

IRF7534D1

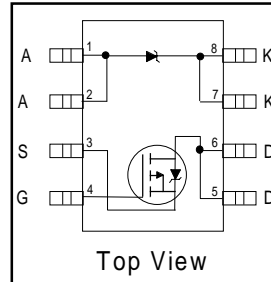
FETKY MOSFET & Schottky Diode

- Co-packaged HEXFET[®] power MOSFET and Schottky diode
- Ultra Low On-Resistance MOSFET
- Trench technology
- Micro8[™] Footprint
- Available in Tape & Reel

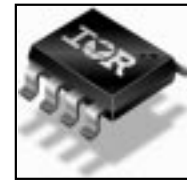
Description

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[™] package makes an ideal device for applications where printed circuit board space is at a premium. The low profile (<1.1mm) of the Micro8[™] 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[™]

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 ^①	-34	
$P_D @ T_A = 25^\circ C$	Maximum Power Dissipation ^④	1.25	W
$P_D @ T_A = 70^\circ C$	Maximum Power Dissipation ^④	0.8	W
	Linear Derating Factor	10	mW/°C
V_{GS}	Gate-to-Source Voltage	± 12	V
dv/dt	Peak Diode Recovery dv/dt ^②	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 ^④	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	Ω	$V_{GS} = -4.5V, I_D = -4.3A$ 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	μA	$V_{DS} = -16V, V_{GS} = 0V$
		—	—	-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 μs sine or 3 μs 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°C
dv/dt	Max. Voltage Rate of Charge	3600	V/ μs	Rated V_R

