

# IRF7534D1PbF

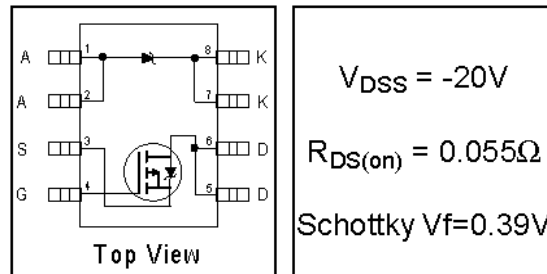
- Lead-Free
- Co-packaged HEXFET<sup>®</sup> power MOSFET and Schottky diode
- Ultra Low On-Resistance MOSFET
- Trench technology
- Micro8<sup>™</sup> Footprint
- Available in Tape & Reel

## Description

The FETKY family of co-packaged MOSFETs and Schottky diodes offers the designer an innovative, board space saving solution for switching regulator and power management applications. International Rectifier utilizes advanced processing techniques to achieve extremely low on-resistance per silicon area. Combining this technology with International Rectifier's low forward drop Schottky rectifiers results in an extremely efficient device suitable for use in a wide variety of portable electronics applications, such as cell phones, PDAs, etc.

The Micro8<sup>™</sup> package makes an ideal device for applications where printed circuit board space is at a premium. The low profile (<1.1mm) of the Micro8<sup>™</sup> will allow it to fit easily into extremely thin application environments such as portable electronics

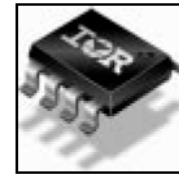
## FETKY MOSFET & Schottky Diode



$$V_{DS} = -20V$$

$$R_{DS(on)} = 0.055\Omega$$

$$\text{Schottky } V_f = 0.39V$$



Micro8<sup>™</sup>

## Absolute Maximum Ratings

	Parameter	Max.	Units
$V_{DS}$	Drain-Source Voltage	-20	V
$I_D @ T_A = 25^\circ C$	Continuous Drain Current, $V_{GS} @ -4.5V$	-4.3	A
$I_D @ T_A = 70^\circ C$	Continuous Drain Current, $V_{GS} @ -4.5V$	-3.4	
$I_{DM}$	Pulsed Drain Current <sup>①</sup>	-34	
$P_D @ T_A = 25^\circ C$	Maximum Power Dissipation <sup>④</sup>	1.25	W
$P_D @ T_A = 70^\circ C$	Maximum Power Dissipation <sup>④</sup>	0.8	W
	Linear Derating Factor	10	mW/°C
$V_{GS}$	Gate-to-Source Voltage	$\pm 12$	V
dv/dt	Peak Diode Recovery dv/dt <sup>②</sup>	1.1	V/ns
$T_J, T_{STG}$	Junction and Storage Temperature Range	-55 to + 150	°C

## Thermal Resistance

	Parameter	Max.	Units
$R_{\theta JA}$	Maximum Junction-to-Ambient <sup>④</sup>	100	°C/W

### Notes:

- ① Repetitive rating – pulse width limited by max. junction temperature (see Fig. 9)
- ②  $I_{SD} \leq -1.2A$ ,  $di/dt \leq 100A/\mu s$ ,  $V_{DD} \leq V_{(BR)DSS}$ ,  $T_J \leq 150^\circ C$
- ③ Pulse width  $\leq 300\mu s$  – duty cycle  $\leq 2\%$
- ④ When mounted on 1 inch square copper board to approximate typical multi-layer PCB thermal resistance

