

Excellent Integrated System Limited

Stocking Distributor

Click to view price, real time Inventory, Delivery & Lifecycle Information:

[International Rectifier \(Infineon Technologies Americas Corp.\)
AUIRLR3410](#)

For any questions, you can email us directly:

sales@integrated-circuit.com

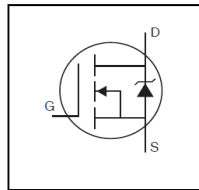
AUTOMOTIVE GRADE

AUIRLR3410

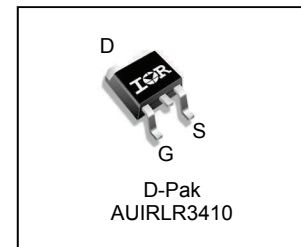
Features

- Advanced Planar Technology
- Low On-Resistance
- Logic Level Gate Drive
- Dynamic dV/dT Rating
- 175°C Operating Temperature
- Fast Switching
- Fully Avalanche Rated
- Repetitive Avalanche Allowed up to Tjmax
- Lead-Free, RoHS Compliant
- Automotive Qualified *

HEXFET® Power MOSFET



| | | |
|--------------|-------------|--------------|
| V_{DSS} | | 100V |
| $R_{DS(on)}$ | max. | 105mΩ |
| I_D | | 17A |



| | | |
|----------|----------|----------|
| G | D | S |
| Gate | Drain | Source |

Description

Specifically designed for Automotive applications, this Stripe Planar design of HEXFET® Power MOSFETs utilizes the latest processing techniques to achieve low 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 and reliable device for use in Automotive and a wide variety of other applications.

| Base part number | Package Type | Standard Pack | | Orderable Part Number |
|------------------|--------------|--------------------|----------|-----------------------|
| | | Form | Quantity | |
| AUIRLR3410 | D-Pak | Tube | 75 | AUIRLR3410 |
| | | Tape and Reel Left | 3000 | AUIRLR3410TRL |

Absolute Maximum Ratings

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only; and functional operation of the device at these or any other condition beyond those indicated in the specifications is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability. The thermal resistance and power dissipation ratings are measured under board mounted and still air conditions. Ambient temperature (TA) is 25°C, unless otherwise specified.

| Symbol | 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 | 60 | |
| $P_D @ T_C = 25^\circ C$ | Maximum Power Dissipation | 79 | W |
| | Linear Derating Factor | 0.53 | W/°C |
| V_{GS} | Gate-to-Source Voltage | ± 16 | V |
| E_{AS} | Single Pulse Avalanche Energy (Thermally Limited) ②⑤ | 150 | mJ |
| I_{AR} | Avalanche Current ①⑤ | 9.0 | A |
| E_{AR} | Repetitive Avalanche Energy ①⑤ | 7.9 | mJ |
| dv/dt | Peak Diode Recovery dv/dt③ | 5.0 | V/ns |
| T_J | Operating Junction and | -55 to + 175 | °C |
| T_{STG} | Storage Temperature Range | | |
| | Soldering Temperature, for 10 seconds (1.6mm from case) | 300 | |

Thermal Resistance

| Symbol | Parameter | Typ. | Max. | Units |
|-----------------|------------------------------------|------|------|-------|
| $R_{\theta JC}$ | Junction-to-Case ⑥ | — | 1.9 | °C/W |
| $R_{\theta JA}$ | Junction-to-Ambient (PCB Mount) ⑦ | — | 50 | |
| $R_{\theta JA}$ | Junction-to-Ambient | — | 110 | |

HEXFET® is a registered trademark of Infineon.

