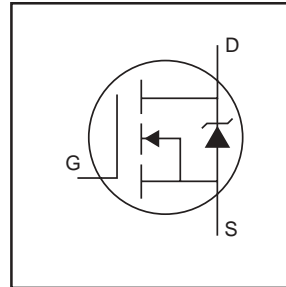


- Generation V Technology
- Ultra Low On-Resistance
- N-Channel MOSFET
- SOT-23 Footprint
- Low Profile (<1.1mm)
- Available in Tape and Reel
- Fast Switching



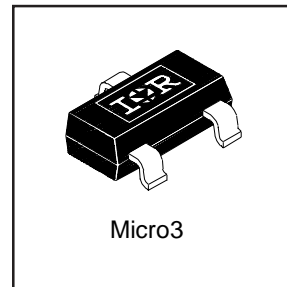
$$V_{DSS} = 20V$$

$$R_{DS(on)} = 0.25\Omega$$

### Description

Fifth Generation HEXFETs 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.

A customized leadframe has been incorporated into the standard SOT-23 package to produce a HEXFET Power MOSFET with the industry's smallest footprint. This package, dubbed the Micro3, is ideal for applications where printed circuit board space is at a premium. The low profile (<1.1mm) of the Micro3 allows it to fit easily into extremely thin application environments such as portable electronics and PCMCIA cards.



### Absolute Maximum Ratings

	Parameter	Max.	Units
$I_D @ T_A = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 4.5V$	1.2	A
$I_D @ T_A = 70^\circ C$	Continuous Drain Current, $V_{GS} @ 4.5V$	0.95	
$I_{DM}$	Pulsed Drain Current ①	7.4	
$P_D @ T_A = 25^\circ C$	Power Dissipation	540	mW
	Linear Derating Factor	4.3	mW/°C
$V_{GS}$	Gate-to-Source Voltage	$\pm 12$	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

	Parameter	Typ.	Max.	Units
$R_{\theta JA}$	Maximum Junction-to-Ambient ④	—	230	°C/W

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

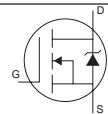
	Parameter	Min.	Typ.	Max.	Units	Conditions
V <sub>(BR)DSS</sub>	Drain-to-Source Breakdown Voltage	20	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA
ΔV <sub>(BR)DSS</sub> /ΔT <sub>J</sub>	Breakdown Voltage Temp. Coefficient	—	0.024	—	V/°C	Reference to 25°C, I <sub>D</sub> = 1mA
R <sub>DS(on)</sub>	Static Drain-to-Source On-Resistance	—	—	0.25	Ω	V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 0.93A ②
		—	—	0.35		V <sub>GS</sub> = 2.7V, I <sub>D</sub> = 0.47A ②
V <sub>GS(th)</sub>	Gate Threshold Voltage	0.70	—	—	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA
g <sub>fs</sub>	Forward Transconductance	1.3	—	—	S	V <sub>DS</sub> = 10V, I <sub>D</sub> = 0.47A
I <sub>DSS</sub>	Drain-to-Source Leakage Current	—	—	1.0	μA	V <sub>DS</sub> = 16V, V <sub>GS</sub> = 0V
		—	—	25		V <sub>DS</sub> = 16V, 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> = -12V
	Gate-to-Source Reverse Leakage	—	—	100		V <sub>GS</sub> = 12V
Q <sub>g</sub>	Total Gate Charge	—	2.6	3.9	nC	I <sub>D</sub> = 0.93A
Q <sub>gs</sub>	Gate-to-Source Charge	—	0.41	0.62		V <sub>DS</sub> = 16V
Q <sub>gd</sub>	Gate-to-Drain ("Miller") Charge	—	1.1	1.7		V <sub>GS</sub> = 4.5V, See Fig. 6 and 9 ③
t <sub>d(on)</sub>	Turn-On Delay Time	—	2.5	—		V <sub>DD</sub> = 10V
t <sub>r</sub>	Rise Time	—	9.5	—	ns	I <sub>D</sub> = 0.93A
t <sub>d(off)</sub>	Turn-Off Delay Time	—	9.7	—		R <sub>G</sub> = 6.2Ω
t <sub>f</sub>	Fall Time	—	4.8	—		R <sub>D</sub> = 11Ω, See Fig. 10 ③
C <sub>iss</sub>	Input Capacitance	—	110	—	pF	V <sub>GS</sub> = 0V
C <sub>oss</sub>	Output Capacitance	—	51	—		V <sub>DS</sub> = 15V
C <sub>rss</sub>	Reverse Transfer Capacitance	—	25	—		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)	—	—	0.54	A	MOSFET symbol showing the integral reverse p-n junction diode.
I <sub>SM</sub>	Pulsed Source Current (Body Diode) ①	—	—	7.4		
V <sub>SD</sub>	Diode Forward Voltage	—	—	1.2	V	T <sub>J</sub> = 25°C, I <sub>S</sub> = 0.93A, V <sub>GS</sub> = 0V ③
t <sub>rr</sub>	Reverse Recovery Time	—	25	38	ns	T <sub>J</sub> = 25°C, I <sub>F</sub> = 0.93A
Q <sub>rr</sub>	Reverse Recovery Charge	—	16	24	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> ≤ 0.93A, di/dt ≤ 90A/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.



