

# International **IR** Rectifier

PD - 95284

## IRF7490PbF

HEXFET® Power MOSFET

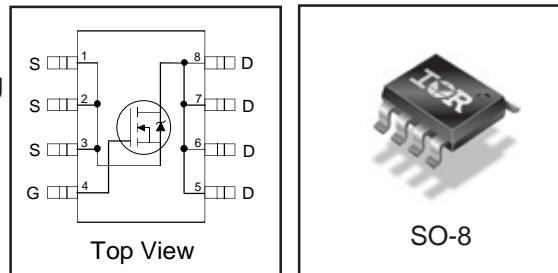
### Applications

- High frequency DC-DC converters
- Lead-Free

<b>V<sub>DSS</sub></b>	<b>R<sub>DS(on)</sub> max</b>	<b>Q<sub>g</sub></b>
100V	39mΩ@V <sub>GS</sub> =10V	37nC

### 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

Symbol	Parameter	Max.	Units
V <sub>DS</sub>	Drain-Source Voltage	100	V
V <sub>GS</sub>	Gate-to-Source Voltage	± 20	
I <sub>D</sub> @ T <sub>A</sub> = 25°C	Continuous Drain Current, V <sub>GS</sub> @ 10V	5.4	A
I <sub>D</sub> @ T <sub>A</sub> = 70°C	Continuous Drain Current, V <sub>GS</sub> @ 10V	4.3	
I <sub>DM</sub>	Pulsed Drain Current①	43	
P <sub>D</sub> @ T <sub>A</sub> = 25°C	Maximum Power Dissipation	2.5	W
P <sub>D</sub> @ T <sub>A</sub> = 70°C	Maximum Power Dissipation	1.6	
	Linear Derating Factor	20	mW/°C
T <sub>J</sub> T <sub>STG</sub>	Operating Junction and Storage Temperature Range	-55 to + 150	°C
	Soldering Temperature, for 10 seconds	300 (1.6mm from case )	

### Thermal Resistance

Symbol	Parameter	Typ.	Max.	Units
R <sub>θJL</sub>	Junction-to-Drain Lead	—	20	°C/W
R <sub>θJA</sub>	Junction-to-Ambient ④	—	50	

Notes ① through ④ are on page 9  
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09/15/04

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

	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(\text{BR})\text{DSS}}$	Drain-to-Source Breakdown Voltage	100	—	—	V	$V_{GS} = 0\text{V}, I_D = 250\mu\text{A}$
$\Delta V_{(\text{BR})\text{DSS}/\Delta T_J}$	Breakdown Voltage Temp. Coefficient	—	0.11	—	$\text{V}/^\circ\text{C}$	Reference to $25^\circ\text{C}, I_D = 1\text{mA}$ ③
$R_{DS(\text{on})}$	Static Drain-to-Source On-Resistance	—	33	39	$\text{m}\Omega$	$V_{GS} = 10\text{V}, I_D = 3.2\text{A}$ ③
$V_{GS(\text{th})}$	Gate Threshold Voltage	2.0	—	4.0	V	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$
$I_{DSS}$	Drain-to-Source Leakage Current	—	—	20	$\mu\text{A}$	$V_{DS} = 100\text{V}, V_{GS} = 0\text{V}$
		—	—	250		$V_{DS} = 80\text{V}, V_{GS} = 0\text{V}, T_J = 125^\circ\text{C}$
$I_{GSS}$	Gate-to-Source Forward Leakage	—	—	200	$\text{nA}$	$V_{GS} = 20\text{V}$
	Gate-to-Source Reverse Leakage	—	—	-200		$V_{GS} = -20\text{V}$

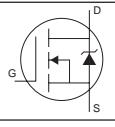
## Dynamic @ $T_J = 25^\circ\text{C}$ (unless otherwise specified)

