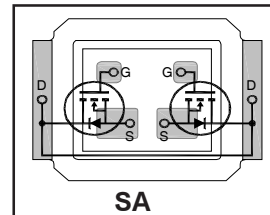


DirectFET[®]plus Power MOSFET ②

- RoHs Compliant Containing No Lead and Bromide ①
- Low Profile (<0.7 mm)
- Dual Sided Cooling Compatible ①
- Low Package Inductance
- Optimized for High Frequency Switching ①
- Ideal for CPU Core DC-DC Converters
- Optimized for Control 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 _{DSS} | V _{GS} | R _{DS(on)} | R _{DS(on)} | | |
|--------------------|-----------------|---------------------|---------------------|------------------|---------------------|
| 25V max | ±16V max | 3.2mΩ @ 10V | 4.5mΩ @ 4.5V | | |
| Q _{g tot} | Q _{gd} | Q _{gs2} | Q _{rr} | Q _{oss} | V _{gs(th)} |
| 8.8nC | 3.1nC | 1.1nC | 22nC | 13nC | 1.6V |



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

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

Description

The IRF6802SDTRPbF combines the latest HEXFET[®] Power MOSFET Silicon technology with the advanced DirectFET[®] packaging to achieve improved performance in a package that has the footprint of a MICRO-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 IRF6802SDTRPbF has low gate resistance and low charge along with ultra low package inductance providing significant reduction in switching losses. The reduced losses make this product ideal for high efficiency DC-DC converters that power the latest generation of processors operating at higher frequencies. The IRF6802SDTRPbF has been optimized for the control FET socket of synchronous buck operating from 12 volt bus converters.

Absolute Maximum Ratings

| | Parameter | Max. | Units |
|--|---|------|-------|
| V _{DS} | Drain-to-Source Voltage | 25 | V |
| V _{GS} | Gate-to-Source Voltage | ±16 | |
| I _D @ T _A = 25°C | Continuous Drain Current, V _{GS} @ 10V ③ | 16 | A |
| I _D @ T _A = 70°C | Continuous Drain Current, V _{GS} @ 10V ③ | 13 | |
| I _D @ T _C = 25°C | Continuous Drain Current, V _{GS} @ 10V ④ | 57 | |
| I _{DM} | Pulsed Drain Current ⑤ | 130 | |
| E _{AS} | Single Pulse Avalanche Energy ⑥ | 66 | mJ |
| I _{AR} | Avalanche Current ⑤ | 13 | A |

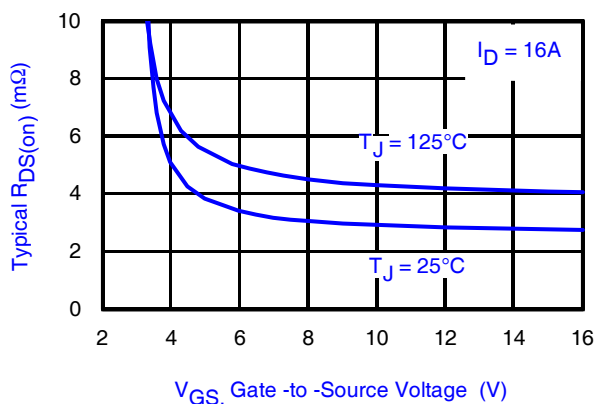


Fig 1. Typical On-Resistance vs. Gate Voltage

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.

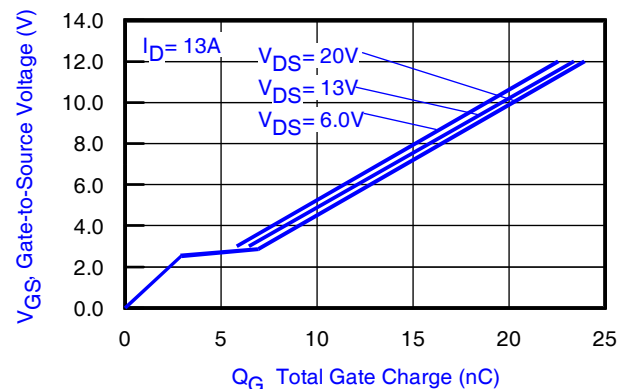


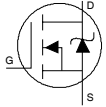
Fig 2. Typical Total Gate Charge vs. Gate-to-Source Voltage

- 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 = 0.78mH, R_G = 50Ω, I_{AS} = 13A.

