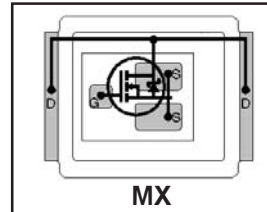


- RoHs Compliant Containing No Lead and Bromide ①
- Low Profile (<0.7 mm)
- Dual Sided Cooling Compatible ①
- Ultra Low Package Inductance
- Optimized for High Frequency Switching ①
- Ideal for CPU Core DC-DC Converters
- Optimized for Sync. FET socket of Sync. Buck Converter①
- Low Conduction and Switching Losses
- Compatible with existing Surface Mount Techniques ①
- 100% Rg tested

Typical values (unless otherwise specified)

| V _{DS} | | V _{GS} | | R _{DS(on)} | |
|--------------------|-----------------|------------------|-----------------|---------------------|---------------------|
| 30V max | | ±20V max | | 1.9mΩ @ 10V | |
| Q _{g tot} | Q _{gd} | Q _{gs2} | Q _{rr} | Q _{oss} | V _{gs(th)} |
| 28nC | 8.2nC | 3.5nC | 34nC | 20nC | 1.8V |



Applicable DirectFET Outline and Substrate Outline (see p.7,8 for details) ①

| | | | | | | | | | |
|----|----|----|--|----|-----------|----|----|--|--|
| SQ | SX | ST | | MQ | MX | MT | MP | | |
|----|----|----|--|----|-----------|----|----|--|--|

Description

The IRF8308MPbF combines the latest HEXFET® Power MOSFET Silicon technology with the advanced DirectFET™ packaging to achieve the lowest on-state resistance in a package that has the footprint of a SO-8 and only 0.7 mm profile. The DirectFET package is compatible with existing layout geometries used in power applications, PCB assembly equipment and vapor phase, infra-red or convection soldering techniques, when application note AN-1035 is followed regarding the manufacturing methods and processes. The DirectFET package allows dual sided cooling to maximize thermal transfer in power systems, improving previous best thermal resistance by 80%.

The IRF8308MPbF balances both low resistance and low charge along with ultra low package inductance to reduce both conduction and switching losses. The reduced total losses make this product ideal for high efficiency DC-DC converters that power the latest generation of processors operating at higher frequencies. The IRF8308MPbF has been optimized for parameters that are critical in synchronous buck including Rds(on), gate charge and Cdv/dt-induced turn on immunity. The IRF8308MPbF offers particularly low Rds(on) and high Cdv/dt immunity for synchronous FET applications.

| Orderable part number | Package Type | Standard Pack | | Note |
|-----------------------|----------------------|---------------|----------|-------------------------------|
| | | Form | Quantity | |
| IRF8308MTRPbF | DirectFET Medium Can | Tape and Reel | 4800 | "TR" suffix |
| IRF8308MTR1PbF | DirectFET Medium Can | Tape and Reel | 1000 | "TR1" suffix EOL notice # 264 |

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 ③ | 27 | A |
| I _D @ T _A = 70°C | Continuous Drain Current, V _{GS} @ 10V ③ | 21 | |
| I _D @ T _C = 25°C | Continuous Drain Current, V _{GS} @ 10V ④ | 150 | |
| I _{DM} | Pulsed Drain Current ⑤ | 212 | |
| E _{AS} | Single Pulse Avalanche Energy ⑥ | 12 | mJ |
| I _{AR} | Avalanche Current ⑤ | 21 | A |

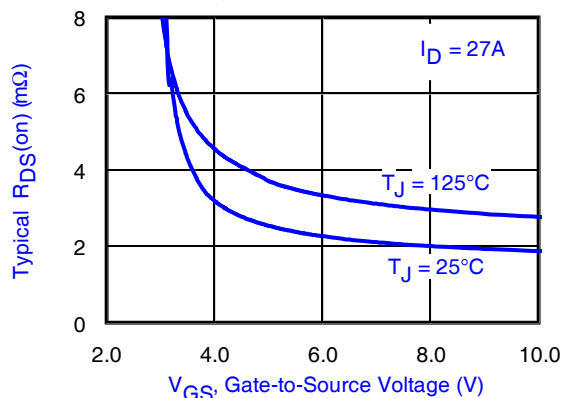


Fig 1. Typical On-Resistance Vs. Gate Voltage

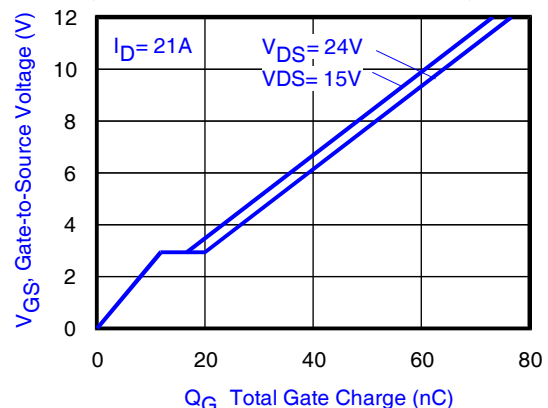


Fig 2. Typical Total Gate Charge vs Gate-to-Source Voltage

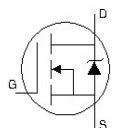
Notes:

- ① Click on this section to link to the appropriate technical paper.
- ② Click on this section to link to the DirectFET Website.
- ③ Surface mounted on 1 in. square Cu board, steady state.
- ④ T_C measured with thermocouple mounted to top (Drain) of part.
- ⑤ Repetitive rating; pulse width limited by max. junction temperature.
- ⑥ Starting T_J = 25°C, L = 0.051mH, R_G = 25Ω, I_{AS} = 21A.

