

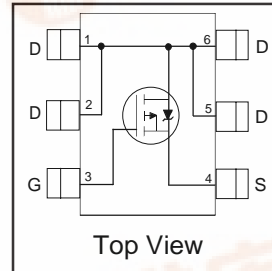
International IR Rectifier

PD- 93759B

IRLMS4502

HEXFET® Power MOSFET

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

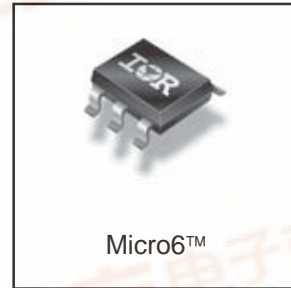


$V_{DS} = -12V$
$R_{DS(on)} = 0.042\Omega$

Description

These P-Channel MOSFETs from International Rectifier utilize advanced processing techniques to achieve the 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.



Absolute Maximum Ratings

	Parameter	Max.	Units
V_{DS}	Drain- Source Voltage	-12	V
$I_D @ T_A = 25^\circ C$	Continuous Drain Current, $V_{GS} @ -4.5V$	-5.5	A
$I_D @ T_A = 70^\circ C$	Continuous Drain Current, $V_{GS} @ -4.5V$	-4.4	
I_{DM}	Pulsed Drain Current ①	-44	
$P_D @ T_A = 25^\circ C$	Power Dissipation	1.7	W
$P_D @ T_A = 70^\circ C$	Power Dissipation	1.1	
	Linear Derating Factor	0.013	W/°C
E_{AS}	Single Pulse Avalanche Energy②	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

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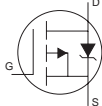
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Electrical Characteristics @ $T_J = 25^\circ\text{C}$ (unless otherwise specified)

