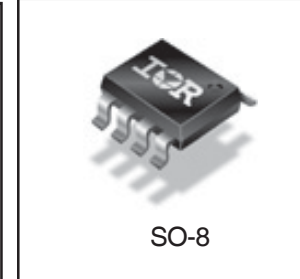
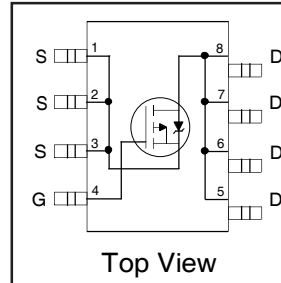


HEXFET® Power MOSFET

$V_{DS}$	<b>-30</b>	<b>V</b>
$R_{DS(on) max}$ (@ $V_{GS} = -10V$ )	<b>0.020</b>	<b><math>\Omega</math></b>
$Q_g$ (typical)	<b>61</b>	<b>nC</b>
$I_b$ (@ $T_A = 25^\circ C$ )	<b>-10</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	
IRF7416PbF-1	SO-8	Tube/Bulk	95	IRF7416PbF-1
		Tape and Reel	4000	IRF7416TRPbF-1

**Absolute Maximum Ratings**

	Parameter	Max.	Units
$I_D @ T_A = 25^\circ C$	Continuous Drain Current, $V_{GS} @ -10V$	-10	A
$I_D @ T_A = 70^\circ C$	Continuous Drain Current, $V_{GS} @ -10V$	-7.1	
$I_{DM}$	Pulsed Drain Current ①	-45	
$P_D @ T_A = 25^\circ C$	Power Dissipation	2.5	W
	Linear Derating Factor	0.02	W/°C
$V_{GS}$	Gate-to-Source Voltage	± 20	V
$E_{AS}$	Single Pulse Avalanche Energy ②	370	mJ
dv/dt	Peak Diode Recovery dv/dt ③	-5.0	V/ns
$T_J$ $T_{STG}$	Operating Junction and Storage Temperature Range	-55 to + 150	°C

**Thermal Resistance**

	Parameter	Max.	Units
$R_{\theta JA}$	Junction-to-Ambient ⑤	50	°C/W

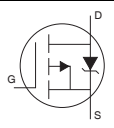
**Static Electrical Characteristics @  $T_J = 25^\circ\text{C}$  (unless otherwise specified)**

	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	-30	—	—	V	$V_{GS} = 0V, I_D = -250\mu A$
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	-0.024	—	V/ $^\circ\text{C}$	Reference to $25^\circ\text{C}$ , $I_D = -1mA$
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	—	0.020	$\Omega$	$V_{GS} = -10V, I_D = -5.6A$ ④
		—	—	0.035		$V_{GS} = -4.5V, I_D = -2.8A$ ④
$V_{GS(th)}$	Gate Threshold Voltage	-1.0	—	-2.04	V	$V_{DS} = V_{GS}, I_D = -250\mu A$
$g_{fs}$	Forward Transconductance	5.6	—	—	S	$V_{DS} = -10V, I_D = -2.8A$
$I_{DSS}$	Drain-to-Source Leakage Current	—	—	-1.0	$\mu A$	$V_{DS} = -24V, V_{GS} = 0V$
		—	—	-25		$V_{DS} = -24V, V_{GS} = 0V, T_J = 125^\circ\text{C}$
$I_{GSS}$	Gate-to-Source Forward Leakage	—	—	-100	nA	$V_{GS} = -20V$
	Gate-to-Source Reverse Leakage	—	—	100		$V_{GS} = 20V$

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

	Parameter	Min.	Typ.	Max.	Units	Conditions
$Q_g$	Total Gate Charge	—	61	92	nC	$I_D = -5.6A$ $V_{DS} = -24V$ $V_{GS} = -10V$ , See Fig. 6 & 9 ④
$Q_{gs}$	Gate-to-Source Charge	—	8.0	12		
$Q_{gd}$	Gate-to-Drain ("Miller") Charge	—	22	32		
$t_{d(on)}$	Turn-On Delay Time	—	18	—	ns	$V_{DD} = -15V$ $I_D = -5.6A$ $R_G = 6.2\Omega$ $R_D = 2.7\Omega$ , See Fig. 10 ④
$t_r$	Rise Time	—	49	—		
$t_{d(off)}$	Turn-Off Delay Time	—	59	—		
$t_f$	Fall Time	—	60	—		
$C_{iss}$	Input Capacitance	—	1700	—	pF	$V_{GS} = 0V$ $V_{DS} = -25V$ $f = 1.0MHz$ , See Fig. 5
$C_{oss}$	Output Capacitance	—	890	—		
$C_{rss}$	Reverse Transfer Capacitance	—	410	—		