*Qualification standards can be found at www.infineon.com

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

| | Parameter | Min. | Typ. | Max. | Units | Conditions |
|---------------------------------|--------------------------------------|------|-------|-------|---------------------|--|
| $V_{(BR)DSS}$ | Drain-to-Source Breakdown Voltage | 100 | — | — | V | $V_{GS} = 0V, I_D = 250\mu A$ |
| $\Delta V_{(BR)DSS}/\Delta T_J$ | Breakdown Voltage Temp. Coefficient | — | 0.122 | — | V/ $^\circ\text{C}$ | Reference to $25^\circ\text{C}, I_D = 1\text{mA}$ |
| $R_{DS(on)}$ | Static Drain-to-Source On-Resistance | — | — | 0.105 | Ω | $V_{GS} = 10V, I_D = 10A$ ④ |
| | | — | — | 0.125 | | $V_{GS} = 5.0V, I_D = 10A$ ④ |
| | | — | — | 0.155 | | $V_{GS} = 4.0V, I_D = 9.0A$ ④ |
| $V_{GS(th)}$ | Gate Threshold Voltage | 1.0 | — | 2.0 | V | $V_{DS} = V_{GS}, I_D = 250\mu A$ |
| g_{fs} | Forward Trans conductance | 7.7 | — | — | S | $V_{DS} = 25V, I_D = 9.0A$ ⑤ |
| I_{DSS} | Drain-to-Source Leakage Current | — | — | 25 | μA | $V_{DS} = 100V, V_{GS} = 0V$ |
| | | — | — | 250 | | $V_{DS} = 80V, V_{GS} = 0V, T_J = 150^\circ\text{C}$ |
| I_{GSS} | Gate-to-Source Forward Leakage | — | — | 100 | nA | $V_{GS} = 16V$ |
| | Gate-to-Source Reverse Leakage | — | — | -100 | | $V_{GS} = -16V$ |

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

| | | | | | | |
|--------------|------------------------------|---|-----|-----|----|---|
| Q_g | Total Gate Charge | — | — | 34 | nC | $I_D = 9.0A$ $V_{DS} = 80V$ $V_{GS} = 5.0V$ ④ ⑤ |
| Q_{gs} | Gate-to-Source Charge | — | — | 4.8 | | |
| Q_{gd} | Gate-to-Drain Charge | — | — | 20 | | |
| $t_{d(on)}$ | Turn-On Delay Time | — | 7.2 | — | ns | $V_{DD} = 50V$ $I_D = 9.0A$ $R_G = 6.0\Omega$ $V_{GS} = 5.0V$ ④ ⑤ |
| t_r | Rise Time | — | 53 | — | | |
| $t_{d(off)}$ | Turn-Off Delay Time | — | 30 | — | | |
| t_f | Fall Time | — | 26 | — | | |
| 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 | — | 800 | — | pF | $V_{GS} = 0V$ $V_{DS} = 25V$ $f = 1.0\text{MHz}$ ⑤ |
| C_{oss} | Output Capacitance | — | 160 | — | | |
| C_{rss} | Reverse Transfer Capacitance | — | 90 | — | | |

Diode 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 | — | — | 60 | | |
| V_{SD} | Diode Forward Voltage | — | — | 1.3 | V | $T_J = 25^\circ\text{C}, I_S = 9.0A, V_{GS} = 0V$ ④ |
| t_{rr} | Reverse Recovery Time | — | 140 | 210 | ns | $T_J = 25^\circ\text{C}, I_F = 9.0A$ |
| Q_{rr} | Reverse Recovery Charge | — | 740 | 1100 | nC | $di/dt = 100A/\mu s$ ④ ⑤ |
| 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 fig. 11)
- ② $V_{DD} = 25V$, starting $T_J = 25^\circ\text{C}$, $L = 3.1\text{mH}$, $R_G = 25\Omega$, $I_{AS} = 9.0A$, $V_{GS} = 10V$. (See fig. 12)
- ③ $I_{SD} \leq 9.0A$, $di/dt \leq 540A/\mu s$, $V_{DD} \leq V_{(BR)DSS}$, $T_J \leq 175^\circ\text{C}$.
- ④ Pulse width $\leq 300\mu s$; duty cycle $\leq 2\%$.
- ⑤ Uses IRL530N data and test conditions.
- ⑥ This is applied for L_S of D-PAK is measured between lead and center of die contact.
- ⑦ When mounted on 1" square PCB (FR-4 or G-10 Material). For recommended footprint and soldering techniques refer to application note #AN-994.
- ⑧ R_θ is measured at T_J approximately 90°C .