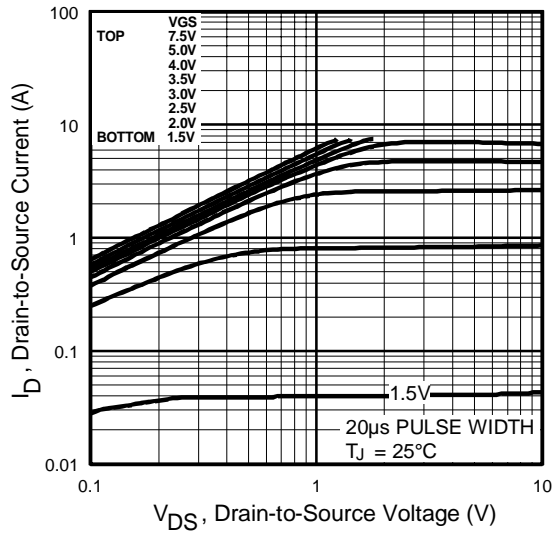


Fig 1. Typical Output Characteristics

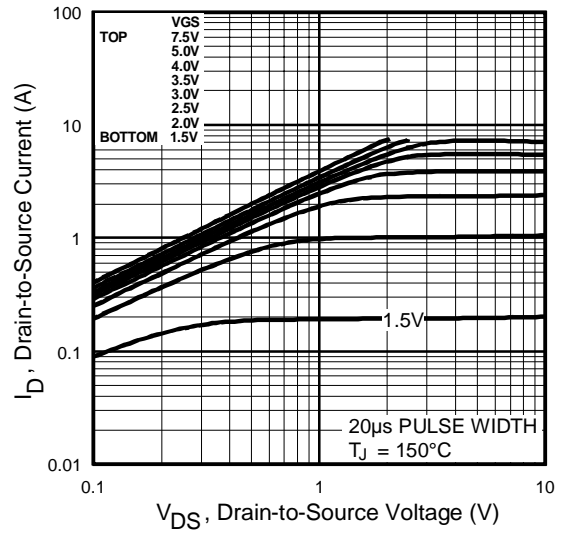


Fig 2. Typical Output Characteristics

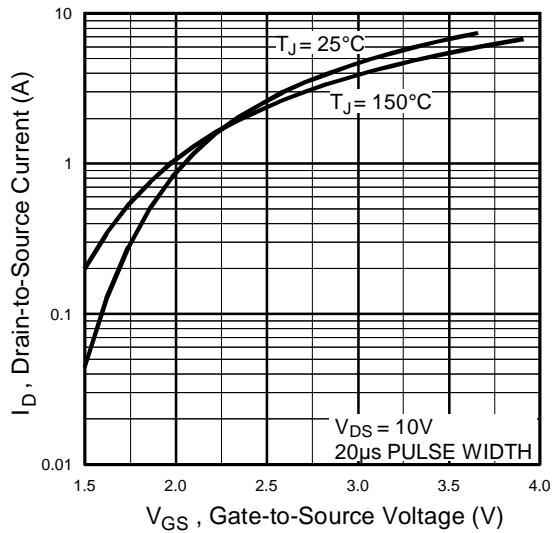


Fig 3. Typical Transfer Characteristics