## MOSFET 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
R <sub>DS(on)</sub>	Static Drain-to-Source On-Resistance	—	—	0.055	Ω	V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -4.3A ③
		—	—	0.105		V <sub>GS</sub> = -2.5V, I <sub>D</sub> = -3.4A ③
V <sub>GS(th)</sub>	Gate Threshold Voltage	-0.6	—	-1.2	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250μA
g <sub>fs</sub>	Forward Transconductance	2.5	—	—	S	V <sub>DS</sub> = -10V, I <sub>D</sub> = -0.8A
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	—	10	15	nC	I <sub>D</sub> = -3A
Q <sub>gs</sub>	Gate-to-Source Charge	—	2.1	3.1		V <sub>DS</sub> = -10V
Q <sub>gd</sub>	Gate-to-Drain ("Miller") Charge	—	2.5	3.7		V <sub>GS</sub> = -5V
t <sub>d(on)</sub>	Turn-On Delay Time	—	10	—	ns	V <sub>DD</sub> = -10V
t <sub>r</sub>	Rise Time	—	46	—		I <sub>D</sub> = -2A
t <sub>d(off)</sub>	Turn-Off Delay Time	—	60	—		R <sub>G</sub> = 6.0Ω
t <sub>f</sub>	Fall Time	—	64	—		R <sub>D</sub> = 5Ω, ③
C <sub>iss</sub>	Input Capacitance	—	1066	—	pF	V <sub>GS</sub> = 0V
C <sub>oss</sub>	Output Capacitance	—	402	—		V <sub>DS</sub> = -10V
C <sub>rss</sub>	Reverse Transfer Capacitance	—	125	—		f = 1.0MHz

## MOSFET Source-Drain Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I <sub>S</sub>	Continuous Source Current (Body Diode)	—	—	-1.3	A	
I <sub>SM</sub>	Pulsed Source Current (Body Diode)	—	—	-34		
V <sub>SD</sub>	Body Diode Forward Voltage	—	—	-1.2	V	T <sub>J</sub> = 25°C, I <sub>S</sub> = -1.6A, V <sub>GS</sub> = 0V
t <sub>rr</sub>	Reverse Recovery Time (Body Diode)	—	54	82	ns	T <sub>J</sub> = 25°C, I <sub>F</sub> = -2.5A
Q <sub>rr</sub>	Reverse Recovery Charge	—	41	61	nC	di/dt = 100A/μs ③

## Schottky Diode Maximum Ratings

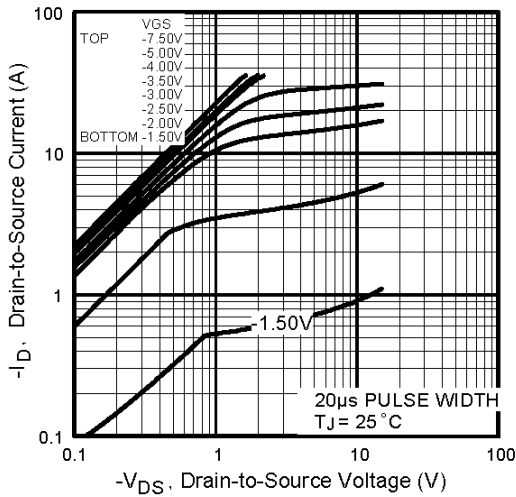
	Parameter	Max.	Units	Conditions
I <sub>F(av)</sub>	Max. Average Forward Current	1.9	A	50% Duty Cycle, Rectangular Wave, T <sub>A</sub> = 25°C See Fig.13
		1.4		
I <sub>SM</sub>	Max. peak one cycle Non-repetitive Surge current	120	A	Following any rated load condition & with V <sub>RRM</sub> applied
		11		

## Schottky Diode Electrical Specifications

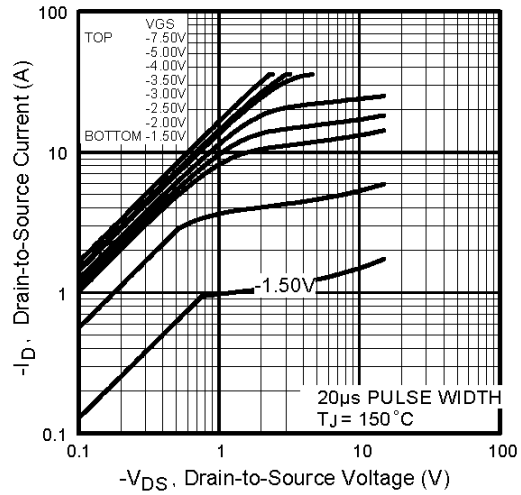
	Parameter	Max.	Units	Conditions
V <sub>FM</sub>	Max. Forward voltage drop	0.50	V	I <sub>F</sub> = 1.0A, T <sub>J</sub> = 25°C
		0.62		I <sub>F</sub> = 2.0A, T <sub>J</sub> = 25°C
		0.39		I <sub>F</sub> = 1.0A, T <sub>J</sub> = 125°C
		0.57		I <sub>F</sub> = 2.0A, T <sub>J</sub> = 125°C
I <sub>RM</sub>	Max. Reverse Leakage current	0.02	mA	V <sub>R</sub> = 20V, T <sub>J</sub> = 25°C
		8		T <sub>J</sub> = 125°C
C <sub>t</sub>	Max. Junction Capacitance	92	pF	V <sub>R</sub> = 5Vdc ( 100kHz to 1 MHz) 25°C
dv/dt	Max. Voltage Rate of Charge	3600	V/μs	Rated V <sub>R</sub>

