

勝特力材料 886-3-5753170
 勝特力电子(上海) 86-21-54151736
 勝特力电子(深圳) 86-755-83298787
[Http://www.100y.com.tw](http://www.100y.com.tw)

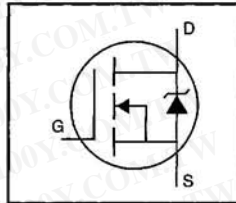
International Rectifier

PD-9.700A

IRFD014

HEXFET® Power MOSFET

- Dynamic dv/dt Rating
- For Automatic Insertion
- End Stackable
- 175°C Operating Temperature
- Fast Switching
- Ease of Paralleling
- Simple Drive Requirements



$$V_{DSS} = 60V$$

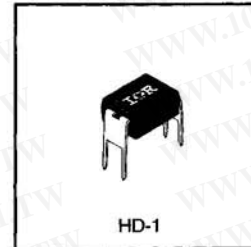
$$R_{DS(on)} = 0.20\Omega$$

$$I_D = 1.7A$$

Description

Third Generation HEXFETs from International Rectifier provide the designer with the best combination of fast switching, ruggedized device design, low on-resistance and cost-effectiveness.

The 4-pin DIP package is a low cost machine-insertable case style which can be stacked in multiple combinations on standard 0.1 inch pin centers. The dual drain serves as a thermal link to the mounting surface for power dissipation levels up to 1 watt.



DATA SHEETS

Absolute Maximum Ratings

| | Parameter | Max. | Units |
|---------------------------|---|-----------------------|-------|
| $I_D @ T_C = 25^\circ C$ | Continuous Drain Current, $V_{GS} @ 10 V$ | 1.7 | A |
| $I_D @ T_C = 100^\circ C$ | Continuous Drain Current, $V_{GS} @ 10 V$ | 1.2 | |
| I_{DM} | Pulsed Drain Current ① | 14 | |
| $P_D @ T_C = 25^\circ C$ | Power Dissipation | 1.3 | W |
| | Linear Derating Factor | 0.0083 | W/°C |
| V_{GS} | Gate-to-Source Voltage | ±20 | V |
| E_{AS} | Single Pulse Avalanche Energy ② | 130 | mJ |
| dv/dt | Peak Diode Recovery dv/dt ③ | 4.5 | V/ns |
| T_J | Operating Junction and | -55 to +175 | °C |
| T_{STG} | Storage Temperature Range | | |
| | Soldering Temperature, for 10 seconds | 300 (1.6mm from case) | |

Thermal Resistance

| | Parameter | Min. | Typ. | Max. | Units |
|-----------------|---------------------|------|------|------|-------|
| $R_{\theta JA}$ | Junction-to-Ambient | — | — | 120 | °C/W |

勝特力材料 886-3-5753170
 勝特力电子(上海) 86-21-54151736
 勝特力电子(深圳) 86-755-83298787
 Http://www.100y.com.tw

IRFD014



Electrical Characteristics @ T_J = 25°C (unless otherwise specified)

| | Parameter | Min. | Typ. | Max. | Units | Test Conditions |
|--|--------------------------------------|------|-------|------|-------|--|
| V _{(BR)DSS} | Drain-to-Source Breakdown Voltage | 60 | — | — | V | V _{GS} =0V, I _D =250μA |
| ΔV _{(BR)DSS} /ΔT _J | Breakdown Voltage Temp. Coefficient | — | 0.063 | — | V/°C | Reference to 25°C, I _D =1mA |
| R _{DS(on)} | Static Drain-to-Source On-Resistance | — | — | 0.20 | Ω | V _{GS} =10V, I _D =1.0A ④ |
| V _{GS(th)} | Gate Threshold Voltage | 2.0 | — | 4.0 | V | V _{DS} =V _{GS} , I _D =250μA |
| g _{fs} | Forward Transconductance | 0.96 | — | — | S | V _{DS} =25V, I _D =1.0A ④ |
| I _{DSS} | Drain-to-Source Leakage Current | — | — | 25 | μA | V _{DS} =60V, V _{GS} =0V |
| | | — | — | 250 | μA | V _{DS} =48V, V _{GS} =0V, T _J =150°C |
| I _{GSS} | Gate-to-Source Forward Leakage | — | — | 100 | nA | V _{GS} =20V |
| | Gate-to-Source Reverse Leakage | — | — | -100 | nA | V _{GS} =-20V |
| Q _g | Total Gate Charge | — | — | 11 | nC | I _D =10A |
| Q _{gs} | Gate-to-Source Charge | — | — | 3.1 | nC | V _{DS} =48V |
| Q _{gd} | Gate-to-Drain ("Miller") Charge | — | — | 5.8 | nC | V _{GS} =10V See Fig. 6 and 13 ④ |
| t _{d(on)} | Turn-On Delay Time | — | 10 | — | ns | V _{DD} =30V I _D =10A R _G =24Ω R _D =2.7Ω See Figure 10 ④ |
| t _r | Rise Time | — | 50 | — | | |
| t _{d(off)} | Turn-Off Delay Time | — | 13 | — | | |
| t _f | Fall Time | — | 19 | — | | |
| L _D | Internal Drain Inductance | — | 4.0 | — | nH | Between lead, 6 mm (0.25in.) from package and center of die contact |
| L _S | Internal Source Inductance | — | 6.0 | — | | |
| C _{iss} | Input Capacitance | — | 310 | — | pF | V _{GS} =0V V _{DS} =25V f=1.0MHz See Figure 5 |
| C _{oss} | Output Capacitance | — | 160 | — | | |
| C _{rss} | Reverse Transfer Capacitance | — | 37 | — | | |



