

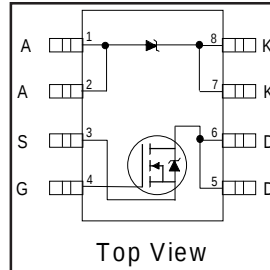
International
IR Rectifier

PRELIMINARY

IRF7521D1

FETKY™ MOSFET / Schottky Diode

- Co-packaged HEXFET® Power MOSFET and Schottky Diode
- N-Channel HEXFET
- Low V_F Schottky Rectifier
- Generation 5 Technology
- Micro8™ Footprint

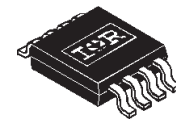


$V_{DS} = 20V$
 $R_{DS(on)} = 0.135\Omega$
 Schottky $V_f = 0.39V$

Description

The **FETKY™** family of co-packaged HEXFETs and Schottky diodes offer the designer an innovative board space saving solution for switching regulator applications. Generation 5 HEXFETs utilize 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 like cell phone, PDA, etc.

The new Micro8™ package, with half the footprint area of the standard SO-8, provides the smallest footprint available in an SOIC outline. This makes the Micro8™ 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 and PCMCIA cards.



Micro8™

Absolute Maximum Ratings ($T_A = 25^\circ C$ unless otherwise noted)

Parameter		Maximum	Units
I_D @ $T_A = 25^\circ C$	Continuous Drain Current, V_{GS} @ 4.5V	2.4	A
I_D @ $T_A = 70^\circ C$		1.9	
I_{DM}	Pulsed Drain Current ①	19	
P_D @ $T_A = 25^\circ C$	Power Dissipation	1.3	W
P_D @ $T_A = 70^\circ C$		0.8	
	Linear Derating Factor	10	mW/°C
V_{GS}	Gate-to-Source Voltage	± 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 Ratings

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

Notes:

- ① Repetitive rating; pulse width limited by maximum junction temperature (see figure 9)
- ② $I_{SD} \leq 1.7A$, $di/dt \leq 66A/\mu s$, $V_{DD} \leq V_{(BR)DSS}$, $T_J \leq 150^\circ C$
- ③ Pulse width $\leq 300\mu s$; duty cycle $\leq 2\%$
- ④ Surface mounted on FR-4 board, $t \leq 10sec$.

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	—	0.085	0.135	Ω	$V_{GS} = 4.5V, I_D = 1.7A$ ③
		—	0.12	0.20		$V_{GS} = 2.7V, I_D = 0.85A$ ③
$V_{GS(th)}$	Gate Threshold Voltage	0.70	—	—	V	$V_{DS} = V_{GS}, I_D = 250\mu A$
g_{fs}	Forward Transconductance	2.6	—	—	S	$V_{DS} = 10V, I_D = 0.85A$
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	—	5.3	8.0	nC	$I_D = 1.7A$
Q_{gs}	Gate-to-Source Charge	—	0.84	1.3		$V_{DS} = 16V$
Q_{gd}	Gate-to-Drain ("Miller") Charge	—	2.2	3.3		$V_{GS} = 4.5V$, See Fig. 6 ③
$t_{d(on)}$	Turn-On Delay Time	—	5.7	—	ns	$V_{DD} = 10V$
t_r	Rise Time	—	24	—		$I_D = 1.7A$
$t_{d(off)}$	Turn-Off Delay Time	—	15	—		$R_G = 6.0\Omega$
t_f	Fall Time	—	16	—		$R_D = 5.7\Omega$, ③
C_{iss}	Input Capacitance	—	260	—	pF	$V_{GS} = 0V$
C_{oss}	Output Capacitance	—	130	—		$V_{DS} = 15V$
C_{rss}	Reverse Transfer Capacitance	—	61	—		$f = 1.0\text{MHz}$, See Fig. 5

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)	—	—	14		
V_{SD}	Body Diode Forward Voltage	—	—	1.2	V	$T_J = 25^\circ\text{C}, I_S = 1.7A, V_{GS} = 0V$
t_{rr}	Reverse Recovery Time (Body Diode)	—	39	59	ns	$T_J = 25^\circ\text{C}, I_F = 1.7A$
Q_{rr}	Reverse Recovery Charge	—	37	56	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, $T_A = 25^\circ\text{C}$
		1.4		See Fig.14 $T_A = 70^\circ\text{C}$
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

