

IRF8736PbF

HEXFET® Power MOSFET

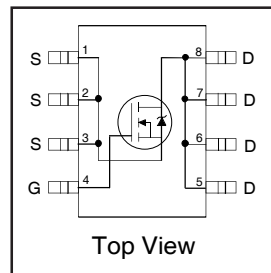
Applications

- 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

| V_{DSS} | $R_{DS(on)}$ max | Qg Typ. |
|-----------|--------------------------------|---------|
| 30V | 4.8m Ω @ $V_{GS} = 10V$ | 17nC |



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, $V_{GS} @ 10V$ | 18 | A |
| $I_D @ T_A = 70^\circ C$ | Continuous Drain Current, $V_{GS} @ 10V$ | 14.4 | |
| I_{DM} | Pulsed Drain Current ① | 144 | |
| $P_D @ T_A = 25^\circ C$ | Power Dissipation ④ | 2.5 | W |
| $P_D @ T_A = 70^\circ C$ | Power Dissipation ④ | 1.6 | |
| | Linear Derating Factor | 0.02 | W/ $^\circ C$ |
| T_J T_{STG} | Operating Junction and Storage Temperature Range | -55 to + 150 | $^\circ C$ |

Thermal Resistance

| | Parameter | Typ. | Max. | Units |
|-----------------|--------------------------|------|------|--------------|
| $R_{\theta JL}$ | Junction-to-Drain Lead ⑤ | — | 20 | $^\circ C/W$ |
| $R_{\theta JA}$ | Junction-to-Ambient ④⑤ | — | 50 | |

Notes ① through ⑤ are on page 9

www.irf.com

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

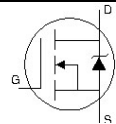
| | Parameter | Min. | Typ. | Max. | Units | Conditions |
|-------------------------------------|---|------|-------|------|-------|---|
| BV _{DSS} | Drain-to-Source Breakdown Voltage | 30 | — | — | V | V _{GS} = 0V, I _D = 250μA |
| ΔBV _{DSS} /ΔT _J | Breakdown Voltage Temp. Coefficient | — | 0.022 | — | 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 |
| ΔV _{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 |
| g _{fs} | Forward Transconductance | 52 | — | — | S | V _{DS} = 15V, I _D = 14.4A |
| Q _g | Total Gate Charge | — | 17 | 26 | nC | V _{DS} = 15V V _{GS} = 4.5V I _D = 14.4A See Fig. 16 |
| Q _{gs1} | Pre-V _{th} Gate-to-Source Charge | — | 4.4 | — | | |
| Q _{gs2} | Post-V _{th} Gate-to-Source Charge | — | 1.9 | — | | |
| Q _{gd} | Gate-to-Drain Charge | — | 5.8 | — | | |
| Q _{godr} | Gate Charge Overdrive | — | 4.9 | — | | |
| 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 | — | ns | V _{DD} = 15V, V _{GS} = 4.5V ③ I _D = 14.4A R _G = 1.8Ω See Fig. 14 |
| t _r | Rise Time | — | 15 | — | | |
| t _{d(off)} | Turn-Off Delay Time | — | 13 | — | | |
| t _f | Fall Time | — | 7.5 | — | | |
| C _{iss} | Input Capacitance | — | 2315 | — | pF | V _{GS} = 0V V _{DS} = 15V f = 1.0MHz |
| C _{oss} | Output Capacitance | — | 449 | — | | |
| C _{rss} | Reverse Transfer Capacitance | — | 219 | — | | |