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

Power MOSFET Characteristics

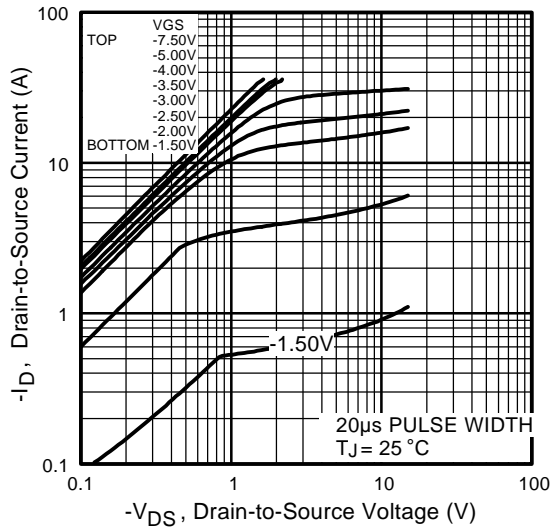


Fig 1. Typical Output Characteristics

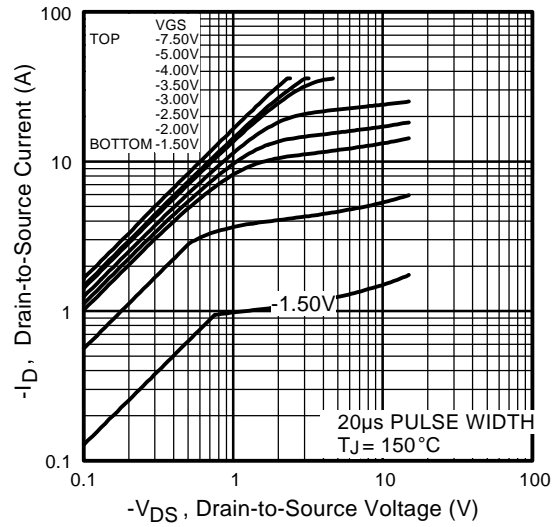


Fig 2. Typical Output Characteristics

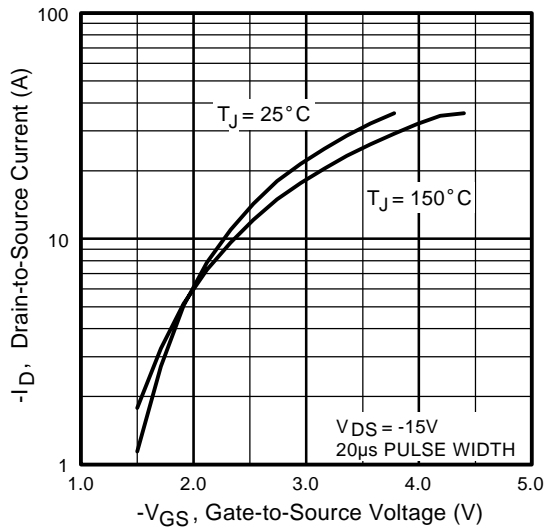


Fig 3. Typical Transfer Characteristics

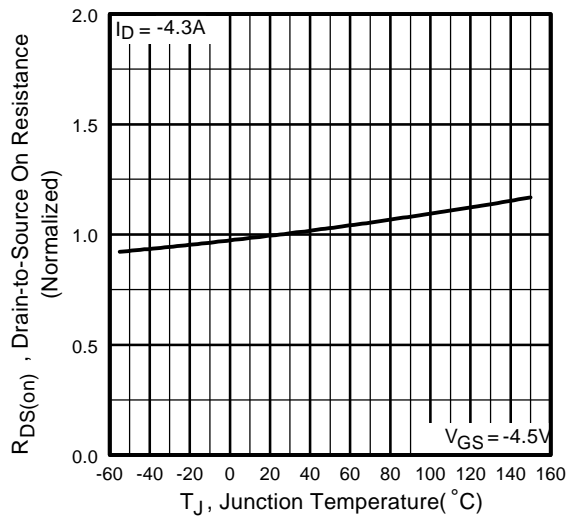


Fig 4. Normalized On-Resistance Vs. Temperature

Power MOSFET Characteristics

