

# IRF7534D1

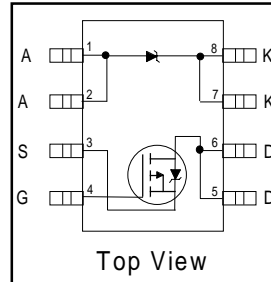
## FETKY MOSFET & Schottky Diode

- 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

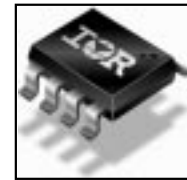
### Description

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



$V_{DSS} = -20V$
$R_{DS(on)} = 0.055\Omega$
Schottky Vf=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 @ $T_J = 25^\circ\text{C}$ (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	-20	—	—	V	$V_{GS} = 0V, I_D = -250\mu A$
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	—	0.055	$\Omega$	$V_{GS} = -4.5V, I_D = -4.3A$ ③
		—	—	0.105		$V_{GS} = -2.5V, I_D = -3.4A$ ③
$V_{GS(th)}$	Gate Threshold Voltage	-0.6	—	-1.2	V	$V_{DS} = V_{GS}, I_D = -250\mu A$
$g_{fs}$	Forward Transconductance	2.5	—	—	S	$V_{DS} = -10V, I_D = -0.8A$
$I_{DSS}$	Drain-to-Source Leakage Current	—	—	-1.0	$\mu A$	$V_{DS} = -16V, V_{GS} = 0V$
		—	—	-25		$V_{DS} = -16V, V_{GS} = 0V, T_J = 125^\circ\text{C}$
$I_{GSS}$	Gate-to-Source Forward Leakage	—	—	-100	nA	$V_{GS} = -12V$
	Gate-to-Source Reverse Leakage	—	—	100		$V_{GS} = 12V$
$Q_g$	Total Gate Charge	—	10	15	nC	$I_D = -3A$
$Q_{gs}$	Gate-to-Source Charge	—	2.1	3.1		$V_{DS} = -10V$
$Q_{gd}$	Gate-to-Drain ("Miller") Charge	—	2.5	3.7		$V_{GS} = -5V$
$t_{d(on)}$	Turn-On Delay Time	—	10	—	ns	$V_{DD} = -10V$
$t_r$	Rise Time	—	46	—		$I_D = -2A$
$t_{d(off)}$	Turn-Off Delay Time	—	60	—		$R_G = 6.0\Omega$
$t_f$	Fall Time	—	64	—		$R_D = 5\Omega, \text{③}$
$C_{iss}$	Input Capacitance	—	1066	—	pF	$V_{GS} = 0V$
$C_{oss}$	Output Capacitance	—	402	—		$V_{DS} = -10V$
$C_{rss}$	Reverse Transfer Capacitance	—	125	—		$f = 1.0\text{MHz}$

## MOSFET Source-Drain Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
$I_S$	Continuous Source Current (Body Diode)	—	—	-1.3	A	
$I_{SM}$	Pulsed Source Current (Body Diode)	—	—	-34		
$V_{SD}$	Body Diode Forward Voltage	—	—	-1.2	V	$T_J = 25^\circ\text{C}, I_S = -1.6A, V_{GS} = 0V$
$t_{rr}$	Reverse Recovery Time (Body Diode)	—	54	82	ns	$T_J = 25^\circ\text{C}, I_F = -2.5A$
$Q_{rr}$	Reverse Recovery Charge	—	41	61	nC	$di/dt = 100A/\mu s$ ③

