

IRF7503PbF

HEXFET® Power MOSFET

- Generation V Technology
- Ultra Low On-Resistance
- Dual N-Channel MOSFET
- Very Small SOIC Package
- Low Profile (<1.1mm)
- Available in Tape & Reel
- Fast Switching
- Lead-Free

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.

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.

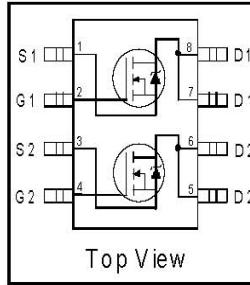
Absolute Maximum Ratings

	Parameter	Max.	Units
$I_D @ T_A = 25^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10\text{V}$	2.4	A
$I_D @ T_A = 70^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10\text{V}$	1.9	
I_{DM}	Pulsed Drain Current ①	14	
$P_D @ T_A = 25^\circ\text{C}$	Power Dissipation	1.25	W
	Linear Derating Factor	10	mW/°C
V_{GS}	Gate-to-Source Voltage	± 20	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

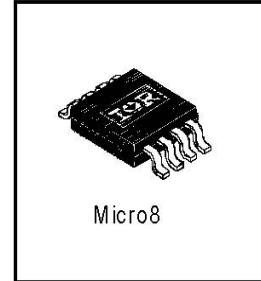
Thermal Resistance

	Parameter	Typ.	Max.	Units
R_{GA}	Maximum Junction-to-Ambient ④	—	100	°C/W

All Micro8 Data Sheets reflect improved Thermal Resistance, Power and Current -Handling Ratings- effective only for product marked with Date Code 505 or later.



$V_{DSS} = 30\text{V}$
 $R_{DS(on)} = 0.135\Omega$



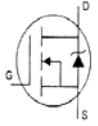
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Electrical Characteristics @ $T_J = 25^\circ\text{C}$ (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(\text{BR})\text{DSS}}$	Drain-to-Source Breakdown Voltage	30	—	—	V	$V_{\text{GS}} = 0\text{V}$, $I_D = 250\mu\text{A}$
$\Delta V_{(\text{BR})\text{DSS}/\Delta T_J}$	Breakdown Voltage Temp. Coefficient	—	0.059	—	V/ $^\circ\text{C}$	Reference to 25°C , $I_D = 1\text{mA}$
$R_{\text{DS}(\text{on})}$	Static Drain-to-Source On-Resistance	—	—	0.135	Ω	$V_{\text{GS}} = 10\text{V}$, $I_D = 1.7\text{A}$ ③
		—	—	0.222		$V_{\text{GS}} = 4.5\text{V}$, $I_D = 0.85\text{A}$ ③
$V_{\text{GS}(\text{th})}$	Gate Threshold Voltage	1.0	—	—	V	$V_{\text{DS}} = V_{\text{GS}}$, $I_D = 250\mu\text{A}$
g_{fs}	Forward Transconductance	1.9	—	—	S	$V_{\text{DS}} = 10\text{V}$, $I_D = 0.85\text{A}$
I_{DSS}	Drain-to-Source Leakage Current	—	—	1.0	μA	$V_{\text{DS}} = 24\text{V}$, $V_{\text{GS}} = 0\text{V}$
		—	—	25		$V_{\text{DS}} = 24\text{V}$, $V_{\text{GS}} = 0\text{V}$, $T_J = 125^\circ\text{C}$
I_{GSS}	Gate-to-Source Forward Leakage	—	—	-100	nA	$V_{\text{GS}} = -20\text{V}$
	Gate-to-Source Reverse Leakage	—	—	100		$V_{\text{GS}} = 20\text{V}$
Q_g	Total Gate Charge	—	7.8	12	nC	$I_D = 1.7\text{A}$
Q_{gs}	Gate-to-Source Charge	—	1.2	1.8		$V_{\text{DS}} = 24\text{V}$
Q_{gd}	Gate-to-Drain ("Miller") Charge	—	2.5	3.8		$V_{\text{GS}} = 10\text{V}$, See Fig. 6 and 9 ③
$t_{\text{d}(\text{on})}$	Turn-On Delay Time	—	4.7	—	ns	$V_{\text{DD}} = 15\text{V}$
t_r	Rise Time	—	10	—		$I_D = 1.7\text{A}$
$t_{\text{d}(\text{off})}$	Turn-Off Delay Time	—	12	—		$R_G = 6.1\Omega$
t_f	Fall Time	—	5.3	—		$R_D = 8.7\Omega$, See Fig. 10 ③
C_{iss}	Input Capacitance	—	210	—	pF	$V_{\text{GS}} = 0\text{V}$
C_{oss}	Output Capacitance	—	80	—		$V_{\text{DS}} = 25\text{V}$
C_{rss}	Reverse Transfer Capacitance	—	32	—		$f = 1.0\text{MHz}$, See Fig. 5