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) | | | | |



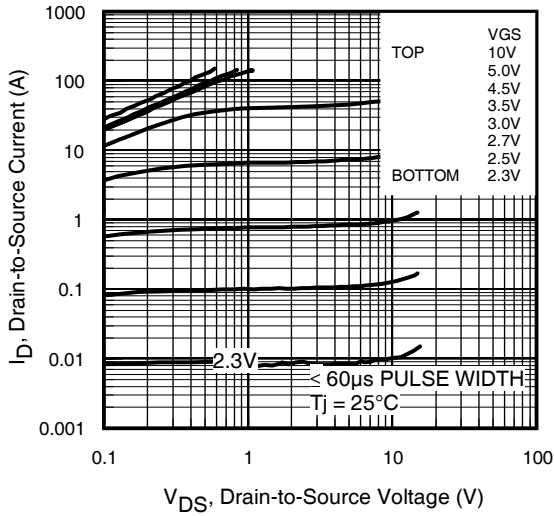


Fig 1. Typical Output Characteristics

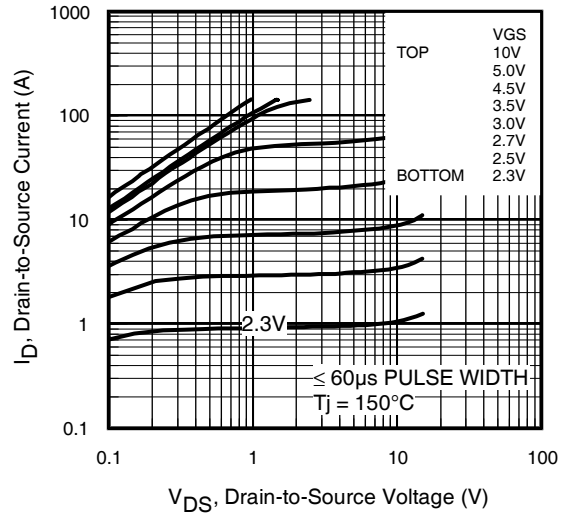


Fig 2. Typical Output Characteristics

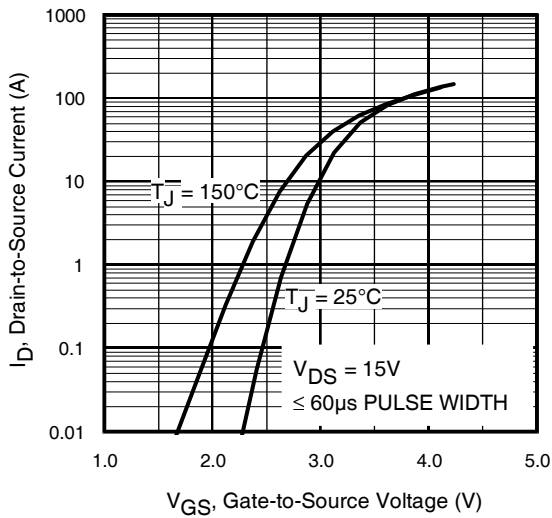


Fig 3. Typical Transfer Characteristics

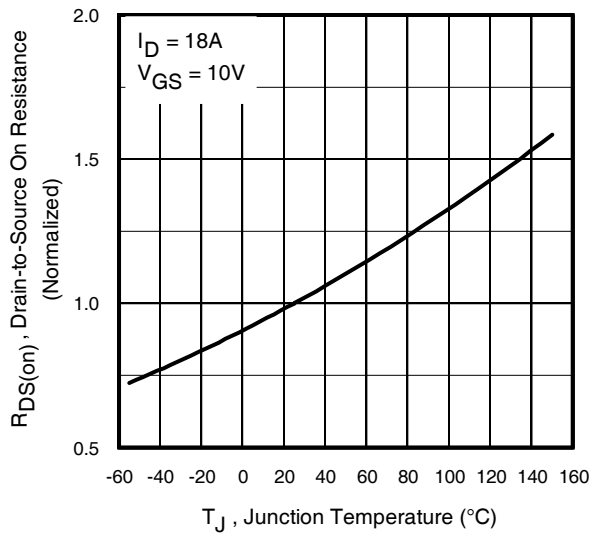


Fig 4. Normalized On-Resistance Vs. Temperature

