## IRFY Series Data Sheet

The IRFY Data Sheet describes 12 devices, 8 N-Channel and 4 P-Channel, all contained in the TO-257AB package. This data sheet is arranged to show common tabular and graphical information between devices.

Absolute maximum ratings and parametric data are presented in tabular format with devices grouped according to generically shared parameters. For each parametric rating, devices are categorized by N and P channel and listed in alpha-numeric order. The conditions specified for a given parametric test are provided in the right hand column of each table.

Graphical information is grouped by devices in alphabetical order. Where the information is device specific, we have assigned a numeric character for the graph type and an alpha character to a given device. (See Table A below). Where graphs are polarity specific as in figures 10, 12, 14 and 15, we have indicated N-Channel or P-Channel. The Thermal Impedance Graph (Fig. 11) is the only exception where a graph is common to both N-Channel and P-Channel devices since the thermal impedance is only dependent on the die size and package.

In Table A below, a legend is provided cross referencing the part number to its assigned alpha code. A given device will retain this alpha code for each device specific graph.

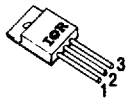
**Table A**

| DEVICE | ALPHA DESIGNATION |
|---|---|
| IRFY044 | a |
| IRFY120 | b |
| IRFY130 | c |
| IRFY140 | d |
| IRFY240 | e |
| IRFY340 | f |
| IRFY430 | g |
| IRFY440 | h |
| IRFY9120 | i |
| IRFY9130 | j |
| IRFY9140 | k |
| IRFY9240 | l |

# HEXFET, CECC Qualified — Europe

TO257/HEXFET/N-Channel

| Basic Type | $V_{DS}$ (V) | $R_{DS(on)}$ (Ohms) | CECC Specification | Issue No. | Issue Date | Level of Quality Assessment and CECC 50 000 Screen Level Options | Case Outline |
|---|---|---|---|---|---|---|---|
| IRFY044(M) | 60 | 0.03 | 50 012-062 | | | E-,EA,EB,EC,ED | **TO-257AA** Y-PAK |
| IRFY120(M) | 100 | 0.31 | 50 012-060 | | | E-,EA,EB,EC,ED | |
| IRFY130(M) | 100 | 0.19 | 50 012-061 | | | E-,EA,EB,EC,ED | |
| IRFY140(M) | 100 | 0.092 | 50 012-062 | | | E-,EA,EB,EC,ED | |
| IRFY240(M) | 200 | 0.19 | 50 012-062 | 1 | 10/91 | E-,EA,EB,EC,ED | |
| IRFY340(M) | 400 | 0.55 | 50 012-062 | | | E-,EA,EB,EC,ED | |
| IRFY430(M) | 500 | 1.50 | 50 012-061 | | | E-,EA,EB,EC,ED | |
| IRFY440(M) | 500 | 0.85 | 50 012-062 | | | E-,EA,EB,EC,ED | |
| TO257/HEXFET/P-Channel | | | | | | | |
| IRFY9120(M) | -100 | 0.60 | 50 012-063 | | | E-,EA,EB,EC,ED | |
| IRFY9130(M) | -100 | 0.31 | 50 012-064 | 1 | 10/91 | E-,EA,EB,EC,ED | |
| IRFY9140(M) | -100 | 0.21 | 50 012-065 | | | E-,EA,EB,EC,ED | |
| IRFY9240(M) | -200 | 0.50 | 50 012-065 | | | E-,EA,EB,EC,ED | |




| | 1 | 2 | 3 |
|---|---|---|---|
| IRFY | G | D | S |
| IRFY(M) | D | S | G |

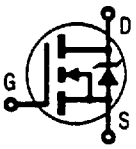
FOR OTHER GOVERNMENT/SPACE QUALIFIED PRODUCTS SEE SECTION E.

# INTERNATIONAL RECTIFIER

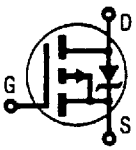
# HEXFET® TRANSISTORS

# IRFY SERIES

## IRFY044 THRU IRFY440
## IRFY9120 THRU IRFY9240




N-CHANNEL




P-CHANNEL

## Description

The HEXFET® technology is the key to International Rectifier's advance line of power MOSFET transistors. The efficient geometry design achieves very low on-state resistance combined with high transconductance.

The HEXFET transistors also feature all of the well established advantages of MOSFETs such as voltage control, very fast switching, ease of paralleling and temperature stability of the electrical parameters.

They are well suited for applications such as switching power supplies and virtually any application where military and/or high reliability is required.

The totally isolated package eliminates the need for additional isolating material between the device and the heatsink, this improves the thermal efficiency and reduces drain capacitance.