Source-Drain Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	1.25	A	MOSFET symbol showing the integral reverse p-n junction diode.
I_{SM}	Pulsed Source Current (Body Diode) ①	—	—	14		
V_{SD}	Diode Forward Voltage	—	—	1.2	V	$T_J = 25^\circ\text{C}$, $I_S = 1.7\text{A}$, $V_{\text{GS}} = 0\text{V}$ ③
t_{rr}	Reverse Recovery Time	—	40	60	ns	$T_J = 25^\circ\text{C}$, $I_F = 1.7\text{A}$
Q_{rr}	Reverse Recovery Charge	—	48	72	nC	$di/dt = 100\text{A}/\mu\text{s}$ ③

Notes:

① Repetitive rating; pulse width limited by max. junction temperature. (See fig. 11)

③ Pulse width $\leq 300\mu\text{s}$; duty cycle $\leq 2\%$.

② $I_{\text{SD}} \leq 1.7\text{A}$, $di/dt \leq 120\text{A}/\mu\text{s}$, $V_{\text{DD}} \leq V_{(\text{BR})\text{DSS}}$, $T_J \leq 150^\circ\text{C}$

④ Surface mounted on FR-4 board, $t \leq 10\text{sec}$.

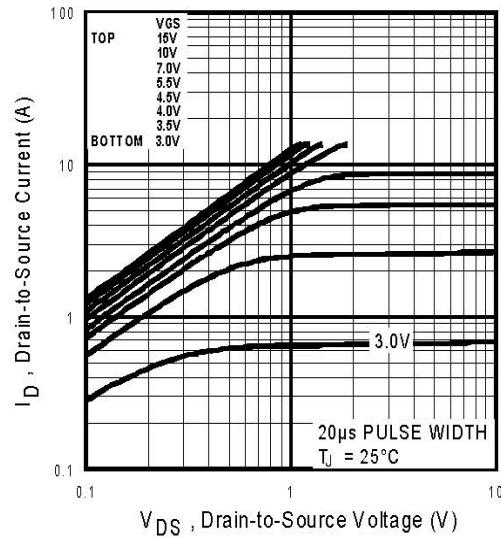


Fig 1. Typical Output Characteristics

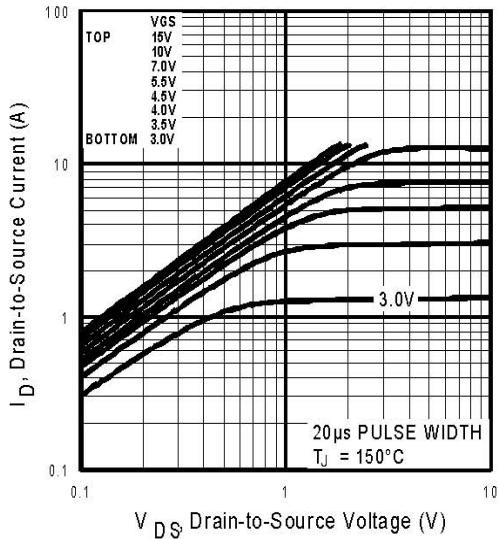


Fig 2. Typical Output Characteristics

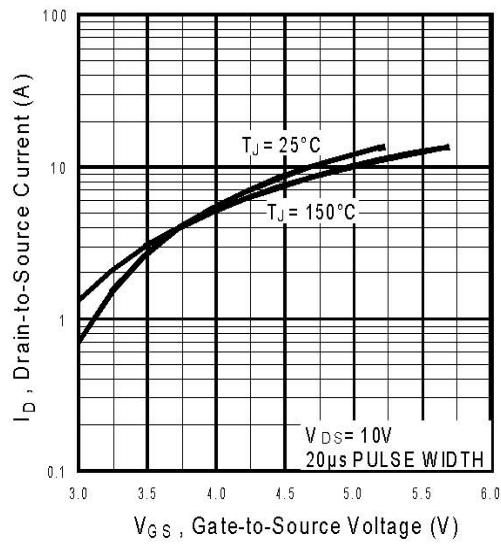


Fig 3. Typical Transfer Characteristics

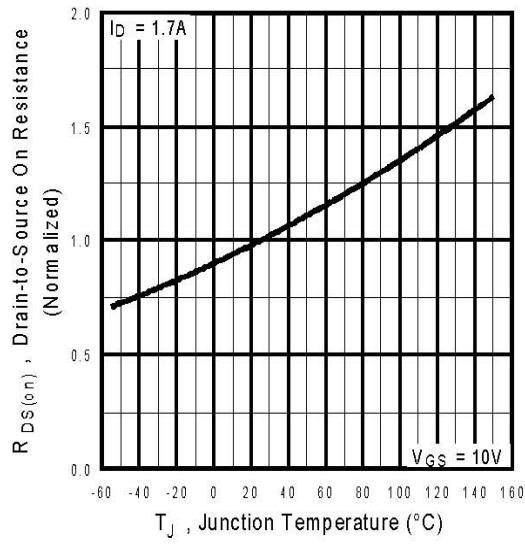


Fig 4. Normalized On-Resistance
 Vs. Temperature

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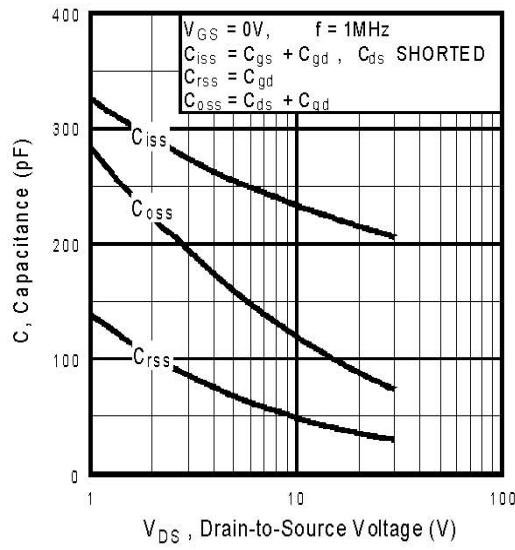