**Diode Characteristics**

	Parameter	Min.	Typ.	Max.	Units	Conditions
$I_S$	Continuous Source Current (Body Diode)	—	—	-3.1	A	MOSFET symbol showing the integral reverse p-n junction diode. 
$I_{SM}$	Pulsed Source Current (Body Diode) ①	—	—	-45		
$V_{SD}$	Diode Forward Voltage	—	—	-1.0	V	$T_J = 25^\circ\text{C}, I_S = -5.6A, V_{GS} = 0V$ ③
$t_{rr}$	Reverse Recovery Time	—	56	85	ns	$T_J = 25^\circ\text{C}, I_F = -5.6A$
$Q_{rr}$	Reverse Recovery Charge	—	99	150	nC	$di/dt = 100A/\mu s$ ③

**Notes:**

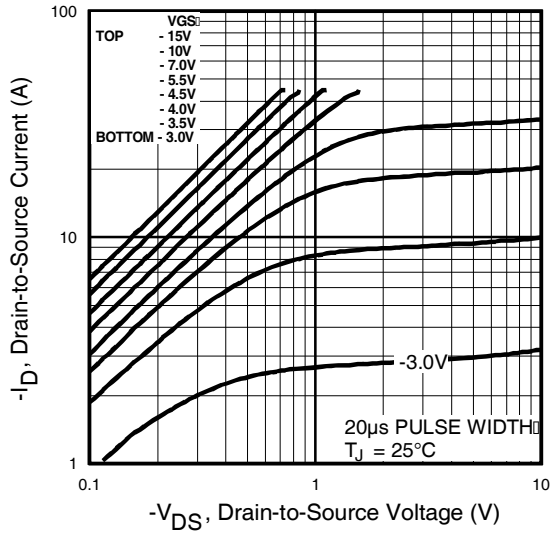
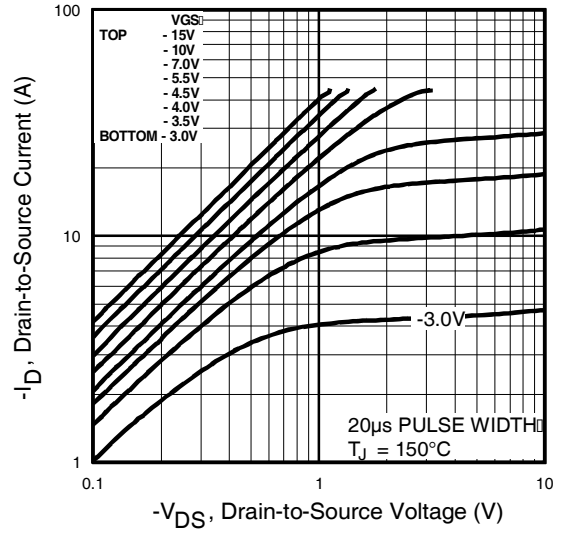
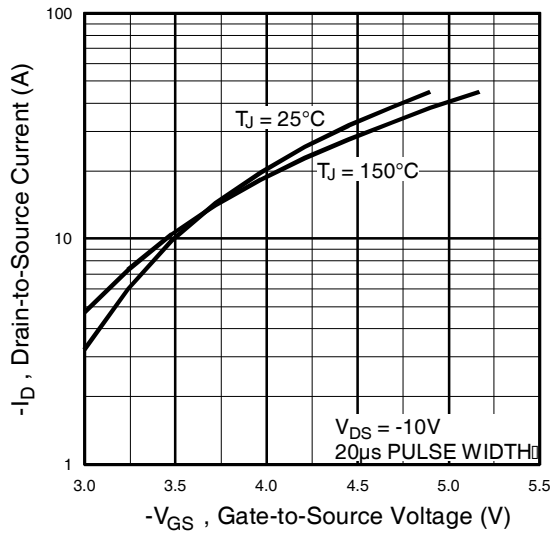
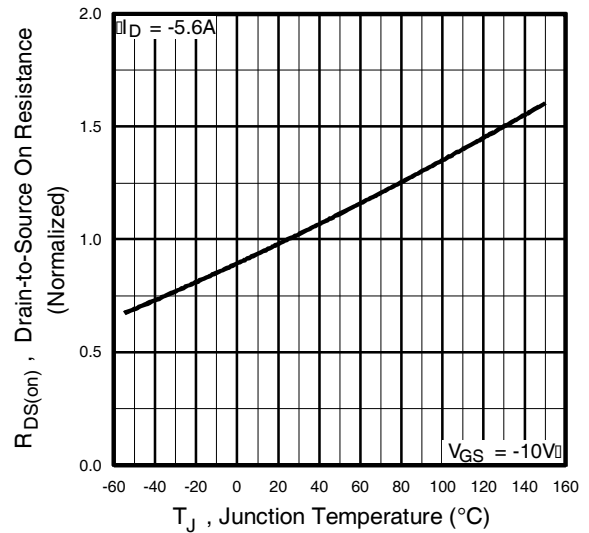
① Repetitive rating; pulse width limited by max. junction temperature. ( See fig. 11 )

