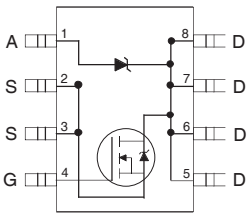
International
IOR Rectifier

PD- 95304

IRF7421D1PbF

FETKY™ MOSFET / Schottky Diode

- Co-packaged HEXFET® Power MOSFET and Schottky Diode
- Ideal For Synchronous Regulator Applications
- Generation V Technology
- SO-8 Footprint
- Lead-Free



Top View

V_{DSS} = 30V

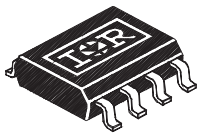
$R_{DS(on)}$ = 0.035Ω

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.

The SO-8 has been modified through a customized leadframe for enhanced thermal characteristics. The SO-8 package is designed for vapor phase, infrared or wave soldering techniques.


SO-8

Absolute Maximum Ratings (T_A = 25°C unless otherwise noted)

Parameter		Maximum	Units
I_D @ T_A = 25°C	Continuous Drain Current, V_{GS}@10V④	5.8	A
I_D @ T_A = 70°C		4.6	
I_{DM}	Pulsed Drain Current ①	46	
P_D @T_A = 25°C	Power Dissipation ④	2.0	W
P_D @T_A = 70°C		1.3	
	Linear Derating Factor	16	W/°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 Ratings

Parameter		Maximum	Units
$R_{\theta JA}$	Junction-to-Ambient ④	62.5	°C/W

Notes:

① Repetitive rating; pulse width limited by maximum junction temperature (see figure 11)

② $I_{SD} \leq 4.1A$, $di/dt \leq 110A/\mu s$, $V_{DD} \leq V_{(BR)DSS}$, $T_J \leq 150°C$

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

④ Surface mounted on FR-4 board, t ≤ 10sec.

10/13/04

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	—	0.026	0.035	Ω	V_{GS} = 10V, I_D = 4.1A ③
		—	0.040	0.060		V_{GS} = 4.5V, I_D = 2.1A ③
$V_{GS(th)}$	Gate Threshold Voltage	1.0	—	—	V	V_{DS} = V_{GS}, I_D = 250µA
g_{fs}	Forward Transconductance	4.6	—	—	S	V_{DS} = 15V, I_D = 2.1A
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	—	18	27	nC	I_D = 4.1A
Q_{gs}	Gate-to-Source Charge	—	2.2	3.3		V_{DS} = 24V
Q_{gd}	Gate-to-Drain ("Miller") Charge	—	5.9	8.9		V_{GS} = 10V (see figure 10) ③
$t_{d(on)}$	Turn-On Delay Time	—	6.7	—	ns	V_{DD} = 15V
t_r	Rise Time	—	27	—		I_D = 4.1A
$t_{d(off)}$	Turn-Off Delay Time	—	20	—		R_G = 6.2Ω
t_f	Fall Time	—	16	—		R_D = 3.7Ω ③
C_{iss}	Input Capacitance	—	510	—	pF	V_{GS} = 0V
C_{oss}	Output Capacitance	—	200	—		V_{DS} = 25V
C_{rss}	Reverse Transfer Capacitance	—	84	—		f = 1.0MHz (see figure 9)

MOSFET Source-Drain Ratings and Characteristics

Parameter		Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	3.1	A	
I_{SM}	Pulsed Source Current (Body Diode)	—	—	33		
V_{SD}	Body Diode Forward Voltage	—	—	1.0	V	T_J = 25°C, I_S = 4.1A, V_{GS} = 0V
t_{rr}	Reverse Recovery Time (Body Diode)	—	57	86	ns	T_J = 25°C, I_F = 4.1A
Q_{rr}	Reverse Recovery Charge	—	93	140	nC	di/dt = 100A/µs ③

Schottky Diode Maximum Ratings

	Parameter	Max.	Units	Conditions	
$I_{F(av)}$	Max. Average Forward Current	1.7	A	50% Duty Cycle. Rectangular Wave, T_A = 25°C	
		1.2		T_A = 70°C	
I_{SM}	Max. peak one cycle Non-repetitive	120		5µs sine or 3µs Rect. pulse	Following any rated
	Surge current	11	A	10ms sine or 6ms Rect. pulse	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°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	110	pF	V_R = 5Vdc (100kHz to 1 MHz) 25°C	
dv/dt	Max. Voltage Rate of Charge	3600	V/ µs	Rated V_R	

