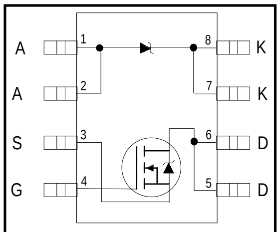
International
IOR Rectifier

IRF7523D1

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



Top View

V_{DSS} = 30V

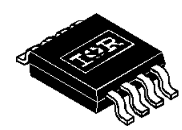
$R_{DS(on)}$ = 0.11Ω

Schottky Vf = 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°C unless otherwise noted)

Parameter		Maximum	Units
I_D @ T_A = 25°C	Continuous Drain Current, V_{GS}@10V ④	2.7	A
I_D @ T_A = 70°C		2.1	
I_{DM}	Pulsed Drain Current ①	21	
P_D @T_A = 25°C	Power Dissipation ④	1.25	W
P_D @T_A = 70°C		0.8	
	Linear Derating Factor	10	W/°C
V_{GS}	Gate-to-Source Voltage	± 20	V
dv/dt	Peak Diode Recovery dv/dt ②	6.2	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 11)

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

③ Pulse width ≤ 300µs; duty cycle ≤ 2%

④ When mounted on 1 inch square copper board to approximate typical multi-layer PCB thermal resistance

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MOSFET Electrical Characteristics @ T_J = 25°C (unless otherwise specified)

Parameter		Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	30	—	—	V	V_{GS} = 0V, I_D = 250µA
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	0.090	0.130	Ω	V_{GS} = 10V, I_D = 1.7A ③
		—	0.140	0.190		V_{GS} = 4.5V, I_D = 0.85A ③
$V_{GS(th)}$	Gate Threshold Voltage	1.0	—	—	V	V_{DS} = V_{GS}, I_D = 250µA
g_{fs}	Forward Transconductance	1.9	—	—	S	V_{DS} = 10V, I_D = 0.85A
I_{DSS}	Drain-to-Source Leakage Current	—	—	1.0	µA	V_{DS} = 24V, V_{GS} = 0V
		—	—	25		V_{DS} = 24V, V_{GS} = 0V, T_J = 125°C
I_{GSS}	Gate-to-Source Forward Leakage	—	—	-100	nA	V_{GS} = -20V
	Gate-to-Source Reverse Leakage	—	—	100		V_{GS} = 20V
Q_g	Total Gate Charge	—	7.8	12	nC	I_D = 1.7A
Q_{gs}	Gate-to-Source Charge	—	1.2	1.8		V_{DS} = 24V
Q_{gd}	Gate-to-Drain ("Miller") Charge	—	2.5	3.8		V_{GS} = 10V (see figure 6) ③
$t_{d(on)}$	Turn-On Delay Time	—	4.7	—	ns	V_{DD} = 15V
t_r	Rise Time	—	10	—		I_D = 1.7A
$t_{d(off)}$	Turn-Off Delay Time	—	12	—		R_G = 6.1Ω
t_f	Fall Time	—	5.3	—		R_D = 8.7Ω ③
C_{iss}	Input Capacitance	—	210	—	pF	V_{GS} = 0V
C_{oss}	Output Capacitance	—	80	—		V_{DS} = 25V
C_{rss}	Reverse Transfer Capacitance	—	32	—		f = 1.0MHz (see figure 5)

MOSFET Source-Drain Ratings and Characteristics

Parameter		Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	1.25	A	
I_{SM}	Pulsed Source Current (Body Diode)	—	—	21		
V_{SD}	Body Diode Forward Voltage	—	—	1.2	V	T_J = 25°C, I_S = 1.7A, V_{GS} = 0V
t_{rr}	Reverse Recovery Time (Body Diode)	—	40	60	ns	T_J = 25°C, I_F = 1.7A
Q_{rr}	Reverse Recovery Charge	—	48	72	nC	di/dt = 100A/µs 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°C	
		1.3		See Fig.14 T_A = 70°C	
I_{SM}	Max. peak one cycle Non-repetitive Surge current	120	A	5µs sine or 3µs Rect. pulse	Following any rated load condition & with V_{RRM} applied
		11		10ms sine or 6ms Rect. pulse	