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 | — | 22 | — | mV/°C | Reference to 25°C, I _D = 1mA |
| R _{DS(on)} | Static Drain-to-Source On-Resistance | — | 1.90 | 2.50 | mΩ | V _{GS} = 10V, I _D = 27A ⑦ |
| | | — | 2.70 | 3.50 | | V _{GS} = 4.5V, I _D = 21A ⑦ |
| V _{GS(th)} | Gate Threshold Voltage | 1.35 | 1.8 | 2.35 | V | V _{DS} = V _{GS} , I _D = 100μA |
| ΔV _{GS(th)} /ΔT _J | 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 | 130 | — | — | S | V _{DS} = 15V, I _D = 21A |
| Q _g | Total Gate Charge | — | 28 | 42 | nC | V _{DS} = 15V V _{GS} = 4.5V I _D = 21A See Fig. 15 |
| Q _{gs1} | Pre-V _{th} Gate-to-Source Charge | — | 8.4 | — | | |
| Q _{gs2} | Post-V _{th} Gate-to-Source Charge | — | 3.5 | — | | |
| Q _{gd} | Gate-to-Drain Charge | — | 8.2 | — | | |
| Q _{godr} | Gate Charge Overdrive | — | 7.9 | — | | |
| Q _{sw} | Switch Charge (Q _{gs2} + Q _{gd}) | — | 12 | — | | |
| Q _{oss} | Output Charge | — | 20 | — | nC | V _{DS} = 16V, V _{GS} = 0V |
| R _G | Gate Resistance | — | 1.2 | 2.2 | Ω | |
| t _{d(on)} | Turn-On Delay Time | — | 11 | — | ns | V _{DD} = 15V, V _{GS} = 4.5V ⑦ I _D = 21A R _G = 1.8Ω |
| t _r | Rise Time | — | 19 | — | | |
| t _{d(off)} | Turn-Off Delay Time | — | 23 | — | | |
| t _f | Fall Time | — | 16 | — | | |
| C _{iss} | Input Capacitance | — | 4404 | — | pF | V _{GS} = 0V V _{DS} = 15V f = 1.0MHz |
| C _{oss} | Output Capacitance | — | 885 | — | | |
| C _{rss} | Reverse Transfer Capacitance | — | 424 | — | | |

Diode Characteristics

| | Parameter | Min. | Typ. | Max. | Units | Conditions |
|-----------------|---|------|------|------|-------|--|
| I _S | Continuous Source Current (Body Diode) | — | — | 150 | A | MOSFET symbol showing the integral reverse p-n junction diode.  |
| I _{SM} | Pulsed Source Current (Body Diode) ⑤ | — | — | 212 | | |
| V _{SD} | Diode Forward Voltage | — | — | 1.0 | V | T _J = 25°C, I _S = 21A, V _{GS} = 0V ⑦ |
| t _{rr} | Reverse Recovery Time | — | 20 | 30 | ns | T _J = 25°C, I _F = 21A |
| Q _{rr} | Reverse Recovery Charge | — | 34 | 51 | nC | di/dt = 300A/μs ⑦ |

Notes:

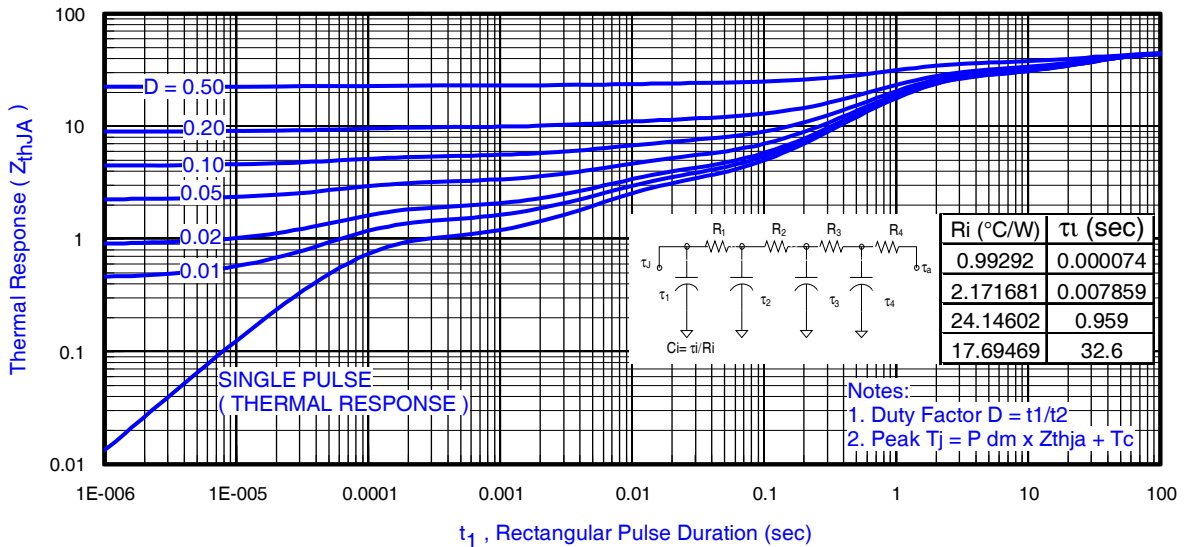
- ⑤ Repetitive rating; pulse width limited by max. junction temperature.
- ⑦ Pulse width ≤ 400μs; duty cycle ≤ 2%.

