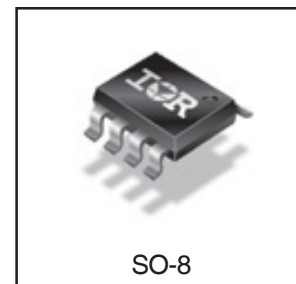
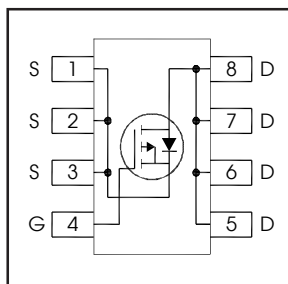


$V_{DS}$	<b>-30</b>	<b>V</b>
$R_{DS(on) \text{ max}}$ (@ $V_{GS} = -10V$ )	<b>4.6</b>	<b>mΩ</b>
$R_{DS(on) \text{ max}}$ (@ $V_{GS} = -4.5V$ )	<b>6.8</b>	
$Q_g$ (typical)	<b>58</b>	<b>nC</b>
$I_D$ (@ $T_A = 25^\circ C$ )	<b>-20</b>	<b>A</b>



**Features**

Industry-standard pinout SO-8 Package
Compatible with Existing Surface Mount Techniques
RoHS Compliant, Halogen-Free
MSL1, Industrial qualification

⇒

**Benefits**

Multi-Vendor Compatibility
Easier Manufacturing
Environmentally Friendlier
Increased Reliability

Base Part Number	Package Type	Standard Pack		Orderable Part Number
		Form	Quantity	
IRF9310PbF-1	SO-8	Tube/Bulk	95	IRF9310PbF-1
		Tape and Reel	4000	IRF9310TRPbF-1

**Absolute Maximum Ratings**

	Parameter	Max.	Units
$V_{DS}$	Drain-to-Source Voltage	-30	V
$V_{GS}$	Gate-to-Source Voltage	± 20	
$I_D @ T_A = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	-20	A
$I_D @ T_A = 70^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	-16	
$I_{DM}$	Pulsed Drain Current ①	-160	
$P_D @ T_A = 25^\circ C$	Power Dissipation ④	2.5	W
$P_D @ T_A = 70^\circ C$	Power Dissipation ④	1.6	
	Linear Derating Factor	0.02	W/°C
$T_J$ $T_{STG}$	Operating Junction and Storage Temperature Range	-55 to + 150	°C

Notes ① through ⑤ are on page 2

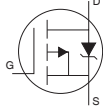
**Static @ T<sub>J</sub> = 25°C (unless otherwise specified)**

	Parameter	Min.	Typ.	Max.	Units	Conditions
BV <sub>DSS</sub>	Drain-to-Source Breakdown Voltage	-30	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = -250μA
ΔBV <sub>DSS</sub> /ΔT <sub>J</sub>	Breakdown Voltage Temp. Coefficient	—	0.020	—	V/°C	Reference to 25°C, I <sub>D</sub> = -1mA
R <sub>DS(on)</sub>	Static Drain-to-Source On-Resistance	—	3.9	4.6	mΩ	V <sub>GS</sub> = -10V, I <sub>D</sub> = -20A ③
		—	5.8	6.8		V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -16A ③
V <sub>GS(th)</sub>	Gate Threshold Voltage	-1.3	-1.8	-2.4	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -100μA
ΔV <sub>GS(th)</sub>	Gate Threshold Voltage Coefficient	—	-5.8	—	mV/°C	
I <sub>DSS</sub>	Drain-to-Source Leakage Current	—	—	-1.0	μA	V <sub>DS</sub> = -24V, V <sub>GS</sub> = 0V
		—	—	-150		V <sub>DS</sub> = -24V, V <sub>GS</sub> = 0V, T <sub>J</sub> = 125°C
I <sub>GSS</sub>	Gate-to-Source Forward Leakage	—	—	-100	nA	V <sub>GS</sub> = -20V
	Gate-to-Source Reverse Leakage	—	—	100		V <sub>GS</sub> = 20V
g <sub>fs</sub>	Forward Transconductance	39	—	—	S	V <sub>DS</sub> = -10V, I <sub>D</sub> = -16A
Q <sub>g</sub>	Total Gate Charge ⑥	—	58	—	nC	V <sub>DS</sub> = -15V, V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -16A
Q <sub>g</sub>	Total Gate Charge ⑥	—	110	165	nC	V <sub>GS</sub> = -10V
Q <sub>gs</sub>	Gate-to-Source Charge ⑥	—	17	—		V <sub>DS</sub> = -15V
Q <sub>gd</sub>	Gate-to-Drain Charge ⑥	—	28	—		I <sub>D</sub> = -16A
R <sub>G</sub>	Gate Resistance ⑥	—	2.8	—	Ω	
t <sub>d(on)</sub>	Turn-On Delay Time	—	25	—	ns	V <sub>DD</sub> = -15V, V <sub>GS</sub> = -4.5V ③
t <sub>r</sub>	Rise Time	—	47	—		I <sub>D</sub> = -1.0A
t <sub>d(off)</sub>	Turn-Off Delay Time	—	65	—		R <sub>G</sub> = 1.8Ω
t <sub>f</sub>	Fall Time	—	70	—		See Figs. 20a & 20b
C <sub>iss</sub>	Input Capacitance	—	5250	—	pF	V <sub>GS</sub> = 0V
C <sub>oss</sub>	Output Capacitance	—	1300	—		V <sub>DS</sub> = -15V
C <sub>rss</sub>	Reverse Transfer Capacitance	—	880	—		f = 1.0MHz