IRF8736PbF

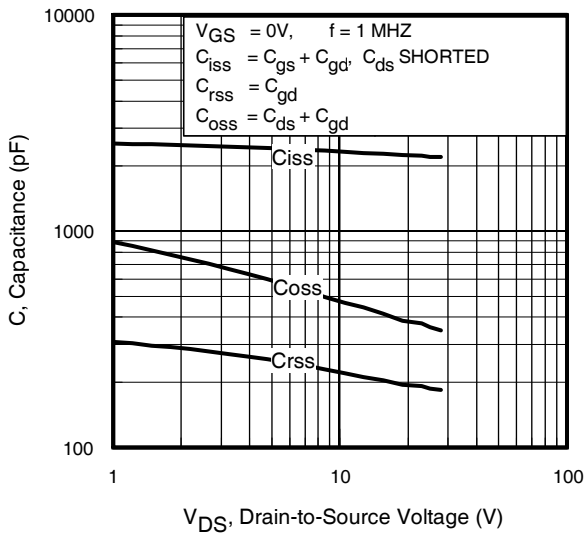


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

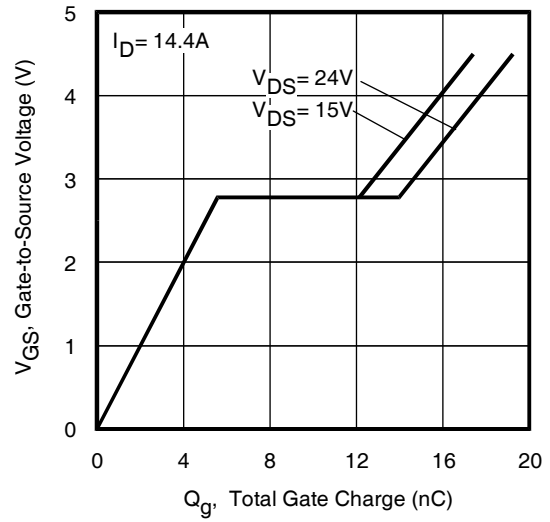


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

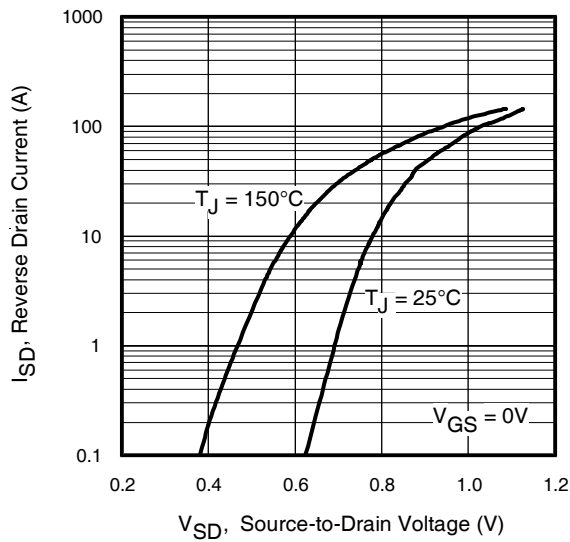


Fig 7. Typical Source-Drain Diode Forward Voltage

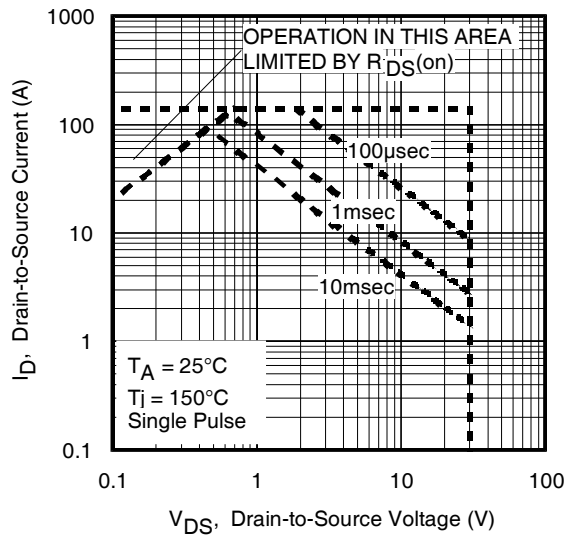


Fig 8. Maximum Safe Operating Area

