International Rectifier

PD - 97120

IRF8736PbF

HEXFET® Power MOSFET

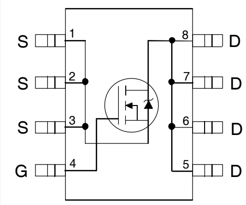
V_{DSS}	$R_{DS(on)}$ max	Qg Typ.
30V	**4.8mΩ@V_{GS} = 10V**	**17nC**

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 4.5V V_{GS}
- Low Gate Charge
- Fully Characterized Avalanche Voltage and Current
- 100% Tested for R_G
- Lead -Free



Top View


SO-8

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	18	A
I_D @ T_A = 70°C	Continuous Drain Current, V_{GS} @ 10V	14.4	
I_{DM}	Pulsed Drain Current ①	144	
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 ④⑤	——	50	

Notes ① through ⑤ are on page 9

08/1/07

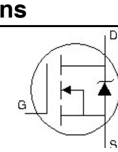
Static @ T_J = 25°C (unless otherwise specified)

	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	—	0.022	—	V/°C	Reference to 25°C, I_D = 1mA
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	3.9	4.8	mΩ	V_{GS} = 10V, I_D = 18A ③
		—	5.5	6.8		V_{GS} = 4.5V, I_D = 14.4A ③
$V_{GS(th)}$	Gate Threshold Voltage	1.35	1.8	2.35	V	V_{DS} = V_{GS}, I_D = 50μA
$\Delta V_{GS(th)}$	Gate Threshold Voltage Coefficient	—	-6.1	—	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	52	—	—	S	V_{DS} = 15V, I_D = 14.4A
Q_g	Total Gate Charge	—	17	26		
Q_{gs1}	Pre-Vth Gate-to-Source Charge	—	4.4	—		V_{DS} = 15V
Q_{gs2}	Post-Vth Gate-to-Source Charge	—	1.9	—	nC	V_{GS} = 4.5V
Q_{gd}	Gate-to-Drain Charge	—	5.8	—		I_D = 14.4A
Q_{godr}	Gate Charge Overdrive	—	4.9	—		See Fig. 16
Q_{sw}	Switch Charge (Q_{gs2} + Q_{gd})	—	7.7	—		
Q_{oss}	Output Charge	—	7.1	—	nC	V_{DS} = 10V, V_{GS} = 0V
R_G	Gate Resistance	—	1.3	2.2	Ω	
$t_{d(on)}$	Turn-On Delay Time	—	12	—		V_{DD} = 15V, V_{GS} = 4.5V ③
t_r	Rise Time	—	15	—		I_D = 14.4A
$t_{d(off)}$	Turn-Off Delay Time	—	13	—	ns	R_G = 1.8Ω
t_f	Fall Time	—	7.5	—		See Fig. 14
C_{iss}	Input Capacitance	—	2315	—		V_{GS} = 0V
C_{oss}	Output Capacitance	—	449	—	pF	V_{DS} = 15V
C_{rss}	Reverse Transfer Capacitance	—	219	—		f = 1.0MHz

Avalanche Characteristics

	Parameter	Typ.	Max.	Units
E_{AS}	Single Pulse Avalanche Energy ②	—	126	mJ
I_{AR}	Avalanche Current ①	—	14.4	A

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	—	—	144		
V_{SD}	Diode Forward Voltage	—	—	1.0	V	T_J = 25°C, I_S = 14.4A, V_{GS} = 0V ③
t_{rr}	Reverse Recovery Time	—	16	24	ns	T_J = 25°C, I_F = 14.4A, V_{DD} = 10V
Q_{rr}	Reverse Recovery Charge	—	19	29	nC	di/dt = 300A/μs ③
t_{on}	Forward Turn-On Time	Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)				

