International **IƆR** Rectifier

IRF7424

HEXFET® Power MOSFET

- Ultra Low On-Resistance
- P-Channel MOSFET
- Surface Mount
- Available in Tape & Reel

V_{DSS}	$R_{DS(on)}$ max (mΩ)	I_D
-30V	13.5@V_{GS} = -10V	-11A
	22@V_{GS} = -4.5V	-8.8A

Description

These P-Channel MOSFETs from International Rectifier utilize advanced processing techniques to achieve the extremely low on-resistance per silicon area. This benefit provides the designer with an extremely efficient device for use in battery and load management applications..

The SO-8 has been modified through a customized leadframe for enhanced thermal characteristics and multiple-die capability making it ideal in a variety of power applications. With these improvements, multiple devices can be used in an application with dramatically reduced board space. The package is designed for vapor phase, infrared, or wave soldering techniques.

Top View

SO-8
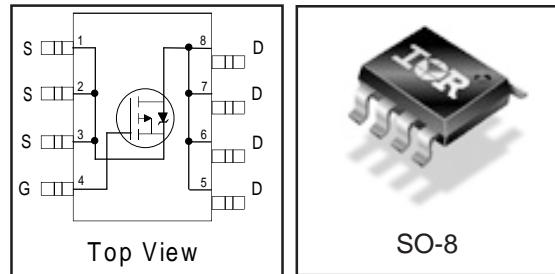
Absolute Maximum Ratings

	Parameter	Max.	Units
V_{DS}	Drain- Source Voltage	-30	V
I_D @ T_A = 25°C	Continuous Drain Current, V_{GS} @ -10V	-11	
I_D @ T_A= 70°C	Continuous Drain Current, V_{GS} @ -10V	-9.3	A
I_{DM}	Pulsed Drain Current ①	-47	
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	20	mW/°C
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
$R_{θJA}$	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	——	0.019	——	V/°C	Reference to 25°C, I_D = -1mA
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	——	——	13.5	mΩ	V_{GS} = -10V, I_D = -11A ②
		——	——	22		V_{GS} = -4.5V, I_D = -8.8A ②
$V_{GS(th)}$	Gate Threshold Voltage	-1.0	——	-2.5	V	V_{DS} = V_{GS}, I_D = -250µA
g_{fs}	Forward Transconductance	17	——	——	S	V_{DS} = -10V, I_D = -11A
I_{DSS}	Drain-to-Source Leakage Current	——	——	-15	µA	V_{DS} = -24V, V_{GS} = 0V
		——	——	-25		V_{DS} = -24V, V_{GS} = 0V, T_J = 70°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	——	75	110		I_D = -11A
Q_{gs}	Gate-to-Source Charge	——	14	21	nC	V_{DS} = -15V
Q_{gd}	Gate-to-Drain ("Miller") Charge	——	12	18		V_{GS} = -10V
$t_{d(on)}$	Turn-On Delay Time	——	15	——		V_{DD} = -15V ②
t_r	Rise Time	——	23	——		I_D = -1.0A
$t_{d(off)}$	Turn-Off Delay Time	——	150	——	ns	R_G = 6.0Ω
t_f	Fall Time	——	76	——		V_{GS} = -10V
C_{iss}	Input Capacitance	——	4030	——		V_{GS} = 0V
C_{oss}	Output Capacitance	——	580	——	pF	V_{DS} = -25V
C_{rss}	Reverse Transfer Capacitance	——	410	——		ƒ = 1.0kHz

Source-Drain Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	——	——	-2.5	A	MOSFET symbol showing the integral reverse p-n junction diode.
I_{SM}	Pulsed Source Current (Body Diode) ①	——	——	-47		
V_{SD}	Diode Forward Voltage	——	——	-1.2	V	T_J = 25°C, I_S = -2.5A, V_{GS} = 0V ②
t_{rr}	Reverse Recovery Time	——	40	60	ns	T_J = 25°C, I_F = -2.5A
Q_{rr}	Reverse Recovery Charge	——	47	71	nC	di/dt = -100A/µs ②
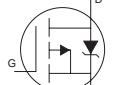
Notes:

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

② Pulse width ≤ 400µs; duty cycle ≤ 2%.

