



ROBERT STĘPIEŃ
HURTOWNIA CZĘŚCI ELEKTRONICZNYCH
podzespoly-elektroniczne.pl

IRFZ24N;IR;TO220;tranzystor; N-MOSFET;17A;55V;45W;0.07R;Pbf



Dane techniczne:

Nazwa: IRFZ24N

Typ tranzystora: unipolarny

Kierunek przewodnictwa: N-MOSFET

Prąd kolektora: 17A

Napięcie kolektor-emiter: 55V

Moc: 45W

Montaż: przewlekany(THT)

Obudowa: TO220

Producent: IR

www.podzespoly-elektroniczne.pl

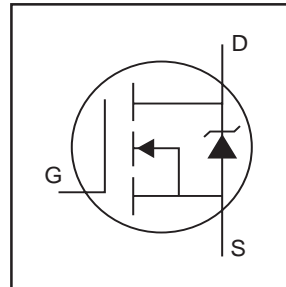
Robert Stępień Hurtownia Części Elektronicznych; Adres: ul. Wolumen 2, pawilon 71; 01-912 Warszawa; tel.: 601 296 402 / sklep@podzespoly-elektroniczne.pl

International
IR Rectifier
 HEXFET® Power MOSFET

PD - 91354A

IRFZ24N

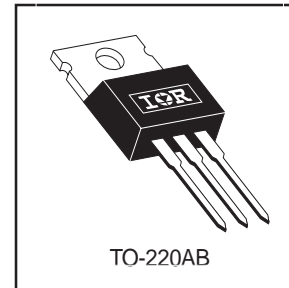
- Advanced Process Technology
- Dynamic dv/dt Rating
- 175°C Operating Temperature
- Fast Switching
- Fully Avalanche Rated



| |
|---------------------------|
| $V_{DSS} = 55V$ |
| $R_{DS(on)} = 0.07\Omega$ |
| $I_D = 17A$ |

Description

Fifth Generation HEXFET® power MOSFETs from International Rectifier utilize advanced processing techniques to achieve the lowest possible on-resistance per silicon area. This benefit, combined with the fast switching speed and ruggedized device design that HEXFET power MOSFETs are well known for, provides the designer with an extremely efficient device for use in a wide variety of applications.



The TO-220 package is universally preferred for all commercial-industrial applications at power dissipation levels to approximately 50 watts. The low thermal resistance and low package cost of the TO-220 contribute to its wide acceptance throughout the industry.

Absolute Maximum Ratings

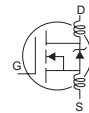
| | Parameter | Max. | Units |
|---------------------------|--|-----------------------|-------|
| $I_D @ T_C = 25^\circ C$ | Continuous Drain Current, $V_{GS} @ 10V$ | 17 | A |
| $I_D @ T_C = 100^\circ C$ | Continuous Drain Current, $V_{GS} @ 10V$ | 12 | |
| I_{DM} | Pulsed Drain Current ① | 68 | |
| $P_D @ T_C = 25^\circ C$ | Power Dissipation | 45 | W |
| | Linear Derating Factor | 0.30 | W/°C |
| V_{GS} | Gate-to-Source Voltage | ±20 | V |
| E_{AS} | Single Pulse Avalanche Energy ② | 71 | mJ |
| I_{AR} | Avalanche Current ① | 10 | A |
| E_{AR} | Repetitive Avalanche Energy ① | 4.5 | mJ |
| dv/dt | Peak Diode Recovery dv/dt ③ | 5.0 | 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) | |
| | Mounting torque, 6-32 or M3 screw. | 10 lbf•in (1.1N•m) | |

Thermal Resistance

| | Parameter | Min. | Typ. | Max. | Units |
|-----------------|-------------------------------------|------|------|------|-------|
| $R_{\theta JC}$ | Junction-to-Case | — | — | 3.3 | °C/W |
| $R_{\theta CS}$ | Case-to-Sink, Flat, Greased Surface | — | 0.50 | — | |
| $R_{\theta JA}$ | Junction-to-Ambient | — | — | 62 | |