**Avalanche Characteristics**

	Parameter	Typ.	Max.	Units
E <sub>AS</sub>	Single Pulse Avalanche Energy ②	—	630	mJ
I <sub>AR</sub>	Avalanche Current ①	—	-16	A

**Diode Characteristics**

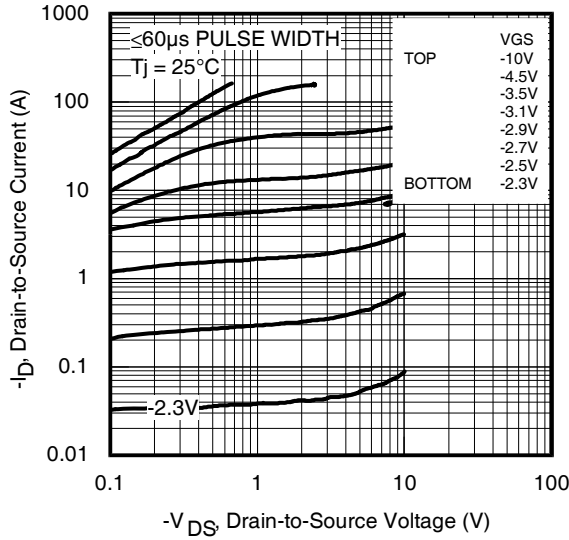
	Parameter	Min.	Typ.	Max.	Units	Conditions
I <sub>S</sub>	Continuous Source Current (Body Diode)	—	—	-2.5	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I <sub>SM</sub>	Pulsed Source Current (Body Diode) ①	—	—	-160		
V <sub>SD</sub>	Diode Forward Voltage	—	—	-1.2	V	T <sub>J</sub> = 25°C, I <sub>S</sub> = -2.5A, V <sub>GS</sub> = 0V ③
t <sub>rr</sub>	Reverse Recovery Time	—	71	107	ns	T <sub>J</sub> = 25°C, I <sub>F</sub> = -2.5A, V <sub>DD</sub> = -24V
Q <sub>rr</sub>	Reverse Recovery Charge	—	12	18	nC	di/dt = 100A/μs ③

**Thermal Resistance**

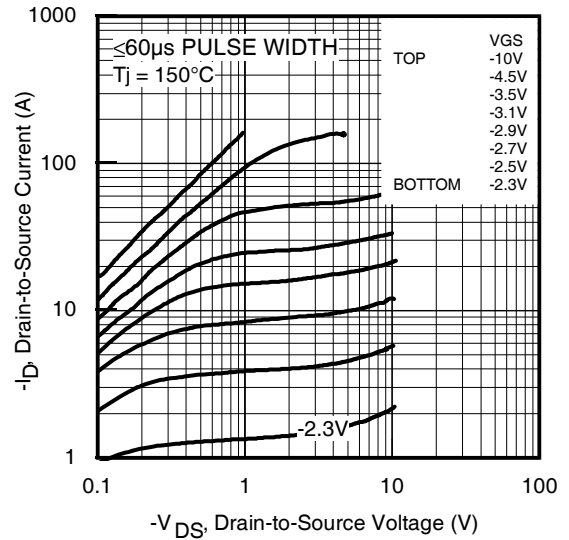
	Parameter	Typ.	Max.	Units
R <sub>θJL</sub>	Junction-to-Drain Lead ⑤	—	20	°C/W
R <sub>θJA</sub>	Junction-to-Ambient ④	—	50	

