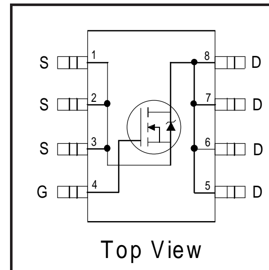
International
IOR Rectifier

PD - 91853C

Si4410DY

HEXFET® Power MOSFET

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



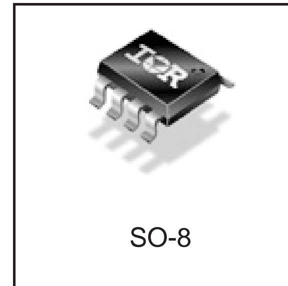
V_{DSS} = 30V

$R_{DS(on)}$ = 0.0135Ω

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 that 800mW in typical board mount applications.



SO-8

Absolute Maximum Ratings

	Parameter	Max.	Units
V_{DS}	Drain- Source Voltage	30	V
I_D @ T_A = 25°C	Continuous Drain Current, V_{GS} @ 10V	±10	A
I_D @ T_A = 70°C	Continuous Drain Current, V_{GS} @ 10V	±8.0	
I_{DM}	Pulsed Drain Current ①	±50	
P_D @T_A = 25°C	Power Dissipation ③	2.5	W
P_D @T_A = 70°C	Power Dissipation ③	1.6	
	Linear Derating Factor	0.02	W/°C
dv/dt	Peak Diode Recovery dv/dt ⑤	5.0	V/ns
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

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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
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	——	0.029	——	V/°C	Reference to 25°C, I_D = 1mA
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	——	0.010	0.0135	Ω	V_{GS} = 10V, I_D = 10A ②
		——	0.015	0.020		V_{GS} = 4.5V, I_D = 5.0A ②
$V_{GS(th)}$	Gate Threshold Voltage	1.0	——	——	V	V_{DS} = V_{GS}, I_D = 250μA
g_{fs}	Forward Transconductance	——	35	——	S	V_{DS} = 15V, I_D = 10A
I_{DSS}	Drain-to-Source Leakage Current	——	——	1.0	μA	V_{DS} = 30V, V_{GS} = 0V
		——	——	25		V_{DS} = 30V, V_{GS} = 0V, T_J = 55°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	——	30	45	nC	I_D = 10A
Q_{gs}	Gate-to-Source Charge	——	5.4	——		V_{DS} = 15V
Q_{gd}	Gate-to-Drain ("Miller") Charge	——	6.5	——		V_{GS} = 10V, See Fig. 10 ②
$t_{d(on)}$	Turn-On Delay Time	——	11	——	ns	V_{DD} = 25V
t_r	Rise Time	——	7.7	——		I_D = 1.0A
$t_{d(off)}$	Turn-Off Delay Time	——	38	——		R_G = 6.0Ω
t_f	Fall Time	——	44	——		R_D = 25Ω, ②
C_{iss}	Input Capacitance	——	1585	——	pF	V_{GS} = 0V
C_{oss}	Output Capacitance	——	739	——		V_{DS} = 15V
C_{rss}	Reverse Transfer Capacitance	——	106	——		f = 1.0MHz, See Fig. 9

Source-Drain Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Diode Conduction)③	——	——	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	——	0.7	1.1	V	T_J = 25°C, I_S = 2.3A, V_{GS} = 0V ②
t_{rr}	Reverse Recovery Time	——	50	80	ns	T_J = 25°C, I_F = 2.3A

Notes:

① Repetitive rating; pulse width limited by max. junction temperature.

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

③ When mounted on FR4 Board, t ≤10 sec

④ Starting T_J = 25°C, L = 8.0mH R_G = 25Ω, I_{AS} = 10A. (See Figure 15)

⑤ I_{SD} ≤2.3A, di/dt ≤ 130A/μs, V_{DD} ≤ $V_{(BR)DSS}$, T_J ≤ 150°C

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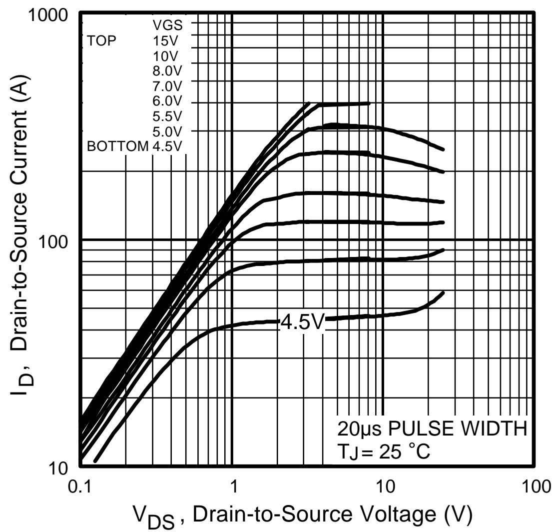