Absolute Maximum Ratings

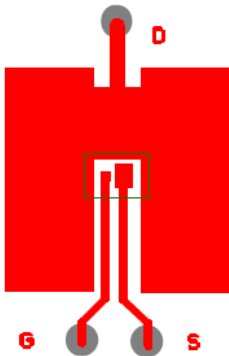
| | Parameter | Max. | Units |
|--------------------------------|----------------------------|--------------|------------------|
| $P_D @ T_A = 25^\circ\text{C}$ | Power Dissipation ③ | 2.8 | W |
| $P_D @ T_A = 70^\circ\text{C}$ | Power Dissipation ③ | 1.8 | |
| $P_D @ T_C = 25^\circ\text{C}$ | Power Dissipation ④ | 89 | |
| T_P | Peak Soldering Temperature | 270 | $^\circ\text{C}$ |
| T_J | Operating Junction and | -40 to + 150 | |
| T_{STG} | Storage Temperature Range | | |

Thermal Resistance

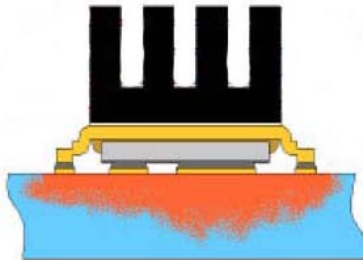
| | Parameter | Typ. | Max. | Units |
|--------------------|--------------------------|-------|------|---------------------------|
| $R_{\theta JA}$ | Junction-to-Ambient ③⑩ | — | 45 | $^\circ\text{C}/\text{W}$ |
| $R_{\theta JA}$ | Junction-to-Ambient ③⑩ | 12.5 | — | |
| $R_{\theta JA}$ | Junction-to-Ambient ⑨⑩ | 20 | — | |
| $R_{\theta JC}$ | Junction-to-Case ④⑩ | — | 1.4 | |
| $R_{\theta J-PCB}$ | Junction-to-PCB Mounted | 1.0 | — | |
| | Linear Derating Factor ③ | 0.022 | | $\text{W}/^\circ\text{C}$ |


Fig 3. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient ①
Notes:

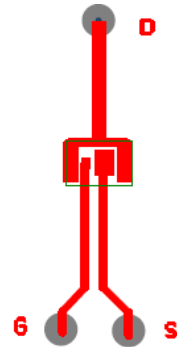
- ③ Used double sided cooling, mounting pad with large heatsink.
- ④ Mounted on minimum footprint full size board with metalized back and with small clip heatsink.
- ⑩ R_{θ} is measured at T_J of approximately 90°C .



③ Surface mounted on 1 in. square Cu (still air).



④ Mounted to a PCB with small clip heatsink (still air)



⑨ Mounted on minimum footprint full size board with metalized back and with small clip heatsink (still air)