Power Mosfet Characteristics

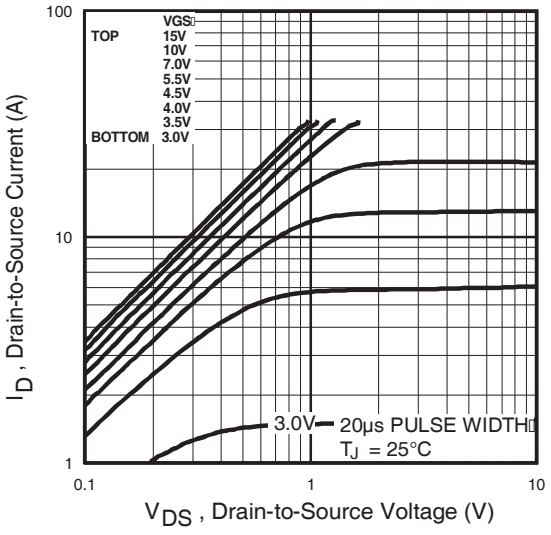


Fig 1. Typical Output Characteristics

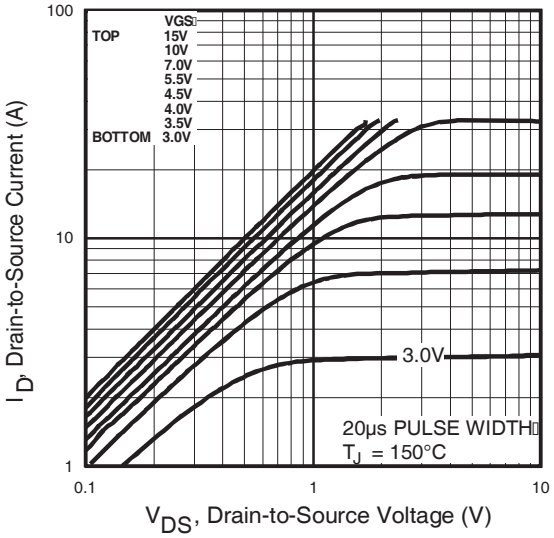


Fig 2. Typical Output Characteristics

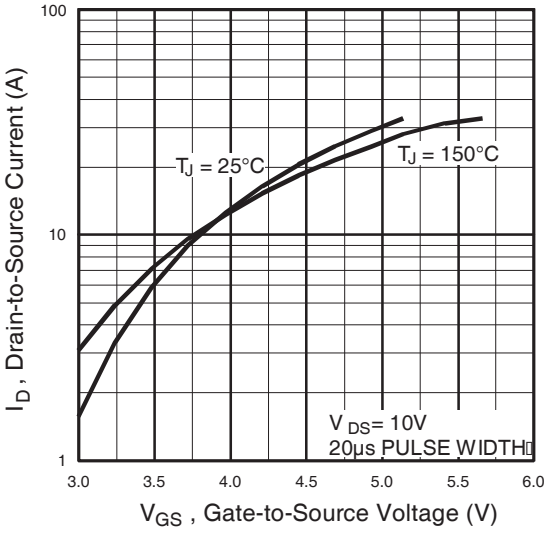


Fig 3. Typical Transfer Characteristics

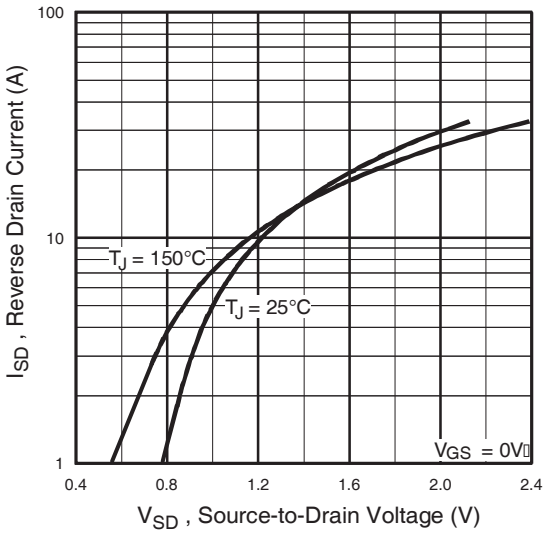


Fig 4. Typical Source-Drain Diode Forward Voltage