Fig 5. Typical Capacitance Vs.
Drain-to-Source Voltage

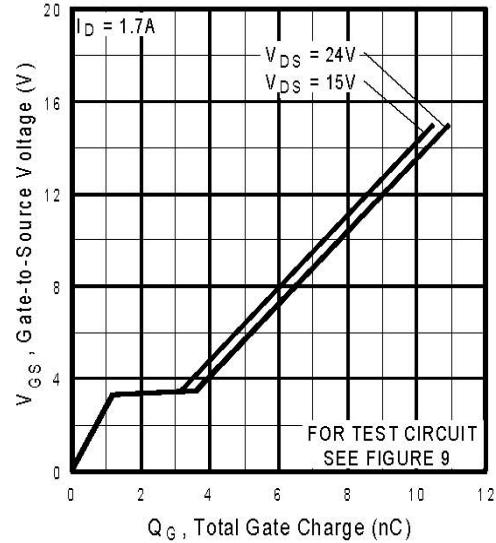


Fig 6. Typical Gate Charge Vs.
Gate-to-Source Voltage

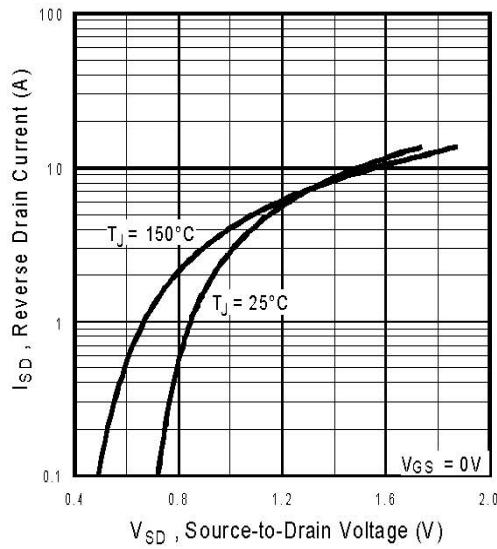


Fig 7. Typical Source-Drain Diode
Forward Voltage

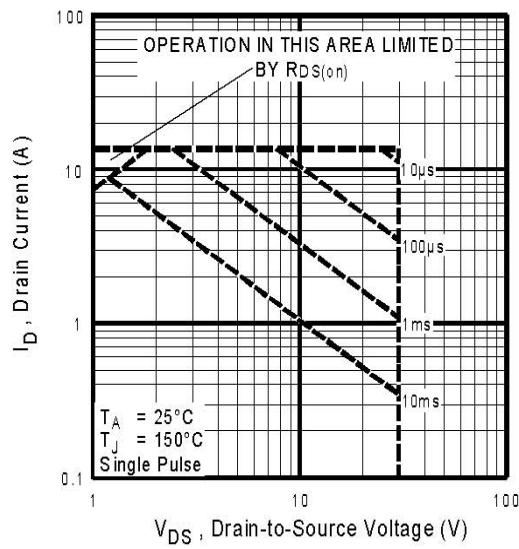


Fig 8. Maximum Safe Operating Area

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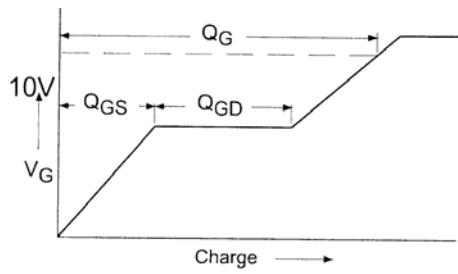


Fig 9a. Basic Gate Charge Waveform

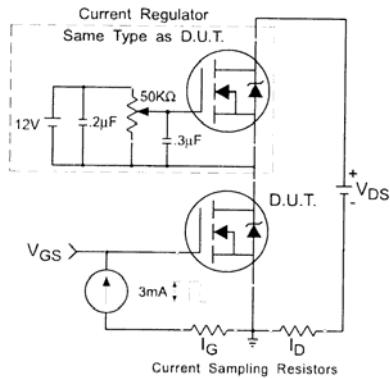


Fig 9b. Gate Charge Test Circuit

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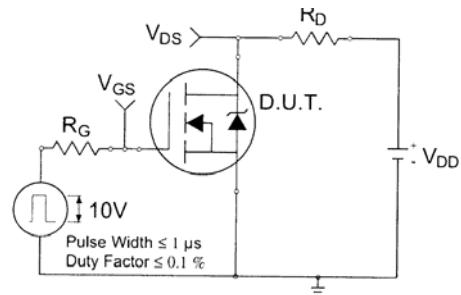