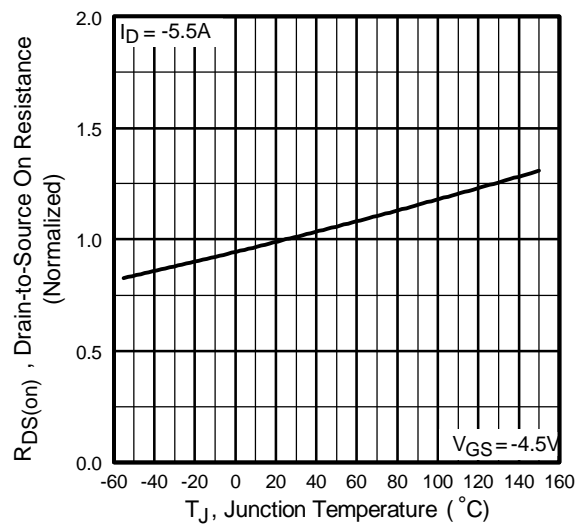
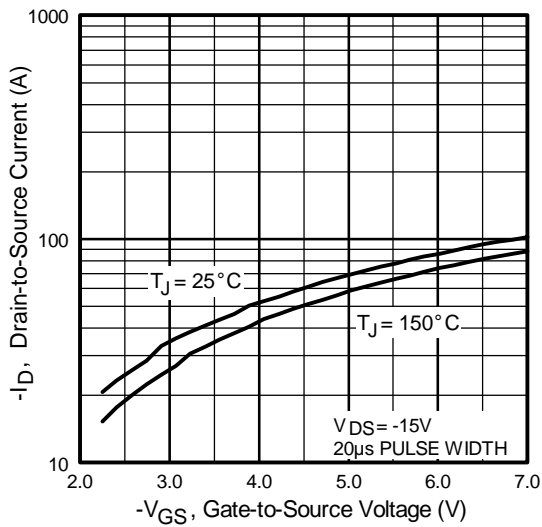
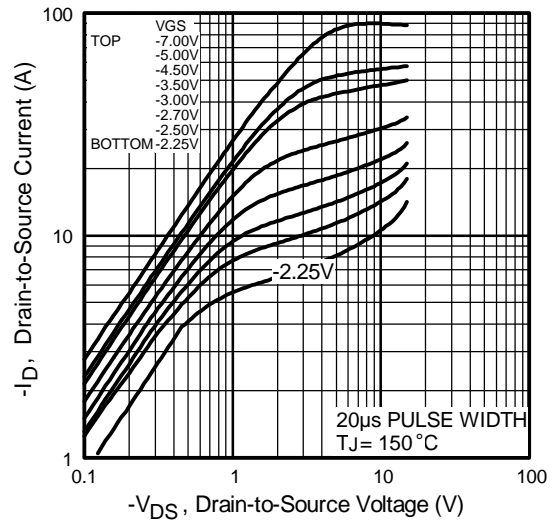
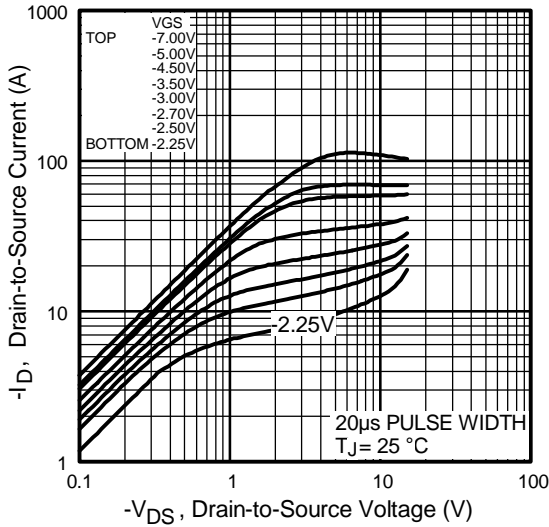
	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	-12	—	—	V	$V_{GS} = 0V, I_D = -250\mu A$
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	-0.003	—	V/ $^\circ\text{C}$	Reference to 25°C , $I_D = -1\text{mA}$
$R_{DS(on)}$	Static Drain-to-Source 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	$V_{DS} = V_{GS}, I_D = -250\mu A$
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		$V_{DS} = -9.6V, V_{GS} = 0V, T_J = 125^\circ\text{C}$
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	—	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	—		$R_G = 4.5\Omega$
t_f	Fall Time	—	250	—		$R_D = 6.0\Omega$ ②
C_{iss}	Input Capacitance	—	1820	—	pF	$V_{GS} = 0V$
C_{oss}	Output Capacitance	—	1110	—		$V_{DS} = -10V$
C_{rss}	Reverse Transfer Capacitance	—	1070	—		$f = 1.0\text{kHz}$

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	$T_J = 25^\circ\text{C}, I_S = -1.7A, V_{GS} = 0V$ ③
t_{rr}	Reverse Recovery Time	—	31	46	ns	$T_J = 25^\circ\text{C}, I_F = -5.5A$
Q_{rr}	Reverse Recovery Charge	—	21	32	nC	$di/dt = -100A/\mu s$ ②

Notes:

- ① Repetitive rating; pulse width limited by max. junction temperature. (See fig. 11)
- ② Pulse width $\leq 400\mu s$; duty cycle $\leq 2\%$.
- ③ Surface mounted on FR-4 board, $t \leq 5\text{sec}$.
- ④ Starting $T_J = 25^\circ\text{C}$, $L = 1.8\text{mH}$
 $R_G = 25\Omega, I_{AS} = -5.5A$. (See Figure 12)



