International
IOR Rectifier

IRF7820PbF

HEXFET® Power MOSFET

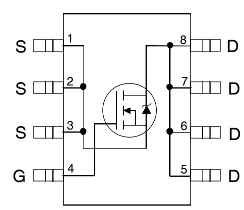
V_{DSS}	$R_{DS(on)}$ max	Qg (typ.)
200V	78mΩ @ V_{GS} = 10V	29nC

Applications

- Synchronous MOSFET for Notebook Processor Power
- Synchronous Rectifier MOSFET for Isolated DC-DC Converters in Networking Systems

Benefits

- Very Low $R_{DS(on)}$ at 10V V_{GS}
- Low Gate Charge
- Fully Characterized Avalanche Voltage and Current
- 20V V_{GS} Max. Gate Rating



Top View


SO-8

Absolute Maximum Ratings

	Parameter	Max.	Units
V_{DS}	Drain-to-Source Voltage	200	V
V_{GS}	Gate-to-Source Voltage	± 20	
I_D @ T_A = 25°C	Continuous Drain Current, V_{GS} @ 10V	3.7	A
I_D @ T_A = 70°C	Continuous Drain Current, V_{GS} @ 10V	2.9	
I_{DM}	Pulsed Drain Current ①	29	
P_D @T_A = 25°C	Power Dissipation ④	2.5	W
P_D @T_A = 70°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

Thermal Resistance

	Parameter	Typ.	Max.	Units
$R_{\theta JL}$	Junction-to-Drain Lead ⑤	——	20	°C/W
$R_{\theta JA}$	Junction-to-Ambient ④	——	50	

Notes ① through ⑤ are on page 9

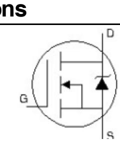
Static @ T_J = 25°C (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
BV_{DSS}	Drain-to-Source Breakdown Voltage	200	—	—	V	V_{GS} = 0V, I_D = 250μA
$\Delta BV_{DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	0.23	—	V/°C	Reference to 25°C, I_D = 1mA
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	62.5	78	mΩ	V_{GS} = 10V, I_D = 2.2A ③
$V_{GS(th)}$	Gate Threshold Voltage	3.0	4.0	5.0	V	V_{DS} = V_{GS}, I_D = 100μA
$\Delta V_{GS(th)}$	Gate Threshold Voltage Coefficient	—	-12	—	mV/°C	
I_{DSS}	Drain-to-Source Leakage Current	—	—	20	μA	V_{DS} = 200V, V_{GS} = 0V
		—	—	250		V_{DS} = 200V, V_{GS} = 0V, T_J = 125°C
I_{GSS}	Gate-to-Source Forward Leakage	—	—	100	nA	V_{GS} = 20V
	Gate-to-Source Reverse Leakage	—	—	-100		V_{GS} = -20V
gfs	Forward Transconductance	5.0	—	—	S	V_{DS} = 50V, I_D = 2.2A
Q_g	Total Gate Charge	—	29	44	nC	
Q_{gs1}	Pre-Vth Gate-to-Source Charge	—	8.6	—		V_{DS} = 100V
Q_{gs2}	Post-Vth Gate-to-Source Charge	—	1.5	—		V_{GS} = 10V
Q_{gs}	Gate-to-Source Charge	—	10.1	—		I_D = 2.2A
Q_{gd}	Gate-to-Drain Charge	—	8.7	—		See Figs. 6, 16a & 16b
Q_{godr}	Gate Charge Overdrive	—	10.2	—		
Q_{sw}	Switch Charge (Q_{gs2} + Q_{gd})	—	10.2	—		
Q_{oss}	Output Charge	—	30	—	nC	V_{DS} = 20V, V_{GS} = 0V
R_G	Gate Resistance	—	0.73	—	Ω	
$t_{d(on)}$	Turn-On Delay Time	—	7.1	—	ns	V_{DD} = 200V, V_{GS} = 10V ③
t_r	Rise Time	—	3.2	—		I_D = 2.2A
$t_{d(off)}$	Turn-Off Delay Time	—	14	—		R_G = 1.8Ω
t_f	Fall Time	—	12	—		See Figs. 15a & 15b
C_{iss}	Input Capacitance	—	1750	—	pF	V_{GS} = 0V
C_{oss}	Output Capacitance	—	90	—		V_{DS} = 100V
C_{rss}	Reverse Transfer Capacitance	—	25	—		f = 1.0MHz