## Schottky Diode Maximum Ratings

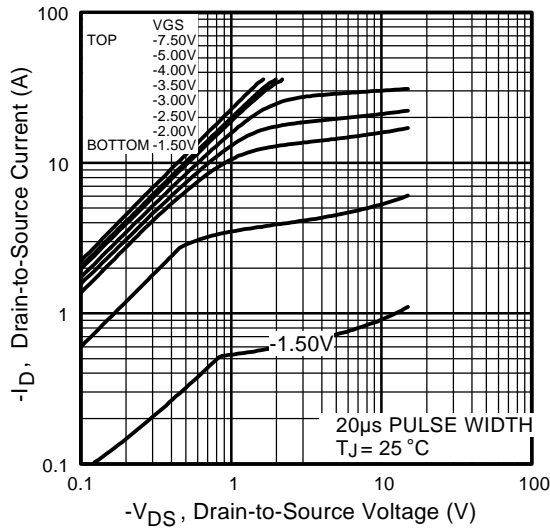
	Parameter	Max.	Units	Conditions
$I_{F(av)}$	Max. Average Forward Current	1.9	A	50% Duty Cycle. Rectangular Wave, $T_A = 25^\circ\text{C}$ See Fig.13 $T_A = 70^\circ\text{C}$
		1.4		
$I_{SM}$	Max. peak one cycle Non-repetitive Surge current	120	A	5 $\mu s$ sine or 3 $\mu s$ Rect. pulse
		11		10ms sine or 6ms Rect. pulse
				Following any rated load condition & with $V_{RRM}$ applied

## Schottky Diode Electrical Specifications

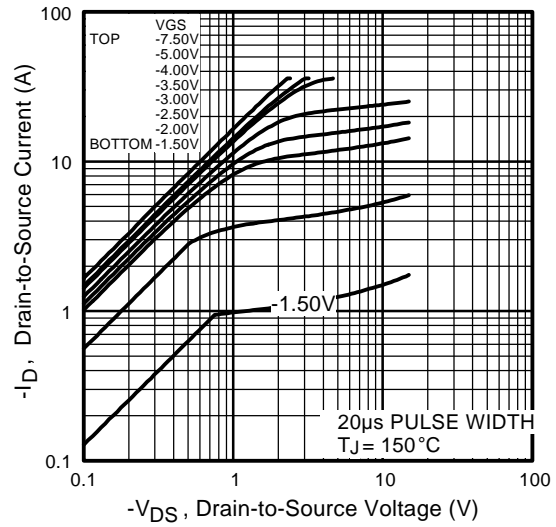
	Parameter	Max.	Units	Conditions
$V_{FM}$	Max. Forward voltage drop	0.50	V	$I_F = 1.0A, T_J = 25^\circ\text{C}$
		0.62		$I_F = 2.0A, T_J = 25^\circ\text{C}$
		0.39		$I_F = 1.0A, T_J = 125^\circ\text{C}$
		0.57		$I_F = 2.0A, T_J = 125^\circ\text{C}$
$I_{RM}$	Max. Reverse Leakage current	0.02	mA	$V_R = 20V, T_J = 25^\circ\text{C}$
		8		$T_J = 125^\circ\text{C}$
$C_t$	Max. Junction Capacitance	92	pF	$V_R = 5V_{dc}$ ( 100kHz to 1 MHz) $25^\circ\text{C}$
$dv/dt$	Max. Voltage Rate of Charge	3600	V/ $\mu s$	Rated $V_R$