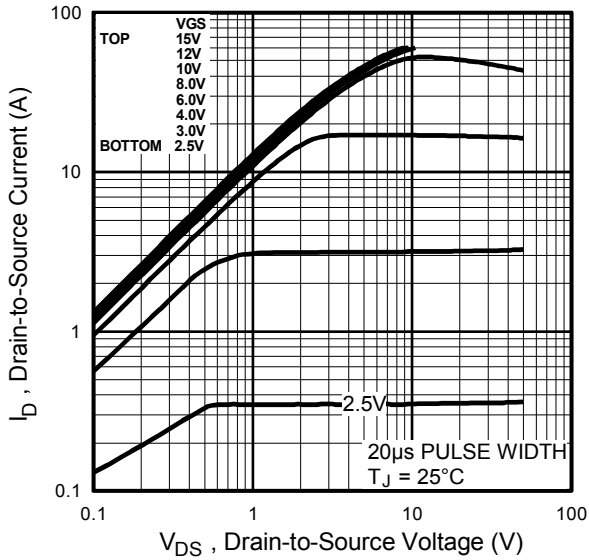


Fig. 1 Typical Output Characteristics

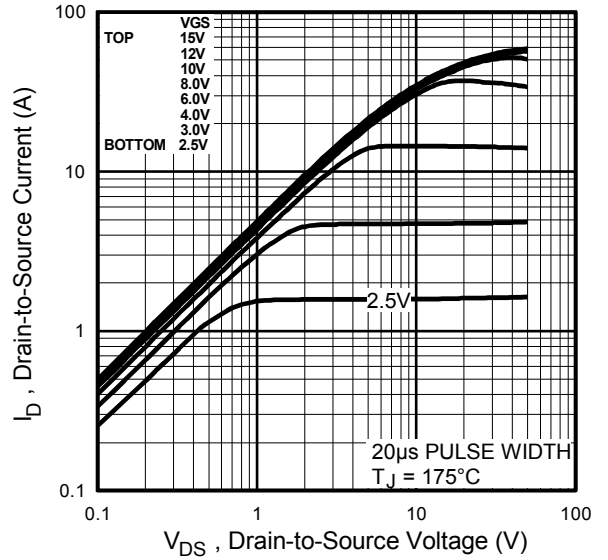


Fig. 2 Typical Output Characteristics

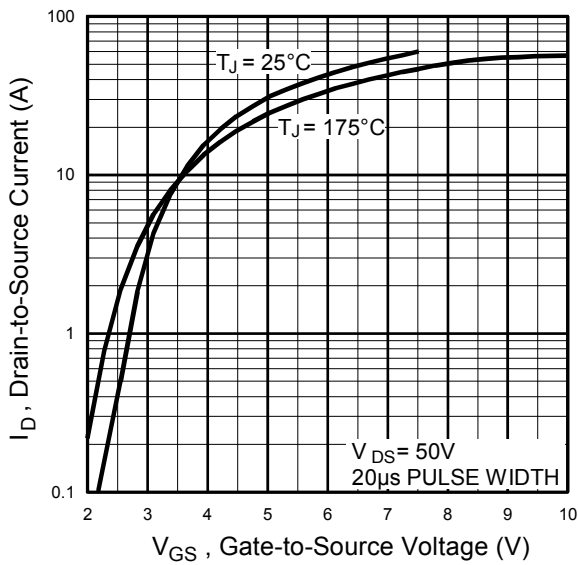


Fig. 3 Typical Transfer Characteristics

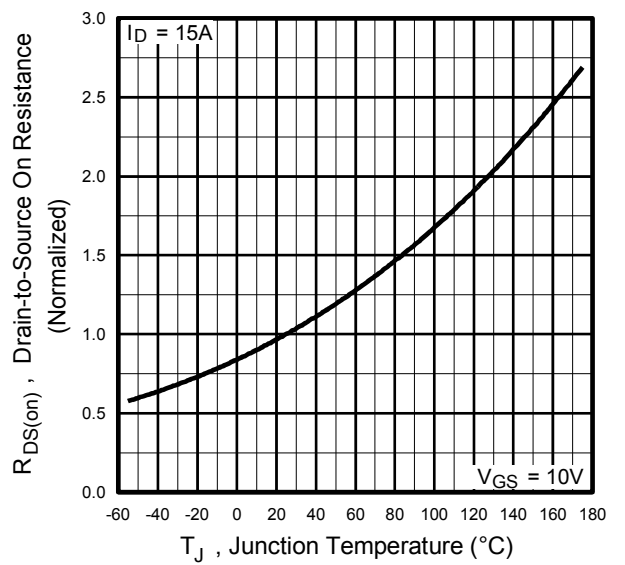


Fig. 4 Normalized On-Resistance Vs. Temperature