Avalanche Characteristics

	Parameter	Typ.	Max.	Units
E_{AS}	Single Pulse Avalanche Energy ②	—	606	mJ
I_{AR}	Avalanche Current ①	—	2.8	A

Diode Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	1.5	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I_{SM}	Pulsed Source Current (Body Diode) ①	—	—	29		
V_{SD}	Diode Forward Voltage	—	—	1.3	V	T_J = 25°C, I_S = 2.2A, V_{GS} = 0V ③
t_{rr}	Reverse Recovery Time	—	33	50	ns	T_J = 25°C, I_F = 2.2A, V_{DD} = 100V
Q_{rr}	Reverse Recovery Charge	—	213	320	nC	di/dt = 500A/μs ③

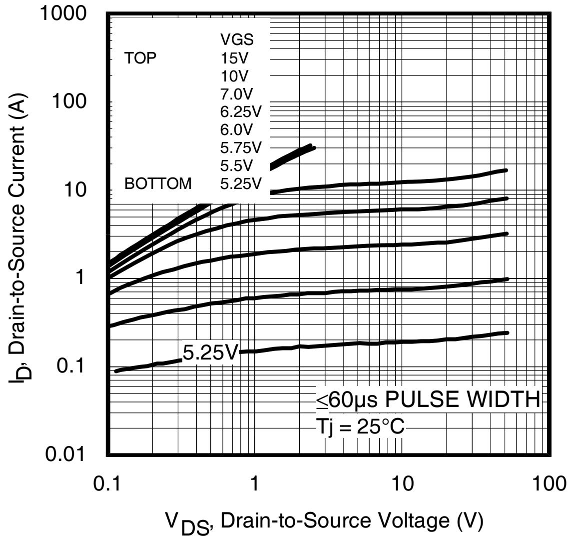


Fig 1. Typical Output Characteristics

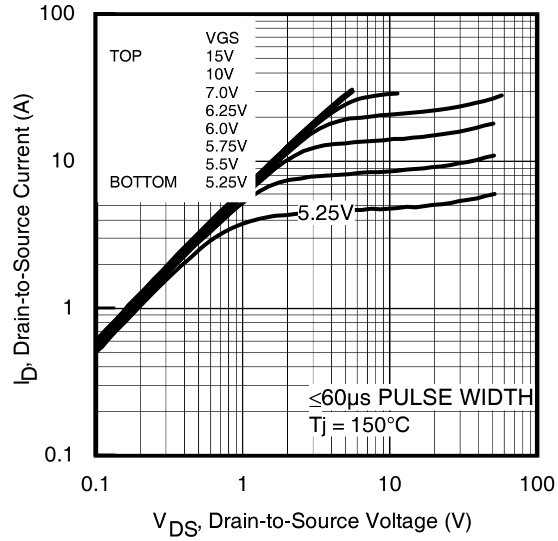


Fig 2. Typical Output Characteristics

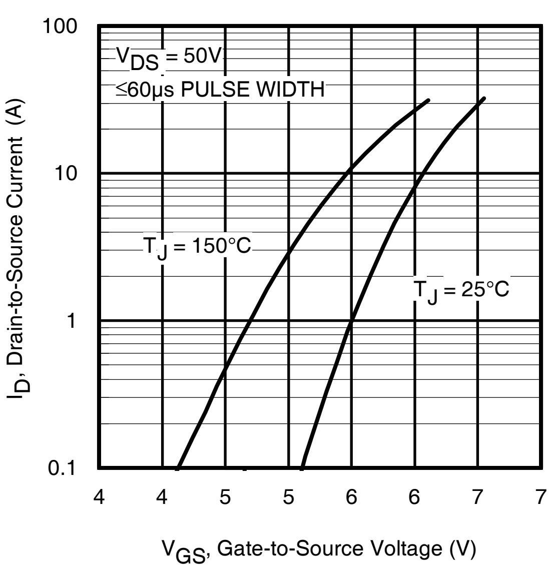


Fig 3. Typical Transfer Characteristics

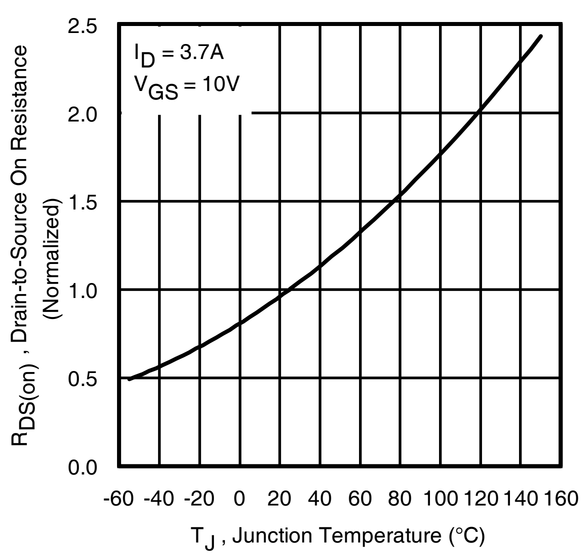