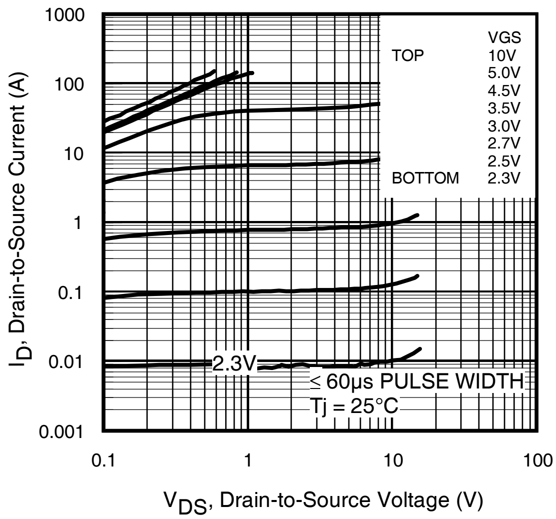


Fig 1. Typical Output Characteristics

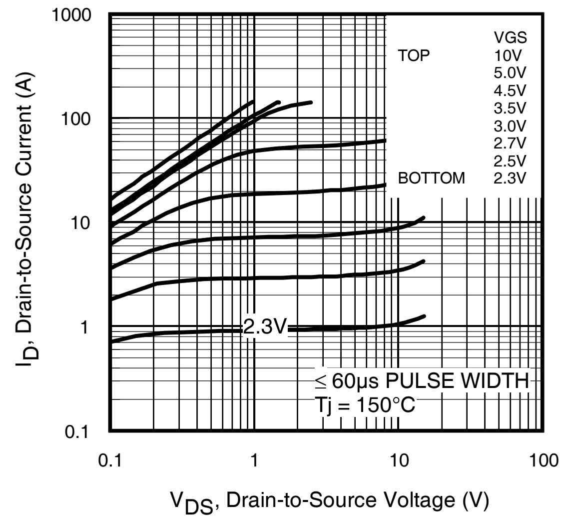


Fig 2. Typical Output Characteristics

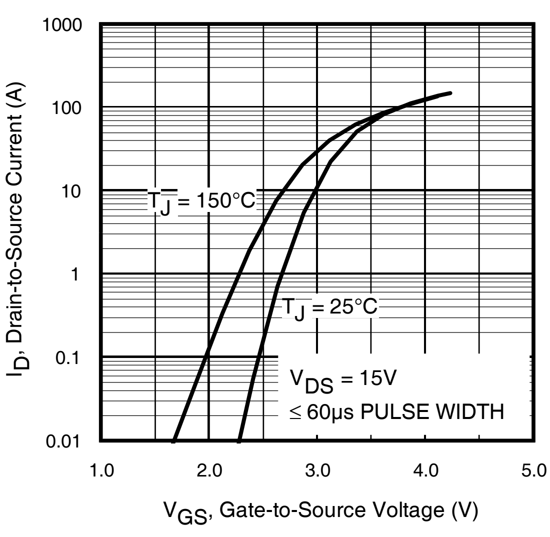


Fig 3. Typical Transfer Characteristics

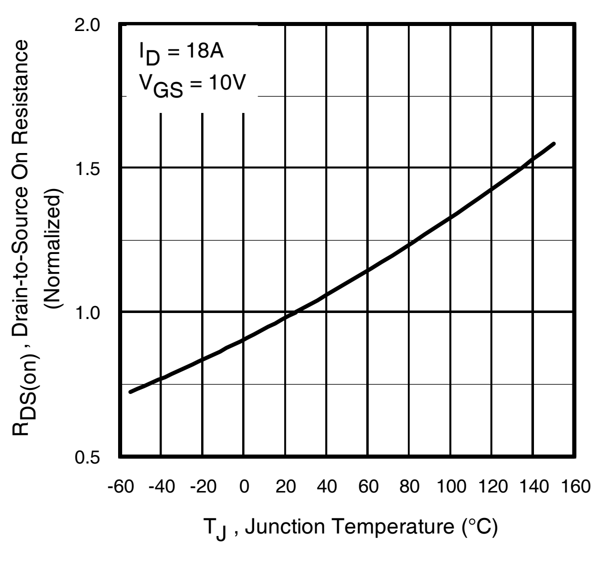


