International
IOR Rectifier

PD- 93895

IRF7464

SMPS MOSFET

HEXFET® Power MOSFET

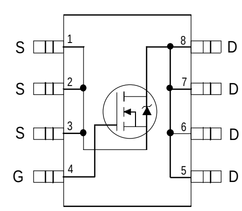
V_{DSS}	$R_{DS(on)}$ max	I_D
200V	**0.73Ω**	**1.2A**

Applications

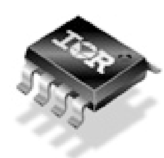
- High frequency DC-DC converters

Benefits

- Low Gate to Drain Charge to Reduce Switching Losses
- Fully Characterized Capacitance Including Effective C_{OSS} to Simplify Design, (See App. Note AN1001)
- Fully Characterized Avalanche Voltage and Current



Top View


SO-8

Absolute Maximum Ratings

	Parameter	Max.	Units
I_D @ T_A = 25°C	Continuous Drain Current, V_{GS} @ 10V	1.2	A
I_D @ T_A = 70°C	Continuous Drain Current, V_{GS} @ 10V	1.0	
I_{DM}	Pulsed Drain Current ①	10	
P_D @T_A = 25°C	Power Dissipation	2.5	W
	Linear Derating Factor	0.02	W/°C
V_{GS}	Gate-to-Source Voltage	± 30	V
dv/dt	Peak Diode Recovery dv/dt ③	6.8	V/ns
T_J T_{STG}	Operating Junction and Storage Temperature Range	-55 to + 150	°C
	Soldering Temperature, for 10 seconds	300 (1.6mm from case)	

Typical SMPS Topologies

- Telecom 48V input Forward Converter

Notes ① through ⑥ are on page 8

4/25/00

Static @ T_J = 25°C (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	200	–––	–––	V	V_{GS} = 0V, I_D = 250µA
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	–––	0.23	–––	V/°C	Reference to 25°C, I_D = 1mA ⑥
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	–––	–––	0.73	Ω	V_{GS} = 10V, I_D = 0.72A ④
$V_{GS(th)}$	Gate Threshold Voltage	3.0	–––	5.5	V	V_{DS} = V_{GS}, I_D = 250µA
I_{DSS}	Drain-to-Source Leakage Current	–––	–––	25	µA	V_{DS} = 200V, V_{GS} = 0V
		–––	–––	250		V_{DS} = 160V, V_{GS} = 0V, T_J = 125°C
I_{GSS}	Gate-to-Source Forward Leakage	–––	–––	100	nA	V_{GS} = 30V
	Gate-to-Source Reverse Leakage	–––	–––	-100		V_{GS} = -30V

Dynamic @ T_J = 25°C (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
g_{fs}	Forward Transconductance	1.1	–––	–––	S	V_{DS} = 50V, I_D = 0.72A
Q_g	Total Gate Charge	–––	9.5	14	nC	I_D = 0.72A
Q_{gs}	Gate-to-Source Charge	–––	2.5	3.8		V_{DS} = 160V
Q_{gd}	Gate-to-Drain ("Miller") Charge	–––	4.6	6.9		V_{GS} = 10V, ④
$t_{d(on)}$	Turn-On Delay Time	–––	11	–––	ns	V_{DD} = 100V
t_r	Rise Time	–––	9.5	–––		I_D = 0.72A
$t_{d(off)}$	Turn-Off Delay Time	–––	18	–––		R_G = 24Ω
t_f	Fall Time	–––	15	–––		V_{GS} = 10V ④
C_{iss}	Input Capacitance	–––	280	–––	pF	V_{GS} = 0V
C_{oss}	Output Capacitance	–––	52	–––		V_{DS} = 25V
C_{rss}	Reverse Transfer Capacitance	–––	14	–––		f = 1.0MHz
C_{oss}	Output Capacitance	–––	330	–––		V_{GS} = 0V, V_{DS} = 1.0V, f = 1.0MHz
C_{oss}	Output Capacitance	–––	25	–––		V_{GS} = 0V, V_{DS} = 160V, f = 1.0MHz
C_{oss} eff.	Effective Output Capacitance	–––	48	–––		V_{GS} = 0V, V_{DS} = 0V to 160V ⑤

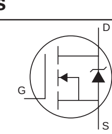
Avalanche Characteristics

	Parameter	Typ.	Max.	Units
E_{AS}	Single Pulse Avalanche Energy②	–––	68	mJ
I_{AR}	Avalanche Current①	–––	1.2	A
E_{AR}	Repetitive Avalanche Energy①	–––	0.25	mJ