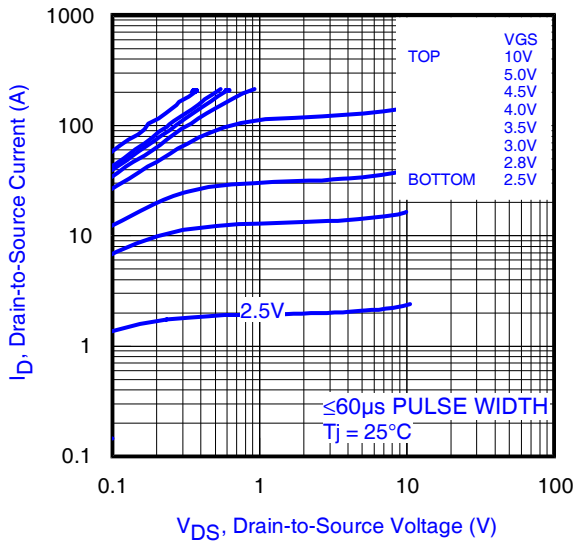


Fig 4. Typical Output Characteristics

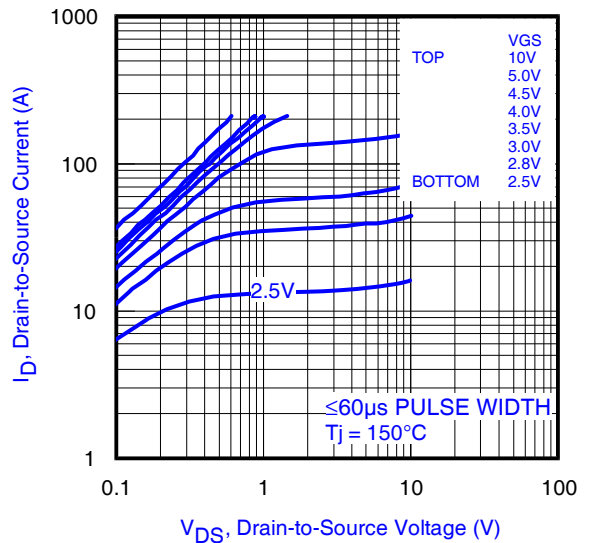


Fig 5. Typical Output Characteristics

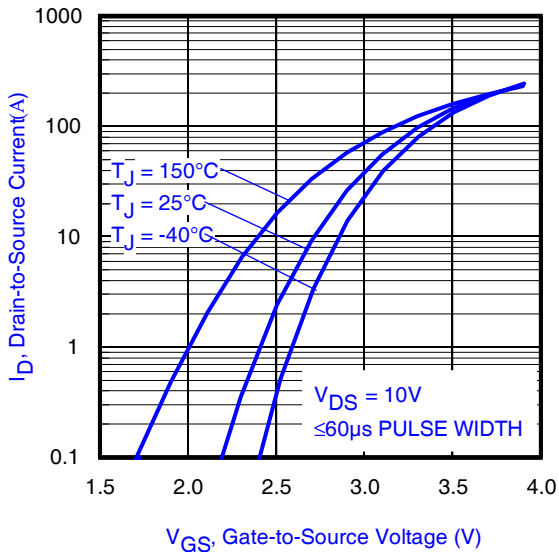


Fig 6. Typical Transfer Characteristics

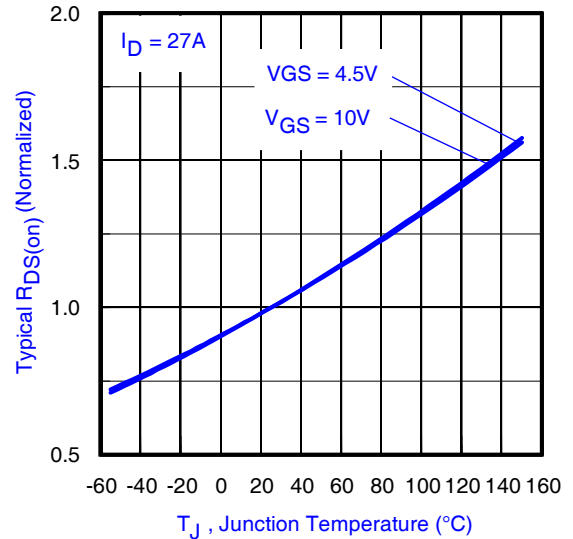


Fig 7. Normalized On-Resistance vs. Temperature

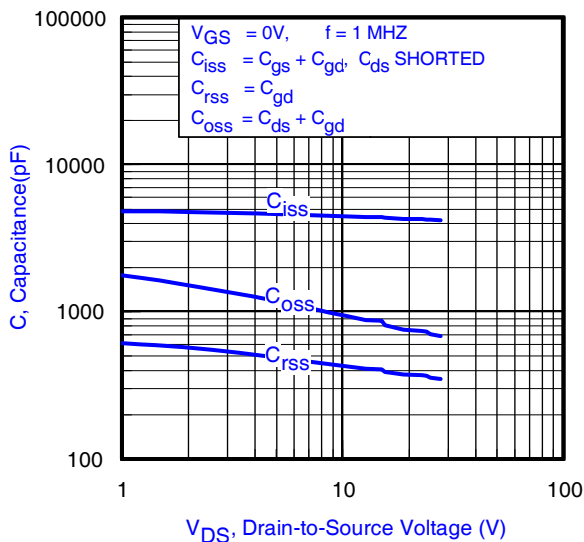


Fig 8. Typical Capacitance vs. Drain-to-Source Voltage

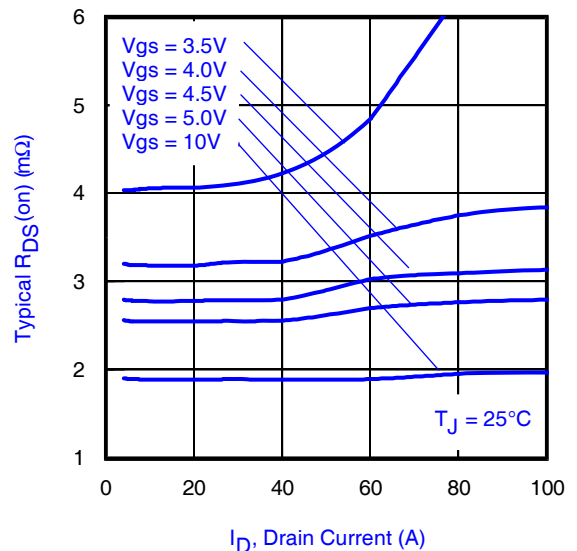


Fig 9. Typical On-Resistance Vs. Drain Current and Gate Voltage