## Product Summary N-Channel

| Characteristic | IRFY044 thru IRFY440 | Units |
|---|---|---|
| $BV_{DSS}$ | 60 to 500 | V |
| $R_{DS(on)}$ | 0.035 to 1.6 | Ω |
| $I_D$ | 3.7 to 20 | A |

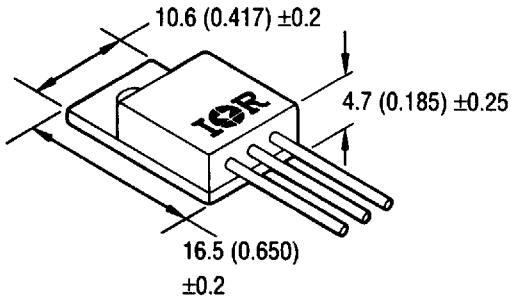
## Product Summary P-Channel

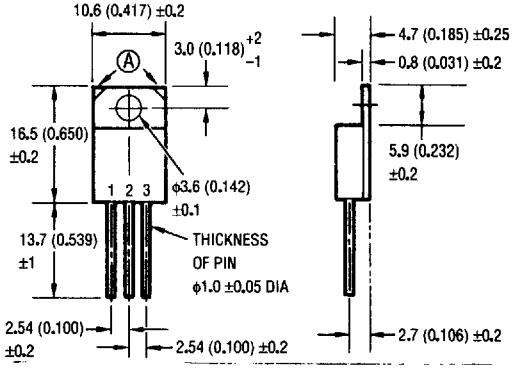
| Characteristic | IRFY9120 thru IRFY9240 | Units |
|---|---|---|
| $BV_{DSS}$ | –100 to –200 | V |
| $R_{DS(on)}$ | 0.21 to 0.50 | Ω |
| $I_D$ | –5.3 to –13 | A |

## FEATURES

- Isolated and Hermetically Sealed
- Alternative to TO-39 and TO-66 Packages
- Simple Drive Requirements
- Ease of Paralleling
- Ceramic eyelet package used on all space level applications or on request

## CASE STYLE AND DIMENSIONS




| TERM | IRFY . . . | IRFY . . . M |
|---|---|---|
| 1 | GATE | DRAIN |
| 2 | DRAIN | SOURCE |
| 3 | SOURCE | GATE |

Ⓐ Corners removed to indicate 'M' option

**Conforms to JEDEC Outline TO-257AB**
Dimensions in Millimeters and (Inches)

## N-CHANNEL — Absolute Maximum Ratings

| | Parameter | IRFY044 | IRFY120 | IRFY130 | IRFY140 | Unit |
|---|---|---|---|---|---|---|
| $I_D$ @ $T_C$ = 25°C | Continuous Drain Current | 20* | 7.3 | 11 | 18 | A |
| $I_D$ @ $T_C$ = 100°C | Continuous Drain Current | 20 | 4.6 | 7.0 | 12 | A |
| $I_{DM}$ | Pulsed Drain Current | 128 | 29 | 44 | 72 | A |
| $V_{GS}$ | Gate-Source Voltage | ±20 | | | | V |
| $P_D$ @ $T_C$ = 25°C | Maximum Power Dissipation | 60 | 30 | 45 | 60 | W |
| | Linear Derating Factor | 0.48 | 0.24 | 0.36 | 0.48 | W/K |
| $T_J$<br>$T_{stg}$ | Operating Junction Storage Temperature Range | −55 to 150 | | | | °C |
| | Weight | 3.4 (typical) | | | | g |

*$I_D$ current limited by pin diameter

## N-CHANNEL — Absolute Maximum Ratings (Continued)

| | Parameter | IRFY240 | IRFY340 | IRFY430 | IRFY440 | Unit |
|---|---|---|---|---|---|---|
| $I_D$ @ $T_C$ = 25°C | Continuous Drain Current | 12 | 6.9 | 3.7 | 5.5 | A |
| $I_D$ @ $T_C$ = 100°C | Continuous Drain Current | 7.8 | 4.4 | 2.4 | 3.5 | A |
| $I_{DM}$ | Pulsed Drain Current | 48 | 27 | 14 | 22 | A |
| $V_{GS}$ | Gate-Source Voltage | ±20 | | | | V |
| $P_D$ @ $T_C$ = 25°C | Maximum Power Dissipation | 60 | 60 | 45 | 60 | W |
| | Linear Derating Factor | 0.48 | 0.48 | 0.36 | 0.48 | W/K |
| $T_J$<br>$T_{stg}$ | Operating Junction Storage Temperature Range | −55 to 150 | | | | °C |
| | Weight | 3.4 (typical) | | | | g |

## P-CHANNEL — Absolute Maximum Ratings

| | Parameter | IRFY9120 | IRFY9130 | IRFY9140 | IRFY9240 | Unit |
|---|---|---|---|---|---|---|
| $I_D$ @ $T_C$ = 25°C | Continuous Drain Current | −5.3 | −9.3 | −13 | −7.7 | A |
| $I_D$ @ $T_C$ = 100°C | Continuous Drain Current | −3.4 | −5.8 | −8.2 | −4.9 | A |
| $I_{DM}$ | Pulsed Drain Current | −21 | −37 | −52 | −30 | V |
| $V_{GS}$ | Gate-Source Voltage | ±20 | | | | V |
| $P_D$ @ $T_C$ = 25°C | Maximum Power Dissipation | 30 | 45 | 60 | 60 | W |
| | Linear Derating Factor | 0.24 | 0.36 | 0.48 | 0.48 | W/K |
| $T_J$<br>$T_{stg}$ | Operating Junction Storage Temperature Range | −55 to 150 | | | | °C |
| | Weight | 3.4 (typical) | | | | g |