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

| | Parameter | Min. | Typ. | Max. | Units | Conditions |
|---------------------------------------|---|------|------|------|-------|--|
| BV _{DSS} | Drain-to-Source Breakdown Voltage | 25 | — | — | V | V _{GS} = 0V, I _D = 250μA |
| ΔBV _{DSS} /ΔT _J | Breakdown Voltage Temp. Coefficient | — | 0.02 | — | V/°C | Reference to 25°C, I _D = 1.0mA |
| R _{DS(on)} | Static Drain-to-Source On-Resistance | — | 3.2 | 4.2 | mΩ | V _{GS} = 10V, I _D = 16A ⑦ |
| | | — | 4.5 | 5.9 | | V _{GS} = 4.5V, I _D = 13A ⑦ |
| V _{GS(th)} | Gate Threshold Voltage | 1.1 | 1.6 | 2.1 | V | V _{DS} = V _{GS} , I _D = 35μA |
| ΔV _{GS(th)} /ΔT _J | Gate Threshold Voltage Coefficient | — | -5.9 | — | mV/°C | V _{DS} = V _{GS} , I _D = 35μA |
| I _{DSS} | Drain-to-Source Leakage Current | — | — | 1.0 | μA | V _{DS} = 20V, V _{GS} = 0V |
| | | — | — | 150 | | V _{DS} = 20V, V _{GS} = 0V, T _J = 125°C |
| I _{GSS} | Gate-to-Source Forward Leakage | — | — | 100 | nA | V _{GS} = 16V |
| | Gate-to-Source Reverse Leakage | — | — | -100 | | V _{GS} = -16V |
| g _{fs} | Forward Transconductance | 160 | — | — | S | V _{DS} = 13V, I _D = 13A |
| Q _g | Total Gate Charge | — | 8.8 | 13 | nC | V _{DS} = 13V V _{GS} = 4.5V I _D = 13A See Fig.15 |
| Q _{gs1} | Pre-V _{th} Gate-to-Source Charge | — | 2.3 | — | | |
| Q _{gs2} | Post-V _{th} Gate-to-Source Charge | — | 1.1 | — | | |
| Q _{gd} | Gate-to-Drain Charge | — | 3.1 | — | | |
| Q _{godr} | Gate Charge Overdrive | — | 2.3 | — | | |
| Q _{sw} | Switch Charge (Q _{gs2} + Q _{gd}) | — | 4.2 | — | | |
| Q _{oss} | Output Charge | — | 13 | — | nC | V _{DS} = 20V, V _{GS} = 0V |
| R _G | Gate Resistance | — | 0.70 | — | Ω | |
| t _{d(on)} | Turn-On Delay Time | — | 9.7 | — | ns | V _{DD} = 13V, V _{GS} = 4.5V ⑦ I _D = 13A R _G = 1.5Ω See Fig.17 |
| t _r | Rise Time | — | 50 | — | | |
| t _{d(off)} | Turn-Off Delay Time | — | 13 | — | | |
| t _f | Fall Time | — | 23 | — | | |
| C _{iss} | Input Capacitance | — | 1350 | — | pF | V _{GS} = 0V V _{DS} = 13V f = 1.0MHz |
| C _{oss} | Output Capacitance | — | 400 | — | | |
| C _{rss} | Reverse Transfer Capacitance | — | 97 | — | | |

Diode Characteristics

| | Parameter | Min. | Typ. | Max. | Units | Conditions |
|-----------------|---|------|------|------|-------|--|
| I _S | Continuous Source Current (Body Diode) | — | — | 26 | A | MOSFET symbol showing the integral reverse p-n junction diode.  |
| I _{SM} | Pulsed Source Current (Body Diode) ⑤ | — | — | 130 | | |
| V _{SD} | Diode Forward Voltage | — | — | 1.0 | V | T _J = 25°C, I _S = 13A, V _{GS} = 0V ⑦ |
| t _{rr} | Reverse Recovery Time | — | 18 | 27 | ns | T _J = 25°C, I _F = 13A |
| Q _{rr} | Reverse Recovery Charge | — | 22 | 33 | nC | di/dt = 260A/μs ⑦ |

Notes:

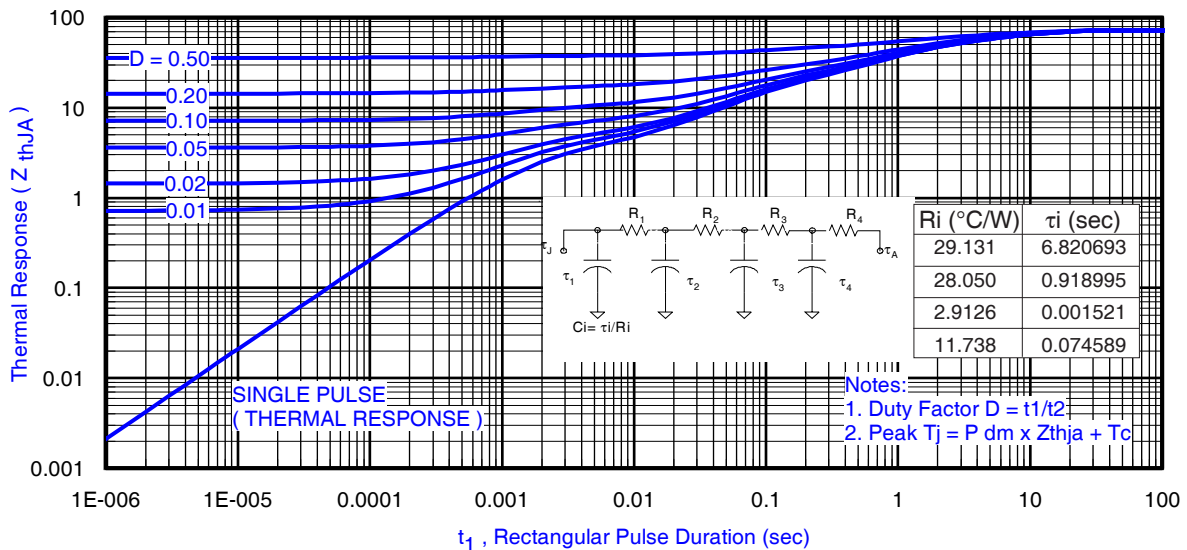
⑦ Pulse width ≤ 400μs; duty cycle ≤ 2%.