Schottky Diode Electrical Specifications

	Parameter	Max.	Units	Conditions	
V_{FM}	Max. Forward voltage drop	0.50	V	I_F = 1.0A, T_J = 25°C	
		0.62		I_F = 2.0A, T_J = 25°C	
		0.39		I_F = 1.0A, T_J = 125°C	
		0.57		I_F = 2.0A, T_J = 125°C .	
I_{RM}	Max. Reverse Leakage current	0.06	mA	V_R = 30V	T_J = 25°C
		16			T_J = 125°C
C_t	Max. Junction Capacitance	92	pF	V_R = 5Vdc (100kHz to 1 MHz) 25°C	
dv/dt	Max. Voltage Rate of Charge	3600	V/ µs	Rated V_R	

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Power Mosfet Characteristics

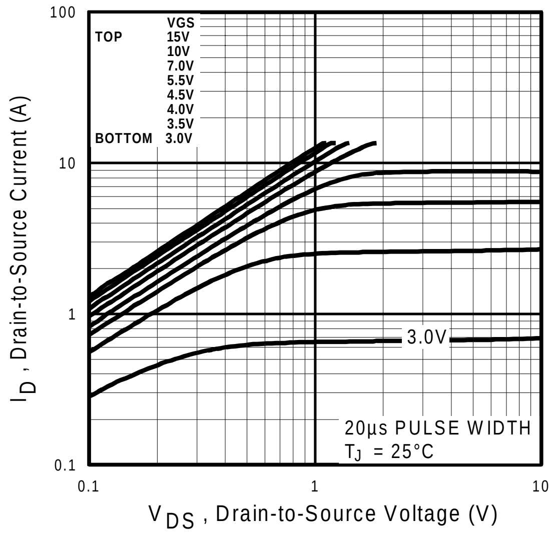

Fig 1. Typical Output Characteristics

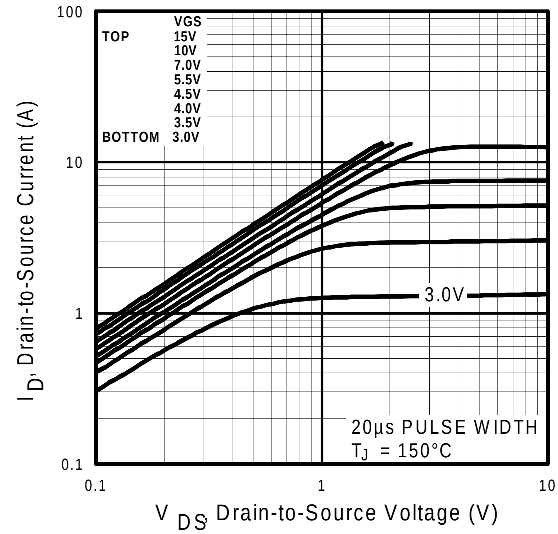

Fig 2. Typical Output Characteristics

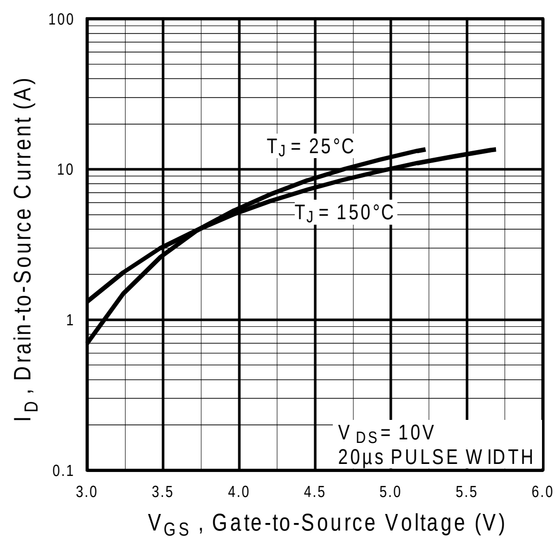

Fig 3. Typical Transfer Characteristics

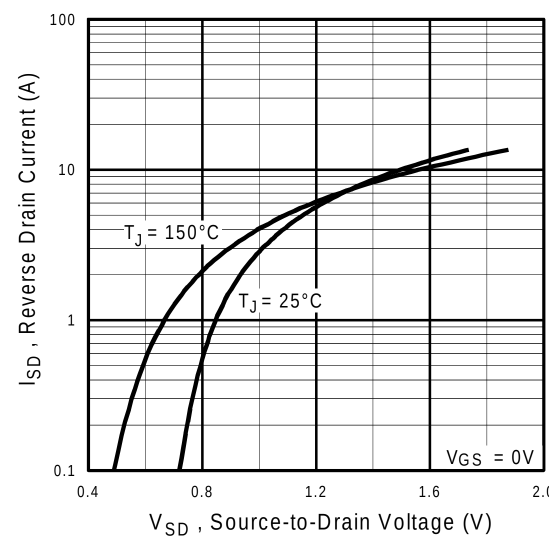

Fig 4. Typical Source-Drain Diode Forward Voltage

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Power Mosfet Characteristics