## Electrical Characteristics @ $T_C$ = 25°C (Unless otherwise specified)

| | Parameter | Type | Min. | Typ. | Max. | Units | Test Conditions |
|---|---|---|---|---|---|---|---|
| $BV_{DSS}$ | Drain-Source Breakdown Voltage | IRFY044 | 60 | — | — | V | $I_D$ = 1.0mA, $V_{GS}$ = 0V |
| | | IRFY120 | 100 | — | — | | |
| | | IRFY130 | 100 | — | — | | |
| | | IRFY140 | 100 | — | — | | |
| | | IRFY240 | 200 | — | — | | |
| | | IRFY340 | 400 | — | — | | |
| | | IRFY430 | 500 | — | — | | |
| | | IRFY440 | 500 | — | — | | |
| | | IRFY9120 | -100 | — | — | | $I_D$ = -1.0mA, $V_{GS}$ = 0V |
| | | IRFY9130 | -100 | — | — | | |
| | | IRFY9140 | -100 | — | — | | |
| | | IRFY9240 | -200 | — | — | | |
| $\Delta BV_{DSS}/\Delta T_J$ | Temperature Coefficient of Breakdown Voltage | IRFY044 | — | 0.68 | — | V/°C | Reference to 25°C, $I_D$ = 1.0mA |
| | | IRFY120 | — | 0.1 | — | | |
| | | IRFY130 | — | 0.1 | — | | |
| | | IRFY140 | — | 0.1 | — | | |
| | | IRFY240 | — | 0.29 | — | | |
| | | IRFY340 | — | 0.46 | — | | |
| | | IRFY430 | — | 0.78 | — | | |
| | | IRFY440 | — | 0.78 | — | | |
| | | IRFY9120 | — | -0.1 | — | | Reference to 25°C, $I_D$ = -1.0mA |
| | | IRFY9130 | — | -0.1 | — | | |
| | | IRFY9140 | — | -0.087 | — | | |
| | | IRFY9240 | — | -0.20 | — | | |
| $R_{DS(on)}$ | Static Drain-Source On-State Resistance | IRFY044 | — | — | 0.035 | Ω | $I_D$ = 20A, $V_{GS}$ = 10V |
| | | IRFY120 | — | — | 0.31 | | $I_D$ = 4.6A, $V_{GS}$ = 10V |
| | | | — | — | 0.36 | | $I_D$ = 7.3A, $V_{GS}$ = 10V |
| | | IRFY130 | — | — | 0.19 | | $I_D$ = 7.0A, $V_{GS}$ = 10V |
| | | | — | — | 0.22 | | $I_D$ = 11A, $V_{GS}$ = 10V |
| | | IRFY140 | — | — | 0.092 | | $I_D$ = 12A, $V_{GS}$ = 10V |
| | | | — | — | 0.11 | | $I_D$ = 18A, $V_{GS}$ = 10V |
| | | IRFY240 | — | — | 0.19 | | $I_D$ = 7.8A, $V_{GS}$ = 10V |
| | | | — | — | 0.22 | | $I_D$ = 12A, $V_{GS}$ = 10V |
| | | IRFY340 | — | — | 0.55 | | $I_D$ = 4.4A, $V_{GS}$ = 10V |
| | | | — | — | 0.63 | | $I_D$ = 6.9A, $V_{GS}$ = 10V |
| | | IRFY430 | — | — | 1.6 | | $I_D$ =2.4A, $V_{GS}$ = 10V |
| | | | — | — | 1.84 | | $I_D$ = 3.7A, $V_{GS}$ = 10V |
| | | IRFY440 | — | — | 0.85 | | $I_D$ = 3.5A, $V_{GS}$ = 10V |
| | | | — | — | 0.98 | | $I_D$ = 5.5A, $V_{GS}$ = 10V |
| | | IRFY9120 | — | — | 0.60 | | $I_D$ = -3.4A, $V_{GS}$ = -10V |
| | | | — | — | 0.69 | | $I_D$ = -5.3A, $V_{GS}$ = -10V |
| | | IRFY9130 | — | — | 0.31 | | $I_D$ = -5.8A, $V_{GS}$ = -10V |
| | | | — | — | 0.36 | | $I_D$ = -9.3A, $V_{GS}$ = -10V |
| | | IRFY9140 | — | — | 0.21 | | $I_D$ = -8.2A, $V_{GS}$ = -10V |
| | | | — | — | 0.24 | | $I_D$ = -13A, $V_{GS}$ = -10V |
| | | IRFY9240 | — | — | 0.50 | | $I_D$ = -4.9A, $V_{GS}$ = -10V |
| | | | — | — | 0.58 | | $I_D$ = -7.7A, $V_{GS}$ = -10V |
| $V_{GS(th)}$ | Gate Threshold Voltage | N-Channel | 2.0 | — | 4.0 | V | $V_{DS}$ = $V_{GS}$, $I_D$ = 250μA |
| | | P-Channel | -2.0 | — | -4.0 | | $V_{DS}$ = $V_{GS}$, $I_D$ = -250μA |

