

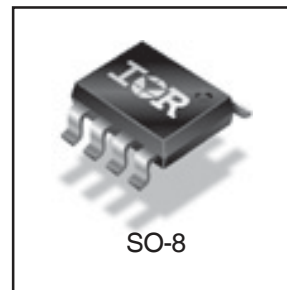
- Advanced Process Technology
- Ultra Low On-Resistance
- Dual N and P Channel MOSFET
- Surface Mount
- Available in Tape & Reel
- 150°C Operating Temperature
- Lead-Free

### Description

These HEXFET® Power MOSFET's in a Dual SO-8 package utilize the latest processing techniques to achieve extremely low on-resistance per silicon area. Additional features of these HEXFET Power MOSFET's are a 150°C junction operating temperature, fast switching speed and improved repetitive avalanche rating. These benefits combine to make this design an extremely efficient and reliable device for use in a wide variety of applications. The efficient SO-8 package provides enhanced thermal characteristics and dual MOSFET die capability making it ideal in a variety of power applications. This dual, surface mount SO-8 can dramatically reduce board space and is also available in Tape & Reel.

### HEXFET® Power MOSFET

<p>Top View</p>		<b>N-Ch</b>	<b>P-Ch</b>
	$V_{DSS}$	20V	-20V
	$R_{DS(on)}$	0.050Ω	0.090Ω



Base Part Number	Package Type	Standard Pack		Orderable Part Number	EOL Notice
		Form	Quantity		
IRF7307QPbF	SO-8	Tube/Bulk	95	IRF7307QPbF	EOL 529
IRF7307QPbF	SO-8	Tape and Reel	4000	IRF7307QTRPbF	

### Absolute Maximum Ratings

	Parameter	Max.		Units
		N-Channel	P-Channel	
$I_D @ T_A = 25^\circ\text{C}$	10 Sec. Pulse Drain Current, $V_{GS} @ 4.5\text{V}$	5.7	-4.7	A
$I_D @ T_A = 25^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 4.5\text{V}$	5.2	-4.3	
$I_D @ T_A = 70^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 4.5\text{V}$	4.1	-3.4	
$I_{DM}$	Pulsed Drain Current ①	21	-17	
$P_D @ T_A = 25^\circ\text{C}$	Power Dissipation	2.0		W
	Linear Derating Factor	0.016		W/°C
$V_{GS}$	Gate-to-Source Voltage	± 12		V
dv/dt	Peak Diode Recovery dv/dt ②	5.0	-5.0	V/ns
$T_J, T_{STG}$	Junction and Storage Temperature Range	-55 to + 150		°C

### Thermal Resistance Ratings

	Parameter	Typ.	Max.	Units
$R_{\theta JA}$	Maximum Junction-to-Ambient ③	—	62.5	°C/W