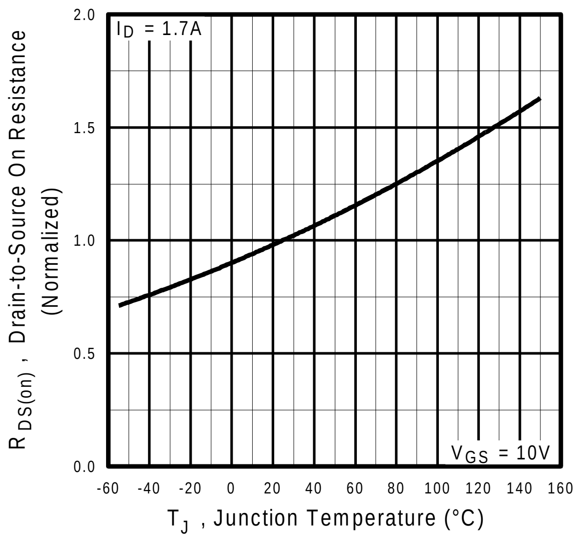

Fig 5. Normalized On-Resistance Vs. Temperature

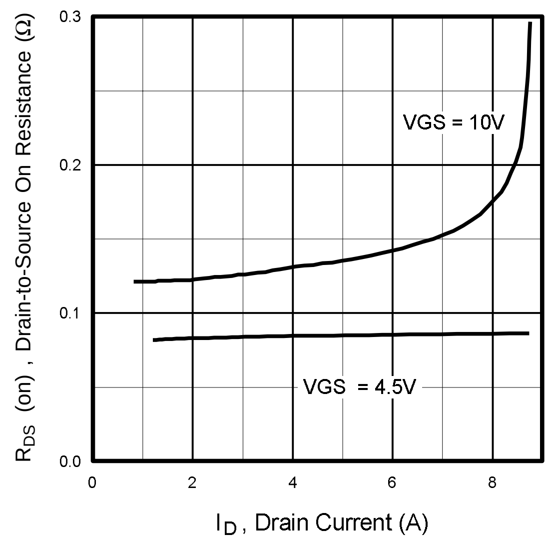

Fig 6. Typical On-Resistance Vs. Drain Current

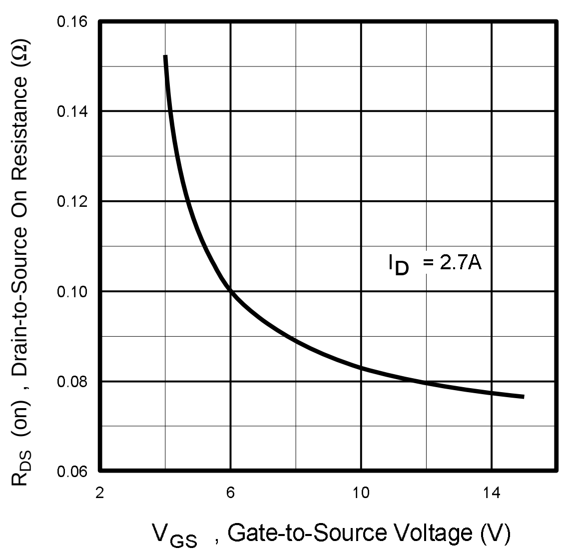

Fig 7. Typical On-Resistance Vs. Gate Voltage

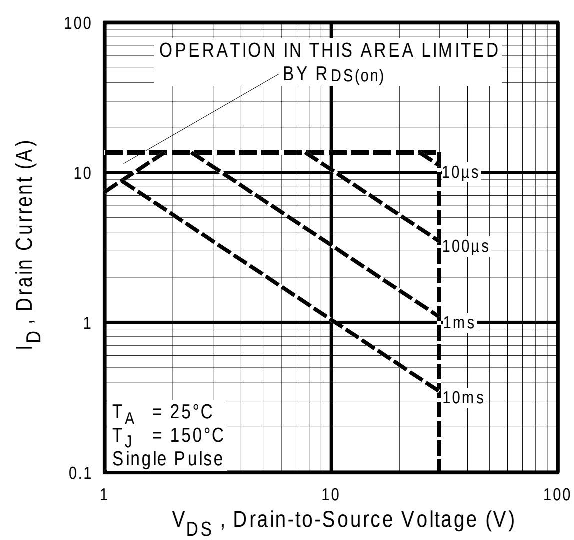

Fig 8. Maximum Safe Operating Area

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Power Mosfet Characteristics