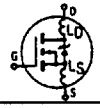
## Electrical Characteristics (Continued)

| | Parameter | Type | Min. | Typ. | Max. | Units | Test Conditions |
|---|---|---|---|---|---|---|---|
| $g_{fs}$ | Forward Transconductance | IRFY044 | 17 | — | — | S(℧) | $I_D$ = 20A, $V_{DS} \geq 15V$ |
| | | IRFY120 | 1.5 | — | — | | $I_D$ = 4.6A |
| | | IRFY130 | 3.0 | — | — | | $I_D$ = 7.0A |
| | | IRFY140 | 9.1 | — | — | | $I_D$ = 12A |
| | | IRFY240 | 6.1 | — | — | | $I_D$ = 7.8A |
| | | IRFY340 | 4.9 | — | — | | $I_D$ = 4.4A |
| | | IRFY430 | 1.5 | — | — | | $I_D$ = 2.4A |
| | | IRFY440 | 4.7 | — | — | | $I_D$ = 3.5A |
| | | IRFY9120 | 1.25 | — | — | | $I_D$ = −3.4A, $V_{DS} \geq -15V$ |
| | | IRFY9130 | 2.5 | — | — | | $I_D$ = −5.8A |
| | | IRFY9140 | 6.2 | — | — | | $I_D$ = −8.2A |
| | | IRFY9240 | 4.0 | — | — | | $I_D$ = −4.9A |
| $I_{DSS}$ | Zero Gate Voltage Drain Current | N-Channel | — | — | 25 | μA | $V_{DS}$ = 0.8 x Max. Rating, $V_{GS}$ = 0V |
| | | | — | — | 250 | | $V_{DS}$ = 0.8 x Max. Rating, $V_{GS}$ = 0V, $T_J$ = 25°C |
| | | P-Channel | — | — | −25 | | $V_{DS}$ = 0.8 x Max. Rating, $V_{GS}$ = 0V |
| | | | — | — | −250 | | $V_{DS}$ = 0.8 x Max. Rating, $V_{GS}$ = 0V, $T_J$ = 125°C |
| $I_{GSS}$ | Gate-Source Leakage Forward | N-Channel | — | — | 100 | nA | $V_{GS}$ = 20V |
| | | P-Channel | — | — | −100 | | $V_{GS}$ = −20V |
| $I_{GSS}$ | Gate-Source Leakage Reverse | N-Channel | — | — | −100 | | $V_{GS}$ = −20V |
| | | P-Channel | — | — | 100 | | $V_{GS}$ = 20V |
| $Q_g$ | Total Gate Charge (Gate-Source plus Gate-Drain) | IRFY044 | 39 | — | 88 | nC | $I_D$ = 20A, $V_{GS}$ = 10V, $V_{DS}$ = 0.5 x $V_{DS}$ max. |
| | | IRFY120 | 7.7 | — | 17 | | $I_D$ = 7.3A |
| | | IRFY130 | 12.8 | — | 28.5 | | $I_D$ = 11A |
| | | IRFY140 | 30 | — | 59 | | $I_D$ = 18A |
| | | IRFY240 | 32 | — | 60 | | $I_D$ = 12A |
| | | IRFY340 | 32 | — | 65 | | $I_D$ = 6.9A |
| | | IRFY430 | 19.8 | — | 29.5 | | $I_D$ = 3.7A |
| | | IRFY440 | 27.3 | — | 68.5 | | $I_D$ = 5.5A |
| | | IRFY9120 | 4.3 | — | 16.3 | | $I_D$ = −5.3A, $V_{GS}$ = −10V, $V_{DS}$ = 0.5 x $V_{DS}$ max. |
| | | IRFY9130 | 14.7 | — | 30 | | $I_D$ = −9.3A |
| | | IRFY9140 | 31 | — | 60 | | $I_D$ = −13A |
| | | IRFY9240 | 28 | — | 60 | | $I_D$ = −7.7A |
| $Q_{gs}$ | Gate Source Charge | IRFY044 | 6.7 | — | 15 | nC | $I_D$ = 20A, $V_{GS}$ = 10V, $V_{DS}$ = 0.5 x $V_{DS}$ max. |
| | | IRFY120 | 0.7 | — | 4.0 | | $I_D$ = 7.3A |
| | | IRFY130 | 1.0 | — | 6.3 | | $I_D$ = 11A |
| | | IRFY140 | 2.4 | — | 12 | | $I_D$ = 18A |
| | | IRFY240 | 2.2 | — | 10.6 | | $I_D$ = 12A |
| | | IRFY340 | 2.2 | — | 10 | | $I_D$ = 6.9A |
| | | IRFY430 | 2.2 | — | 4.6 | | $I_D$ = 3.7A |
| | | IRFY440 | 2.0 | — | 12.5 | | $I_D$ = 5.5A |
| | | IRFY9120 | 1.3 | — | 4.7 | | $I_D$ = −5.3A, $V_{GS}$ = −10V, $V_{DS}$ = 0.5 x $V_{DS}$ max. |
| | | IRFY9130 | 1.0 | — | 7.1 | | $I_D$ = −9.3A |
| | | IRFY9140 | 3.7 | — | 13 | | $I_D$ = −13A |
| | | IRFY9240 | 3.0 | — | 15 | | $I_D$ = −7.7A |