**Electrical Characteristics @ T<sub>J</sub> = 25°C (unless otherwise specified)**

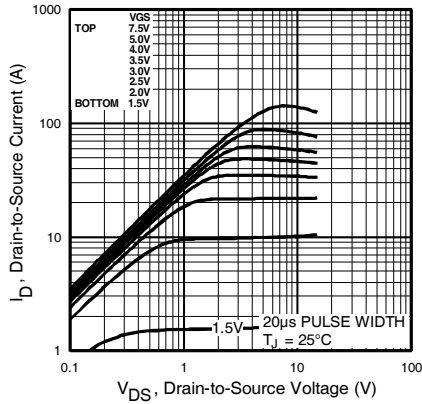
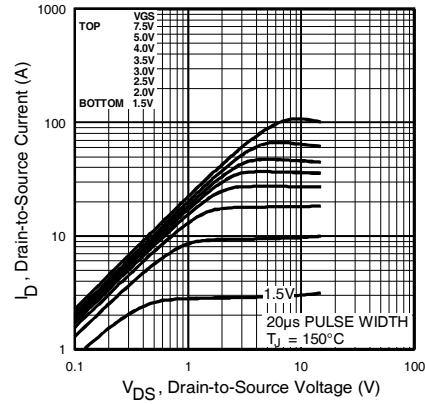
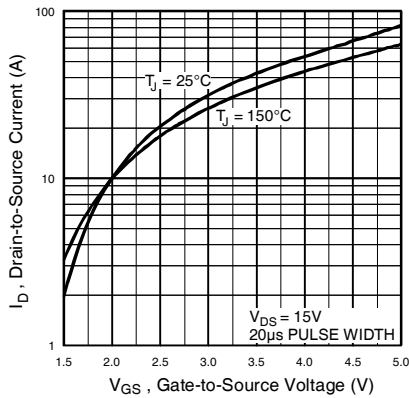
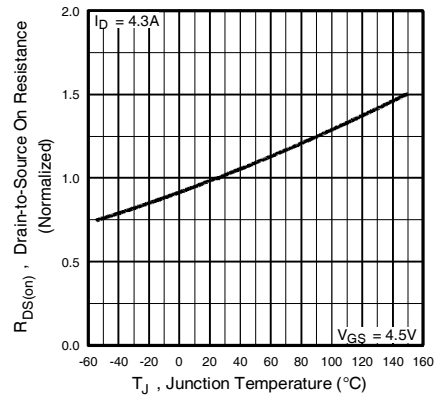
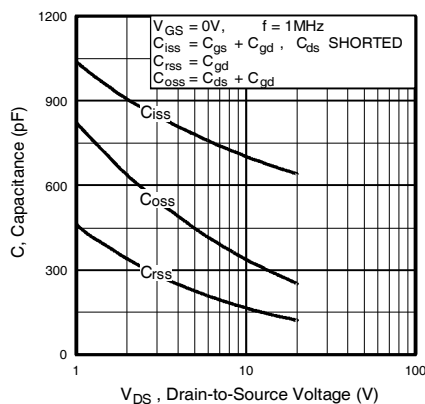
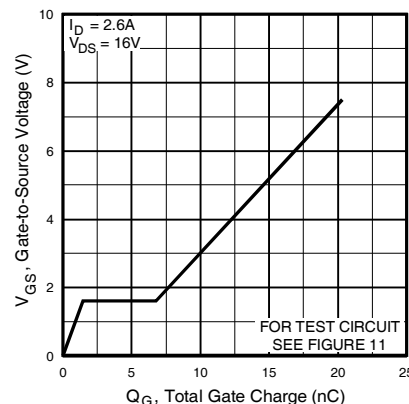
Parameter	Description		Min.	Typ.	Max.	Units	Conditions
V <sub>(BR)DSS</sub>	Drain-to-Source Breakdown Voltage	N-Ch	20	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA
		P-Ch	-20	—	—		V <sub>GS</sub> = 0V, I <sub>D</sub> = -250μA
ΔV <sub>(BR)DSS</sub> /ΔT <sub>J</sub>	Breakdown Voltage Temp. Coefficient	N-Ch	—	0.044	—	V/°C	Reference to 25°C, I <sub>D</sub> = 1mA
		P-Ch	—	-0.012	—		Reference to 25°C, I <sub>D</sub> = -1mA
R <sub>DS(ON)</sub>	Static Drain-to-Source On-Resistance	N-Ch	—	—	0.050	Ω	V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 2.6A ③
			—	—	0.070		V <sub>GS</sub> = 2.7V, I <sub>D</sub> = 2.2A ③
		P-Ch	—	—	0.090		V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -2.2A ③
			—	—	0.140		V <sub>GS</sub> = -2.7V, I <sub>D</sub> = -1.8A ③
V <sub>GS(th)</sub>	Gate Threshold Voltage	N-Ch	0.70	—	—	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA
		P-Ch	-0.70	—	—		V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250μA
g <sub>fs</sub>	Forward Transconductance	N-Ch	8.30	—	—	S	V <sub>DS</sub> = 15V, I <sub>D</sub> = 2.6A ③
		P-Ch	4.00	—	—		V <sub>DS</sub> = -15V, I <sub>D</sub> = -2.2A ③
I <sub>DSS</sub>	Drain-to-Source Leakage Current	N-Ch	—	—	1.0	μA	V <sub>DS</sub> = 16V, V <sub>GS</sub> = 0V
		P-Ch	—	—	-1.0		V <sub>DS</sub> = -16V, V <sub>GS</sub> = 0V,
		N-Ch	—	—	25		V <sub>DS</sub> = 16V, V <sub>GS</sub> = 0V, T <sub>J</sub> = 125°C
		P-Ch	—	—	-25		V <sub>DS</sub> = -16V, V <sub>GS</sub> = 0V, T <sub>J</sub> = 125°C
I <sub>GSS</sub>	Gate-to-Source Forward Leakage	N-P	—	—	±100	V <sub>GS</sub> = ±12V	
Q <sub>g</sub>	Total Gate Charge	N-Ch	—	—	20	nC	N-Channel I <sub>D</sub> = 2.6A, V <sub>DS</sub> = 16V, V <sub>GS</sub> = 4.5V ③
		P-Ch	—	—	22		
Q <sub>gs</sub>	Gate-to-Source Charge	N-Ch	—	—	2.2	nC	P-Channel I <sub>D</sub> = -2.2A, V <sub>DS</sub> = -16V, V <sub>GS</sub> = -4.5V ③
		P-Ch	—	—	3.3		
Q <sub>gd</sub>	Gate-to-Drain ("Miller") Charge	N-Ch	—	—	8.0	nC	P-Channel I <sub>D</sub> = -2.2A, V <sub>DS</sub> = -16V, V <sub>GS</sub> = -4.5V ③
		P-Ch	—	—	9.0		
t <sub>d(on)</sub>	Turn-On Delay Time	N-Ch	—	9.0	—	ns	N-Channel V <sub>DD</sub> = 10V, I <sub>D</sub> = 2.6A, R <sub>G</sub> = 6.0Ω, R <sub>D</sub> = 3.8Ω ③
t <sub>r</sub>	Rise Time	N-Ch	—	42	—		
		P-Ch	—	26	—		
t <sub>d(off)</sub>	Turn-Off Delay Time	N-Ch	—	32	—		
		P-Ch	—	51	—		
t <sub>f</sub>	Fall Time	N-Ch	—	51	—	ns	P-Channel V <sub>DD</sub> = -10V, I <sub>D</sub> = -2.2A, R <sub>G</sub> = 6.0Ω, R <sub>D</sub> = 4.5Ω ③
		P-Ch	—	33	—		
L <sub>D</sub>	Internal Drain Inductance	N-P	—	4.0	—	nH	Between lead tip and center of die contact
L <sub>S</sub>	Internal Source Inductance	N-P	—	6.0	—		
C <sub>iss</sub>	Input Capacitance	N-Ch	—	660	—	pF	N-Channel V <sub>GS</sub> = 0V, V <sub>DS</sub> = 15V, f = 1.0MHz ③
		P-Ch	—	610	—		
C <sub>oss</sub>	Output Capacitance	N-Ch	—	280	—		
		P-Ch	—	310	—		
C <sub>rss</sub>	Reverse Transfer Capacitance	N-Ch	—	140	—	pF	P-Channel V <sub>GS</sub> = 0V, V <sub>DS</sub> = -15V, f = 1.0MHz ③
		P-Ch	—	170	—		