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

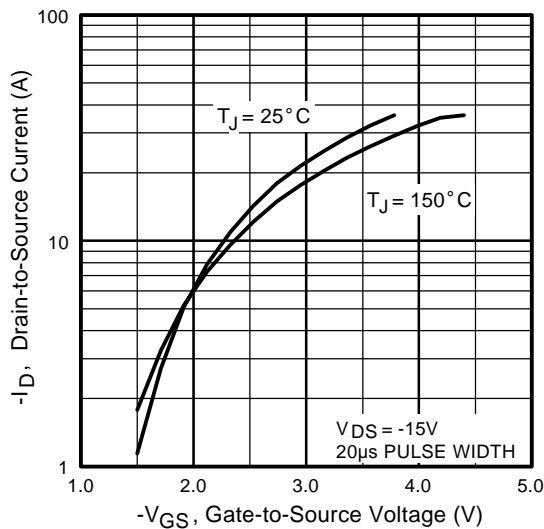
## Power MOSFET Characteristics



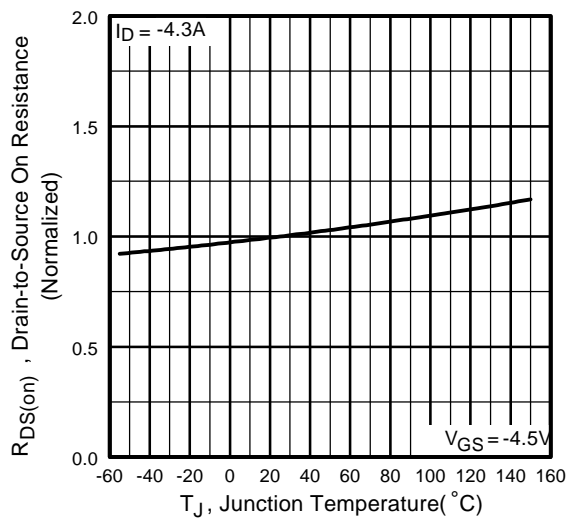
**Fig 1.** Typical Output Characteristics