## Electrical Characteristics (Continued)

| | Parameter | Type | Min. | Typ. | Max. | Units | Test Conditions |
|---|---|---|---|---|---|---|---|
| $Q_{gd}$ | Gate Drain ("Miller") Charge | IRFY044 | 18 | — | 52 | nC | $I_D$ = 20A |
| | | IRFY120 | 2.0 | — | 8.0 | | $I_D$ = 7.3A |
| | | IRFY130 | 3.8 | — | 16.6 | | $I_D$ = 11A |
| | | IRFY140 | 12 | — | 30.7 | | $I_D$ = 18A, $V_{GS}$ = 10V, |
| | | IRFY240 | 14.2 | — | 37.6 | | $I_D$ = 12A, $V_{DS}$ = 0.5 x $V_{DS}$ max. |
| | | IRFY340 | 13.8 | — | 40.5 | | $I_D$ = 6.9A |
| | | IRFY430 | 5.5 | — | 19.7 | | $I_D$ = 3.7A |
| | | IRFY440 | 11.1 | — | 42.4 | | $I_D$ = 5.5A |
| | | IRFY9120 | 1.0 | — | 9.0 | | $I_D$ = -5.3A |
| | | IRFY9130 | 2.0 | — | 21 | | $I_D$ = -9.3A, $V_{GS}$ = -10V, |
| | | IRFY9140 | 7.0 | — | 35.2 | | $I_D$ = -13A, $V_{DS}$ = $V_{DS}$ max. x 0.8 |
| | | IRFY9240 | 4.5 | — | 38 | | $I_D$ = -7.7A |
| $t_{d(on)}$ | Turn-on Delay Time | IRFY044 | — | — | 23 | ns | $V_{DD}$ = 30V, $I_D$ = 20A, $R_G$ = 9.1Ω |
| | | IRFY120 | — | — | 15 | | $V_{DD}$ = 50V, $I_D$ = 7.3A, $R_G$ = 7.5Ω |
| | | IRFY130 | — | — | 30 | | $V_{DD}$ = 50V, $I_D$ = 11A, $R_G$ = 7.5Ω |
| | | IRFY140 | — | — | 21 | | $V_{DD}$ = 50V, $I_D$ = 18A, $R_G$ = 9.1Ω, $V_{GS}$ = 10V |
| | | IRFY240 | — | — | 20 | | $V_{DD}$ = 100V, $I_D$ = 12A, $R_G$ = 9.1Ω |
| | | IRFY340 | — | — | 25 | | $V_{DD}$ = 200V, $I_D$ = 6.9A, $R_G$ = 9.1Ω |
| | | IRFY430 | — | — | 35 | | $V_{DD}$ = 250V, $I_D$ = 3.7A, $R_G$ = 7.5Ω |
| | | IRFY440 | — | — | 21 | | $V_{DD}$ = 250V, $I_D$ = 5.5A, $R_G$ = 9.1Ω |
| | | IRFY9120 | — | — | 60 | | $V_{DD}$ = -50V, $I_D$ = -5.3A, $R_G$ = 7.5Ω |
| | | IRFY9130 | — | — | 60 | | $V_{DD}$ = -50V, $I_D$ = -9.3A, $R_G$ = 7.5Ω, $V_{GS}$ = -10V |
| | | IRFY9140 | — | — | 35 | | $V_{DD}$ = -50V, $I_D$ = -13A, $R_G$ = 9.1Ω |
| | | IRFY9240 | — | — | 35 | | $V_{DD}$ = -100V, $I_D$ = -7.7A, $R_G$ = 9.1Ω |
| $t_r$ | Rise Time | IRFY044 | — | — | 130 | ns | $V_{DD}$ = 30V, $I_D$ = 20A, $R_G$ = 9.1Ω |
| | | IRFY120 | — | — | 70 | | $V_{DD}$ = 50V, $I_D$ = 7.3A, $R_G$ = 7.5Ω |
| | | IRFY130 | — | — | 75 | | $V_{DD}$ = 50V, $I_D$ = 11A, $R_G$ = 7.5Ω |
| | | IRFY140 | — | — | 145 | | $V_{DD}$ = 50V, $I_D$ = 18A, $R_G$ = 9.1Ω, $V_{GS}$ = 10V |
| | | IRFY240 | — | — | 152 | | $V_{DD}$ = 100V, $I_D$ = 12A, $R_G$ = 9.1Ω |
| | | IRFY340 | — | — | 92 | | $V_{DD}$ = 200V, $I_D$ = 6.9A, $R_G$ = 9.1Ω |
| | | IRFY430 | — | — | 30 | | $V_{DD}$ = 250V, $I_D$ = 3.7A, $R_G$ = 7.5Ω |
| | | IRFY440 | — | — | 73 | | $V_{DD}$ = 250V, $I_D$ = 5.5A, $R_G$ = 9.1Ω |
| | | IRFY9120 | — | — | 100 | | $V_{DD}$ = -50V, $I_D$ = -5.3A, $R_G$ = 7.5Ω |
| | | IRFY9130 | — | — | 140 | | $V_{DD}$ = -50V, $I_D$ = -9.3A, $R_G$ = 7.5Ω, $V_{GS}$ = -10V |
| | | IRFY9140 | — | — | 85 | | $V_{DD}$ = -50V, $I_D$ = -13A, $R_G$ = 9.1Ω |
| | | IRFY9240 | — | — | 85 | | $V_{DD}$ = -100V, $I_D$ = -7.7, $R_G$ = 9.1Ω |
| $t_{d(off)}$ | Turn-Off Delay Time | IRFY044 | — | — | 81 | ns | $V_{DD}$ = 30V, $I_D$ = 20A, $R_G$ = 9.1Ω |
| | | IRFY120 | — | — | 40 | | $V_{DD}$ = 50V, $I_D$ = 7.3A, $R_G$ = 7.5Ω |
| | | IRFY130 | — | — | 40 | | $V_{DD}$ = 50V, $I_D$ = 11A, $R_G$ = 7.5Ω |
| | | IRFY140 | — | — | 64 | | $V_{DD}$ = 50V, $I_D$ = 18A, $R_G$ = 9.1Ω, $V_{GS}$ = 10V |
| | | IRFY240 | — | — | 58 | | $V_{DD}$ = 100V, $I_D$ = 12A, $R_G$ = 9.1Ω |
| | | IRFY340 | — | — | 79 | | $V_{DD}$ = 200V, $I_D$ = 6.9A, $R_G$ = 9.1Ω |
| | | IRFY430 | — | — | 55 | | $V_{DD}$ = 250V, $I_D$ = 3.7A, $R_G$ = 7.5Ω |
| | | IRFY440 | — | — | 72 | | $V_{DD}$ = 250V, $I_D$ = 5.5A, $R_G$ = 9.1Ω |
| | | IRFY9120 | — | — | 50 | | $V_{DD}$ = -50V, $I_D$ = -5.3A, $R_G$ = 7.5Ω |
| | | IRFY9130 | — | — | 140 | | $V_{DD}$ = -50V, $I_D$ = -9.3A, $R_G$ = 7.5Ω, $V_{GS}$ = -10V |
| | | IRFY9140 | — | — | 85 | | $V_{DD}$ = -50V, $I_D$ = -13A, $R_G$ = 9.1Ω |
| | | IRFY9240 | — | — | 85 | | $V_{DD}$ = -100V, $I_D$ = -7.7, $R_G$ = 9.1Ω |