③ Surface mounted on 1 in square Cu board
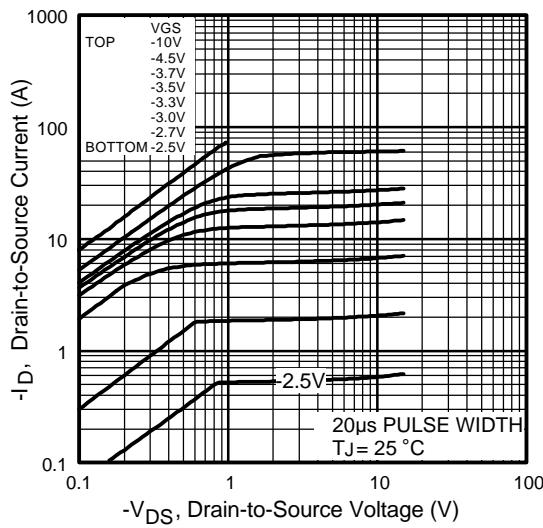
**Fig 1.** Typical Output Characteristics
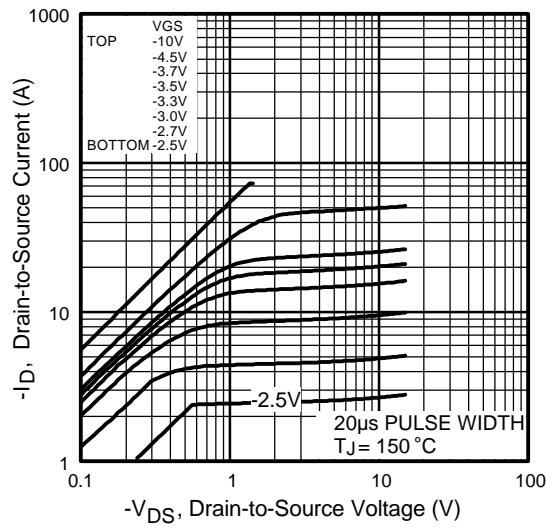

Fig 2. Typical Output Characteristics
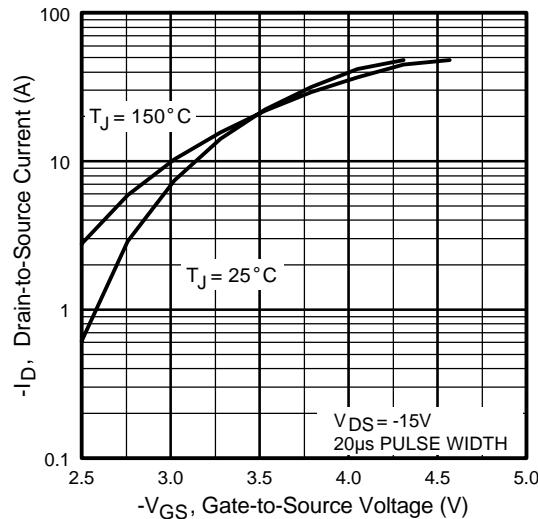
**Fig 3.** Typical Transfer Characteristics
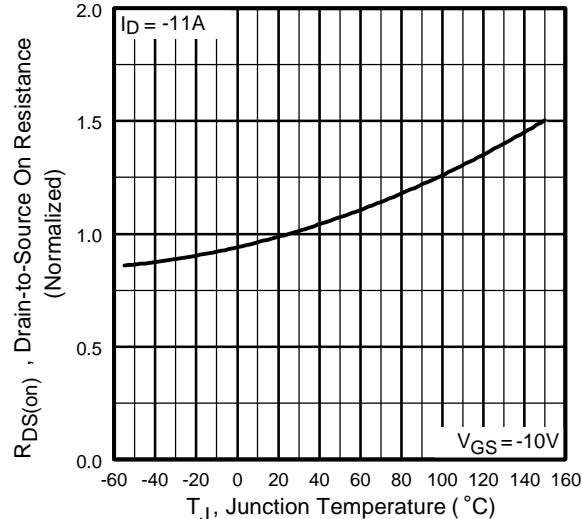
Fig 4. Normalized On-Resistance
Vs. Temperature