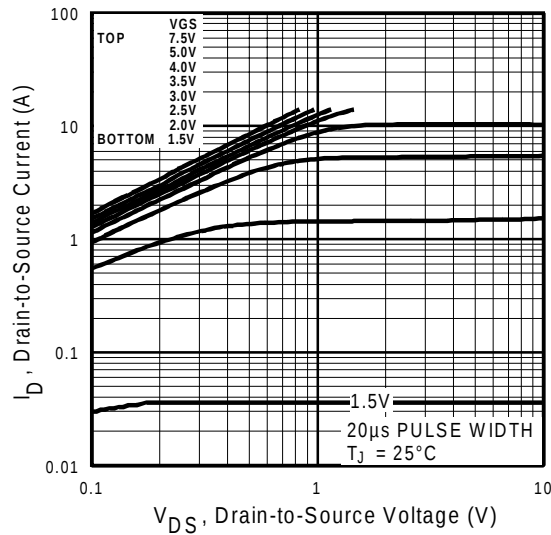


Fig 1. Typical Output Characteristics

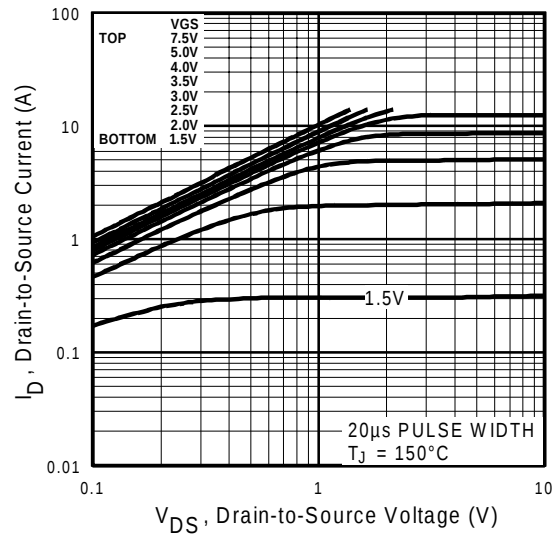


Fig 2. Typical Output Characteristics

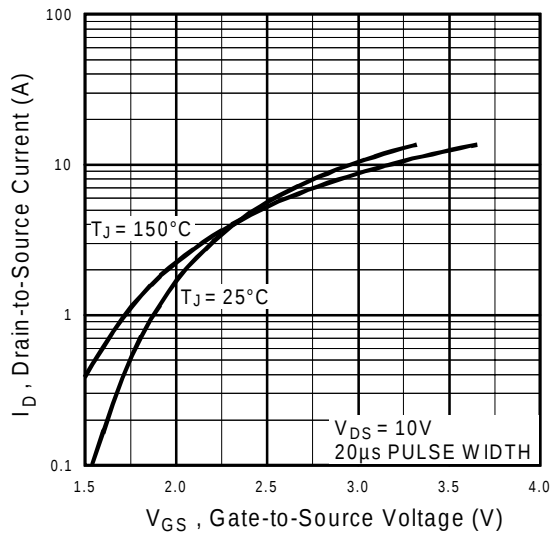


Fig 3. Typical Transfer Characteristics

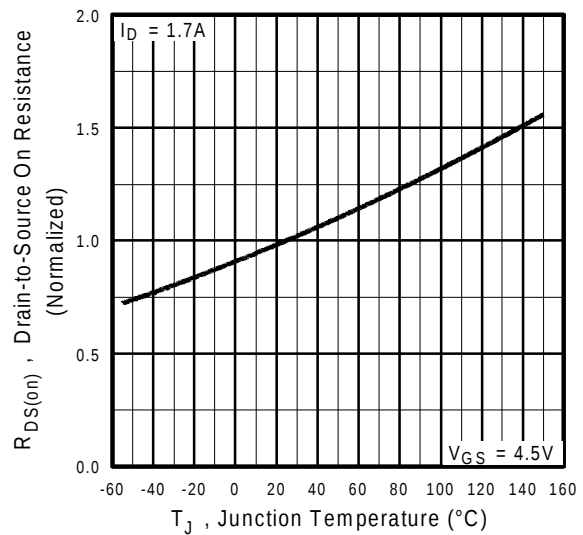


Fig 4. Normalized On-Resistance Vs. Temperature