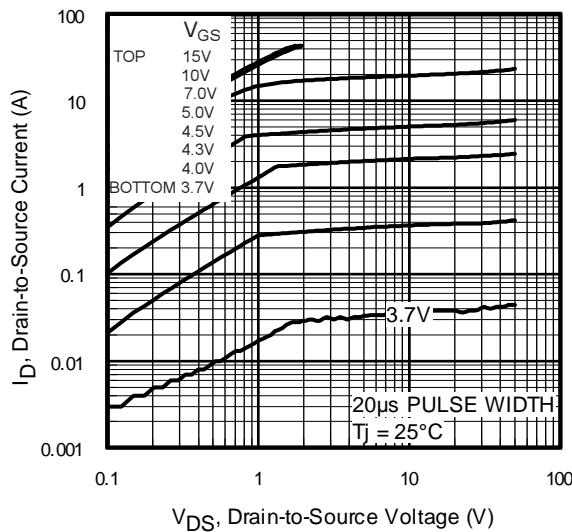
	Parameter	Min.	Typ.	Max.	Units	Conditions
$g_{fs}$	Forward Transconductance	8.0	—	—	S	$V_{DS} = 50\text{V}, I_D = 3.2\text{A}$
$Q_g$	Total Gate Charge	—	37	56	nC	$I_D = 3.2\text{A}$
$Q_{gs}$	Gate-to-Source Charge	—	8.0	—	nC	$V_{DS} = 50\text{V}$
$Q_{gd}$	Gate-to-Drain ("Miller") Charge	—	10	—	nC	$V_{GS} = 10\text{V},$
$t_{d(on)}$	Turn-On Delay Time	—	13	—	ns	$V_{DD} = 100\text{V}$
$t_r$	Rise Time	—	4.2	—		$I_D = 3.2\text{A}$
$t_{d(off)}$	Turn-Off Delay Time	—	51	—		$R_G = 9.1\Omega$
$t_f$	Fall Time	—	11	—		$V_{GS} = 10\text{V}$ ③
$C_{iss}$	Input Capacitance	—	1720	—	pF	$V_{GS} = 0\text{V}$
$C_{oss}$	Output Capacitance	—	220	—		$V_{DS} = 25\text{V}$
$C_{rss}$	Reverse Transfer Capacitance	—	25	—		$f = 1.0\text{MHz}$
$C_{oss}$	Output Capacitance	—	1650	—		$V_{GS} = 0\text{V}, V_{DS} = 1.0\text{V}, f = 1.0\text{MHz}$
$C_{oss}$	Output Capacitance	—	130	—		$V_{GS} = 0\text{V}, V_{DS} = 80\text{V}, f = 1.0\text{MHz}$
$C_{oss \text{ eff.}}$	Effective Output Capacitance	—	250	—		$V_{GS} = 0\text{V}, V_{DS} = 0\text{V to } 80\text{V}$ ③

## Avalanche Characteristics

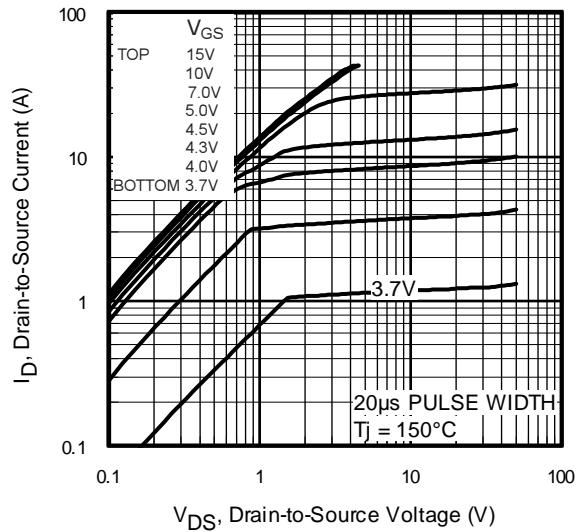
	Parameter	Typ.	Max.	Units
$E_{AS}$	Single Pulse Avalanche Energy ②	—	91	mJ
$I_{AR}$	Avalanche Current ①	—	3.2	A

