HESTORE.HU
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EN: This Datasheet is presented by the manufacturer.

Please visit our website for pricing and availability at www.hestore.hu.

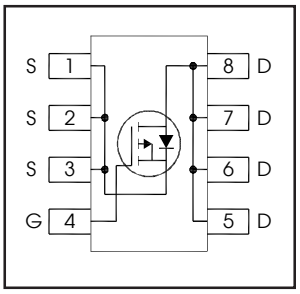
International
IOR Rectifier

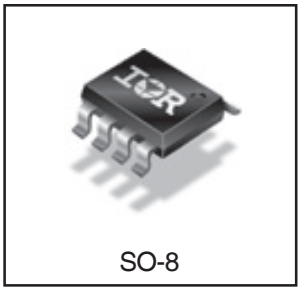
PD - 96311A

IRF9335PbF

HEXFET® Power MOSFET

V_{DS}	-30	V
$R_{DS(on)\ max}$ ($@V_{GS}$ = -10V)	59	mΩ
$R_{DS(on)\ max}$ ($@V_{GS}$ = -4.5V)	110	mΩ
$Q_{g\ (typical)}$	9.1	nC
I_D ($@T_A$ = 25°C)	-5.4	A





Applications

- Charge and Discharge Switch for Notebook PC Battery Application
- System/Load Switch

Features and Benefits

Features		Resulting Benefits
Industry-Standard SO-8 Package	results in	Multi-Vendor Compatibility
RoHS Compliant Containing no Lead, no Bromide and no Halogen	⇒	Environmentally Friendlier

Orderable part number	Package Type	Standard Pack		Note
		Form	Quantity	
IRF9335PbF	SO8	Tube/Bulk	95	
IRF9335TRPbF	SO8	Tape and Reel	4000	

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°C	Continuous Drain Current, V_{GS} @ -10V	-5.4	A
I_D @ T_A = 70°C	Continuous Drain Current, V_{GS} @ -10V	-4.3	
I_{DM}	Pulsed Drain Current ①	-43	
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

Notes ① through ⑥ are on page 2

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

	Parameter	Min.	Typ.	Max.	Units	Conditions
BV_{DSS}	Drain-to-Source Breakdown Voltage	-30	—	—	V	V_{GS} = 0V, I_D = -250µA
$\Delta BV_{DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	0.019	—	V/°C	Reference to 25°C, I_D = -1mA
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	48	59	mΩ	V_{GS} = -10V, I_D = -5.4A ③
		—	83	110		V_{GS} = -4.5V, I_D = -4.3A ③
$V_{GS(th)}$	Gate Threshold Voltage	-1.3	-1.8	-2.4	V	V_{DS} = V_{GS}, I_D = -10µA
$\Delta V_{GS(th)}$	Gate Threshold Voltage Coefficient	—	-5.1	—	mV/°C	
I_{DSS}	Drain-to-Source Leakage Current	—	—	-1.0	µA	V_{DS} = -24V, V_{GS} = 0V
		—	—	-150		V_{DS} = -24V, 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	5.4	—	—	S	V_{DS} = -10V, I_D = -4.3A
Q_g	Total Gate Charge ⑥	—	4.7	—	nC	V_{DS} = -15V,V_{GS} = -4.5V,I_D = - 4.3A
Q_g	Total Gate Charge ⑥	—	9.1	14	nC	V_{GS} = -10V
Q_{gs}	Gate-to-Source Charge ⑥	—	1.3	—		V_{DS} = -15V
Q_{gd}	Gate-to-Drain Charge ⑥	—	2.6	—		I_D = -4.3A
R_G	Gate Resistance ⑥	—	10	—	Ω	
$t_{d(on)}$	Turn-On Delay Time	—	9.7	—	ns	V_{DD} = -15V, V_{GS} = -4.5V ③
t_r	Rise Time	—	19	—		I_D = -1.0A
$t_{d(off)}$	Turn-Off Delay Time	—	16	—		R_G = 6.8Ω
t_f	Fall Time	—	15	—		See Figs. 19a & 19b
C_{iss}	Input Capacitance	—	386	—	pF	V_{GS} = 0V
C_{oss}	Output Capacitance	—	94	—		V_{DS} = -25V
C_{rss}	Reverse Transfer Capacitance	—	66	—		f = 1.0KHz