Absolute Maximum Ratings

| | Parameter | Max. | Units |
|--------------------------------|----------------------------|--------------|-------|
| $P_D @ T_A = 25^\circ\text{C}$ | Power Dissipation ③④ | 1.7 | W |
| $P_D @ T_A = 70^\circ\text{C}$ | Power Dissipation ③④ | 1.1 | |
| $P_D @ T_C = 25^\circ\text{C}$ | Power Dissipation ④ | 21 | |
| T_P | Peak Soldering Temperature | 270 | °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 ③④ | — | 72 | °C/W |
| $R_{\theta JA}$ | Junction-to-Ambient ⑤⑥ | 12.5 | — | |
| $R_{\theta JA}$ | Junction-to-Ambient ⑦⑧ | 20 | — | |
| $R_{\theta JC}$ | Junction-to-Case ④ | — | 5.9 | |
| $R_{\theta J-PCB}$ | Junction-to-PCB Mounted | 1.0 | — | |
| | Linear Derating Factor ③ | 0.014 | | W/°C |


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

- ③ Used double sided cooling , mounting pad with large heatsink.
- ④ R_{θ} is measured at T_J of approximately 90°C .
- ⑤ Mounted on minimum footprint full size board with metalized back and with small clip heatsink.



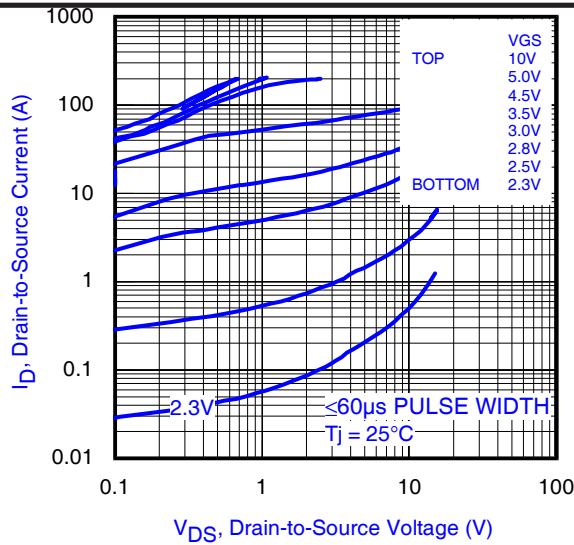
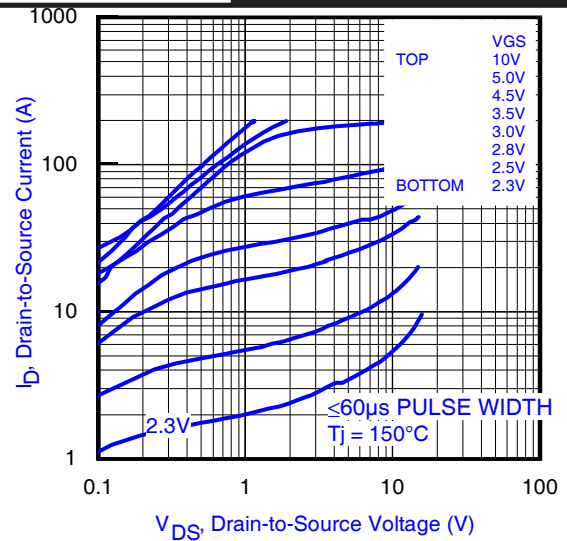
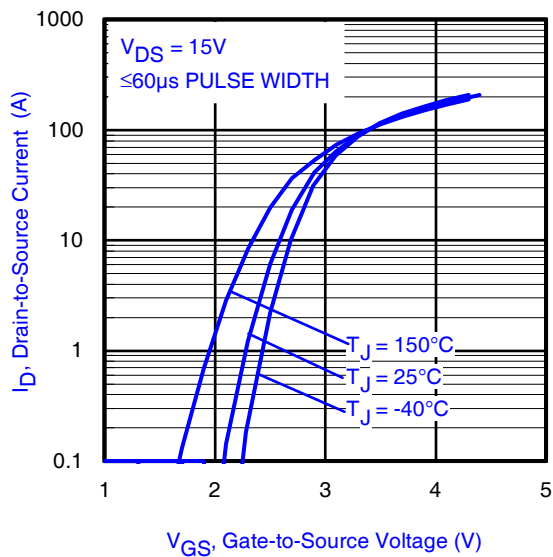
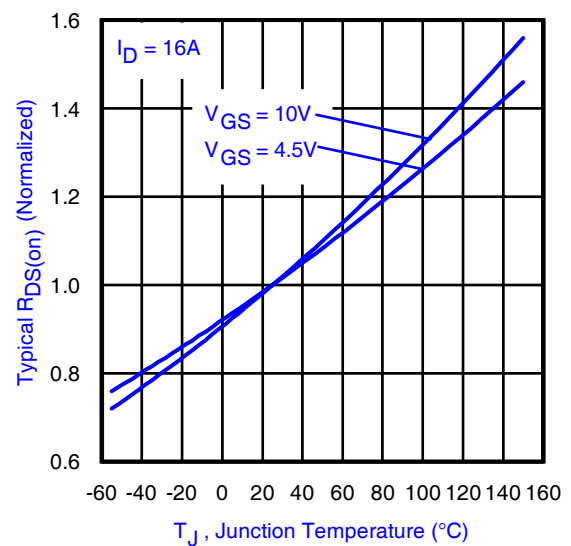
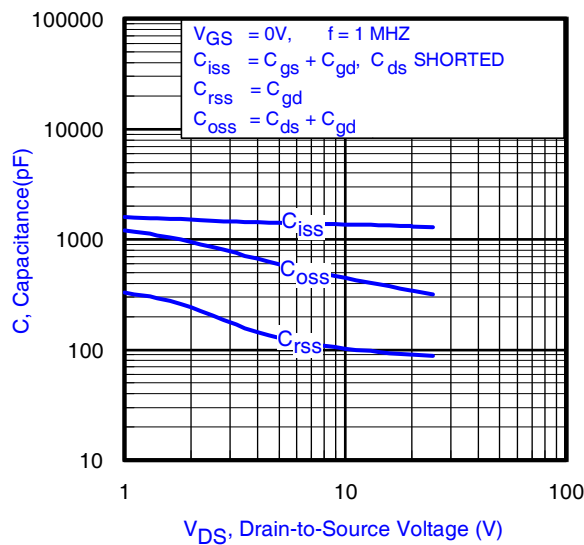
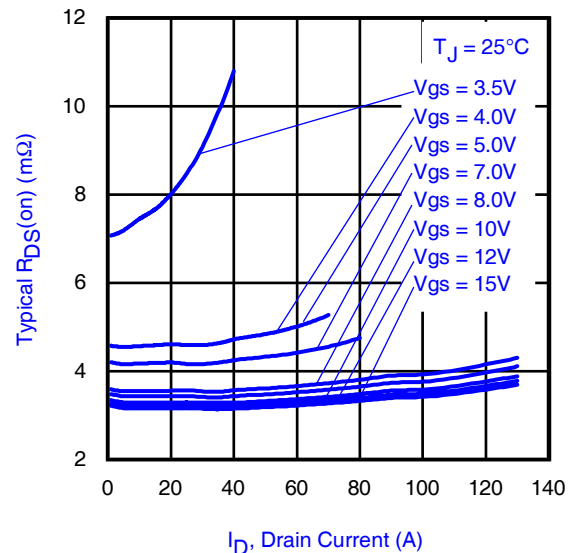
③ Surface mounted on 1 in. square Cu (still air).