Electrical Characteristics @ $T_J = 25^\circ\text{C}$ (unless otherwise specified)

| | Parameter | Min. | Typ. | Max. | Units | Conditions |
|---------------------------------|--------------------------------------|------|-------|------|---------------------|--|
| $V_{(BR)DSS}$ | Drain-to-Source Breakdown Voltage | 55 | — | — | V | $V_{GS} = 0V, I_D = 250\mu A$ |
| $\Delta V_{(BR)DSS}/\Delta T_J$ | Breakdown Voltage Temp. Coefficient | — | 0.052 | — | V/ $^\circ\text{C}$ | Reference to $25^\circ\text{C}, I_D = 1\text{mA}$ |
| $R_{DS(on)}$ | Static Drain-to-Source On-Resistance | — | — | 0.07 | Ω | $V_{GS} = 10V, I_D = 10A$ ④ |
| $V_{GS(th)}$ | Gate Threshold Voltage | 2.0 | — | 4.0 | V | $V_{DS} = V_{GS}, I_D = 250\mu A$ |
| g_{fs} | Forward Transconductance | 4.5 | — | — | S | $V_{DS} = 25V, I_D = 10A$ |
| I_{DSS} | Drain-to-Source Leakage Current | — | — | 25 | μA | $V_{DS} = 55V, V_{GS} = 0V$ |
| | | — | — | 250 | | $V_{DS} = 44V, V_{GS} = 0V, T_J = 150^\circ\text{C}$ |
| I_{GSS} | Gate-to-Source Forward Leakage | — | — | 100 | nA | $V_{GS} = 20V$ |
| | Gate-to-Source Reverse Leakage | — | — | -100 | | $V_{GS} = -20V$ |
| Q_g | Total Gate Charge | — | — | 20 | nC | $I_D = 10A$ |
| Q_{gs} | Gate-to-Source Charge | — | — | 5.3 | | $V_{DS} = 44V$ |
| Q_{gd} | Gate-to-Drain ("Miller") Charge | — | — | 7.6 | | $V_{GS} = 10V$, See Fig. 6 and 13 ④ |
| $t_{d(on)}$ | Turn-On Delay Time | — | 4.9 | — | ns | $V_{DD} = 28V$ |
| t_r | Rise Time | — | 34 | — | | $I_D = 10A$ |
| $t_{d(off)}$ | Turn-Off Delay Time | — | 19 | — | | $R_G = 24\Omega$ |
| t_f | Fall Time | — | 27 | — | | $R_D = 2.6\Omega$, See Fig. 10 ④ |
| L_D | Internal Drain Inductance | — | 4.5 | — | nH | Between lead, 6mm (0.25in.) from package and center of die contact |
| L_S | Internal Source Inductance | — | 7.5 | — | | |
| C_{iss} | Input Capacitance | — | 370 | — | pF | $V_{GS} = 0V$ |
| C_{oss} | Output Capacitance | — | 140 | — | | $V_{DS} = 25V$ |
| C_{rss} | Reverse Transfer Capacitance | — | 65 | — | | $f = 1.0\text{MHz}$, See Fig. 5 |



Source-Drain Ratings and Characteristics

| | Parameter | Min. | Typ. | Max. | Units | Conditions |
|----------|--|------|------|------|-------|--|
| I_S | Continuous Source Current (Body Diode) | — | — | 17 | A | MOSFET symbol showing the integral reverse p-n junction diode. |
| I_{SM} | Pulsed Source Current (Body Diode) ① | — | — | 68 | | |
| V_{SD} | Diode Forward Voltage | — | — | 1.3 | V | $T_J = 25^\circ\text{C}, I_S = 10A, V_{GS} = 0V$ ② |
| t_{rr} | Reverse Recovery Time | — | 56 | 83 | ns | $T_J = 25^\circ\text{C}, I_F = 10A$ |
| Q_{rr} | Reverse Recovery Charge | — | 120 | 180 | nC | $di/dt = 100A/\mu s$ ④ |

Notes:

- ① Repetitive rating; pulse width limited by max. junction temperature. (See fig. 11)
- ② $V_{DD} = 25V$, starting $T_J = 25^\circ\text{C}$, $L = 1.0\text{mH}$, $R_G = 25\Omega$, $I_{AS} = 10A$. (See Figure 12)
- ③ $I_{SD} \leq 10A$, $di/dt \leq 280A/\mu s$, $V_{DD} \leq V_{(BR)DSS}$, $T_J \leq 175^\circ\text{C}$
- ④ Pulse width $\leq 300\mu s$; duty cycle $\leq 2\%$.