Avalanche Characteristics

	Parameter	Typ.	Max.	Units
E_{AS}	Single Pulse Avalanche Energy ②	—	98	mJ
I_{AR}	Avalanche Current ①	—	-4.3	A

Diode Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	-2.5	A	MOSFET symbol showing the integral reverse p-n junction diode.
I_{SM}	Pulsed Source Current (Body Diode) ①	—	—	-43		
V_{SD}	Diode Forward Voltage	—	—	-1.2	V	T_J = 25°C, I_S = -2.5A, V_{GS} = 0V ③
t_{rr}	Reverse Recovery Time	—	14	21	ns	T_J = 25°C, I_F = -2.5A, V_{DD} = -24V
Q_{rr}	Reverse Recovery Charge	—	7.4	11	nC	di/dt = 100/µs ③

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 Repetitive rating; pulse width limited by max. junction temperature.

② Starting T_J = 25°C, L = 10.6mH, R_G = 50Ω, I_{AS} = -4.3A.

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.

⑥ For DESIGN AID ONLY, not subject to production testing.

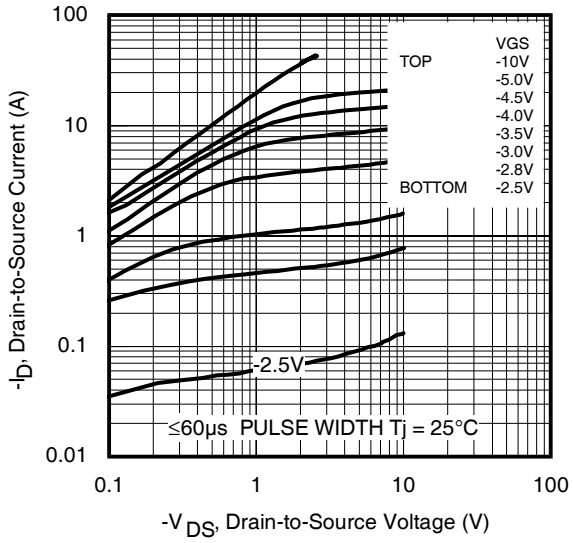


