

# IRF7495

HEXFET® Power MOSFET

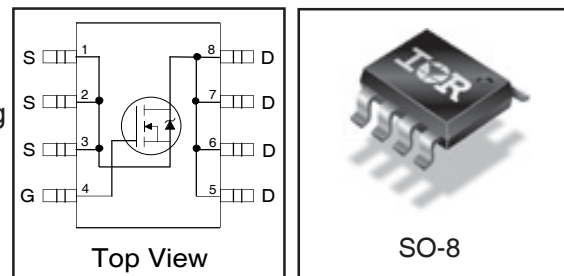
## Applications

- High frequency DC-DC converters

$V_{DSS}$	$R_{DS(on)}$ max	$I_D$
100V	22mΩ @ $V_{GS} = 10V$	7.3A

## 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



## Absolute Maximum Ratings

	Parameter	Max.	Units
$V_{DS}$	Drain-to-Source Voltage	100	V
$V_{GS}$	Gate-to-Source Voltage	± 20	
$I_D @ T_A = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	7.3	A
$I_D @ T_A = 100^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	4.6	
$I_{DM}$	Pulsed Drain Current ①	58	
$P_D @ T_A = 25^\circ C$	Maximum Power Dissipation	2.5	W
	Linear Derating Factor	0.02	W/°C
dv/dt	Peak Diode Recovery dv/dt ②	7.3	V/ns
$T_J$	Operating Junction and	-55 to + 150	°C
$T_{STG}$	Storage Temperature Range		

## Thermal Resistance

	Parameter	Typ.	Max.	Units
$R_{\theta JL}$	Junction-to-Drain Lead	—	20	°C/W
$R_{\theta JA}$	Junction-to-Ambient (PCB Mount) ③	—	50	

Notes ① through ⑥ are on page 8

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## Static @ T<sub>J</sub> = 25°C (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
V <sub>(BR)DSS</sub>	Drain-to-Source Breakdown Voltage	100	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA
ΔV <sub>(BR)DSS</sub> /ΔT <sub>J</sub>	Breakdown Voltage Temp. Coefficient	—	0.10	—	V/°C	Reference to 25°C, I <sub>D</sub> = 1mA
R <sub>DS(on)</sub>	Static Drain-to-Source On-Resistance	—	18	22	mΩ	V <sub>GS</sub> = 10V, I <sub>D</sub> = 4.4A ④
V <sub>GS(th)</sub>	Gate Threshold Voltage	2.0	—	4.0	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA
I <sub>DSS</sub>	Drain-to-Source Leakage Current	—	—	20	μA	V <sub>DS</sub> = 100V, V <sub>GS</sub> = 0V
		—	—	250		V <sub>DS</sub> = 80V, V <sub>GS</sub> = 0V, T <sub>J</sub> = 125°C
I <sub>GSS</sub>	Gate-to-Source Forward Leakage	—	—	200	nA	V <sub>GS</sub> = 20V
	Gate-to-Source Reverse Leakage	—	—	-200		V <sub>GS</sub> = -20V

## Dynamic @ T<sub>J</sub> = 25°C (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
gfs	Forward Transconductance	11	—	—	S	V <sub>DS</sub> = 25V, I <sub>D</sub> = 4.4A
Q <sub>g</sub>	Total Gate Charge	—	34	51	nC	I <sub>D</sub> = 4.4A V <sub>DS</sub> = 50V V <sub>GS</sub> = 10V ④
Q <sub>gs</sub>	Gate-to-Source Charge	—	6.3	—		
Q <sub>gd</sub>	Gate-to-Drain ("Miller") Charge	—	11.7	—		
t <sub>d(on)</sub>	Turn-On Delay Time	—	8.7	—	ns	V <sub>DD</sub> = 50V I <sub>D</sub> = 4.4A R <sub>G</sub> = 6.2Ω V <sub>GS</sub> = 10V ④
t <sub>r</sub>	Rise Time	—	13	—		
t <sub>d(off)</sub>	Turn-Off Delay Time	—	10	—		
t <sub>f</sub>	Fall Time	—	36	—		
C <sub>iss</sub>	Input Capacitance	—	1530	—	pF	V <sub>GS</sub> = 0V V <sub>DS</sub> = 25V f = 1.0MHz V <sub>GS</sub> = 0V, V <sub>DS</sub> = 1.0V, f = 1.0MHz V <sub>GS</sub> = 0V, V <sub>DS</sub> = 80V, f = 1.0MHz V <sub>GS</sub> = 0V, V <sub>DS</sub> = 0V to 80V ⑤
C <sub>oss</sub>	Output Capacitance	—	250	—		
C <sub>rss</sub>	Reverse Transfer Capacitance	—	110	—		
C <sub>oss</sub>	Output Capacitance	—	980	—		
C <sub>oss</sub>	Output Capacitance	—	160	—		
C <sub>oss eff.</sub>	Effective Output Capacitance	—	240	—		