Fig 4. Normalized On-Resistance
Vs. Temperature

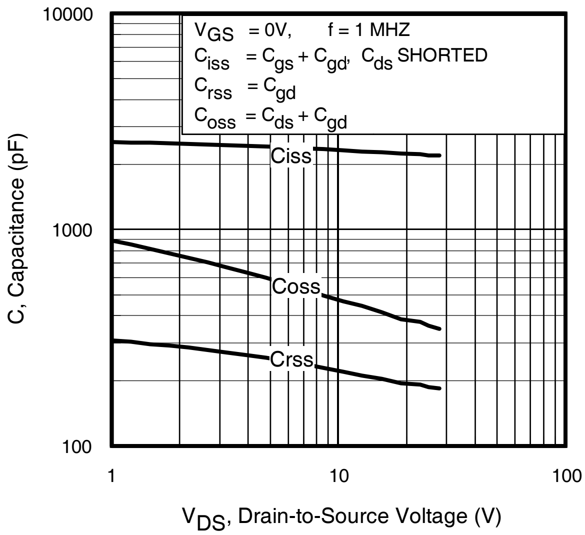


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

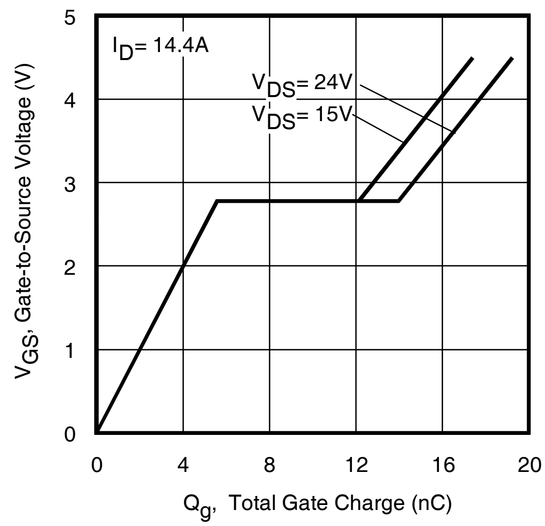


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

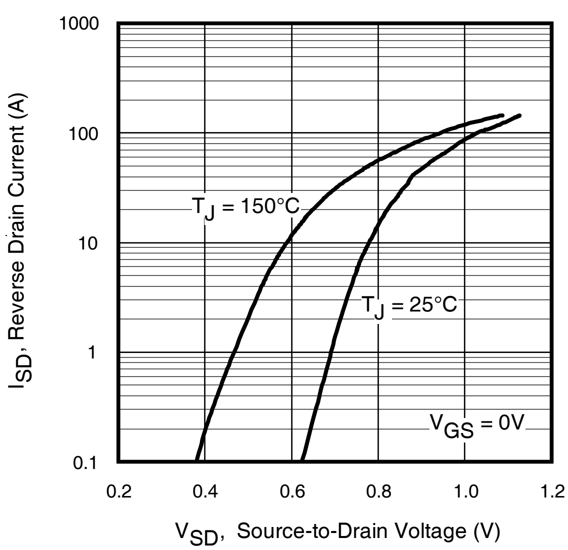