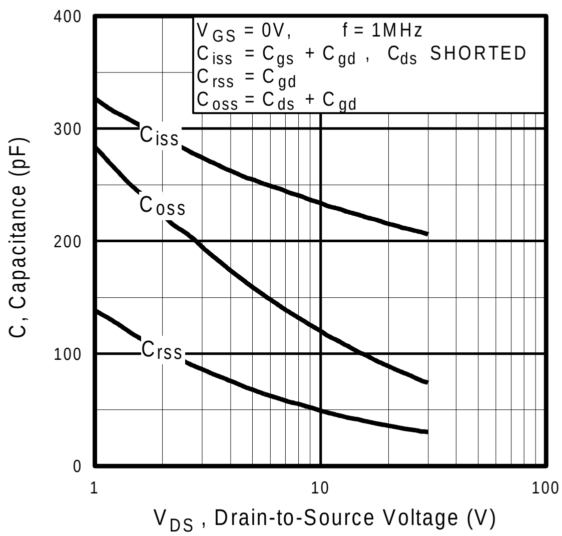

Fig 9. Typical Capacitance Vs. Drain-to-Source Voltage

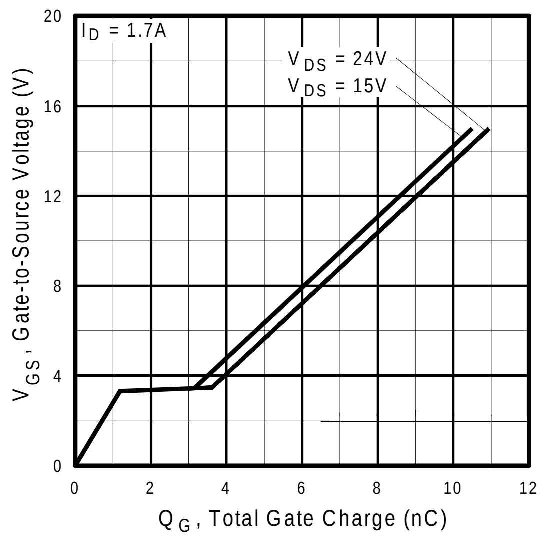

Fig 10. Typical Gate Charge Vs. Gate-to-Source Voltage

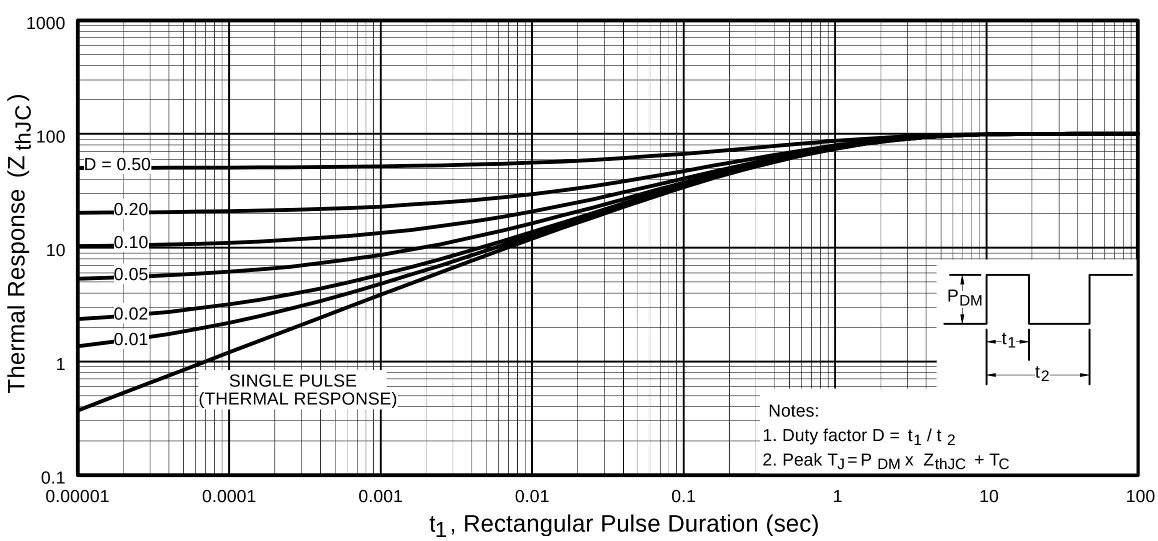

Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

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Schottky Diode Characteristics