## Avalanche Characteristics

	Parameter	Typ.	Max.	Units
E <sub>AS</sub>	Single Pulse Avalanche Energy ②	—	180	mJ
I <sub>AR</sub>	Avalanche Current ①	—	4.4	A

## Diode Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I <sub>S</sub>	Continuous Source Current (Body Diode)	—	—	2.3	A	MOSFET symbol showing the integral reverse p-n junction diode.
I <sub>SM</sub>	Pulsed Source Current (Body Diode) ①	—	—	58		
V <sub>SD</sub>	Diode Forward Voltage	—	—	1.3	V	T <sub>J</sub> = 25°C, I <sub>S</sub> = 4.4A, V <sub>GS</sub> = 0V ④
t <sub>rr</sub>	Reverse Recovery Time	—	42	—	ns	T <sub>J</sub> = 25°C, I <sub>F</sub> = 4.4A, V <sub>DD</sub> = 25V
Q <sub>rr</sub>	Reverse Recovery Charge	—	73	—	nC	di/dt = 100A/μs ④
t <sub>on</sub>	Forward Turn-On Time	Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)				

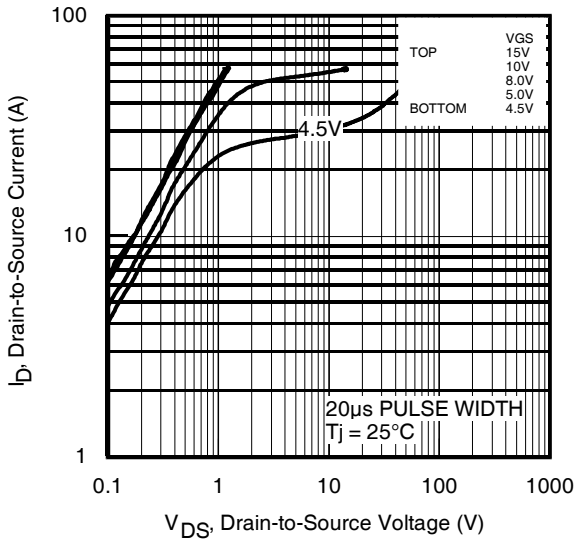


Fig 1. Typical Output Characteristics

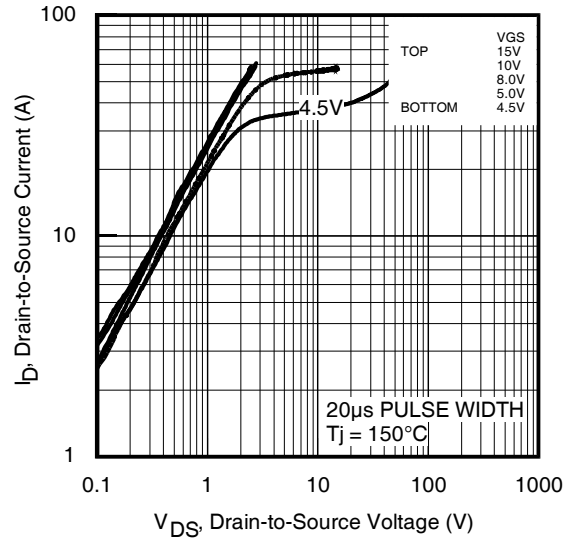


Fig 2. Typical Output Characteristics

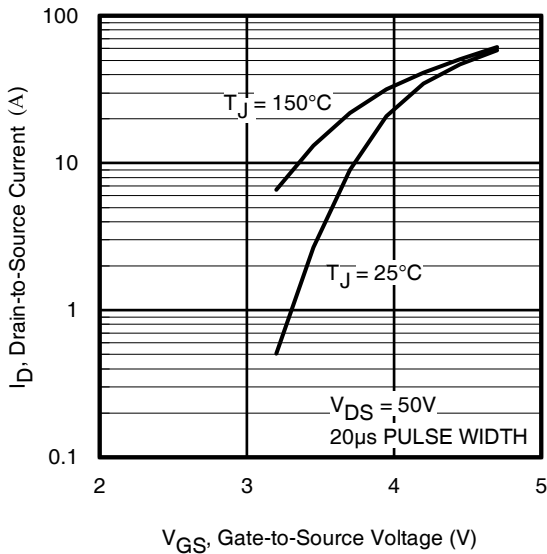


Fig 3. Typical Transfer Characteristics

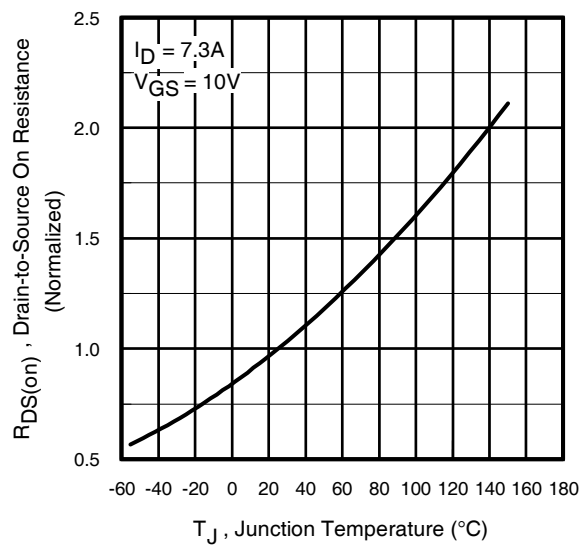
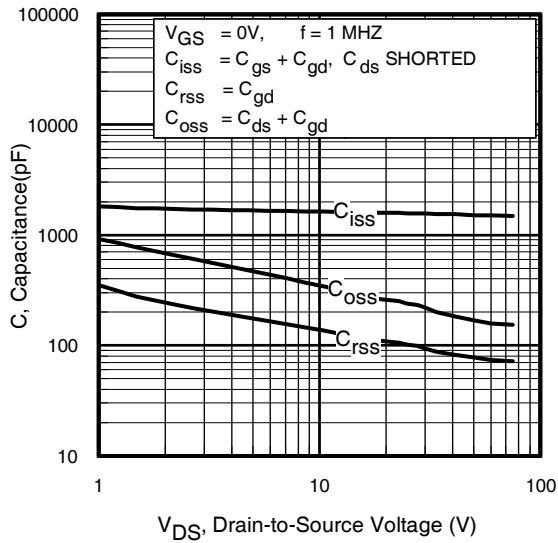
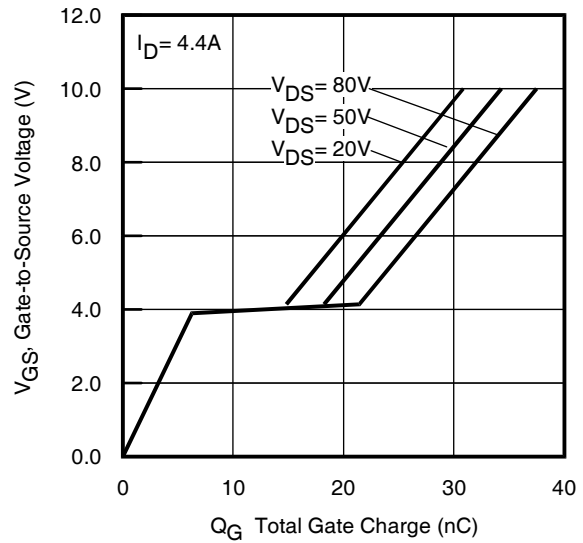