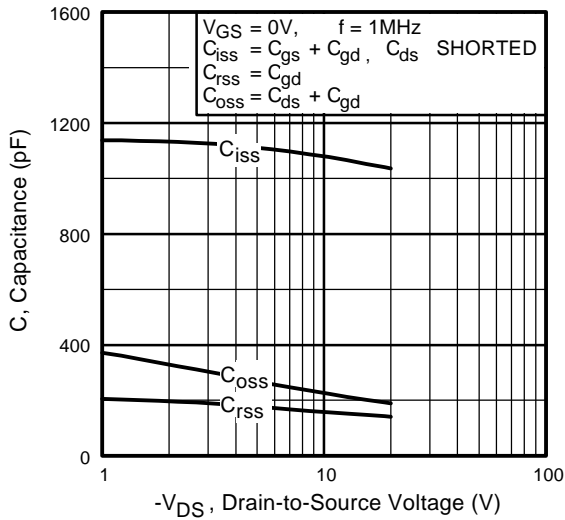


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

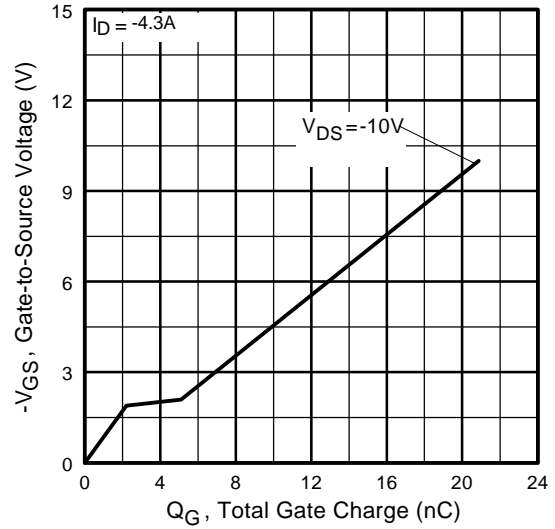


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

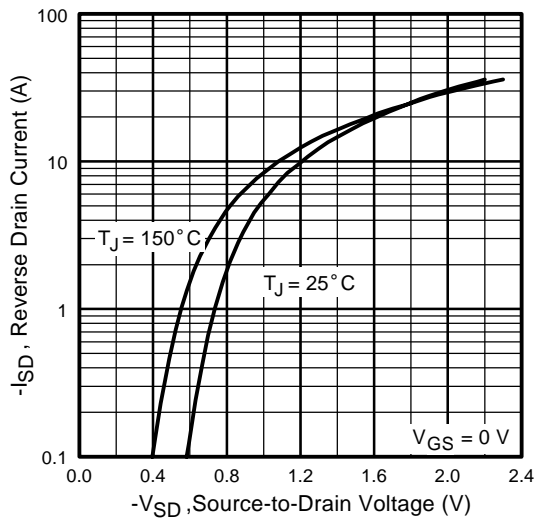


Fig 7. Typical Source-Drain Diode Forward Voltage

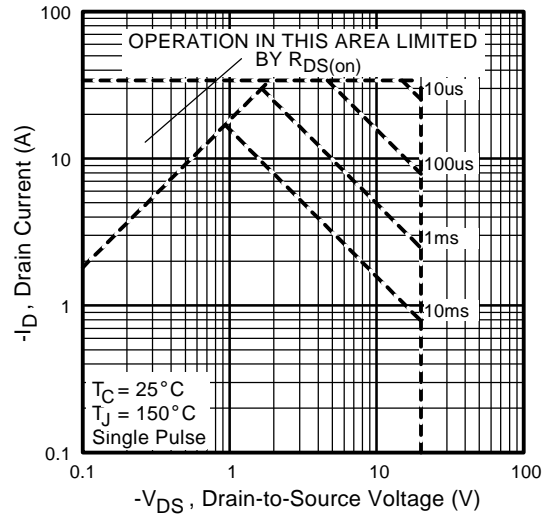


Fig 8. Maximum Safe Operating Area

Power MOSFET Characteristics

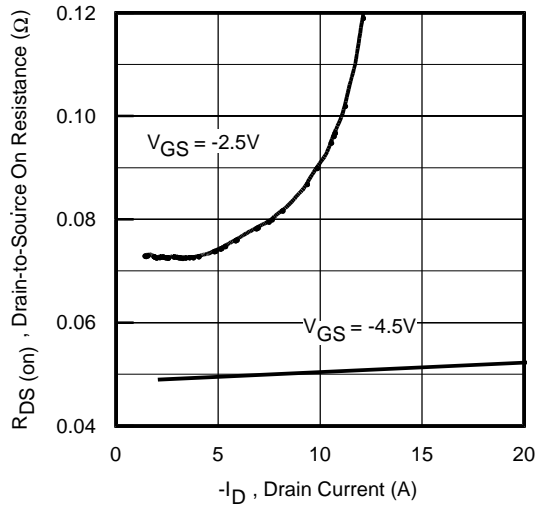


Fig 9. Typical On-Resistance Vs. Drain Current