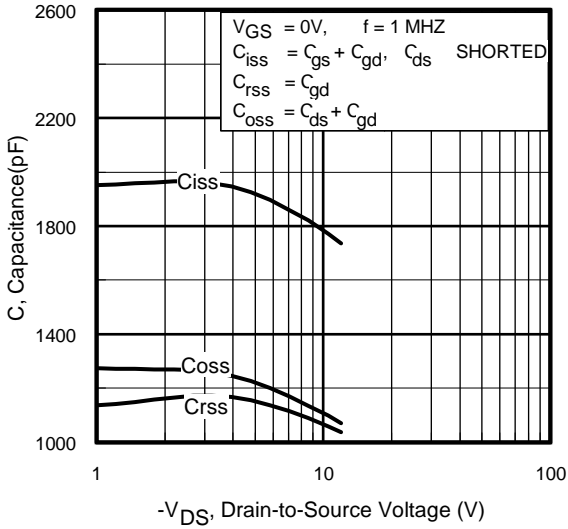


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

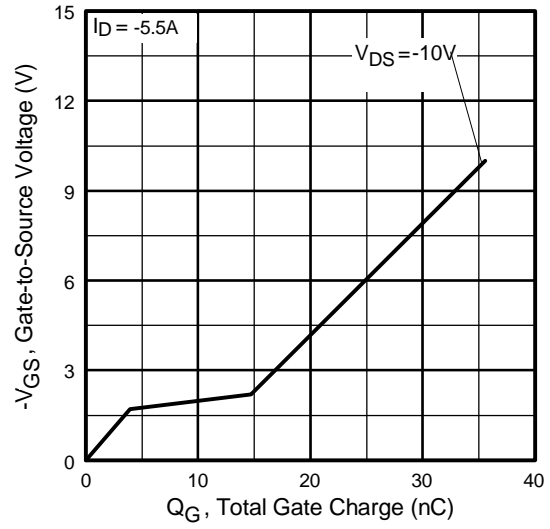


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

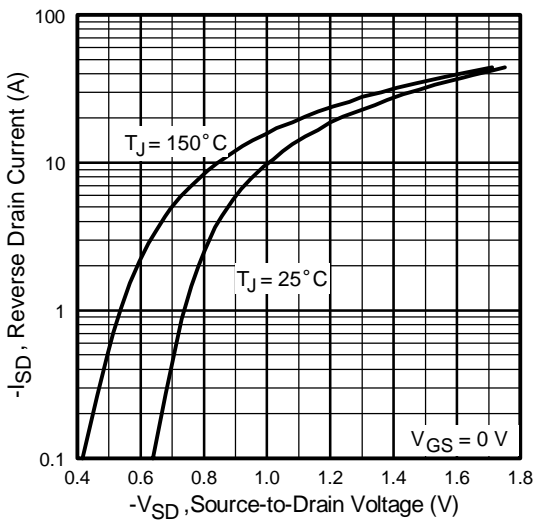


Fig 7. Typical Source-Drain Diode Forward Voltage

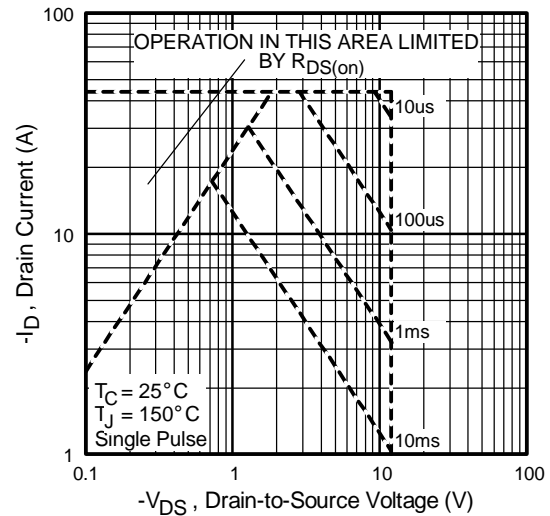