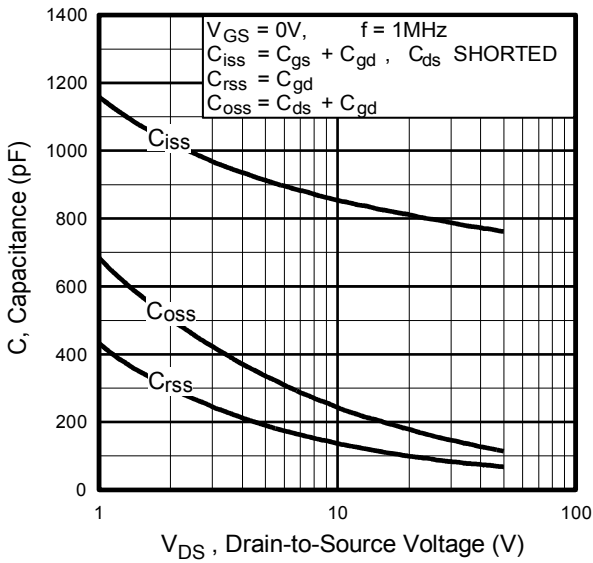


Fig 5. Typical Capacitance vs. Drain-to-Source Voltage

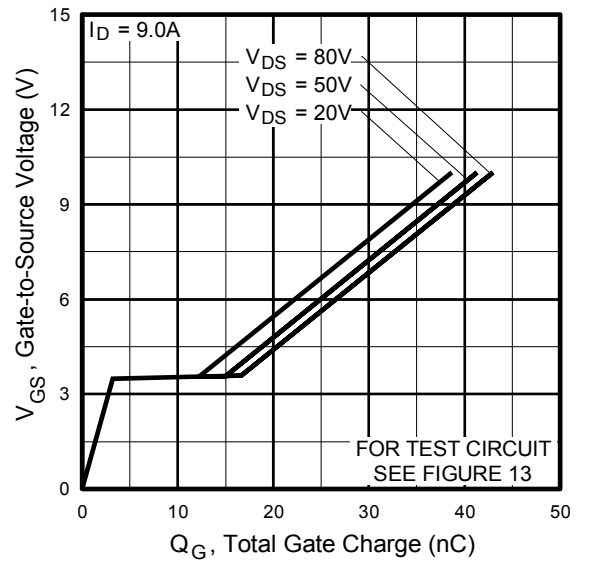


Fig 6. Typical Gate Charge vs. Gate-to-Source Voltage

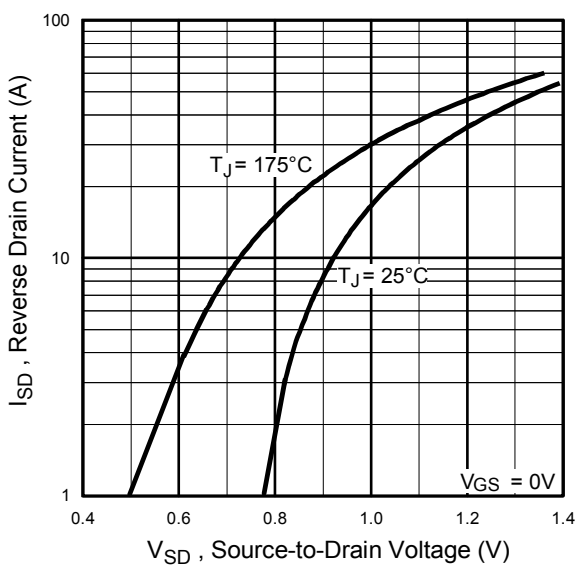


Fig. 7 Typical Source-to-Drain Diode Forward Voltage