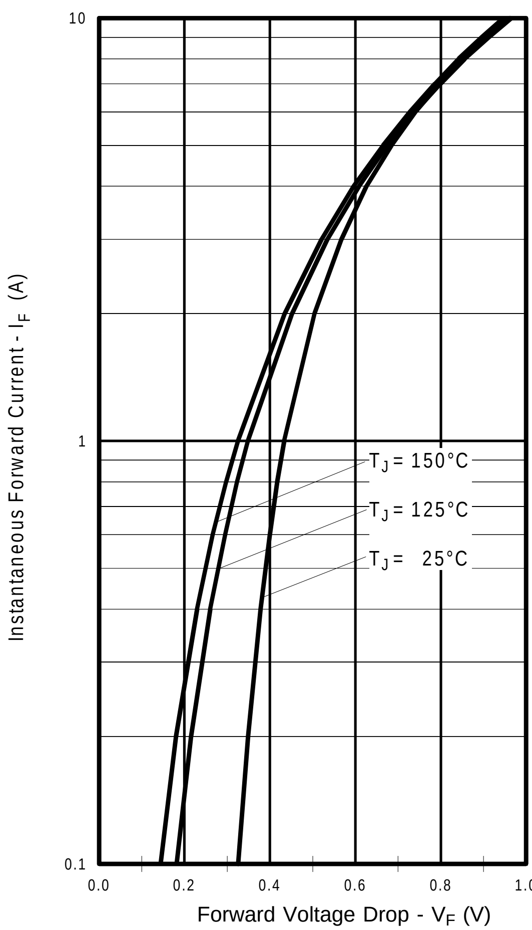

Fig. 12 -Typical Forward Voltage Drop Characteristics

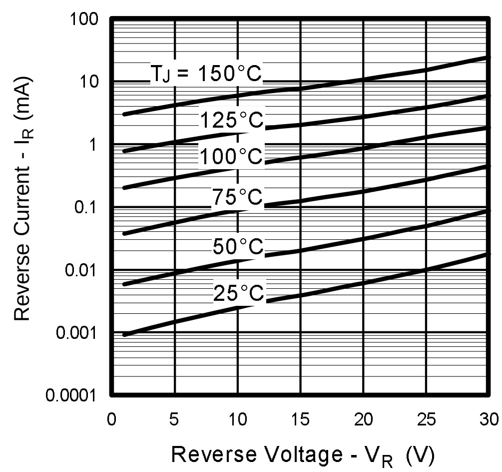

Fig. 13 - Typical Values of Reverse Current Vs. Reverse Voltage

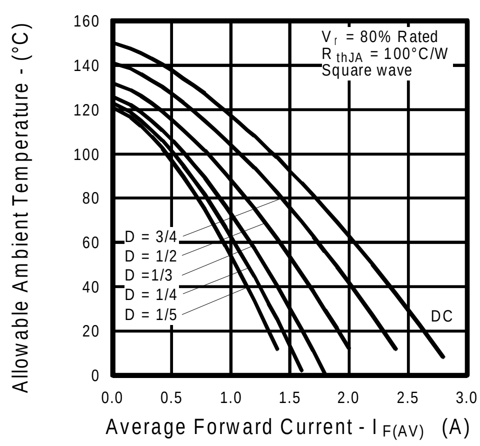

Fig.14 - Maximum Allowable Ambient Temp. Vs. Forward Current

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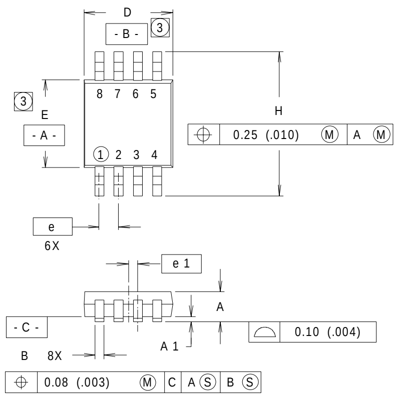
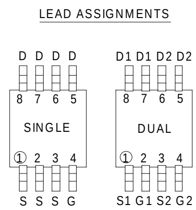
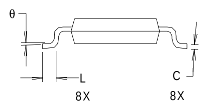
Micro8™ Package Details

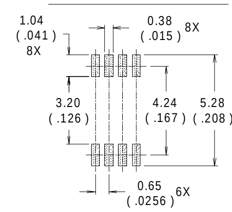




DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.036	.044	0.91	1.11
A1	.004	.008	0.10	0.20
B	.010	.014	0.25	0.36
C	.005	.007	0.13	0.18