Thermal Resistance

	Parameter	Typ.	Max.	Units
$R_{\theta JA}$	Maximum Junction-to-Ambient⑥	–––	50	°C/W

Diode Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	–––	–––	2.3	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I_{SM}	Pulsed Source Current (Body Diode) ①	–––	–––	10		
V_{SD}	Diode Forward Voltage	–––	–––	1.3	V	T_J = 25°C, I_S = 0.72A, V_{GS} = 0V ④
t_{rr}	Reverse Recovery Time	–––	60	90	ns	T_J = 25°C, I_F = 0.72A
Q_{rr}	Reverse RecoveryCharge	–––	130	200	nC	di/dt = 100A/µs ④

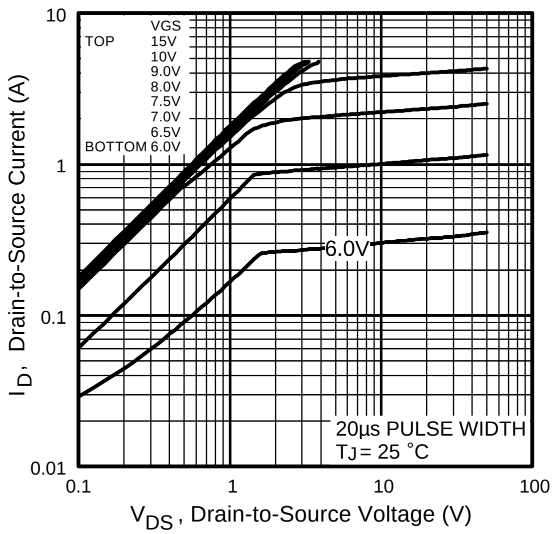


Fig 1. Typical Output Characteristics

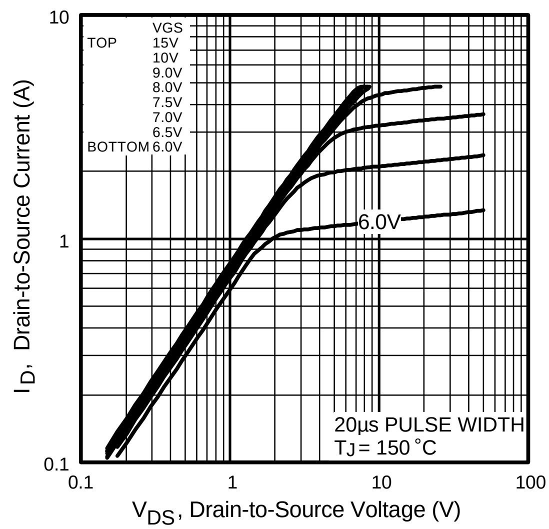