Power Mosfet Characteristics

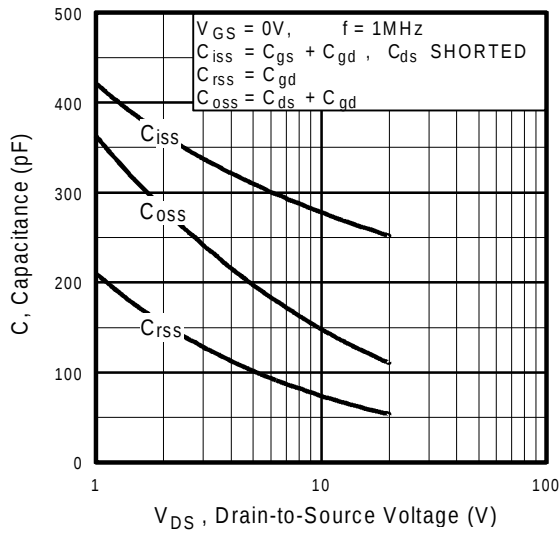


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

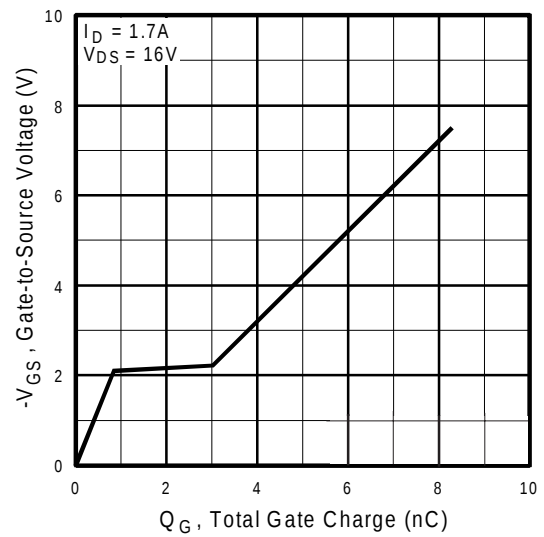


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

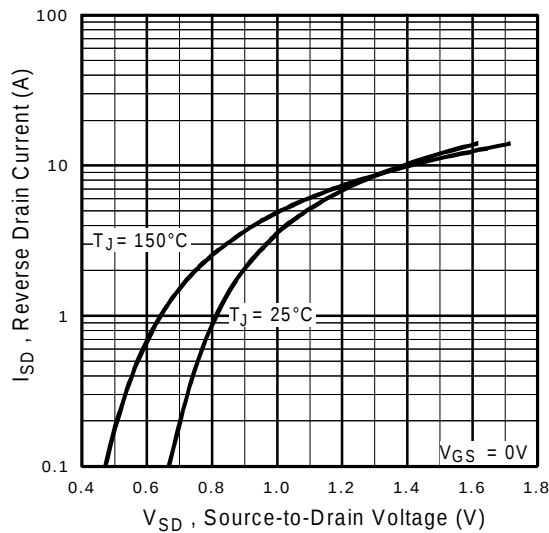


Fig 7. Typical Source-Drain Diode Forward Voltage

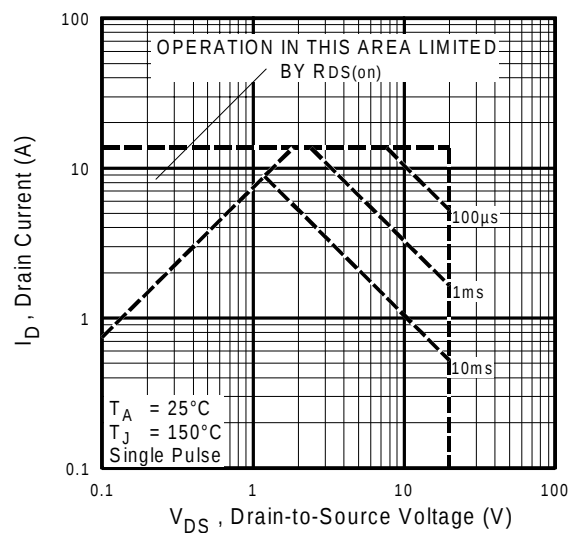


