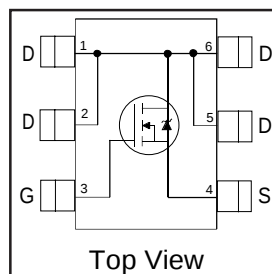


IRLMS2002

HEXFET® Power MOSFET

- Ultra Low On-Resistance
- N-Channel MOSFET
- Surface Mount
- Available in Tape & Reel
- 2.5V Rated

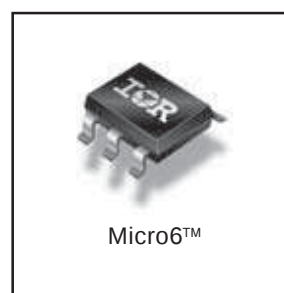


$V_{DS} = 20V$
$R_{DS(on)} = 0.030\Omega$

Description

These N-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. Its 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	20	V
$I_D @ T_A = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 4.5V$	6.5	A
$I_D @ T_A = 70^\circ C$	Continuous Drain Current, $V_{GS} @ 4.5V$	5.2	
I_{DM}	Pulsed Drain Current ①	20	
$P_D @ T_A = 25^\circ C$	Power Dissipation	2.0	W
$P_D @ T_A = 70^\circ C$	Power Dissipation	1.3	
	Linear Derating Factor	0.016	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	Max.	Units
$R_{\theta JA}$	Maximum Junction-to-Ambient③	62.5	°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	—	0.016	—	V/ $^\circ\text{C}$	Reference to 25°C , $I_D = 1mA$
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	—	0.030	Ω	$V_{GS} = 4.5V, I_D = 6.5A$ ②
		—	—	0.045		$V_{GS} = 2.5V, I_D = 5.2A$ 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	13	—	—	S	$V_{DS} = 10V, I_D = 6.5A$
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	—	15	22	nC	$I_D = 6.5A$
Q_{gs}	Gate-to-Source Charge	—	2.2	3.3		$V_{DS} = 10V$
Q_{gd}	Gate-to-Drain ("Miller") Charge	—	3.5	5.3		$V_{GS} = 5.0V$ ②
$t_{d(on)}$	Turn-On Delay Time	—	8.5	—	ns	$V_{DD} = 10V$
t_r	Rise Time	—	11	—		$I_D = 1.0A$
$t_{d(off)}$	Turn-Off Delay Time	—	36	—		$R_G = 6.0\Omega$
t_f	Fall Time	—	16	—		$R_D = 10\Omega$ ②
C_{iss}	Input Capacitance	—	1310	—	pF	$V_{GS} = 0V$
C_{oss}	Output Capacitance	—	150	—		$V_{DS} = 15V$
C_{rss}	Reverse Transfer Capacitance	—	36	—		$f = 1.0MHz$

Source-Drain Ratings and Characteristics

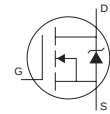
	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	2.0	A	MOSFET symbol showing the integral reverse p-n junction diode.
I_{SM}	Pulsed Source Current (Body Diode) ①	—	—	20		
V_{SD}	Diode Forward Voltage	—	—	1.2	V	$T_J = 25^\circ\text{C}, I_S = 1.7A, V_{GS} = 0V$ ②
t_{rr}	Reverse Recovery Time	—	19	29	ns	$T_J = 25^\circ\text{C}, I_F = 1.7A$
Q_{rr}	Reverse Recovery Charge	—	13	20	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, $t \leq 5sec$.