## Diode Characteristics

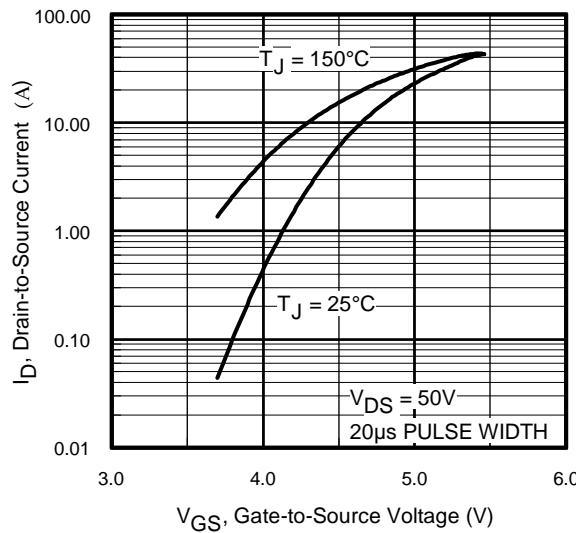
	Parameter	Min.	Typ.	Max.	Units	Conditions
$I_S$	Continuous Source Current (Body Diode)	—	—	2.3	A	MOSFET symbol showing the integral reverse p-n junction diode.
$I_{SM}$	Pulsed Source Current (Body Diode) ①	—	—	43		
$V_{SD}$	Diode Forward Voltage	—	—	1.3	V	$T_J = 25^\circ\text{C}, I_S = 3.2\text{A}, V_{GS} = 0\text{V}$ ③
$t_{rr}$	Reverse Recovery Time	—	67	100	ns	$T_J = 25^\circ\text{C}, I_F = 3.2\text{A}$
$Q_{rr}$	Reverse Recovery Charge	—	220	330	nC	$di/dt = 100\text{A}/\mu\text{s}$ ③



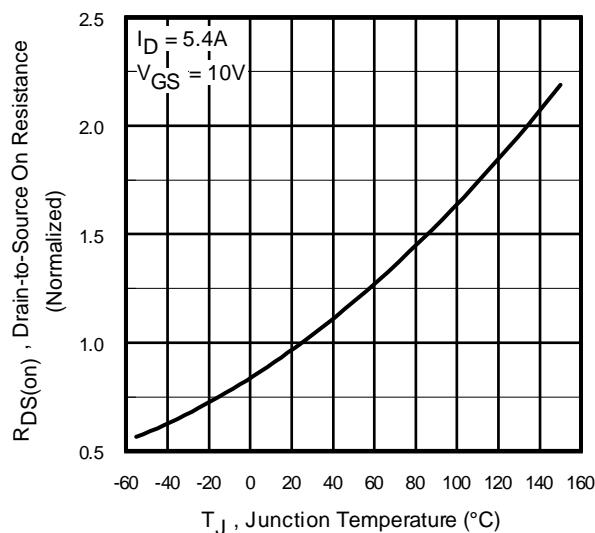
**Fig 1.** Typical Output Characteristics



**Fig 2.** Typical Output Characteristics



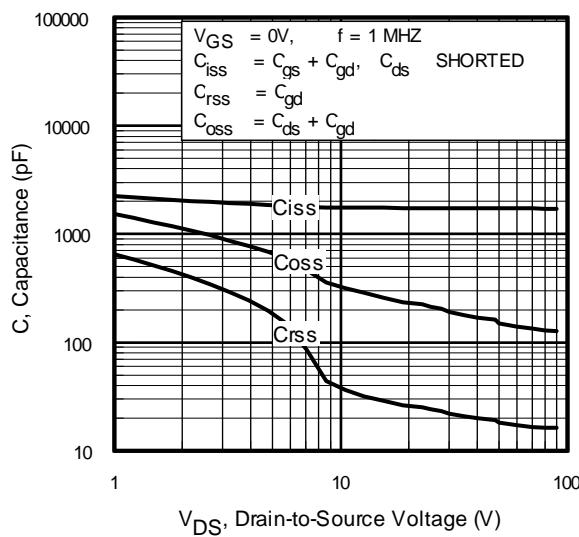
**Fig 3.** Typical Transfer Characteristics