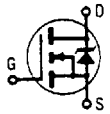
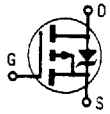
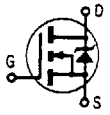
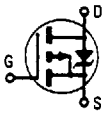
## Electrical Characteristics (Continued)

| | Parameter | Type | Min. | Typ. | Max. | Units | Test Conditions | |
|---|---|---|---|---|---|---|---|---|
| $t_f$ | Fall Time | IRFY044 | — | — | 79 | ns | $V_{DD}$ = 30V, $I_D$ = 20A, $R_G$ = 9.1Ω | $V_{GS}$ = 10V |
| | | IRFY120 | — | — | 70 | | $V_{DD}$ = 50V, $I_D$ = 7.3A, $R_G$ = 7.5Ω | |
| | | IRFY130 | — | — | 45 | | $V_{DD}$ = 50V, $I_D$ = 11A, $R_G$ = 7.5Ω | |
| | | IRFY140 | — | — | 105 | | $V_{DD}$ = 50V, $I_D$ = 18A, $R_G$ = 9.1Ω | |
| | | IRFY240 | — | — | 67 | | $V_{DD}$ = 100V, $I_D$ = 12A, $R_G$ = 9.1Ω | |
| | | IRFY340 | — | — | 58 | | $V_{DD}$ = 200V, $I_D$ = 6.9A, $R_G$ = 9.1Ω | |
| | | IRFY430 | — | — | 30 | | $V_{DD}$ = 250V, $I_D$ = 3.7A, $R_G$ = 7.5Ω | |
| | | IRFY440 | — | — | 51 | | $V_{DD}$ = 250V, $I_D$ = 5.5A, $R_G$ = 9.1Ω | |
| | | IRFY9120 | — | — | 70 | | $V_{DD}$ = −50V, $I_D$ = −5.3A, $R_G$ = 7.5Ω | $V_{GS}$ = −10V |
| | | IRFY9130 | — | — | 140 | | $V_{DD}$ = −50V, $I_D$ = −9.3A, $R_G$ = 7.5Ω | |
| | | IRFY9140 | — | — | 65 | | $V_{DD}$ = −50V, $I_D$ = −13A, $R_G$ = 9.1Ω | |
| | | IRFY9240 | — | — | 65 | | $V_{DD}$ = −100V, $I_D$ = −7.7A, $R_G$ = 9.1Ω | |
| $L_D$ | Internal Drain Inductance | N-Channel | — | 8.7 | — | nH | Measured from the drain lead, 6 mm (0.25 in.) from package to center of die | Modified MOSFET symbol showing the internal inductances.  |
| $L_S$ | Internal Source Inductance | | | | | | Meaured from the source lead, 6 mm (0.25 in.) from package to center of source bonding pad | |
| $L_D$ | Internal Drain Inductance | P-Channel | — | 8.7 | — | nH | Measured from the drain lead, 6 mm (0.25 in.) from package to center of die | Modified MOSFET symbol showing the internal inductances.  |
| $L_S$ | Internal Source Inductance | | | | | | Meaured from the source lead, 6 mm (0.25 in.) from package to center of source bonding pad | |
| $C_{iss}$ | Input Capacitance | IRFY044 | — | 2400 | — | pF | $V_{GS}$ = 0V, $V_{DS}$ = 25V, f = 1.0 MHz<br>See fig. 5 | |
| | | IRFY120 | — | 350 | — | | | |
| | | IRFY130 | — | 650 | — | | | |
| | | IRFY140 | — | 1660 | — | | | |
| | | IRFY240 | — | 1300 | — | | | |
| | | IRFY340 | — | 1400 | — | | | |
| | | IRFY430 | — | 610 | — | | | |
| | | IRFY440 | — | 1300 | — | | | |
| | | IRFY9120 | — | 380 | — | | | |
| | | IRFY9130 | — | 800 | — | | | |
| | | IRFY9140 | — | 1400 | — | | | |
| | | IRFY9240 | — | 1200 | — | | | |
| $C_{oss}$ | Output Capacitance | IRFY044 | — | 1100 | — | pF | $V_{GS}$ = 0V, $V_{DS}$ = 25V, f = 1.0 MHz<br>See fig. 5 | |
| | | IRFY120 | — | 150 | — | | | |
| | | IRFY130 | — | 240 | — | | | |
| | | IRFY140 | — | 550 | — | | | |
| | | IRFY240 | — | 400 | — | | | |
| | | IRFY340 | — | 350 | — | | | |
| | | IRFY430 | — | 135 | — | | | |
| | | IRFY440 | — | 310 | — | | | |
| | | IRFY9120 | — | 170 | — | | | |
| | | IRFY9130 | — | 350 | — | | | |
| | | IRFY9140 | — | 600 | — | | | |
| | | IRFY9240 | — | 570 | — | | | |