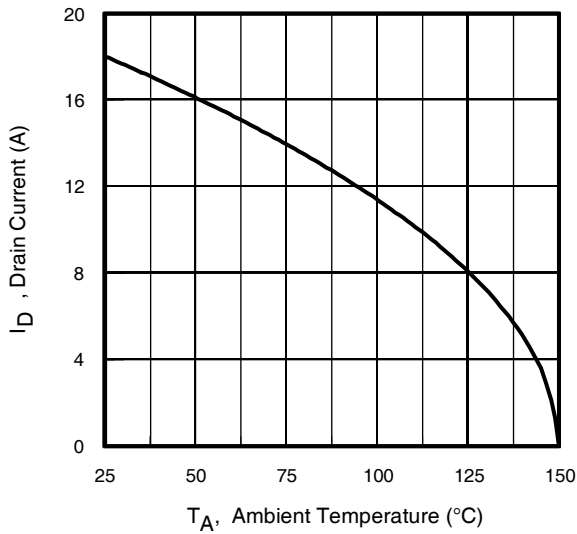


Fig 9. Maximum Drain Current Vs. Ambient Temperature

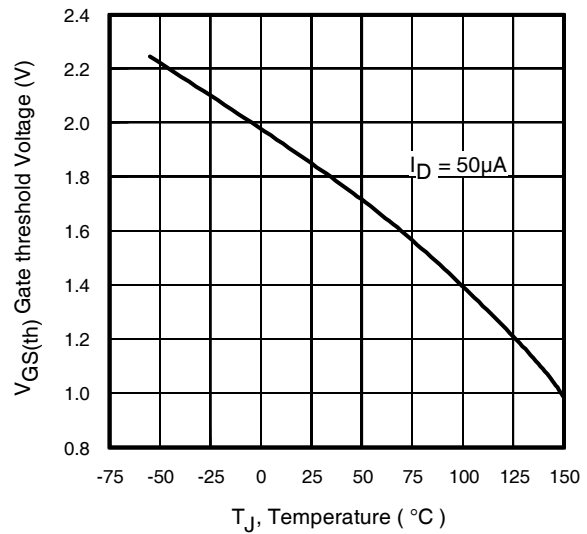


Fig 10. Threshold Voltage Vs. Temperature

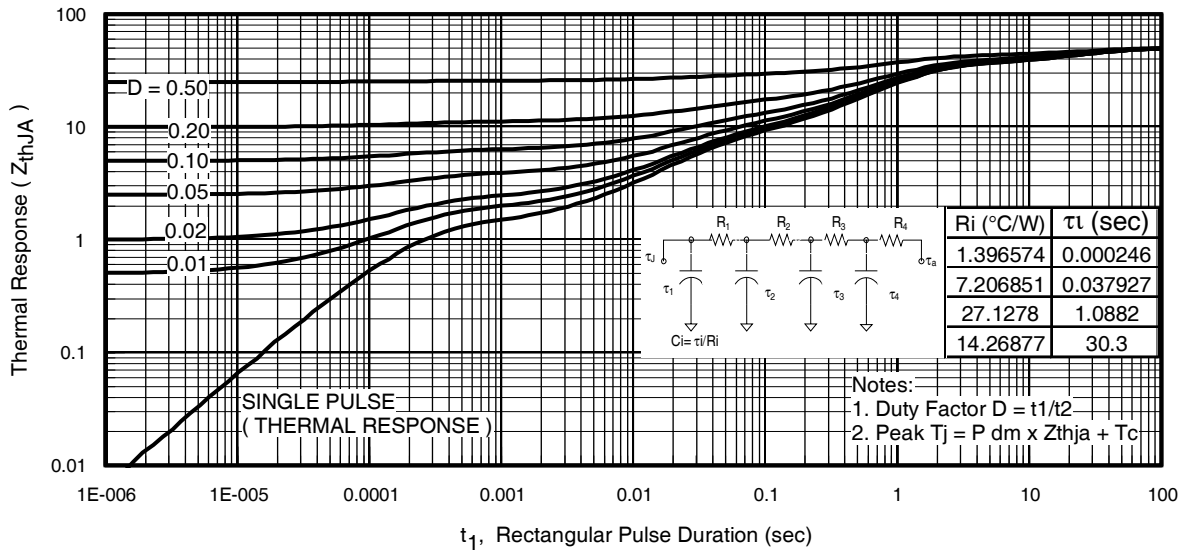


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

IRF8736PbF

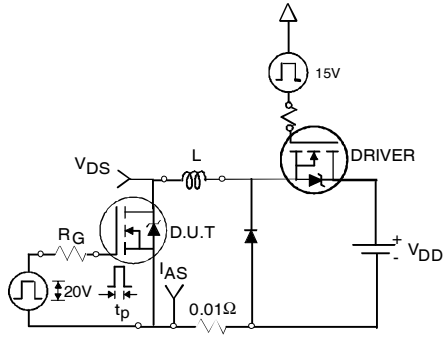


Fig 12a. Unclamped Inductive Test Circuit