Fig 8. Maximum Safe Operating Area

Power Mosfet Characteristics

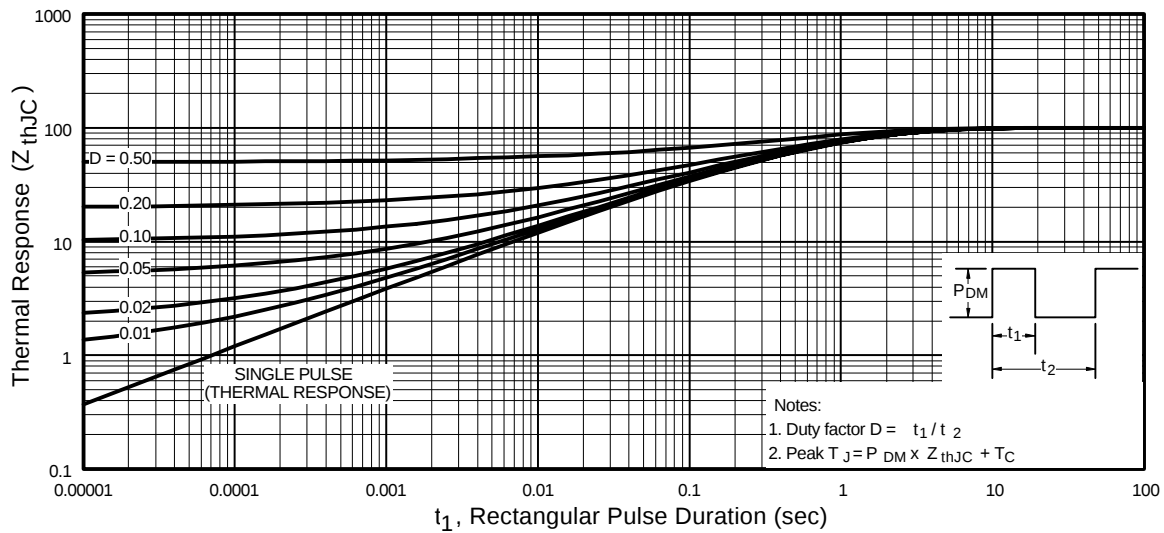


Fig 9. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

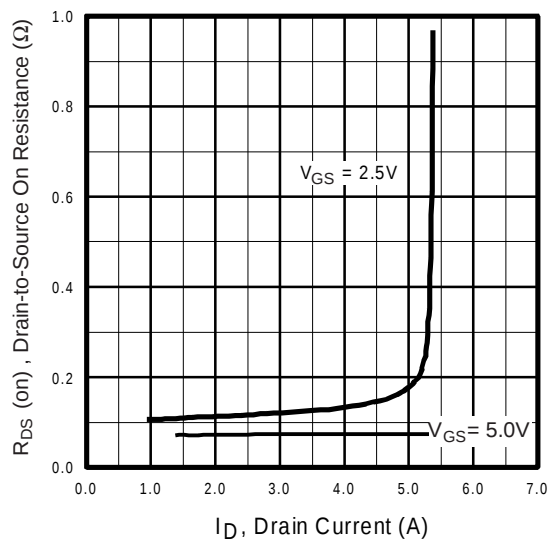


Fig 10. Typical On-Resistance Vs. Drain Current

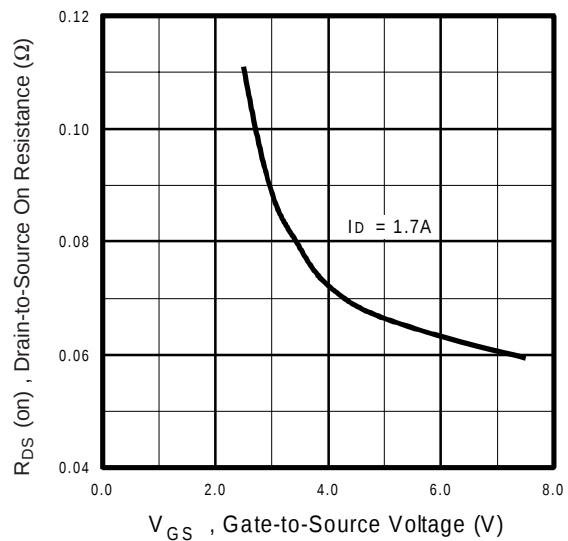


Fig 11. Typical On-Resistance Vs. Gate Voltage