(HEXFET is the reg. TM for International Rectifier Power MOSFET's)

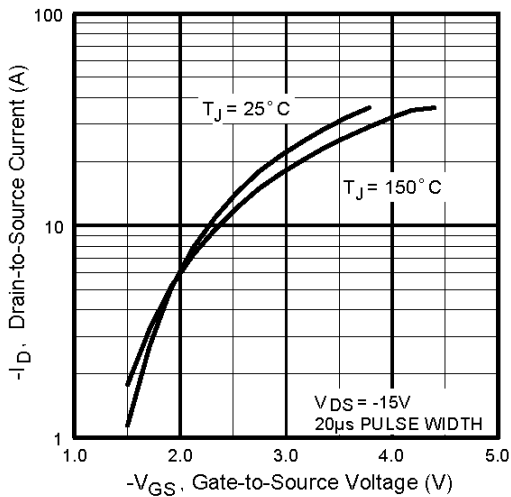
## Power MOSFET Characteristics



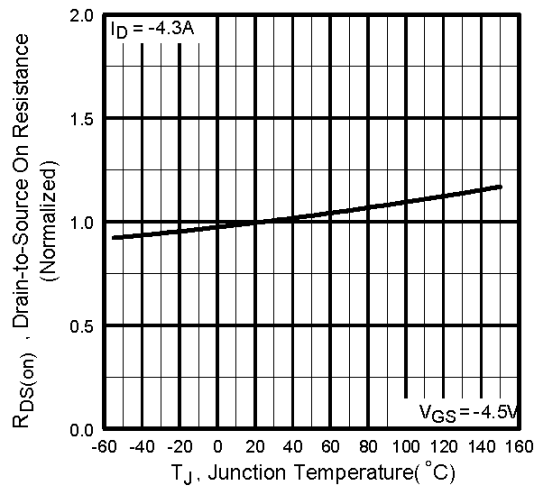
**Fig 1.** Typical Output Characteristics