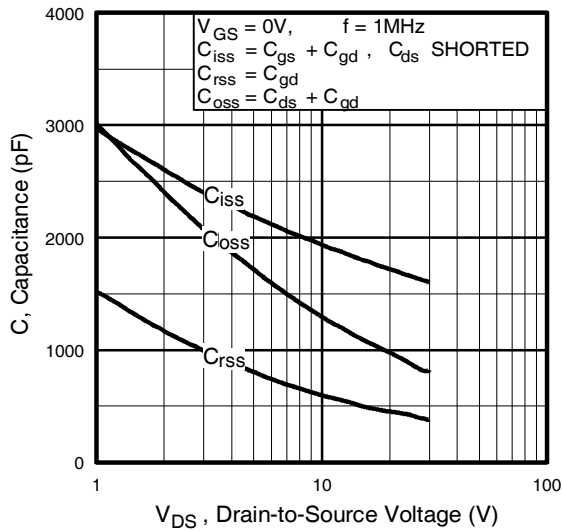
② Starting  $T_J = 25^\circ\text{C}$ ,  $L = 25mH$   
 $R_G = 25\Omega, I_{AS} = -5.6A$ . (See Figure 12)

③  $I_{SD} \leq -5.6A, di/dt \leq 100A/\mu s, V_{DD} \leq V_{(BR)DSS}, T_J \leq 150^\circ\text{C}$

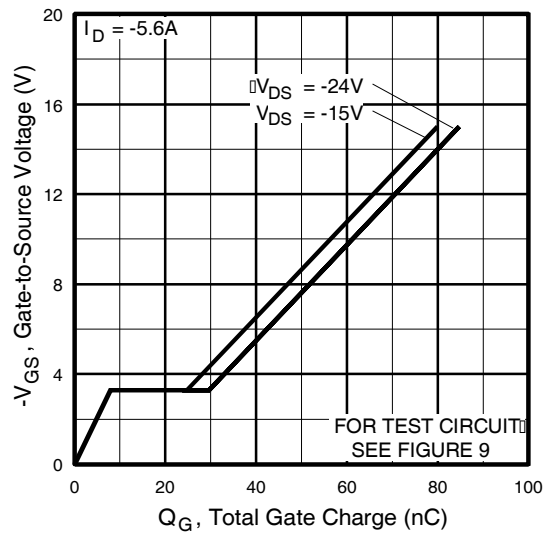
④ Pulse width  $\leq 300\mu s$ ; duty cycle  $\leq 2\%$ .

⑤ Surface mounted on FR-4 board,  $t \leq 10sec$ .