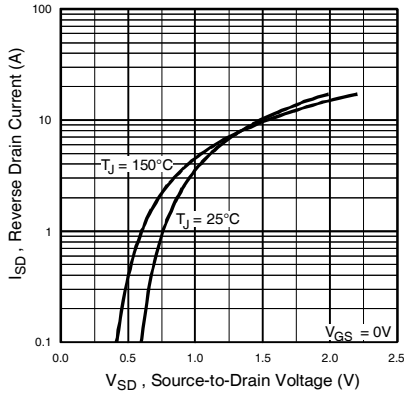
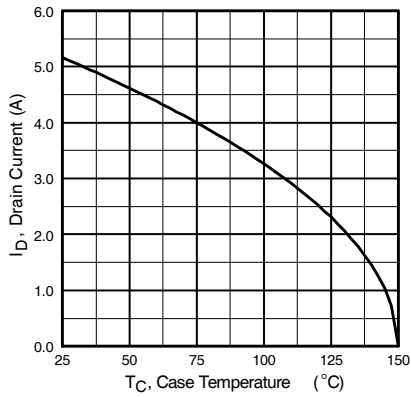
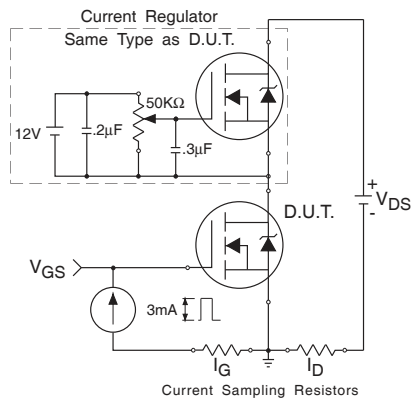
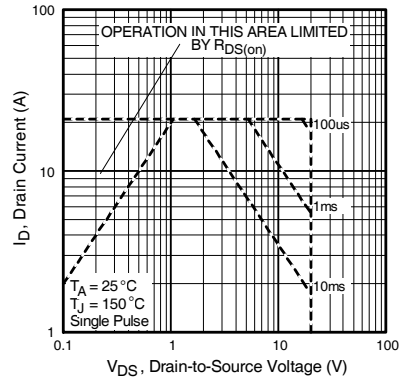
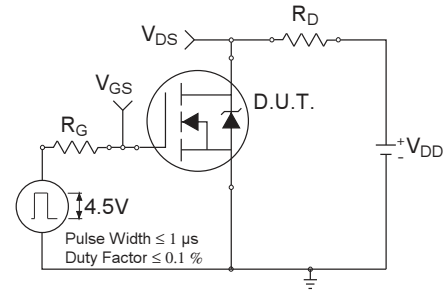
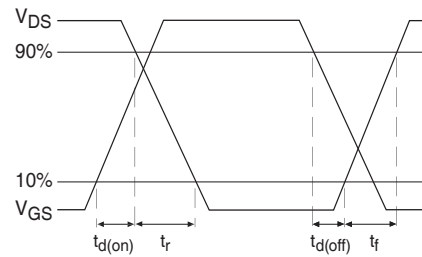
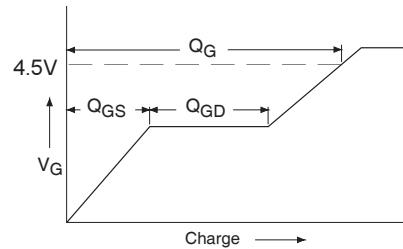
**Source-Drain Ratings and Characteristics**