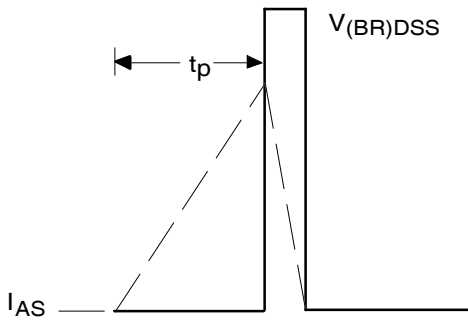


Fig 12b. Unclamped Inductive Waveforms

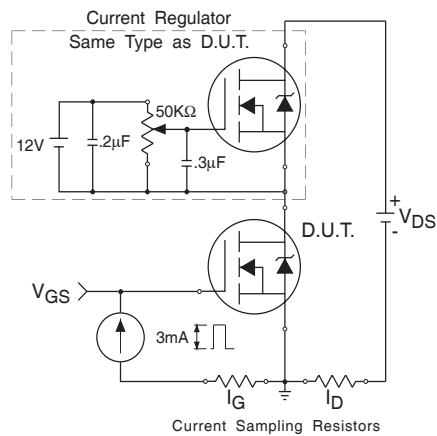


Fig 13. Gate Charge Test Circuit

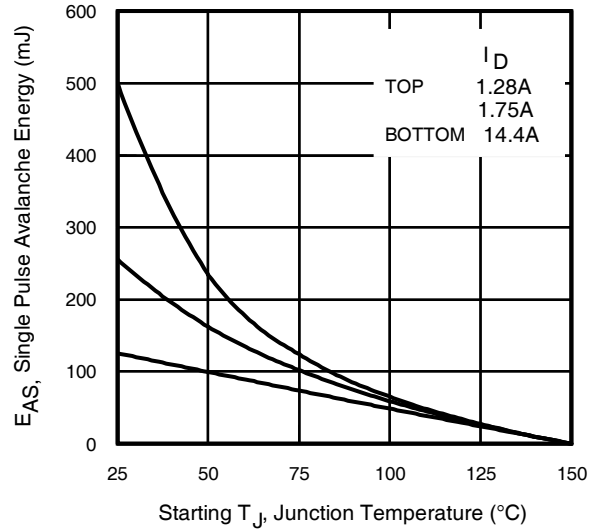


Fig 12c. Maximum Avalanche Energy Vs. Drain Current

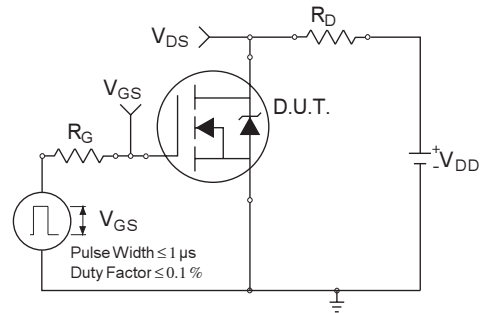


Fig 14a. Switching Time Test Circuit

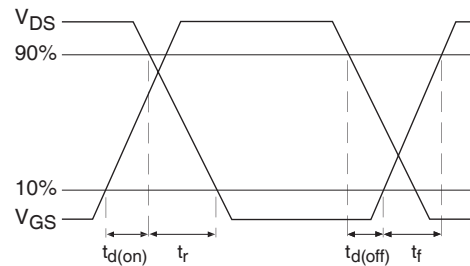


