

# IRLMS5703PbF

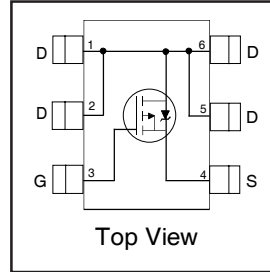
HEXFET® Power MOSFET

- Generation V Technology
- Micro6 Package Style
- Ultra Low  $R_{DS(on)}$
- P-channel MOSFET
- Lead-Free

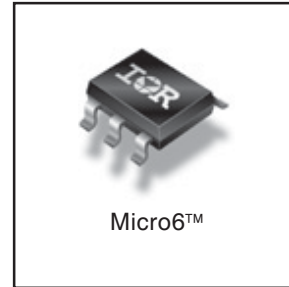
## Description

Fifth Generation HEXFET® power 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 a wide variety of 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.



$V_{DSS} = -30V$
$R_{DS(on)} = 0.18\Omega$



## Absolute Maximum Ratings

	Parameter	Max.	Units
$I_D @ T_A = 25^\circ C$	Continuous Drain Current, $V_{GS} @ -10V$	-2.4	A
$I_D @ T_A = 70^\circ C$	Continuous Drain Current, $V_{GS} @ -10V$	-1.9	
$I_{DM}$	Pulsed Drain Current ①	-13	
$P_D @ T_A = 25^\circ C$	Power Dissipation	1.7	W
	Linear Derating Factor	13	mW/°C
$V_{GS}$	Gate-to-Source Voltage	$\pm 20$	V
dv/dt	Peak Diode Recovery dv/dt ②	5.0	V/ns
$T_J, T_{STG}$	Junction and Storage Temperature Range	-55 to +150	°C

## Thermal Resistance Ratings

	Parameter	Min.	Typ.	Max	Units
$R_{\theta JA}$	Maximum Junction-to-Ambient ④	—	—	75	°C/W

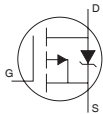
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International  
IR Rectifier

## Electrical Characteristics @ T<sub>J</sub> = 25°C (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
V <sub>(BR)DSS</sub>	Drain-to-Source Breakdown Voltage	-30	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = -250μA
ΔV <sub>(BR)DSS/ΔT<sub>J</sub></sub>	Breakdown Voltage Temp. Coefficient	—	0.01	—	V/°C	Reference to 25°C, I <sub>D</sub> = -1mA
R <sub>DS(on)</sub>	Static Drain-to-Source On-Resistance	—	—	0.180	Ω	V <sub>GS</sub> = -10V, I <sub>D</sub> = -1.6A ④
		—	—	0.325		V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -0.80A ④
V <sub>GS(th)</sub>	Gate Threshold Voltage	-1.0	—	—	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250μA
g <sub>fs</sub>	Forward Transconductance	1.1	—	—	S	V <sub>DS</sub> = -10V, I <sub>D</sub> = -0.80A
I <sub>DSS</sub>	Drain-to-Source Leakage Current	—	—	-1.0	μA	V <sub>DS</sub> = -24V, V <sub>GS</sub> = 0V
		—	—	-25		V <sub>DS</sub> = -24V, V <sub>GS</sub> = 0V, T <sub>J</sub> = 125°C
I <sub>GSS</sub>	Gate-to-Source Forward Leakage	—	—	100	nA	V <sub>GS</sub> = -20V
	Gate-to-Source Reverse Leakage	—	—	-100		V <sub>GS</sub> = 20V
Q <sub>g</sub>	Total Gate Charge	—	7.2	11	nC	I <sub>D</sub> = -1.6A
Q <sub>gs</sub>	Gate-to-Source Charge	—	1.4	2.1		V <sub>DS</sub> = -24V
Q <sub>gd</sub>	Gate-to-Drain ("Miller") Charge	—	2.3	3.4		V <sub>GS</sub> = -10V, See Fig. 6 and 9 ④
t <sub>d(on)</sub>	Turn-On Delay Time	—	10	—	ns	V <sub>DD</sub> = -15V
t <sub>r</sub>	Rise Time	—	12	—		I <sub>D</sub> = -1.6A
t <sub>d(off)</sub>	Turn-Off Delay Time	—	20	—		R <sub>G</sub> = 6.2Ω
t <sub>f</sub>	Fall Time	—	8.4	—		R <sub>D</sub> = 9.2Ω, See Fig. 10 ④
C <sub>iss</sub>	Input Capacitance	—	170	—	pF	V <sub>GS</sub> = 0V
C <sub>oss</sub>	Output Capacitance	—	89	—		V <sub>DS</sub> = -25V
C <sub>rss</sub>	Reverse Transfer Capacitance	—	44	—		f = 1.0MHz, See Fig. 5