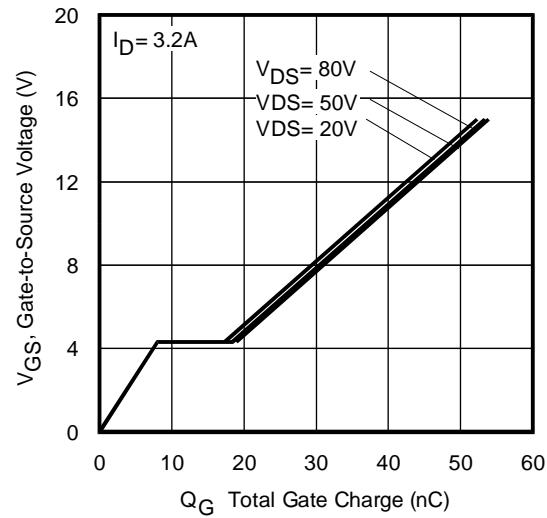
**Fig 4.** Normalized On-Resistance  
Vs. Temperature

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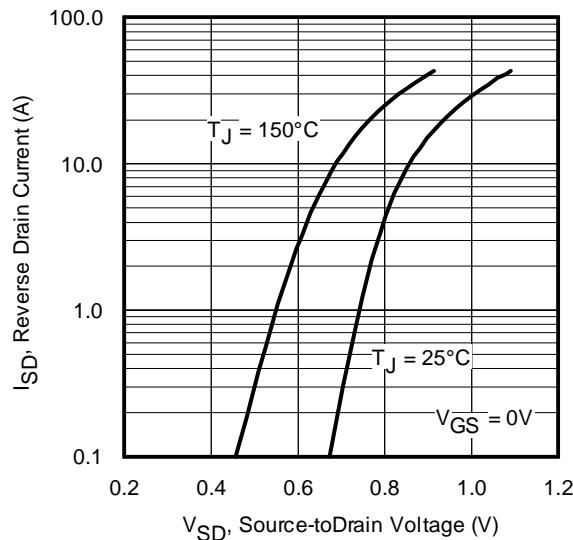
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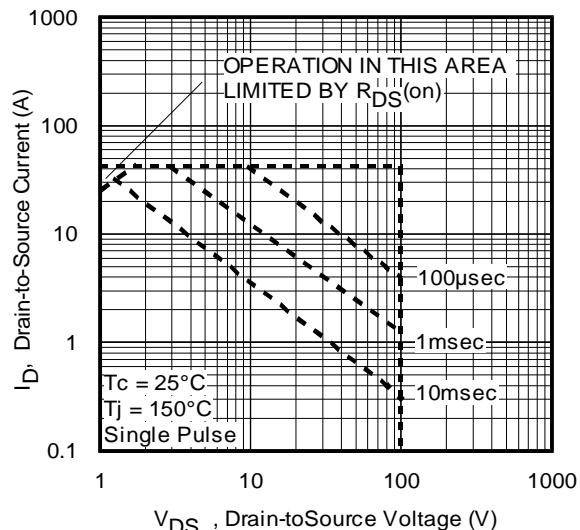
**Fig 5.** Typical Capacitance Vs.  
Drain-to-Source Voltage