⑤ Mounted to a PCB with small clip heatsink (still air)



⑦ 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

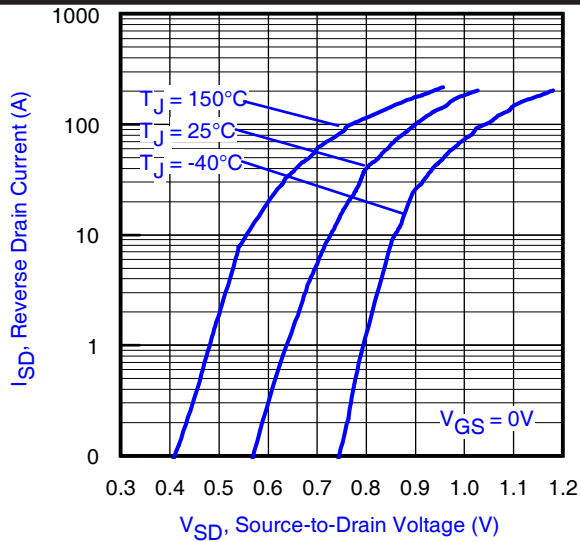


Fig 10. Typical Source-Drain Diode Forward Voltage

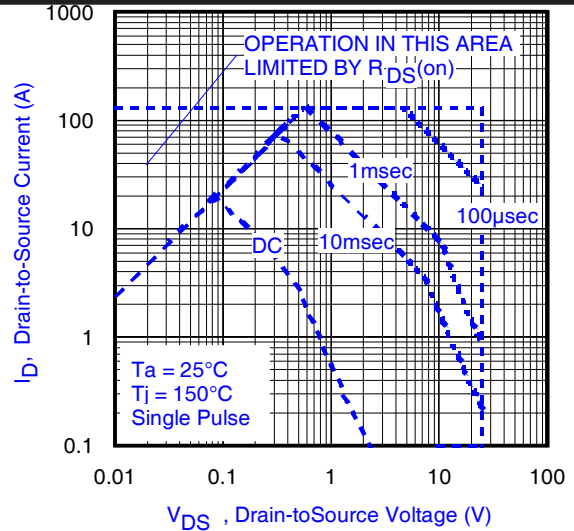


Fig 11. Maximum Safe Operating Area

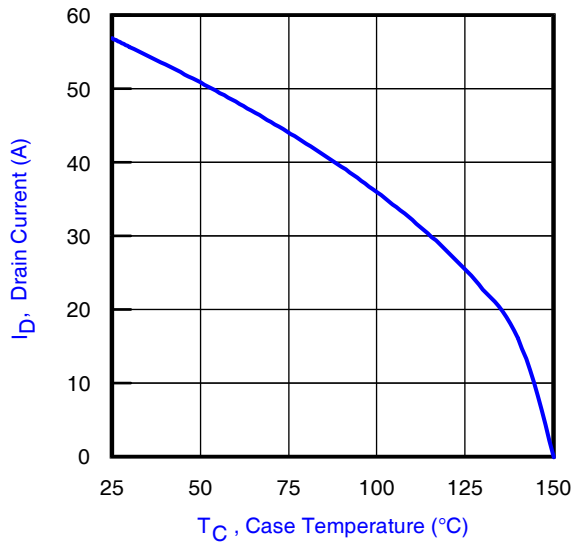


Fig 12. Maximum Drain Current vs. Case Temperature