Fig 1. Typical Output Characteristics

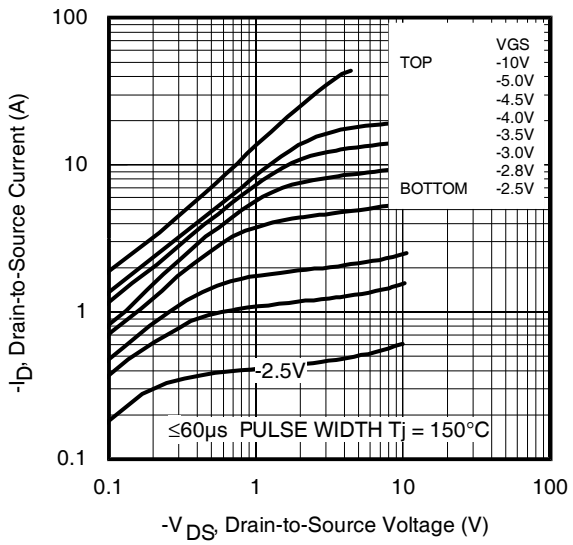


Fig 2. Typical Output Characteristics

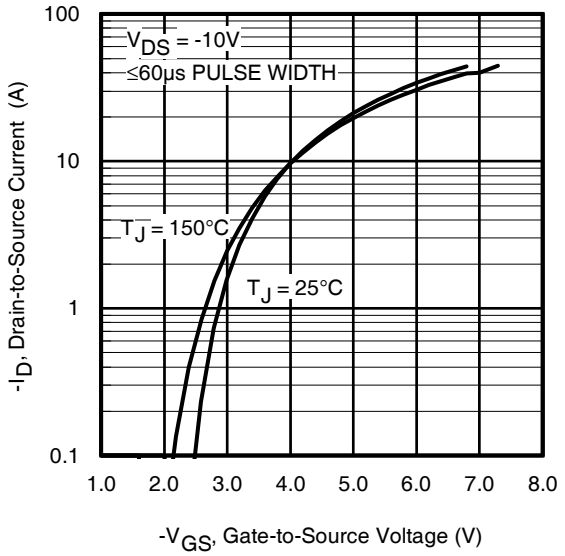


Fig 3. Typical Transfer Characteristics

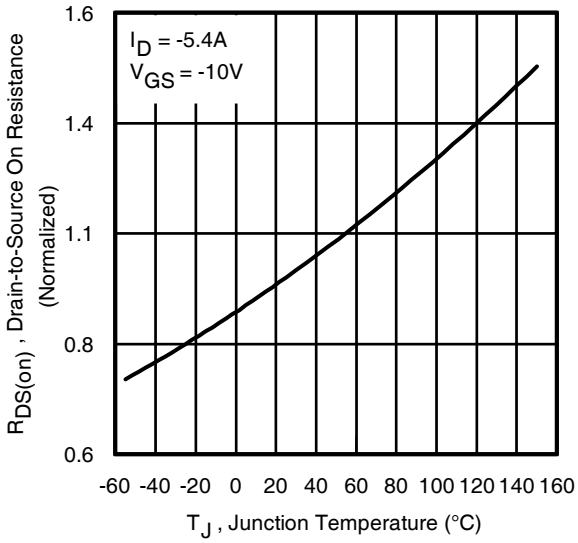


Fig 4. Normalized On-Resistance vs. Temperature

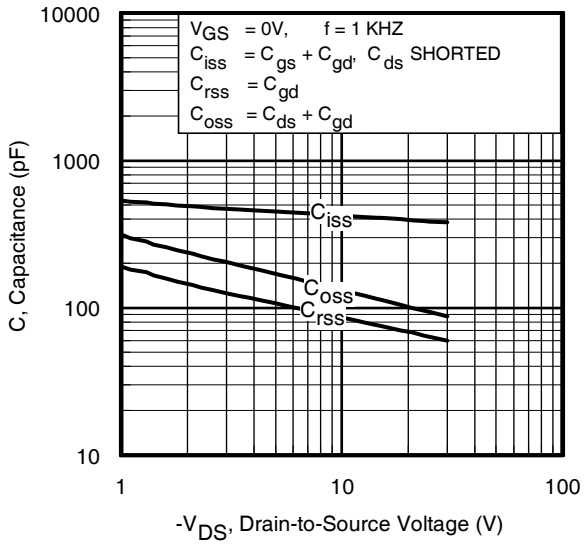


Fig 5. Typical Capacitance vs.Drain-to-Source Voltage

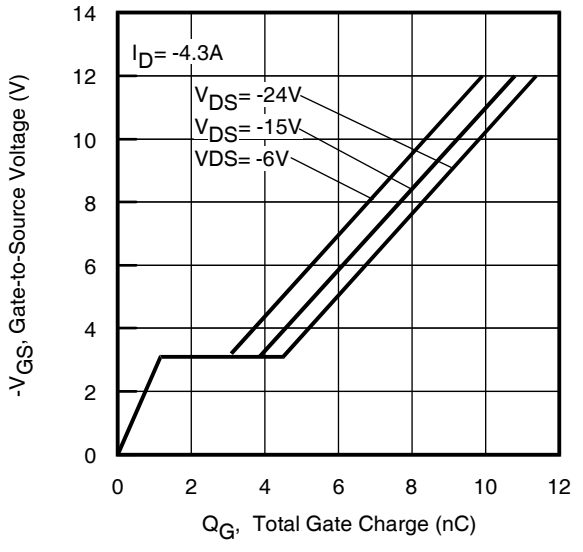