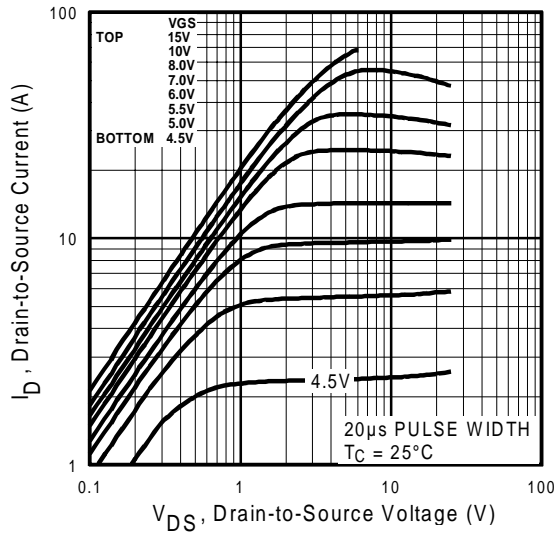


Fig 1. Typical Output Characteristics,
 $T_J = 25^\circ\text{C}$

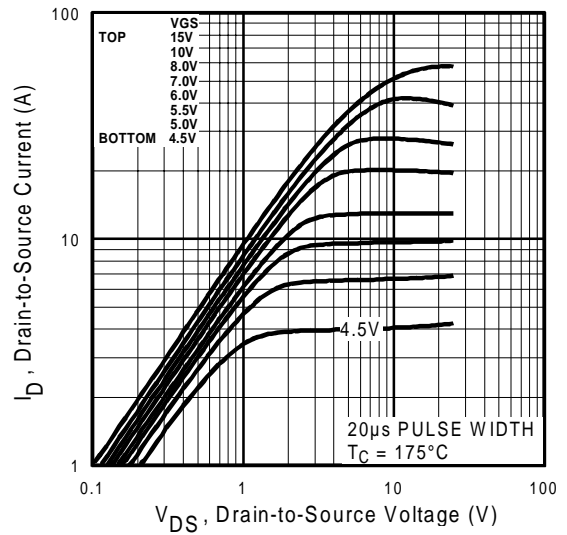


Fig 2. Typical Output Characteristics,
 $T_J = 175^\circ\text{C}$

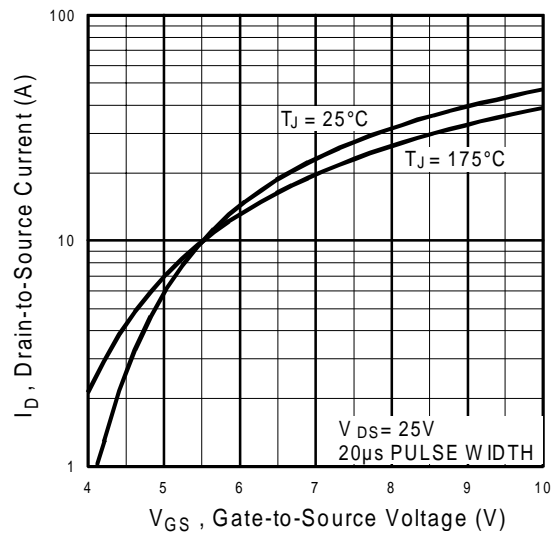


Fig 3. Typical Transfer Characteristics