**Fig 2.** Typical Output Characteristics

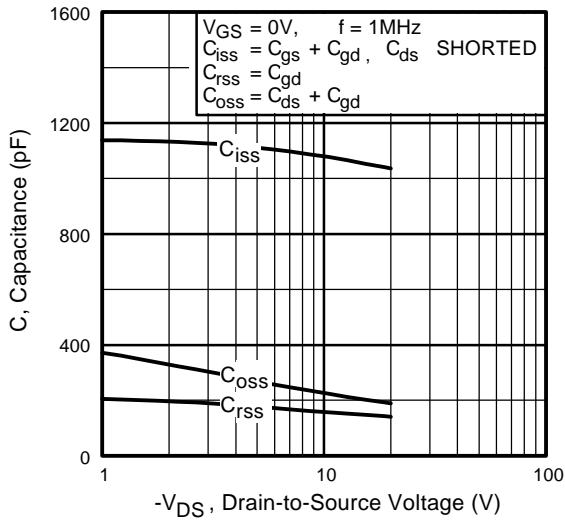


**Fig 3.** Typical Transfer Characteristics

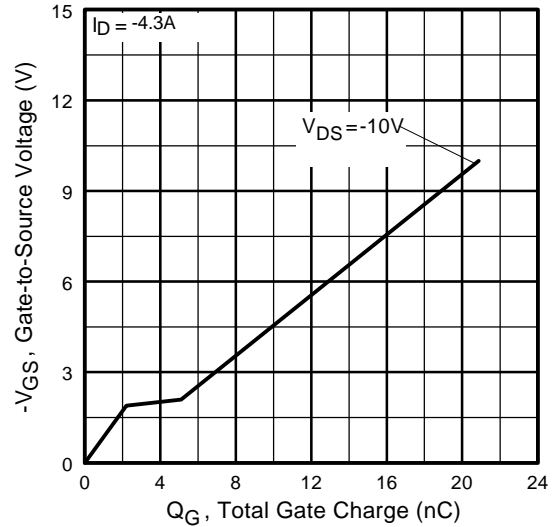


**Fig 4.** Normalized On-Resistance Vs. Temperature

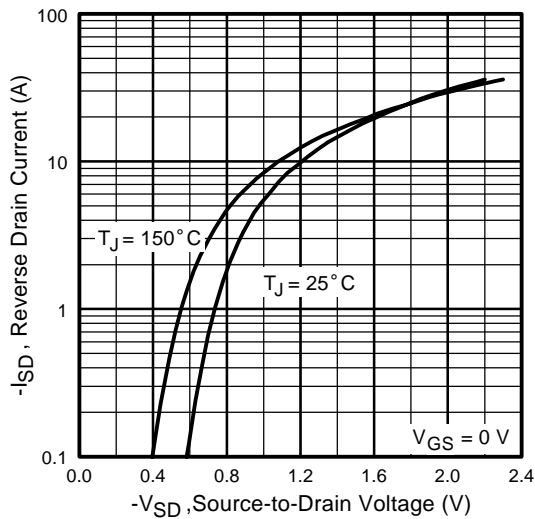
## Power MOSFET Characteristics



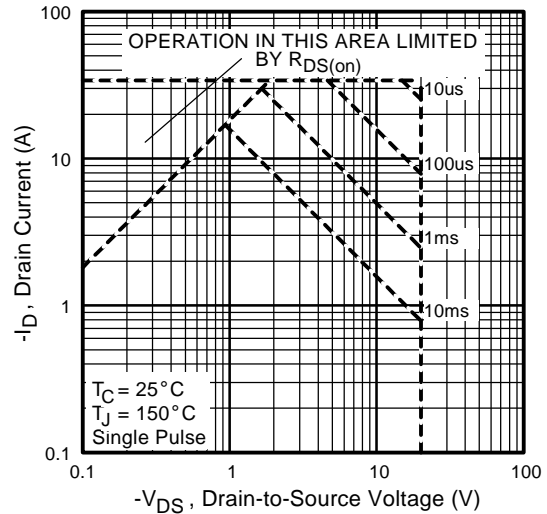
**Fig 5.** Typical Capacitance Vs. Drain-to-Source Voltage