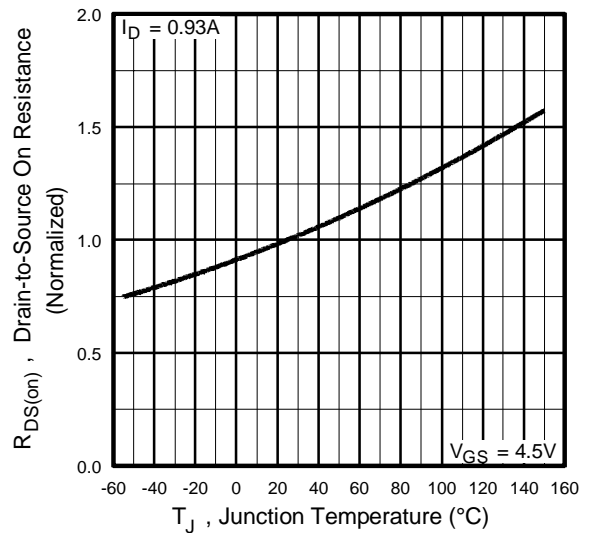
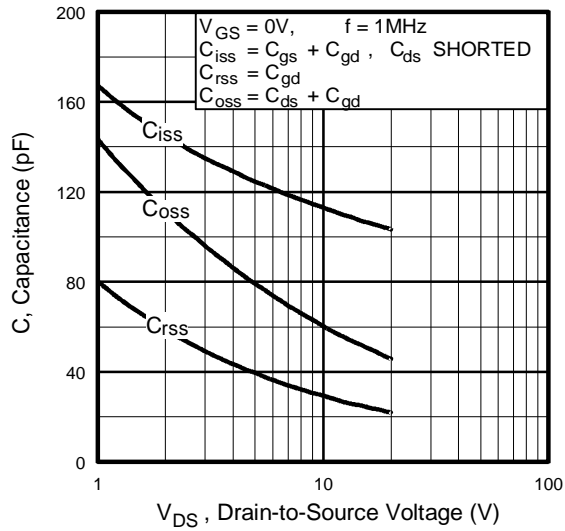
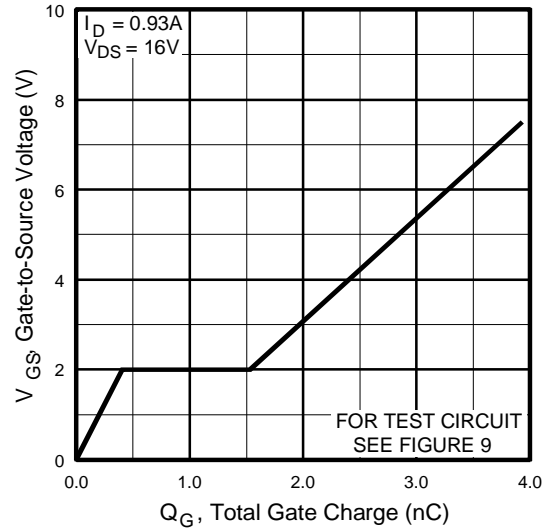


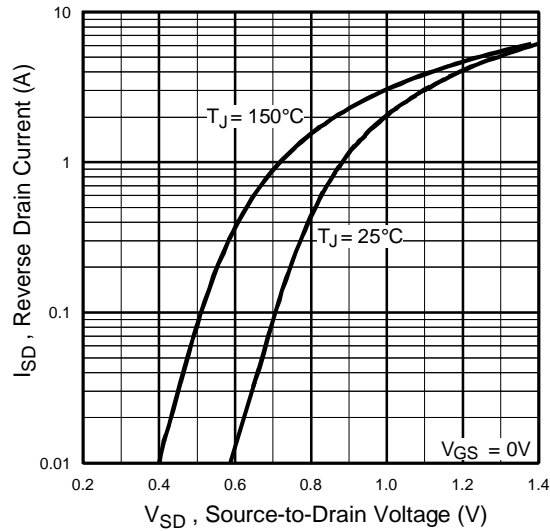
Fig 4. Normalized On-Resistance Vs. Temperature