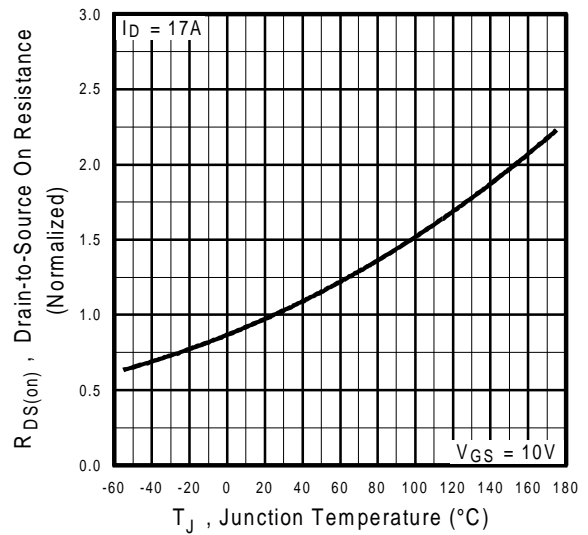


Fig 4. Normalized On-Resistance
Vs. Temperature

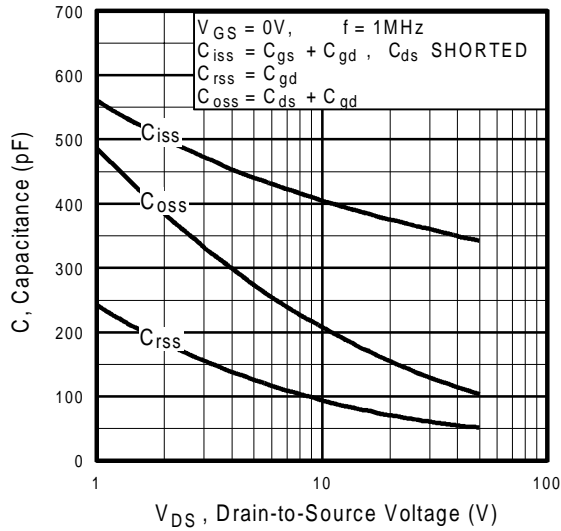


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

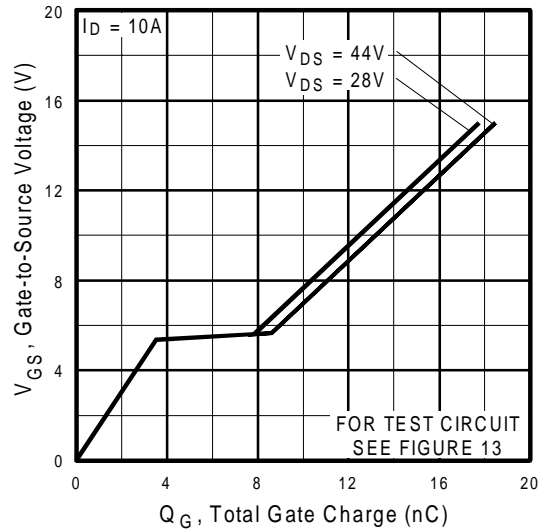


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

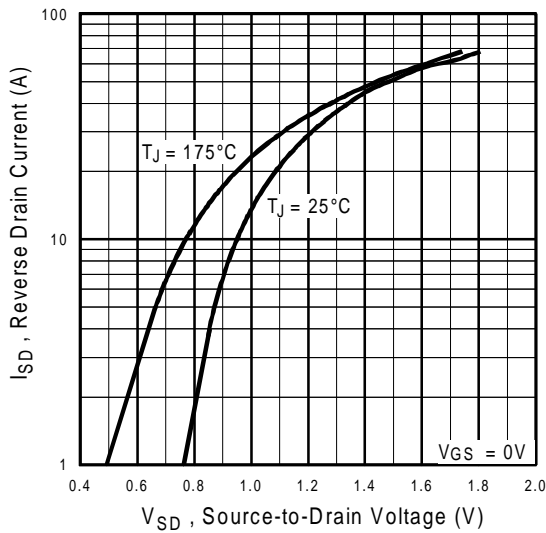