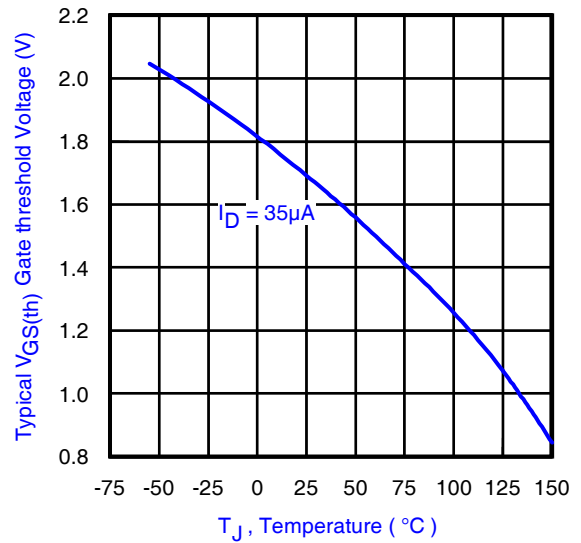


Fig 13. Typical Threshold Voltage vs. Junction Temperature

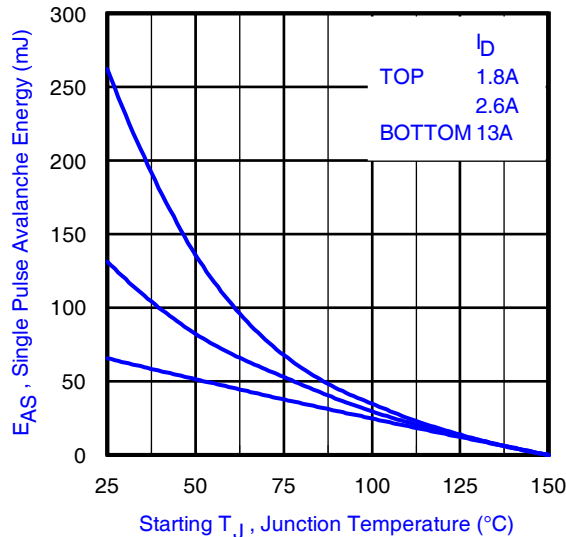


Fig 14. Maximum Avalanche Energy vs. Drain Current

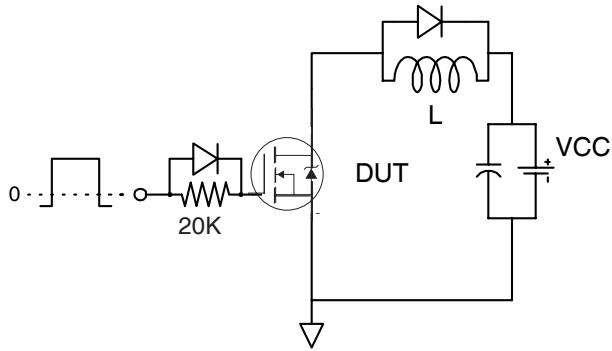


Fig 15a. Gate Charge Test Circuit

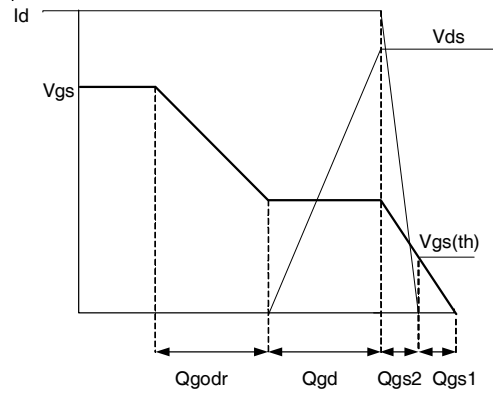


Fig 15b. Gate Charge Waveform

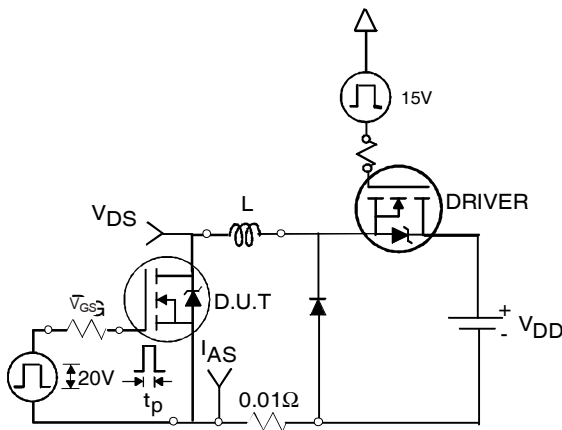