Fig 7. Typical Source-Drain Diode Forward Voltage

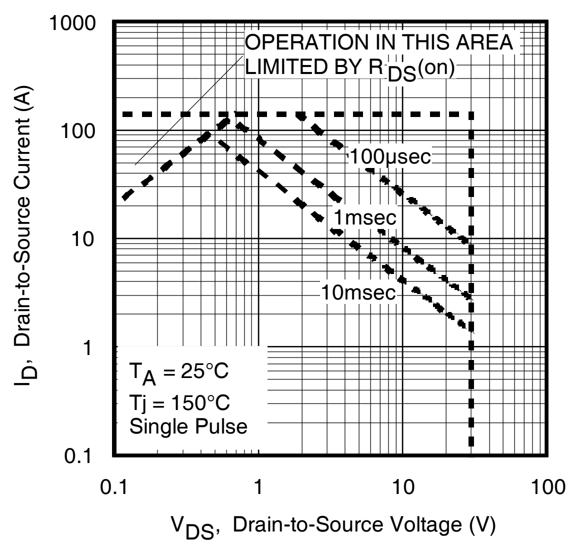


Fig 8. Maximum Safe Operating Area

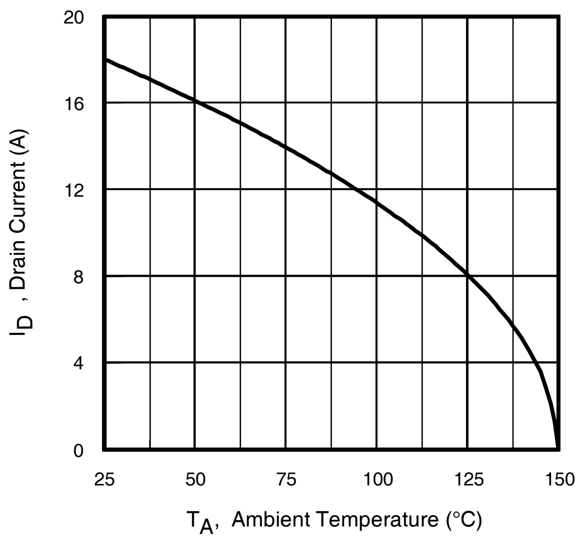


Fig 9. Maximum Drain Current Vs. Ambient Temperature

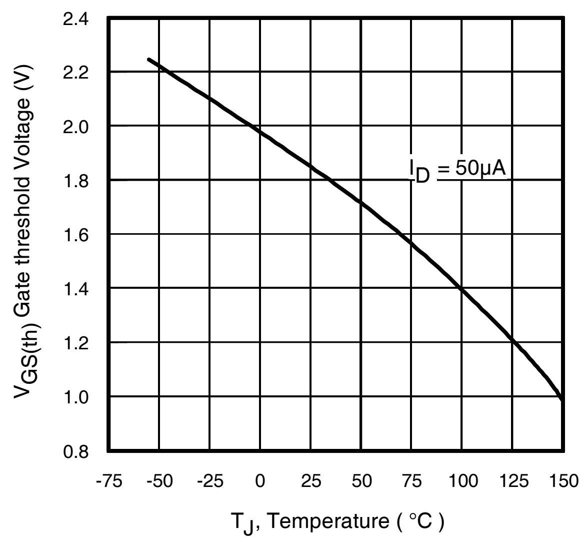
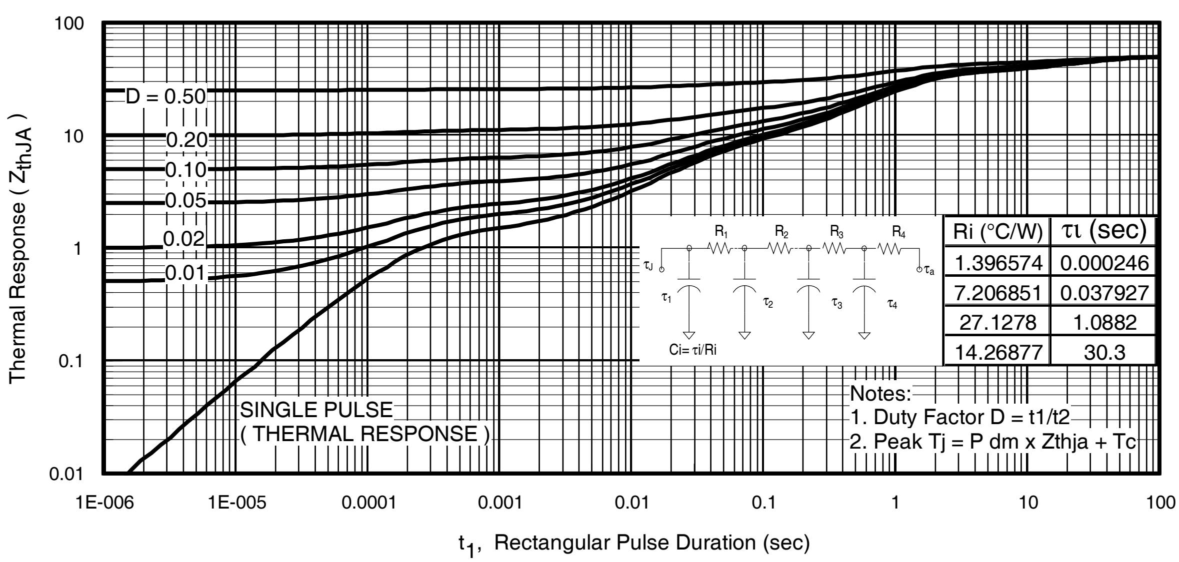