## Electrical Characteristics (Continued)

| Parameter | | Type | Min. | Typ. | Max. | Units | Test Conditions |
|---|---|---|---|---|---|---|---|
| $C_{rss}$ | Reverse Transfer Capacitance | IRFY044 | — | 230 | — | pF | $V_{GS}$ = 0V, $V_{DS}$ = 25V, f = 1.0 MHz<br>See fig. 5 |
| | | IRFY120 | — | 24 | — | | |
| | | IRFY130 | — | 44 | — | | |
| | | IRFY140 | — | 120 | — | | |
| | | IRFY240 | — | 130 | — | | |
| | | IRFY340 | — | 230 | — | | |
| | | IRFY430 | — | 65 | — | | |
| | | IRFY440 | — | 120 | — | | |
| | | IRFY9120 | — | 45 | — | | |
| | | IRFY9130 | — | 125 | — | | |
| | | IRFY9140 | — | 200 | — | | |
| | | IRFY9240 | — | 81 | — | | |

## Source-Drain Diode Rating and Characteristics

| Parameter | | Type | Min. | Typ. | Max. | Units | Test Conditions |
|---|---|---|---|---|---|---|---|
| $I_S$ | Continuous Source Current (Body Diode) | IRFY044 | — | — | 20 | A | Modified MOSFET symbol showing the integral reverse p-n junction rectifier.<br>  <br><br>N-Channel |
| | | IRFY120 | — | — | 7.3 | | |
| | | IRFY130 | — | — | 11 | | |
| | | IRFY140 | — | — | 18 | | |
| | | IRFY240 | — | — | 12 | | |
| | | IRFY340 | — | — | 6.9 | | |
| | | IRFY430 | — | — | 3.7 | | |
| | | IRFY440 | — | — | 5.5 | | |
| | | IRFY9120 | — | — | -5.3 | |  <br><br>P-Channel |
| | | IRFY9130 | — | — | -9.3 | | |
| | | IRFY9140 | — | — | -13 | | |
| | | IRFY9240 | — | — | -7.7 | | |
| $I_{SM}$ | Pulsed Source Current (Body Diode) | IRFY044 | — | — | 128 | A | Modified MOSFET symbol showing the integral reverse p-n junction rectifier.<br>  <br><br>N-Channel |
| | | IRFY120 | — | — | 29 | | |
| | | IRFY130 | — | — | 43 | | |
| | | IRFY140 | — | — | 73 | | |
| | | IRFY240 | — | — | 49 | | |
| | | IRFY340 | — | — | 27 | | |
| | | IRFY430 | — | — | 14 | | |
| | | IRFY440 | — | — | 22 | | |
| | | IRFY9120 | — | — | -21 | |  <br><br>P-Channel |
| | | IRFY9130 | — | — | -37 | | |
| | | IRFY9140 | — | — | -52 | | |
| | | IRFY9240 | — | — | -30 | | |

