

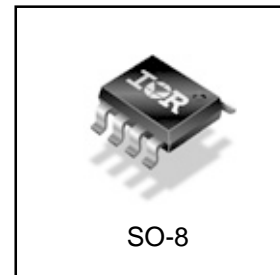
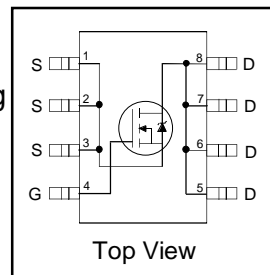
**Applications**

- High frequency DC-DC converters

<b>V<sub>DSS</sub></b>	<b>R<sub>DS(on)</sub> max</b>	<b>I<sub>D</sub></b>
<b>100V</b>	<b>0.060Ω</b>	<b>4.5A</b>

**Benefits**

- Low Gate to Drain Charge to Reduce Switching Losses
- Fully Characterized Capacitance Including Effective C<sub>oss</sub> to Simplify Design, (See App. Note AN1001)
- Fully Characterized Avalanche Voltage and Current



**Absolute Maximum Ratings**

	<b>Parameter</b>	<b>Max.</b>	<b>Units</b>
I <sub>D</sub> @ T <sub>A</sub> = 25°C	Continuous Drain Current, V <sub>GS</sub> @ 10V	4.5	A
I <sub>D</sub> @ T <sub>A</sub> = 70°C	Continuous Drain Current, V <sub>GS</sub> @ 10V	3.6	
I <sub>DM</sub>	Pulsed Drain Current ①	36	
P <sub>D</sub> @ T <sub>A</sub> = 25°C	Power Dissipation	2.5	W
	Linear Derating Factor	0.02	W/°C
V <sub>GS</sub>	Gate-to-Source Voltage	± 30	V
dv/dt	Peak Diode Recovery dv/dt ③	3.5	V/ns
T <sub>J</sub>	Operating Junction and	-55 to + 150	°C
T <sub>STG</sub>	Storage Temperature Range		
	Soldering Temperature, for 10 seconds	300 (1.6mm from case )	

**Typical SMPS Topologies**

- Telecom 48V input DC-DC with Half Bridge Primary or Datacom 28V input with Passive Reset Forward Converter Primary

Notes ① through ③ are on page 8  
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# IRF7452

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Static @  $T_J = 25^\circ\text{C}$  (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	100	—	—	V	$V_{GS} = 0V, I_D = 250\mu A$
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	0.11	—	V/°C	Reference to $25^\circ\text{C}$ , $I_D = 1\text{mA}$ ⑥
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	—	0.060	$\Omega$	$V_{GS} = 10V, I_D = 2.7A$ ④
$V_{GS(th)}$	Gate Threshold Voltage	3.0	—	5.5	V	$V_{DS} = V_{GS}, I_D = 250\mu A$
$I_{DSS}$	Drain-to-Source Leakage Current	—	—	25	$\mu A$	$V_{DS} = 100V, V_{GS} = 0V$
		—	—	250		$V_{DS} = 80V, V_{GS} = 0V, T_J = 150^\circ\text{C}$
$I_{GSS}$	Gate-to-Source Forward Leakage	—	—	100	nA	$V_{GS} = 24V$
	Gate-to-Source Reverse Leakage	—	—	-100		$V_{GS} = -24V$

Dynamic @  $T_J = 25^\circ\text{C}$  (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
$g_{fs}$	Forward Transconductance	3.4	—	—	S	$V_{DS} = 50V, I_D = 2.7A$
$Q_g$	Total Gate Charge	—	33	50	nC	$I_D = 2.7A$
$Q_{gs}$	Gate-to-Source Charge	—	7.3	11		$V_{DS} = 80V$
$Q_{gd}$	Gate-to-Drain ("Miller") Charge	—	16	24		$V_{GS} = 10V, \text{④}$
$t_{d(on)}$	Turn-On Delay Time	—	9.5	—	ns	$V_{DD} = 50V$
$t_r$	Rise Time	—	11	—		$I_D = 2.7A$
$t_{d(off)}$	Turn-Off Delay Time	—	16	—		$R_G = 6.0\Omega$
$t_f$	Fall Time	—	13	—		$V_{GS} = 10V, \text{④}$
$C_{iss}$	Input Capacitance	—	930	—	pF	$V_{GS} = 0V$
$C_{oss}$	Output Capacitance	—	300	—		$V_{DS} = 25V$
$C_{rss}$	Reverse Transfer Capacitance	—	84	—		$f = 1.0\text{MHz}$
$C_{oss}$	Output Capacitance	—	1370	—		$V_{GS} = 0V, V_{DS} = 1.0V, f = 1.0\text{MHz}$
$C_{oss}$	Output Capacitance	—	170	—		$V_{GS} = 0V, V_{DS} = 80V, f = 1.0\text{MHz}$
$C_{oss\ eff.}$	Effective Output Capacitance	—	280	—		$V_{GS} = 0V, V_{DS} = 0V \text{ to } 80V \text{ ⑤}$