Fig 16a. Unclamped Inductive Test Circuit

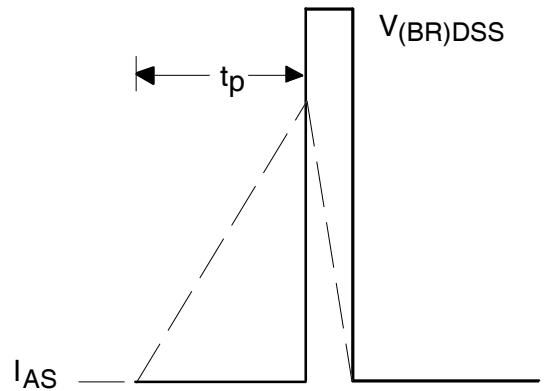


Fig 16b. Unclamped Inductive Waveforms

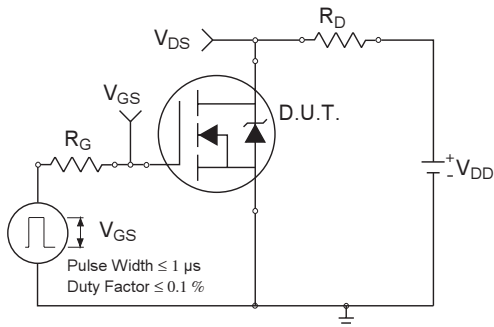


Fig 17a. Switching Time Test Circuit

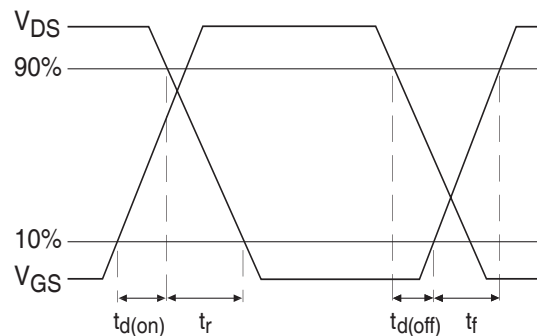


Fig 17b. Switching Time Waveforms

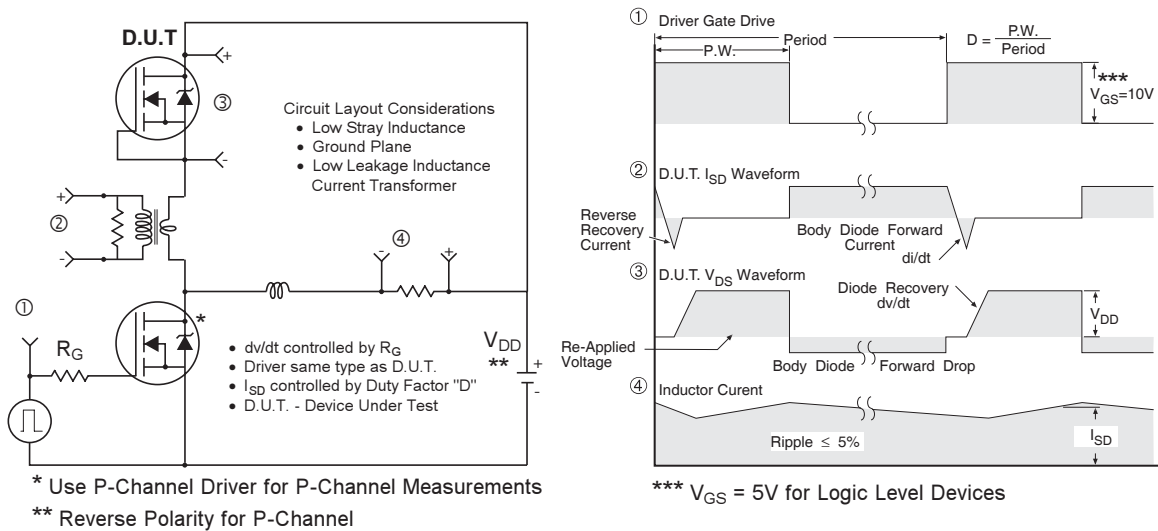
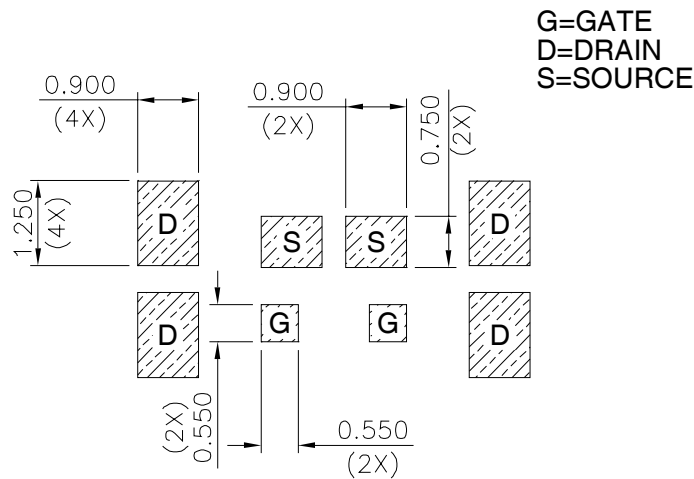
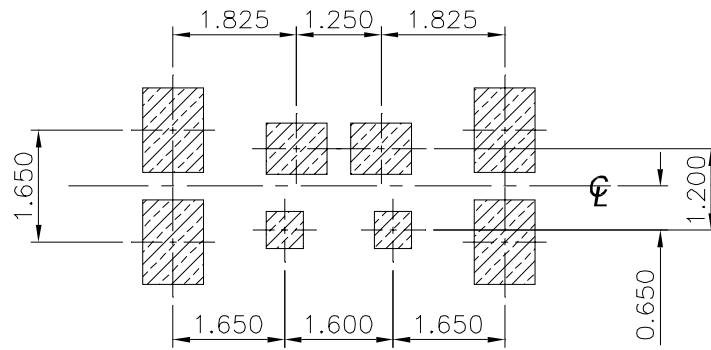