Fig 2. Typical Output Characteristics

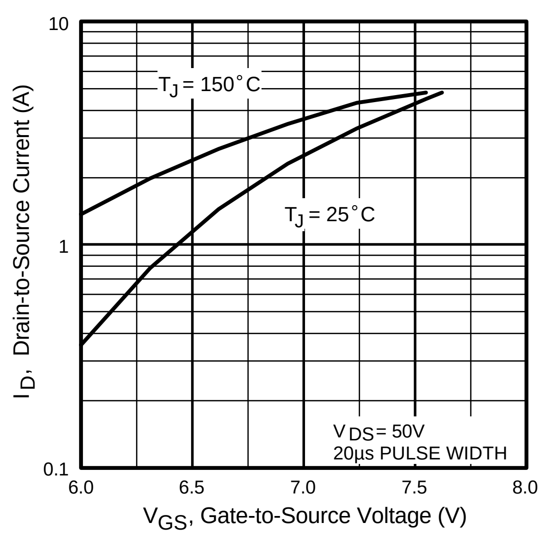


Fig 3. Typical Transfer Characteristics

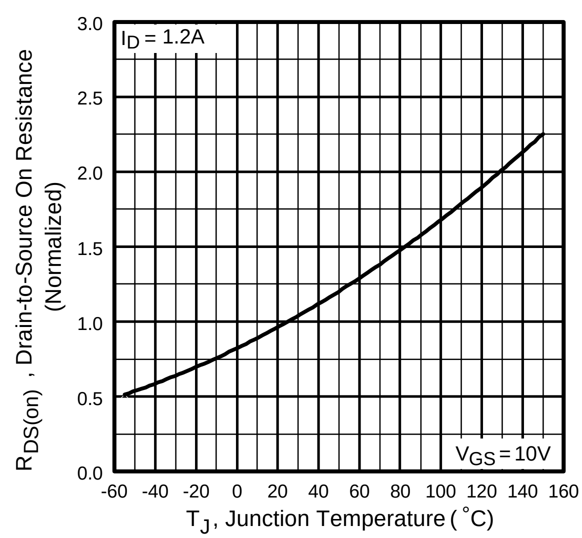


Fig 4. Normalized On-Resistance Vs. Temperature

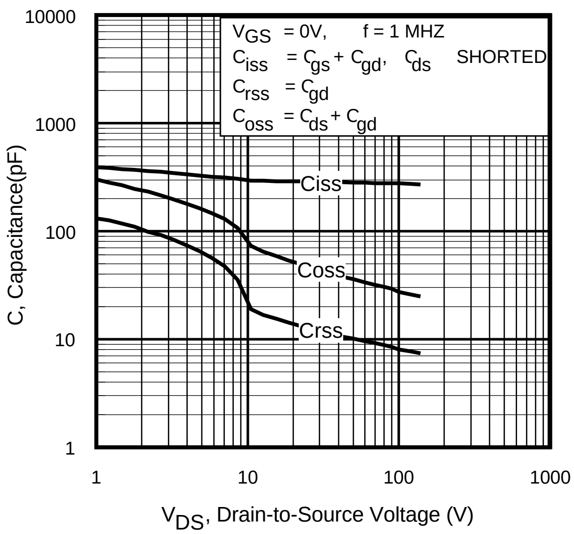


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

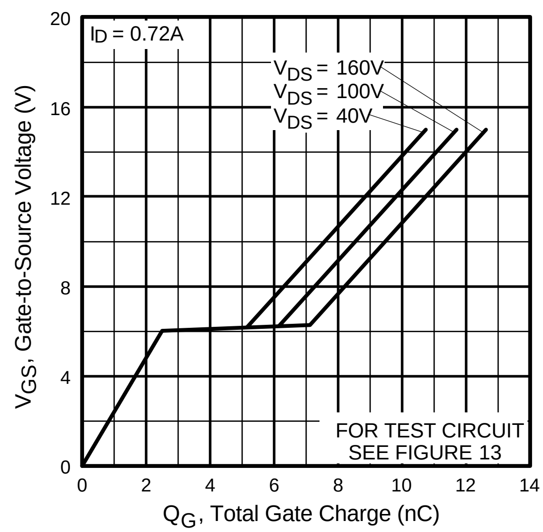


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

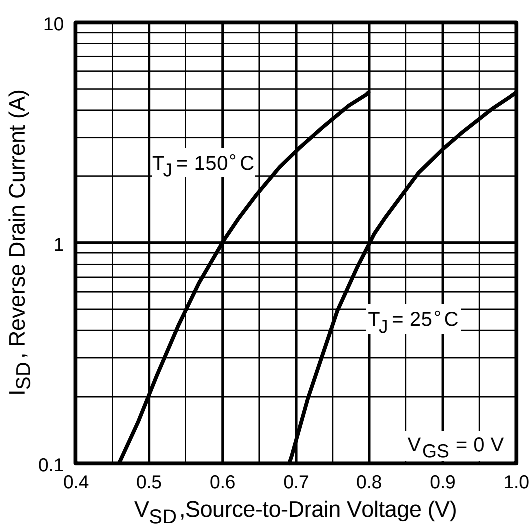


Fig 7. Typical Source-Drain Diode Forward Voltage

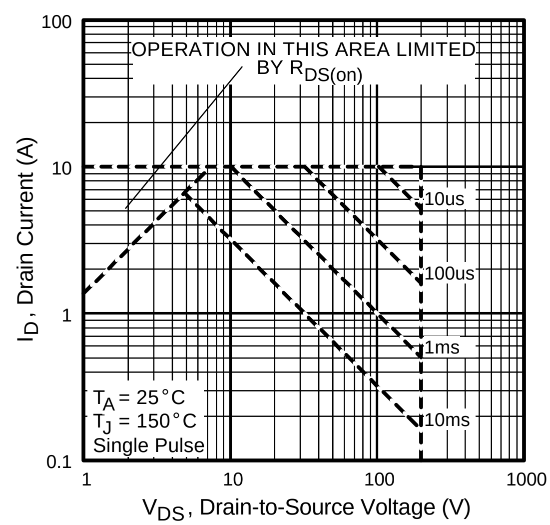
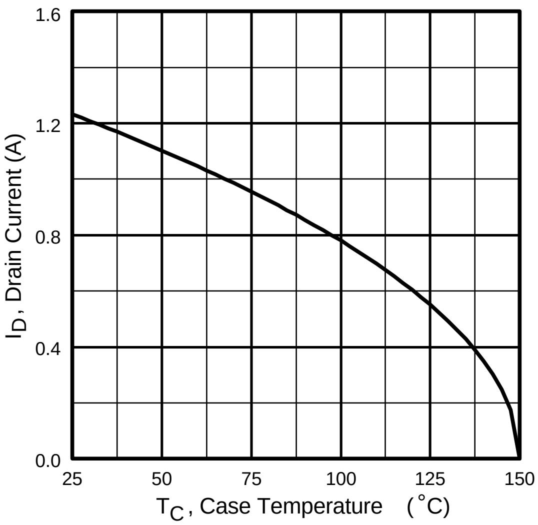