Fig 1. Typical Output Characteristics

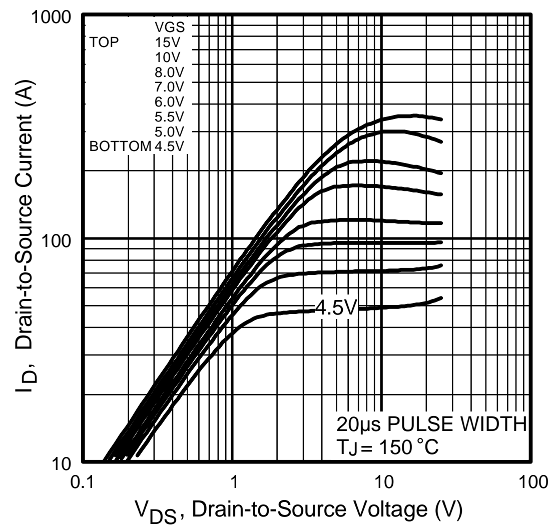

Fig 2. Typical Output Characteristics

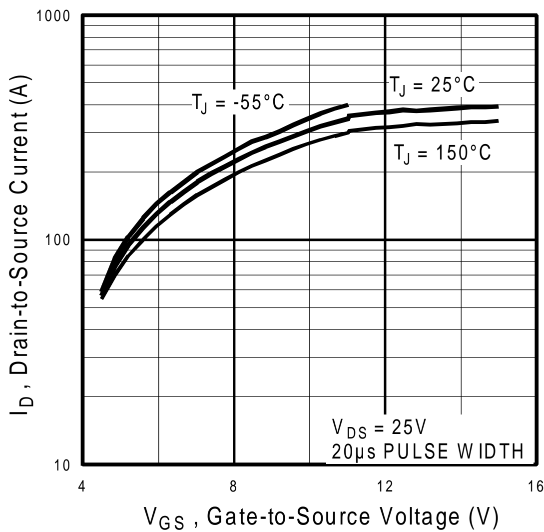

Fig 3. Typical Transfer Characteristics

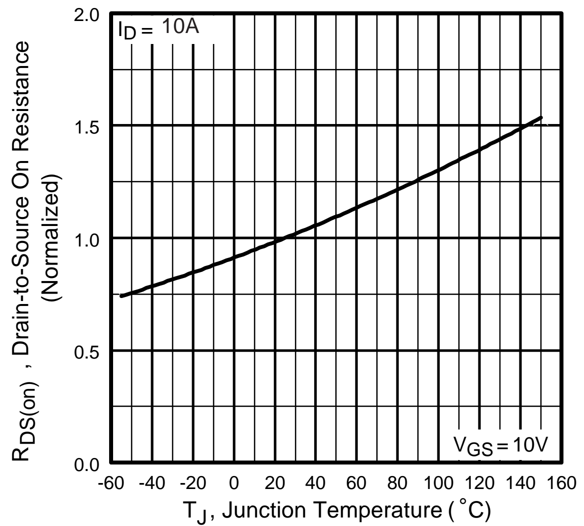

Fig 4. Normalized On-Resistance Vs. Temperature

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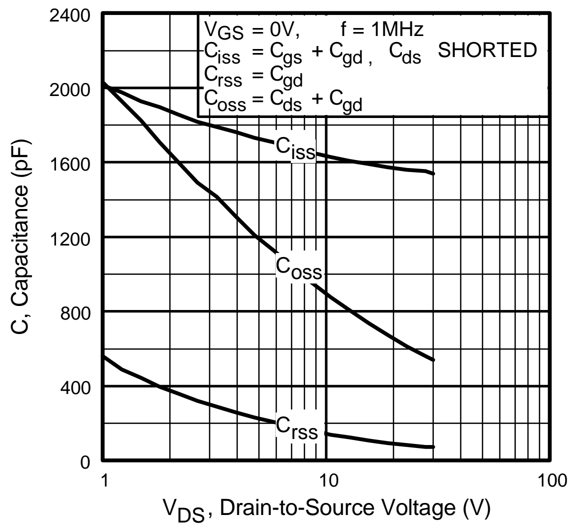

Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

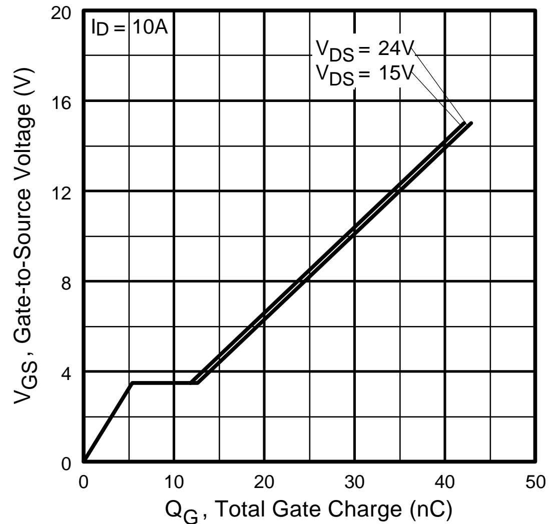

Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

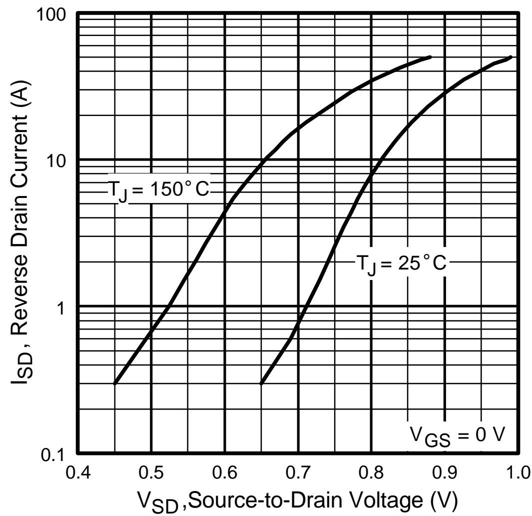

Fig 7. Typical Source-Drain Diode Forward Voltage

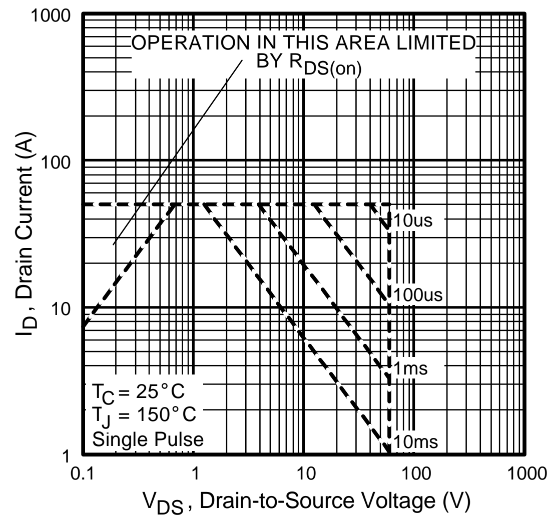

Fig 8. Maximum Safe Operating Area

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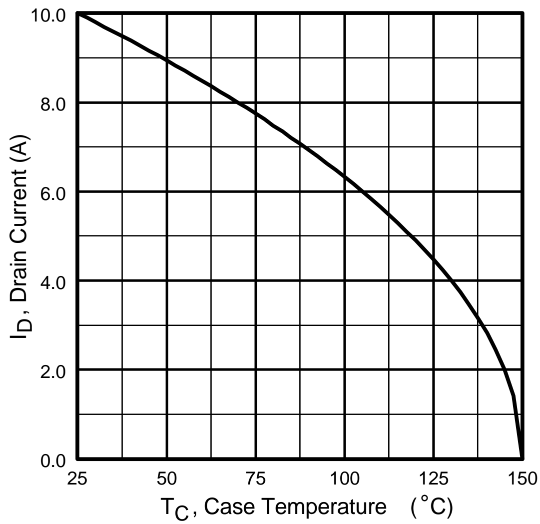