Fig 10a. Switching Time Test Circuit

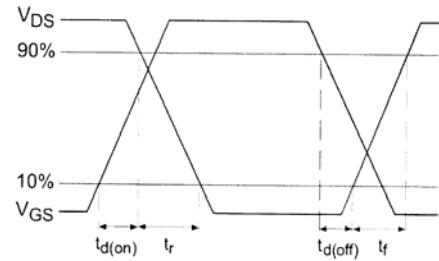


Fig 10b. Switching Time Waveforms

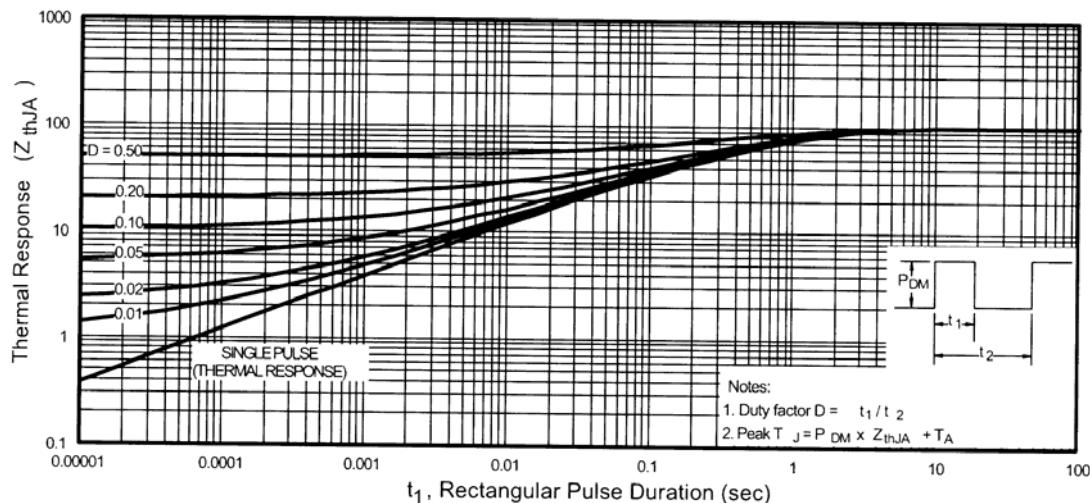


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