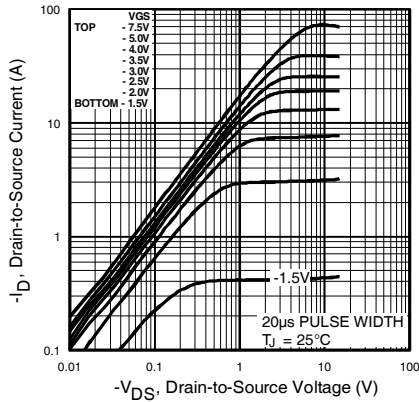
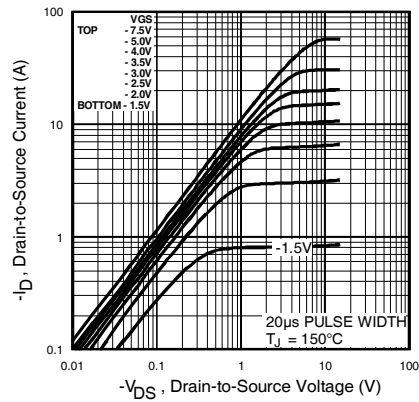
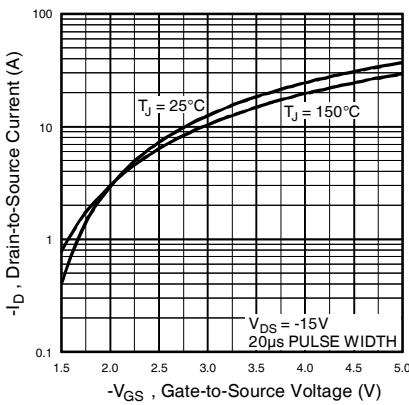
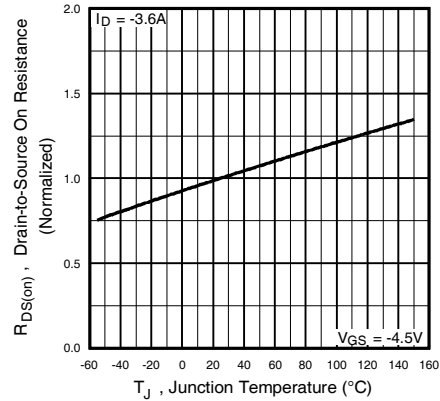
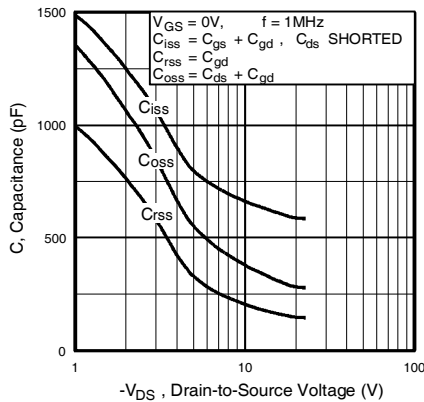
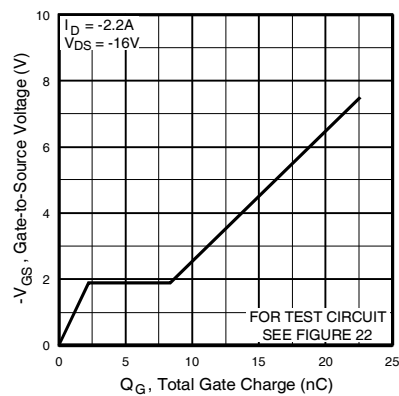
Parameter	Description		Min.	Typ.	Max.	Units	Conditions
I <sub>S</sub>	Continuous Source Current (Body Diode)	N-Ch	—	—	2.5	A	
		P-Ch	—	—	-2.5		
I <sub>SM</sub>	Pulsed Source Current (Body Diode) ①	N-Ch	—	—	21	A	
		P-Ch	—	—	-17		
V <sub>SD</sub>	Diode Forward Voltage	N-Ch	—	—	1.0	V	T <sub>J</sub> = 25°C, I <sub>S</sub> = 1.8A, V <sub>GS</sub> = 0V ③
		P-Ch	—	—	-1.0		T <sub>J</sub> = 25°C, I <sub>S</sub> = -1.8A, V <sub>GS</sub> = 0V ③
t <sub>rr</sub>	Reverse Recovery Time	N-Ch	—	29	44	ns	N-Channel T <sub>J</sub> = 25°C, I <sub>F</sub> = 2.6A, di/dt = 100A/μs ③
		P-Ch	—	56	84		
Q <sub>rr</sub>	Reverse Recovery Charge	N-Ch	—	22	33	nC	P-Channel T <sub>J</sub> = 25°C, I <sub>F</sub> = -2.2A, di/dt = 100A/μs ③
		P-Ch	—	71	110		
t <sub>on</sub>	Forward Turn-On Time	N-P	Intrinsic turn-on time is negligible (turn-on is dominated by L <sub>S</sub> +L <sub>D</sub> )				