Fig 18. Diode Reverse Recovery Test Circuit for HEXFET® Power MOSFETs

DirectFET®plus Board Footprint, SA Outline (Small Size Can, A-Designation).

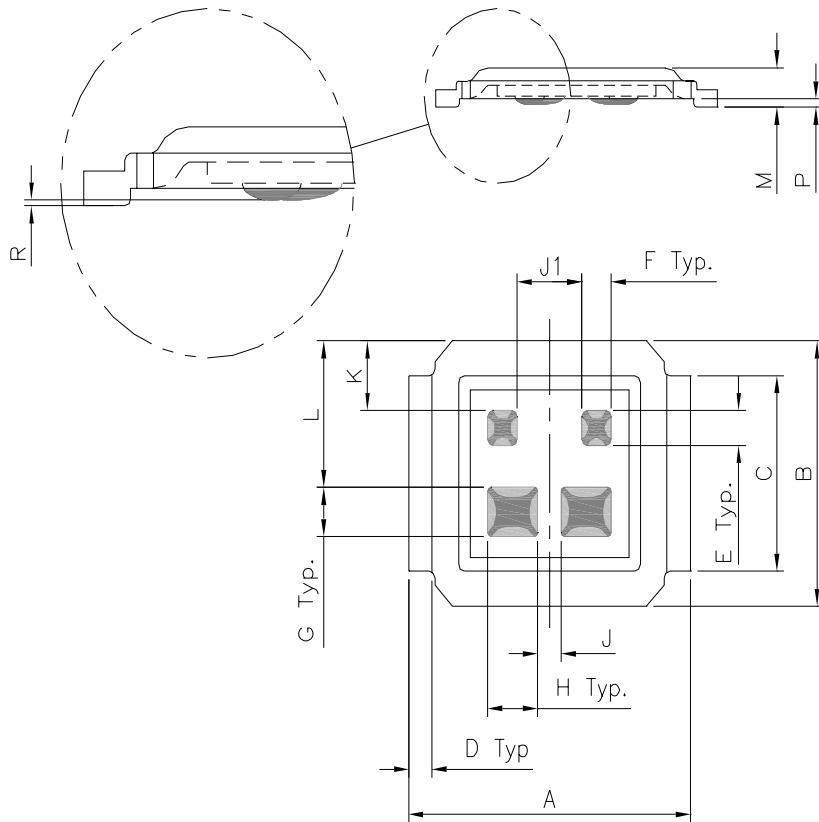
Please see application note AN-1035 for all details regarding the assembly of DirectFET®plus.

This includes all recommendations for stencil and substrate designs.



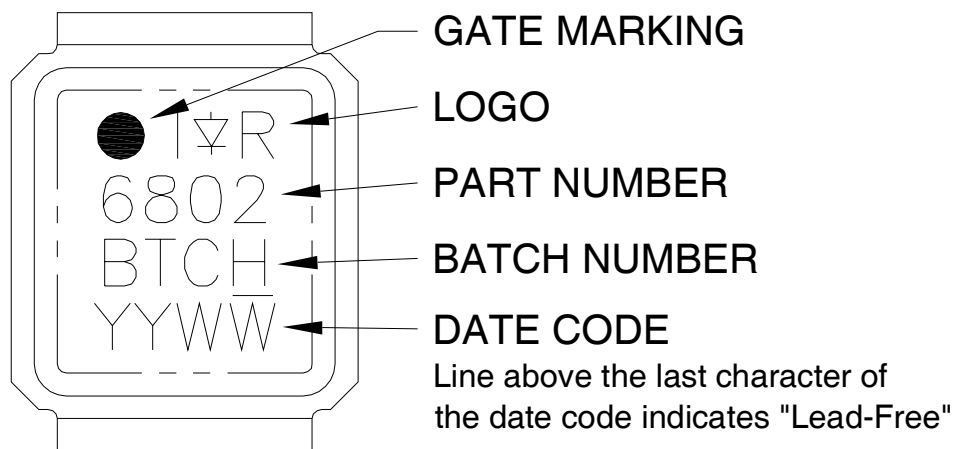
DirectFET^{®plus} Outline Dimension, SA Outline (Small Size Can, A-Designation).