Peak Diode Recovery dv/dt Test Circuit

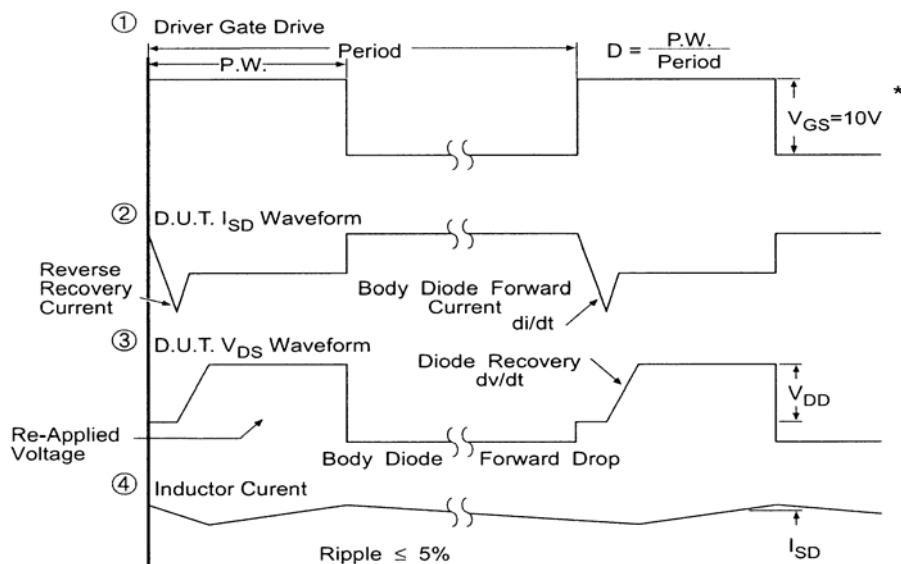
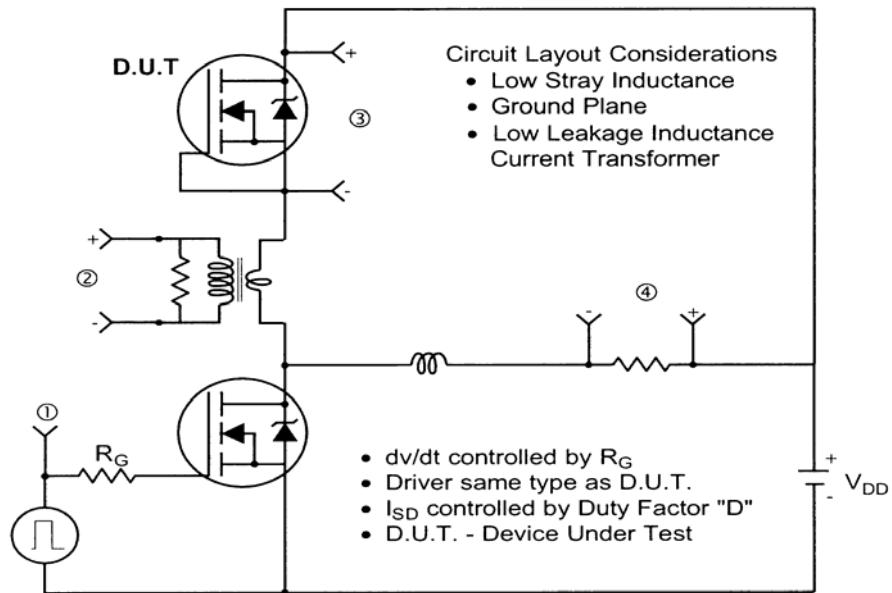
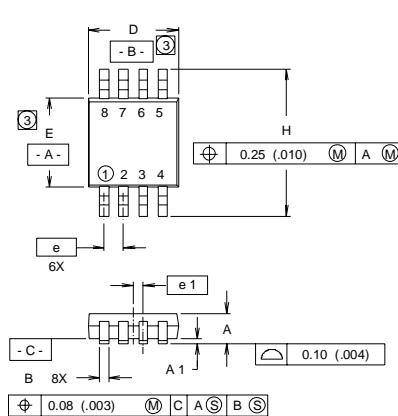


