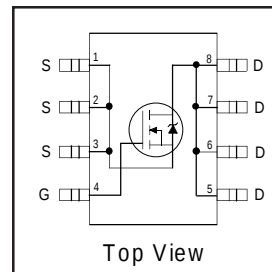


Si4420DY

HEXFET® Power MOSFET

- N-Channel MOSFET
- Low On-Resistance
- Low Gate Charge
- Surface Mount
- Logic Level Drive



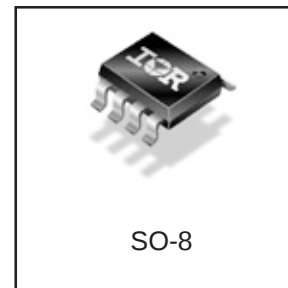
$$V_{DSS} = 30V$$

$$R_{DS(on)} = 0.009\Omega$$

Description

This N-channel HEXFET® power MOSFET is produced using International Rectifier's advanced HEXFET power MOSFET technology. The low on-resistance and low gate charge inherent to this technology make this device ideal for low voltage or battery driven power conversion applications

The SO-8 package with copper leadframe offers enhanced thermal characteristics that allow power dissipation of greater than 800mW in typical board mount applications.



Absolute Maximum Ratings

	Parameter	Max.	Units
V_{DS}	Drain- Source Voltage	30	V
$I_D @ T_A = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	± 12.5	A
$I_D @ T_A = 70^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	± 10	
I_{DM}	Pulsed Drain Current ①	± 50	
$P_D @ T_A = 25^\circ C$	Power Dissipation ③	2.5	W
$P_D @ T_A = 70^\circ C$	Power Dissipation ③	1.6	
	Linear Derating Factor	0.02	W/°C
E_{AS}	Single Pulse Avalanche Energy④	400	mJ
V_{GS}	Gate-to-Source Voltage	± 20	V
T_J, T_{STG}	Junction and Storage Temperature Range	-55 to + 150	°C

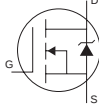
Thermal Resistance

	Parameter	Max.	Units
$R_{\theta JA}$	Maximum Junction-to-Ambient③	50	°C/W

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	30	—	—	V	$V_{GS} = 0V, I_D = 250\mu A$
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	0.028	—	V/ $^\circ\text{C}$	Reference to 25°C , $I_D = 1mA$
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	—	0.009	Ω	$V_{GS} = 10V, I_D = 12.5A$ ②
		—	—	0.013		$V_{GS} = 4.5V, I_D = 10.5A$ ②
$V_{GS(th)}$	Gate Threshold Voltage	1.0	—	—	V	$V_{DS} = V_{GS}, I_D = 250\mu A$
g_{fs}	Forward Transconductance	—	29	—	S	$V_{DS} = 15V, I_D = 12.5A$
I_{DSS}	Drain-to-Source Leakage Current	—	—	1.0	μA	$V_{DS} = 30V, V_{GS} = 0V$
		—	—	5.0		$V_{DS} = 30V, V_{GS} = 0V, T_J = 55^\circ\text{C}$
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	—	52	78	nC	$I_D = 12.5A$
Q_{gs}	Gate-to-Source Charge	—	8.7	—		$V_{DS} = 15V$
Q_{gd}	Gate-to-Drain ("Miller") Charge	—	12	—		$V_{GS} = 10V$, See Fig. 6 ②
$t_{d(on)}$	Turn-On Delay Time	—	15	—	ns	$V_{DD} = 15V$
t_r	Rise Time	—	10	—		$I_D = 1.0A$
$t_{d(off)}$	Turn-Off Delay Time	—	55	—		$R_G = 6.0\Omega$
t_f	Fall Time	—	47	—		$R_D = 15\Omega$, ②
C_{iss}	Input Capacitance	—	2240	—	pF	$V_{GS} = 0V$
C_{oss}	Output Capacitance	—	1100	—		$V_{DS} = 15V$
C_{rss}	Reverse Transfer Capacitance	—	150	—		$f = 1.0MHz$, See Fig. 5②