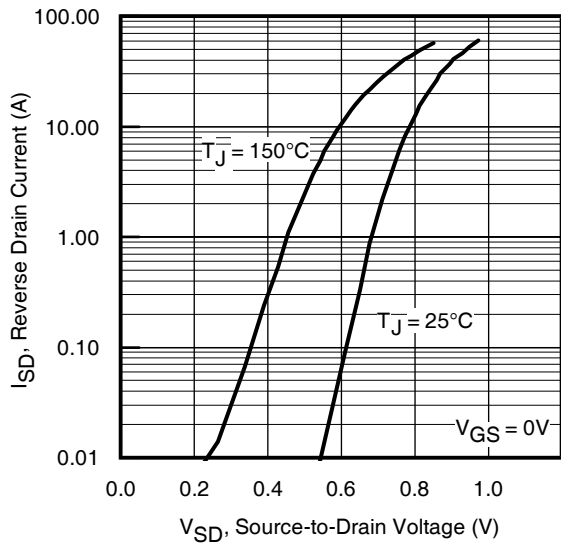
Fig 4. Normalized On-Resistance vs. Temperature



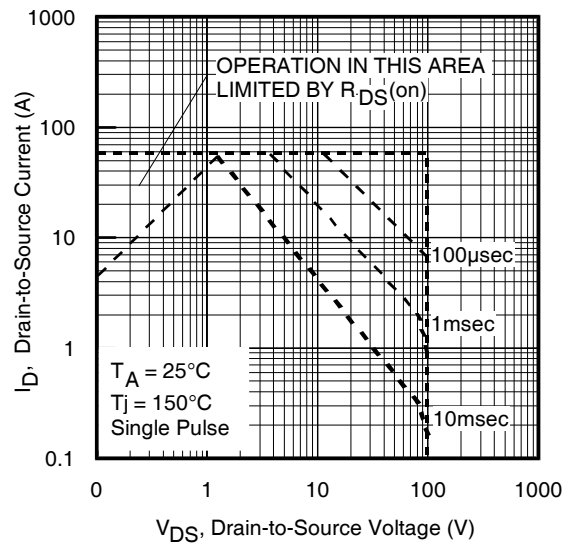
**Fig 5.** Typical Capacitance vs. Drain-to-Source Voltage



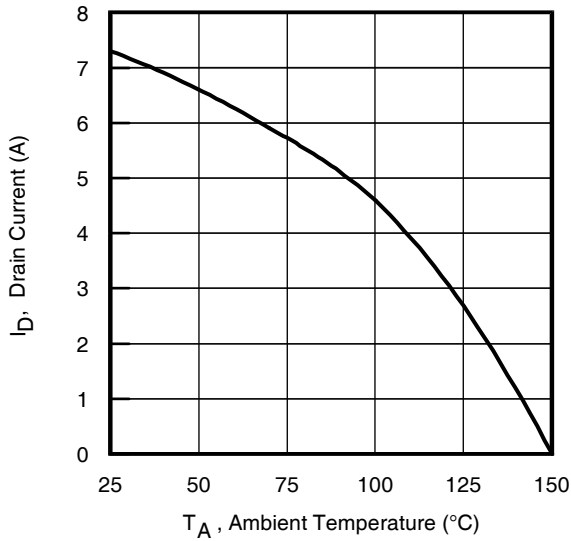
**Fig 6.** Typical Gate Charge vs. Gate-to-Source Voltage



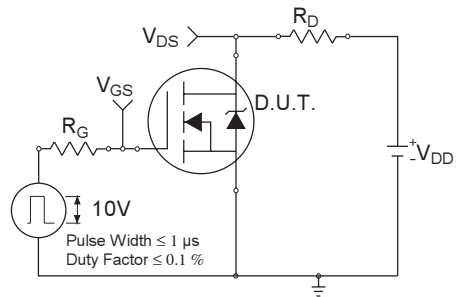
**Fig 7.** Typical Source-Drain Diode Forward Voltage