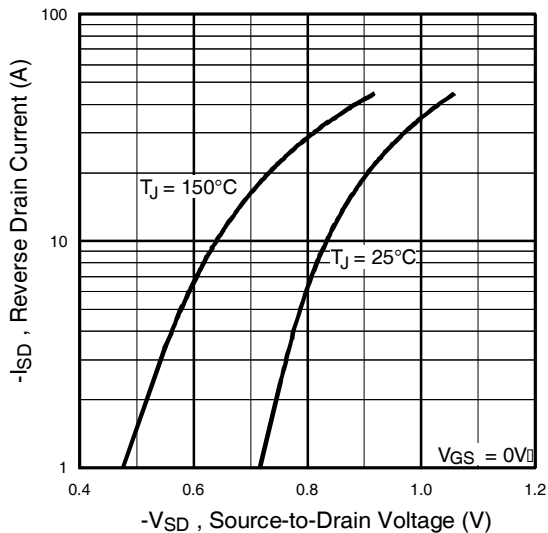

**Fig 1. Typical Output Characteristics**

**Fig 2. Typical Output Characteristics**

**Fig 3. Typical Transfer Characteristics**

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



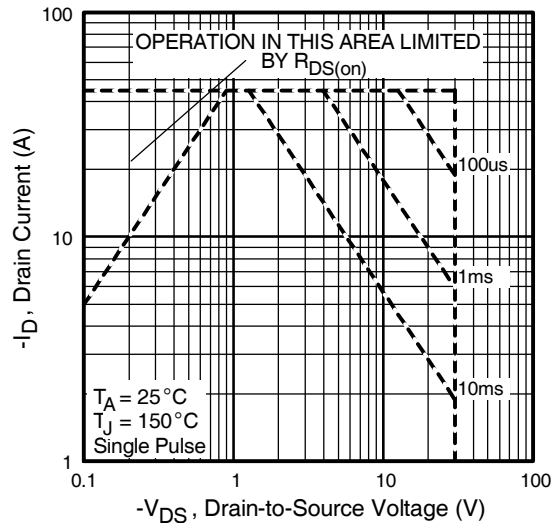
**Fig 5.** Typical Capacitance Vs. Drain-to-Source Voltage



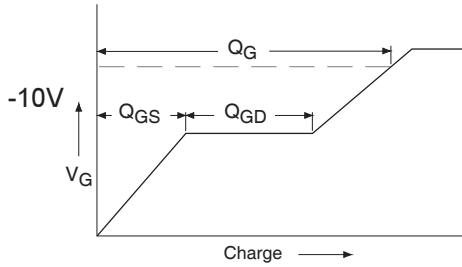
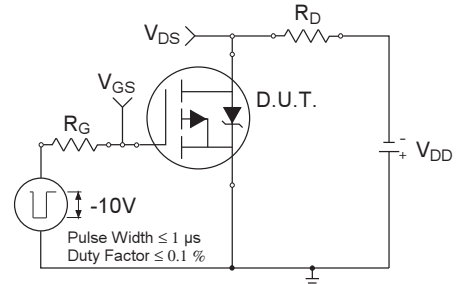
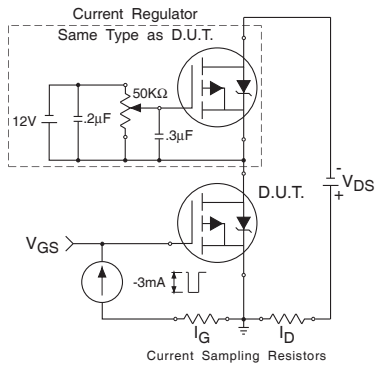
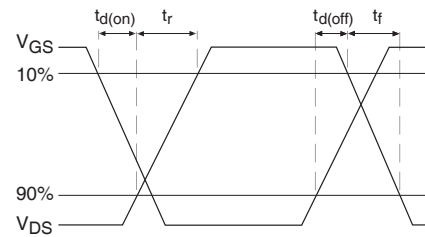
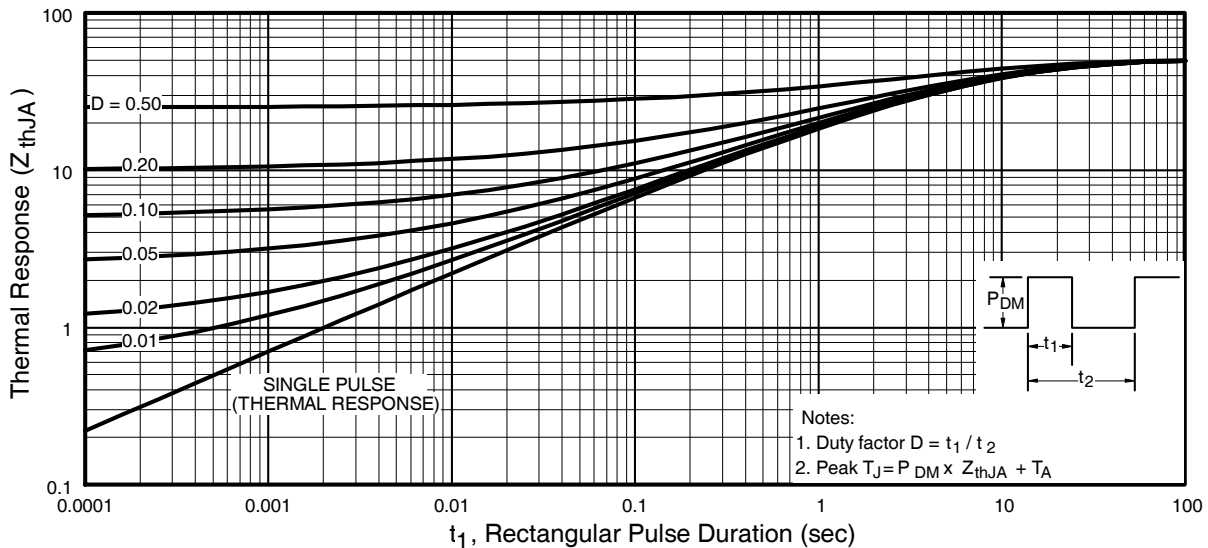
**Fig 6.** Typical Gate Charge Vs. Gate-to-Source Voltage