Source-Drain Ratings and Characteristics

| | Parameter | Min. | Typ. | Max. | Units | Test Conditions |
|-----------------|--|--|------|------|-------|---|
| I _S | Continuous Source Current (Body Diode) | — | — | 1.7 | A | MOSFET symbol showing the integral reverse p-n junction diode. |
| I _{SM} | Pulsed Source Current (Body Diode) ① | — | — | 14 | | |
| V _{SD} | Diode Forward Voltage | — | — | 1.6 | V | T _J =25°C, I _S =1.7A, V _{GS} =0V ② |
| t _{rr} | Reverse Recovery Time | — | 70 | 140 | ns | T _J =25°C, I _F =10A |
| Q _{rr} | Reverse Recovery Charge | — | 0.20 | 0.40 | μC | di/dt=100A/μs ③ |
| t _{on} | Forward Turn-On Time | Intrinsic turn-on time is negligible (turn-on is dominated by L _S +L _D) | | | | |

Notes:

- ① Repetitive rating; pulse width limited by max. junction temperature (See Figure 11)
- ② V_{DD}=25V, starting T_J=25°C, L=52mH, R_G=25Ω, I_{AS}=1.7A (See Figure 12)
- ③ I_{SD}≤10A, di/dt≤90A/μs, V_{DD}≤V_{(BR)DSS}, T_J≤175°C
- ④ Pulse width ≤ 300 μs; duty cycle ≤2%.

勝特力材料 886-3-5753170
 勝特力电子(上海) 86-21-54151736
 勝特力电子(深圳) 86-755-83298787
[Http://www.100y.com.tw](http://www.100y.com.tw)



