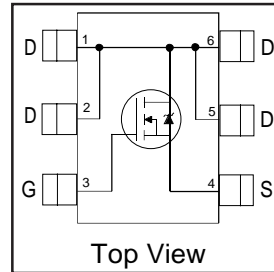


IRLMS2002

HEXFET® Power MOSFET

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

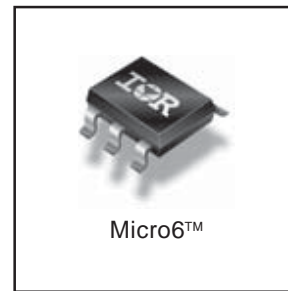


$V_{DSS} = 20V$
$R_{DS(on)} = 0.030\Omega$

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

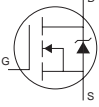
Thermal Resistance

	Parameter	Max.	Units
$R_{\theta JA}$	Maximum Junction-to-Ambient③	62.5	°C/W

Electrical Characteristics @ T_J = 25°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 = 250μA
ΔV _{(BR)DSS} /ΔT _J	Breakdown Voltage Temp. Coefficient	—	0.016	—	V/°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 = 250μA
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°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 = 6.0Ω
t _f	Fall Time	—	16	—		R _D = 10Ω 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°C, I _S = 1.7A, V _{GS} = 0V ②
t _{rr}	Reverse Recovery Time	—	19	29	ns	T _J = 25°C, I _F = 1.7A
Q _{rr}	Reverse Recovery Charge	—	13	20	nC	di/dt = 100A/μs ②

Notes:

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

② Pulse width ≤ 400μs; duty cycle ≤ 2%.

③ Surface mounted on FR-4 board, t ≤ 5sec.