Fig 6. Typical Gate Charge vs.Gate-to-Source Voltage

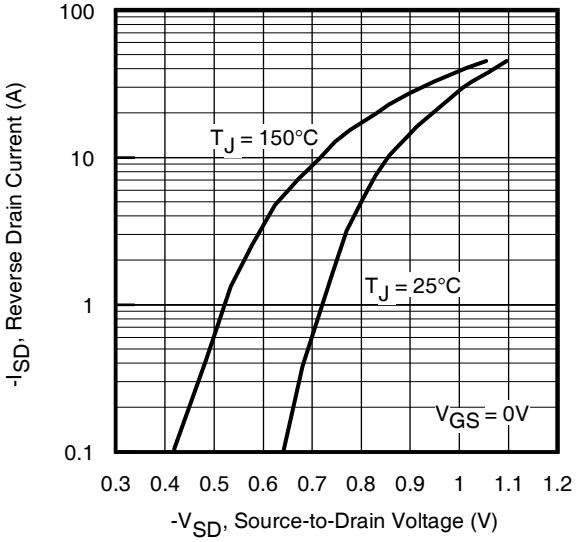


Fig 7. Typical Source-Drain Diode Forward Voltage

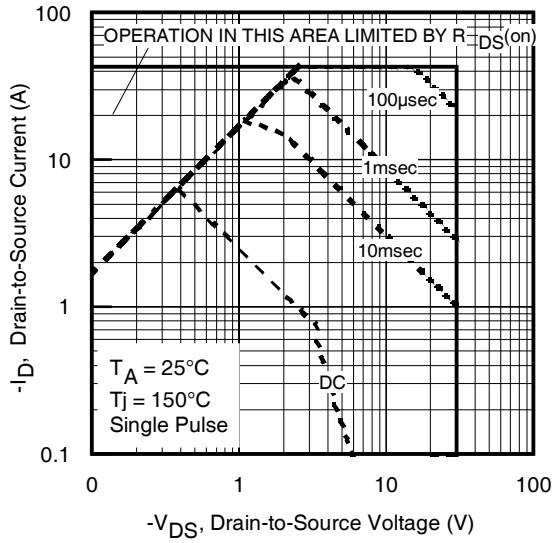


Fig 8. Maximum Safe Operating Area

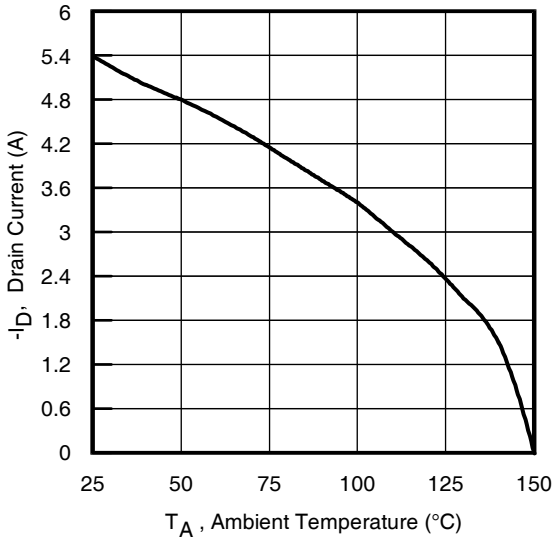


Fig 9. Maximum Drain Current vs. Ambient Temperature

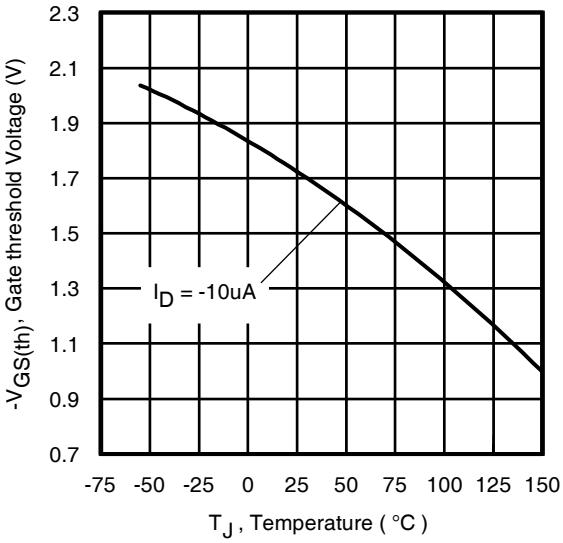


Fig 10. Threshold Voltage vs. Temperature

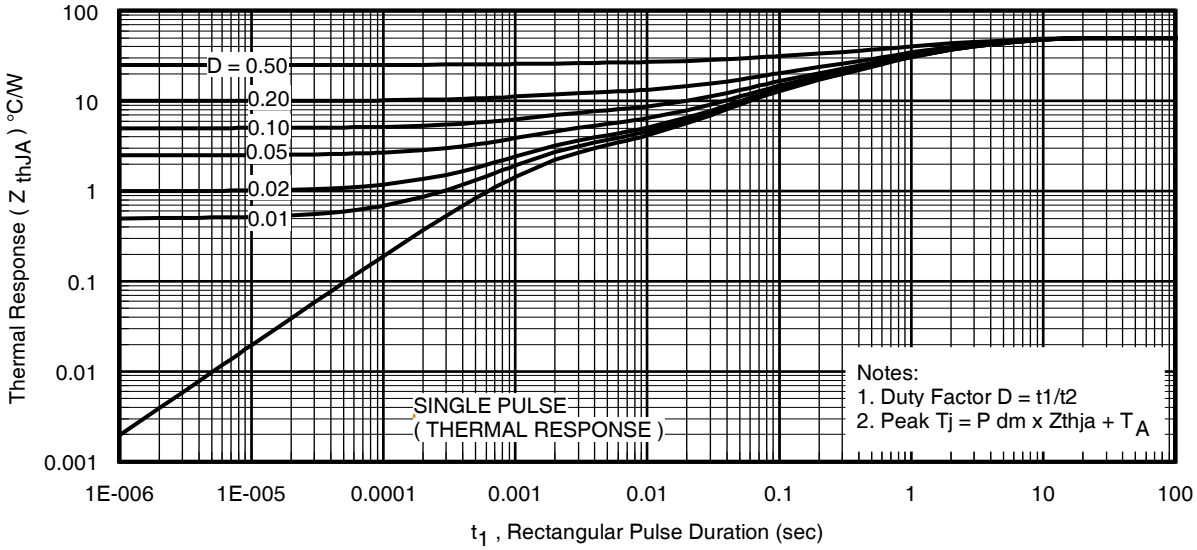


