe Operating Area

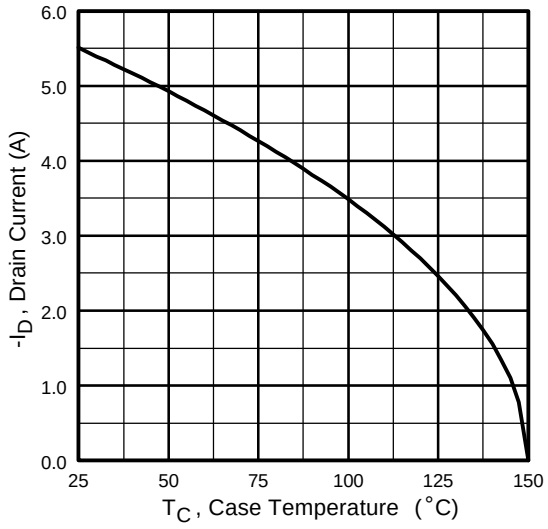


Fig 9. Maximum Drain Current Vs. Case Temperature

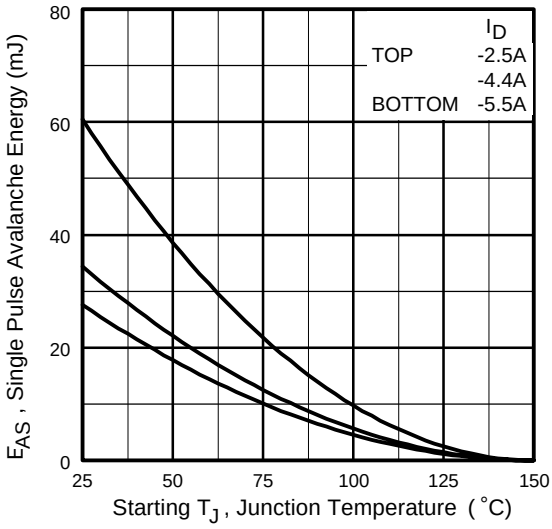


Fig 10. Maximum Avalanche Energy Vs. Drain Current

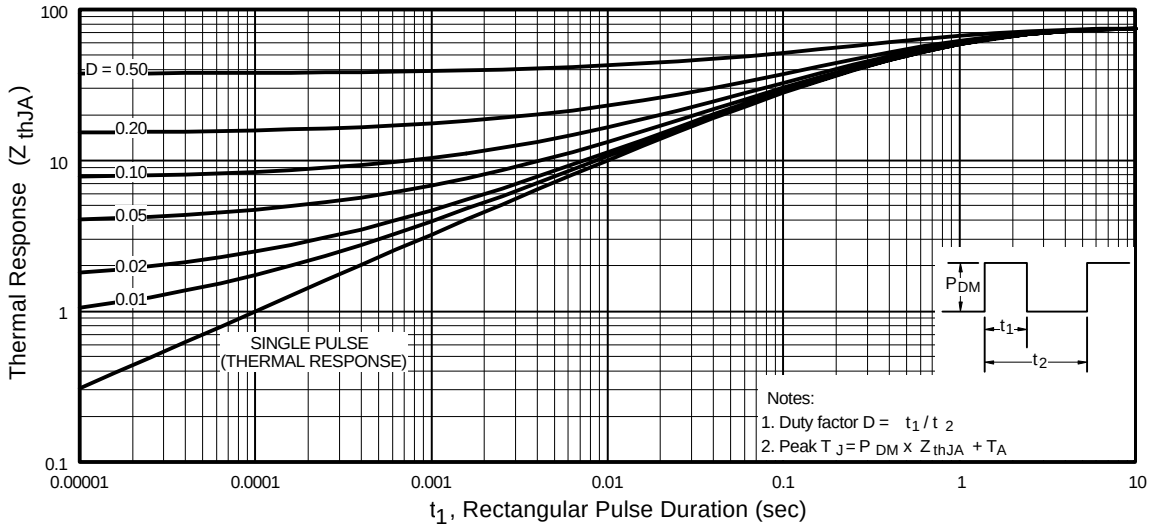
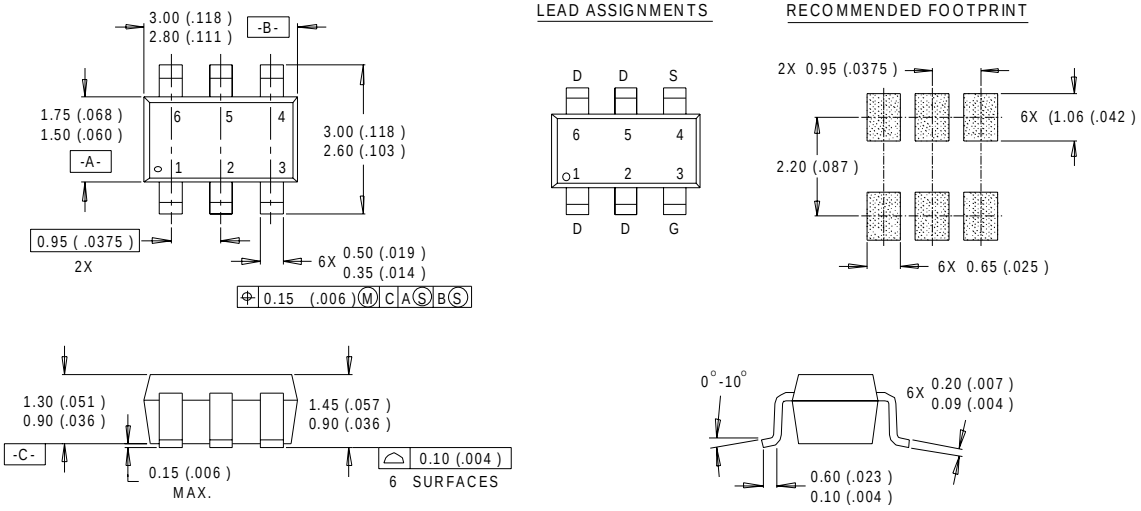