Fig 12. For N-Channel HEXFETS

Micro8 Package Outline

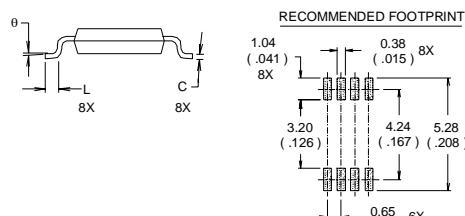
Dimensions are shown in millimeters (inches)



LEAD ASSIGNMENTS			
D	D	D	D
8	7	6	5
①	2	3	4
S	S	S	G

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.036	.044	0.91	1.11
A1	.004	.008	0.10	0.20
B	.010	.014	0.25	0.36
C	.005	.007	0.13	0.18
D	.116	.120	2.95	3.05
e	.0256 BASIC		0.65 BASIC	
e1	.0128 BASIC		0.33 BASIC	
E	.116	.120	2.95	3.05
H	.188	.198	4.78	5.03
L	.016	.026	0.41	0.66
θ	0°	6°	0°	6°

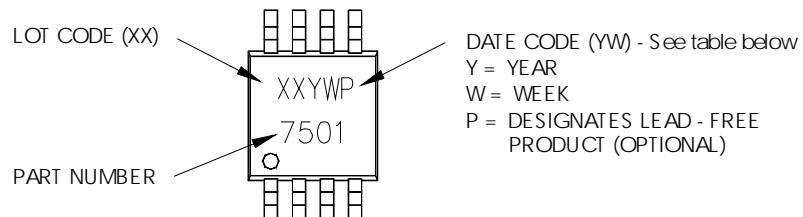
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NOTES:
 1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M-1982.
 2. CONTROLLING DIMENSION: INCH.
 3. DIMENSIONS DO NOT INCLUDE MOLD FLASH.

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

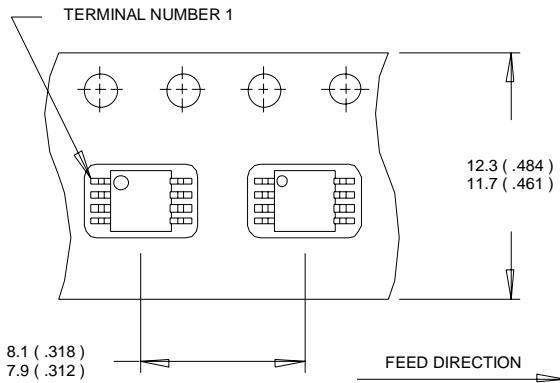
YEAR	Y	WORK WEEK	W
2001	A	27	A
2002	B	28	B
2003	C	29	C
2004	D	30	D
2005	E		
2006	F		
2007	G		
2008	H		
2009	J		
2010	K	50	X
		51	Y
		52	Z

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Micro8 Tape & Reel Information

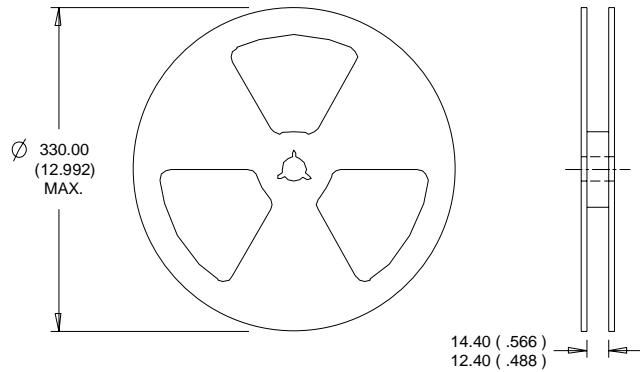
Dimensions are shown in millimeters (inches)

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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.
Qualifications Standards can be found on IR's Web site.

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