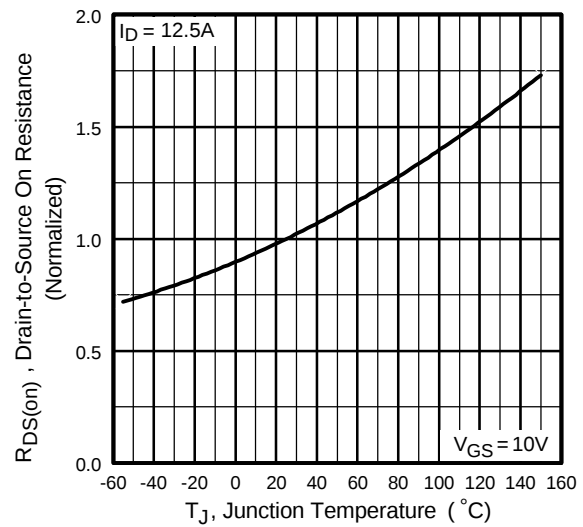
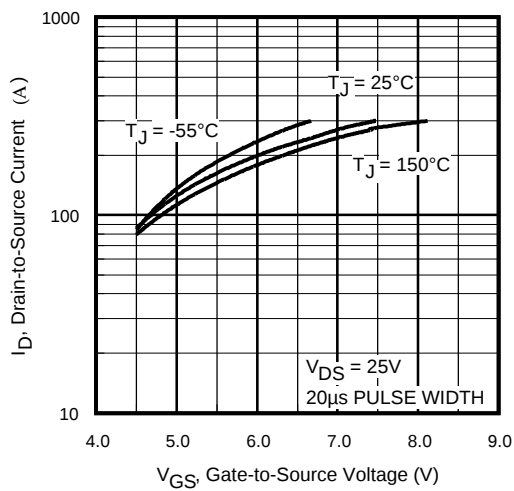
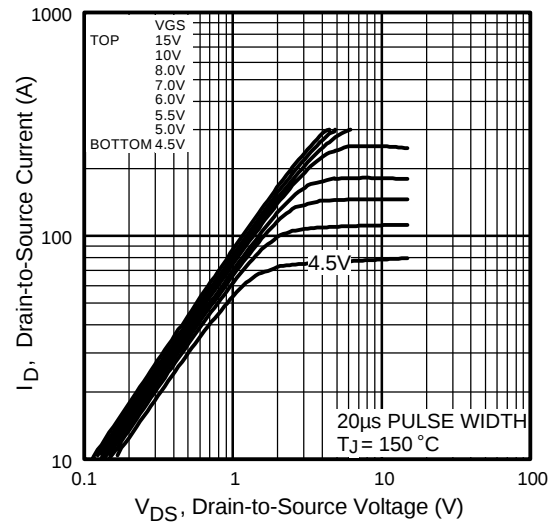
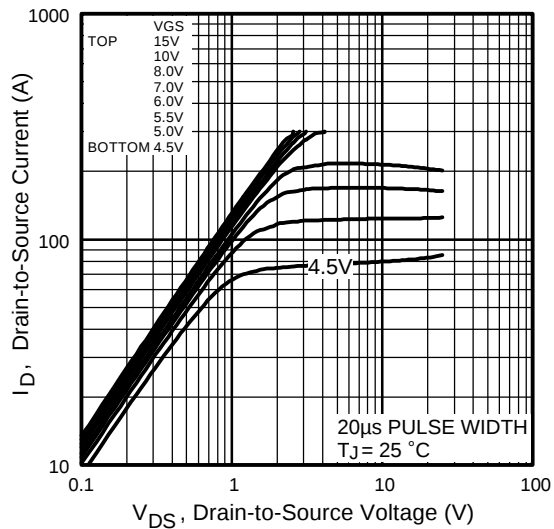
Source-Drain Ratings and Characteristics