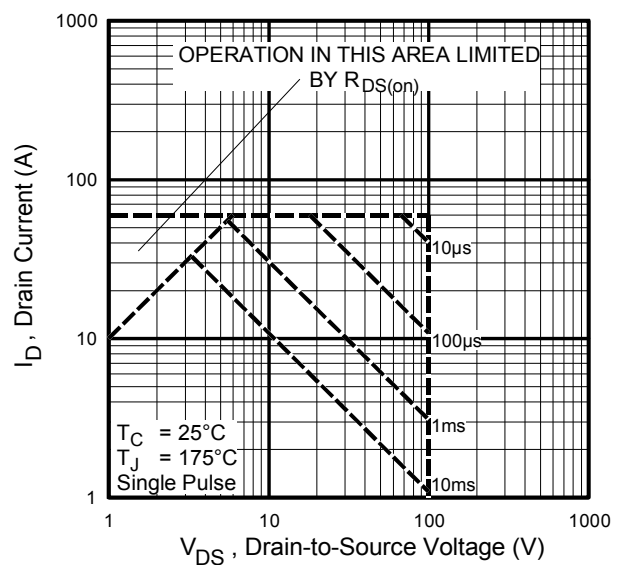


Fig 8. Maximum Safe Operating Area

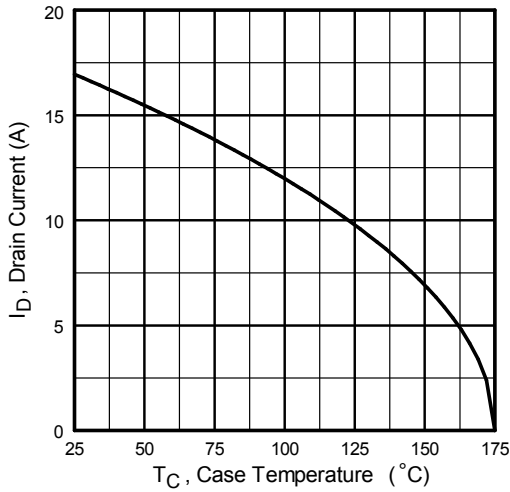


Fig 9. Maximum Drain Current Vs. Case Temperature

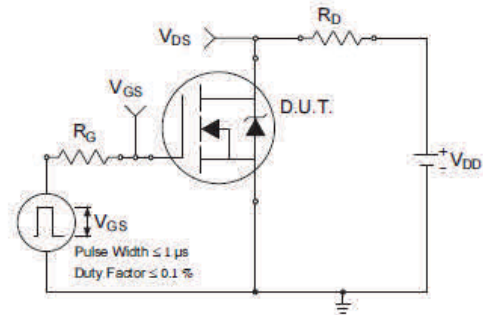


Fig 10a. Switching Time Test Circuit

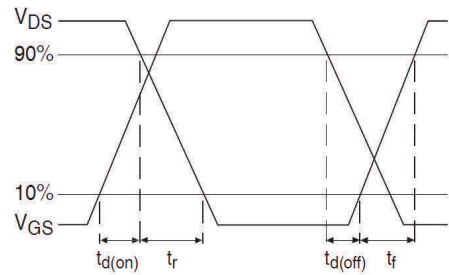


Fig 10b. Switching Time Waveforms