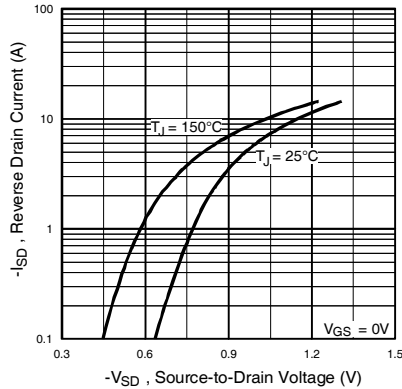
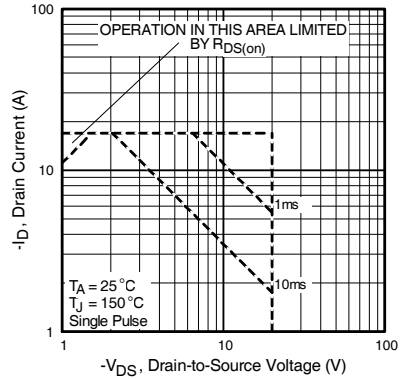
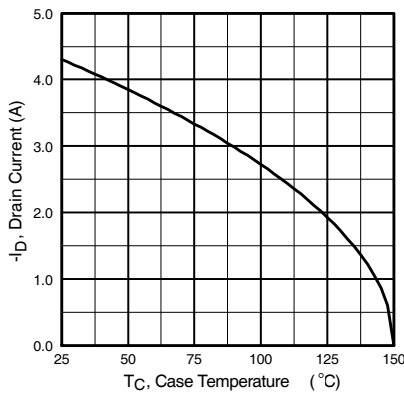
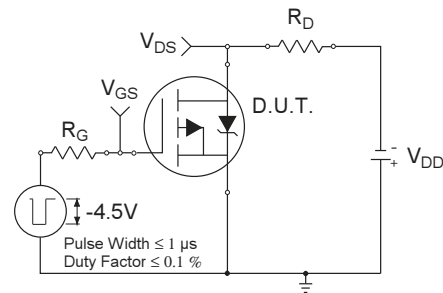
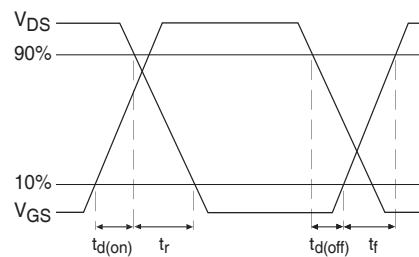
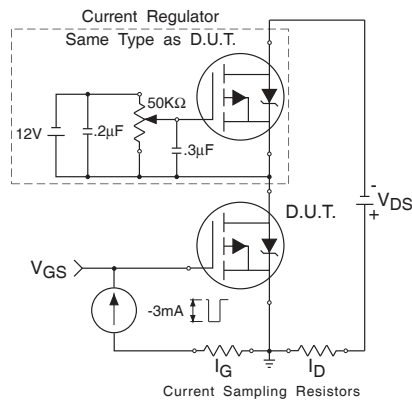
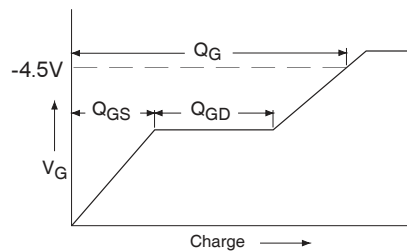
**Notes:**