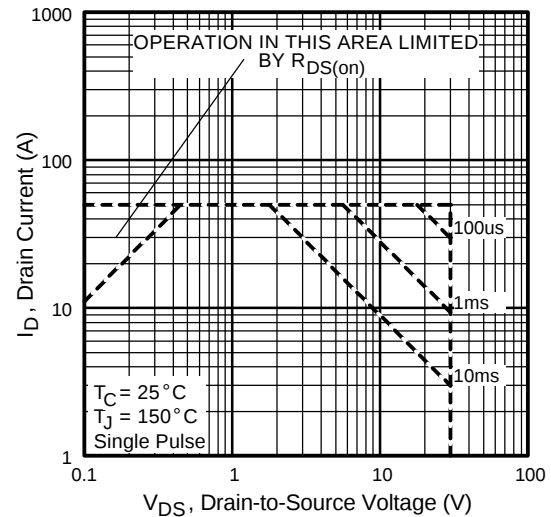
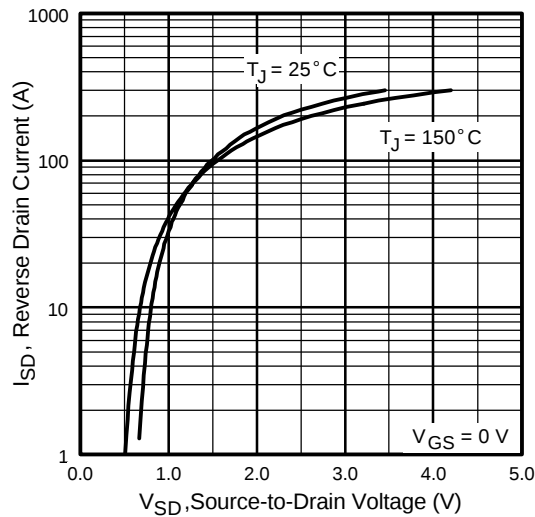
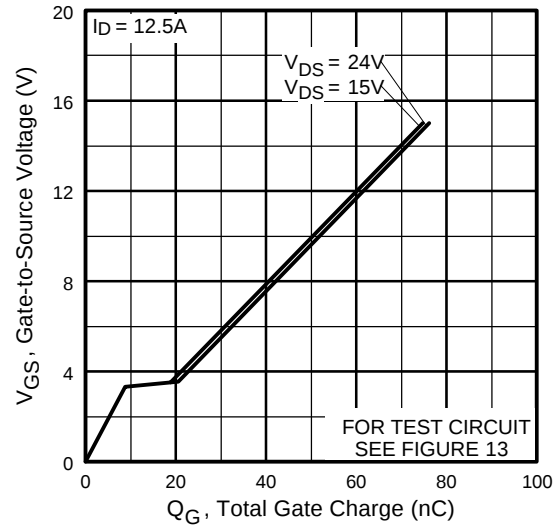
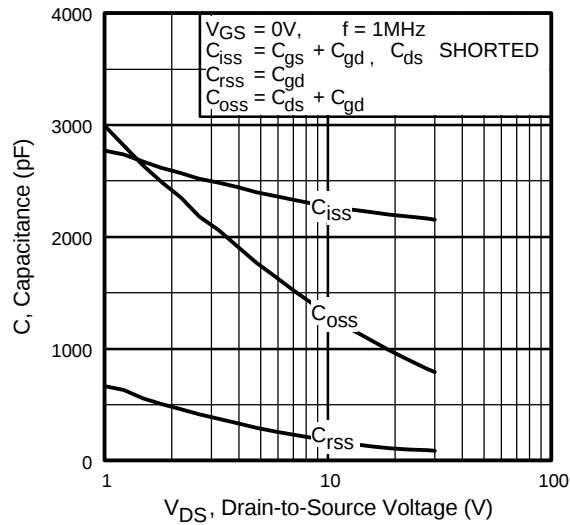
	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Diode Conduction)	—	—	2.3	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I_{SM}	Pulsed Source Current (Body Diode) ①	—	—	50		
V_{SD}	Diode Forward Voltage	—	—	1.1	V	$T_J = 25^\circ\text{C}, I_S = 2.3A, V_{GS} = 0V$ ②
t_{rr}	Reverse Recovery Time	—	52	78	ns	$T_J = 25^\circ\text{C}, I_F = 2.3A$

Notes:

- ① Repetitive rating; pulse width limited by max. junction temperature.
 ② Pulse width $\leq 300\mu s$; duty cycle $\leq 2\%$.
 ③ When mounted on FR4 Board, $t \leq 10$ sec

- ④ Starting $T_J = 25^\circ\text{C}$, $L = 13mH$
 $R_G = 25\Omega$, $I_{AS} = 8.9A$. (See Figure 15)