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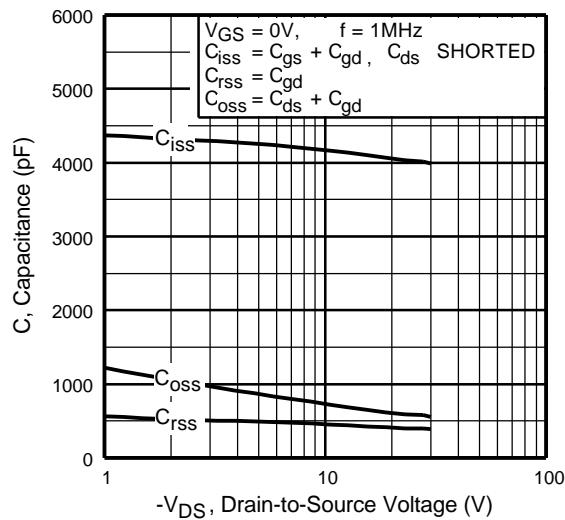
Fig 5. Typical Capacitance Vs.
Drain-to-Source Voltage
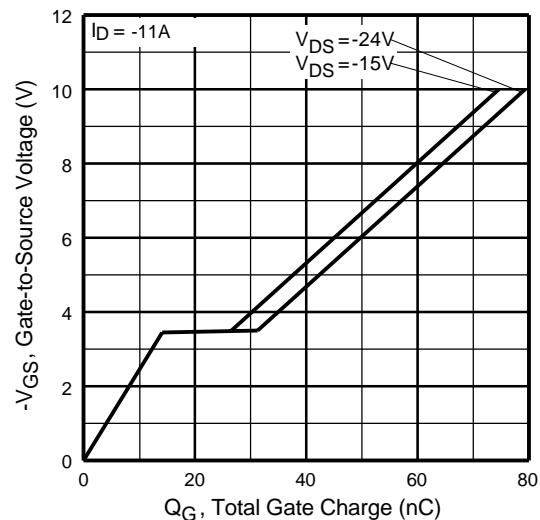
**Fig 6.** Typical Gate Charge Vs.
Gate-to-Source Voltage
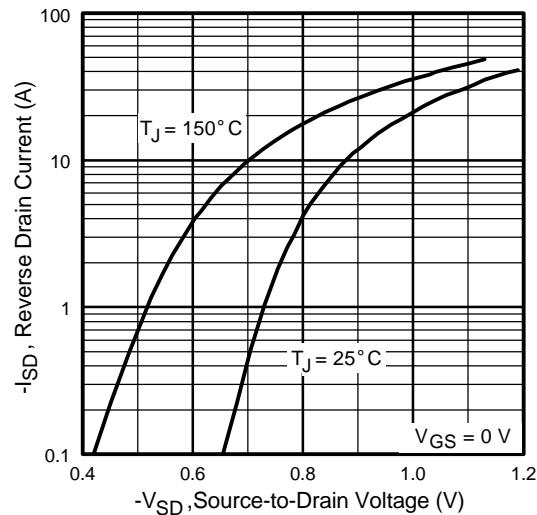
**Fig 7.** Typical Source-Drain Diode
Forward Voltage
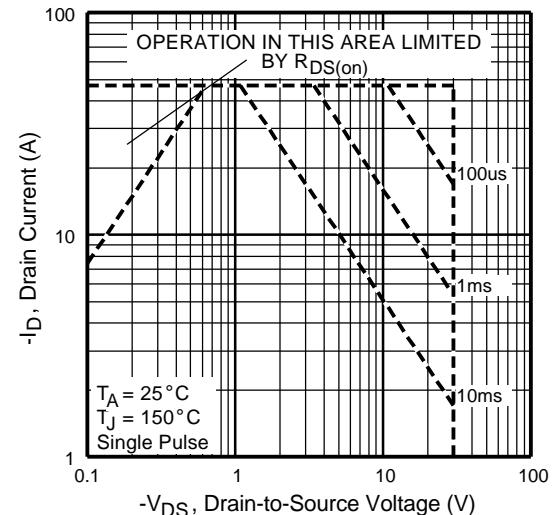
Fig 8. Maximum Safe Operating Area
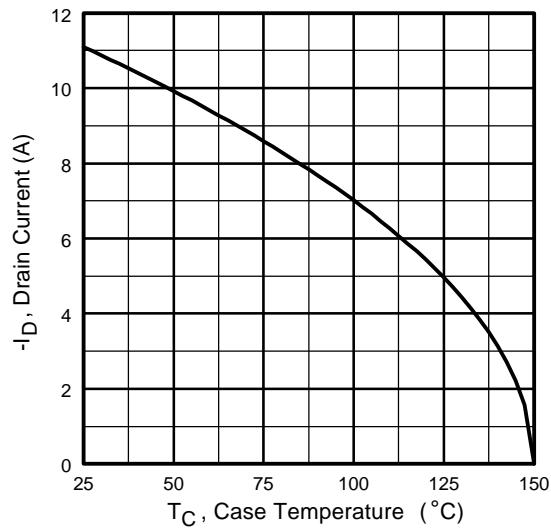
Fig 9. Maximum Drain Current Vs. Case Temperature
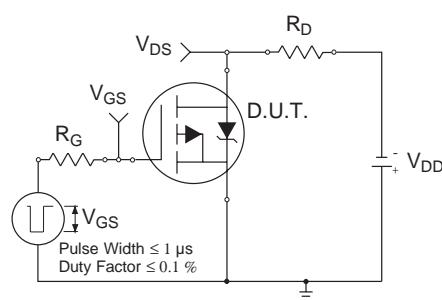
Fig 10a. Switching Time Test Circuit