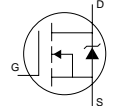
## Avalanche Characteristics

	Parameter	Typ.	Max.	Units
$E_{AS}$	Single Pulse Avalanche Energy②	—	200	mJ
$I_{AR}$	Avalanche Current①	—	4.5	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	—	—	36		
$V_{SD}$	Diode Forward Voltage	—	—	1.3	V	$T_J = 25^\circ\text{C}, I_S = 2.7A, V_{GS} = 0V$ ④
$t_{rr}$	Reverse Recovery Time	—	77	120	ns	$T_J = 25^\circ\text{C}, I_F = 2.7A$
$Q_{rr}$	Reverse Recovery Charge	—	270	410	nC	$di/dt = 100A/\mu s$ ④

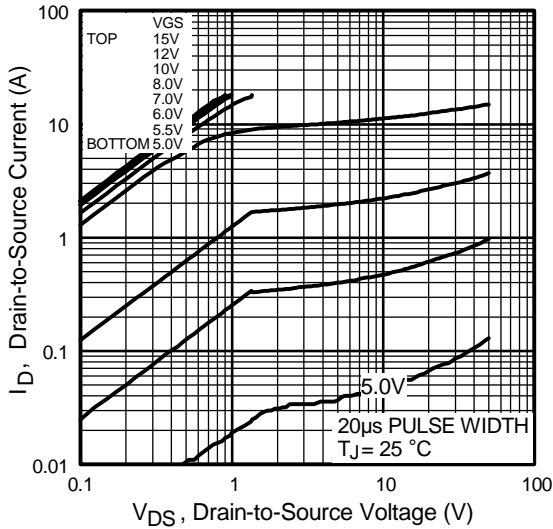


Fig 1. Typical Output Characteristics

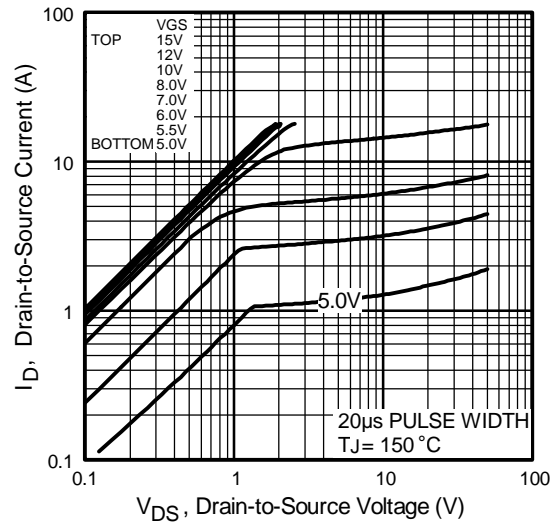


Fig 2. Typical Output Characteristics

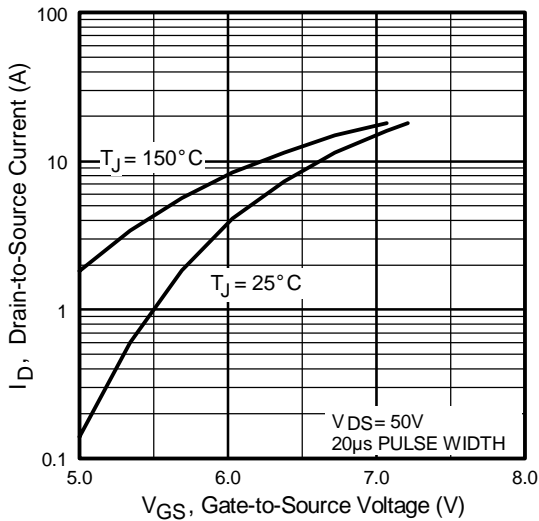


Fig 3. Typical Transfer Characteristics

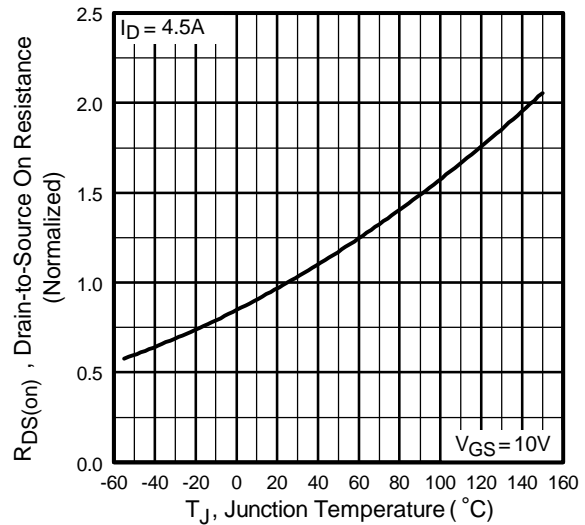
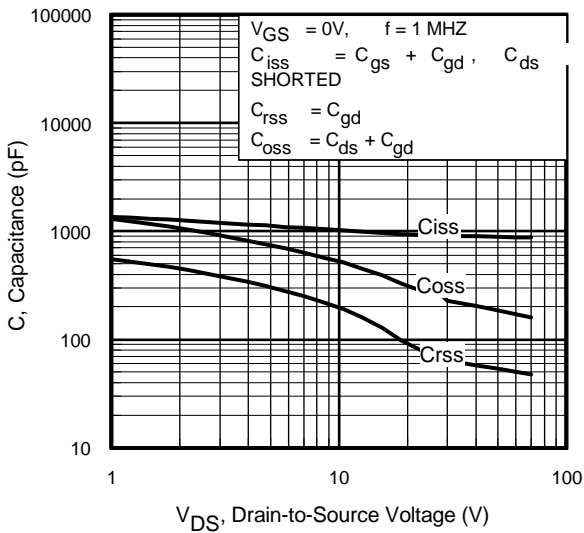
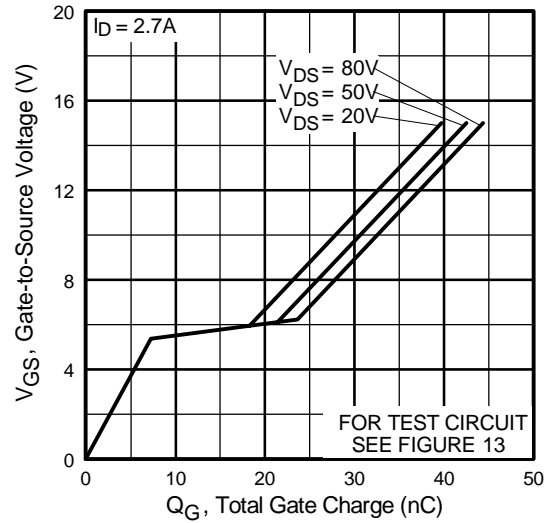


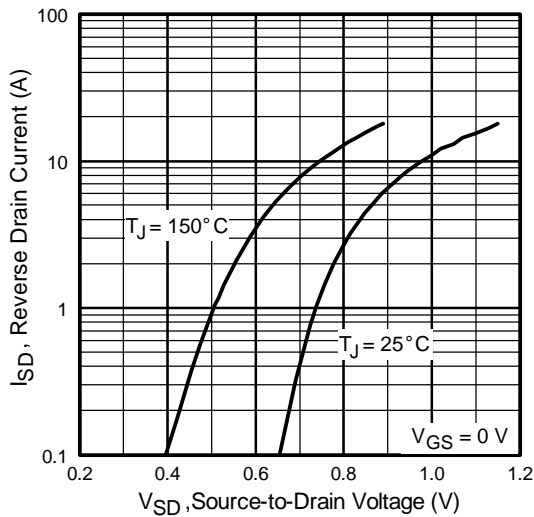
Fig 4. Normalized On-Resistance Vs. Temperature