**Fig 2.** Typical Output Characteristics

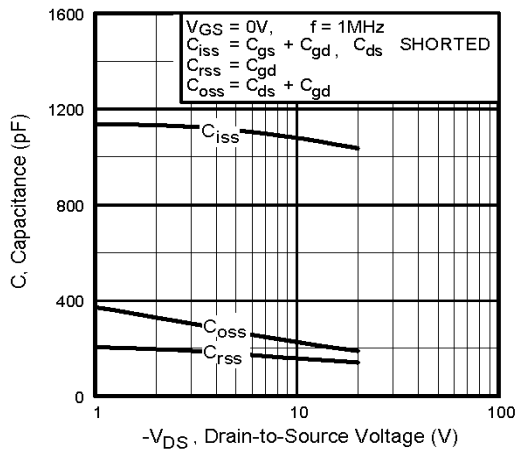


**Fig 3.** Typical Transfer Characteristics

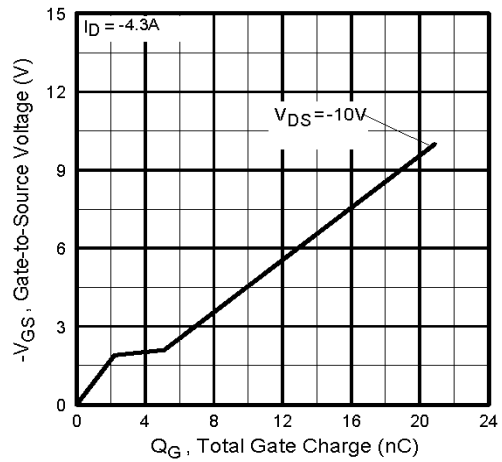


**Fig 4.** Normalized On-Resistance Vs. Temperature

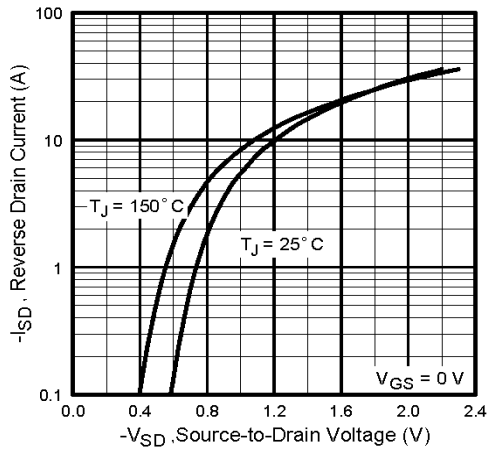
## Power MOSFET Characteristics



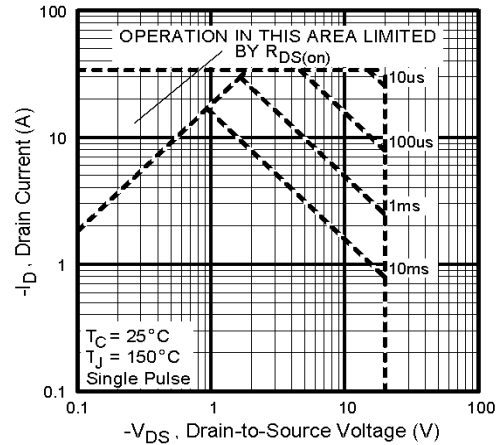
**Fig 5.** Typical Capacitance Vs. Drain-to-Source Voltage



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



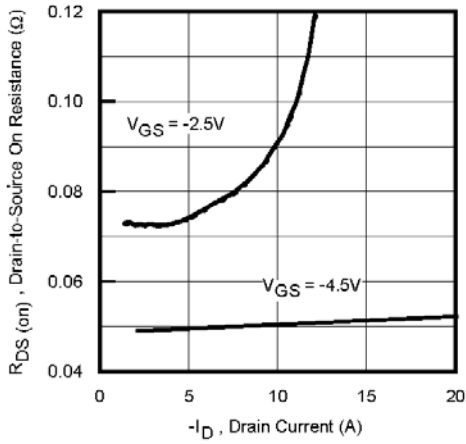
**Fig 7.** Typical Source-Drain Diode Forward Voltage