Fig 14b. Switching Time Waveforms

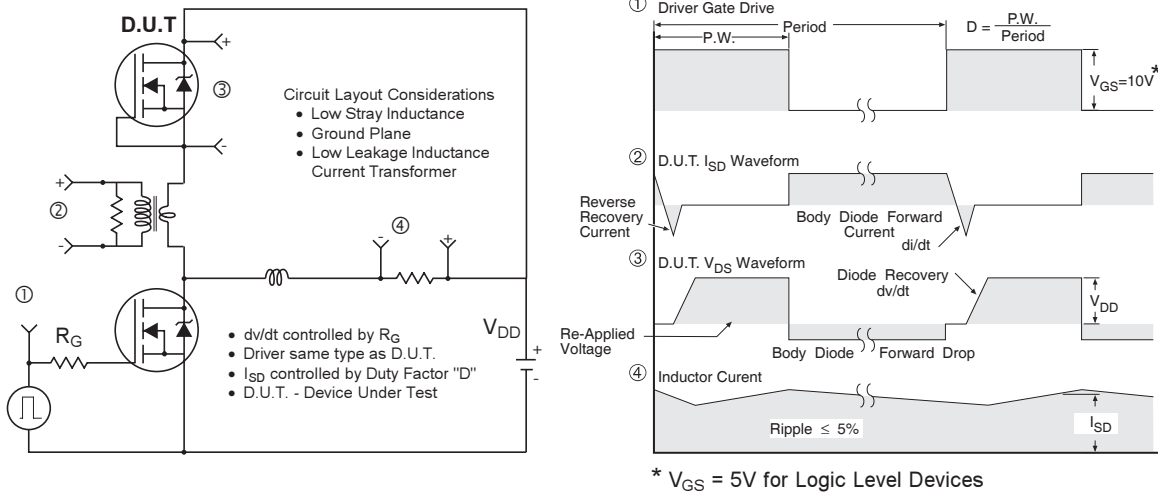


Fig 15. Peak Diode Recovery dv/dt Test Circuit for N-Channel HEXFET® Power MOSFETs

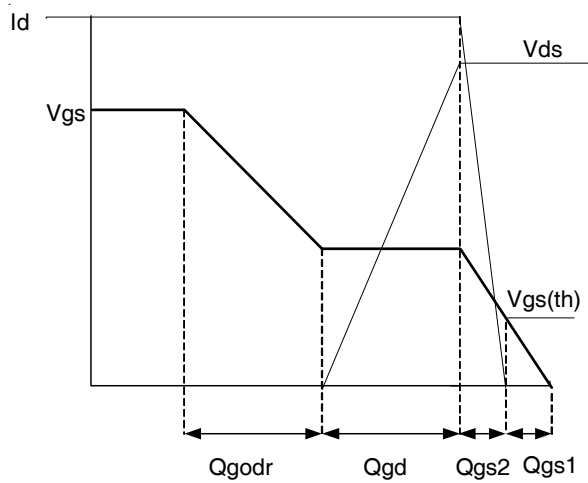


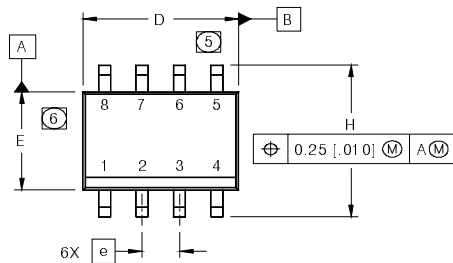
Fig 16. Gate Charge Waveform

IRF8736PbF

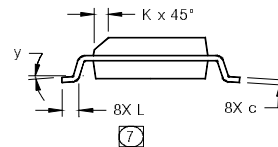
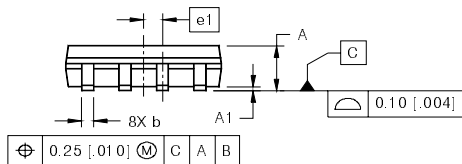
International
IR Rectifier