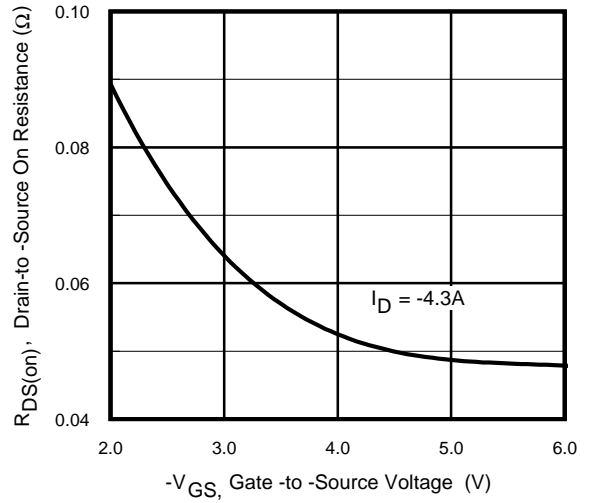


Fig 10. Typical On-Resistance Vs. Gate Voltage

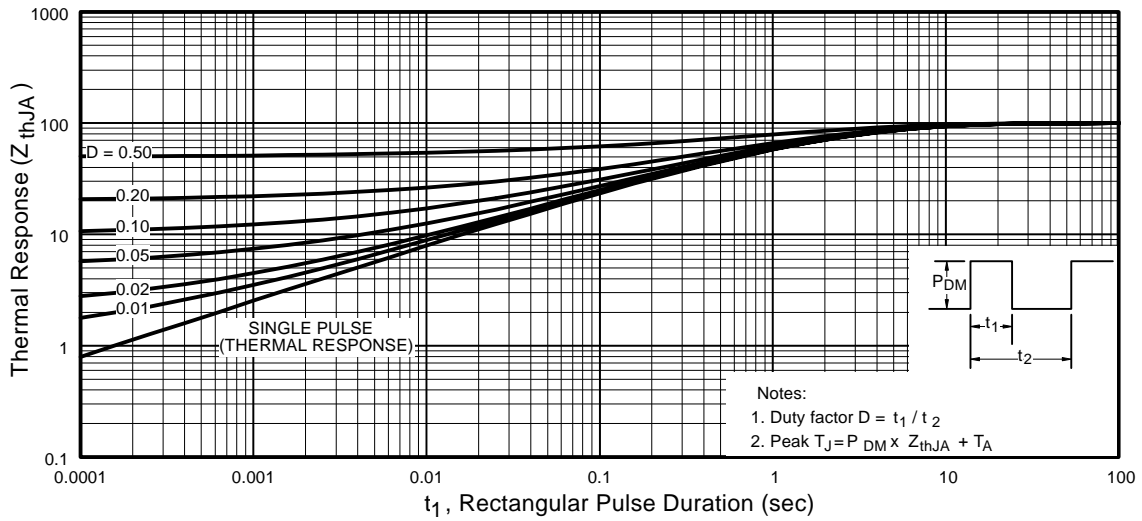


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

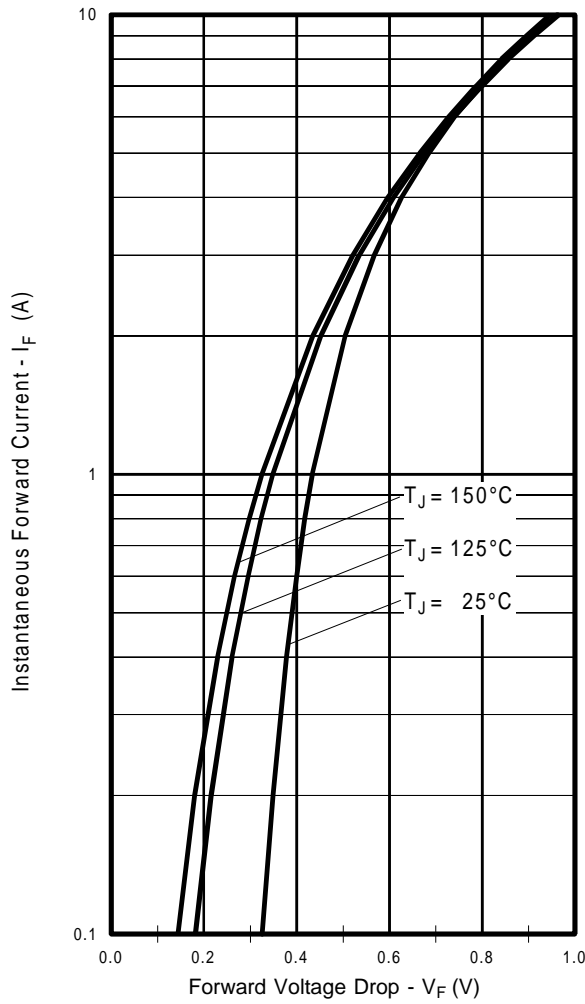


Fig. 12 -Typical Forward Voltage Drop Characteristics

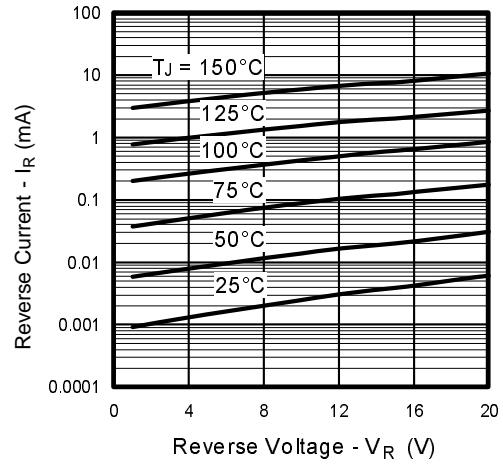


Fig. 13 - Typical Values of Reverse Current Vs. Reverse Voltage

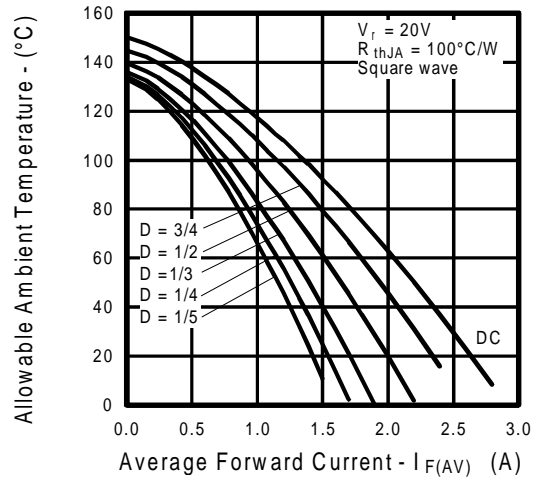
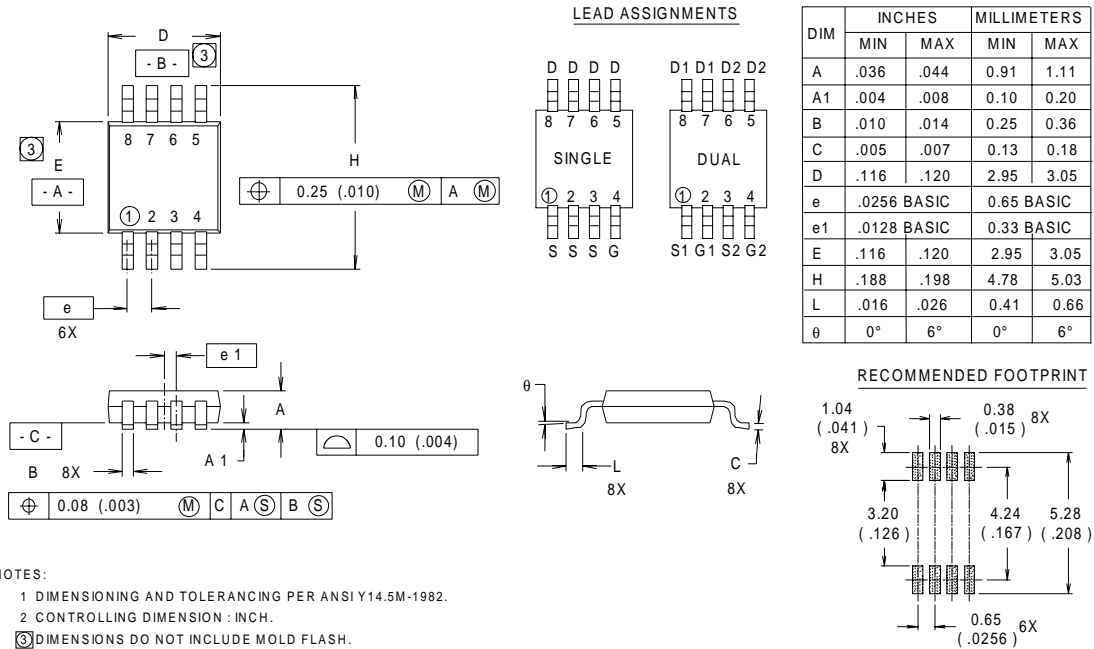