Fig 10. Threshold Voltage Vs. Temperature



Ri (°C/W)	τi (sec)
1.396574	0.000246
7.206851	0.037927
27.1278	1.0882
14.26877	30.3

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

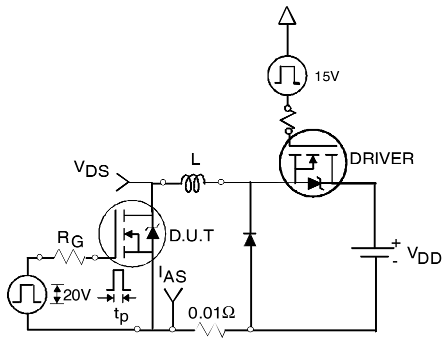


Fig 12a. Unclamped Inductive Test Circuit

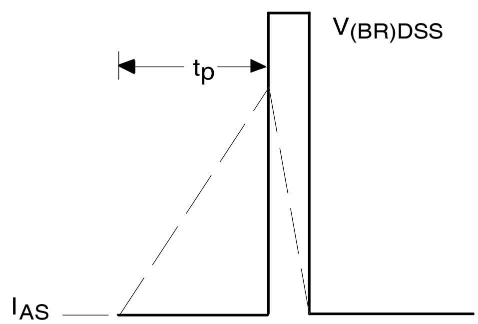


Fig 12b. Unclamped Inductive Waveforms

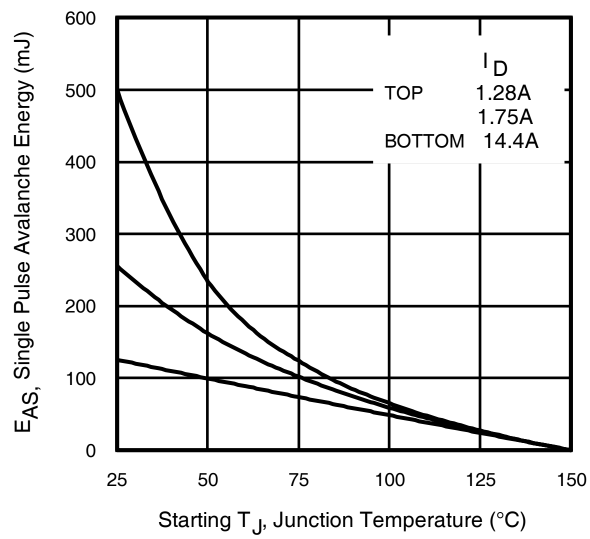


Fig 12c. Maximum Avalanche Energy Vs. Drain Current