**Notes:**

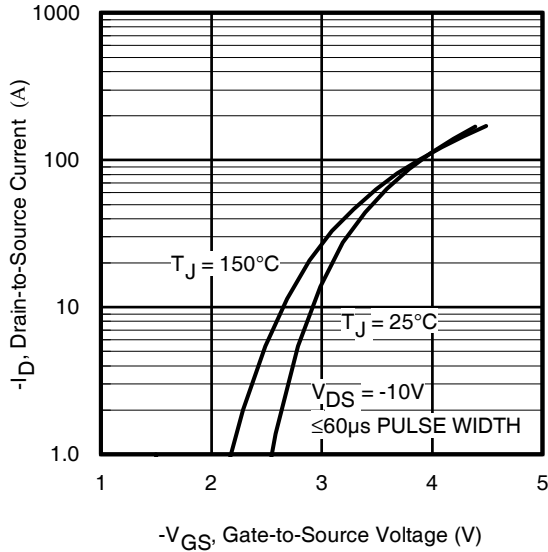
- ① Repetitive rating; pulse width limited by max. junction temperature.
- ② Starting T<sub>J</sub> = 25°C, L = 4.9mH, R<sub>G</sub> = 25Ω, I<sub>AS</sub> = -16A.
- ③ Pulse width ≤ 400μs; duty cycle ≤ 2%.
- ④ When mounted on 1 inch square copper board.
- ⑤ R<sub>θ</sub> is measured at T<sub>J</sub> of approximately 90°C.
- ⑥ For DESIGN AID ONLY, not subject to production testing.



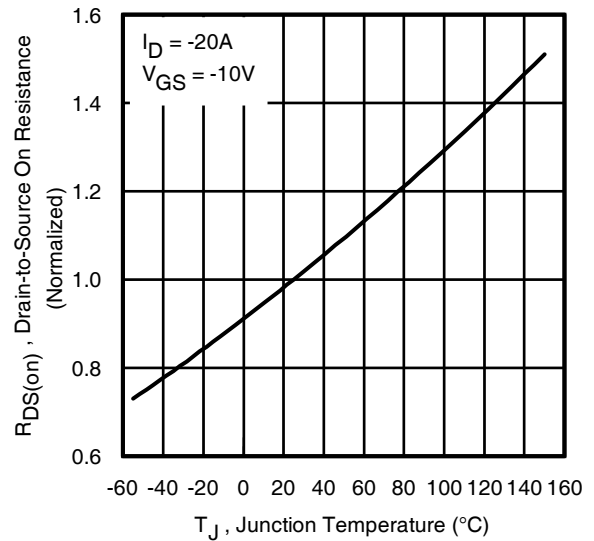
**Fig 1.** Typical Output Characteristics



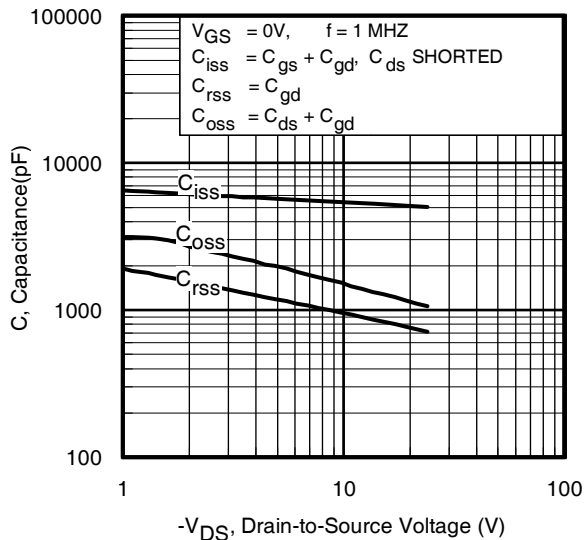
**Fig 2.** Typical Output Characteristics



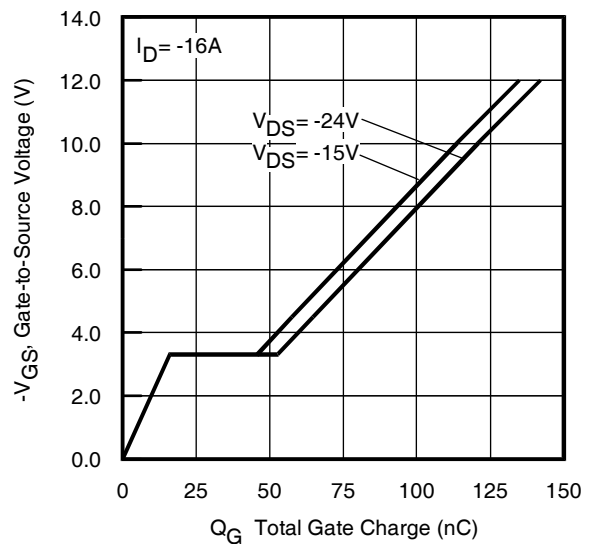
**Fig 3.** Typical Transfer Characteristics