Fig 4. Normalized On-Resistance vs. Temperature

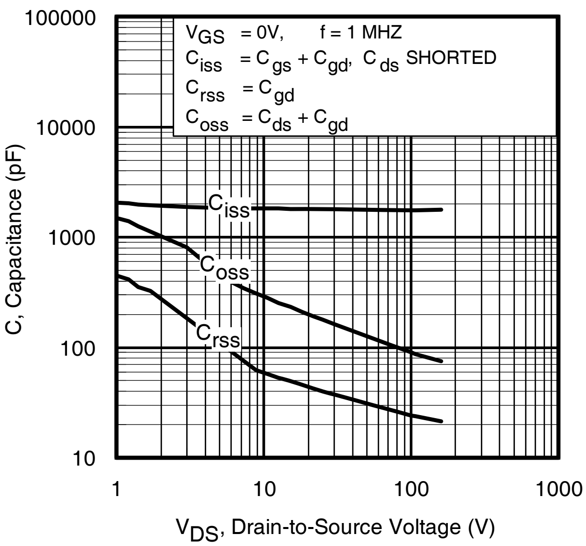


Fig 5. Typical Capacitance vs. Drain-to-Source Voltage

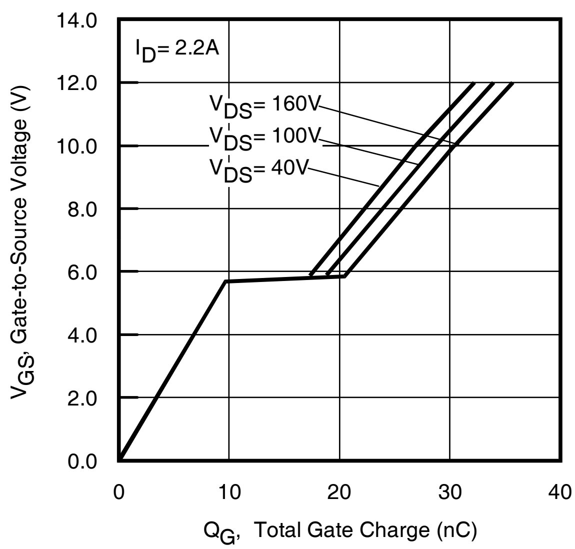


Fig 6. Typical Gate Charge vs. Gate-to-Source Voltage

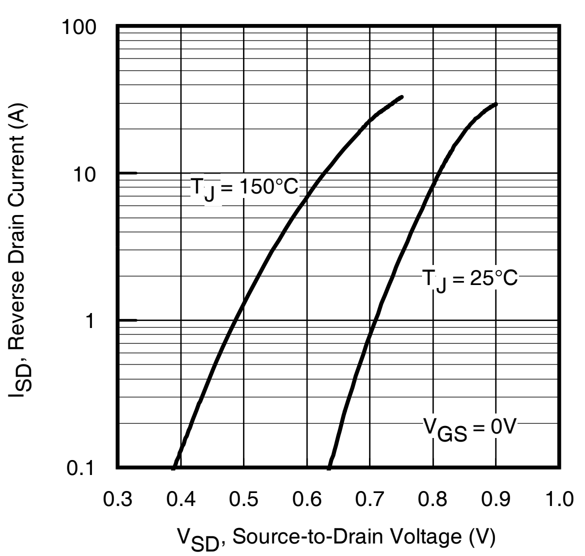


Fig 7. Typical Source-Drain Diode Forward Voltage

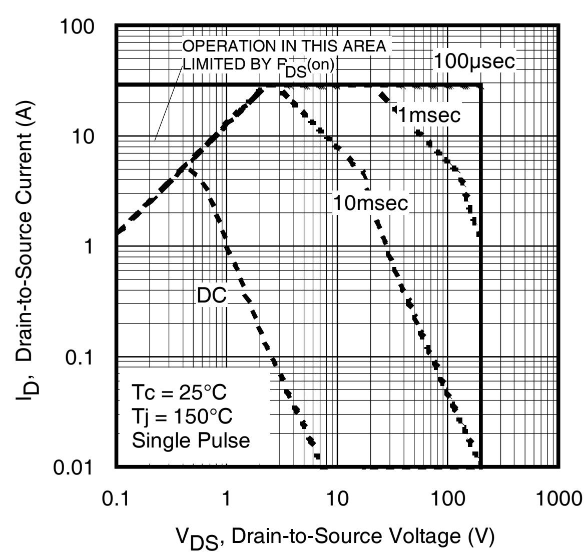


Fig 8. Maximum Safe Operating Area