Pulse Width ≤ 1 μs
Duty Factor ≤ 0.1 %
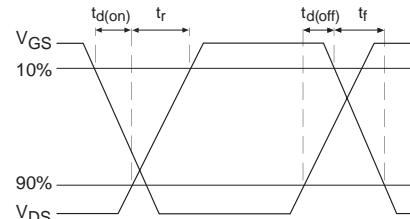
Fig 10b. Switching Time Waveforms

Notes:
1. Duty factor D = t_1 / t_2
2. Peak $T_J = P_{DM} \times Z_{thJA} + T_A$
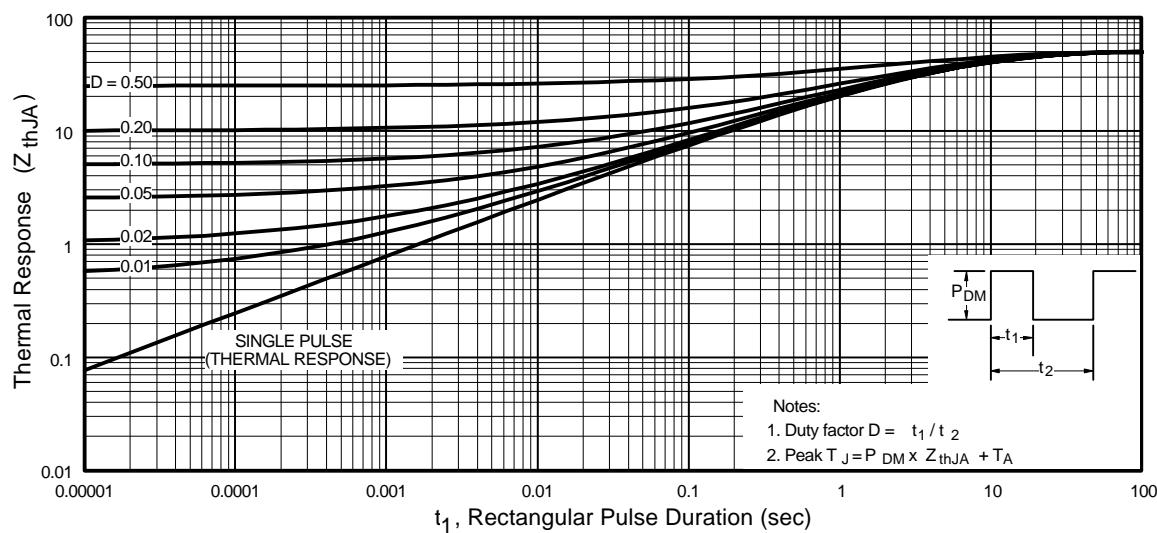
**Fig 11.** Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