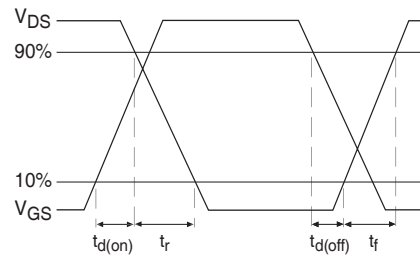
**Fig 8.** Maximum Safe Operating Area



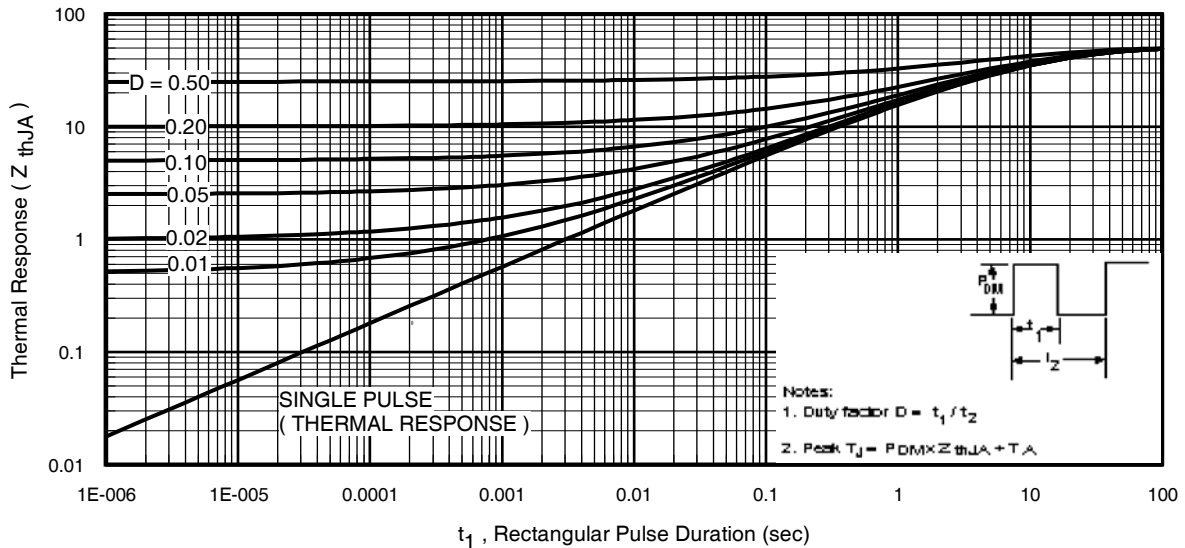
**Fig 9.** Maximum Drain Current vs. Ambient Temperature



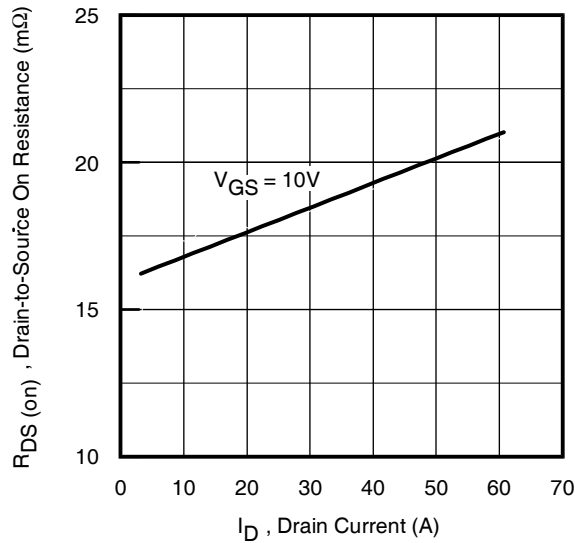
**Fig 10a.** Switching Time Test Circuit