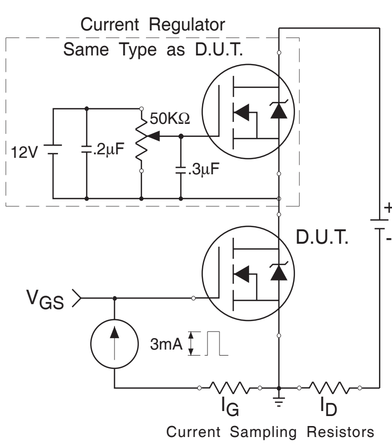


Fig 13. Gate Charge Test Circuit

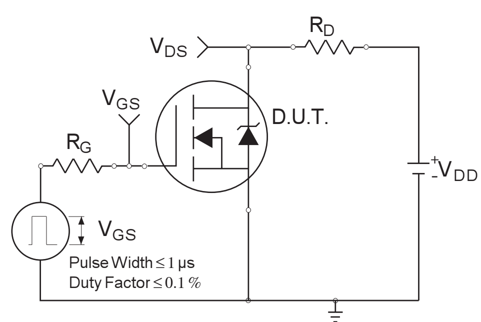


Fig 14a. Switching Time Test Circuit

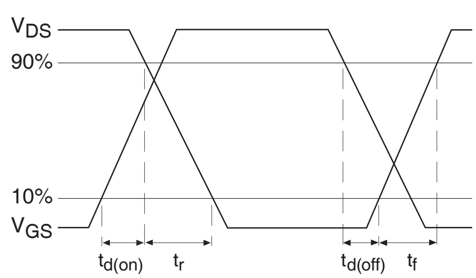


Fig 14b. Switching Time Waveforms

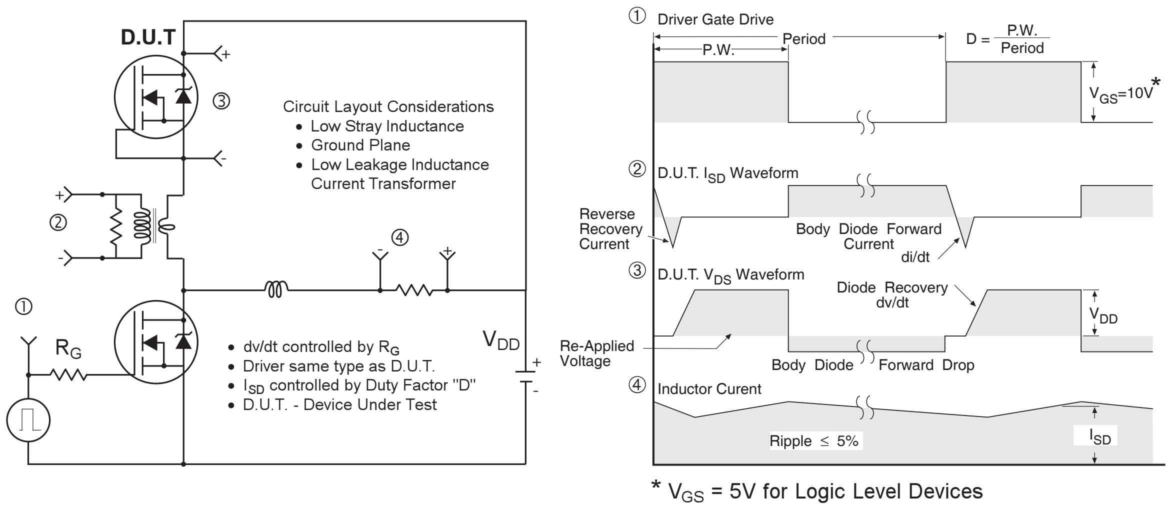


Fig 15. Peak Diode Recovery dv/dt Test Circuit for N-Channel HEXFET® Power MOSFETs

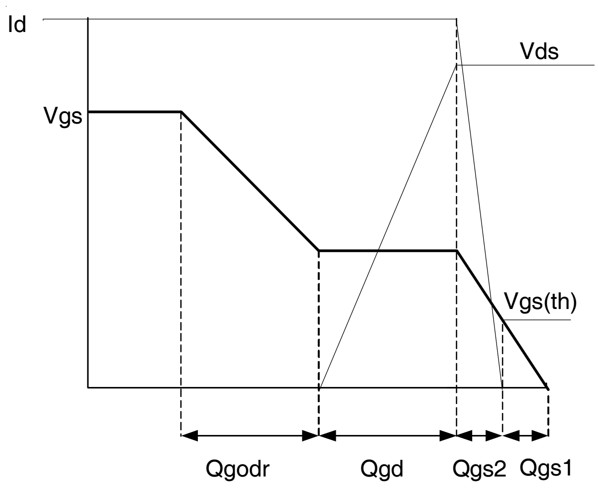
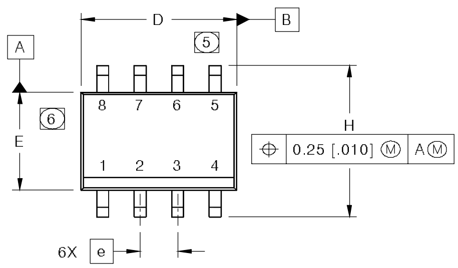