## Source-Drain Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I <sub>S</sub>	Continuous Source Current (Body Diode)	—	—	-1.7	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I <sub>SM</sub>	Pulsed Source Current (Body Diode) ①	—	—	-13		
V <sub>SD</sub>	Diode Forward Voltage	—	—	-1.2	V	T <sub>J</sub> = 25°C, I <sub>S</sub> = -1.6A, V <sub>GS</sub> = 0V ③
t <sub>rr</sub>	Reverse Recovery Time	—	29	44	ns	T <sub>J</sub> = 25°C, I <sub>F</sub> = -1.6A
Q <sub>rr</sub>	Reverse Recovery Charge	—	27	41	nC	di/dt = -100A/μs ③

### Notes:

- ① Repetitive rating; pulse width limited by max. junction temperature. ( See fig. 11 )
- ② I<sub>SD</sub> ≤ -1.6A, di/dt ≤ -140A/μs, V<sub>DD</sub> ≤ V<sub>(BR)DSS</sub>, T<sub>J</sub> ≤ 150°C
- ③ Pulse width ≤ 300μs; duty cycle ≤ 2%.
- ④ Surface mounted on FR-4 board, t ≤ 5sec.

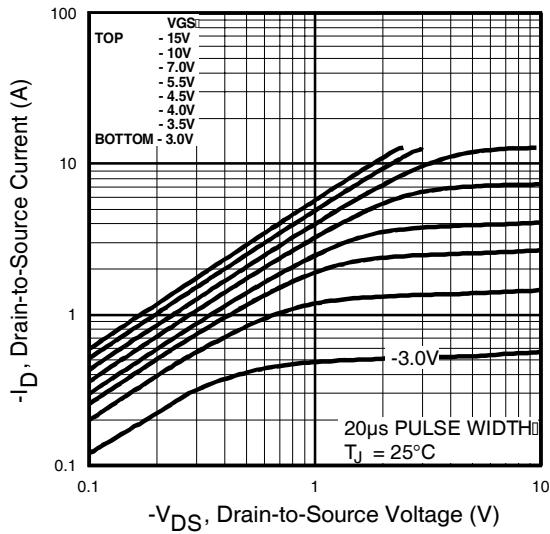


Fig 1. Typical Output Characteristics

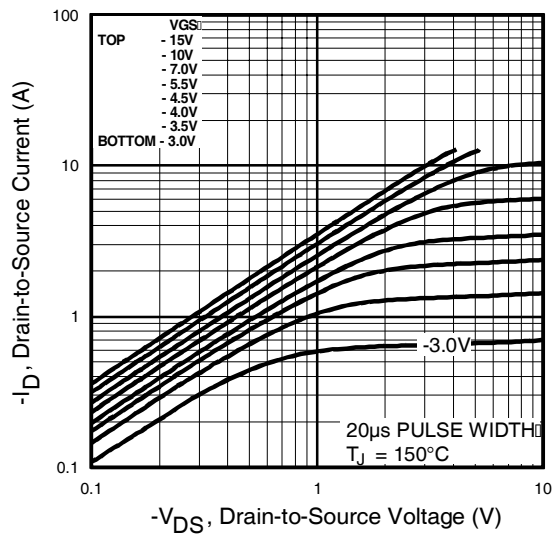


Fig 2. Typical Output Characteristics

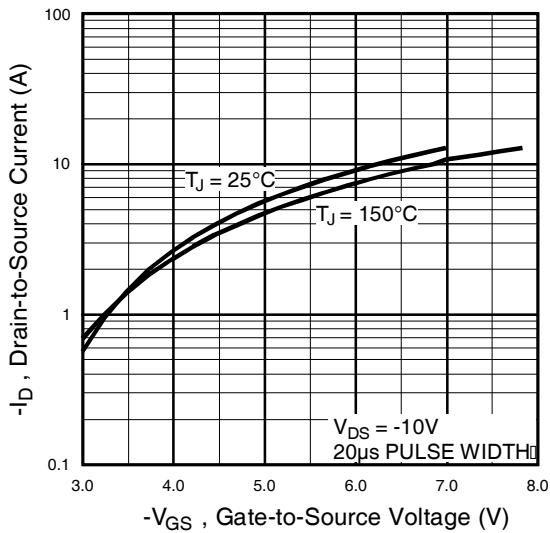


Fig 3. Typical Transfer Characteristics

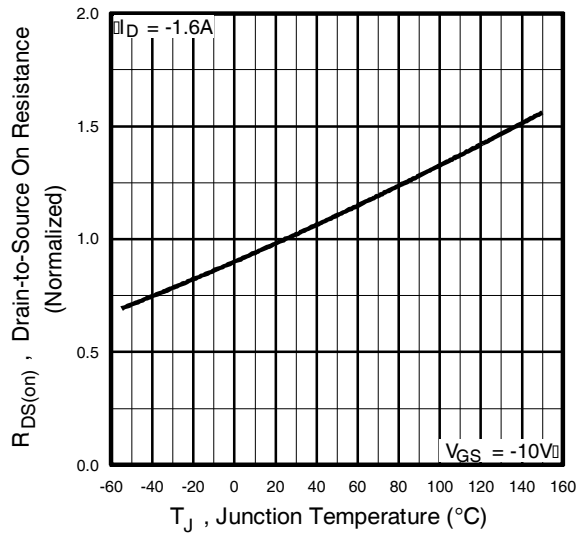
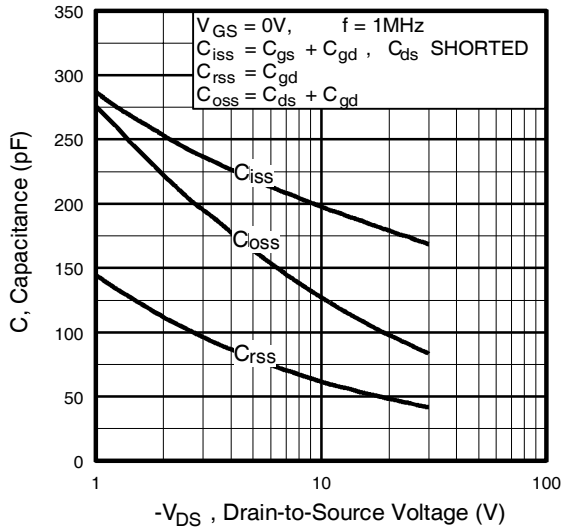
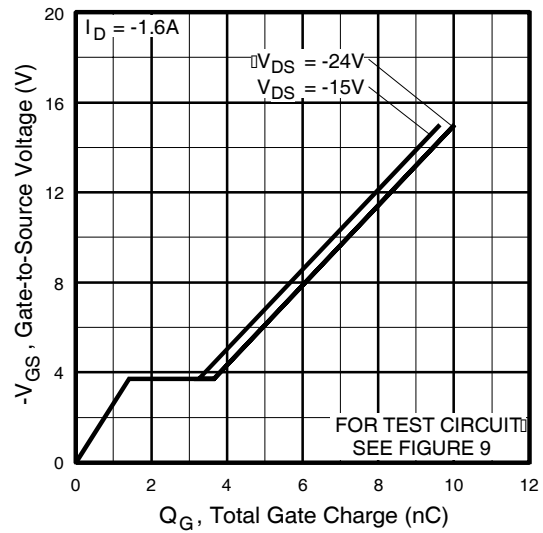