Please see application note AN-1035 for all details regarding the assembly of DirectFET^{®plus}. This includes all recommendations for stencil and substrate designs.



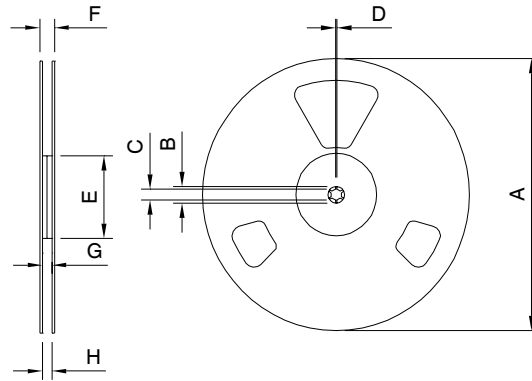
| DIMENSIONS | | | | |
|------------|--------|------|----------|--------|
| | METRIC | | IMPERIAL | |
| CODE | MIN | MAX | MIN | MAX |
| A | 4.75 | 4.85 | 0.187 | 0.191 |
| B | 3.70 | 3.95 | 0.146 | 0.156 |
| C | 2.75 | 2.85 | 0.108 | 0.112 |
| D | 0.35 | 0.45 | 0.014 | 0.018 |
| E | 0.48 | 0.52 | 0.019 | 0.020 |
| F | 0.48 | 0.52 | 0.019 | 0.020 |
| G | 0.68 | 0.72 | 0.027 | 0.028 |
| H | 0.83 | 0.87 | 0.033 | 0.034 |
| J | 0.38 | 0.42 | 0.015 | 0.016 |
| J1 | 1.08 | 1.12 | 0.043 | 0.044 |
| K | 0.95 | 1.05 | 0.037 | 0.041 |
| L | 2.05 | 2.15 | 0.081 | 0.085 |
| M | 0.52 | 0.62 | 0.020 | 0.024 |
| P | 0.08 | 0.17 | 0.003 | 0.007 |
| R | 0.02 | 0.08 | 0.0008 | 0.0031 |

DirectFET^{®plus} Part Marking



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

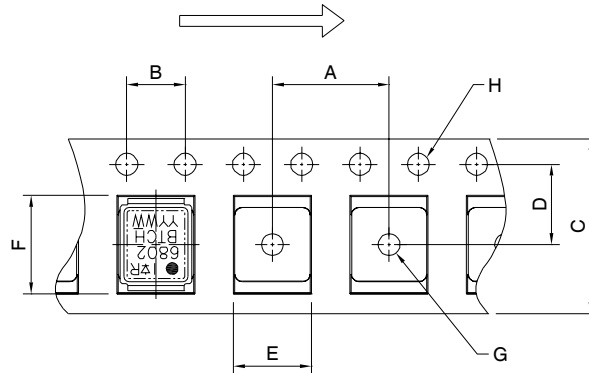
DirectFET^{®plus} Tape & Reel Dimension (Showing component orientation).



NOTE: Controlling dimensions in mm
Std reel quantity is 4800 parts. (ordered as IRF6802SDTRPbF). For 1000 parts on 7" reel, order IRF6802SDTR1PbF

| REEL DIMENSIONS | | | | | | | | |
|-----------------|----------------------------|------|----------|-------|-----------------------|-------|----------|------|
| CODE | STANDARD OPTION (QTY 4800) | | | | TR1 OPTION (QTY 1000) | | | |
| | METRIC | | IMPERIAL | | METRIC | | IMPERIAL | |
| A | 330.0 | N.C | 12.992 | N.C | 177.77 | N.C | 6.9 | N.C |
| B | 20.2 | N.C | 0.795 | N.C | 19.06 | N.C | 0.75 | N.C |
| C | 12.8 | 13.2 | 0.504 | 0.520 | 13.5 | 12.8 | 0.53 | 0.50 |
| D | 1.5 | N.C | 0.059 | N.C | 1.5 | N.C | 0.059 | N.C |
| E | 100.0 | N.C | 3.937 | N.C | 58.72 | N.C | 2.31 | N.C |
| F | N.C | 18.4 | N.C | 0.724 | N.C | 13.50 | N.C | 0.53 |
| G | 12.4 | 14.4 | 0.488 | 0.567 | 11.9 | 12.01 | 0.47 | N.C |
| H | 11.9 | 15.4 | 0.469 | 0.606 | 11.9 | 12.01 | 0.47 | N.C |

LOADED TAPE FEED DIRECTION



NOTE: CONTROLLING DIMENSIONS IN MM

| CODE | DIMENSIONS | | | |
|------|------------|-------|----------|-------|
| | METRIC | | IMPERIAL | |
| 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 | 4.00 | 4.20 | 0.158 | 0.165 |
| F | 5.00 | 5.20 | 0.197 | 0.205 |
| 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>

单击下面可查看定价，库存，交付和生命周期等信息

[>>Infineon Technologies\(英飞凌\)](#)