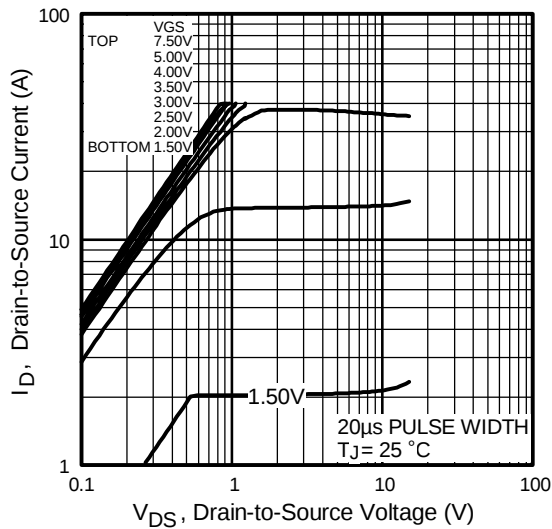


Fig 1. Typical Output Characteristics

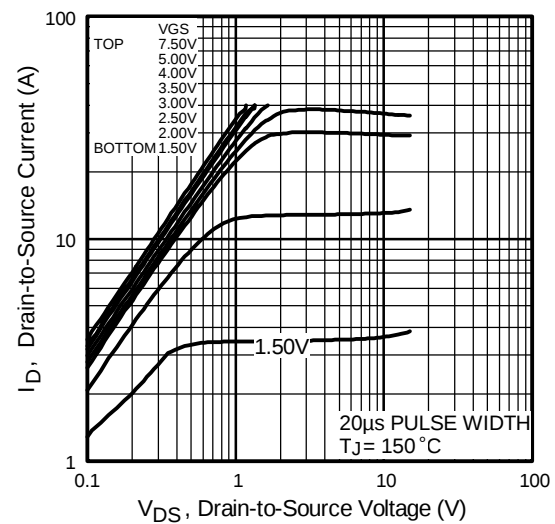


Fig 2. Typical Output Characteristics

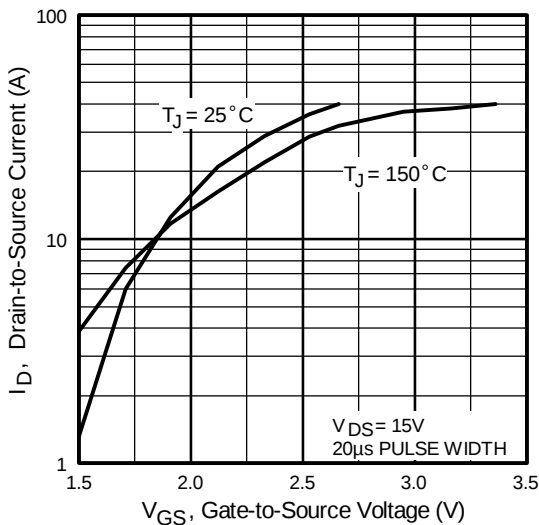


Fig 3. Typical Transfer Characteristics

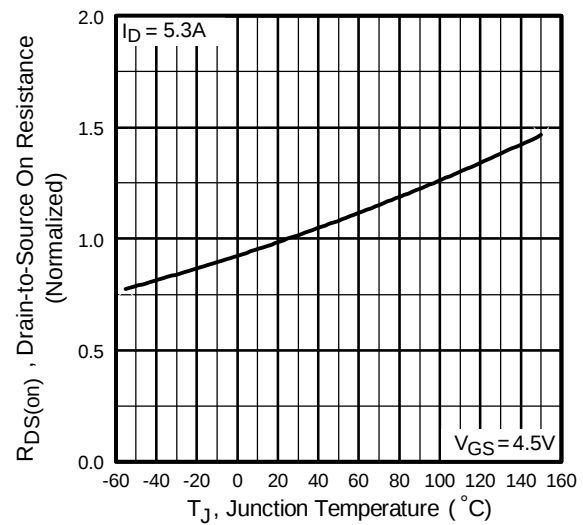


Fig 4. Normalized On-Resistance Vs. Temperature

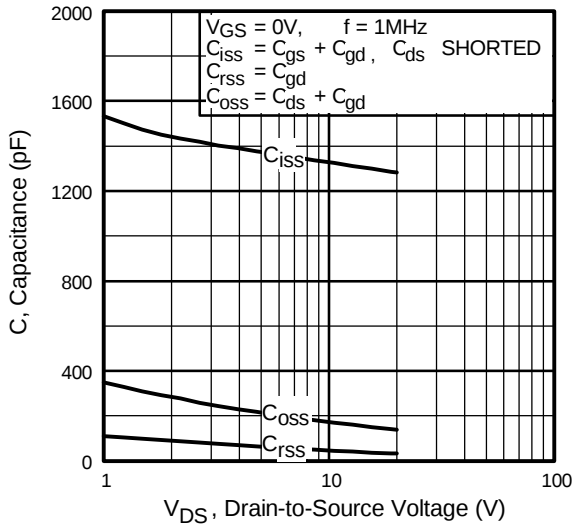


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

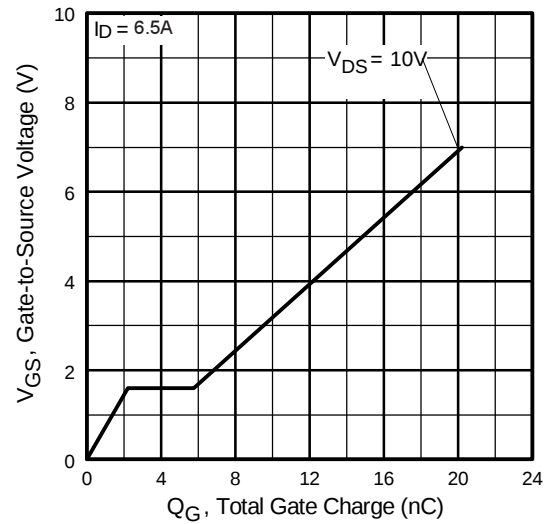


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

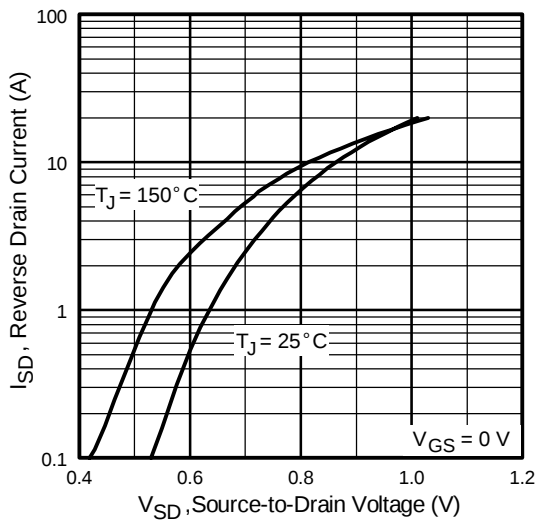