IRFD014

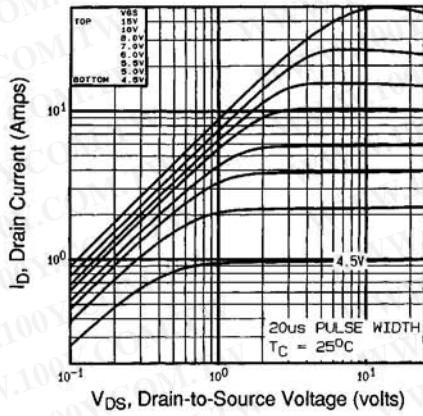


Fig 1. Typical Output Characteristics, $T_C=25^\circ\text{C}$

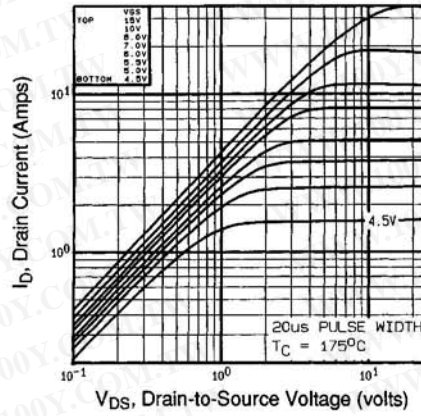


Fig 2. Typical Output Characteristics, $T_C=175^\circ\text{C}$

DATA SHEETS

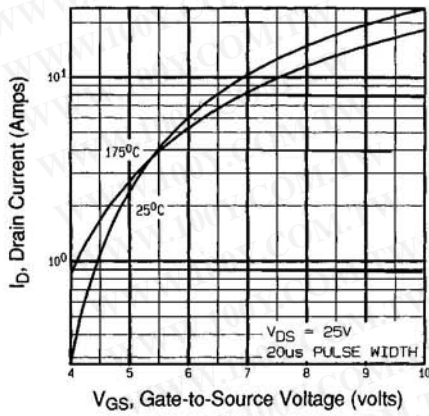


Fig 3. Typical Transfer Characteristics

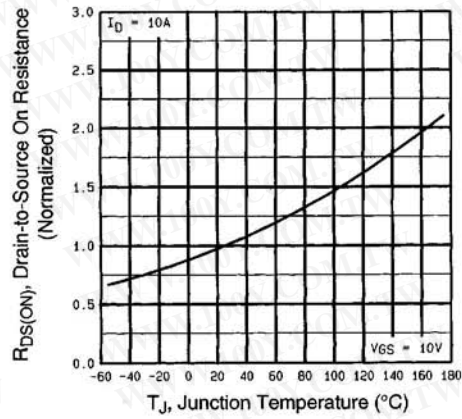


Fig 4. Normalized On-Resistance Vs. Temperature

勝特力材料 886-3-5753170
 勝特力电子(上海) 86-21-54151736
 勝特力电子(深圳) 86-755-83298787
[Http://www.100y.com.tw](http://www.100y.com.tw)