Fig 8. Maximum Safe Operating Area

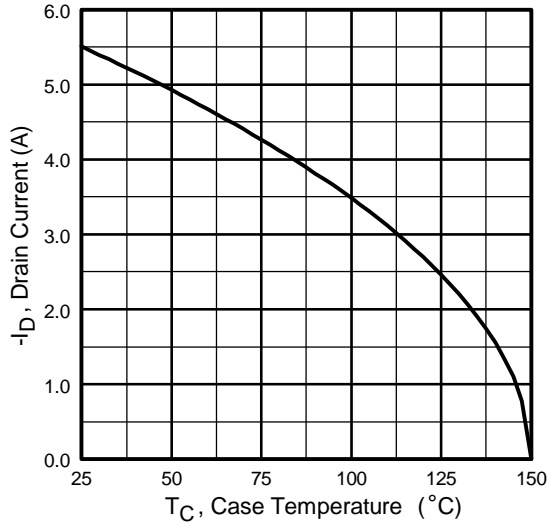


Fig 9. Maximum Drain Current Vs. Case Temperature

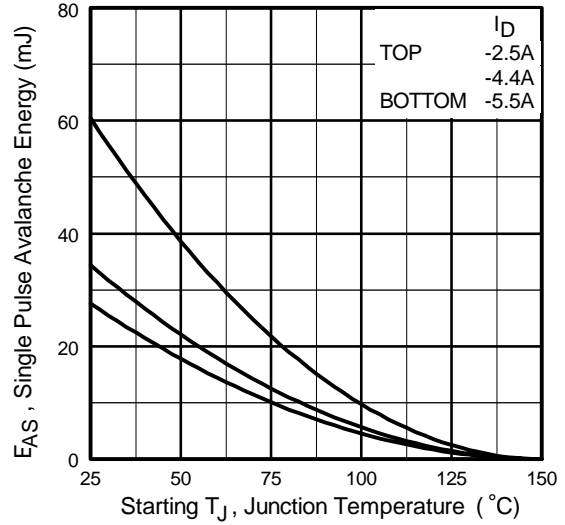


Fig 10. Maximum Avalanche Energy Vs. Drain Current

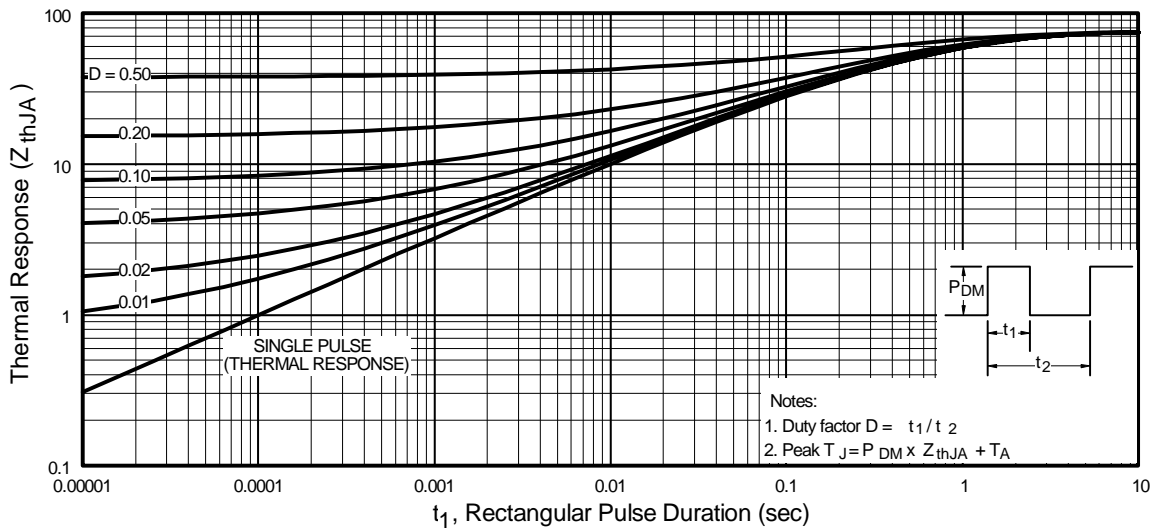
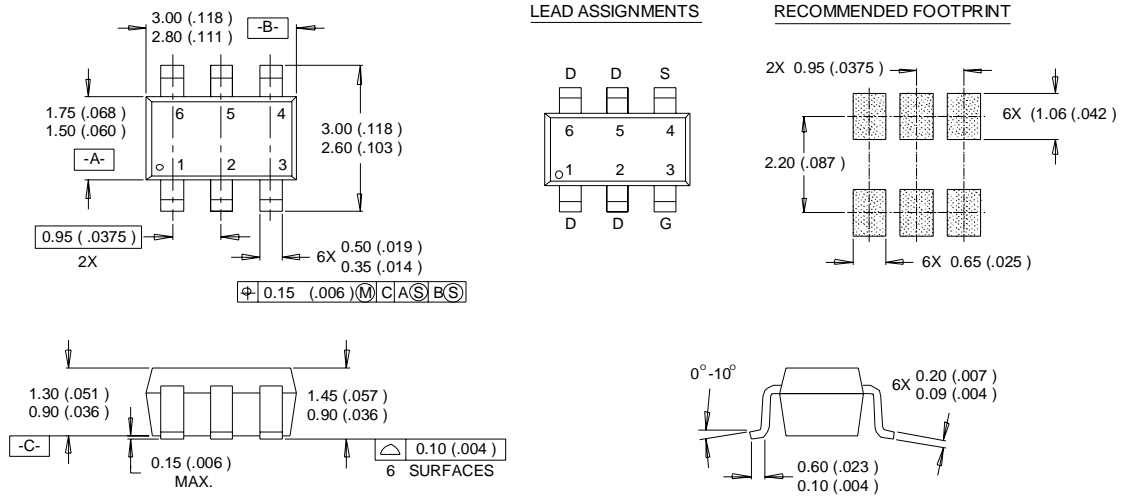