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

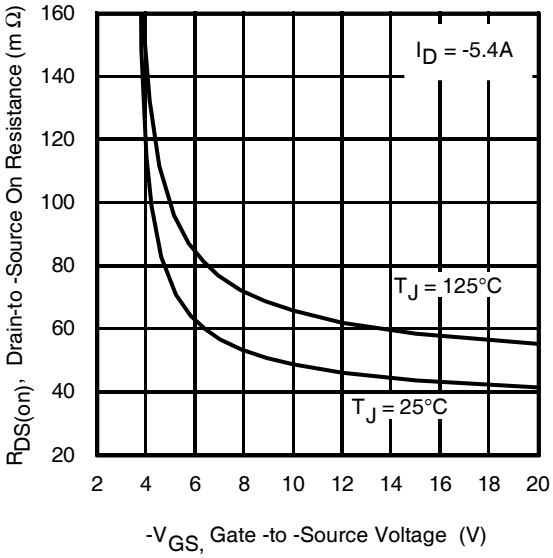


Fig 12. On-Resistance vs. Gate Voltage

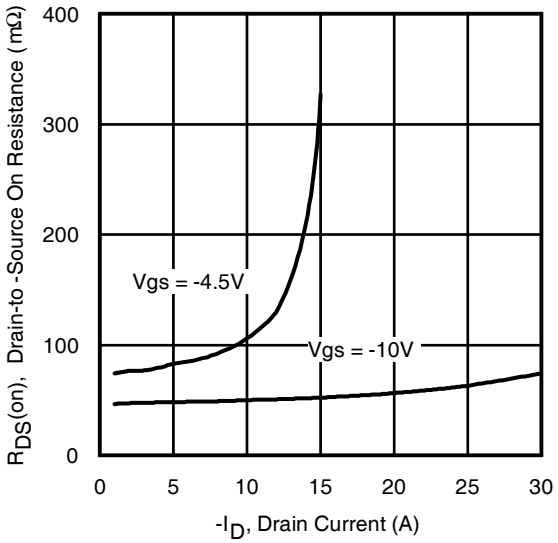


Fig 13. Typical On-Resistance vs. Drain Current

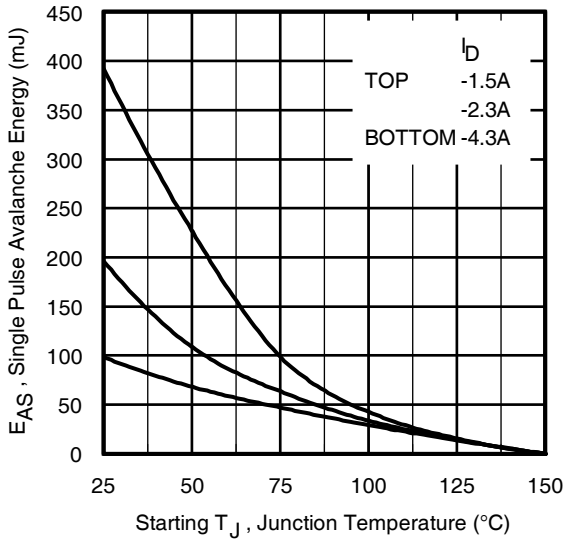


Fig 14. Maximum Avalanche Energy vs. Drain Current

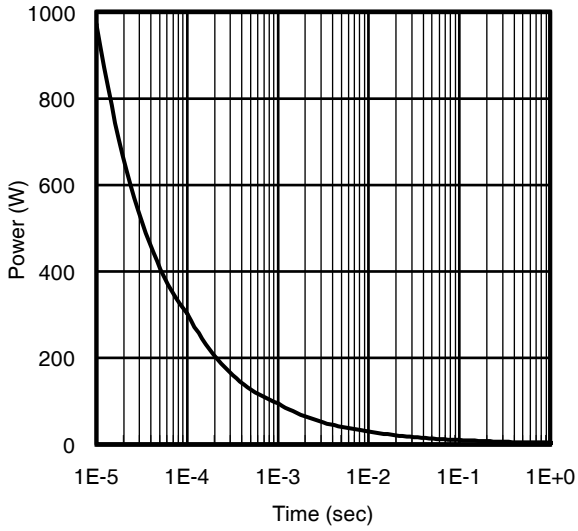
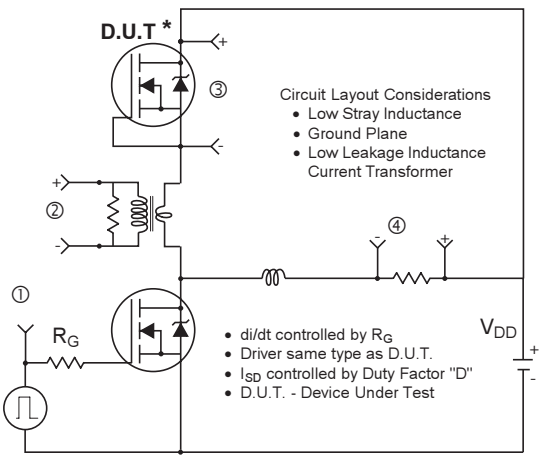
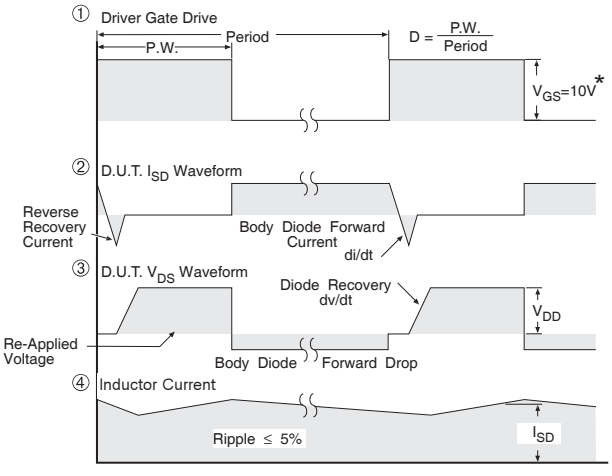