Fig 4. Normalized On-Resistance Vs. Temperature

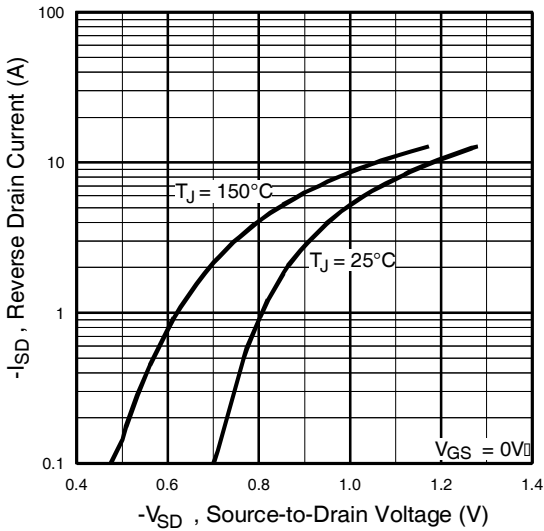
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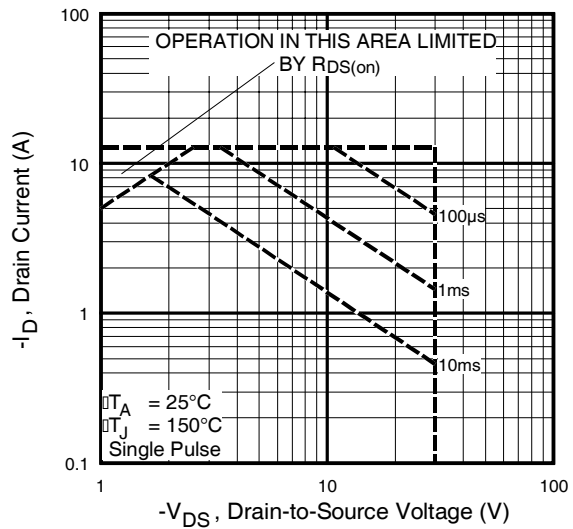
**Fig 5.** Typical Capacitance Vs. Drain-to-Source Voltage



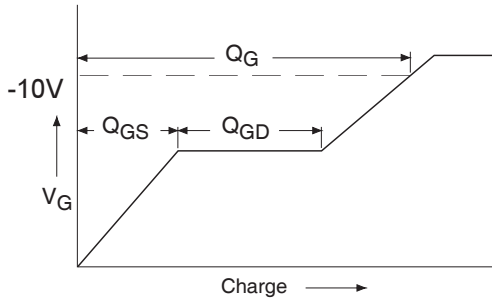
**Fig 6.** Typical Gate Charge Vs. Gate-to-Source Voltage



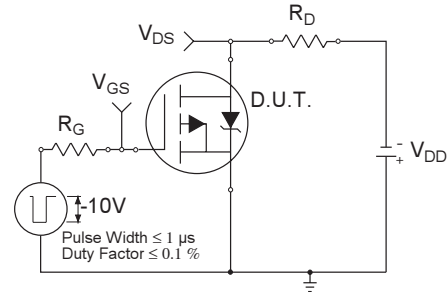
**Fig 7.** Typical Source-Drain Diode Forward Voltage