## Source-Drain Diode Ratings and Characteristics (Continued)

| Parameter | | Type | Min. | Typ. | Max. | Units | Test Conditions |
|---|---|---|---|---|---|---|---|
| $V_{SD}$ | Diode Forward Voltage | IRFY044 | — | — | 2.5 | V | $I_S$ = 20A, $T_C$ = 25°C, $V_{GS}$ = 0V |
| | | IRFY120 | — | — | 1.8 | | $I_S$ = 7.3A |
| | | IRFY130 | — | — | 1.5 | | $I_S$ = 11A |
| | | IRFY140 | — | — | 1.5 | | $I_S$ = 18A |
| | | IRFY240 | — | — | 1.5 | | $I_S$ = 12A |
| | | IRFY340 | — | — | 1.5 | | $I_S$ = 6.9A |
| | | IRFY430 | — | — | 1.4 | | $I_S$ = 3.7A |
| | | IRFY440 | — | — | 1.5 | | $I_S$ = 5.5A |
| | | IRFY9120 | — | — | -4.8 | | $I_S$ = -5.3A |
| | | IRFY9130 | — | — | -4.7 | | $I_S$ = -9.3A |
| | | IRFY9140 | — | — | -4.2 | | $I_S$ = -13A |
| | | IRFY9240 | — | — | -4.6 | | $I_S$ = -7.7A |
| $t_{rr}$ | Reverse Recovery Time | IRFY044 | — | — | 220 | ns | $I_F$ = 20A, $T_J$ = 25°C, di/dt ≤ 100A/μs, $V_{DD}$ ≤ 50V |
| | | IRFY120 | — | — | 240 | | $I_S$ = 7.3A |
| | | IRFY130 | — | — | 300 | | $I_S$ = 11A |
| | | IRFY140 | — | — | 400 | | $I_S$ = 18A |
| | | IRFY240 | — | — | 500 | | $I_S$ = 12A |
| | | IRFY340 | — | — | 600 | | $I_S$ = 6.9A |
| | | IRFY430 | — | — | 900 | | $I_S$ = 3.7A |
| | | IRFY440 | — | — | 700 | | $I_S$ = 5.5A |
| | | IRFY9120 | — | — | 200 | | $I_S$ = -5.3A, $T_J$ = 25°C, di/dt ≤ -100A/μs, $V_{DD}$ ≤ -50V |
| | | IRFY9130 | — | — | 250 | | $I_S$ = -9.3A |
| | | IRFY9140 | — | — | 280 | | $I_S$ = -13A |
| | | IRFY9240 | — | — | 440 | | $I_S$ = -7.7A |

## Source-Drain Diode Ratings and Characteristics (Continued)

| Parameter | | Type | Min. | Typ. | Max. | Units | Test Conditions |
|---|---|---|---|---|---|---|---|
| $Q_{rr}$ | Reverse Recovered Charge | IRFY044 | — | — | 1.6 | μC | $I_S$ = 20A, $T_J$ = 25°C, di/dt ≤ 100A/μs, $V_{DD}$ ≤ 50V |
| | | IRFY120 | — | — | 2.0 | | $I_S$ = 7.3A |
| | | IRFY130 | — | — | 3.0 | | $I_S$ = 11A |
| | | IRFY140 | — | — | 2.4 | | $I_S$ = 18A |
| | | IRFY240 | — | — | 5.3 | | $I_S$ = 12A |
| | | IRFY340 | — | — | 5.6 | | $I_S$ = 6.9A |
| | | IRFY430 | — | — | 7.0 | | $I_S$ = 3.7A |
| | | IRFY440 | — | — | 8.9 | | $I_S$ = 5.5A |
| | | IRFY9120 | — | — | 3.1 | | $I_S$ = −5.3A, $T_J$ = 25°C, di/dt ≤ −100A/μs, $V_{DD}$ ≤ −50V |
| | | IRFY9130 | — | — | 3.0 | | $I_S$ = −9.3A |
| | | IRFY9140 | — | — | 3.6 | | $I_S$ = −13A |
| | | IRFY9240 | — | — | 7.2 | | $I_S$ = −7.7A |

## Thermal Resistance and Isolation

| Parameter | | Type | Min. | Typ. | Max. | Units | Test Conditions |
|---|---|---|---|---|---|---|---|
| $R_{thJC}$ | Junction-to-Case | IRFY044 | — | — | 2.1 | K/W | |
| | | IRFY120 | — | — | 4.1 | | |
| | | IRFY130 | — | — | 2.8 | | |
| | | IRFY140 | — | — | 2.1 | | |
| | | IRFY240 | — | — | 2.1 | | |
| | | IRFY340 | — | — | 2.1 | | |
| | | IRFY430 | — | — | 2.8 | | |
| | | IRFY440 | — | — | 2.1 | | |
| | | IRFY9120 | — | — | 4.1 | | |
| | | IRFY9130 | — | — | 2.8 | | |
| | | IRFY9140 | — | — | 2.1 | | |
| | | IRFY9240 | — | — | 2.1 | | |
| $R_{thCS}$ | Case-to-Sink | ALL | — | 0.21 | — | K/W | Mounting surface flat, smooth |
| $R_{thJA}$ | Junction-to-Ambient | ALL | — | — | 80 | K/W | Typical socket mount |