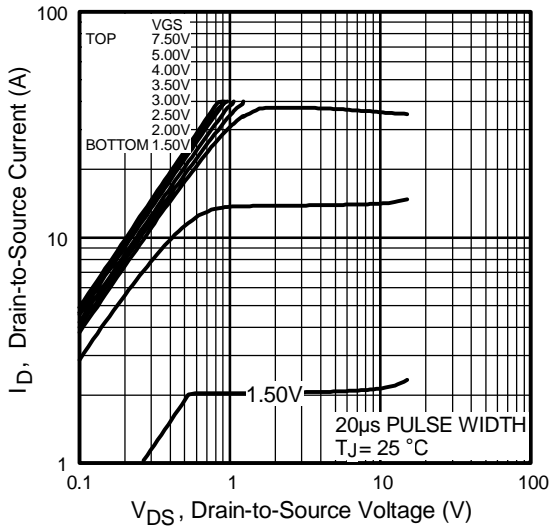


Fig 1. Typical Output Characteristics

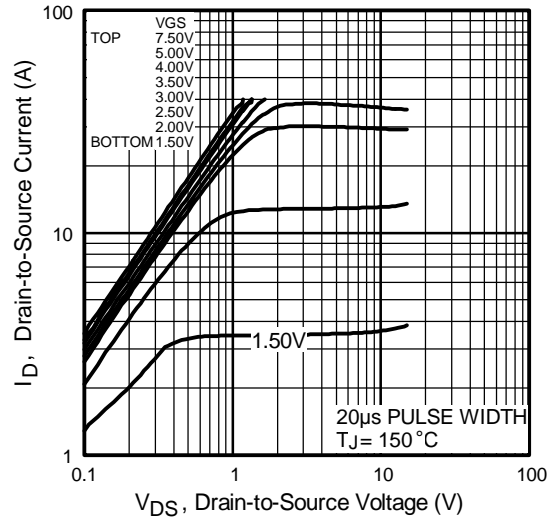


Fig 2. Typical Output Characteristics

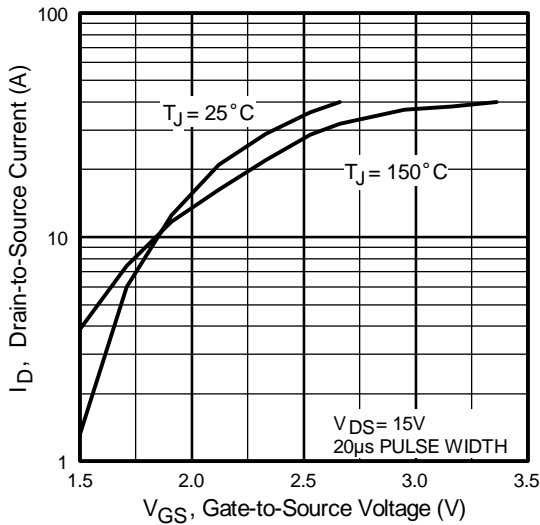


Fig 3. Typical Transfer Characteristics

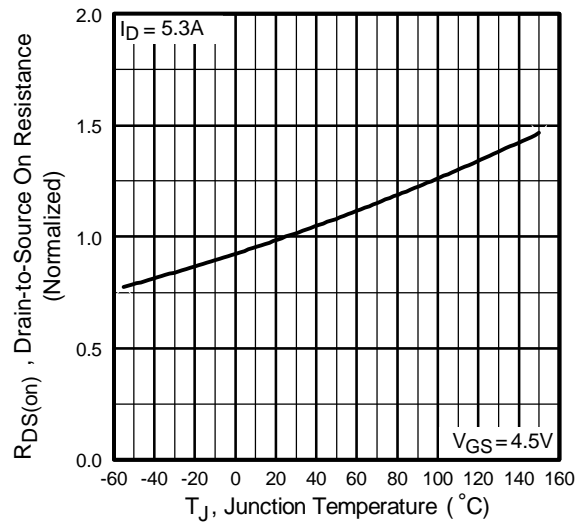


Fig 4. Normalized On-Resistance Vs. Temperature

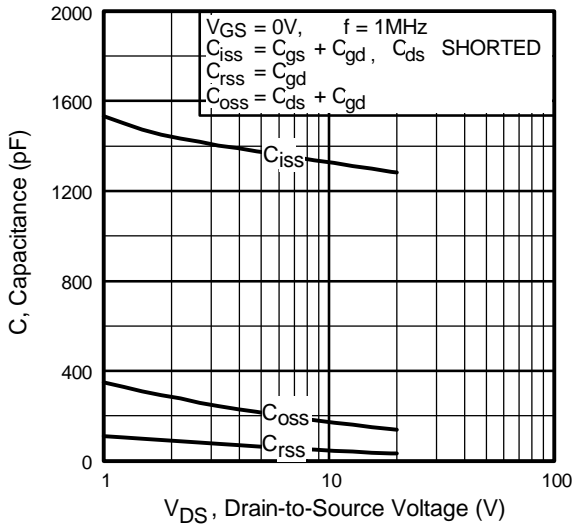


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

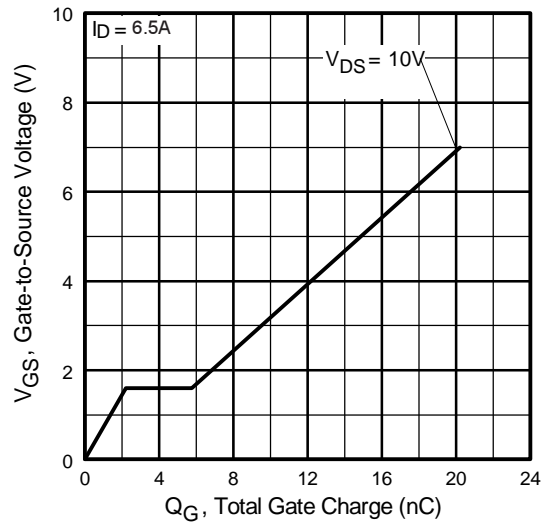


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

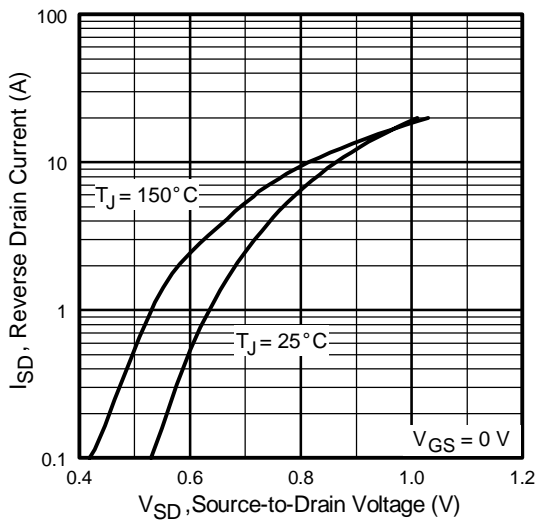