- ① Repetitive rating; pulse width limited by max. junction temperature. ( See fig. 23 )
- ② N-Channel I<sub>SD</sub> ≤ 2.6A, di/dt ≤ 100A/μs, V<sub>DD</sub> ≤ V<sub>(BR)DSS</sub>, T<sub>J</sub> ≤ 150°C  
P-Channel I<sub>SD</sub> ≤ -2.2A, di/dt ≤ 50A/μs, V<sub>DD</sub> ≤ V<sub>(BR)DSS</sub>, T<sub>J</sub> ≤ 150°C
- ③ Pulse width ≤ 300μs; duty cycle ≤ 2%.
- ④ Surface mounted on FR-4 board, t ≤ 10sec.

**N-Channel**

**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**

**N-Channel**

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

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

**Fig 11a. Gate Charge Test Circuit**

**Fig 8. Maximum Safe Operating Area**

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

**Fig 10b. Switching Time Waveforms**

**Fig 11b. Basic Gate Charge Waveform**

**P-Channel**

**Fig 12. Typical Output Characteristics**

**Fig 13. Typical Output Characteristics**

**Fig 14. Typical Transfer Characteristics**

**Fig 15. Normalized On-Resistance Vs. Temperature**

**Fig 16. Typical Capacitance Vs. Drain-to-Source Voltage**

**Fig 17. Typical Gate Charge Vs. Gate-to-Source Voltage**

**P-Channel**

**Fig 18. Typical Source-Drain Diode Forward Voltage**

**Fig 19. Maximum Safe Operating Area**

**Fig 20. Maximum Drain Current Vs. Ambient Temperature**

**Fig 21a. Switching Time Test Circuit**

**Fig 21b. Switching Time Waveforms**

**Fig 22a. Gate Charge Test Circuit**

**Fig 22b. Basic Gate Charge Waveform**

N & P-Channel

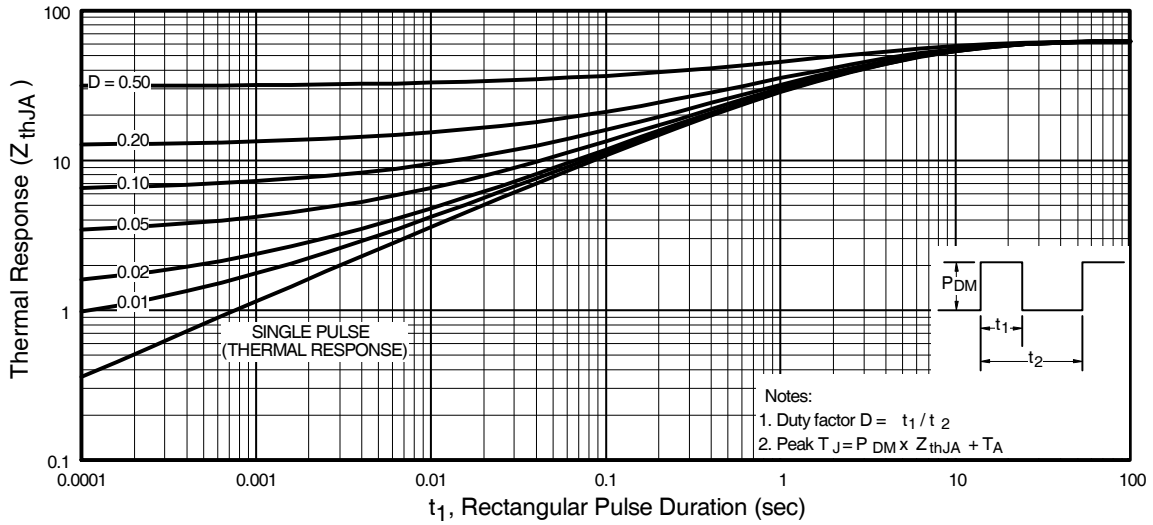
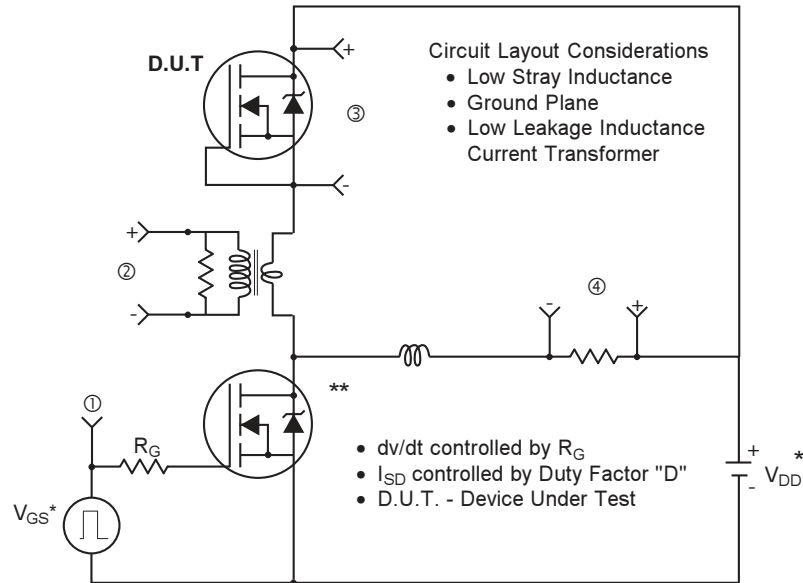