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

IRLMS4502

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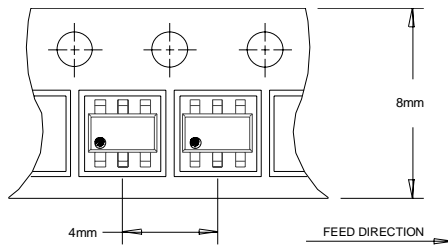
Micro6™ Package Outline



NOTES :

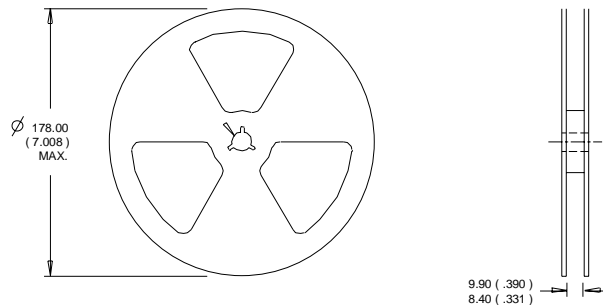
1. DIMENSIONING & TOLERANCING PER ANSI Y14.5M-1982.
2. CONTROLLING DIMENSION : MILLIMETER.
3. DIMENSIONS ARE SHOWN IN MILLIMETERS (INCHES).

Micro6™ Tape & Reel Information



NOTES :

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



NOTES:

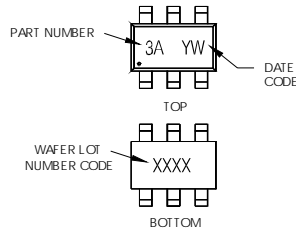
1. CONTROLLING DIMENSION : MILLIMETER.
2. OUTLINE CONFORMS TO EIA-481 & EIA-541.

Micro6™ Part Marking Information

Notes: This part marking information applies to devices produced before 02/26/2001

EXAMPLE: THIS IS AN IRLMS6702

WW = (1-26) IF PRECEDED BY LAST DIGIT OF CALENDAR YEAR



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

PART NUMBER CODE REFERENCE:

- 2A = IRLMS1902
- 2B = IRLMS1503
- 2C = IRLMS6702
- 2D = IRLMS5703
- 2E = IRLMS6802
- 2F = IRLMS4502
- 2G = IRLMS2002
- 2H = IRLMS6803

DATE CODE EXAMPLES:

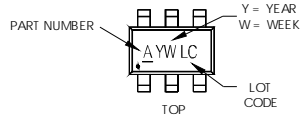
- YWW = 9603 = 6C
- YWW = 9632 = FF

WW = (27-52) IF PRECEDED BY A LETTER

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

Notes: This part marking information applies to devices produced after 02/26/2001

W = (1-26) IF PRECEDED BY LAST DIGIT OF CALENDAR YEAR



PART NUMBER CODE REFERENCE:

- A = IRLMS1902
- B = IRLMS1503
- C = IRLMS6702
- D = IRLMS5703
- E = IRLMS6802
- F = IRLMS4502
- G = IRLMS2002
- H = IRLMS6803

W = (27-52) IF PRECEDED BY A LETTER

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

This product has been designed and qualified for the consumer market. Qualification Standards can be found on IR's Web site.