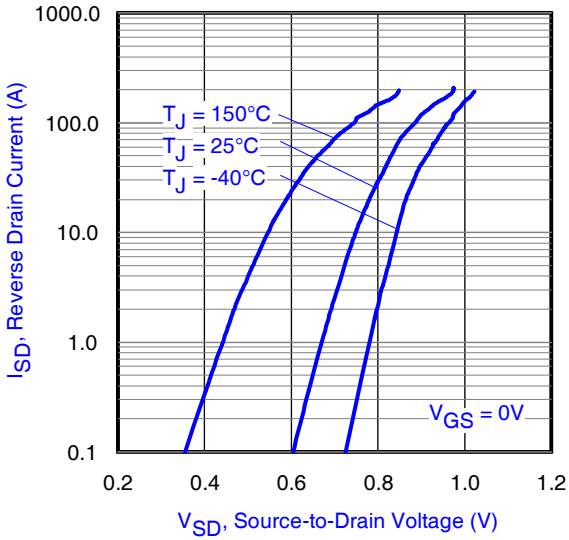


Fig 10. Typical Source-Drain Diode Forward Voltage

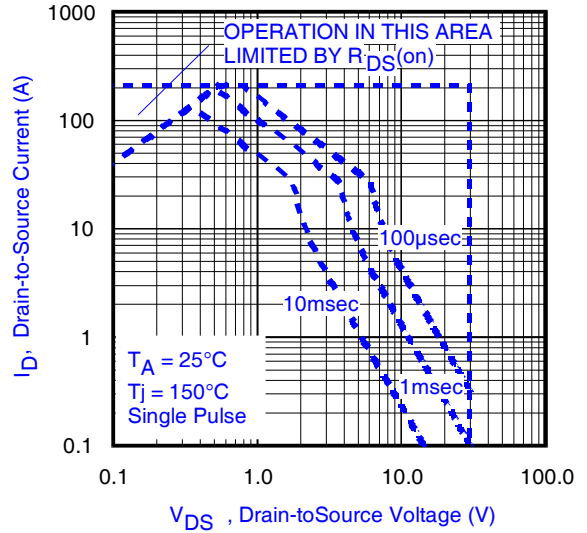


Fig11. Maximum Safe Operating Area

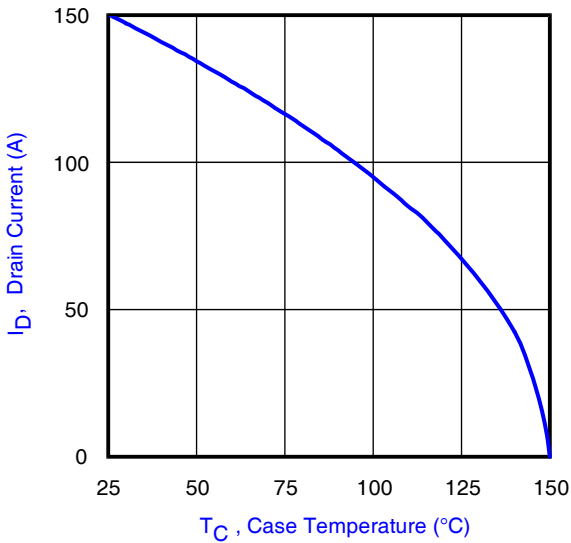


Fig 12. Maximum Drain Current vs. Case Temperature

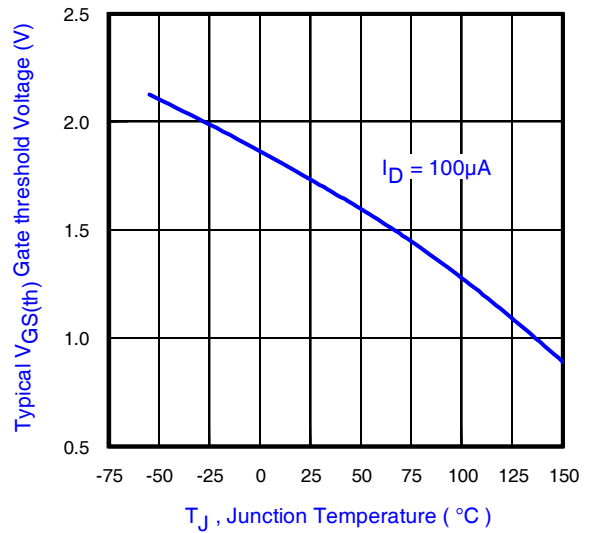


Fig 13. Typical Threshold Voltage vs. Junction Temperature

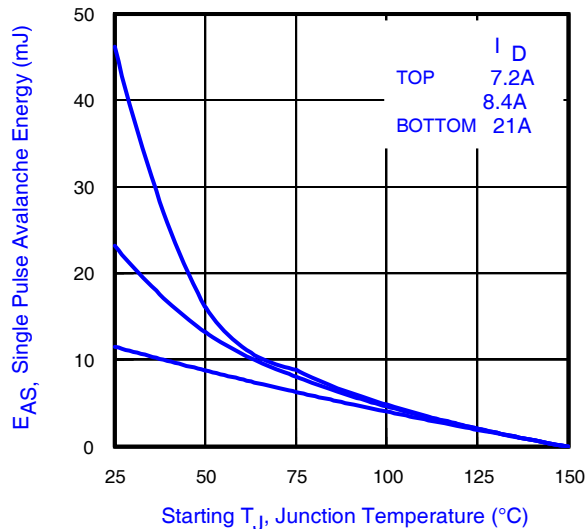


Fig 14. Maximum Avalanche Energy Vs. Drain Current

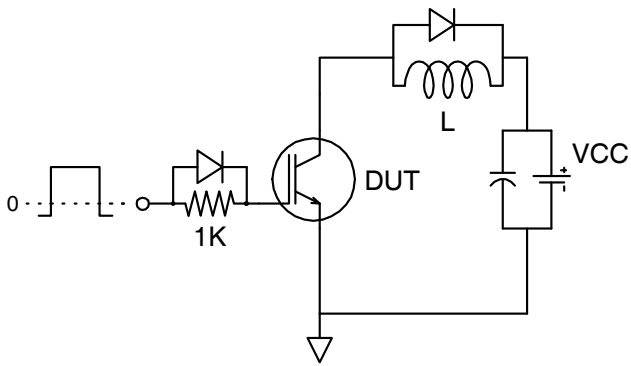