Fig 7. Typical Source-Drain Diode Forward Voltage

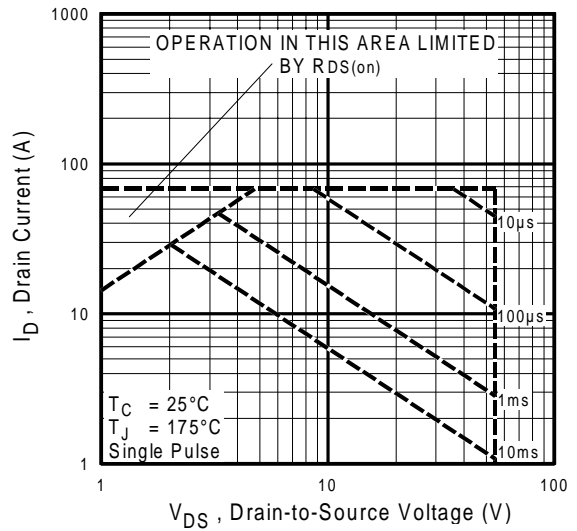


Fig 8. Maximum Safe Operating Area

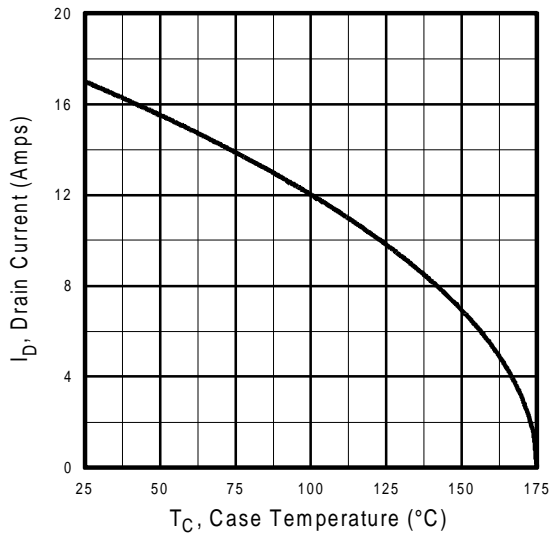


Fig 9. Maximum Drain Current Vs. Case Temperature

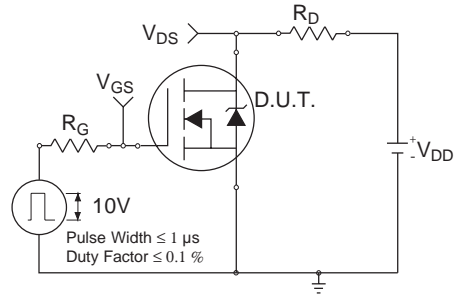


Fig 10a. Switching Time Test Circuit