Schottky Diode Characteristics

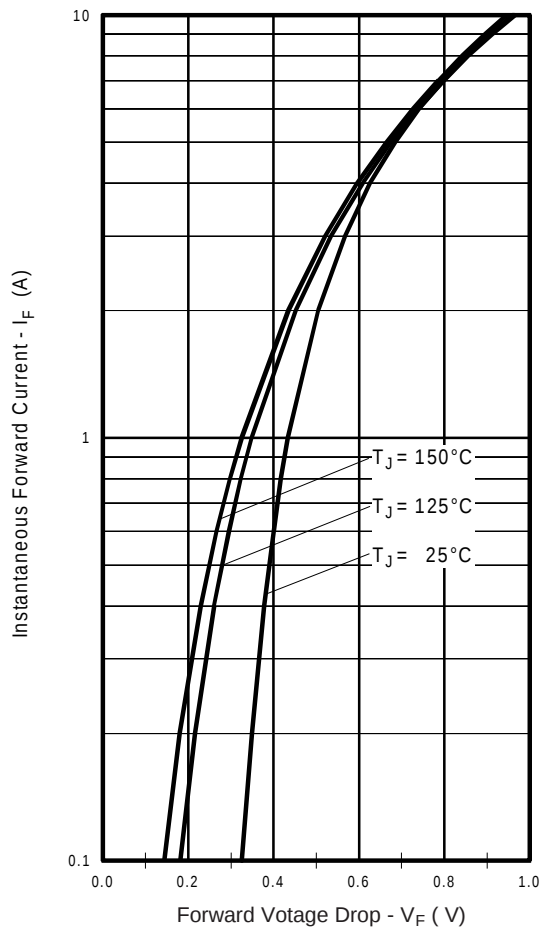


Fig. 12 -Typical Forward Voltage Drop Characteristics

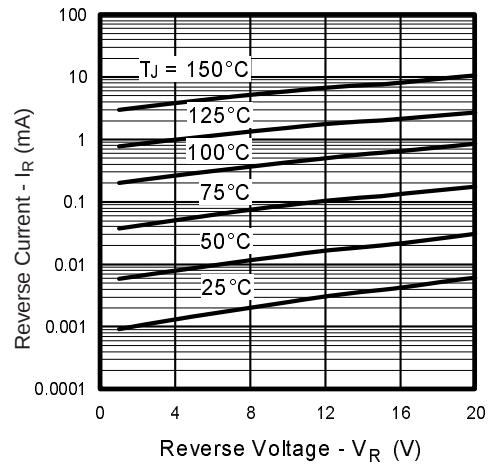


Fig. 13 - Typical Values of Reverse Current Vs. Reverse Voltage

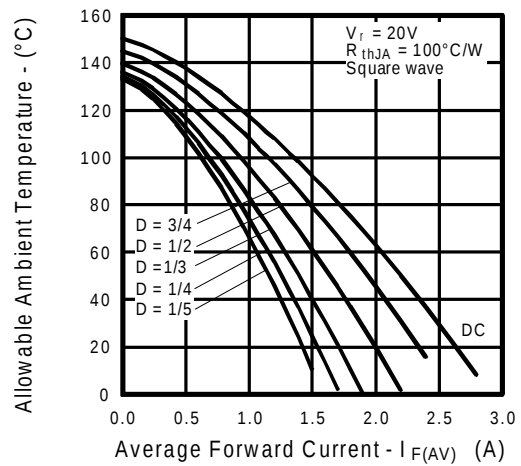
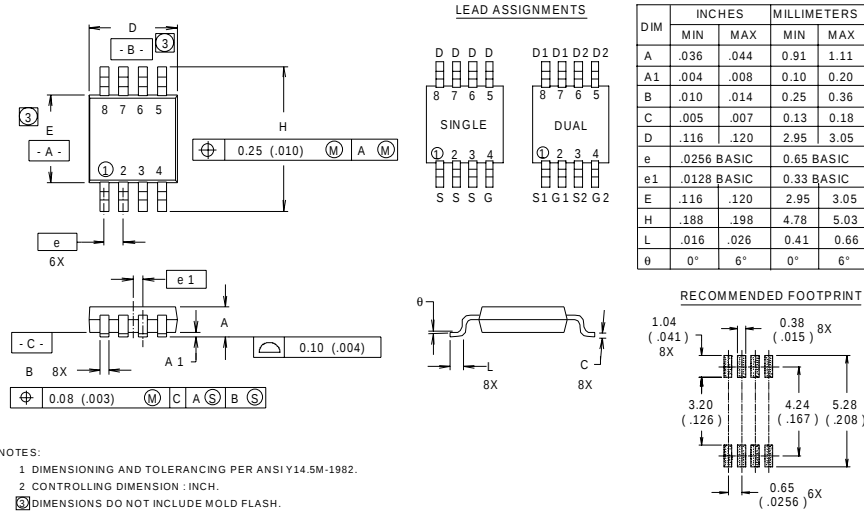