**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

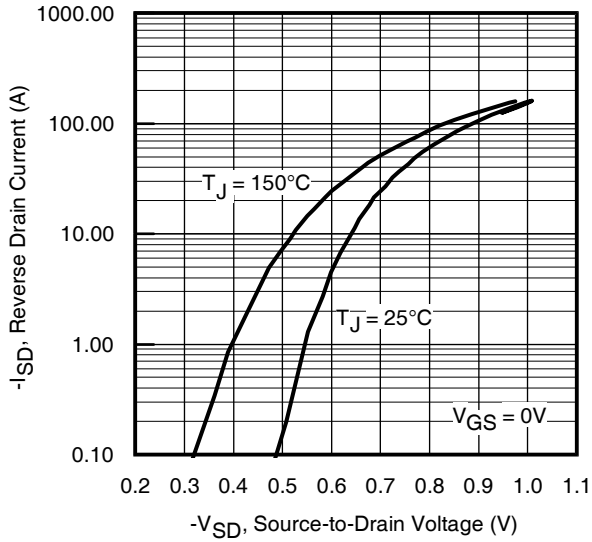


Fig 7. Typical Source-Drain Diode Forward Voltage

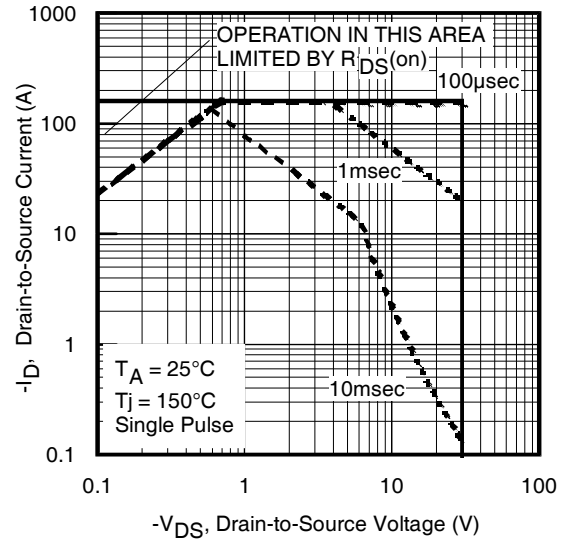


Fig 8. Maximum Safe Operating Area

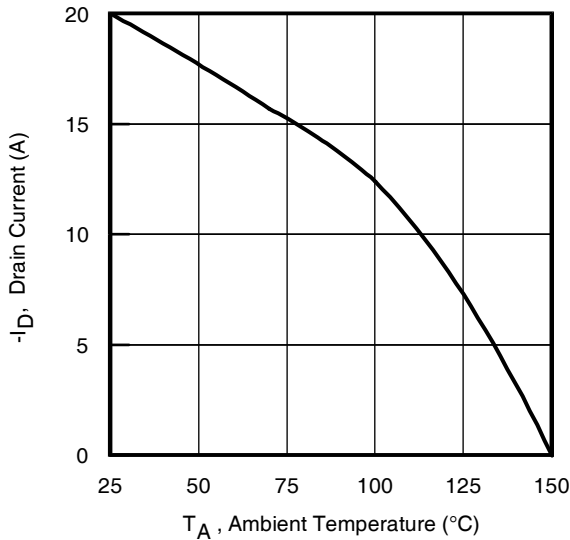


Fig 9. Maximum Drain Current vs. Ambient Temperature