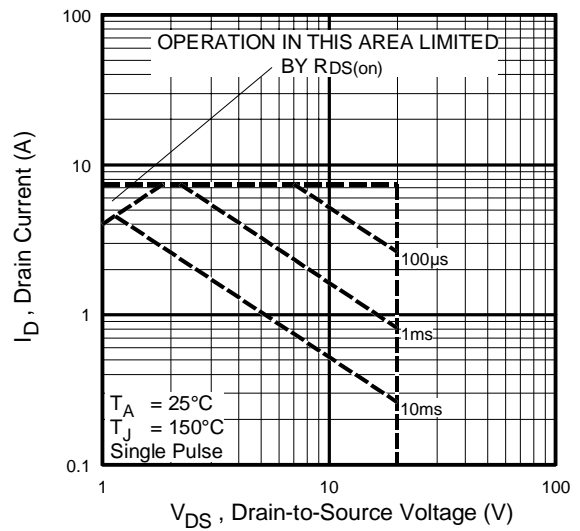
**Fig 5.** Typical Capacitance Vs. Drain-to-Source Voltage



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



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



**Fig 8.** Maximum Safe Operating Area

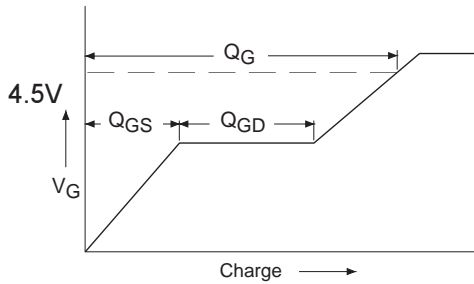


Fig 9a. Basic Gate Charge Waveform