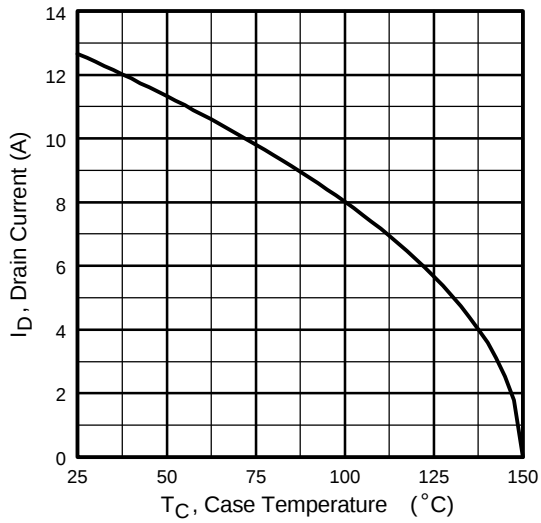


Fig 9. Maximum Drain Current Vs. Case Temperature

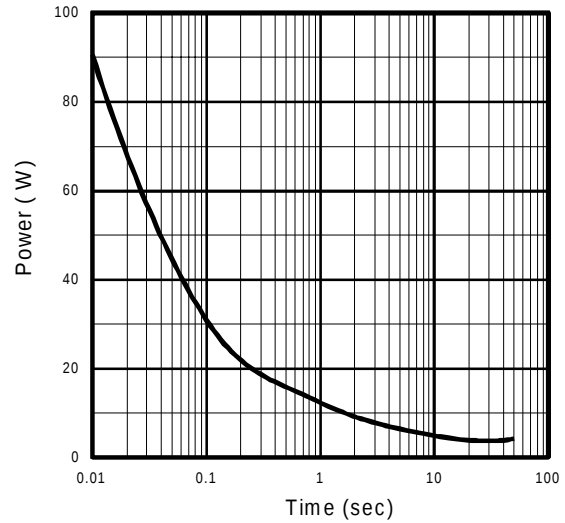


Fig 10. Typical Power Vs. Time

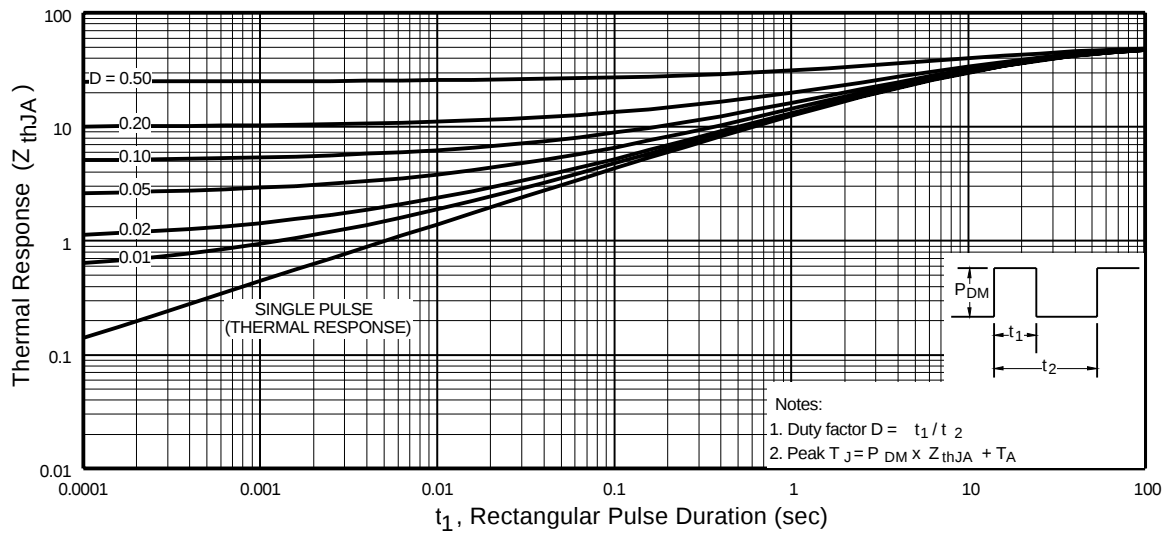


Fig 11. Typical Effective Transient Thermal Impedance, Junction-to-Ambient

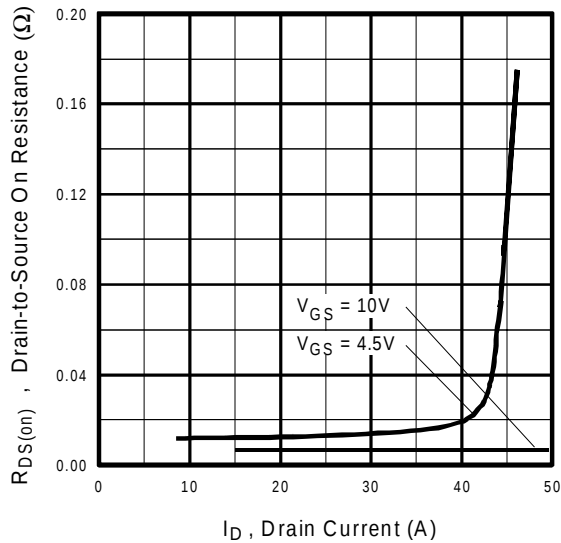


Fig 12. Typical On-Resistance Vs. Drain Current