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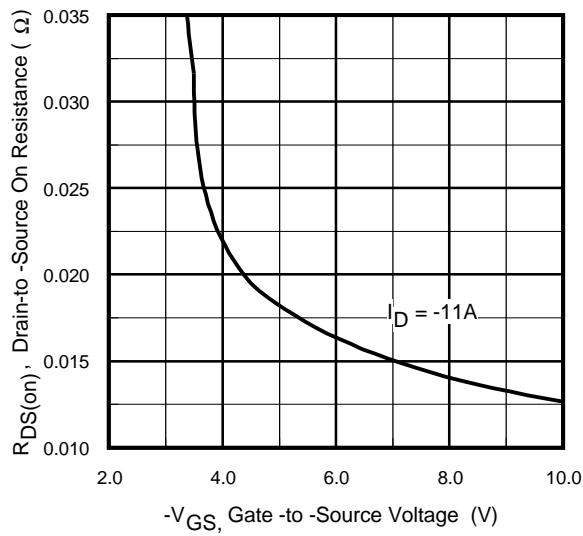
Fig 12. Typical On-Resistance Vs. Gate Voltage
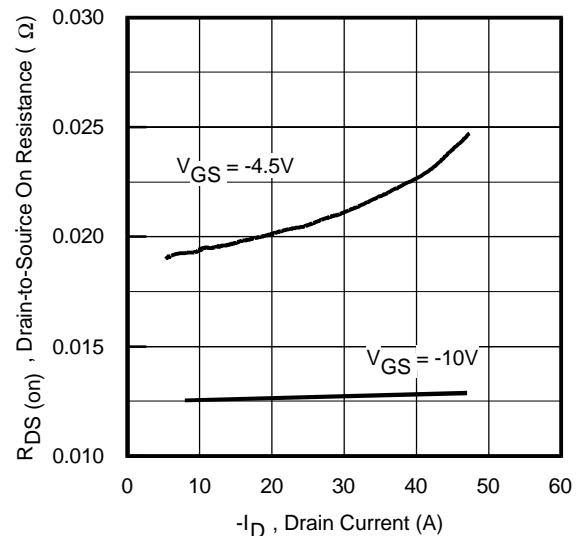
**Fig 13.** Typical On-Resistance Vs. Drain Current
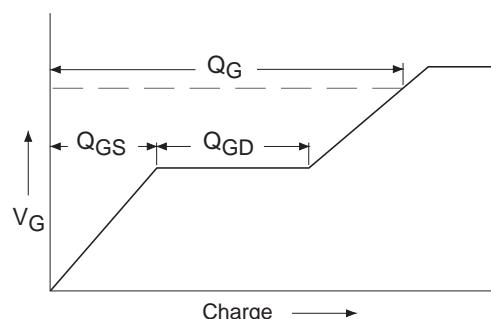
Fig 14a. Basic Gate Charge Waveform
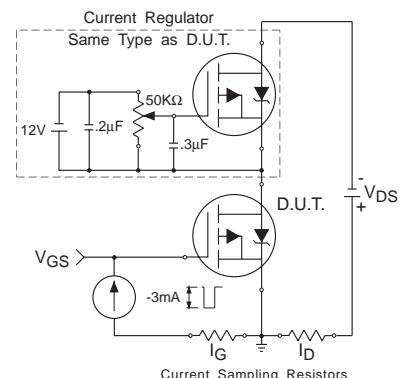
**Fig 14b.** Gate Charge Test Circuit