Fig 15a. Gate Charge Test Circuit

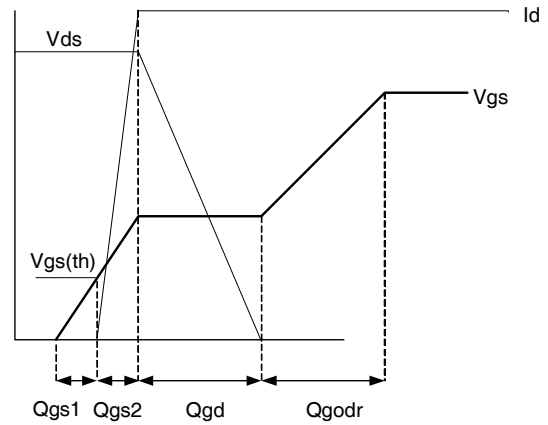


Fig 15b. Gate Charge Waveform

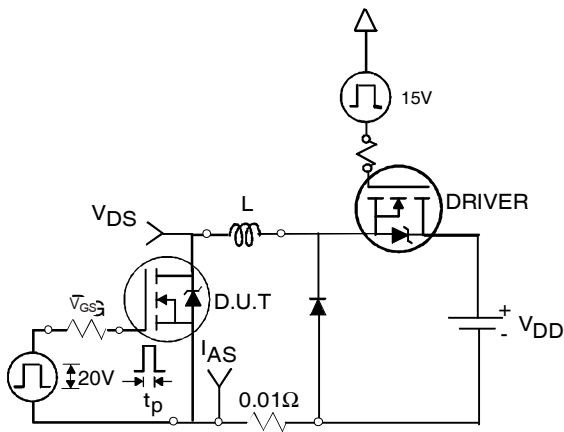


Fig 16a. Unclamped Inductive Test Circuit

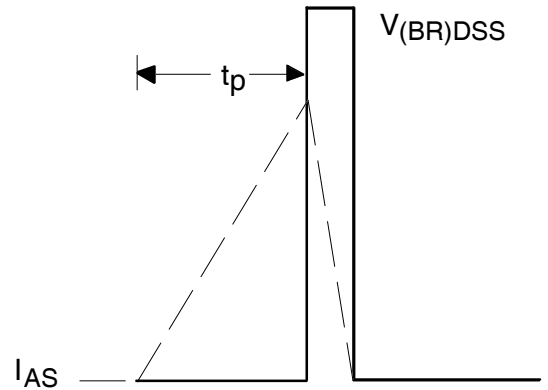


Fig 16b. Unclamped Inductive Waveforms

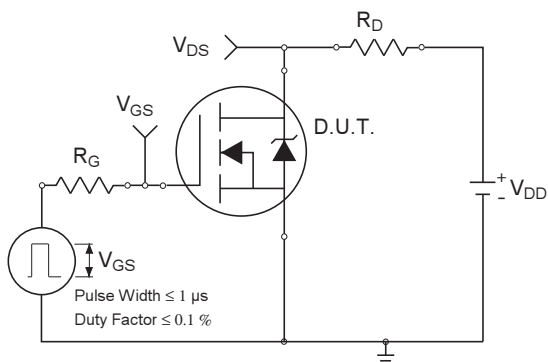


Fig 17a. Switching Time Test Circuit

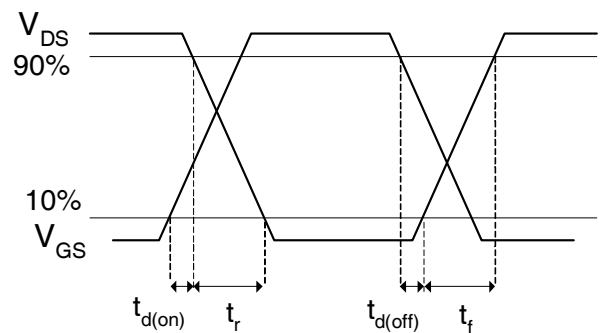


Fig 17b. Switching Time Waveforms

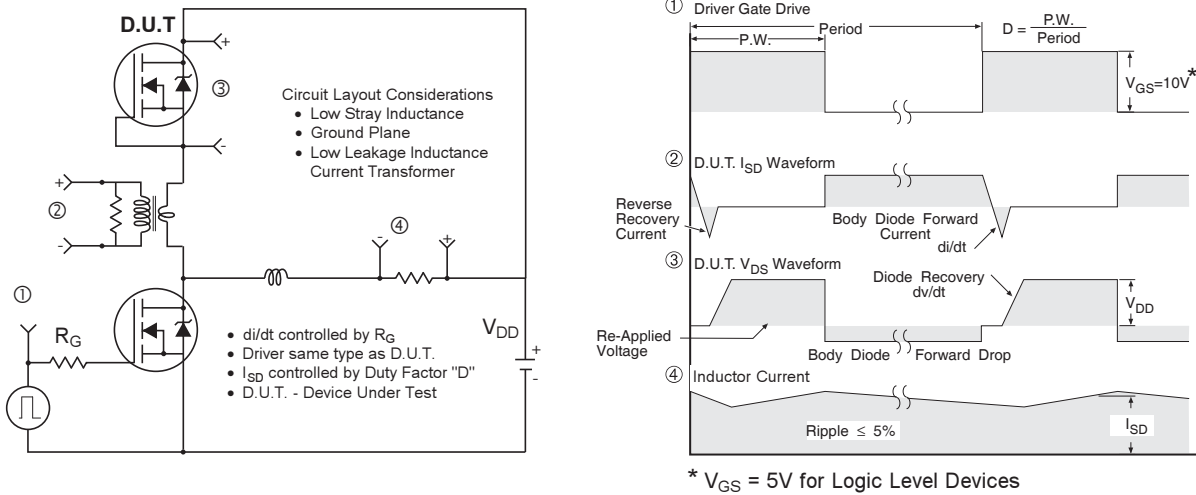
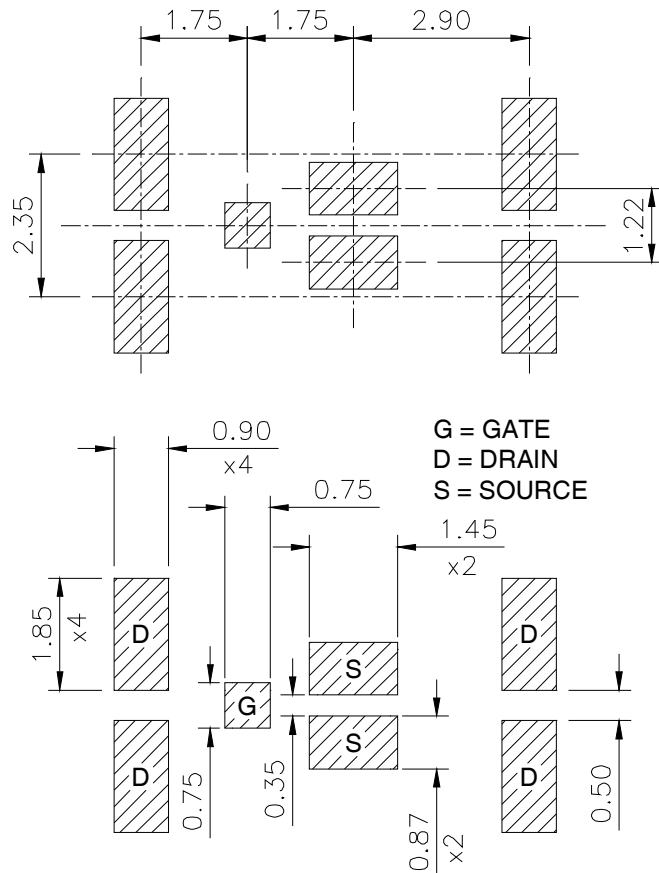