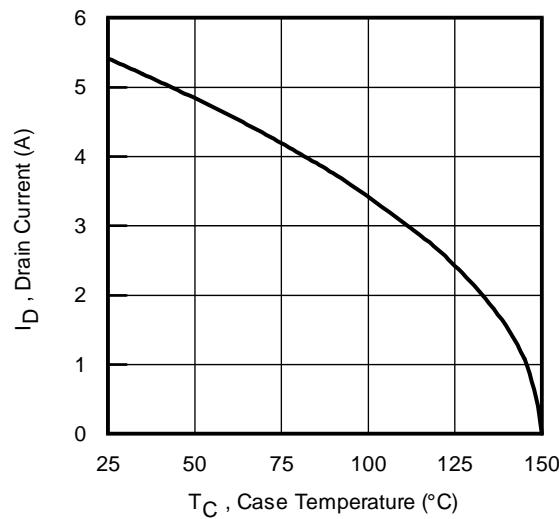
**Fig 6.** Typical Gate Charge Vs.  
Gate-to-Source Voltage



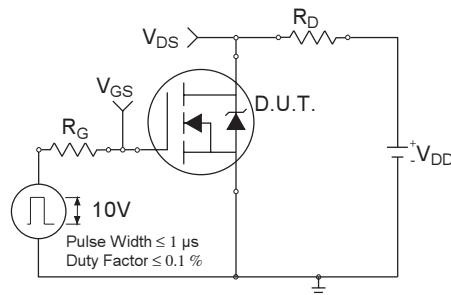
**Fig 7.** Typical Source-Drain Diode  
Forward Voltage



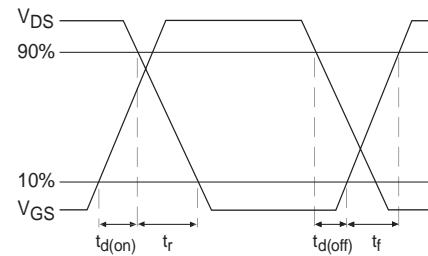
**Fig 8.** Maximum Safe Operating Area



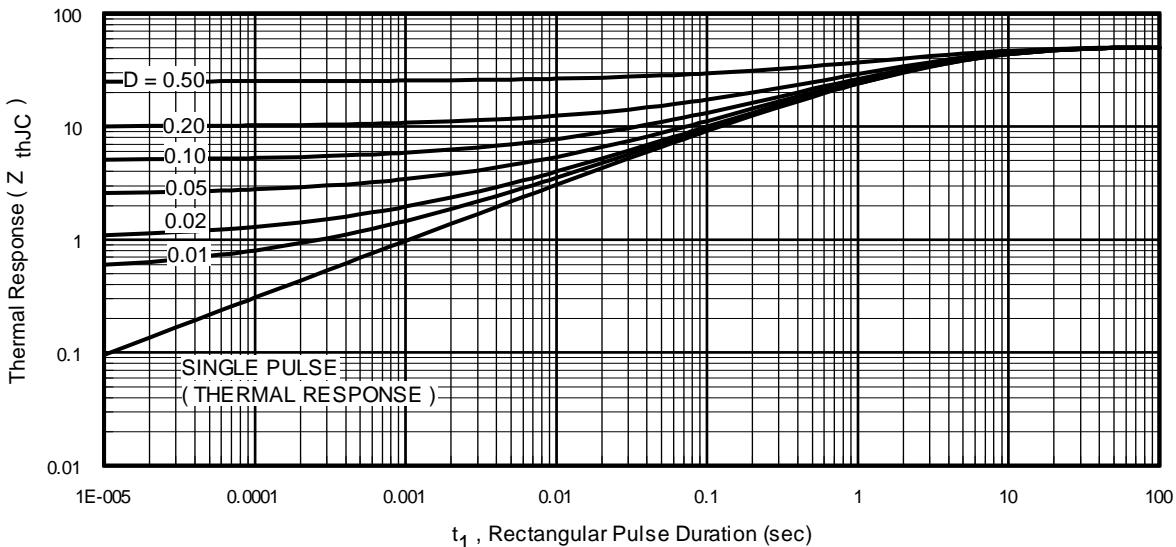
**Fig 9.** Maximum Drain Current Vs.  
Ambient Temperature