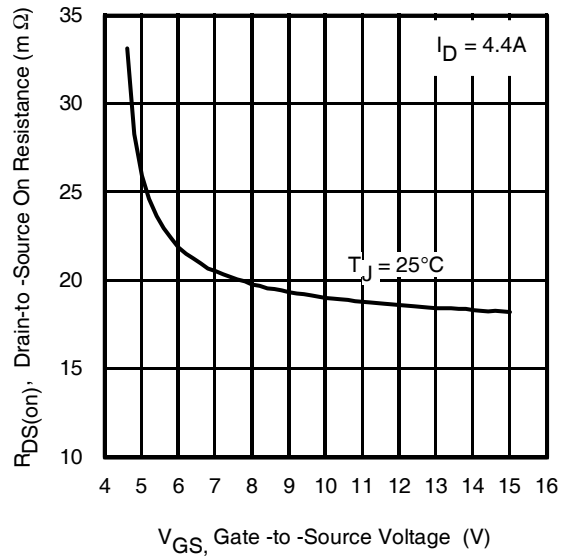
**Fig 10b.** Switching Time Waveforms



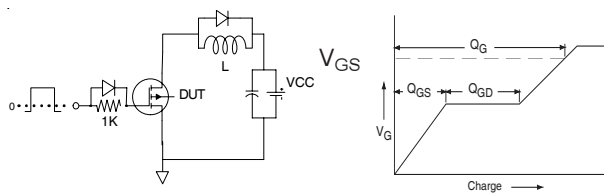
**Fig 11.** Maximum Effective Transient Thermal Impedance, Junction-to-Case



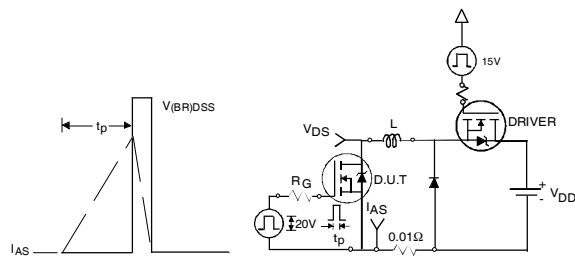
**Fig 12.** On-Resistance vs. Drain Current



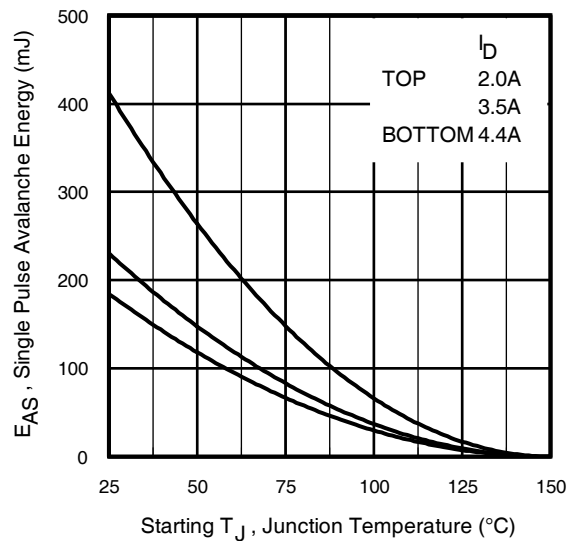
**Fig 13.** On-Resistance vs. Gate Voltage



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



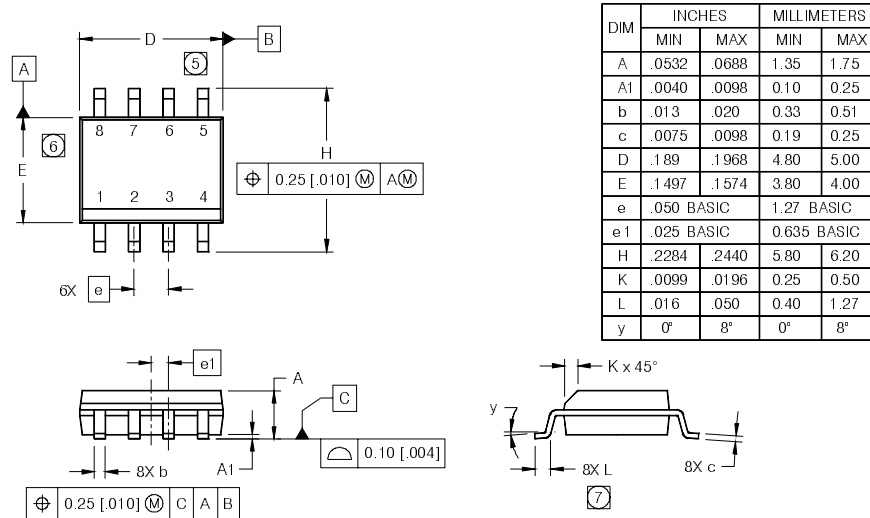
**Fig 15a&b.** Unclamped Inductive Test circuit and Waveforms