Power Mosfet Characteristics

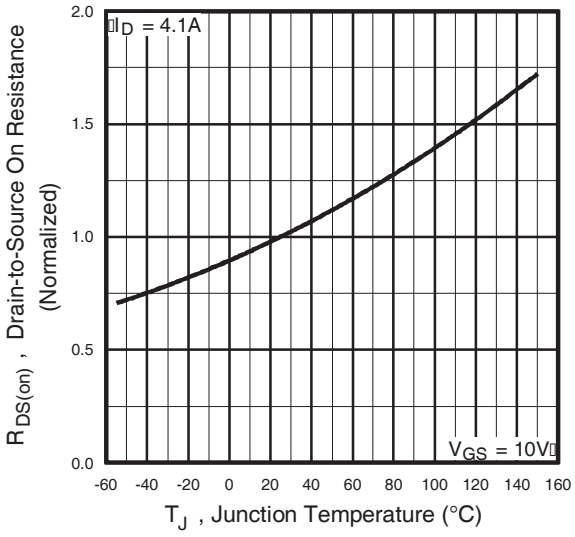


Fig 5. Normalized On-Resistance Vs. Temperature

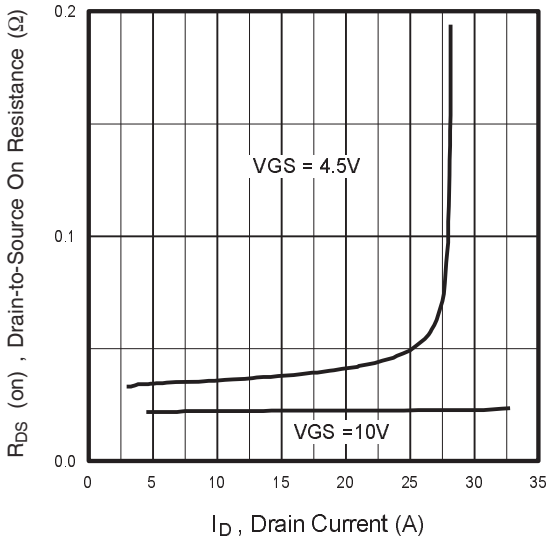


Fig 6. Typical On-Resistance Vs. Drain Current

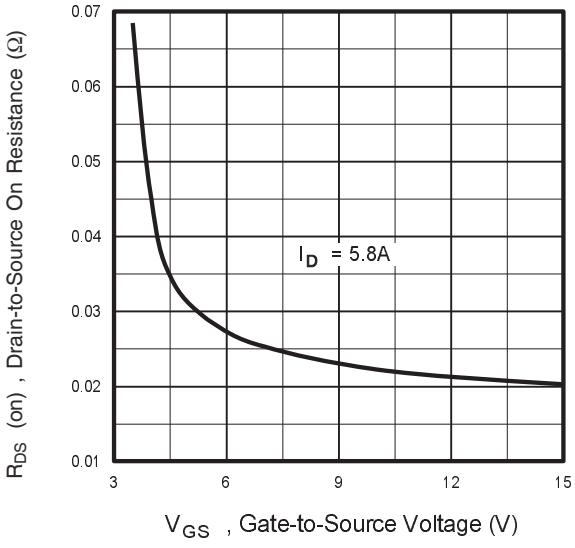


Fig 7. Typical On-Resistance Vs. Gate Voltage

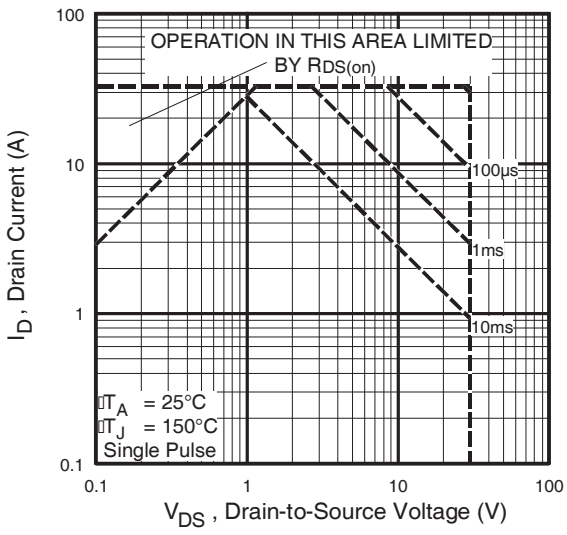