**Fig 10a.** Switching Time Test Circuit



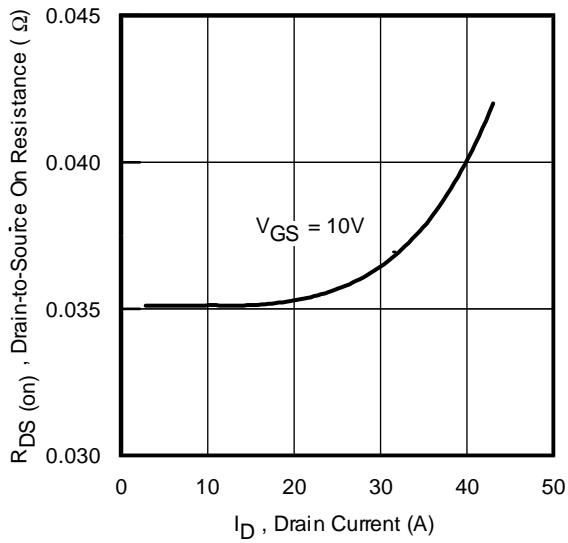
**Fig 10b.** Switching Time Waveforms



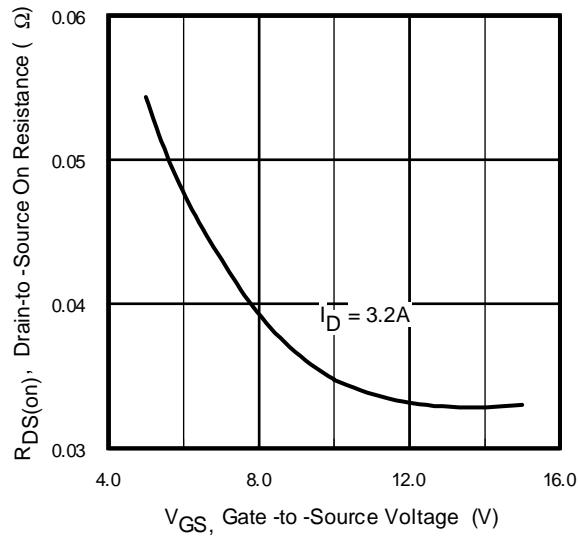
**Fig 11.** Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

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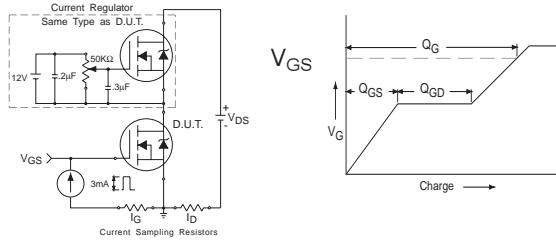
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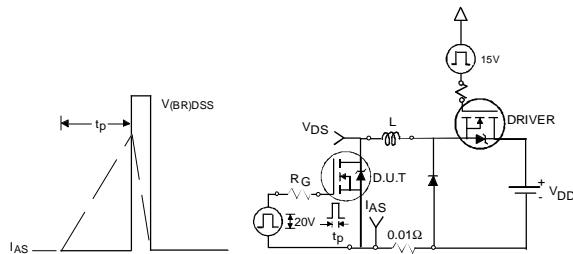
**Fig 12.** On-Resistance Vs. Drain Current



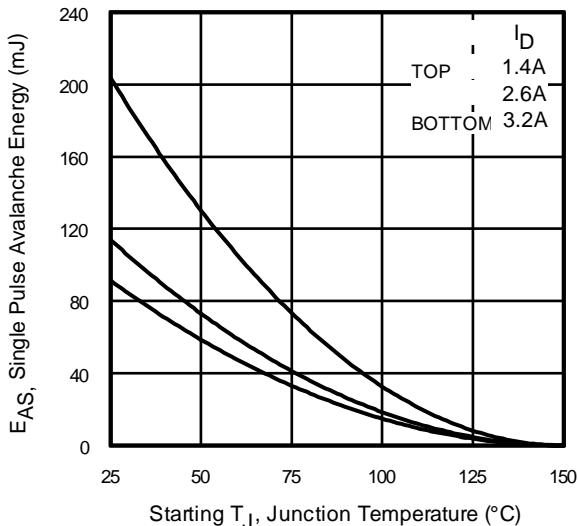
**Fig 13.** On-Resistance Vs. Gate Voltage