Fig 15. Typical Power vs. Time



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



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

Fig 16. Diode Reverse Recovery Test Circuit for P-Channel HEXFET® Power MOSFETs

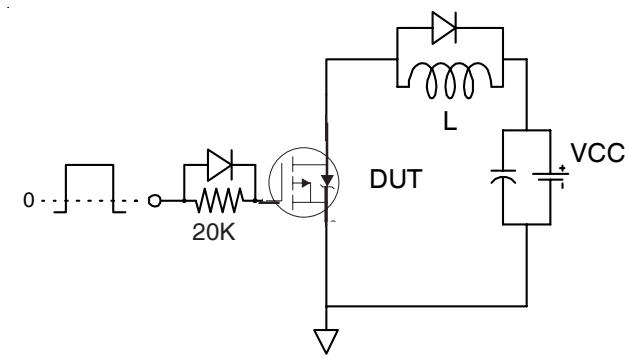


Fig 17a. Gate Charge Test Circuit

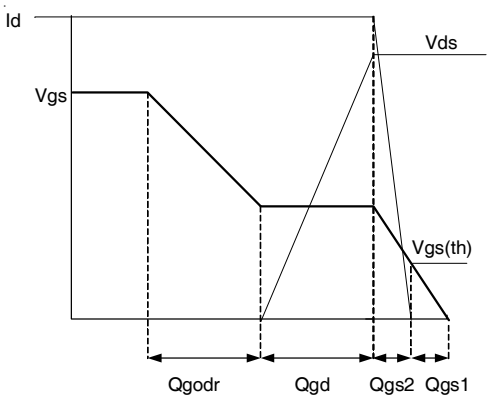


Fig 17b. Gate Charge Waveform

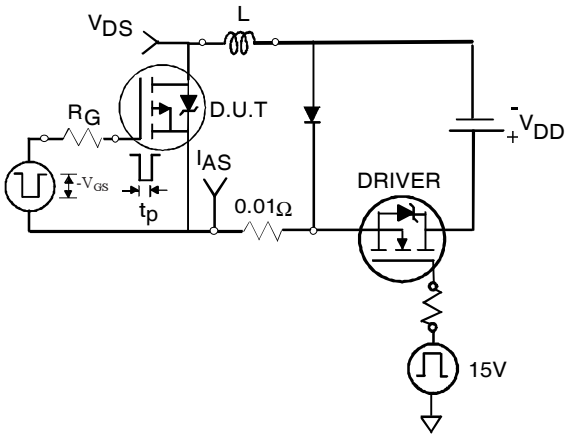


Fig 18a. Unclamped Inductive Test Circuit

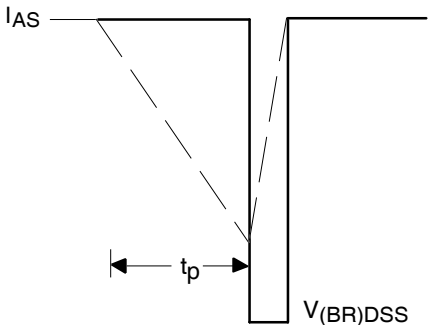


Fig 18b. Unclamped Inductive Waveforms

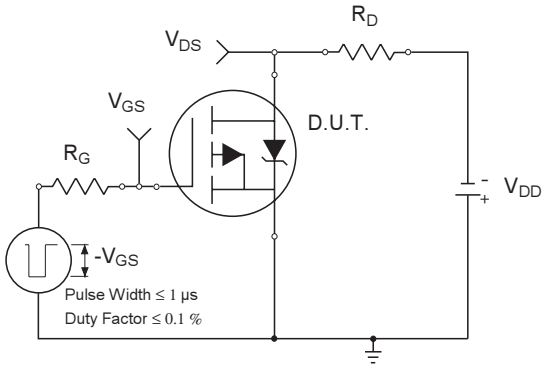


Fig 19a. Switching Time Test Circuit

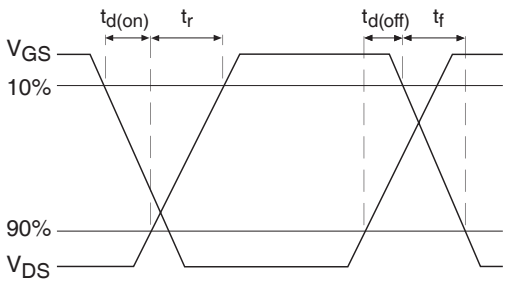
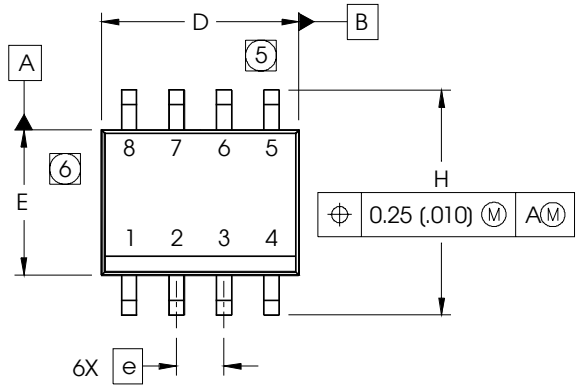


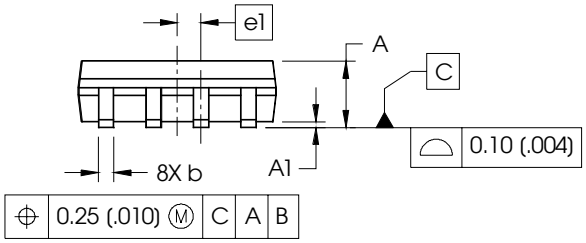
Fig 19b. Switching Time Waveforms

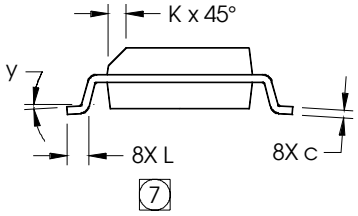
SO-8 Package Outline (Mosfet & Fetky)