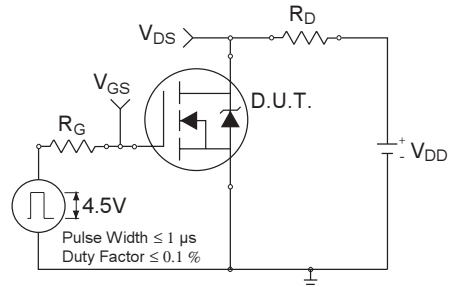


Fig 10a. Switching Time Test Circuit

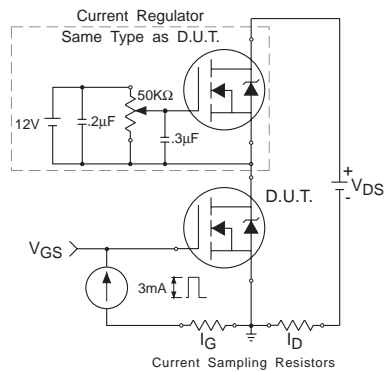


Fig 9b. Gate Charge Test Circuit

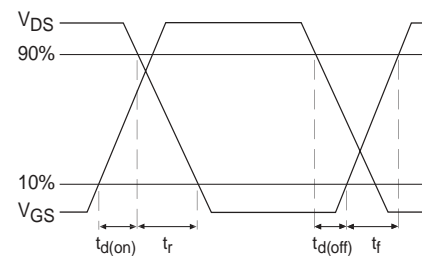


Fig 10b. Switching Time Waveforms

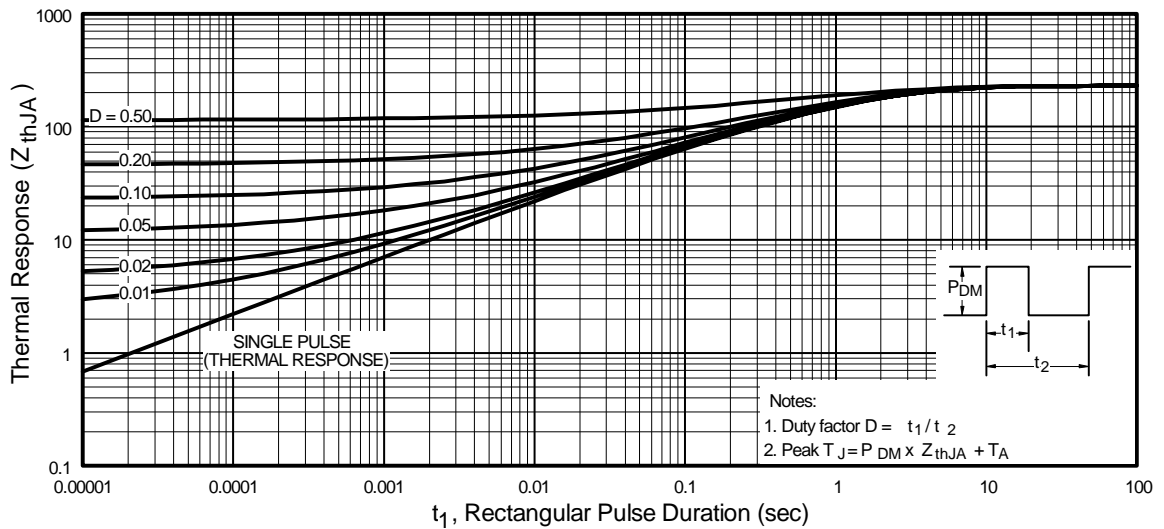
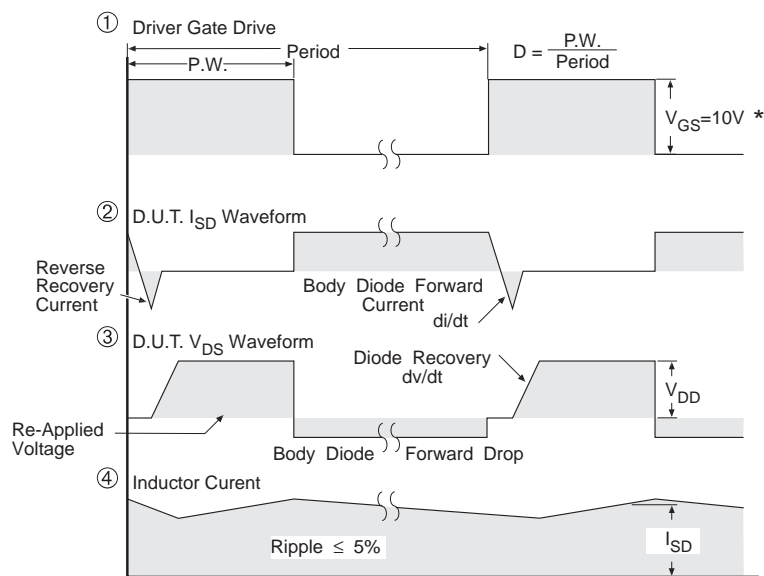
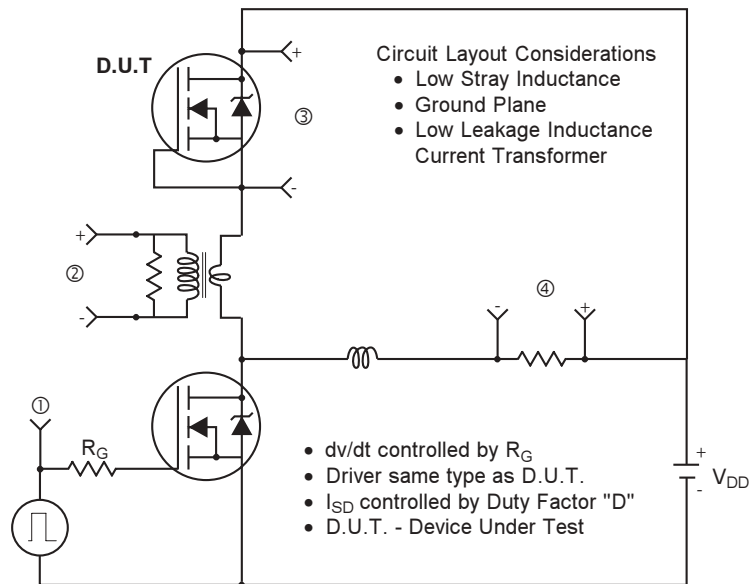