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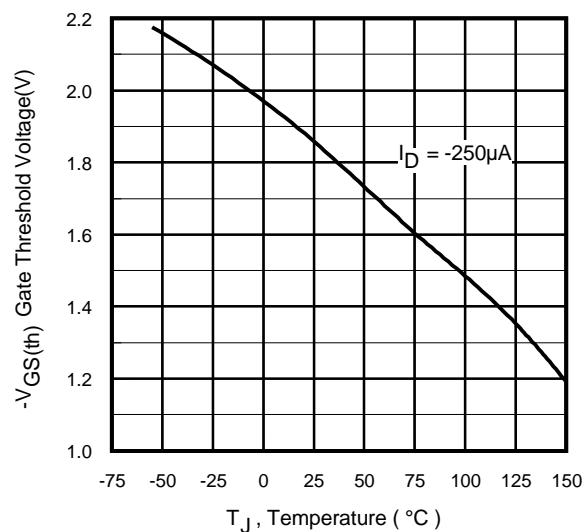
Fig 15. Typical Vgs(th) Vs. Junction Temperature
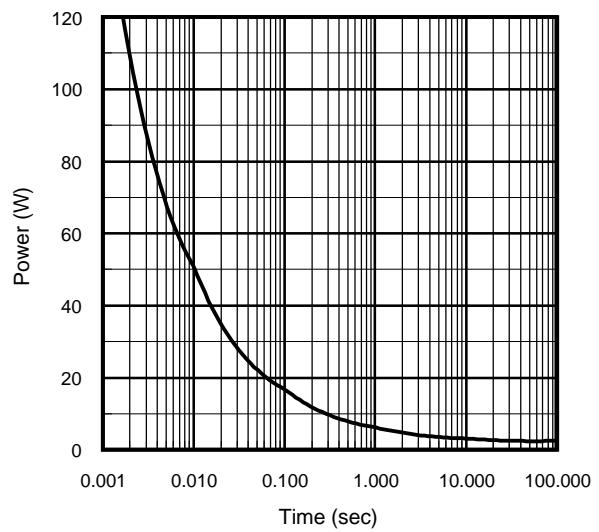
**Fig 16.** Typical Power Vs. Time

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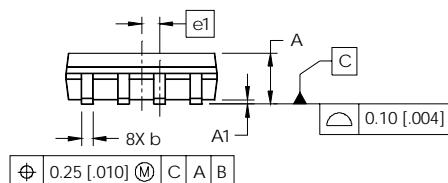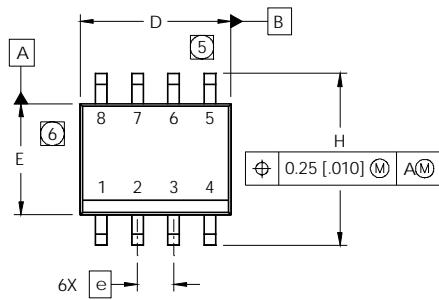
| DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.0532	.0688	1.35	1.75
A1	.0040	.0098	0.10	0.25
b	.013	.020	0.33	0.51
c	.0075	.0098	0.19	0.25
D	.189	.1968	4.80	5.00
E	.1497	.1574	3.80	4.00
e	.050 BASIC		1.27 BASIC	
e1	.025 BASIC		0.635 BASIC	
H	.2284	.2440	5.80	6.20
K	.0099	.0196	0.25	0.50
L	.016	.050	0.40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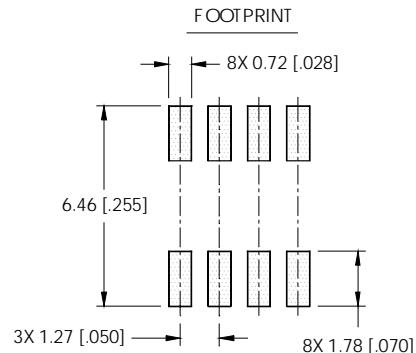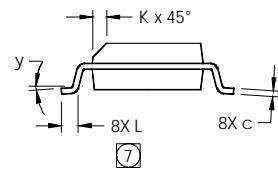
NOTES:

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.