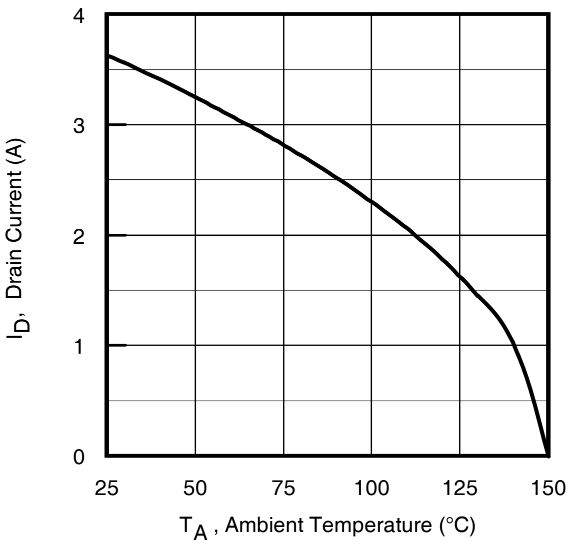


Fig 9. Maximum Drain Current vs. Ambient Temperature

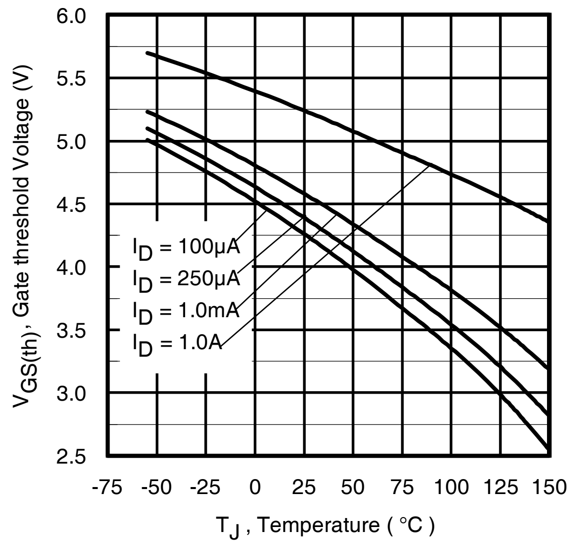


Fig 10. Threshold Voltage vs. Temperature

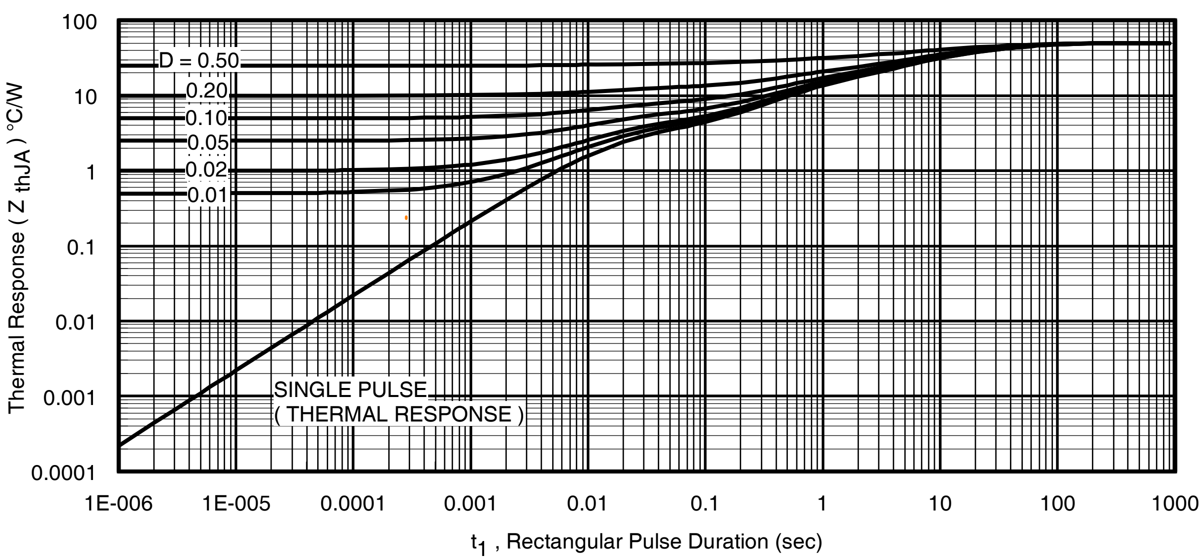


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

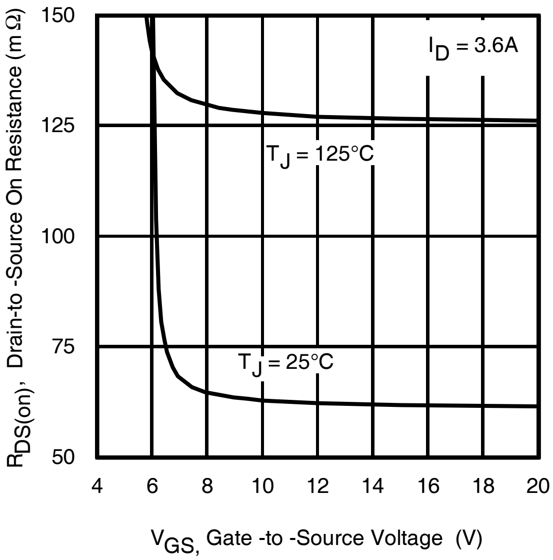


Fig 12. On-Resistance vs. Gate Voltage

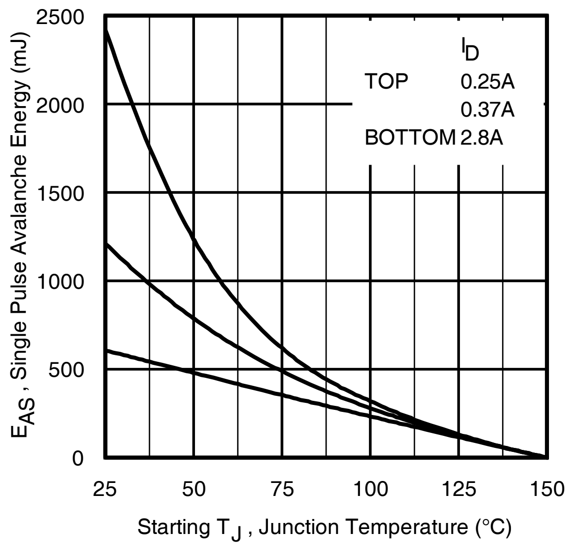


Fig 13. Maximum Avalanche Energy vs. Drain Current