Fig 8. Maximum Safe Operating Area

Fig 6. On-Resistance Vs. Drain Current



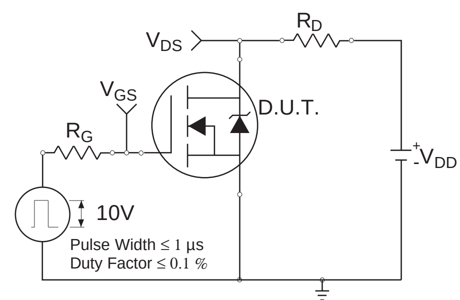


Fig 10a. Switching Time Test Circuit

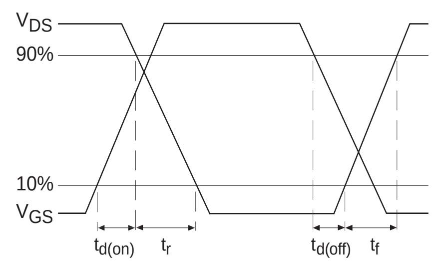


Fig 10b. Switching Time Waveforms

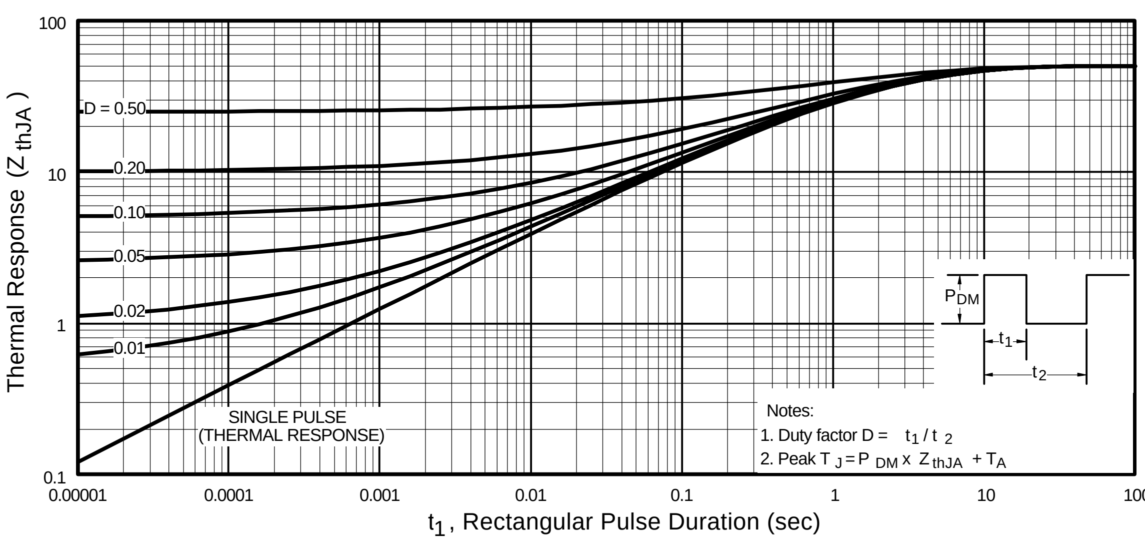


Fig 10. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

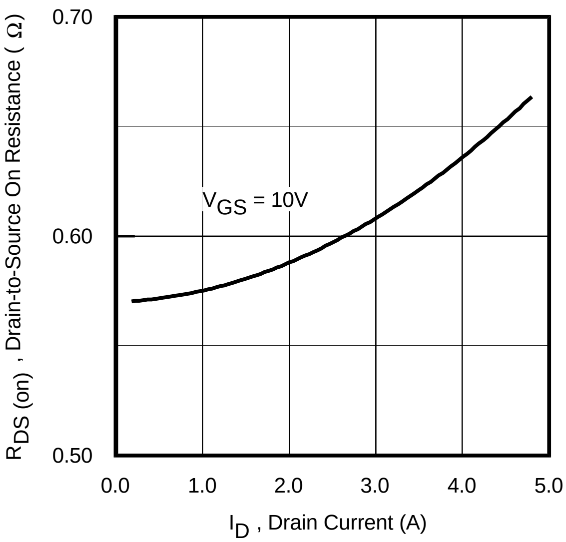