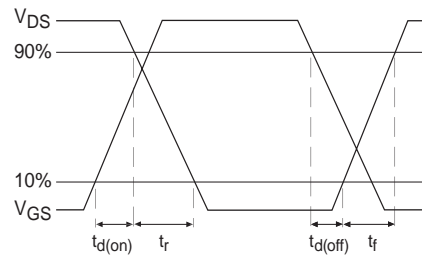


Fig 10b. Switching Time Waveforms

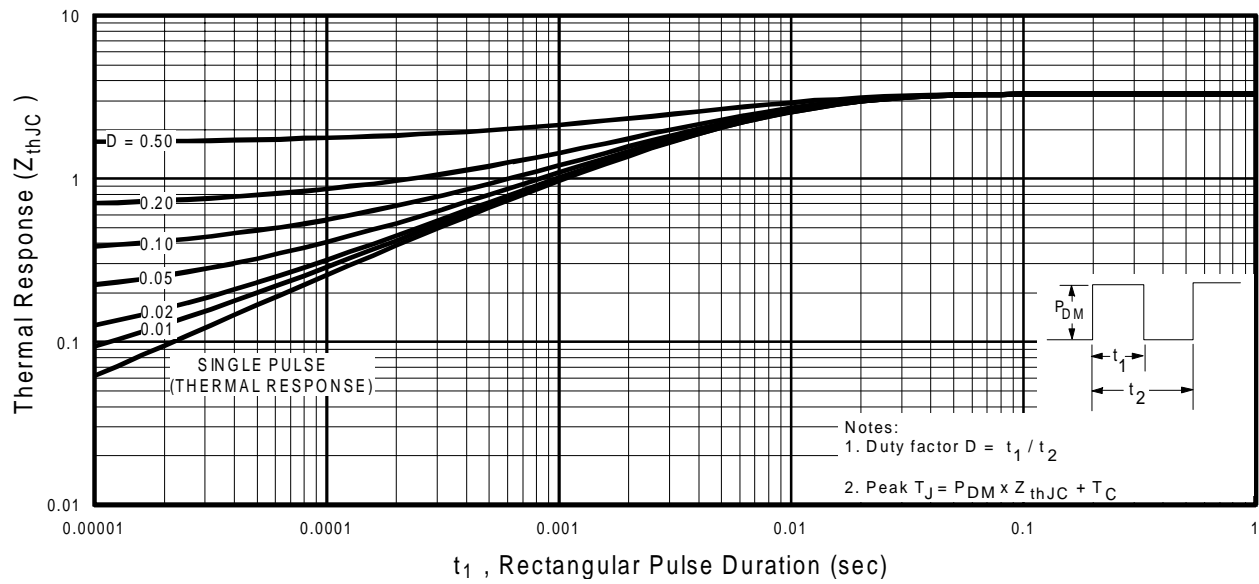


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Case

IRFZ24N

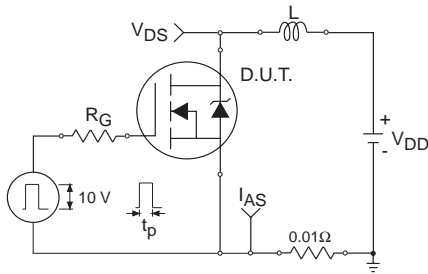


Fig 12a. Unclamped Inductive Test Circuit

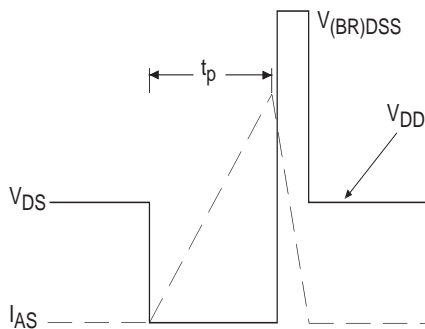


Fig 12b. Unclamped Inductive Waveforms