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

## Peak Diode Recovery dv/dt Test Circuit



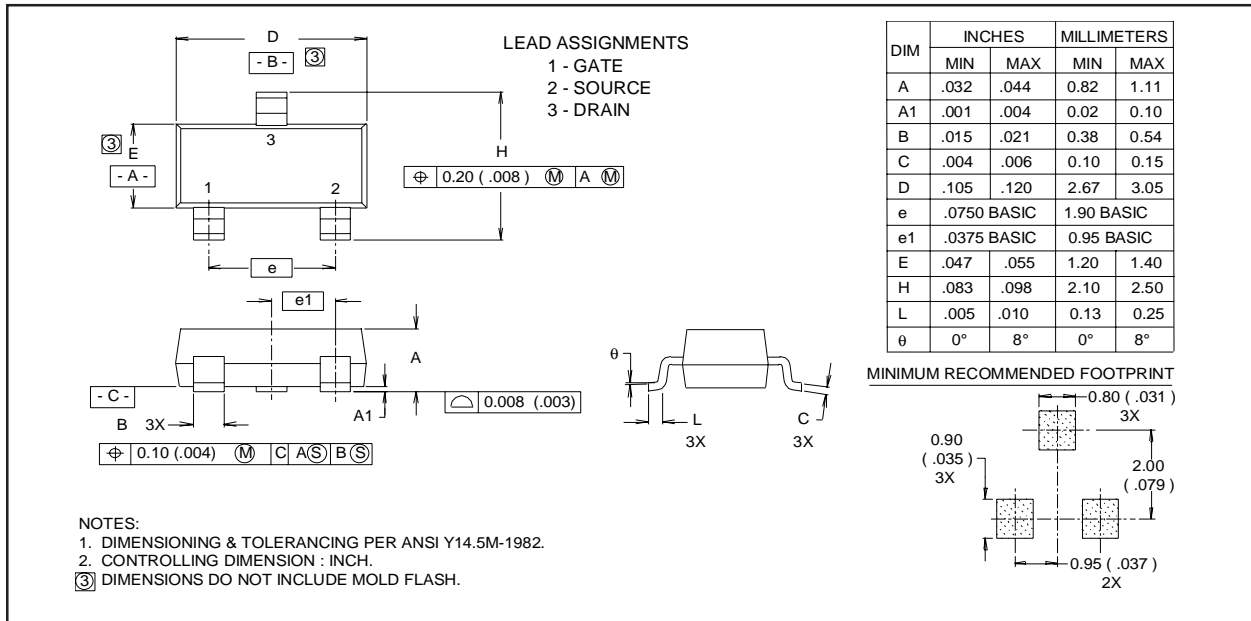
\*  $V_{GS} = 5V$  for Logic Level Devices

**Fig 12.** For N-Channel HEXFETS

## Package Outline

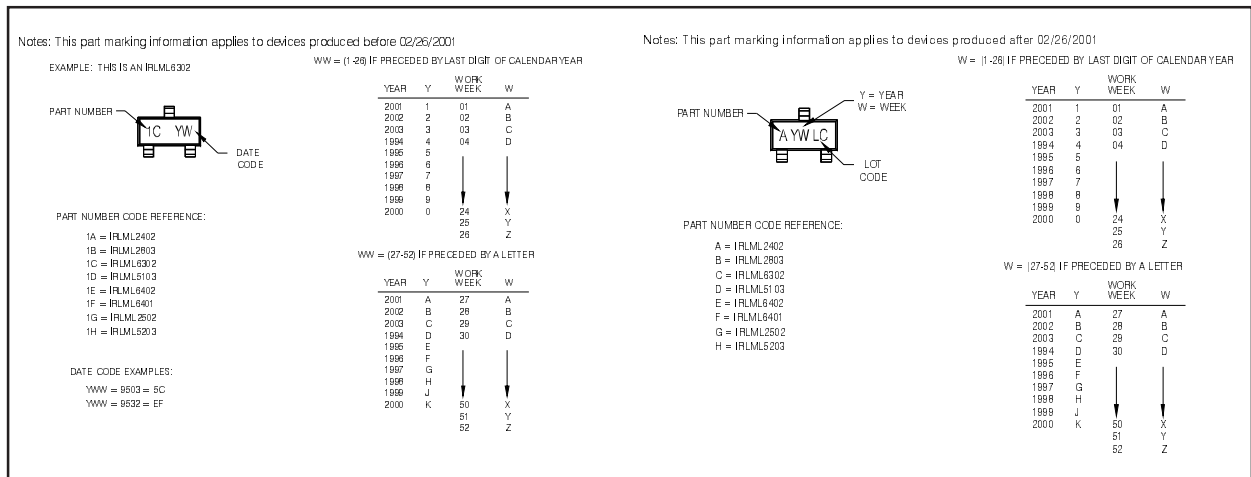
### Micro3 (SOT-23 / TO-236AB)