Fig.14 - Maximum Allowable Ambient Temp. Vs. Forward Current

Package Outline

Micro8™ Outline

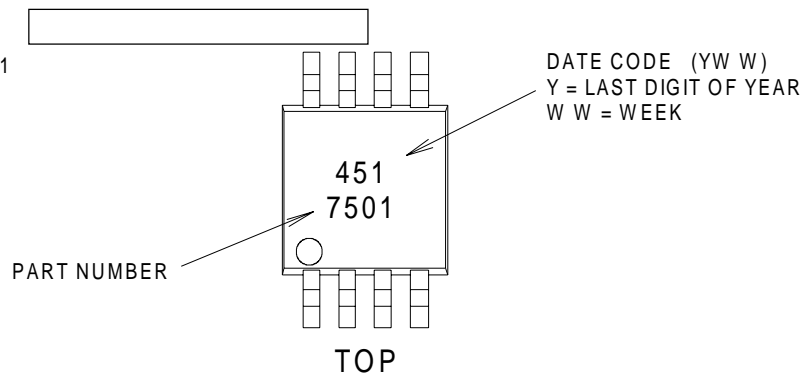
Dimensions are shown in millimeters (inches)



Part Marking Information

Micro8™

EXAMPLE : THIS IS AN IRF7501



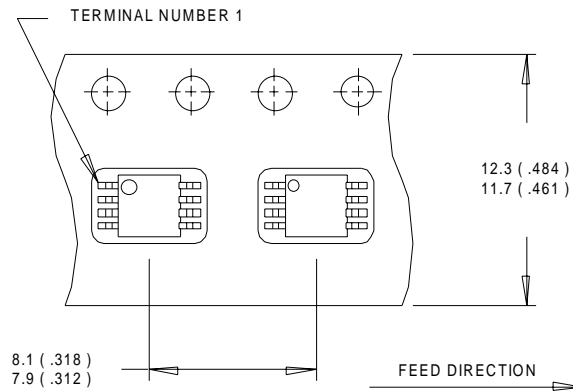
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International
IR Rectifier

Tape & Reel Information

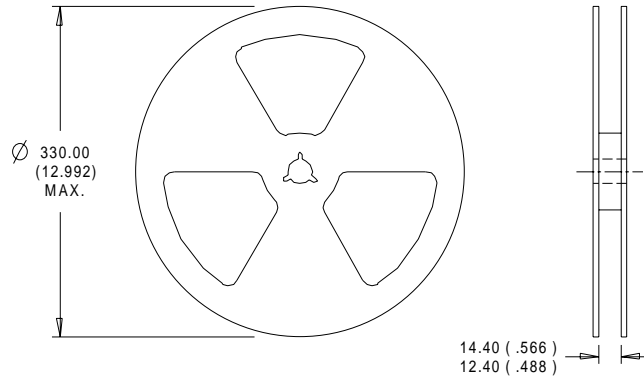
Micro8™

Dimensions are shown in millimeters (inches)



NOTES:

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



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

International
IR Rectifier

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