Fig 8. Maximum Safe Operating Area

Power Mosfet Characteristics

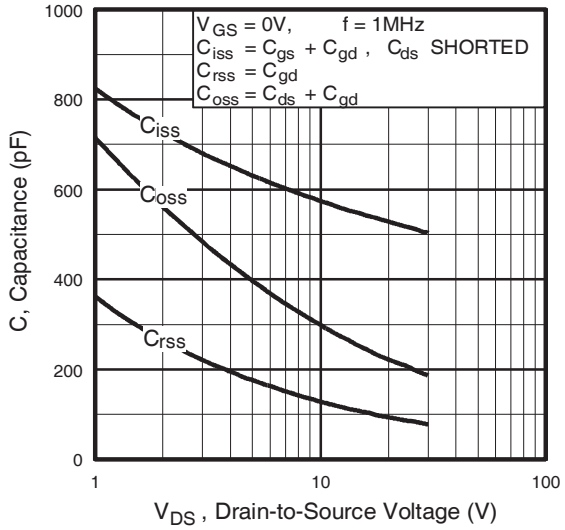


Fig 9. Typical Capacitance Vs. Drain-to-Source Voltage

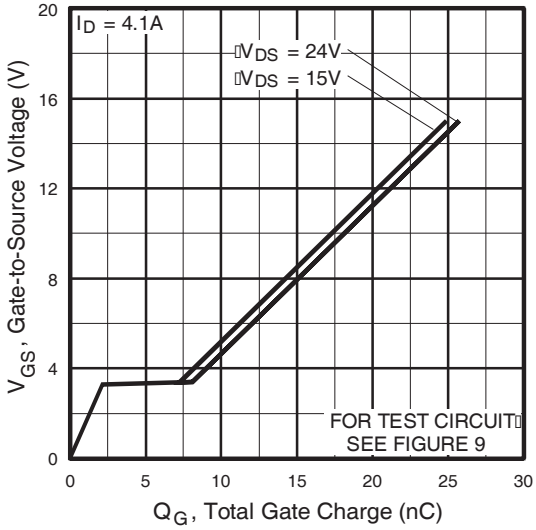


Fig 10. Typical Gate Charge Vs. Gate-to-Source Voltage

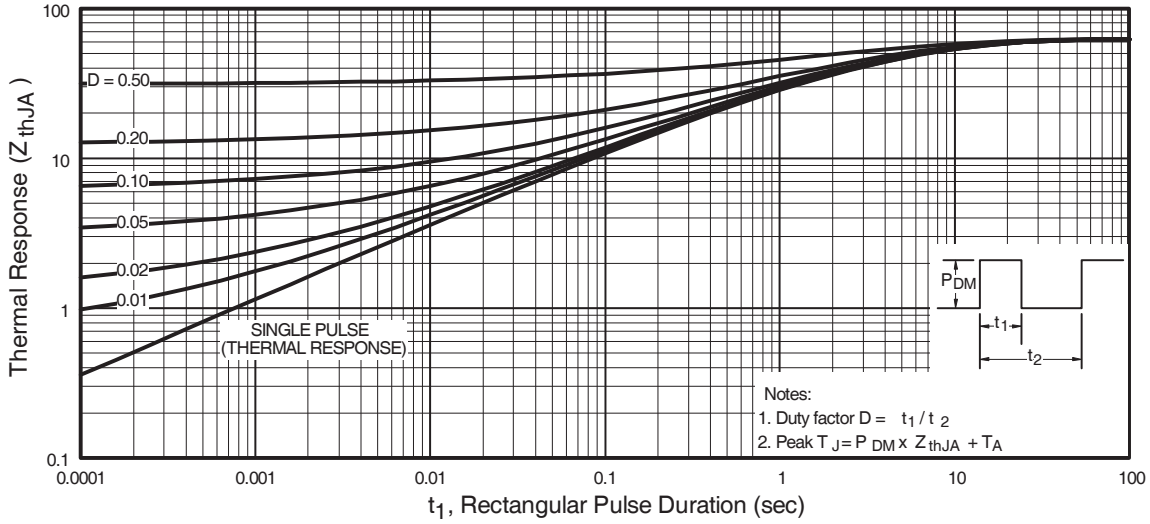


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