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

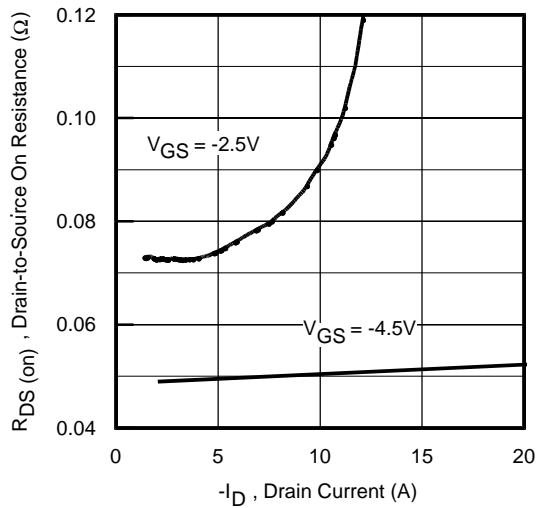


**Fig 7.** Typical Source-Drain Diode Forward Voltage

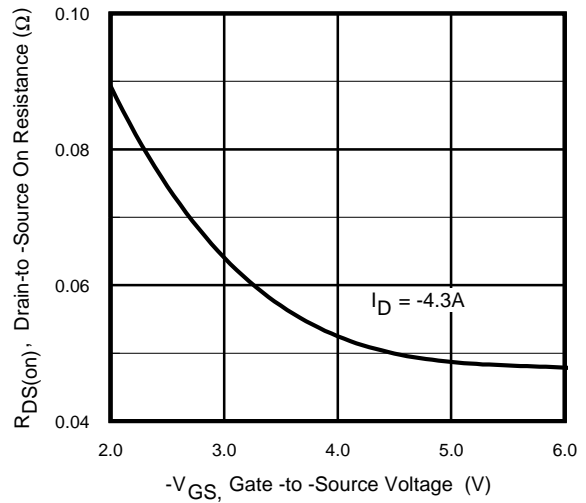


**Fig 8.** Maximum Safe Operating Area

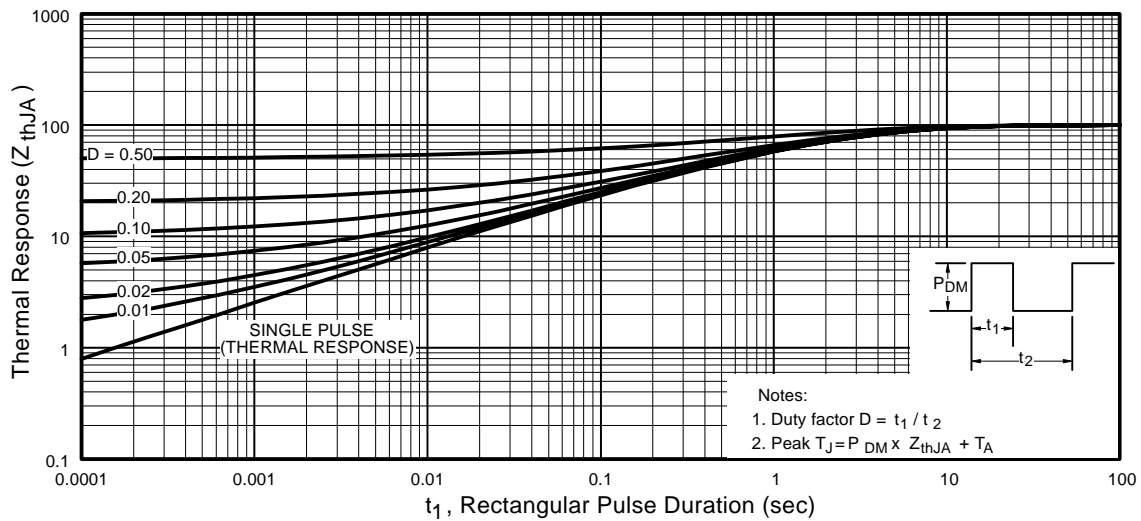
## Power MOSFET Characteristics



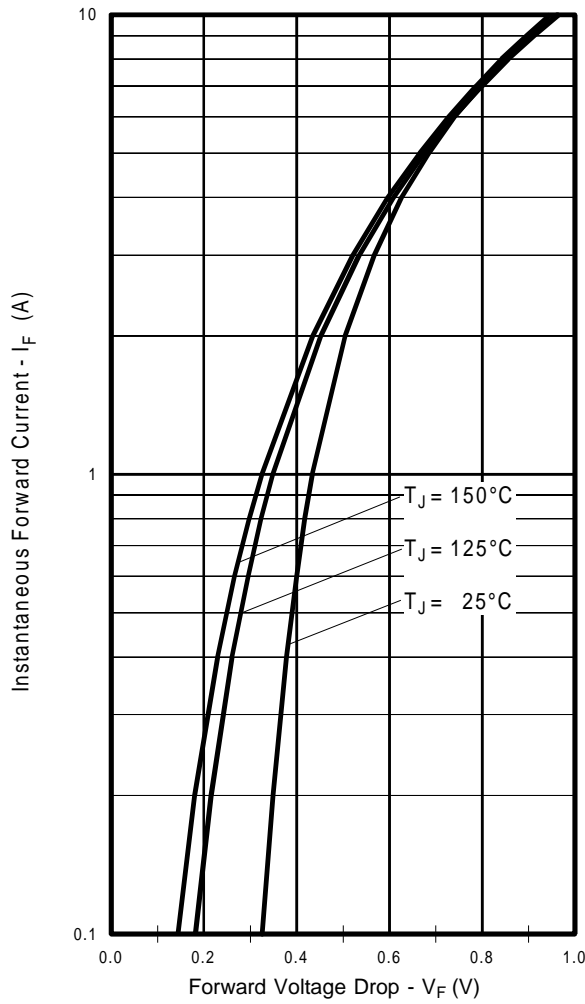
**Fig 9.** Typical On-Resistance Vs. Drain Current



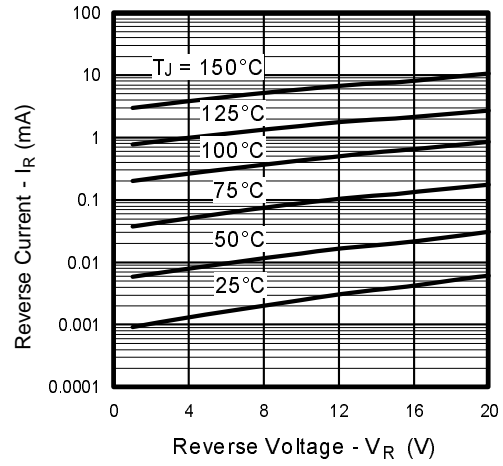
**Fig 10.** Typical On-Resistance Vs. Gate Voltage