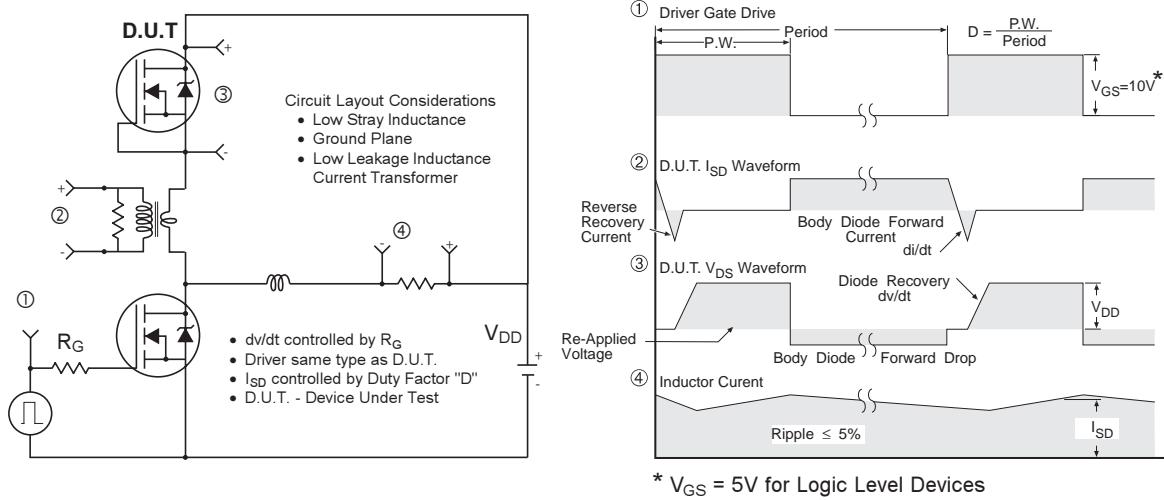
**Fig 14a&b.** Basic Gate Charge Test Circuit and Waveform



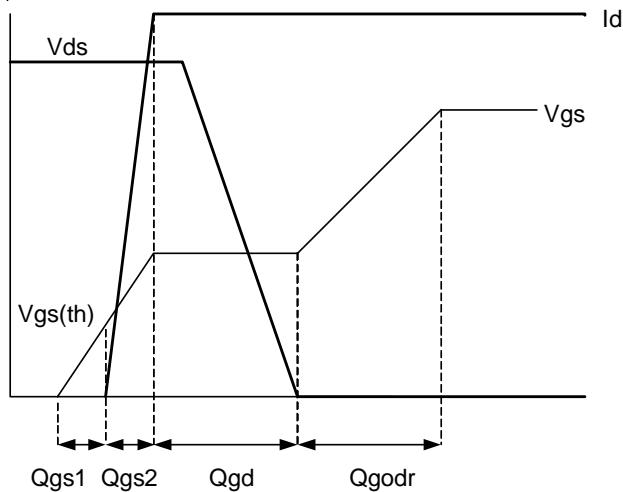
**Fig 15a&b.** Unclamped Inductive Test circuit and Waveforms