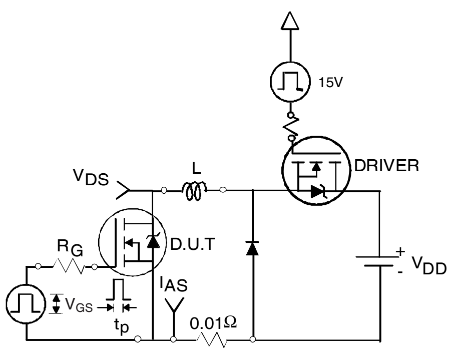


Fig 14a. Unclamped Inductive Test Circuit

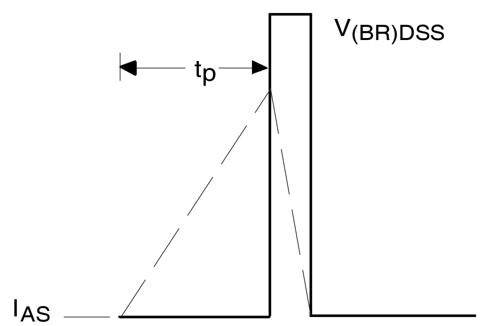


Fig 14b. Unclamped Inductive Waveforms

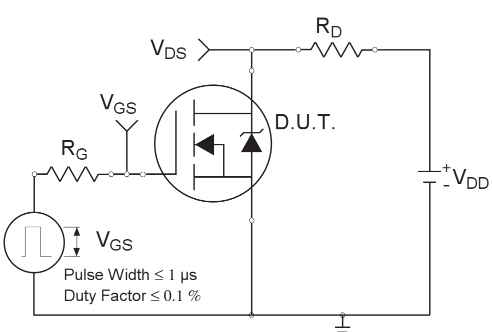


Fig 15a. Switching Time Test Circuit

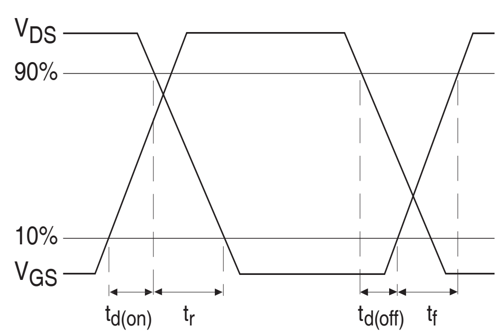


Fig 15b. Switching Time Waveforms

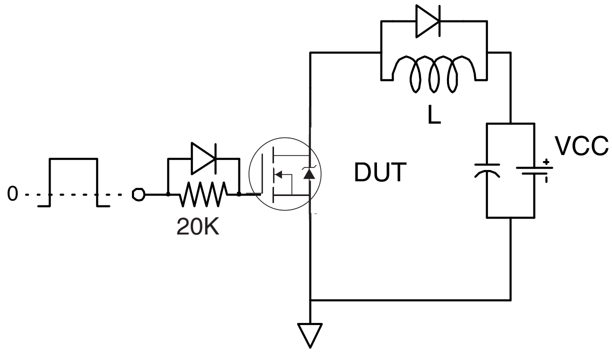


Fig 16a. Gate Charge Test Circuit