FOOTPRINT

8X 0.72 [.028]

6.46 [.255]

3X 1.27 [.050]

8X 1.78 [.070]

SO-8 Part Marking

EXAMPLE: THIS IS AN IRF7101 (MOSFET)
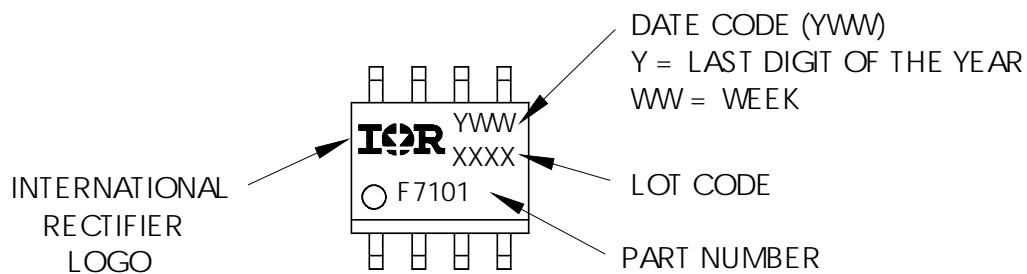
DATE CODE (YWW)
Y = LAST DIGIT OF THE YEAR
WW = WEEK

INTERNATIONAL RECTIFIER LOGO

LOT CODE

PART NUMBER

Tape and Reel

TERMINAL NUMBER 1

12.3 (.484)
11.7 (.461)

8.1 (.318)
7.9 (.312)

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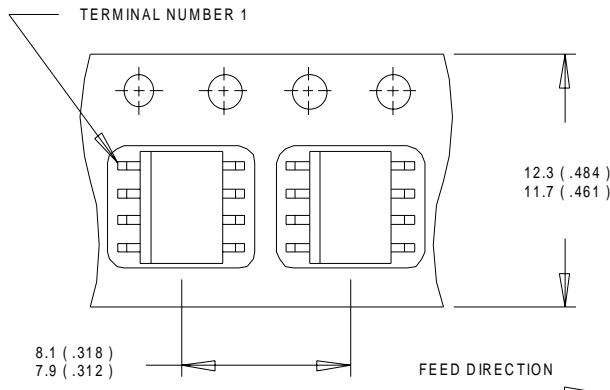
NOTES:
1. CONTROLLING DIMENSION : MILLIMETER.
2. ALL DIMENSIONS ARE SHOWN IN MILLIMETERS(INCHES).
3. OUTLINE CONFORMS TO EIA-481 & EIA-541.

$\varnothing$ 330.00
(12.992)
MAX.

14.40 (.566)
12.40 (.488)
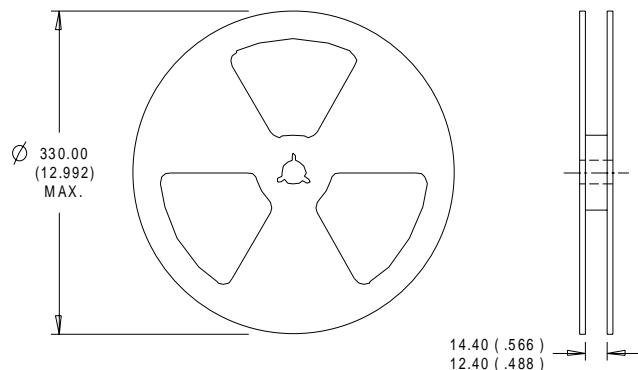
NOTES :
1. CONTROLLING DIMENSION : MILLIMETER.
2. OUTLINE CONFORMS TO EIA-481 & EIA-541.

Data and specifications subject to change without notice.
This product has been designed and qualified for the consumer market.
Qualification Standards can be found on IR's Web site.

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