IRFD014

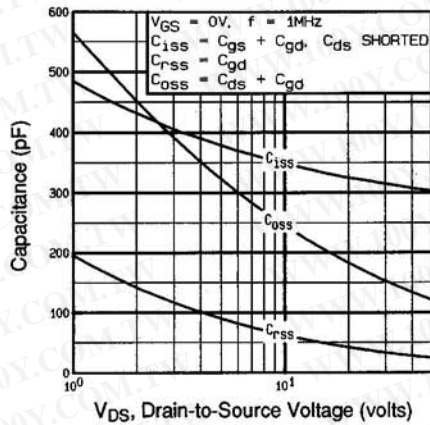


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

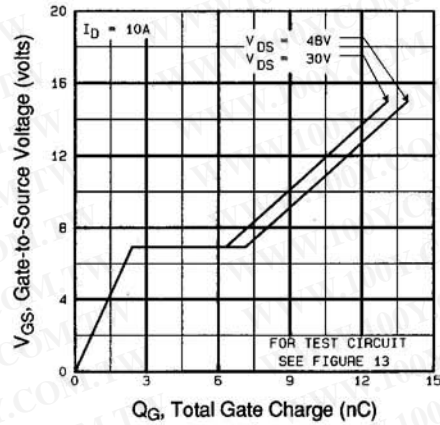


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

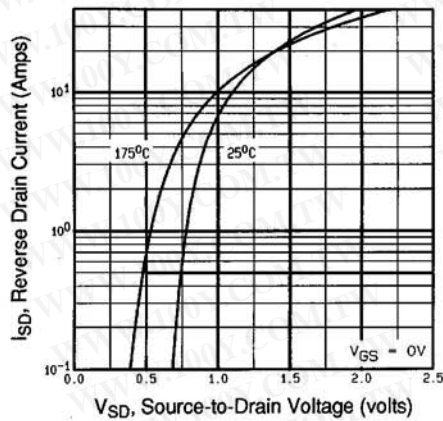


Fig 7. Typical Source-Drain Diode Forward Voltage

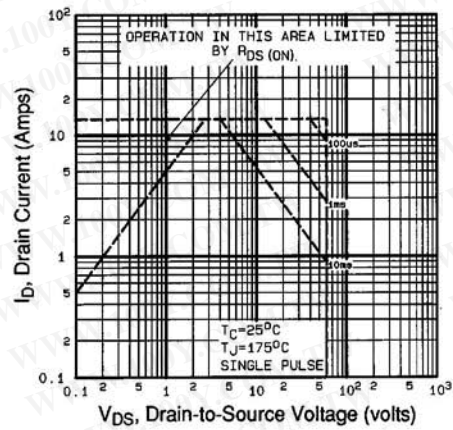


Fig 8. Maximum Safe Operating Area



IRFD014

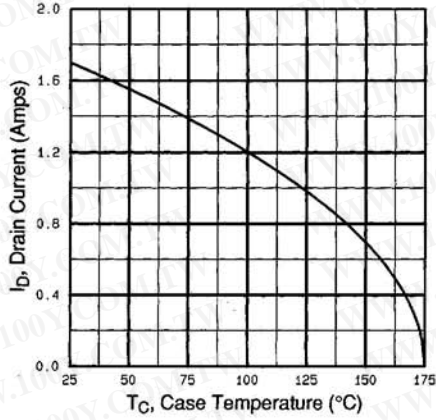


Fig 9. Maximum Drain Current Vs. Case Temperature

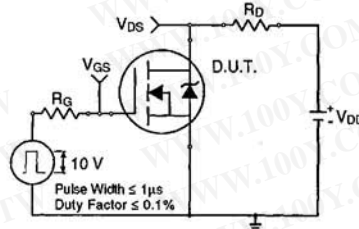


Fig 10a. Switching Time Test Circuit

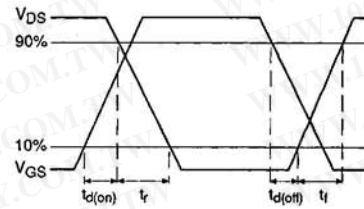


Fig 10b. Switching Time Waveforms

DATA SHEETS

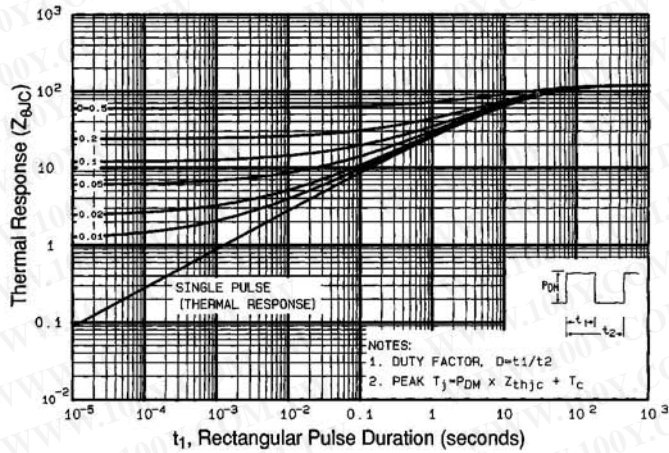


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Case

勝特力材料 886-3-5753170
 勝特力电子(上海) 86-21-54151736
 勝特力电子(深圳) 86-755-83298787
[Http://www.100y.com.tw](http://www.100y.com.tw)

IRFD014

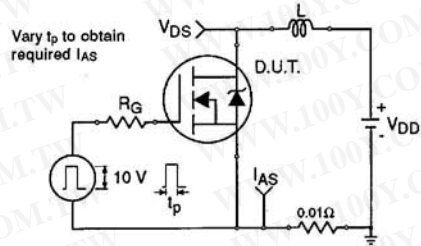


Fig 12a. Unclamped Inductive Test Circuit

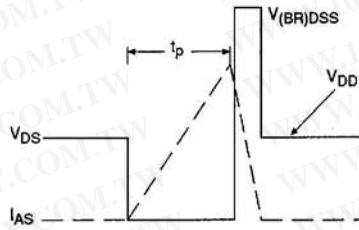


Fig 12b. Unclamped Inductive Waveforms

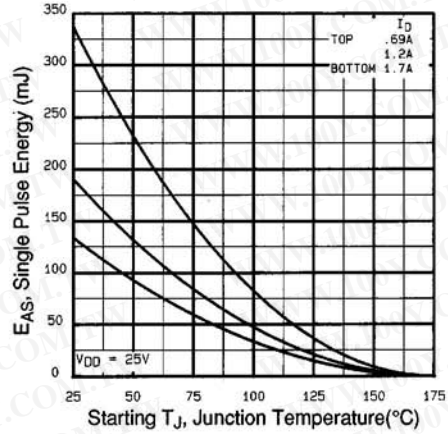


Fig 12c. Maximum Avalanche Energy Vs. Drain Current

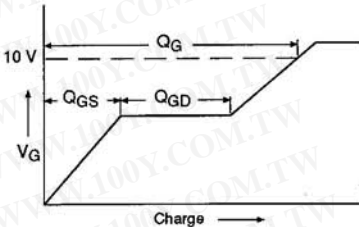


Fig 13a. Basic Gate Charge Waveform

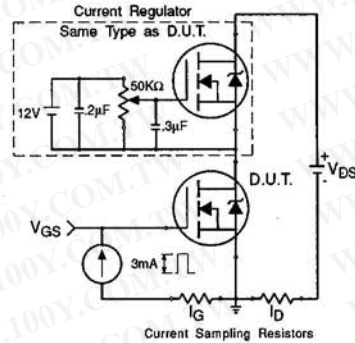


Fig 13b. Gate Charge Test Circuit

Appendix A: Figure 14, Peak Diode Recovery dv/dt Test Circuit – See page 1505

Appendix B: Package Outline Mechanical Drawing – See page 1507

Appendix C: Part Marking Information – See page 1515

International
IR Rectifier