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

Package Outline

Micro6™

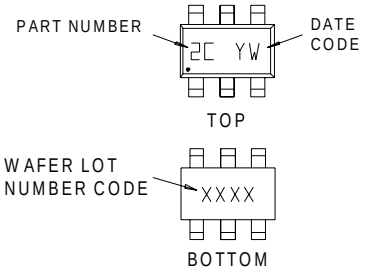


NOTES :
1. DIMENSIONING & TOLERANCING PER ANSI Y14.5M-1982.
2. CONTROLLING DIMENSION : MILLIMETER.
3. DIMENSIONS ARE SHOWN IN MILLIMETERS (INCHES).

Part Marking Information

Micro6™

EXAMPLE : THIS IS AN IRLMS6702



PART NUMBER EXAMPLES:
2A = IRLMS1902
2B = IRLMS1503
2C = IRLMS6702
2D = IRLMS5703

DATE CODE EXAMPLES:
YWW = 9603 = 6C
YWW = 9632 = FF

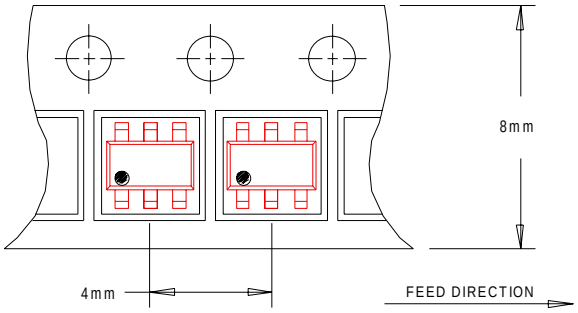
YEAR	Y	WORK WEEK	W
2001	1	01	A
2002	2	02	B
2003	3	03	C
2004	4	04	D
2005	5	↓	↓
1996	6		
1997	7		
1998	8		
1999	9	↓	↓
2000	0	24	X
		25	Y
		26	Z

YEAR	Y	WORK WEEK	W
2001	A	27	A
2002	B	28	B
2003	C	29	C
2004	D	30	D
2005	E	↓	↓
1996	F		
1997	G		
1998	H		
1999	J	↓	↓
2000	K	50	X
		51	Y
		52	Z

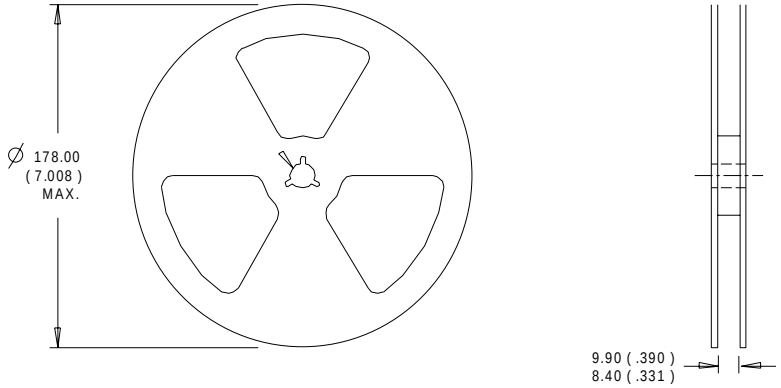
WORK WEEK = (1-26) IF PRECEDED BY LAST DIGIT OF CALENDER YEAR
WORK WEEK = (27-52) IF PRECEDED BY A LETTER

Tape & Reel Information

Micro6™



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



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International
IOR Rectifier

WORLD HEADQUARTERS: 233 Kansas St., El Segundo, California 90245, Tel: (310) 322 3331
IR GREAT BRITAIN: Hurst Green, Oxted, Surrey RH8 9BB, UK Tel: ++ 44 1883 732020
IR CANADA: 15 Lincoln Court, Brampton, Ontario L6T3Z2, Tel: (905) 453 2200
IR GERMANY: Saalburgstrasse 157, 61350 Bad Homburg Tel: ++ 49 6172 96590
IR ITALY: Via Liguria 49, 10071 Borgaro, Torino Tel: ++ 39 11 451 0111
IR FAR EAST: K&H Bldg., 2F, 30-4 Nishi-Ikebukuro 3-Chome, Toshima-Ku, Tokyo Japan 171 Tel: 81 3 3983 0086
IR SOUTHEAST ASIA: 1 Kim Seng Promenade, Great World City West Tower, 13-11, Singapore 237994 Tel: ++ 65 838 4630
IR TAIWAN:16 Fl. Suite D. 207, Sec. 2, Tun Haw South Road, Taipei, 10673, Taiwan Tel: 886-2-2377-9936
http://www.irf.com/ *Data and specifications subject to change without notice. 9/99*