Fig 9. Maximum Drain Current Vs. Case Temperature

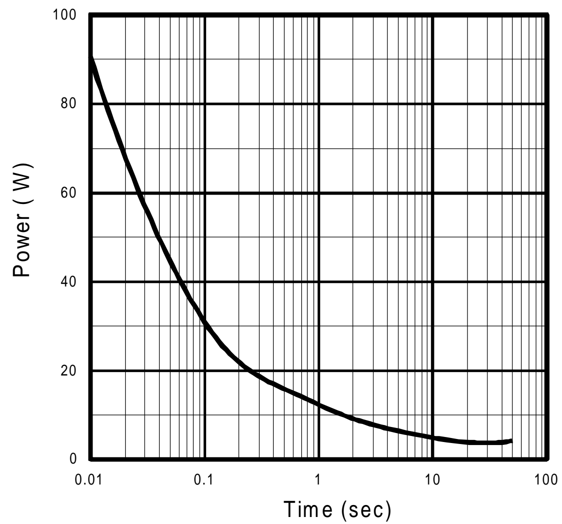

Fig 10. Typical Power Vs. Time

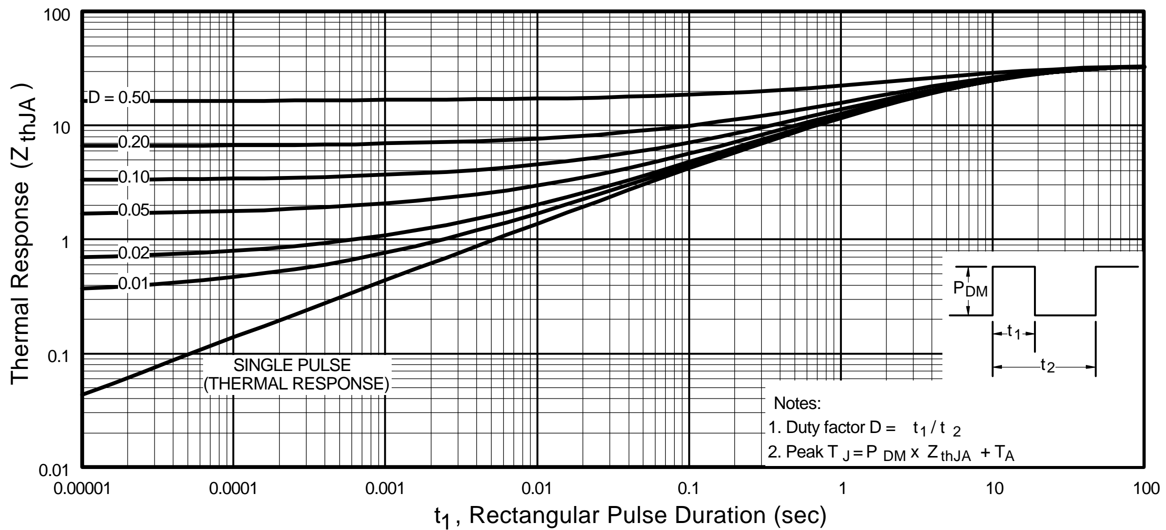

Fig 11. Typical Effective Transient Thermal Impedance, Junction-to-Ambient

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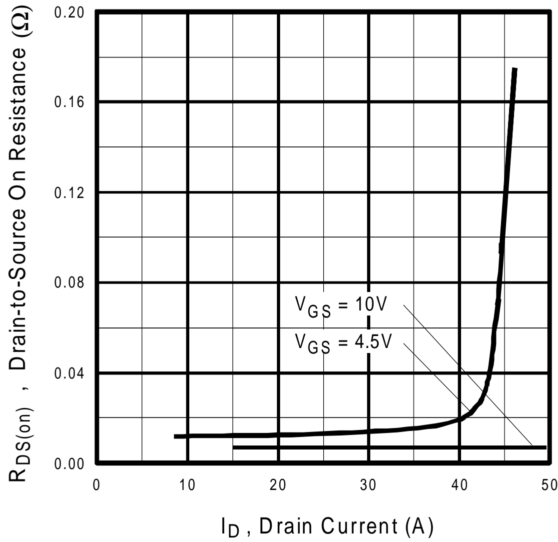