SO-8 Package Outline

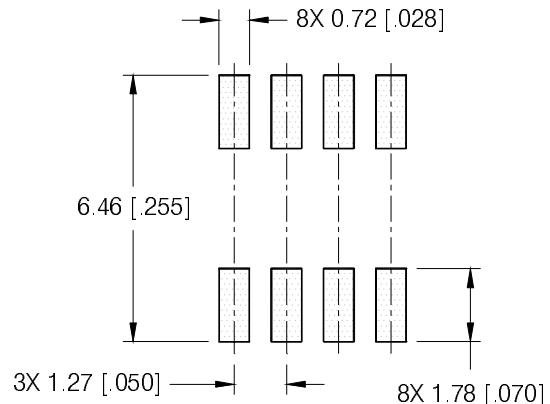
Dimensions are shown in millimeters (inches)



| 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° |



FOOTPRINT

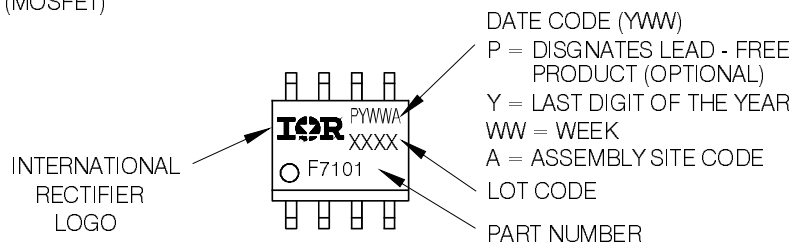


NOTES:

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 [0.006].
6. DIMENSION DOES NOT INCLUDE MOLD PROTRUSIONS. MOLD PROTRUSIONS NOT TO EXCEED 0.25 [0.010].
7. DIMENSION IS THE LENGTH OF LEAD FOR SOLDERING TO A SUBSTRATE.

SO-8 Part Marking Information

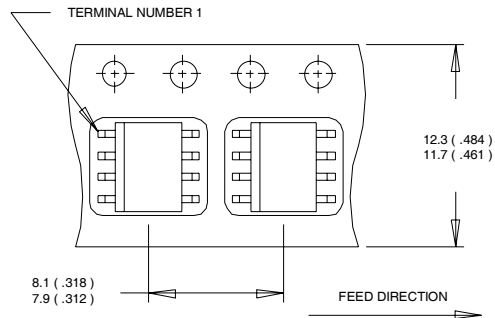
EXAMPLE: THIS IS AN IRF7101 (MOSFET)



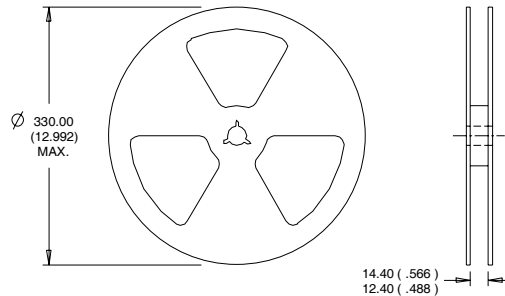
Note: For the most current drawing please refer to IR website at <http://www.irf.com/package>

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>

Notes:

- ① Repetitive rating; pulse width limited by max. junction temperature.
- ② Starting $T_J = 25^\circ\text{C}$, $L = 1.21\text{mH}$, $R_G = 25\Omega$, $I_{AS} = 14.4\text{A}$.
- ③ Pulse width $\leq 400\mu\text{s}$; 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.