Fig 12. On-Resistance Vs. Drain Current

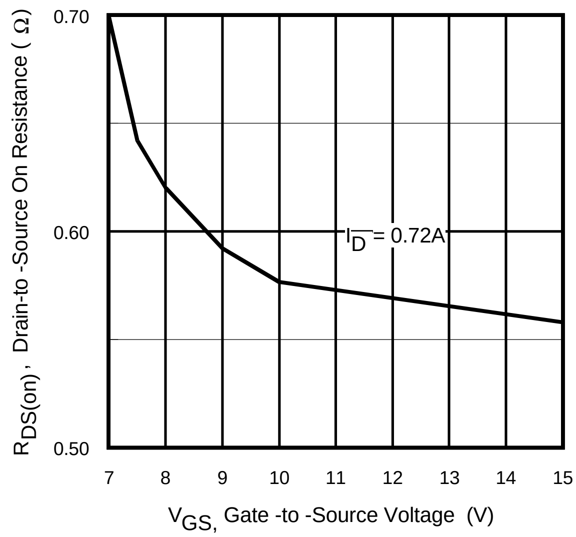


Fig 13. On-Resistance Vs. Gate Voltage

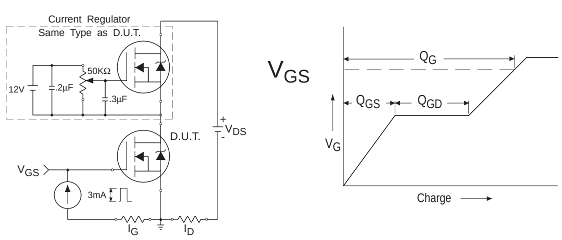
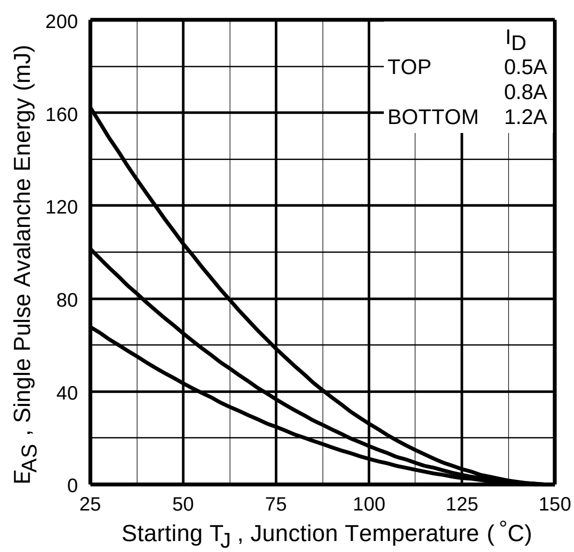


Fig 13a&b. Basic Gate Charge Test Circuit and Waveform



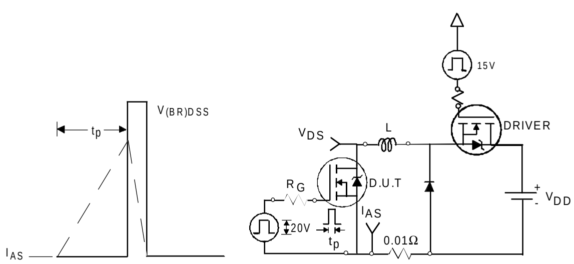
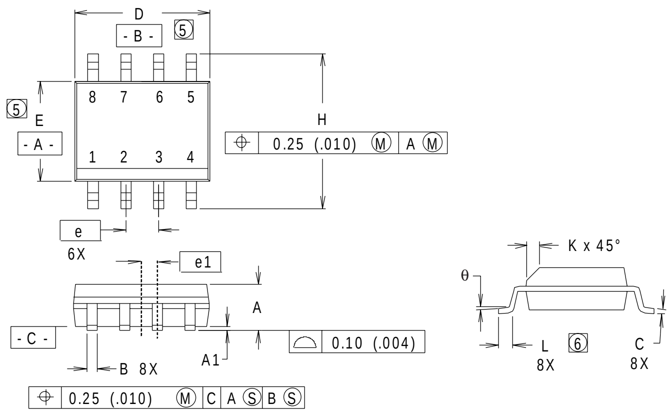