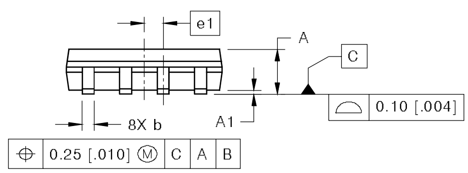
Fig 16. Gate Charge Waveform

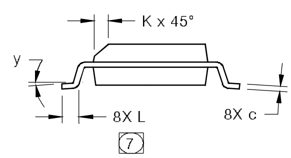
SO-8 Package Outline

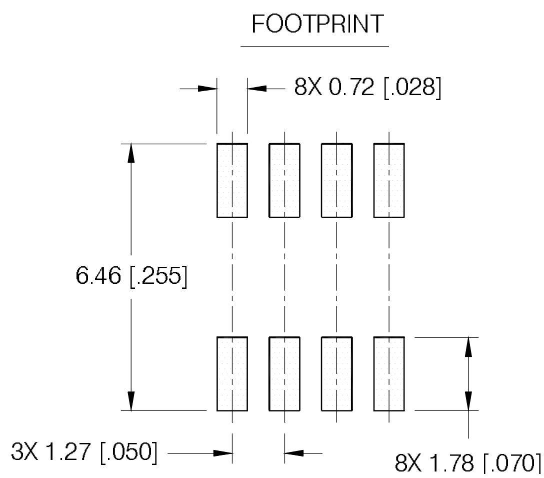
Dimensions are shown in milimeters (inches)



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.

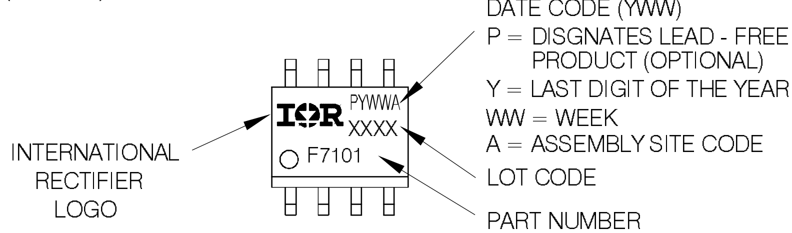
5 DIMENSION DOES NOT INCLUDE MOLD PROTRUSIONS. MOLD PROTRUSIONS NOT TO EXCEED 0.15 [.006].

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

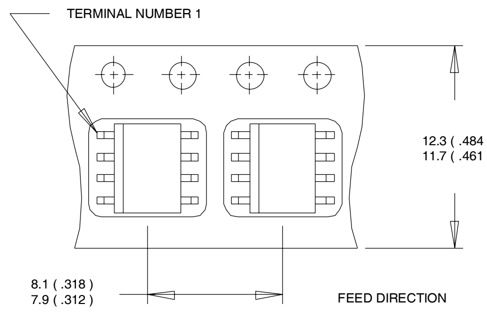
EXAMPLE: THIS IS AN IRF7101 (MOSFET)



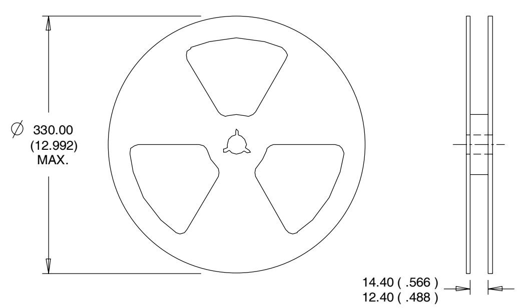
Note: For the most current drawing please refer to IR website at http://www.irf.com/package

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.

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 $T_J = 25°C$, $L = 1.21mH$, $R_G = 25\Omega$, $I_{AS} = 14.4A$.
③ Pulse width $\leq$ 400µs; duty cycle $\leq$ 2%.
④ When mounted on 1 inch square copper board
⑤ R_θ is measured at T_J approximately 90°C

Data and specifications subject to change without notice.
This product has been designed and qualified for the Consumer market.
Qualification Standards can be found on IR's Web site.

International
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