Fig 7. Typical Source-Drain Diode Forward Voltage

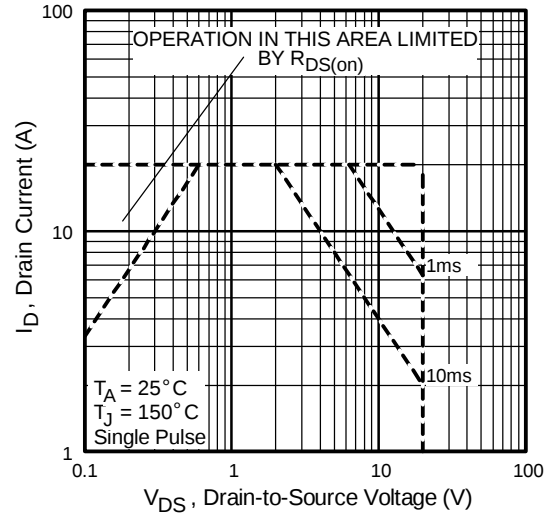


Fig 8. Maximum Safe Operating Area

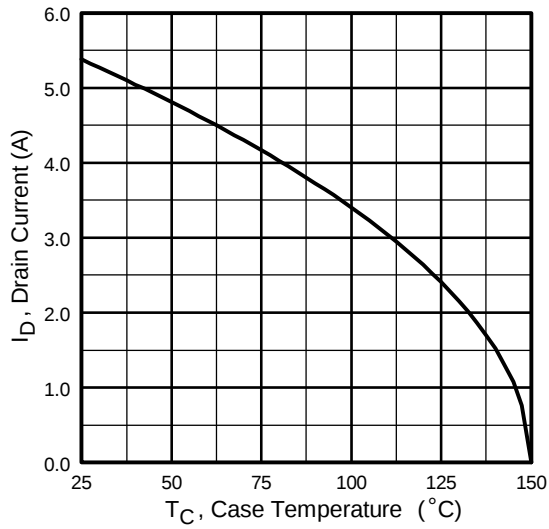


Fig 9. Maximum Drain Current Vs. Case Temperature

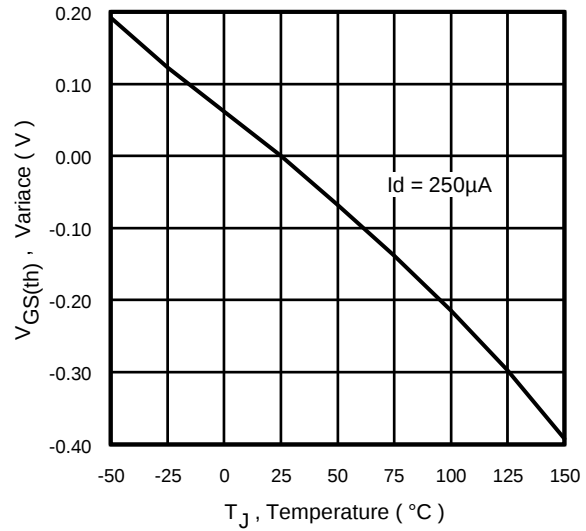


Fig 10. Typical $V_{GS(th)}$ Variance Vs. Junction Temperature

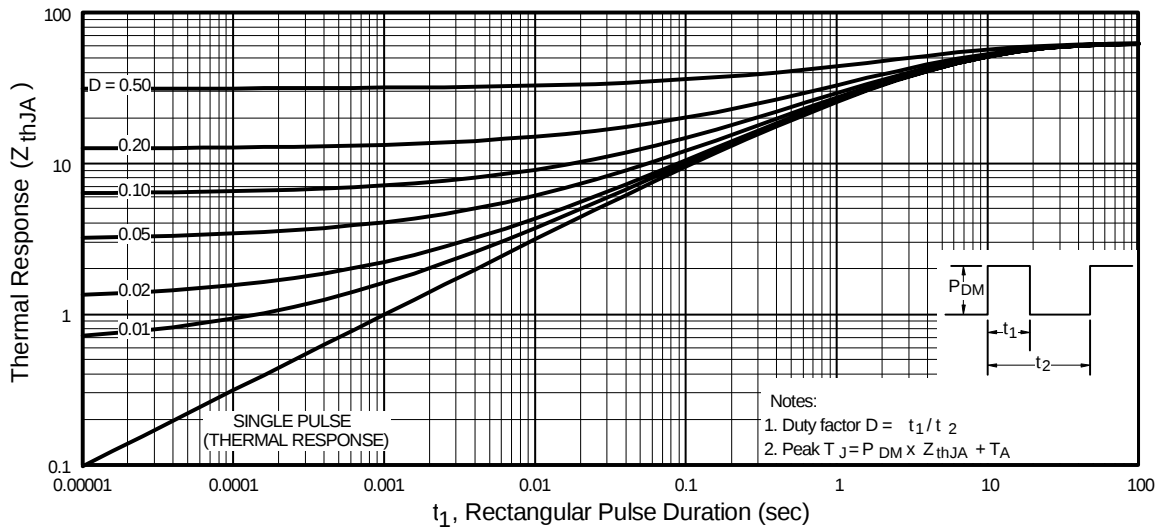


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

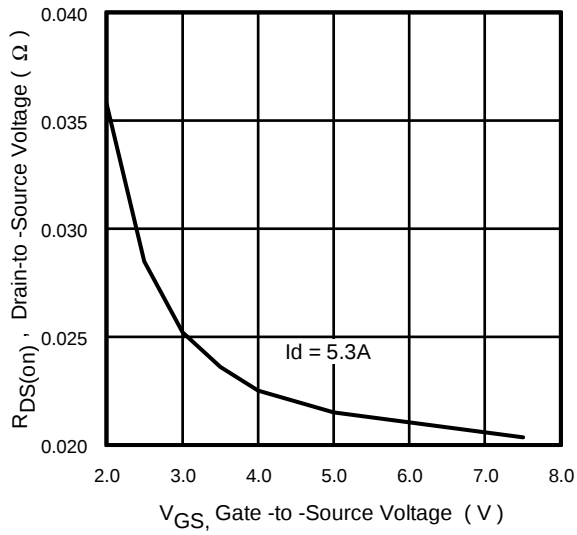


Fig 12. Typical On-Resistance Vs. Gate Voltage

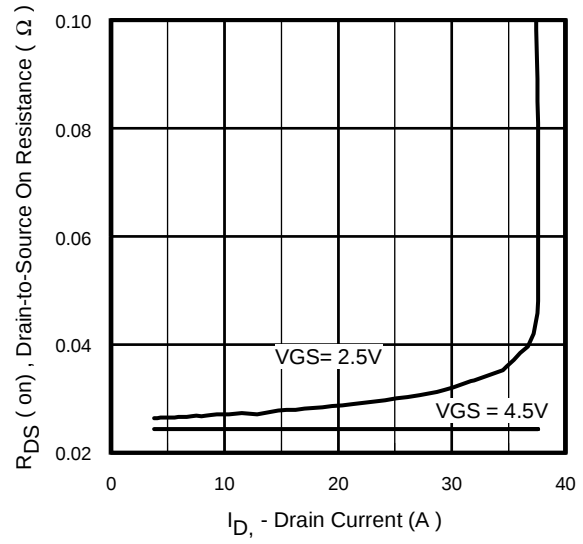
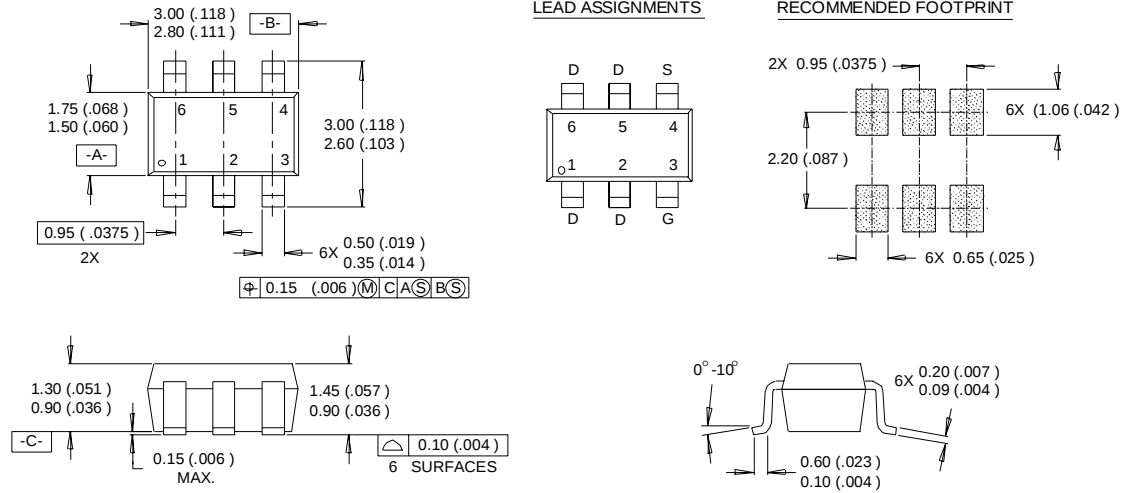