Dimensions are shown in millimeters (inches)



## Part Marking Information

### Micro3 (SOT-23 / TO-236AB)



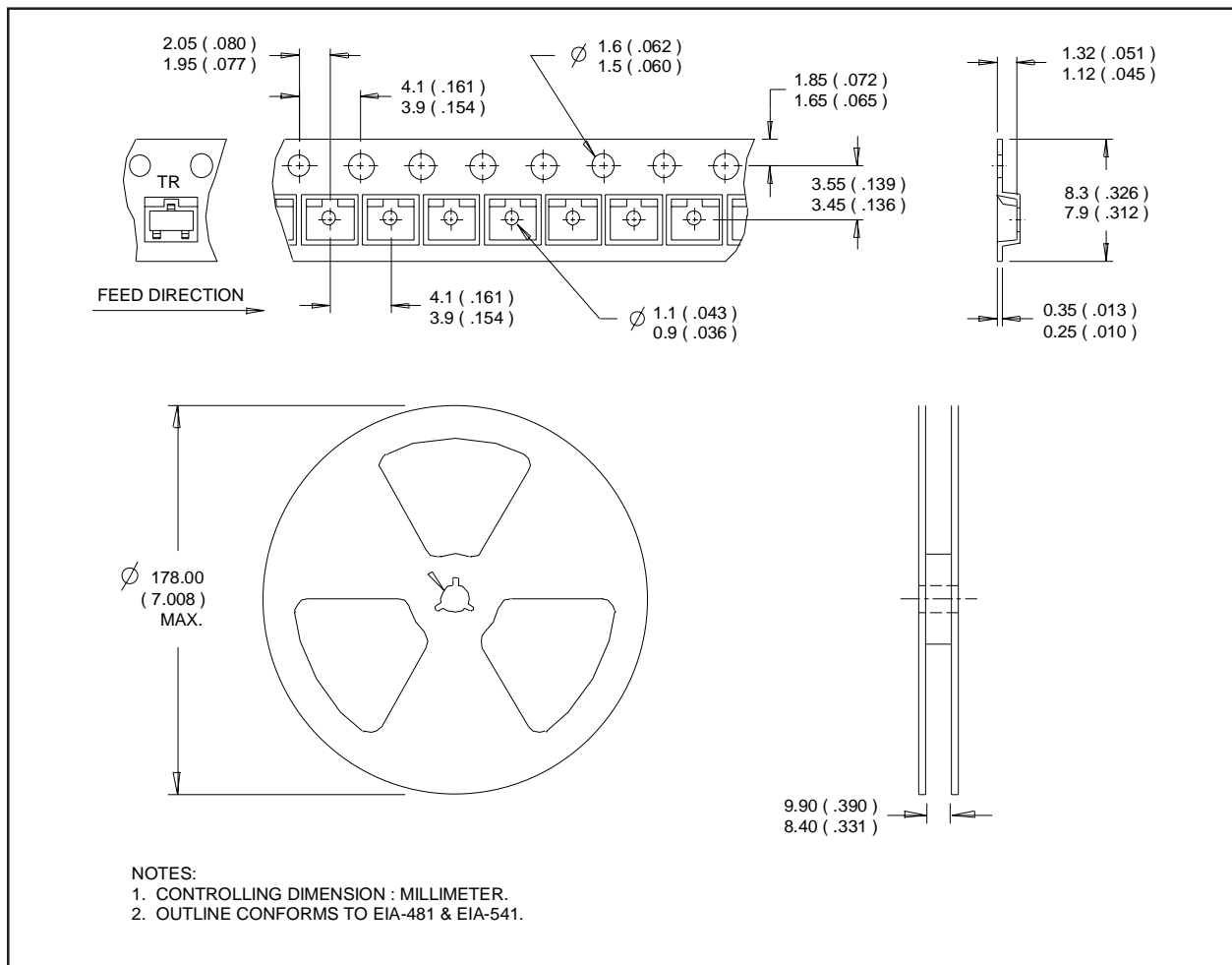
# IRLML2402

International  
**IR** Rectifier

## Tape & Reel Information

Micro3 (SOT-23 / TO-236AB)

Dimensions are shown in millimeters (inches)



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TAC Fax: (310) 252-7903

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