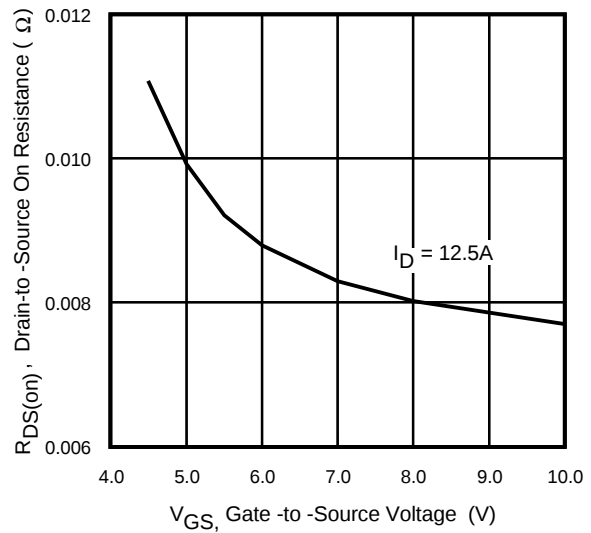


Fig 13. Typical On-Resistance Vs. Gate Voltage

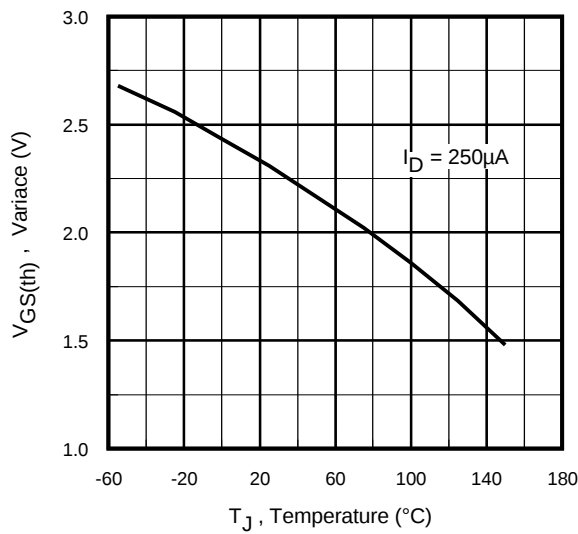


Fig 14. Typical Threshold Voltage Vs. Temperature

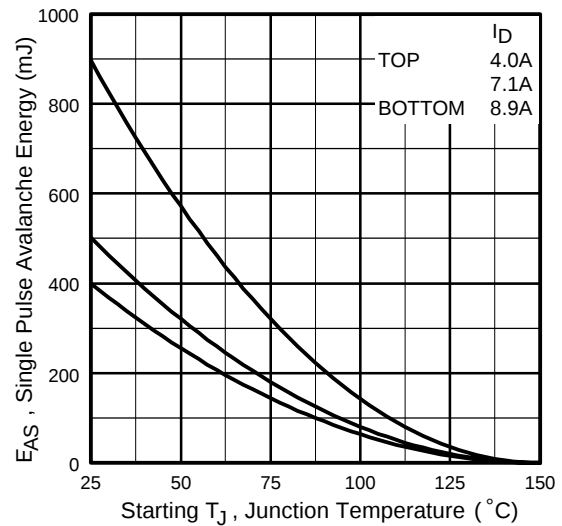
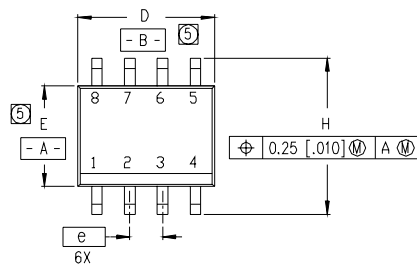
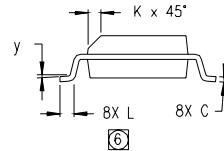
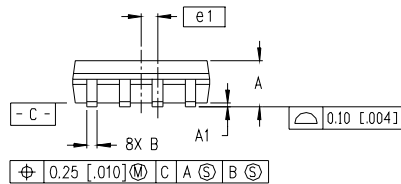