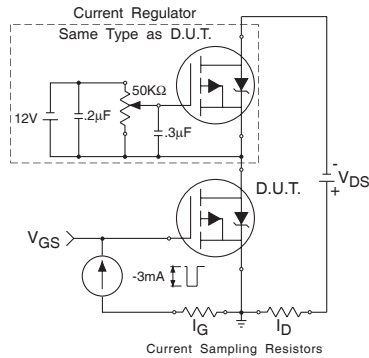
**Fig 8.** Maximum Safe Operating Area



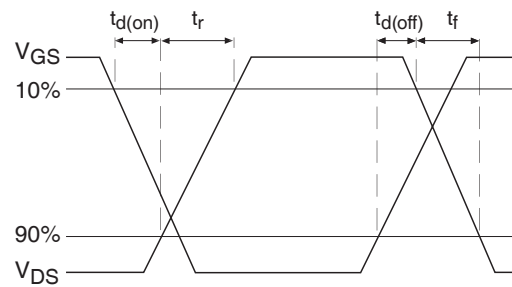
**Fig 9a.** Basic Gate Charge Waveform



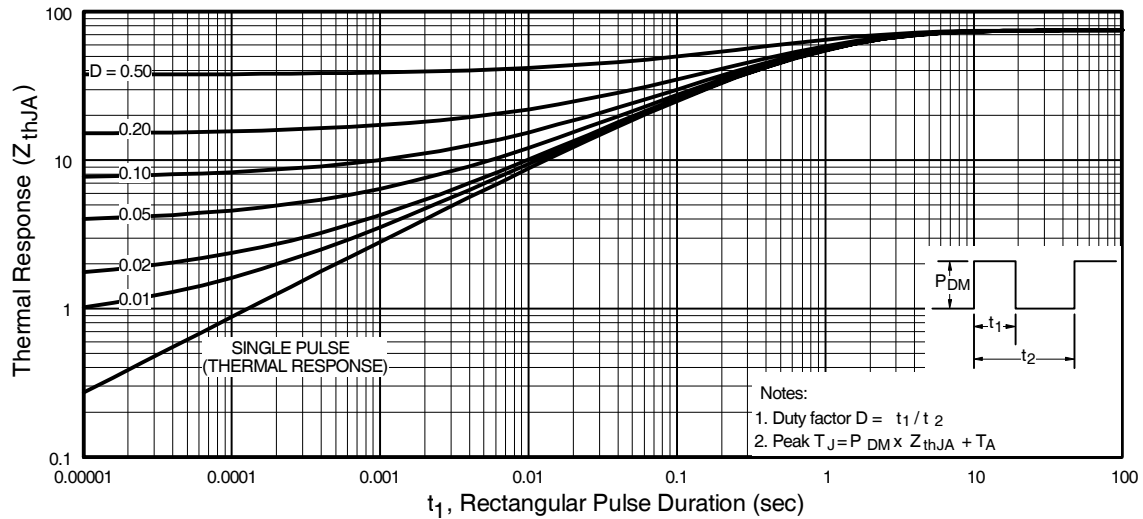
**Fig 10a.** Switching Time Test Circuit