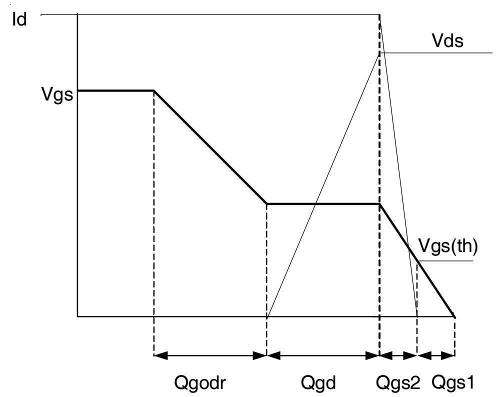
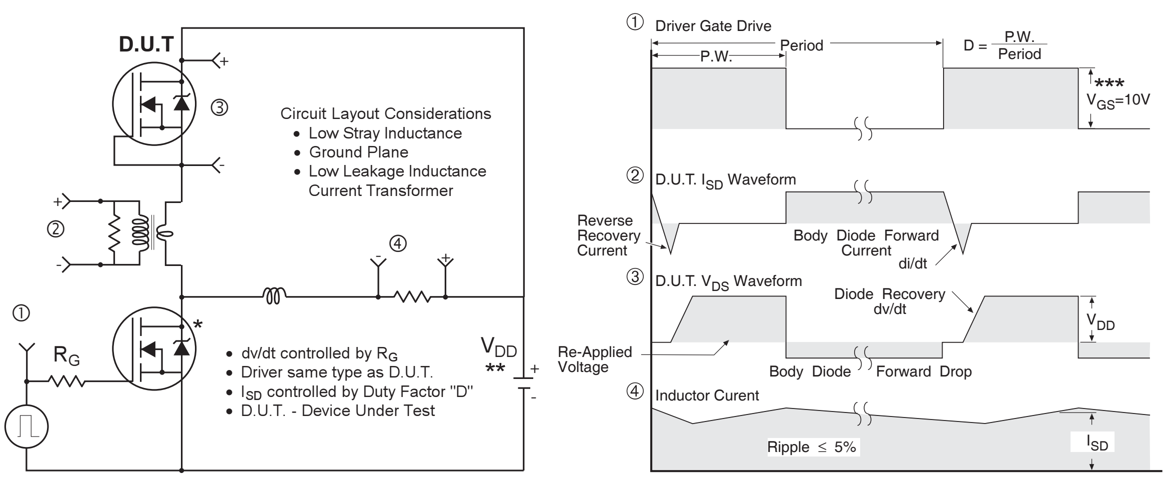


Fig 16b. Gate Charge Waveform



* Use P-Channel Driver for P-Channel Measurements

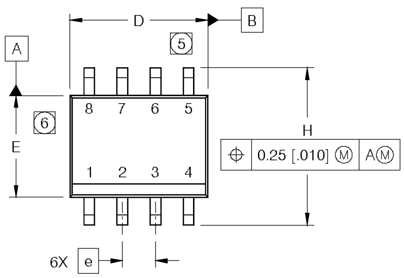
** Reverse Polarity for P-Channel

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

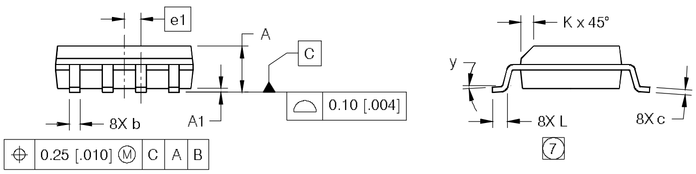
Fig 17. Diode Reverse Recovery Test Circuit for HEXFET® Power MOSFETs