Schottky Diode Characteristics

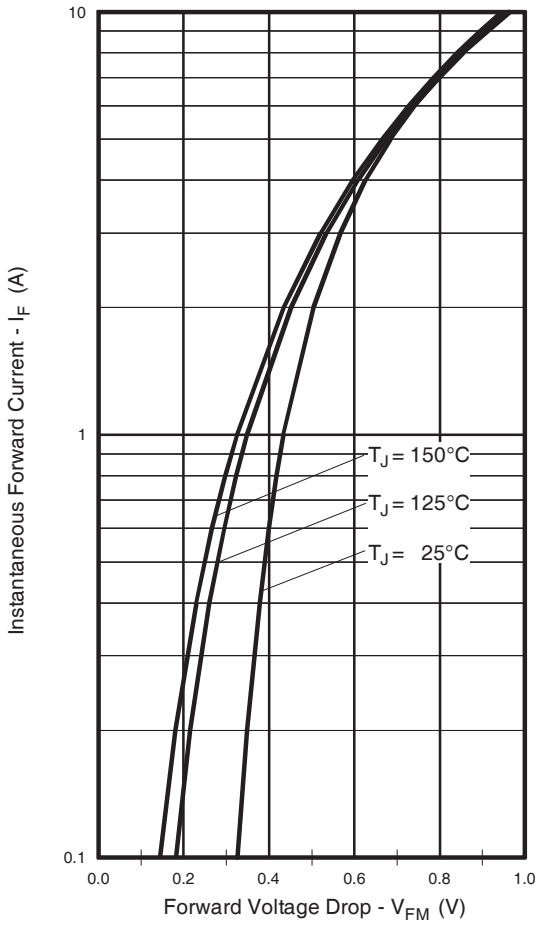


Fig. 12 -Typical Forward Voltage Drop Characteristics

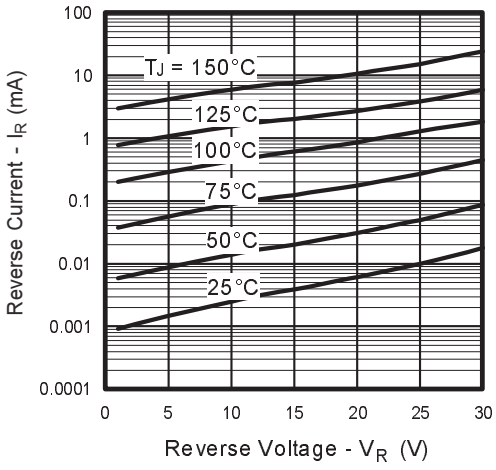


Fig. 13 - Typical Values of Reverse Current Vs. Reverse Voltage

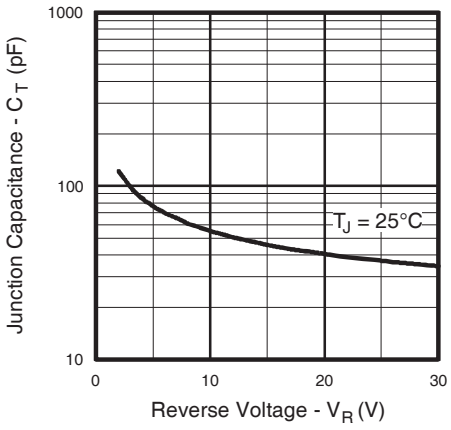
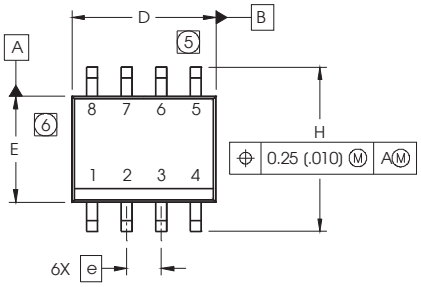
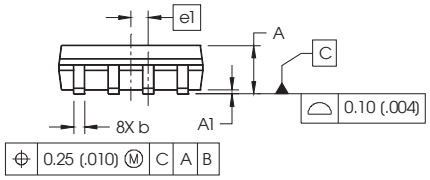