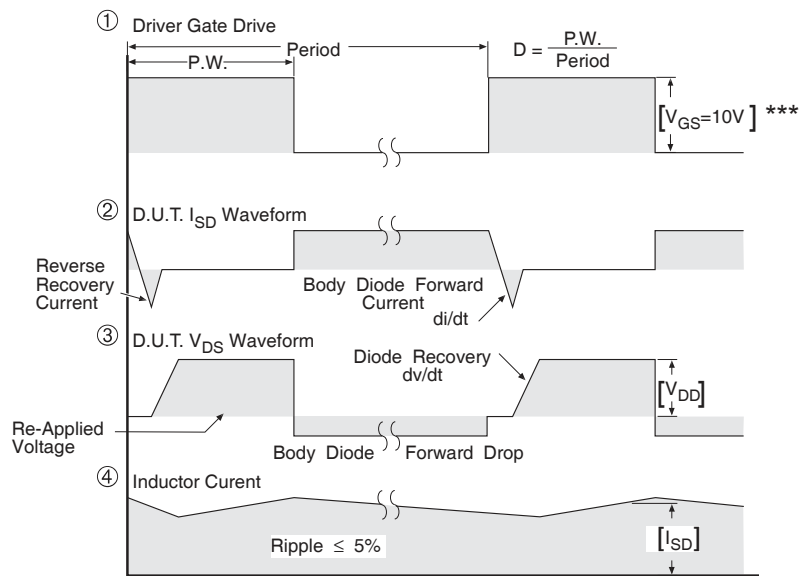
Fig 23. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

### Peak Diode Recovery dv/dt Test Circuit



\* Reverse Polarity for P-Channel

\*\* Use P-Channel Driver for P-Channel Measurements



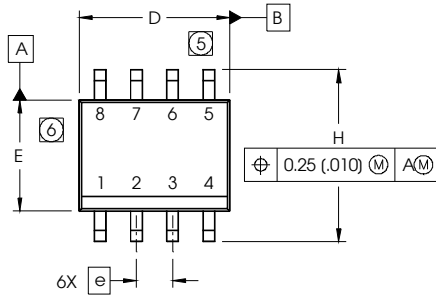
\*\*\*  $V_{GS} = 5.0V$  for Logic Level and 3V Drive Devices

**Fig 24.** For N and P Channel HEXFETS

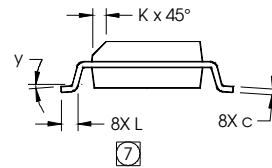
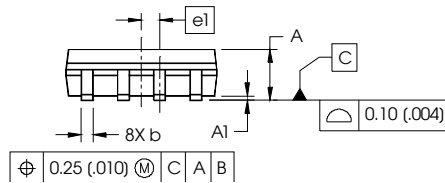


### SO-8 Package Outline

Dimensions are shown in millimeters (inches)



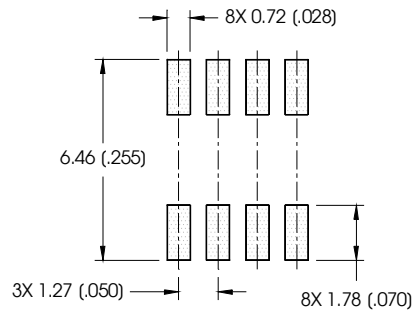
DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.0532	.0688	1.35	1.75
Al	.0040	.0098	0.10	0.25
b	.013	.020	0.33	0.51
c	.0075	.0098	0.19	0.25
D	.189	.1968	4.80	5.00
E	.1497	.1574	3.80	4.00
e	.050 BASIC		1.27 BASIC	
e1	.025 BASIC		0.635 BASIC	
H	.2284	.2440	5.80	6.20
K	.0099	.0196	0.25	0.50
L	.016	.050	0.40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