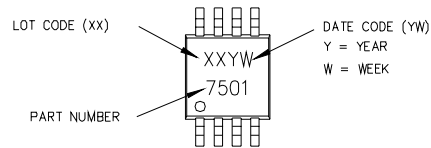
Fig.14 - Maximum Allowable Ambient Temp. Vs. Forward Current

Micro8™ Package Details



Part Marking

EXAMPLE: THIS IS AN IRF7501



WW = (1-26) IF PRECEDED BY LAST DIGIT OF CALENDAR YEAR

DATE CODE EXAMPLES:

YWW = 9503 = 5C
YWW = 9532 = EF

YEAR	Y	WORK WEEK	W
2001	1	01	A
2002	2	02	B
2003	3	03	C
1994	4	04	D
1995	5		
1996	6		
1997	7		
1998	8		
1999	9		
2000	0	24	X
		25	Y
		26	Z

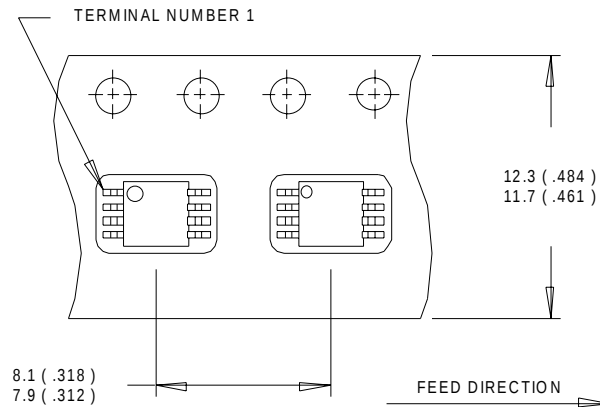
WW = (27-52) IF PRECEDED BY A LETTER

YEAR	Y	WORK WEEK	W
2001	A	27	A
2002	B	28	B
2003	C	29	C
1994	D	30	D
1995	E		
1996	F		
1997	G		
1998	H		
1999	J		
2000	K	50	X
		51	Y
		52	Z

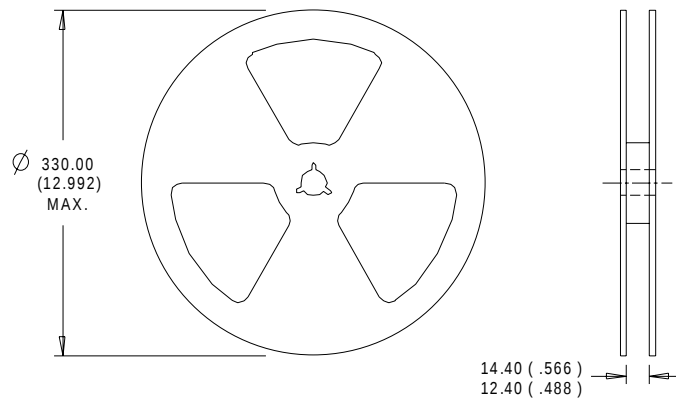
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Micro8™ Tape & Reel



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



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<http://www.irf.com/> Data and specifications subject to change without notice . 01/99

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