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	
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:

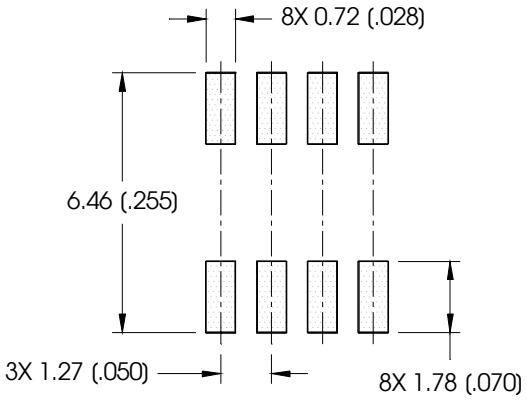
1. DIMENSIONING & TOLERANCING PER ASME Y14.5M-1994.
2. CONTROLLING DIMENSION: MILLIMETER
3. DIMENSIONS ARE SHOWN IN MILLIMETERS (INCHES).
4. OUTLINE CONFORMS TO JEDEC OUTLINE MS-012AA.

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).

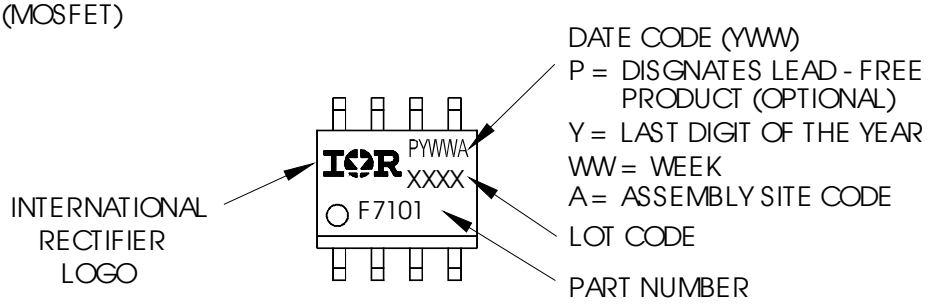
7 DIMENSION IS THE LENGTH OF LEAD FOR SOLDERING TO A SUBSTRATE.

FOOTPRINT



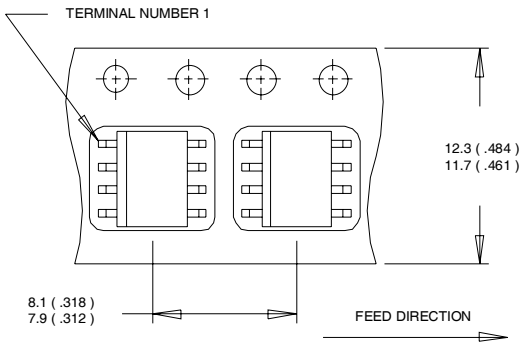
SO-8 Part Marking Information

EXAMPLE: THIS IS AN IRF7101 (MOSFET)

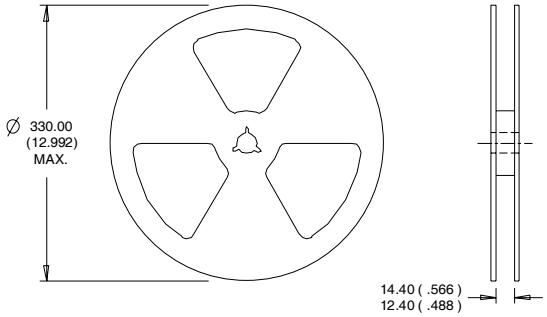


Note: For the most current drawing please refer to IR website at http://www.irf.com/package/

SO-8 Tape and Reel (Dimensions are shown in milimeters (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.

Qualification Information†

Qualification level	Consumer ††	
	(per JEDEC JESD47F††† guidelines)	
Moisture Sensitivity Level	SO-8	MSL1 (per JEDEC J-STD-020D†††)
RoHS Compliant	Yes	

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

†† Higher qualification ratings may be available should the user have such requirements.
Please contact your International Rectifier sales representative for further information:
http://www.irf.com/whoto-call/salesrep/

††† Applicable version of JEDEC standard at the time of product release.

Data and specifications subject to change without notice.

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TAC Fax: (310) 252-7903
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