Fig 18. Diode Reverse Recovery Test Circuit for N-Channel HEXFET® Power MOSFETs

DirectFET™ Substrate and PCB Layout, MX Outline (Medium Size Can, X-Designation).

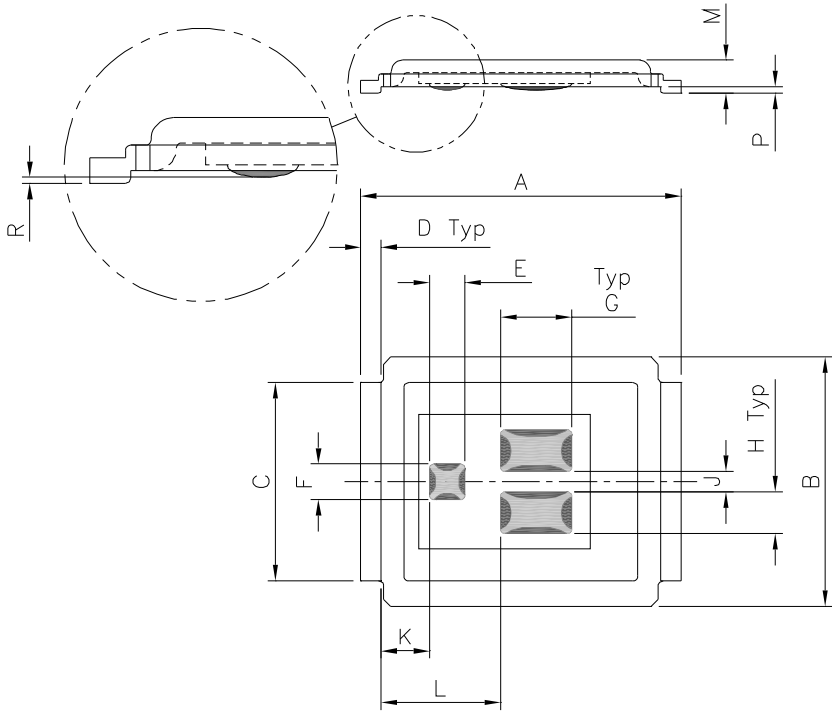
Please see AN-1035 for DirectFET assembly details and stencil and substrate design recommendations



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

**DirectFET™ Outline Dimension, MX Outline
(Medium Size Can, X-Designation)**

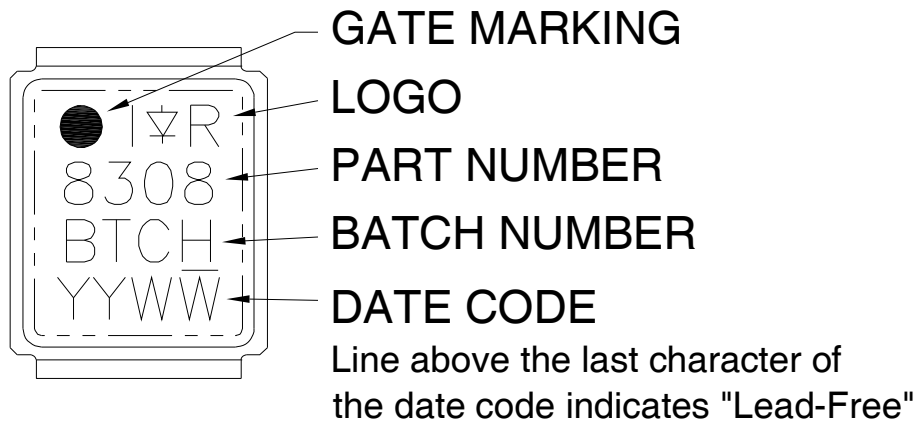
Please see AN-1035 for DirectFET assembly details, stencil and substrate design recommendations



| CODE | METRIC | | IMPERIAL | |
|------|--------|------|----------|-------|
| | MIN | MAX | MIN | MAX |
| A | 6.25 | 6.35 | 0.246 | 0.250 |
| B | 4.80 | 5.05 | 0.189 | 0.199 |
| C | 3.85 | 3.95 | 0.152 | 0.156 |
| D | 0.35 | 0.45 | 0.014 | 0.018 |
| E | 0.68 | 0.72 | 0.027 | 0.028 |
| F | 0.68 | 0.72 | 0.027 | 0.028 |
| G | 1.38 | 1.42 | 0.054 | 0.056 |
| H | 0.80 | 0.84 | 0.031 | 0.033 |
| J | 0.38 | 0.42 | 0.015 | 0.017 |
| K | 0.88 | 1.02 | 0.035 | 0.040 |
| L | 2.28 | 2.42 | 0.090 | 0.095 |
| M | 0.59 | 0.70 | 0.023 | 0.028 |
| R | 0.03 | 0.08 | 0.001 | 0.003 |
| P | 0.08 | 0.17 | 0.003 | 0.007 |