Fig 7. Typical Source-Drain Diode Forward Voltage

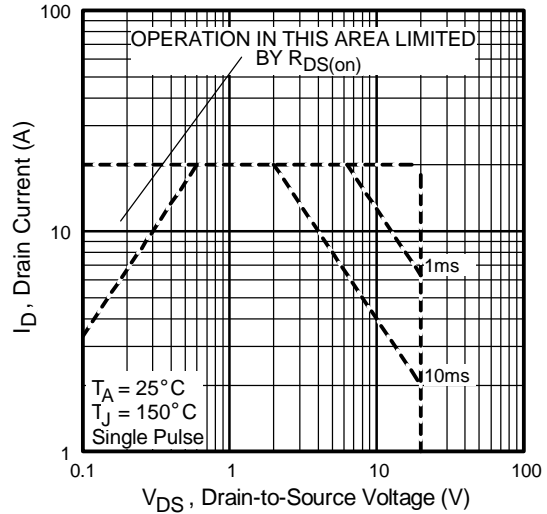


Fig 8. Maximum Safe Operating Area

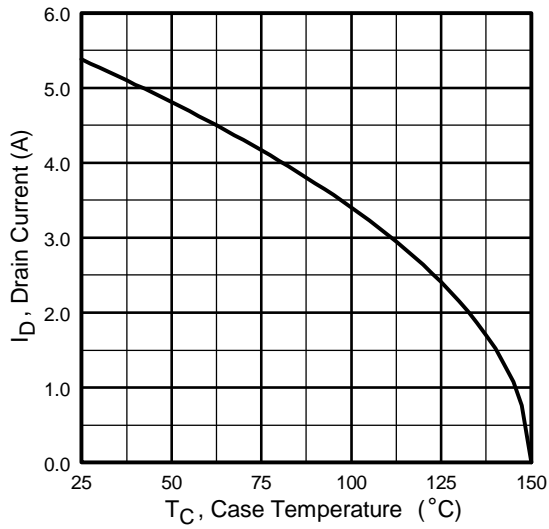


Fig 9. Maximum Drain Current Vs. Case Temperature

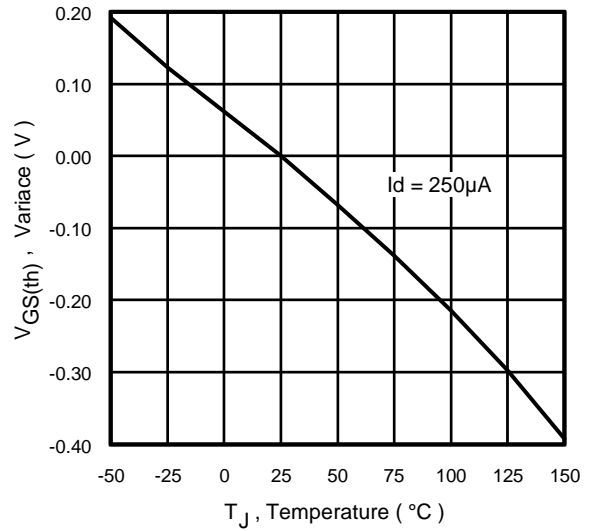


Fig 10. Typical $V_{GS(th)}$ Variance Vs. Junction Temperature

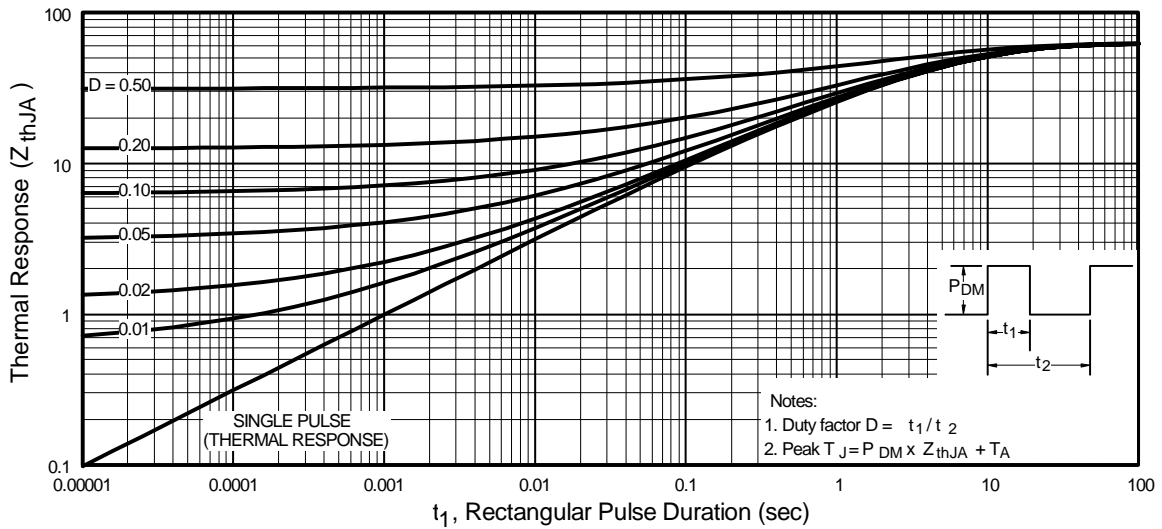


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

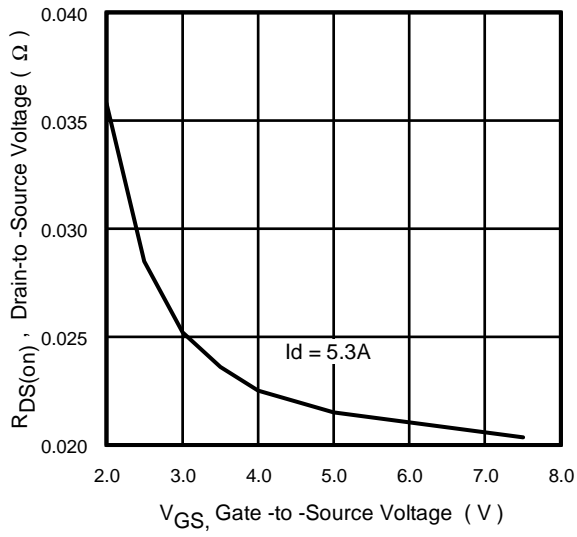


Fig 12. Typical On-Resistance Vs. Gate Voltage

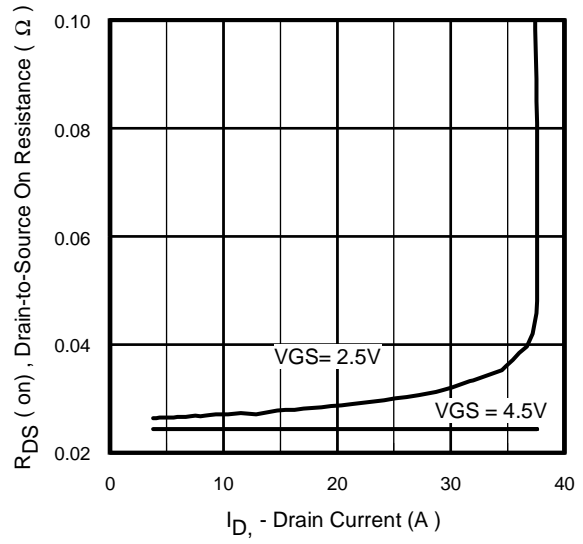