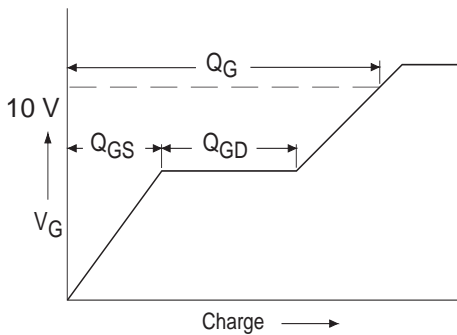


Fig 13a. Basic Gate Charge Waveform

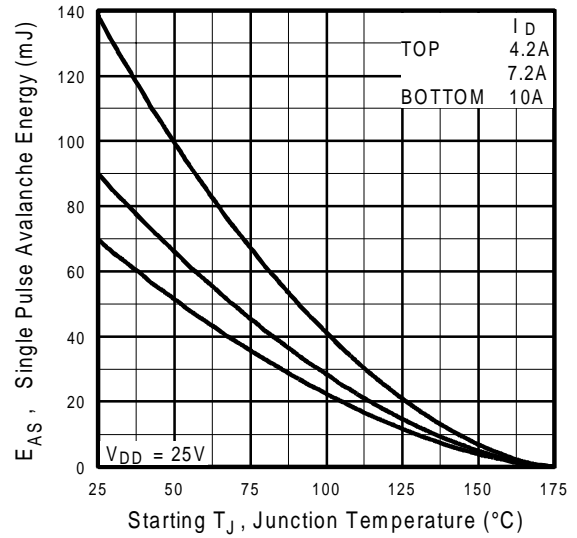


Fig 12c. Maximum Avalanche Energy Vs. Drain Current

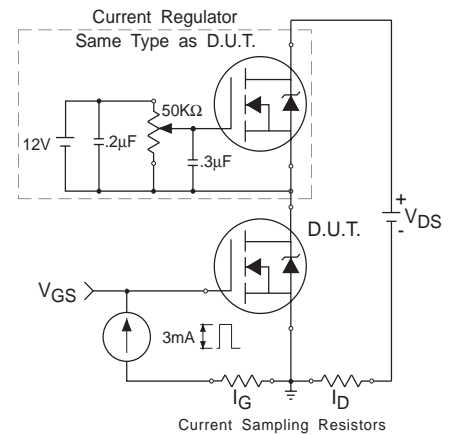
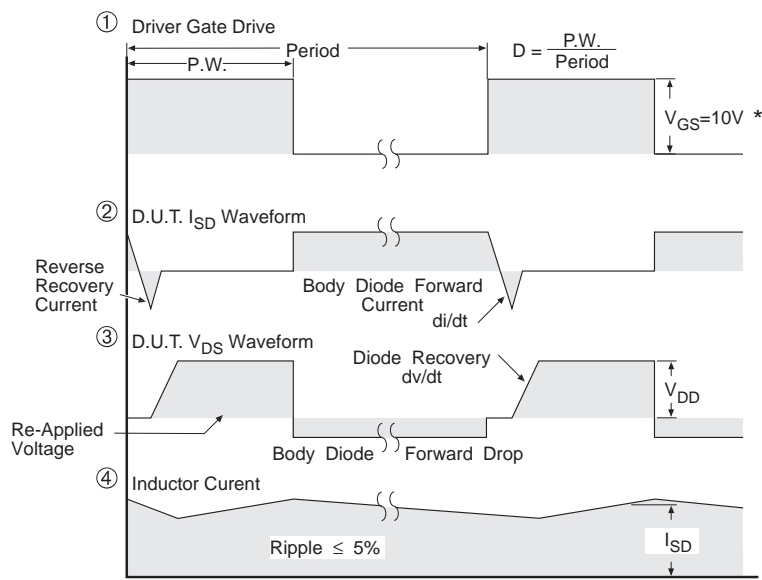
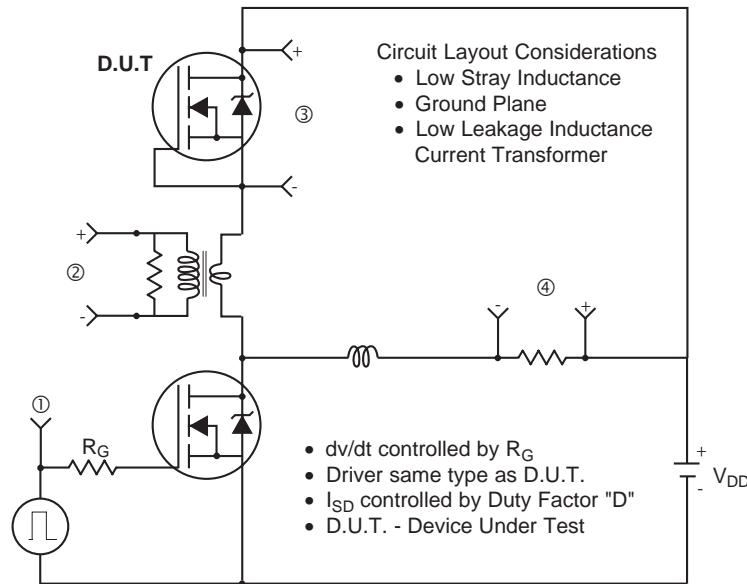