Fig 14a&b. Unclamped Inductive Test circuit and Waveforms

Fig 14c. Maximum Avalanche Energy Vs. Drain Current

SO-8 Package Details



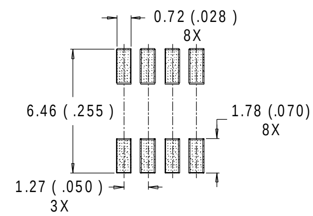
DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.0532	.0688	1.35	1.75
A1	.0040	.0098	0.10	0.25
B	.014	.018	0.36	0.46
C	.0075	.0098	0.19	0.25
D	.189	.196	4.80	4.98
E	.150	.157	3.81	3.99
e	.050 BASIC		1.27 BASIC	
e1	.025 BASIC		0.635 BASIC	
H	.2284	.2440	5.80	6.20
K	.011	.019	0.28	0.48
L	0.16	.050	0.41	1.27
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).

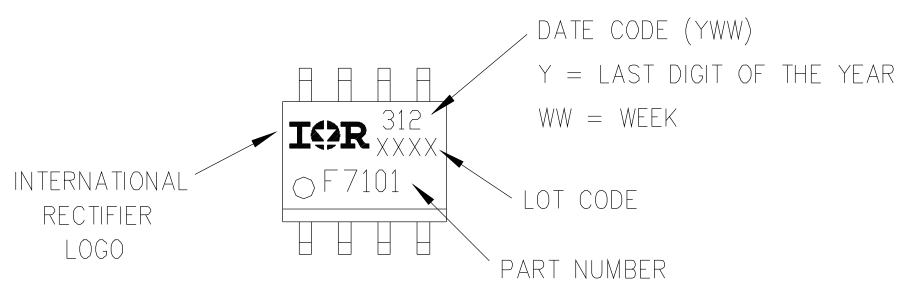
6 DIMENSIONS IS THE LENGTH OF LEAD FOR SOLDERING TO A SUBSTRATE..

RECOMMENDED FOOTPRINT

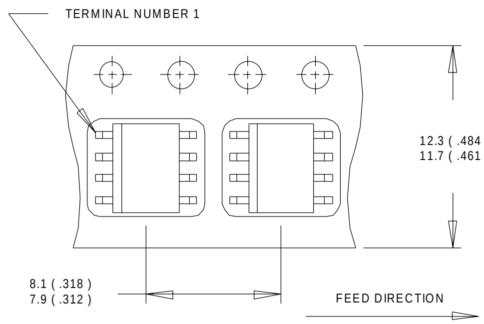


SO-8 Part Marking

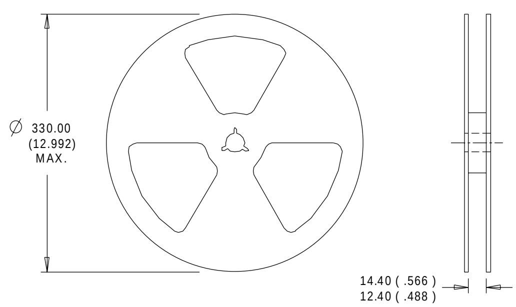
EXAMPLE: THIS IS AN IRF7101



SO-8 Tape and Reel



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.

Notes:

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

② Starting $T_J = 25°C$, L = 94mH $R_G = 25\Omega$, $I_{AS} = 1.2A$.

③ $I_{SD} \le 0.72A$, $di/dt \le 130A/\mu s$, $V_{DD} \le V_{(BR)DSS}$, $T_J \le 150°C$

④ Pulse width ≤ 300µs; duty cycle ≤ 2%.

⑤ C_{oss} eff. is a fixed capacitance that gives the same charging time as C_{oss} while V_{DS} is rising from 0 to 80% V_{DSS}

⑥ When mounted on 1 inch square copper board, t<10 sec

International
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 (0) 6172 96590
IR ITALY: Via Liguria 49, 10071 Borgaro, Torino Tel: ++ 39 011 451 0111
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