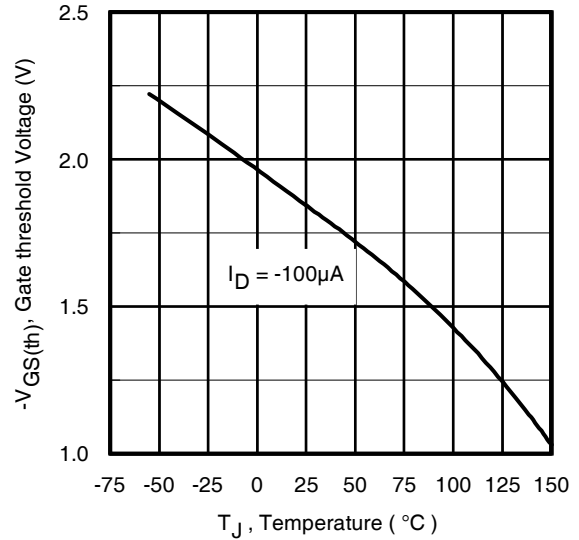


Fig 10. Threshold Voltage vs. Temperature

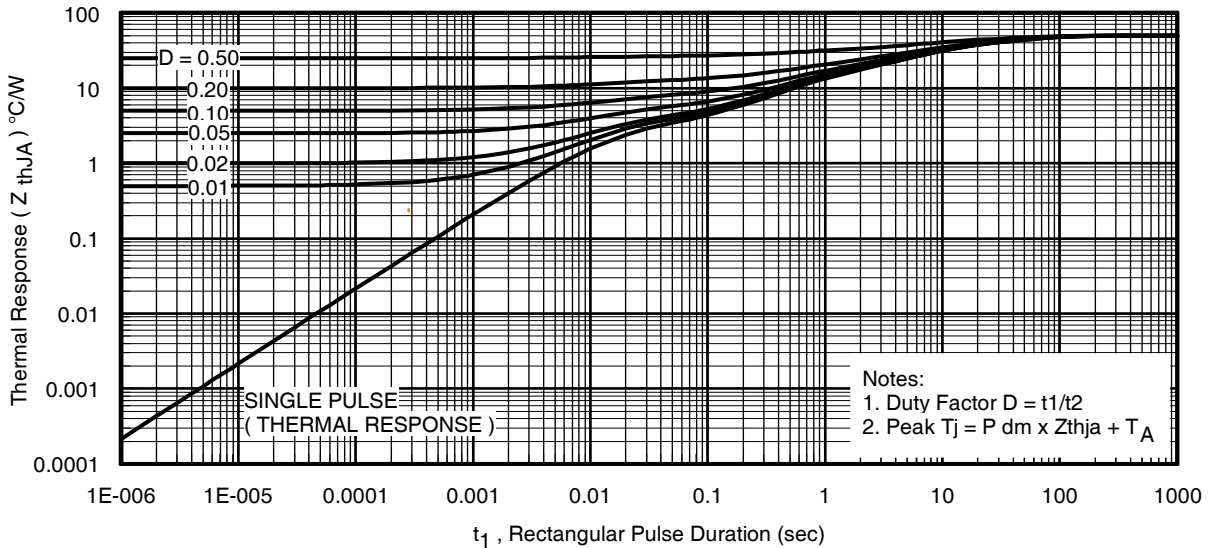


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

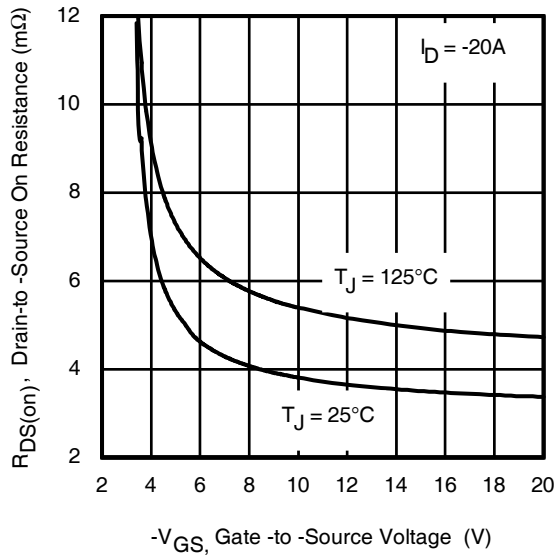


Fig 12. On-Resistance vs. Gate Voltage