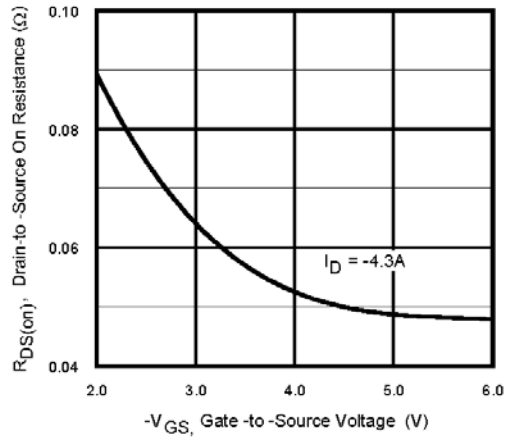
**Fig 8.** Maximum Safe Operating Area



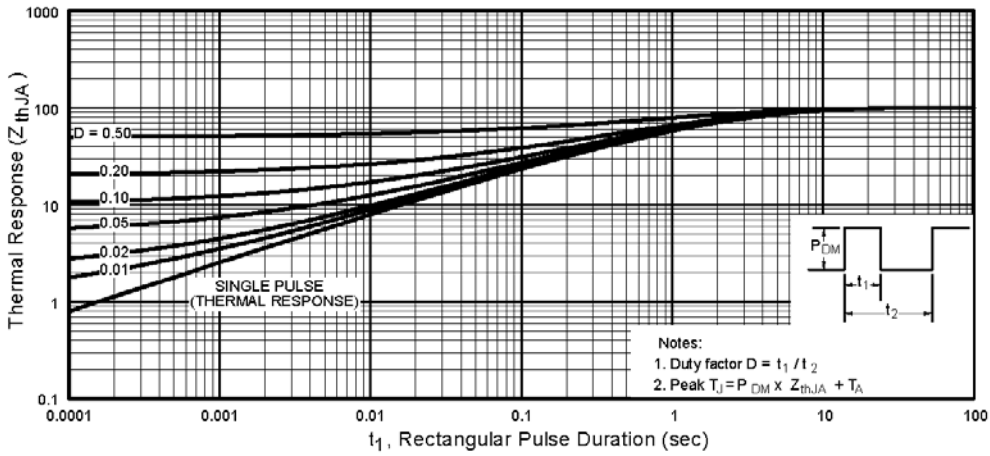
## Power MOSFET Characteristics



**Fig 9.** Typical On-Resistance Vs. Drain Current

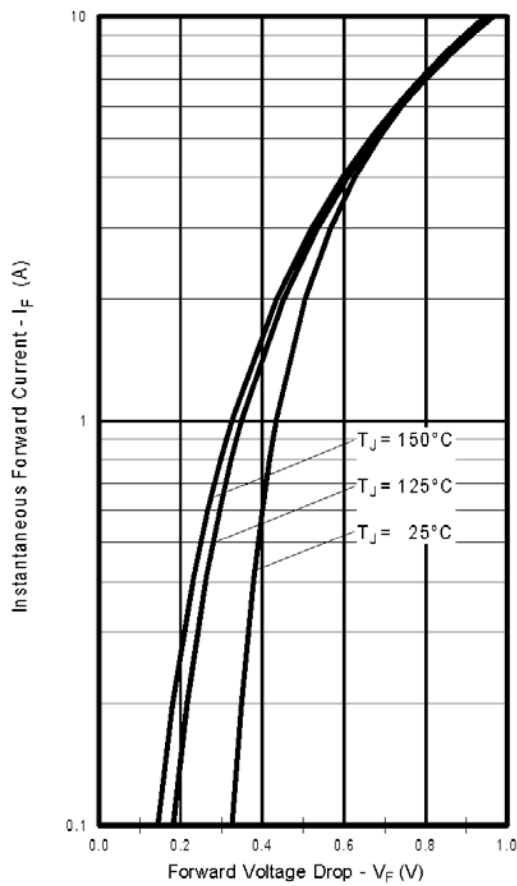


**Fig 10.** Typical On-Resistance Vs. Gate Voltage

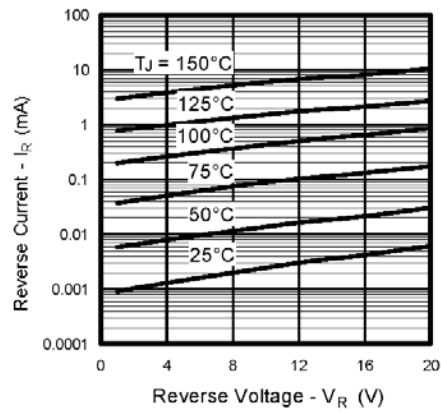


**Fig 11.** Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

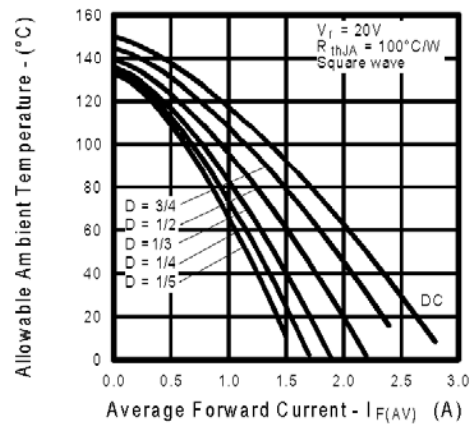
## Schottky Diode Characteristics



**Fig. 12**-Typical Forward Voltage Drop Characteristics



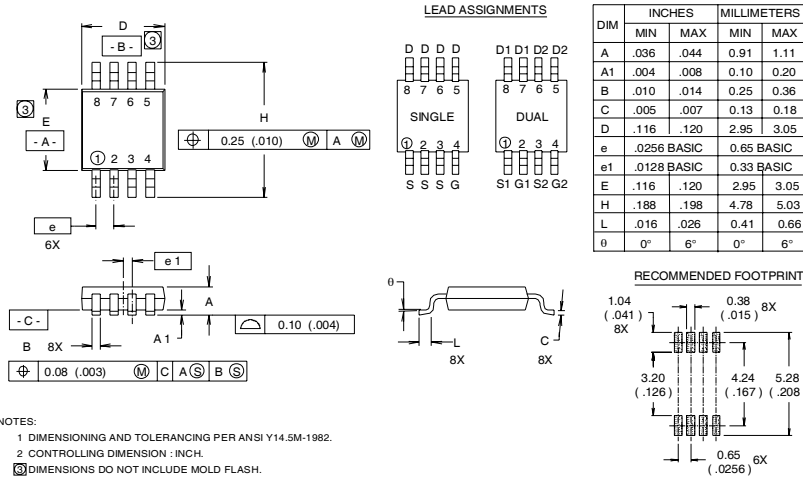
**Fig. 13** - Typical Values of Reverse Current Vs. Reverse Voltage



**Fig.14** - Maximum Allowable Ambient Temp. Vs. Forward Current

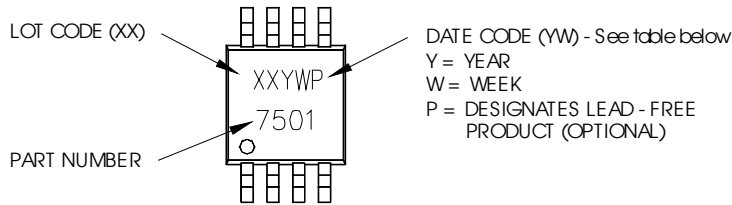
## Micro8 Package Outline

Dimensions are shown in millimeters (inches)



## Micro8 Part Marking Information

EXAMPLE: THIS IS AN IRF7501