**NOTES:**

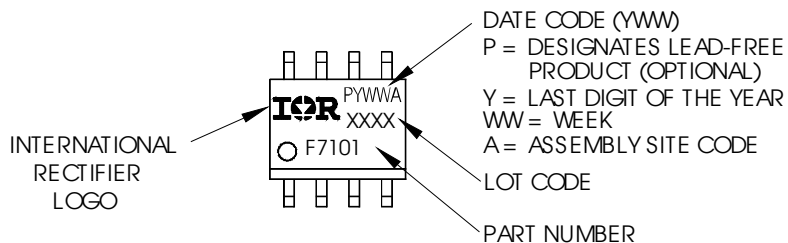
- DIMENSIONING & TOLERANCING PER ASME Y14.5M-1994.
- CONTROLLING DIMENSION: MILLIMETER
- DIMENSIONS ARE SHOWN IN MILLIMETERS (INCHES).
- OUTLINE CONFORMS TO JEDEC OUTLINE MS-012AA
- DIMENSION DOES NOT INCLUDE MOLD PROTRUSIONS. MOLD PROTRUSIONS NOT TO EXCEED 0.15 (.006).
- DIMENSION DOES NOT INCLUDE MOLD PROTRUSIONS. MOLD PROTRUSIONS NOT TO EXCEED 0.25 (.010).
- DIMENSION IS THE LENGTH OF LEAD FOR SOLDERING TO A SUBSTRATE.

**FOOTPRINT**



### SO-8 Part Marking

EXAMPLE: THIS IS AN IRF7101 (MOSFET)

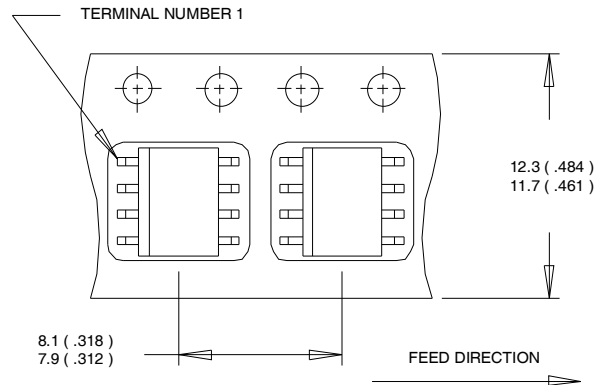


**Note:**

- For an Automotive Qualified version of this part please see : <http://www.irf.com/product-info/auto/>
- For the most current drawing please refer to IR website at: <http://www.irf.com/package/>

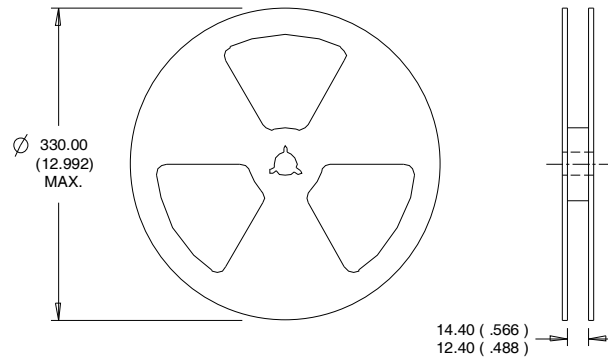
### SO-8 Tape and Reel

Dimensions are shown in millimeters (inches)



**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.

Note: For the most current drawing please refer to IR website at: <http://www.irf.com/package/>

**Qualification information<sup>†</sup>**

Qualification level	Industriid (per JEDEC JESD47F <sup>††</sup> guidelines)	
Moisture Sensitivity Level	SO-8	MSL1 (per JEDEC J-STD-020D <sup>††</sup> )
RoHS compliant	Yes	

<sup>†</sup> Qualification standards can be found at International Rectifier's web site: <http://www.irf.com/product-info/reliability>

<sup>††</sup> Applicable version of JEDEC standard at the time of product release

**Revision History**

Date	Comment
9/3/2014	<ul style="list-style-type: none"> <li>• Updated data sheet based on corporate template.</li> <li>• Added Qual level on page 11.</li> <li>• Added ordering information and updated to reflect the End-Of-life (EOL) of the Tube option (EOL notice #529) on page 1.</li> </ul>