D	.116	.120	2.95	3.05
e	.0256 BASIC		0.65 BASIC	
e1	.0128 BASIC		0.33 BASIC	
E	.116	.120	2.95	3.05
H	.188	.198	4.78	5.03
L	.016	.026	0.41	0.66
θ	0°	6°	0°	6°



RECOMMENDED FOOTPRINT



NOTES:

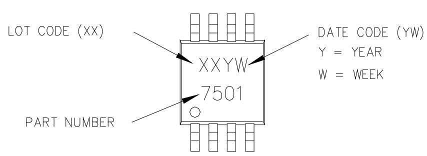
1 DIMENSIONING AND TOLERANCING PER ANSI Y14.5M-1982.

2 CONTROLLING DIMENSION : INCH.

3 DIMENSIONS DO NOT INCLUDE MOLD FLASH.

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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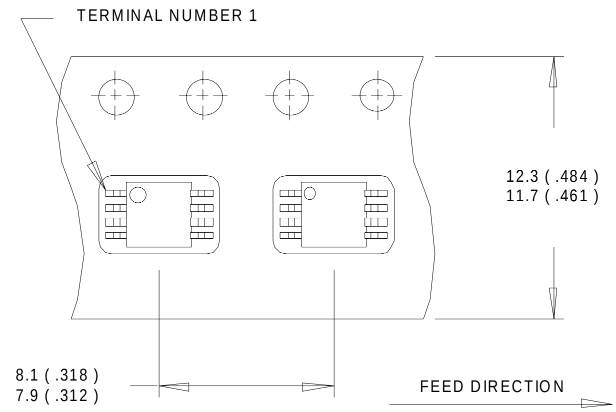
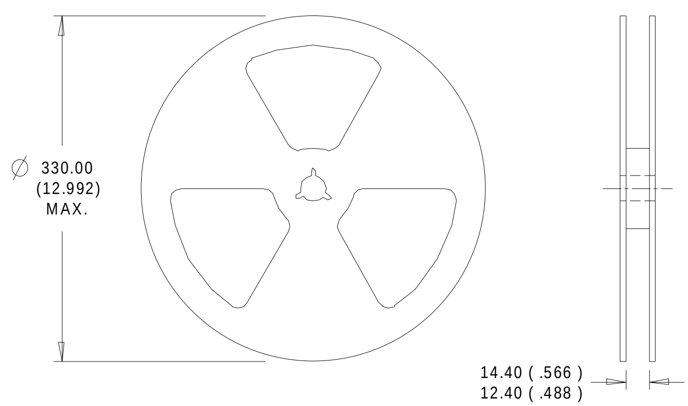
Micro8TM Tape & Reel



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.

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