SO-8 Package Outline(Mosfet & Fetky)

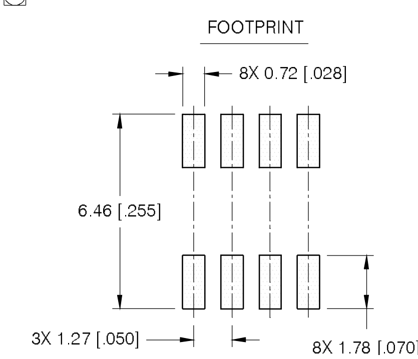
Dimensions are shown in milimeters (inches)



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	
e 1	.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°

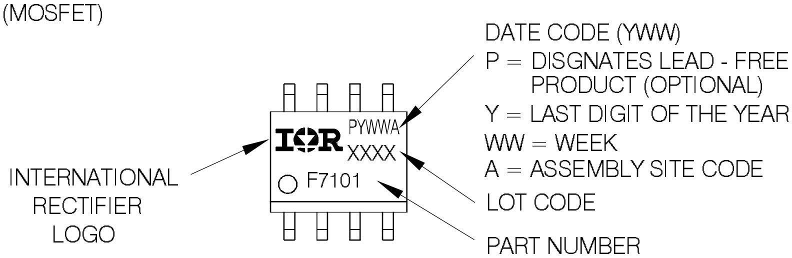


NOTES:
1. DIMENSIONING & TOLERANCING PER ASME Y14.5M-1994.
2. CONTROLLING DIMENSION: MILLIMETER
3. DIMENSIONS ARE SHOWN IN MILLIMETERS [INCHES].
4. OUTLINE CONFORMS TO JEDEC OUTLINE MS-012AA.
5. DIMENSION DOES NOT INCLUDE MOLD PROTRUSIONS. MOLD PROTRUSIONS NOT TO EXCEED 0.15 [.006].
6. DIMENSION DOES 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

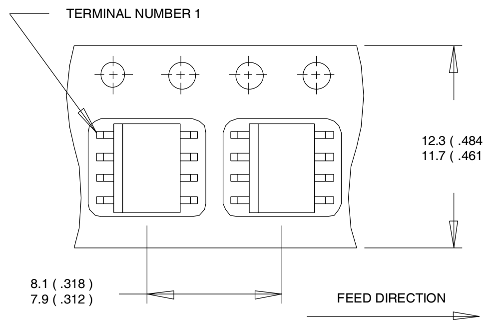
EXAMPLE: THIS IS AN IRF7101 (MOSFET)



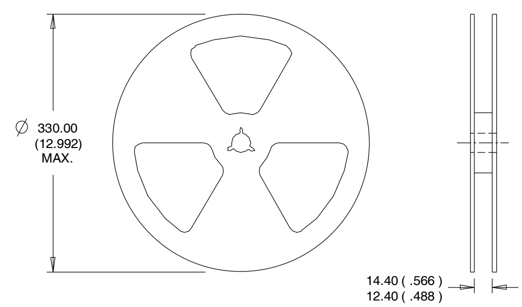
IR WORLD

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

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.

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

Notes:

① Repetitive rating; pulse width limited by max. junction temperature.
② Starting T_J = 25°C, L = 155mH, R_G = 50Ω, I_{AS} = 2.8A
③ Pulse width ≤ 400µs; duty cycle ≤ 2%.
④ When mounted on 1 inch square copper board.
⑤ R_θ is measured at T_J of approximately 90°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.

International IOR Rectifier

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