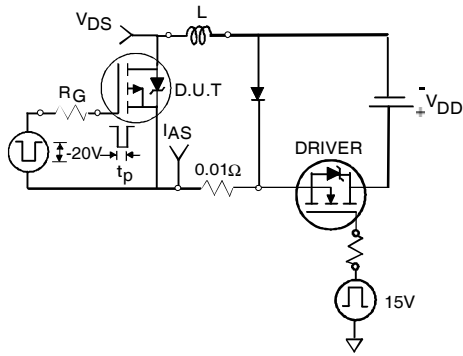
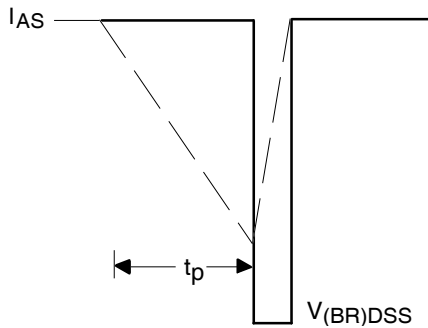
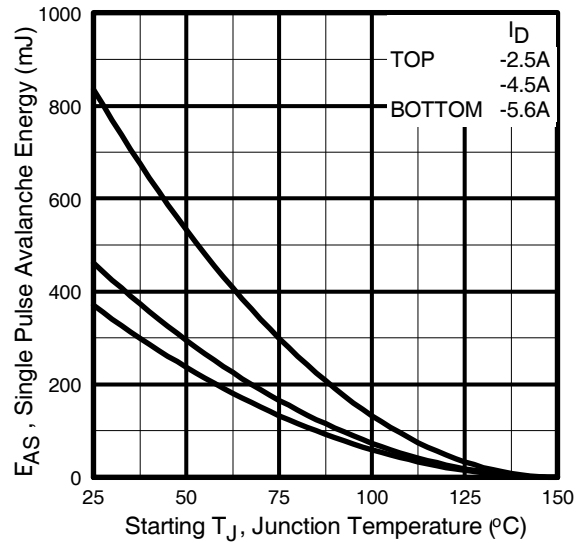