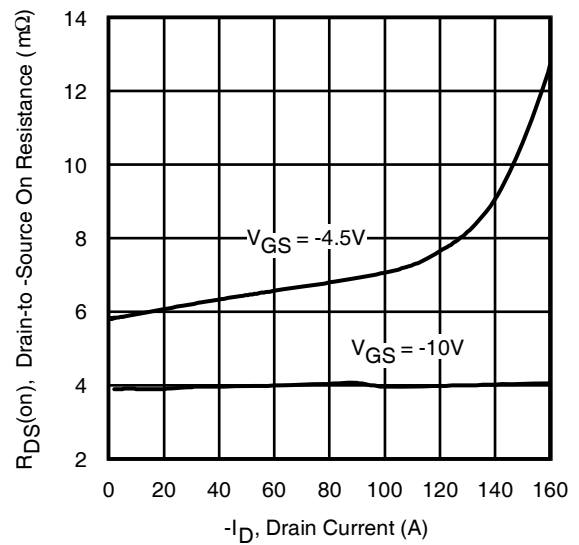


Fig 13. Typical On-Resistance vs. Drain Current

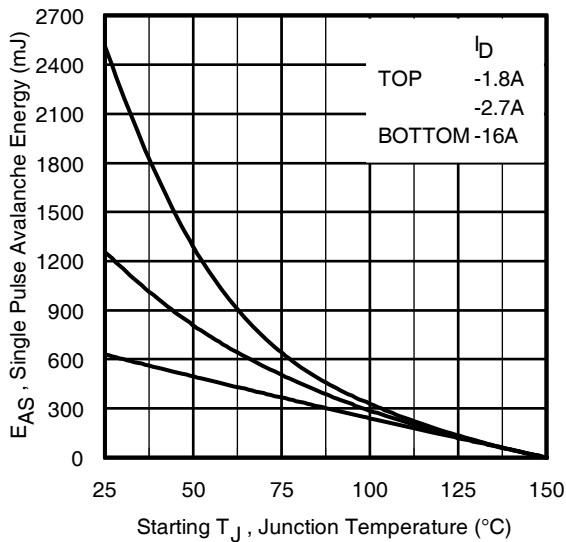


Fig 14. Maximum Avalanche Energy vs. Drain Current

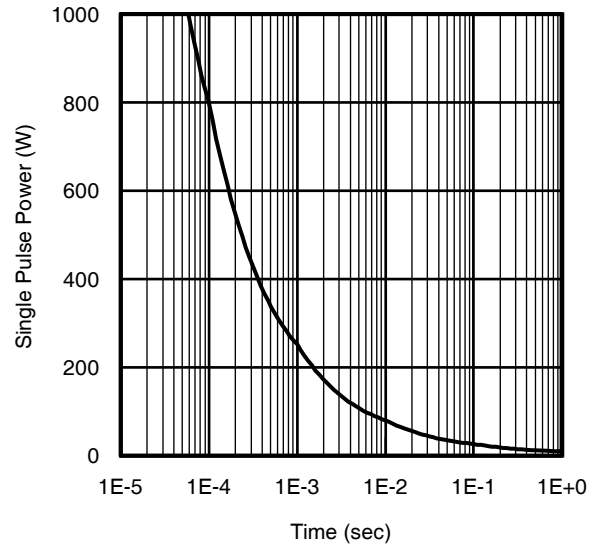
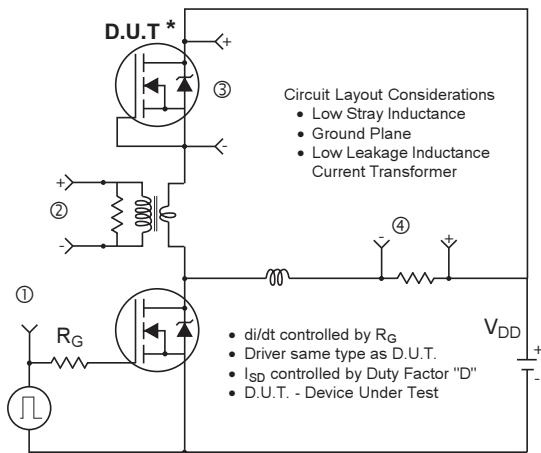
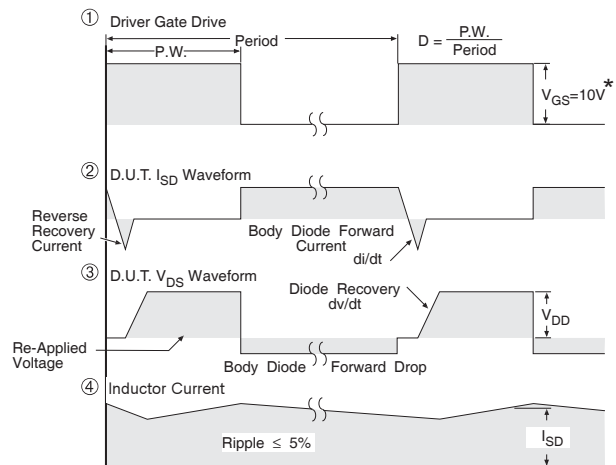