Fig 15. Maximum Avalanche Energy Vs. Drain Current

SO-8 Package Outline



DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.0532	.0688	1.35	1.75
A1	.0040	.0098	0.10	0.25
B	.014	.018	0.36	0.46
C	.0075	.0098	0.19	0.25
D	.189	.196	4.80	4.98
E	.150	.157	3.81	3.99
e	.050	BASIC	1.27	BASIC
e1	.025	BASIC	0.635	BASIC
H	.2284	.2440	5.80	6.20
K	.011	.019	0.28	0.48
L	.016	.050	0.41	1.27
y	0°	8°	0°	8°



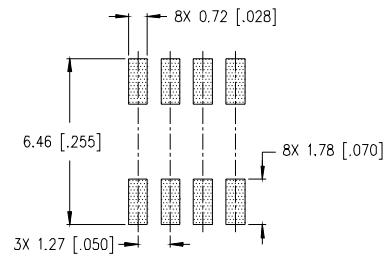
NOTES:

1. DIMENSIONING & TOLERANCING PER ANSI Y14.5M-1982.
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 0.25 [0.006].

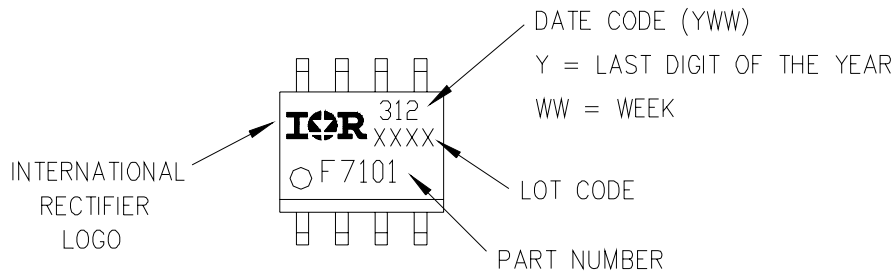
⑥ DIMENSION IS THE LENGTH OF LEAD FOR
SOLDERING TO A SUBSTRATE.

RECOMMENDED FOOTPRINT



SO-8 Part Marking Information

EXAMPLE: THIS IS AN IRF7101

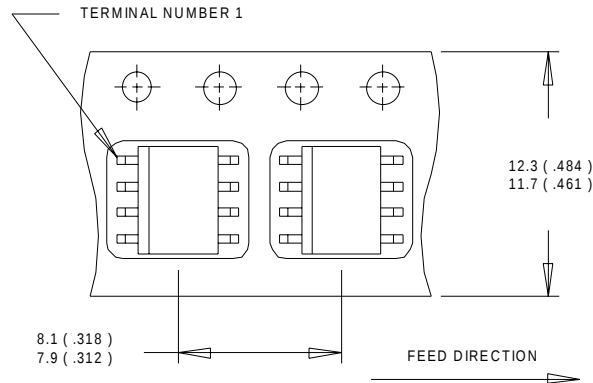


Si4420DY

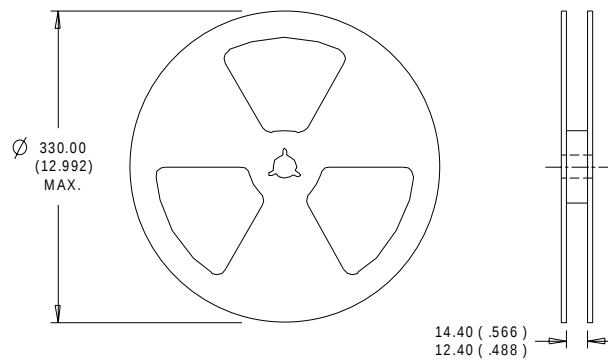
International
IR Rectifier

SO-8 Tape & Reel Information

Dimensions are shown in millimeters (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.

International
IR Rectifier

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IR CANADA: 15 Lincoln Court, Brampton, Ontario L6T3Z2, Tel: (905) 453 2200

IR GERMANY: Saalburgstrasse 157, 61350 Bad Homburg Tel: ++ 49 6172 96590

IR ITALY: Via Liguria 49, 10071 Borgaro, Torino Tel: ++ 39 11 451 0111

IR JAPAN: K&H Bldg., 2F, 30-4 Nishi-Ikebukuro 3-Chome, Toshima-Ku, Tokyo Japan 171 Tel: 81 3 3983 0086

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Data and specifications subject to change without notice. 1/2000