Fig 13b. Gate Charge Test Circuit

Peak Diode Recovery dv/dt Test Circuit



* $V_{GS} = 5V$ for Logic Level Devices

Fig 14. For N-Channel HEXFET[®] power MOSFETs

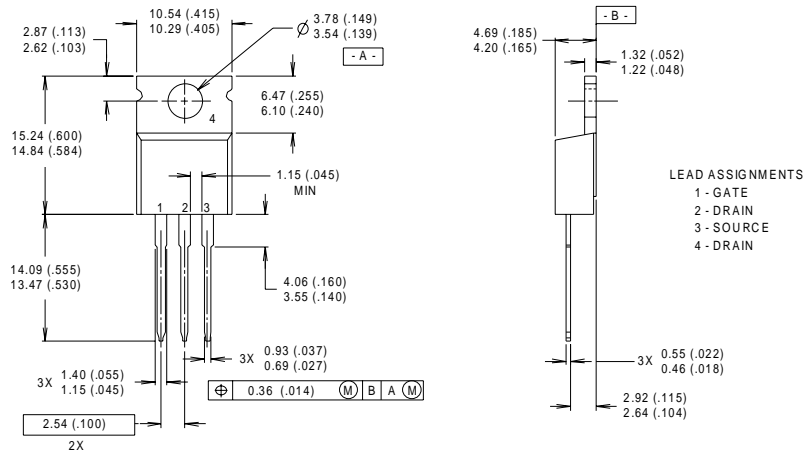
IRFZ24N

International
IOR Rectifier

Package Outline

TO-220AB

Dimensions are shown in millimeters (inches)

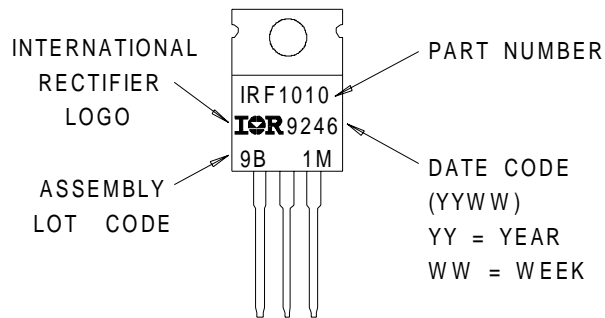


- NOTES:
- 1 DIMENSIONING & TOLERANCING PER ANSII Y14.5M, 1982.
 - 2 CONTROLLING DIMENSION : INCH
 - 3 OUTLINE CONFORMS TO JEDEC OUTLINE TO-220-AB.
 - 4 HEATSINK & LEAD MEASUREMENTS DO NOT INCLUDE BURRS.

Part Marking Information

TO-220AB

EXAMPLE : THIS IS AN IRF1010
WITH ASSEMBLY
LOT CODE 9B1M



International
IOR Rectifier

WORLD HEADQUARTERS: 233 Kansas St., El Segundo, California 90245, Tel: (310) 322 3331

IR GREAT BRITAIN: Hurst Green, Oxted, Surrey RH8 9BB, UK Tel: ++ 44 1883 732020

IR CANADA: 15 Lincoln Court, Brampton, Ontario L6T3Z2, Tel: (905) 453 2200

IR GERMANY: Saalburgstrasse 157, 61350 Bad Homburg Tel: ++ 49 6172 96590

IR ITALY: Via Liguria 49, 10071 Borgaro, Torino Tel: ++ 39 11 451 0111

IR FAR EAST: K&H Bldg., 2F, 30-4 Nishi-Ikebukuro 3-Chome, Toshima-Ku, Tokyo Japan 171 Tel: 81 3 3983 0086

IR SOUTHEAST ASIA: 1 Kim Seng Promenade, Great World City West Tower, 13-11, Singapore 237994 Tel: ++ 65 838 4630

IR TAIWAN: 16 Fl. Suite D. 207, Sec. 2, Tun Haw South Road, Taipei, 10673, Taiwan Tel: 886-2-2377-9936

<http://www.irf.com/> Data and specifications subject to change without notice. 9/99

www.irf.com

This datasheet has been download from:

www.datasheetcatalog.com

Datasheets for electronics components.