**Fig 9b.** Gate Charge Test Circuit

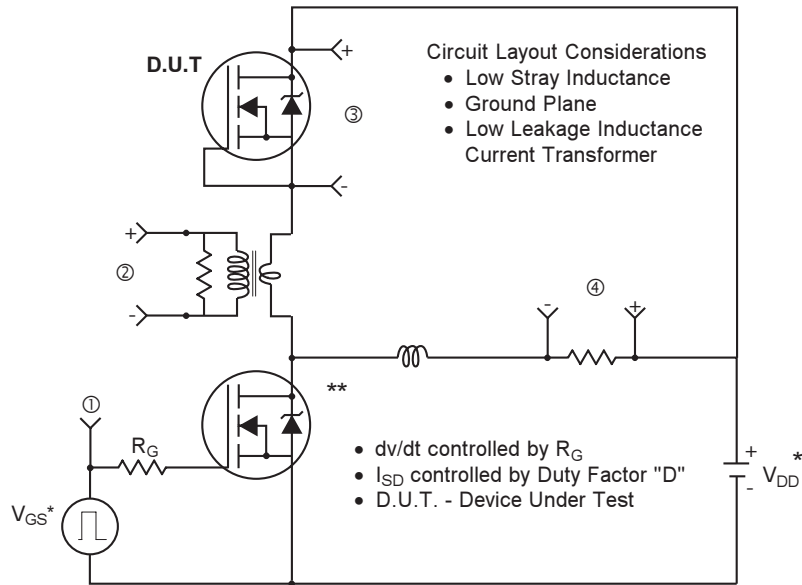


**Fig 10b.** Switching Time Waveforms

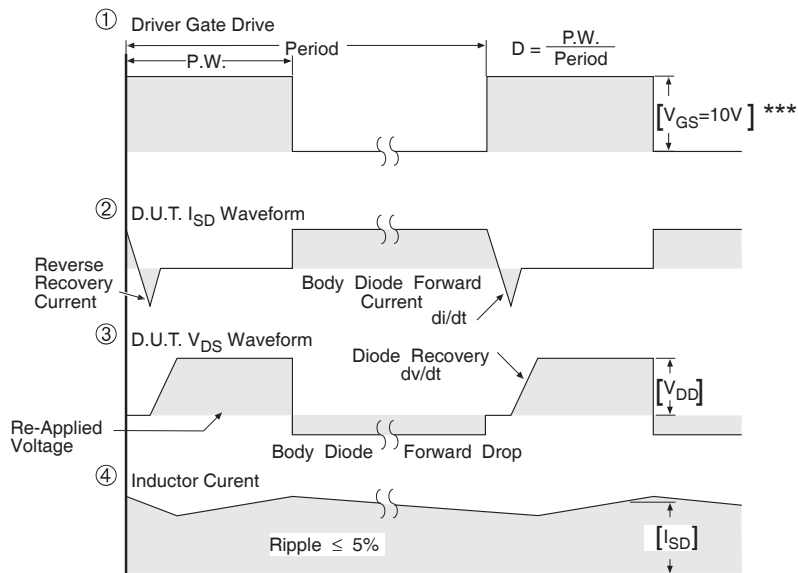


**Fig 11.** Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

## Peak Diode Recovery dv/dt Test Circuit



\* Reverse Polarity of D.U.T for P-Channel

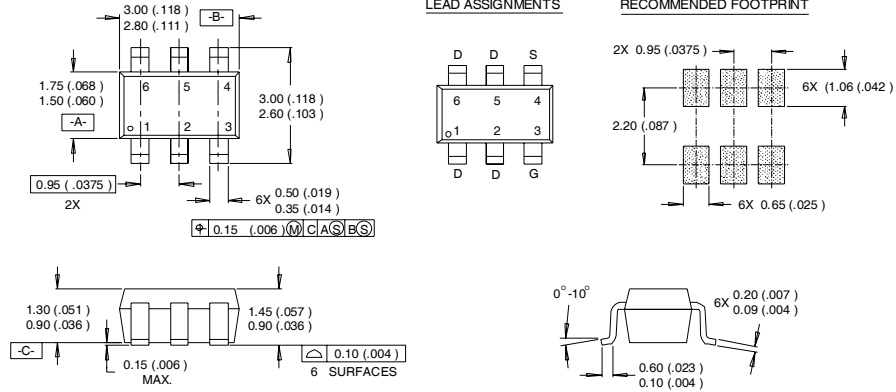


\*\*\*  $V_{GS} = 5.0V$  for Logic Level and 3V Drive Devices

**Fig 13.** For P-channel HEXFET® power MOSFET s

## Micro6 (SOT23 6L) Package Outline

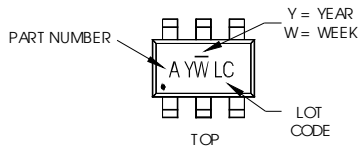
Dimensions are shown in millimeters (inches)



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

## Micro6 (SOT23 6L) Part Marking Information

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

Note: A line above the work week (as shown here) indicates Lead-Free.

YEAR	Y	WORK WEEK	W
2001	1	01	A
2002	2	02	B
2003	3	03	C
2004	4	04	D
2005	5		
2006	6		
2007	7		
2008	8		
2009	9		
2010	0	24	X
		25	Y
		26	Z

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

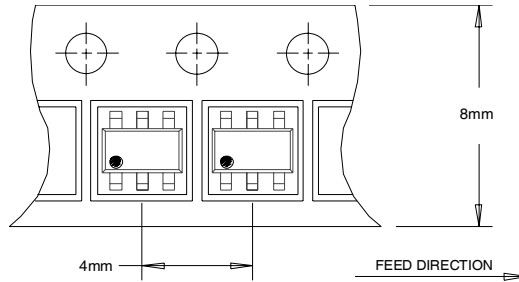
YEAR	Y	WORK WEEK	W
2001	A	27	A
2002	B	28	B
2003	C	29	C
2004	D	30	D
2005	E		
2006	F		
2007	G		
2008	H		
2009	J		
2010	K	50	X
		51	Y
		52	Z

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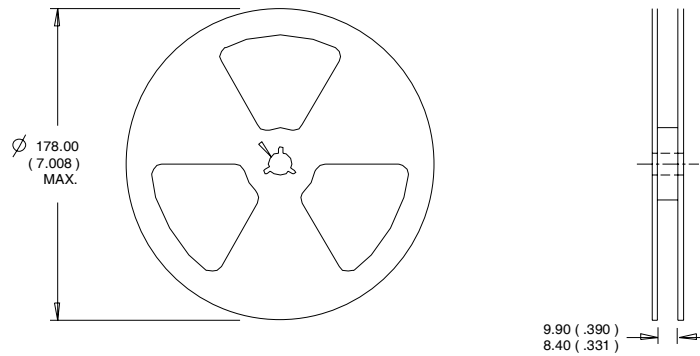
## Micro6 Tape & Reel Information

Dimensions are shown in millimeters (inches)



NOTES :

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



NOTES:

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

This product has been designed and qualified for the consumer market.

Qualification Standards can be found on IR's Web site.

Data and specifications subject to change without notice.

International  
**IR** Rectifier

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