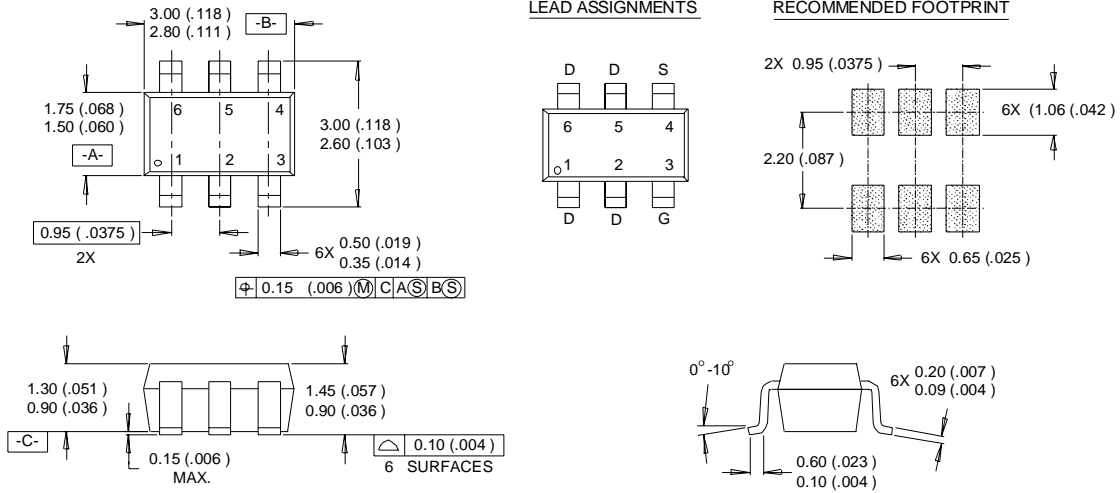


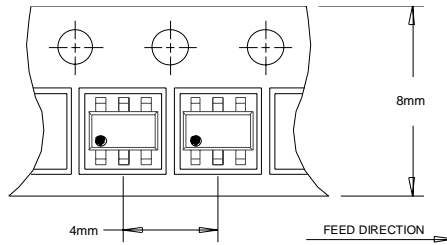
Fig 13. Typical On-Resistance Vs. Drain Current

Micro6™ Package Outline

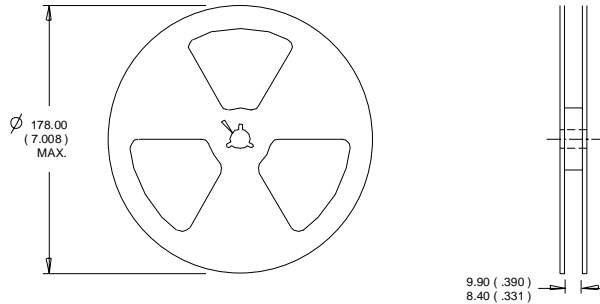


- NOTES :
1. DIMENSIONING & TOLERANCING PER ANSI Y14.5M-1982.
 2. CONTROLLING DIMENSION : MILLIMETER.
 3. DIMENSIONS ARE SHOWN IN MILLIMETERS (INCHES).

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

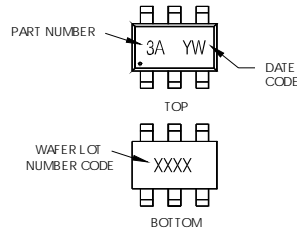


Micro6™ Part Marking Information

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 = IRLMS 1902
- 2B = IRLMS 1503
- 2C = IRLMS 6702
- 2D = IRLMS 5703
- 2E = IRLMS 6802
- 2F = IRLMS 4502
- 2G = IRLMS 2002
- 2H = IRLMS 6803

DATE CODE EXAMPLES:

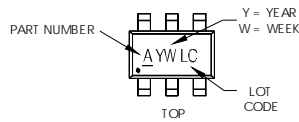
- YW = 9603 = 6C
- YWW = 9632 = FF

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



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:

- A = IRLMS 1902
- B = IRLMS 1503
- C = IRLMS 6702
- D = IRLMS 5703
- E = IRLMS 6802
- F = IRLMS 4502
- G = IRLMS 2002
- H = IRLMS 6803

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.



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