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

## SO-8 Package Outline

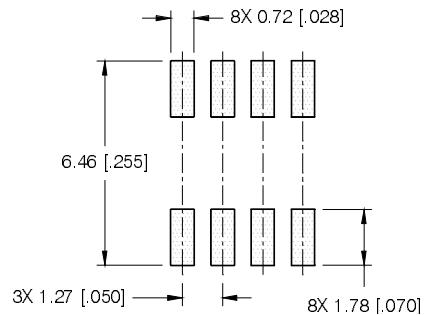
Dimensions are shown in millimeters (inches)



**NOTES:**

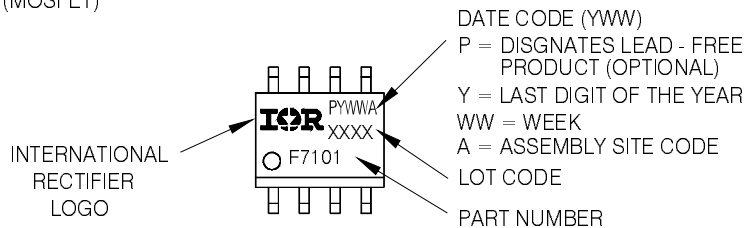
1. DIMENSIONING & TOLERANCING PER ASME Y14.5M-1994.
2. CONTROLLING DIMENSION: MILLIMETER
3. DIMENSIONS ARE SHOWN IN MILLIMETERS [INCHES].
4. OUTLINE CONFORMS TO JEDEC OUTLINE MS-012AA.
5. DIMENSION DOES NOT INCLUDE MOLD PROTRUSIONS. MOLD PROTRUSIONS NOT TO EXCEED 0.15 [0.006].
6. DIMENSION DOES NOT INCLUDE MOLD PROTRUSIONS. MOLD PROTRUSIONS NOT TO EXCEED 0.25 [0.010].
7. DIMENSION IS THE LENGTH OF LEAD FOR SOLDERING TO A SUBSTRATE.

**FOOTPRINT**



## SO-8 Part Marking Information

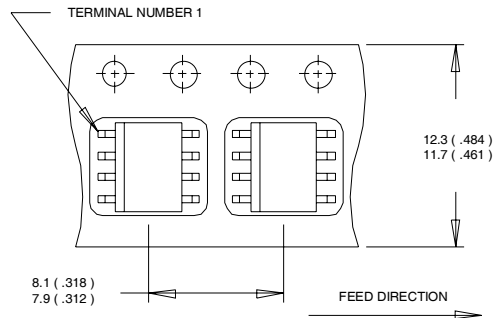
EXAMPLE: THIS IS AN IRF7101 (MOSFET)



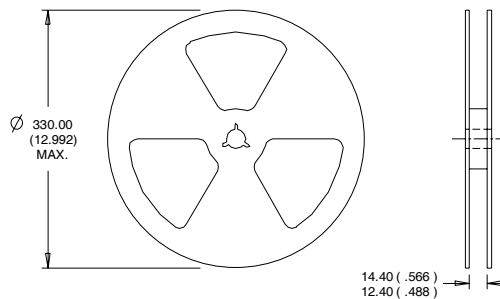
# IRF7495

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**IR** Rectifier

## 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  $T_J = 25^\circ\text{C}$ ,  $L = 19\text{mH}$   
 $R_G = 25\Omega$ ,  $I_{AS} = 4.4\text{A}$ .
- ③ When mounted on 1 inch square copper board,  $t \leq 10$  sec.
- ④ Pulse width  $\leq 400\mu\text{s}$ ; duty cycle  $\leq 2\%$ .
- 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  $I_{SD} \leq 5.8\text{A}$ ,  $di/dt \leq 250\text{A}/\mu\text{s}$ ,  $V_{DD} \leq V_{(BR)DSS}$ ,  $T_J \leq 150^\circ\text{C}$ .

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

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