**Fig 7.** Typical Source-Drain Diode Forward Voltage

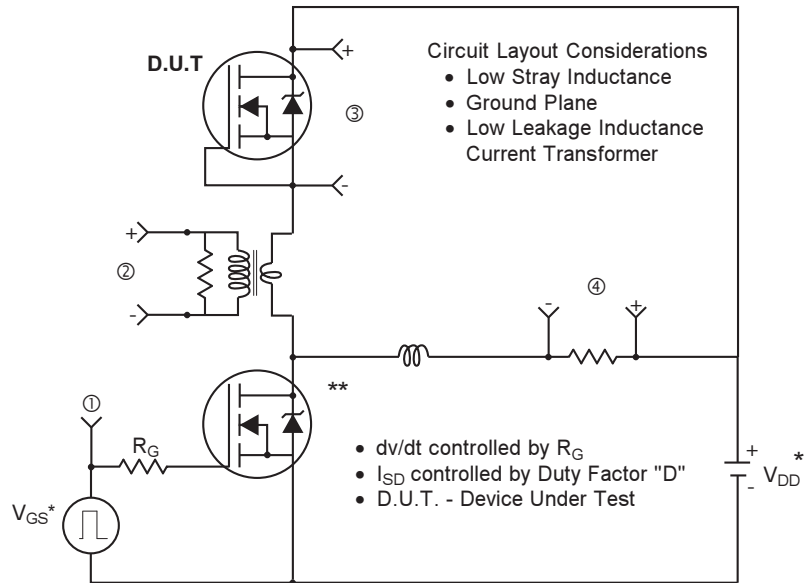


**Fig 8.** Maximum Safe Operating Area


**Fig 9a. Basic Gate Charge Waveform**

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

**Fig 9b. Gate Charge Test Circuit**

**Fig 10b. Switching Time Waveforms**

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

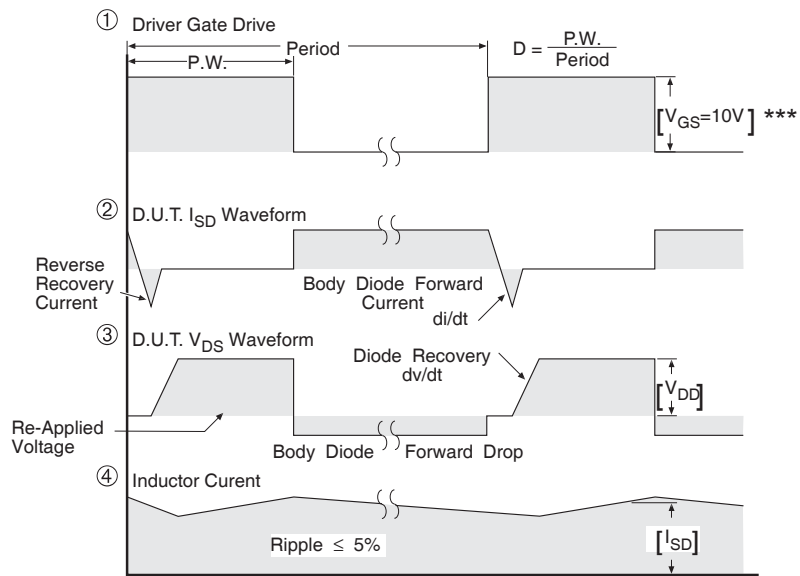

**Fig 12a. Unclamped Inductive Test Circuit**

**Fig 12b. Unclamped Inductive Waveforms**

**Fig 12c. Maximum Avalanche Energy Vs. Drain Current**

### Peak Diode Recovery dv/dt Test Circuit



\* Reverse Polarity for P-Channel

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

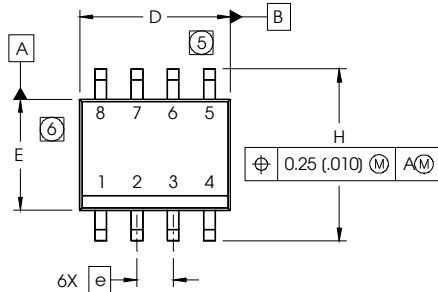


\*\*\*  $V_{GS} = 5.0V$  for Logic Level and 3V Drive Devices

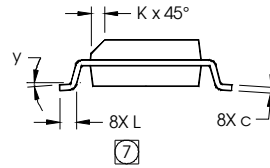
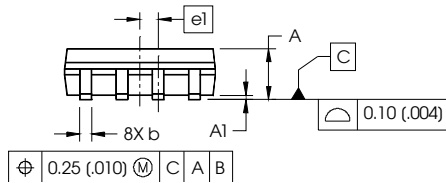
**Fig 13. For P-Channel HEXFETS**