Fig 13. Typical On-Resistance Vs. Drain Current

Micro6™ Package Outline

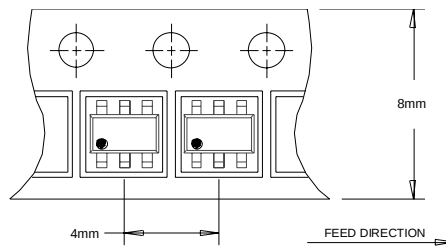
IRLMS2002



NOTES :

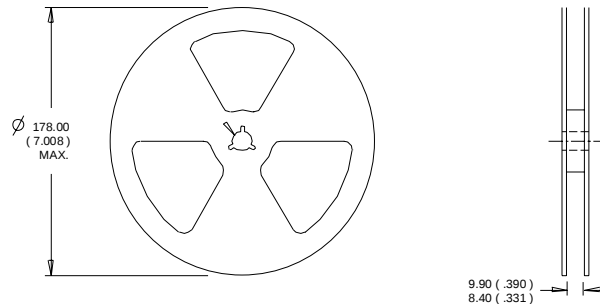
1. DIMENSIONING & TOLERANCING PER ANSI Y14.5M-1982.
2. CONTROLLING DIMENSION : MILLIMETER.
3. DIMENSIONS ARE SHOWN IN MILLIMETERS (INCHES).

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.

IRLMS2002

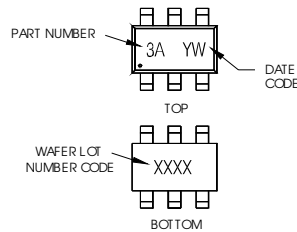
Micro6™ Part Marking Information

International
IR Rectifier

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



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

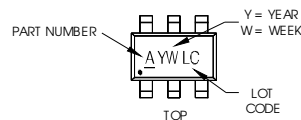
YEAR	Y	WORK WEEK	W
2001	1	01	A
2002	2	02	B
2003	3	03	C
2004	4	04	D
2005	5		
1996	6		
1997	7		
1998	8		
1999	9		
2000	0	24	X
		25	Y
		26	Z

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

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

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.

International
IR Rectifier

IR WORLD HEADQUARTERS: 233 Kansas St., El Segundo, California 90245, USA Tel: (310) 252-7105
TAC Fax: (310) 252-7903

Visit us at www.irf.com for sales contact information.
Data and specifications subject to change without notice. 01/03
www.irf.com