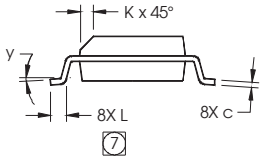
Fig.14 - Typical Junction Capacitance Vs. Reverse Voltage

SO-8 (Fetky) Package Outline



DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.0532	.0688	1.35	1.75
A1	.0040	.0098	0.10	0.25
b	.013	.020	0.33	0.51
c	.0075	.0098	0.19	0.25
D	.189	.1968	4.80	5.00
E	.1497	.1574	3.80	4.00
e	.050 BASIC		1.27 BASIC	
e1	.025 BASIC		0.635 BASIC	
H	.2284	.2440	5.80	6.20
K	.0099	.0196	0.25	0.50
L	.016	.050	0.40	1.27
y	0°	8°	0°	8°





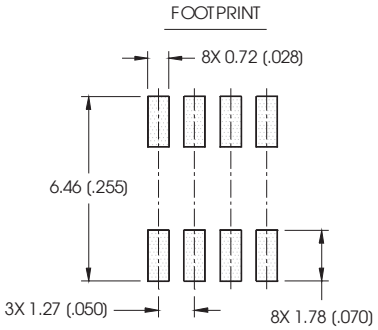
NOTES:

1. DIMENSIONING & TOLERANCING PER ASME Y14.5M-1994.
2. CONTROLLING DIMENSION: MILLIMETER
3. DIMENSIONS ARE SHOWN IN MILLIMETERS (INCHES).
4. OUTLINE CONFORMS TO JEDEC OUTLINE MS-012AA.

(5) DIMENSION DOES NOT INCLUDE MOLD PROTRUSIONS. MOLD PROTRUSIONS NOT TO EXCEED 0.15 (.006).

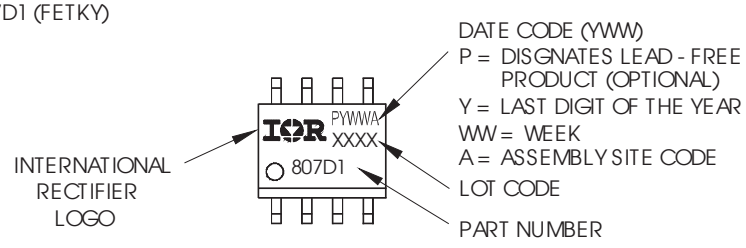
(6) DIMENSION DOES NOT INCLUDE MOLD PROTRUSIONS. MOLD PROTRUSIONS NOT TO EXCEED 0.25 (.010).

(7) DIMENSION IS THE LENGTH OF LEAD FOR SOLDERING TO A SUBSTRATE.



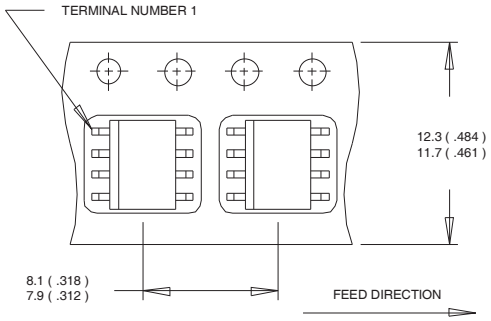
SO-8 (Fetky) Part Marking Information

EXAMPLE: THIS IS AN IRF7807D1 (FETKY)

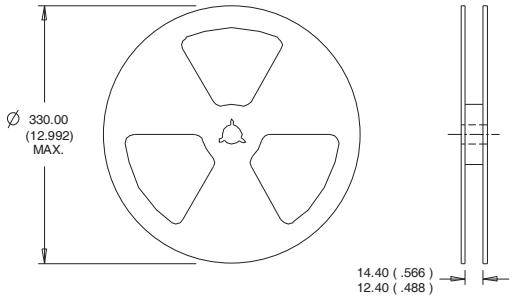


SO-8 Tape and Reel

Dimensions are shown in milimeters (inches)



NOTES:
1. CONTROLLING DIMENSION : MILLIMETER.
2. ALL DIMENSIONS ARE SHOWN IN MILLIMETERS(INCHES).
3. OUTLINE CONFORMS TO EIA-481 & EIA-541.



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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