Fig 12. Typical On-Resistance Vs. Drain Current

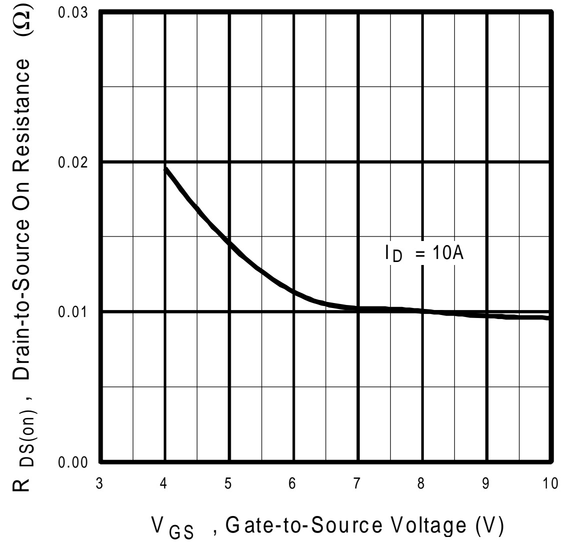

Fig 13. Typical On-Resistance Vs. Gate Voltage

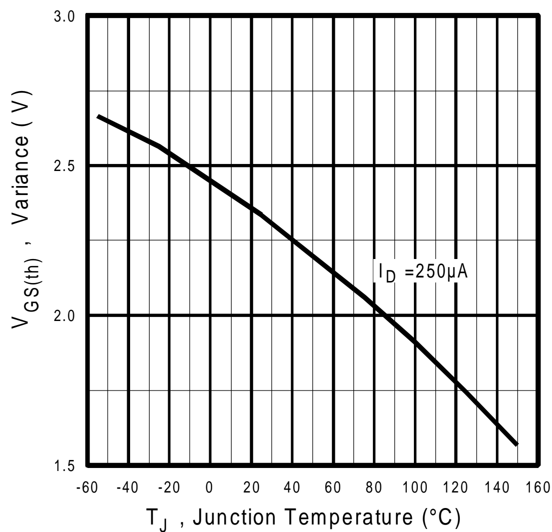

Fig 14. Typical Threshold Voltage Vs.Temperature

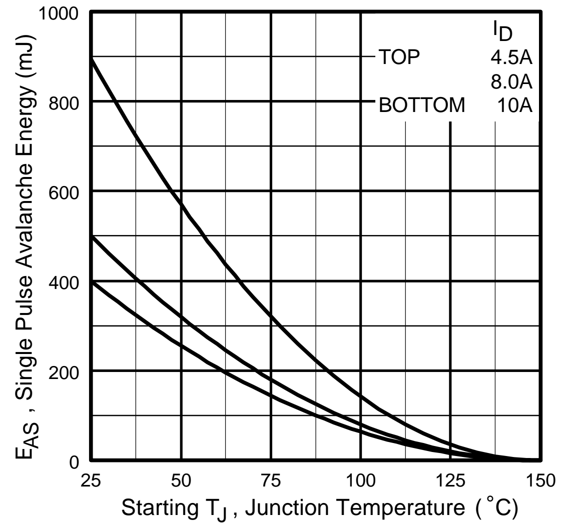

Fig 15. Maximum Avalanche Energy Vs. Drain Current

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SO-8 Package Outline

D
- B -
5
8 7 6 5
1 2 3 4
5
E
- A -
H
0.25 (.010) M A M
e
6X
e1
A
- C -
B 8X
A1
0.10 (.004)
0.25 (.010) M C A S B S
K x 45°
θ
L 6
8X
C
8X

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	0.16	.050	0.41	1.27
θ	0°	8°	0°	8°

NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M-1982.
2. CONTROLLING DIMENSION : INCH.
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 (.006).

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

RECOMMENDED FOOTPRINT

0.72 (.028)
8X
6.46 (.255)
1.78 (.070)
8X
1.27 (.050)
3X

SO-8 Part Marking Information

EXAMPLE: THIS IS AN IRF7101

IOR
312
XXXX
F7101
DATE CODE (YWW)
Y = LAST DIGIT OF THE YEAR
WW = WEEK
INTERNATIONAL
RECTIFIER
LOGO
LOT CODE
PART NUMBER

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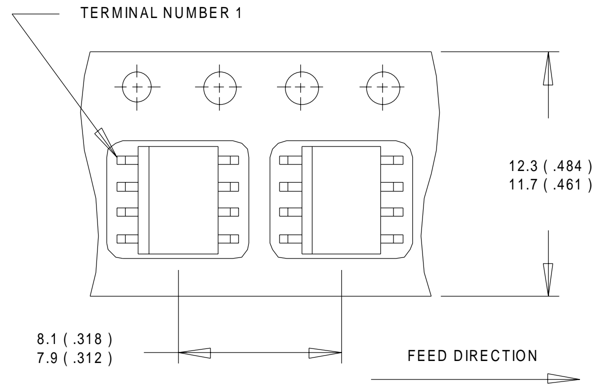
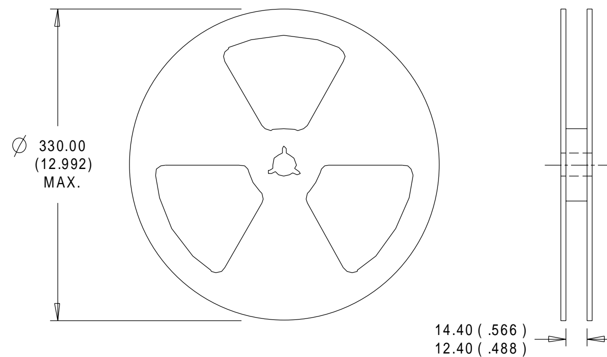
SO-8 Tape & Reel Information

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.

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