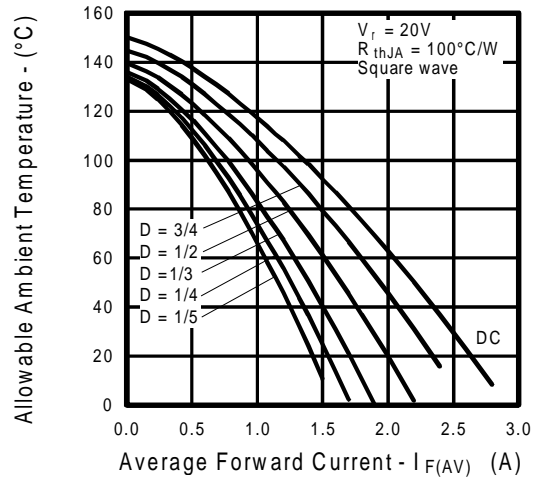
**Fig 11.** Maximum Effective Transient Thermal Impedance, Junction-to-Ambient



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



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

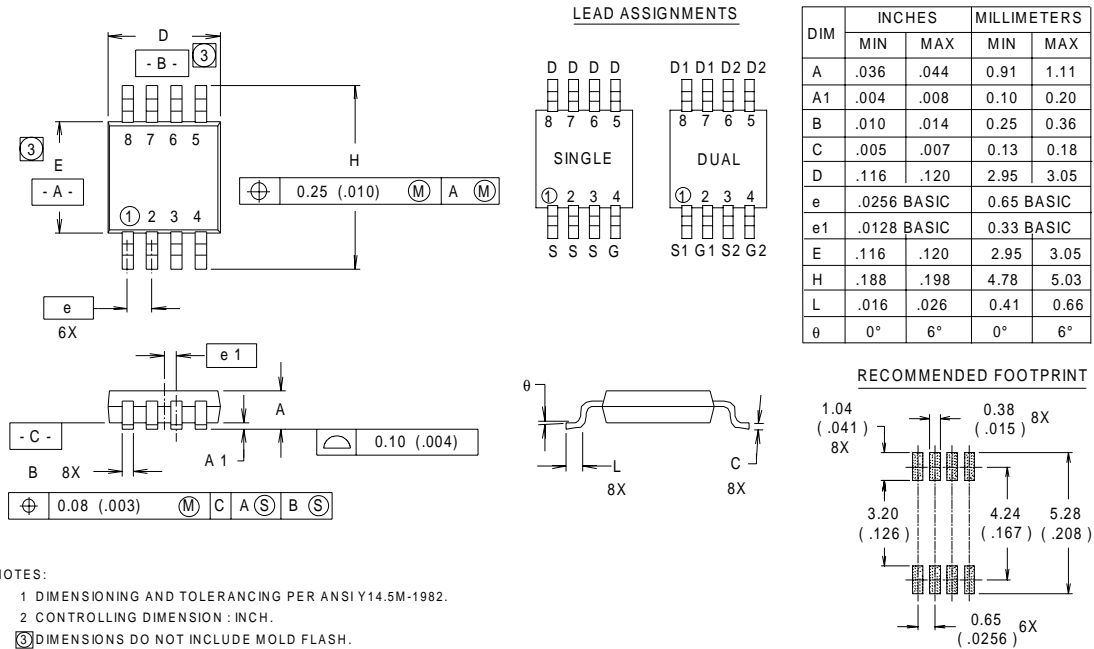


**Fig.14** - Maximum Allowable Ambient Temp. Vs. Forward Current

## Package Outline

### Micro8™ Outline

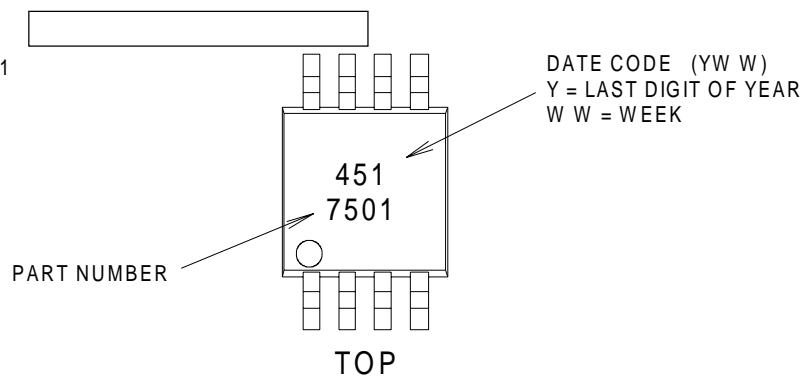
Dimensions are shown in millimeters (inches)



## Part Marking Information

### Micro8™

EXAMPLE : THIS IS AN IRF7501



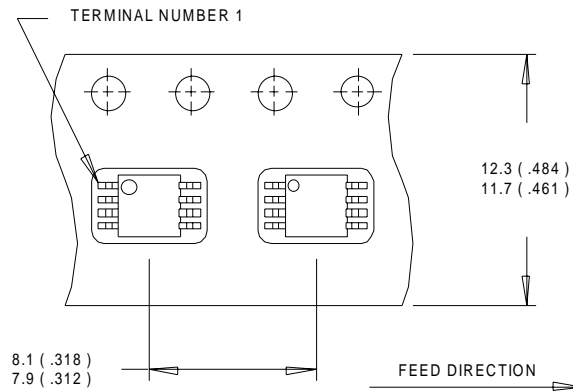
# IRF7534D1

International  
**IR** Rectifier

## Tape & Reel Information

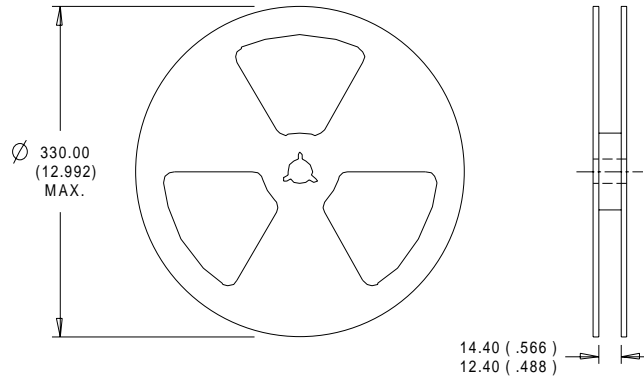
### Micro8™

Dimensions are shown in millimeters (inches)



#### NOTES:

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



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

International  
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**WORLD HEADQUARTERS:** 233 Kansas St., El Segundo, California 90245, Tel: (310) 252 7105

**IR GREAT BRITAIN:** Hurst Green, Oxted, Surrey RH8 9BB, UK Tel: ++ 44 1883 732020

**IR CANADA:** 15 Lincoln Court, Brampton, Ontario L6T3Z2, Tel: (905) 453 2200

**IR GERMANY:** Saalburgstrasse 157, 61350 Bad Homburg Tel: ++ 49 6172 96590

**IR ITALY:** Via Liguria 49, 10071 Borgaro, Torino Tel: ++ 39 11 451 0111

**IR JAPAN:** K&H Bldg., 2F, 30-4 Nishi-Ikebukuro 3-Chome, Toshima-Ku, Tokyo Japan 171 Tel: 81 3 3983 0086

**IR SOUTHEAST ASIA:** 1 Kim Seng Promenade, Great World City West Tower, 13-11, Singapore 237994 Tel: ++ 65 838 4630

**IR TAIWAN:** 16 Fl. Suite D. 207, Sec. 2, Tun Haw South Road, Taipei, 10673, Taiwan Tel: 886-2-2377-9936

*Data and specifications subject to change without notice. 2/2000*