Fig 16. Typical Power vs. Time



\* Reverse Polarity of D.U.T. for P-Channel



\*  $V_{GS} = 5V$  for Logic Level Devices

Fig 17. Diode Reverse Recovery Test Circuit for P-Channel HEXFET Power MOSFETs

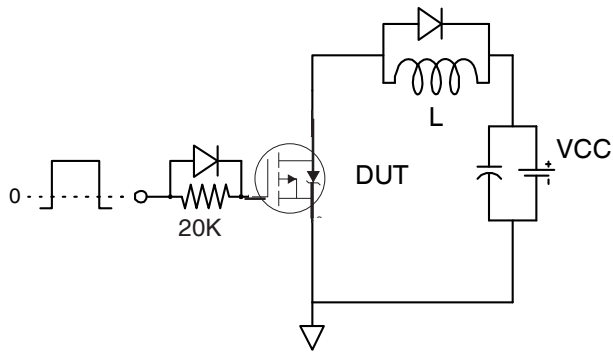


Fig 18a. Gate Charge Test Circuit

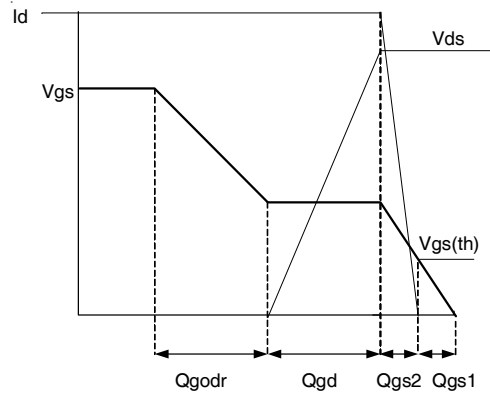


Fig 18b. Gate Charge Waveform

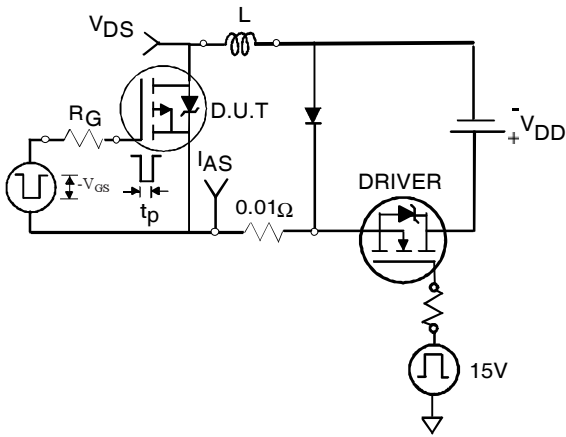


Fig 19a. Unclamped Inductive Test Circuit

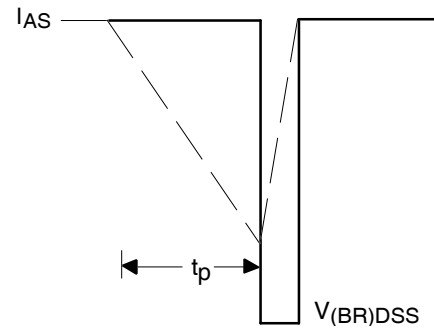


Fig 19b. Unclamped Inductive Waveforms

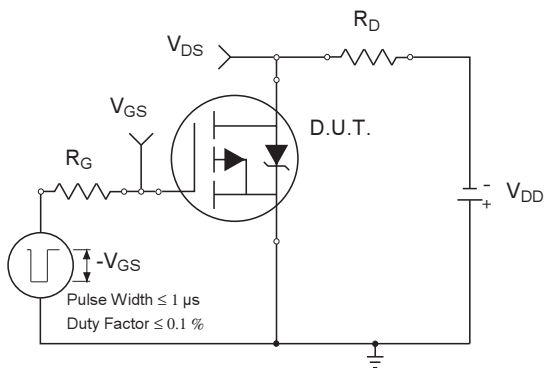


Fig 20a. Switching Time Test Circuit

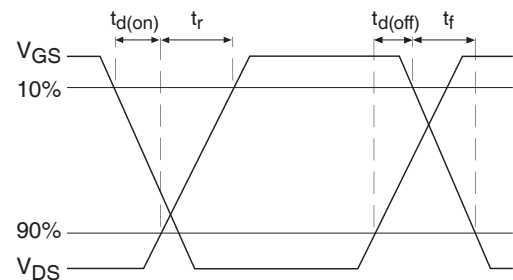
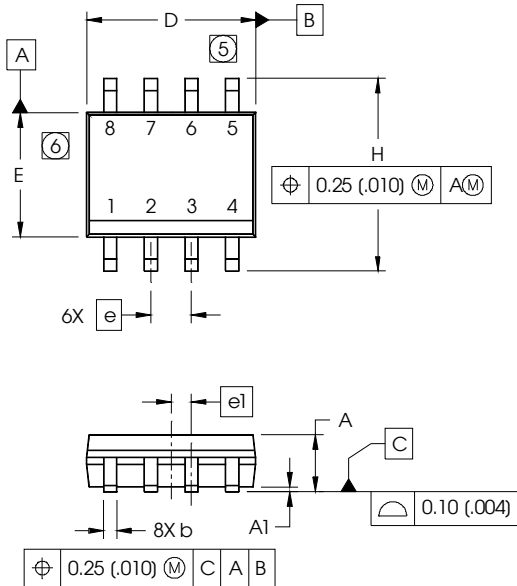


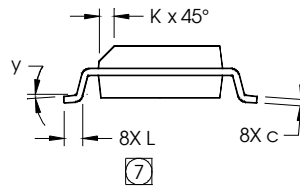
Fig 20b. Switching Time Waveforms

# SO-8 Package Outline (MOSFET & Fetky)

Dimensions are shown in millimeters (inches)

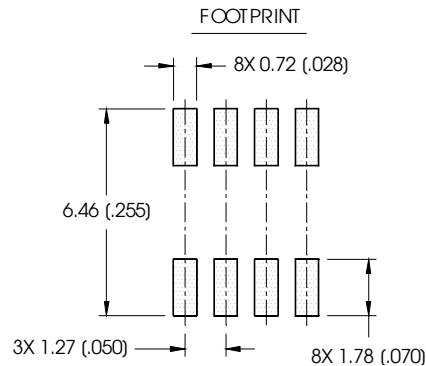


DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.0532	.0688	1.35	1.75
A1	.0040	.0098	0.10	0.25
b	.013	.020	0.33	0.51
c	.0075	.0098	0.19	0.25
D	.189	.1968	4.80	5.00
E	.1497	.1574	3.80	4.00
e	.050 BASIC		1.27 BASIC	
e1	.025 BASIC		0.635 BASIC	
H	.2284	.2440	5.80	6.20
K	.0099	.0196	0.25	0.50
L	.016	.050	0.40	1.27
y	0°	8°	0°	8°



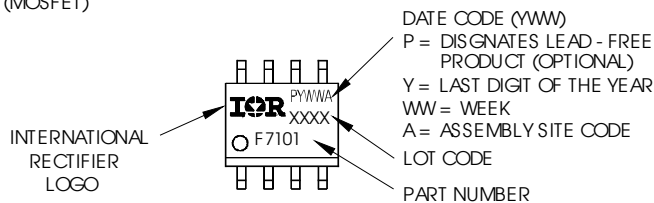
**NOTES:**

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 (.006).
6. DIMENSION DOES NOT INCLUDE MOLD PROTRUSIONS. MOLD PROTRUSIONS NOT TO EXCEED 0.25 (.010).
7. DIMENSION IS THE LENGTH OF LEAD FOR SOLDERING TO A SUBSTRATE.



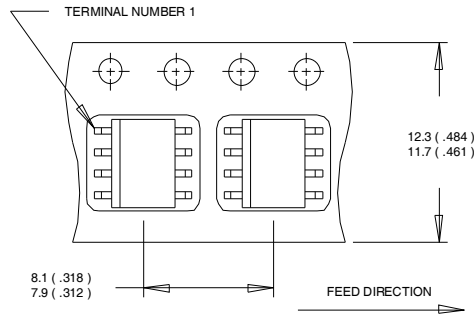
## SO-8 Part Marking Information

EXAMPLE: THIS IS AN IRF7101 (MOSFET)

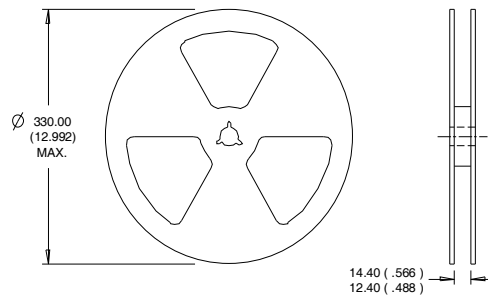


Note: For the most current drawing please refer to IR website at: <http://www.irf.com/package/>

**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