## SO-8 Package Outline

Dimensions are shown in millimeters (inches)



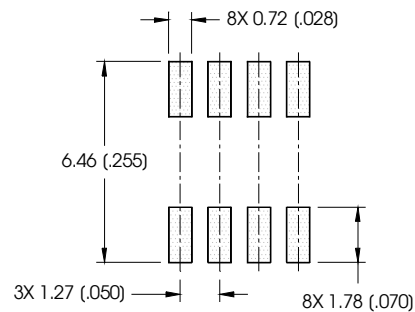
DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.0532	.0688	1.35	1.75
A1	.0040	.0098	0.10	0.25
b	.013	.020	0.33	0.51
c	.0075	.0098	0.19	0.25
D	.189	.1968	4.80	5.00
E	.1497	.1574	3.80	4.00
e	.050 BASIC		1.27 BASIC	
e1	.025 BASIC		0.635 BASIC	
H	.2284	.2440	5.80	6.20
K	.0099	.0196	0.25	0.50
L	.016	.050	0.40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



**NOTES:**

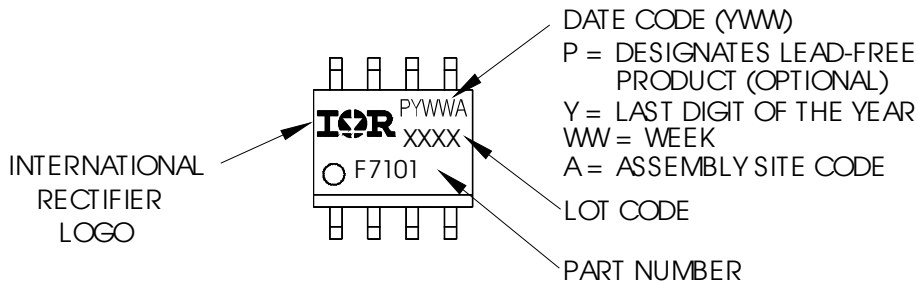
1. DIMENSIONING & TOLERANCING PER ASME Y14.5M-1994.
2. CONTROLLING DIMENSION: MILLIMETER
3. DIMENSIONS ARE SHOWN IN MILLIMETERS (INCHES).
4. OUTLINE CONFORMS TO JEDEC OUTLINE MS-012AA
- ⑤ DIMENSION DOES NOT INCLUDE MOLD PROTRUSIONS. MOLD PROTRUSIONS NOT TO EXCEED 0.15 (.006).
- ⑥ DIMENSION DOES NOT INCLUDE MOLD PROTRUSIONS. MOLD PROTRUSIONS NOT TO EXCEED 0.25 (.010).
- ⑦ DIMENSION IS THE LENGTH OF LEAD FOR SOLDERING TO A SUBSTRATE.

**FOOTPRINT**



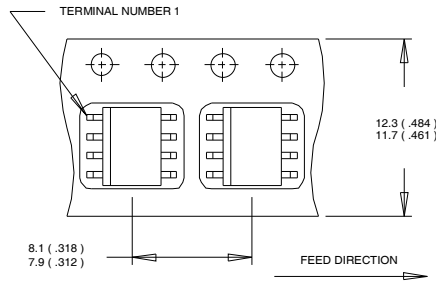
## SO-8 Part Marking

EXAMPLE: THIS IS AN IRF7101 (MOSFET)

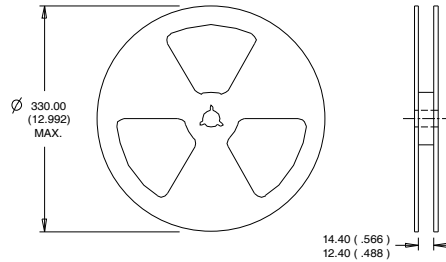


Note: For the most current drawing please refer to IR website at <http://www.irf.com/package/>



**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

单击下面可查看定价，库存，交付和生命周期等信息

[>>Infineon Technologies\(英飞凌\)](#)