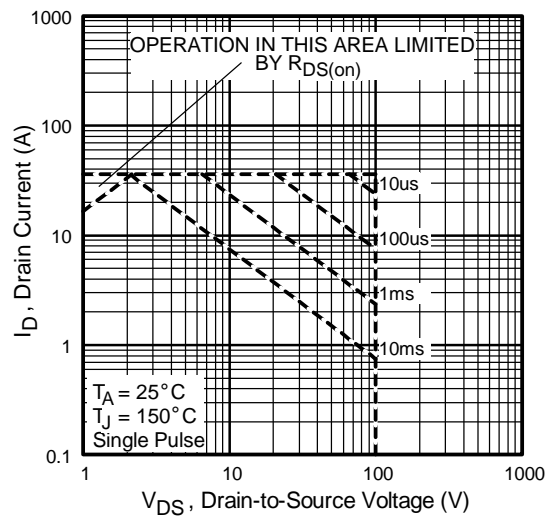
**Fig 5.** Typical Capacitance Vs. Drain-to-Source Voltage



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



**Fig 7.** Typical Source-Drain Diode Forward Voltage



**Fig 8.** Maximum Safe Operating Area

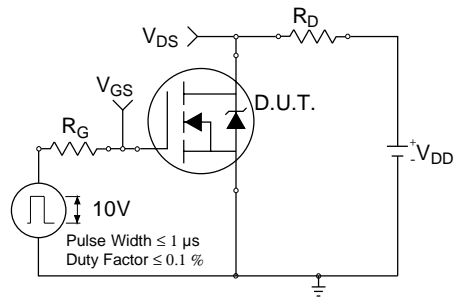
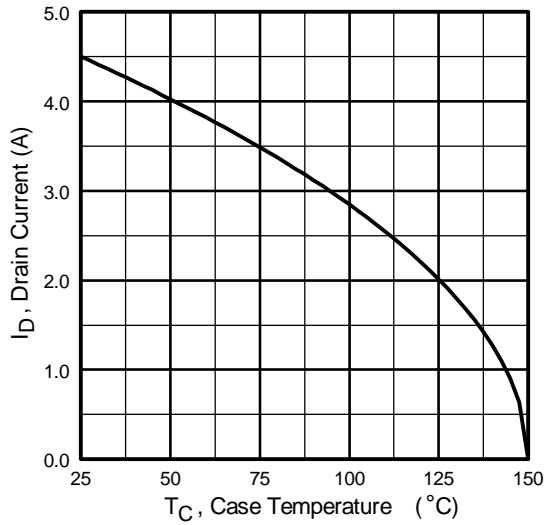