**Fig 15c.** Maximum Avalanche Energy Vs. Drain Current



**Fig 16.** Peak Diode Recovery  $dv/dt$  Test Circuit for N-Channel HEXFET® Power MOSFETs

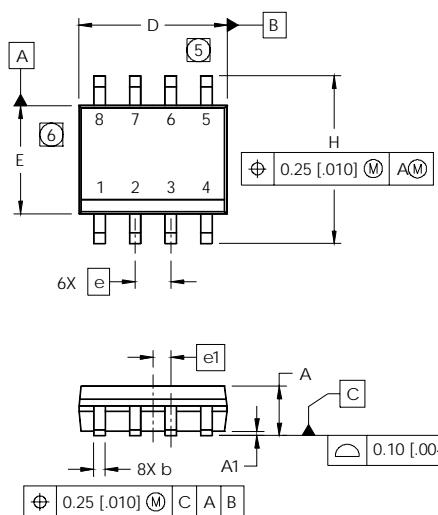


**Fig 17.** Gate Charge Waveform

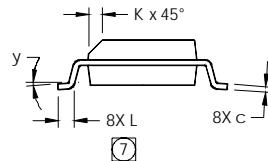
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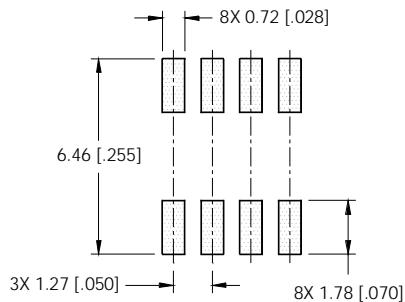
## SO-8 Package Outline



DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.0532	.0688	1.35	1.75
A1	.0040	.0098	0.10	0.25
b	.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°

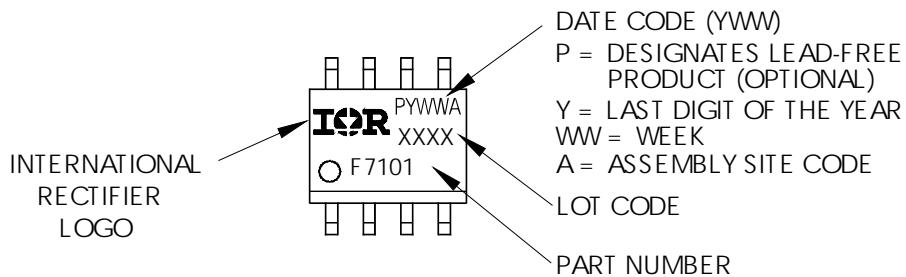


FOOTPRINT



## SO-8 Part Marking

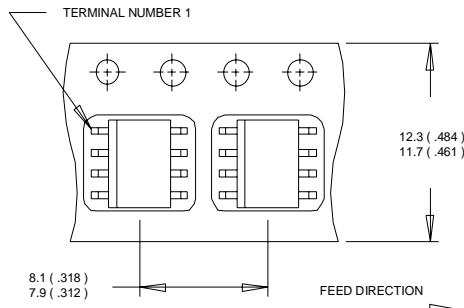
EXAMPLE: THIS IS AN IRF 7101 (MOS FET)



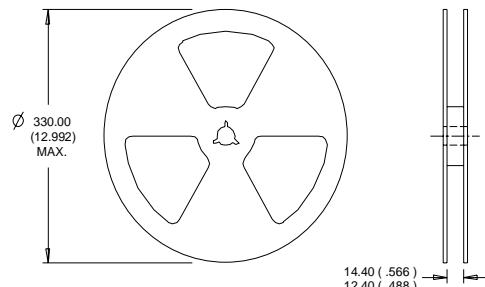
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## SO-8 Tape and Reel



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  $T_J = 25^\circ\text{C}$ ,  $L = 17\text{mH}$   
 $R_G = 25\Omega$ ,  $I_{AS} = 3.2\text{A}$ .
- ③ Pulse width  $\leq 300\mu\text{s}$ ; duty cycle  $\leq 2\%$ .
- ④ When mounted on 1 inch square copper board
- 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%  $V_{DSS}$

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

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- Поставка более 17-ти миллионов наименований электронных компонентов;
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- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



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Электронная почта: [org@eplast1.ru](mailto:org@eplast1.ru)

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