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		
2006	6		
2007	7		
2008	8		
2009	9		
2010	0	24	X
		25	Y
		26	Z

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

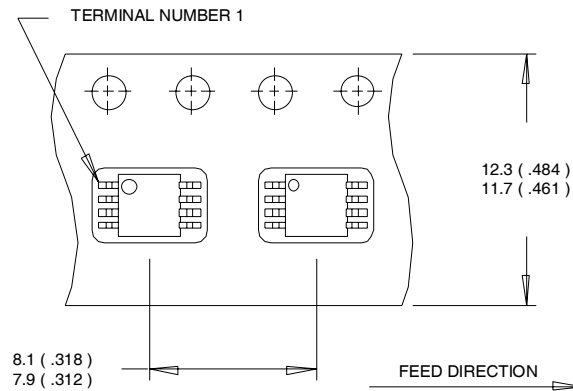
YEAR	Y	WORK WEEK	W
2001	A	27	A
2002	B	28	B
2003	C	29	C
2004	D	30	D
2005	E		
2006	F		
2007	G		
2008	H		
2009	J		
2010	K	50	X
		51	Y
		52	Z

# IRF7534D1PbF

International  
**IR** Rectifier

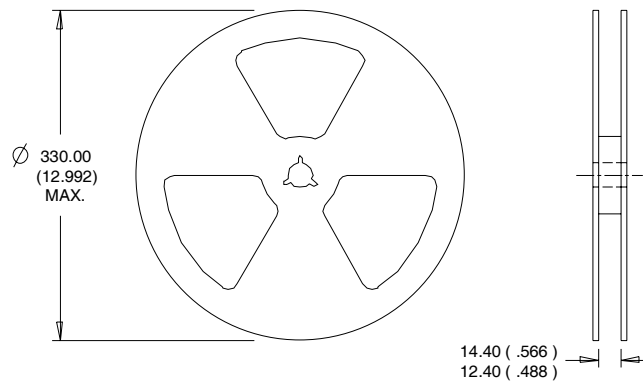
## Micro8 Tape & Reel Information

Dimensions are shown in millimeters (inches)



NOTES:

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



NOTES:

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

Data and specifications subject to change without notice.  
This product has been designed and qualified for the Consumer market.  
Qualification Standards can be found on IR's Web site.

International  
**IR** Rectifier

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