Fig 10a. Switching Time Test Circuit

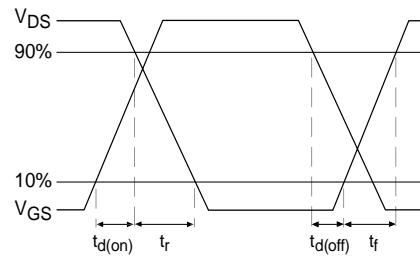


Fig 10b. Switching Time Waveforms

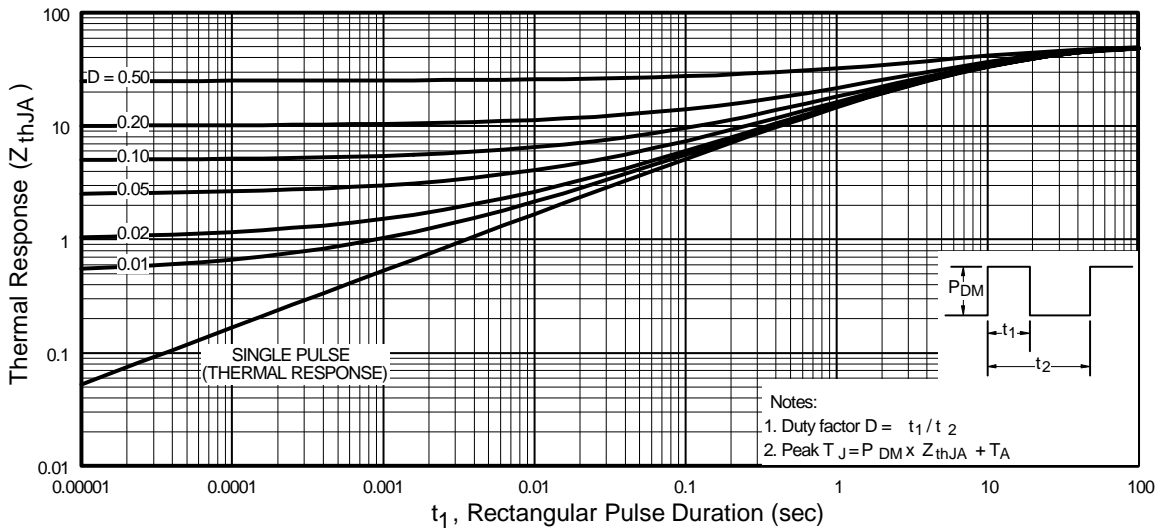
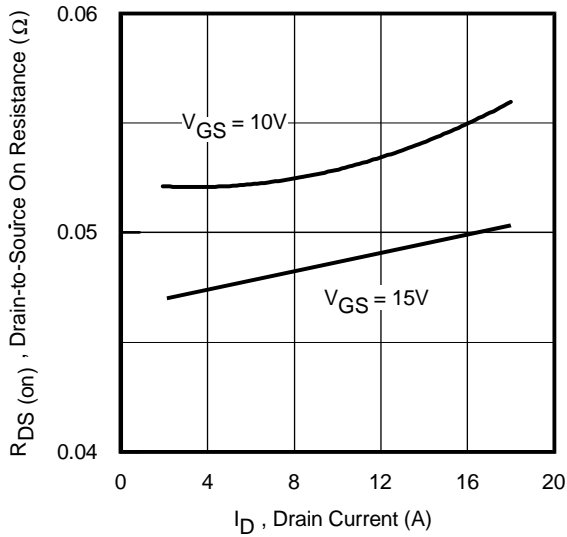
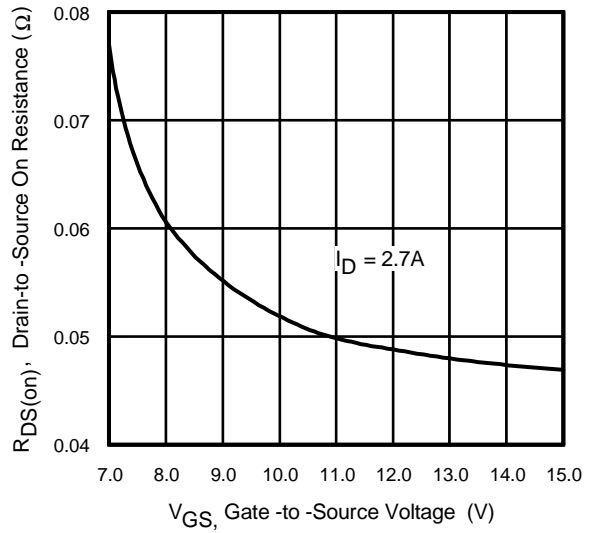


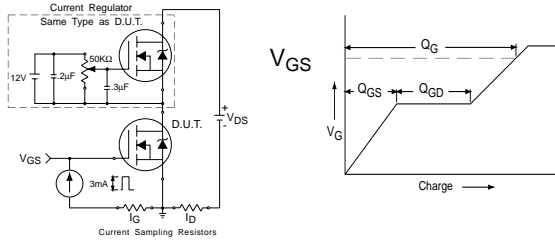
Fig 10. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient



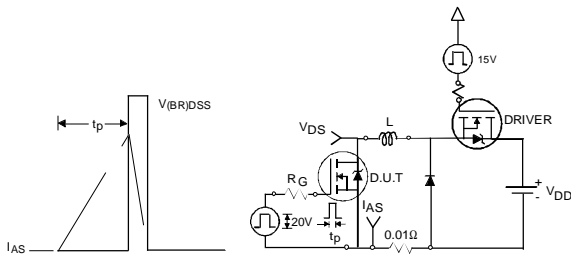
**Fig 12.** On-Resistance Vs. Drain Current



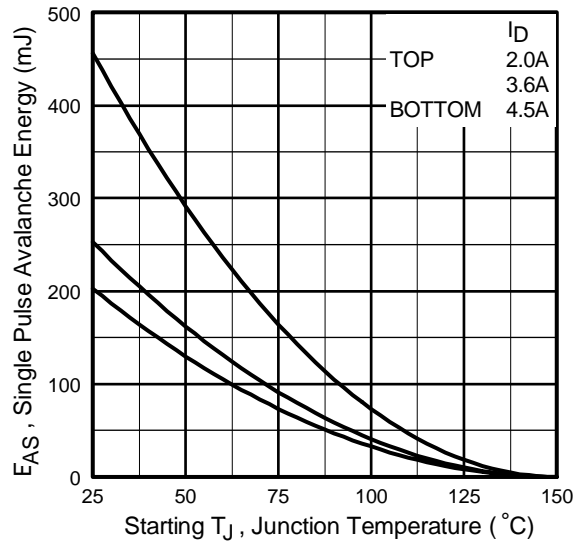
**Fig 13.** On-Resistance Vs. Gate Voltage