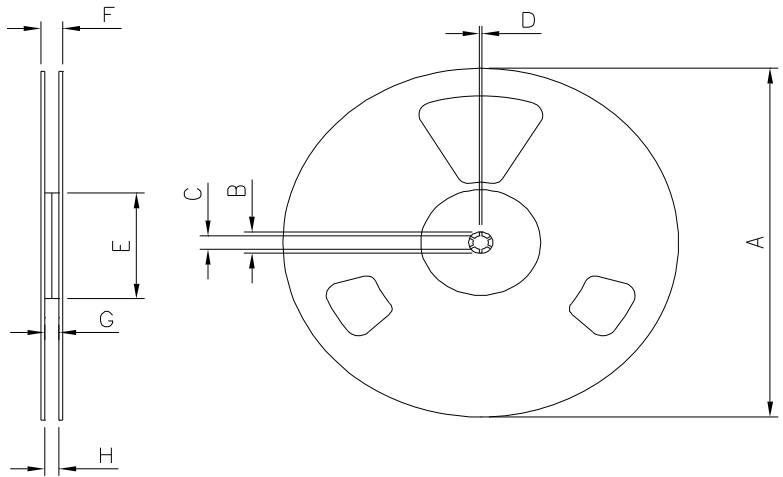
Dimensions are shown in millimeters (inches)

DirectFET™ Part Marking



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

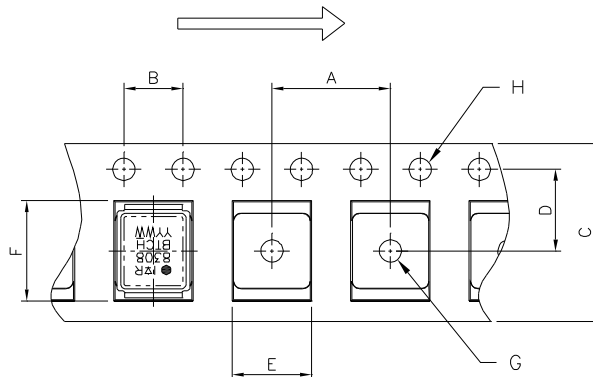
DirectFET™ Tape & Reel Dimension (Showing component orientation).



NOTE: Controlling dimensions in mm
Std reel quantity is 4800 parts (ordered as IRF8308MTRPBF).

| REEL DIMENSIONS | | | | |
|----------------------------|--------|------|----------|-------|
| STANDARD OPTION (QTY 4800) | | | | |
| CODE | METRIC | | IMPERIAL | |
| | MIN | MAX | MIN | MAX |
| A | 330.0 | N.C | 12.992 | N.C |
| B | 20.2 | N.C | 0.795 | N.C |
| C | 12.8 | 13.2 | 0.504 | 0.520 |
| D | 1.5 | N.C | 0.059 | N.C |
| E | 100.0 | N.C | 3.937 | N.C |
| F | N.C | 18.4 | N.C | 0.724 |
| G | 12.4 | 14.4 | 0.488 | 0.567 |
| H | 11.9 | 15.4 | 0.469 | 0.606 |

LOADED TAPE FEED DIRECTION



NOTE: CONTROLLING DIMENSIONS IN MM

| DIMENSIONS | | | | |
|------------|--------|-------|----------|-------|
| CODE | METRIC | | IMPERIAL | |
| | MIN | MAX | MIN | MAX |
| A | 7.90 | 8.10 | 0.311 | 0.319 |
| B | 3.90 | 4.10 | 0.154 | 0.161 |
| C | 11.90 | 12.30 | 0.469 | 0.484 |
| D | 5.45 | 5.55 | 0.215 | 0.219 |
| E | 5.10 | 5.30 | 0.201 | 0.209 |
| F | 6.50 | 6.70 | 0.256 | 0.264 |
| G | 1.50 | N.C | 0.059 | N.C |
| H | 1.50 | 1.60 | 0.059 | 0.063 |

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

Qualification Information[†]

| | | |
|----------------------------|--|--|
| Qualification level | Consumer ^{††} | |
| | (per JEDEC JESD47F ^{†††} guidelines) | |
| | Comments: This family of products has passed JEDEC's Industrial qualification. IR's Consumer qualification level is granted by extension of the higher Industrial level. | |
| Moisture Sensitivity Level | DFET2 | 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.

Revision History

| Date | Comments |
|-----------|--|
| 2/24/2014 | <ul style="list-style-type: none"> • Updated ordering information to reflect the End-Of-life (EOL) of the mini-reel option (EOL notice #264) • Added Qualification table on page 10 • Updated data sheet with new IR corporate template |

Данный компонент на территории Российской Федерации

Вы можете приобрести в компании MosChip.

Для оперативного оформления запроса Вам необходимо перейти по данной ссылке:

<http://moschip.ru/get-element>

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Нашей специализацией является поставка электронной компонентной базы двойного назначения, продукции таких производителей как XILINX, Intel (ex.ALTERA), Vicor, Microchip, Texas Instruments, Analog Devices, Mini-Circuits, Amphenol, Glenair.

Сотрудничество с глобальными дистрибьюторами электронных компонентов, предоставляет возможность заказывать и получать с международных складов практически любой перечень компонентов в оптимальные для Вас сроки.

На всех этапах разработки и производства наши партнеры могут получить квалифицированную поддержку опытных инженеров.

Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ РВ 0015-002 и ЭС РД 009

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Факс: +7 495 668-12-70 (доб.304)

E-mail: info@moschip.ru

Skype отдела продаж:

moschip.ru

moschip.ru_4

moschip.ru_6

moschip.ru_9