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

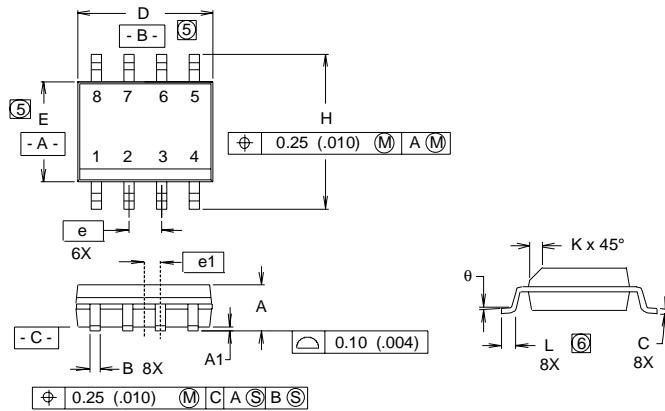


**Fig 14a&b.** Unclamped Inductive Test circuit and Waveforms



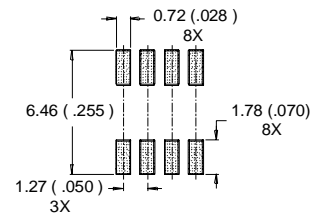
**Fig 14c.** Maximum Avalanche Energy Vs. Drain Current

## 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
$\theta$	0°	8°	0°	8°

### RECOMMENDED FOOTPRINT

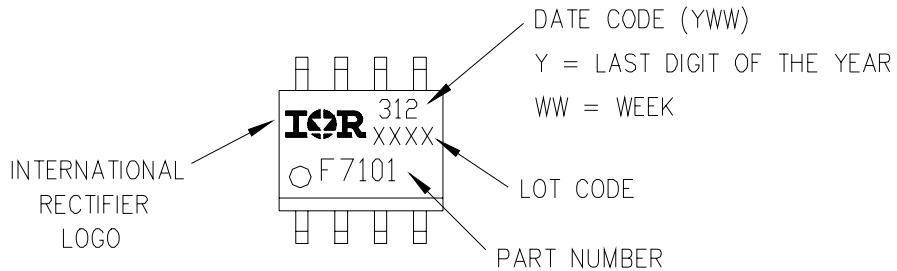


### NOTES:

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..

## SO-8 Part Marking

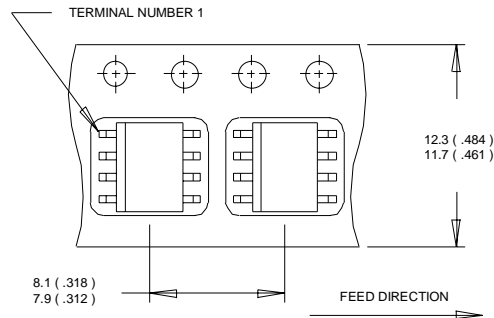
EXAMPLE: THIS IS AN IRF7101



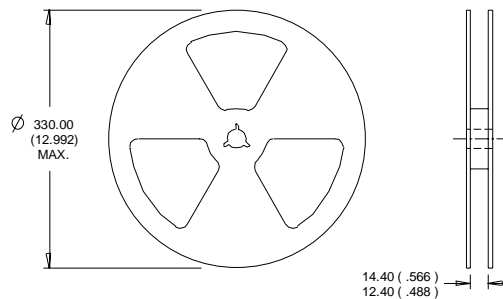
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## SO-8 Tape and Reel



- 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  $T_J = 25^\circ\text{C}$ ,  $L = 20\text{mH}$   
 $R_G = 25\Omega$ ,  $I_{AS} = 4.5\text{A}$ .
- ③ Pulse width  $\leq 400\mu\text{s}$ ; duty cycle  $\leq 2\%$ .
- ④ When mounted on 1 inch square copper board,  $t_{<10}$  sec

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**IR TAIWAN:** 16 Fl. Suite D. 207, Sec. 2, Tun Haw South Road, Taipei, 10673 Tel: 886-(0)2 2377 9936

*Data and specifications subject to change without notice. 11/01*