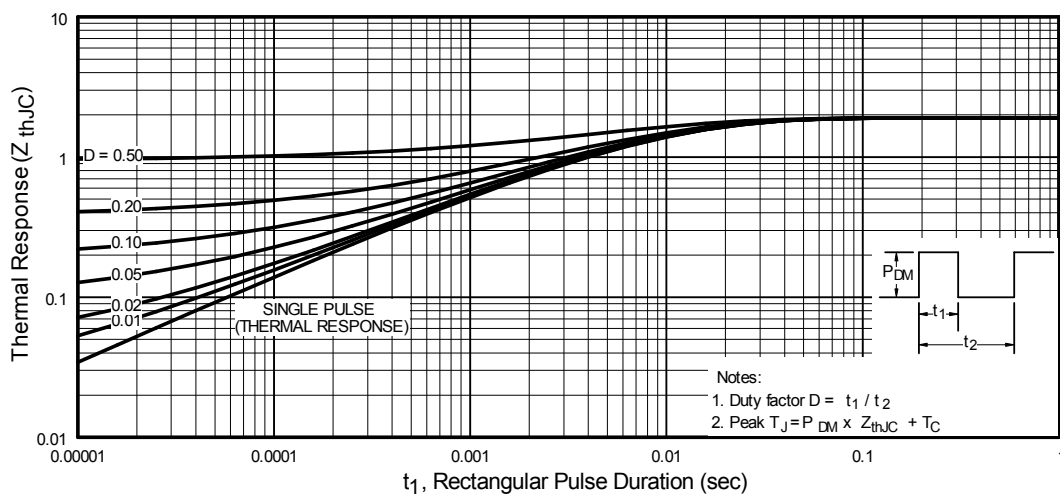


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Case

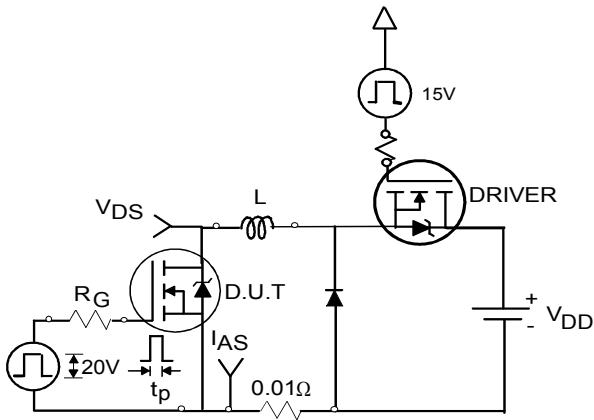


Fig 12a. Unclamped Inductive Test Circuit

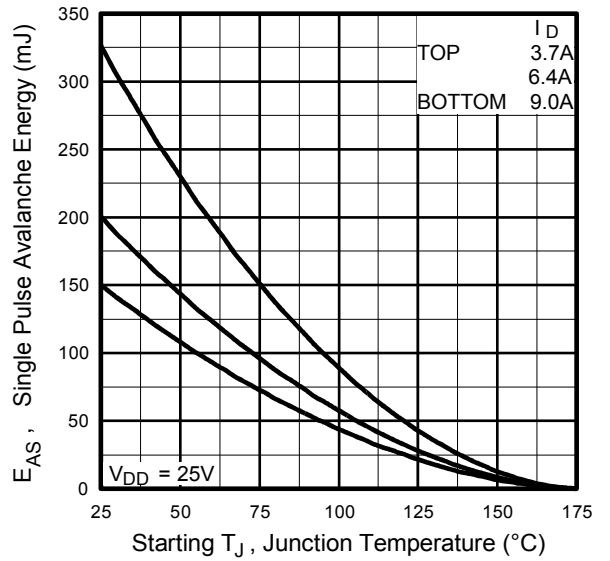


Fig 12c. Maximum Avalanche Energy vs. Drain Current

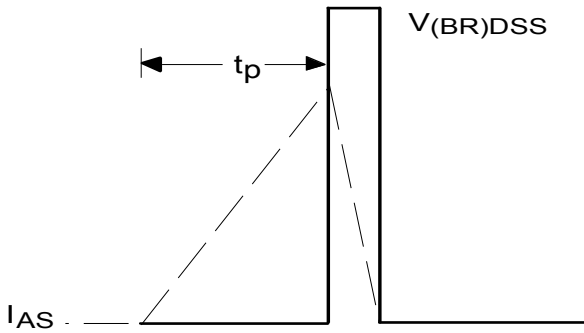


Fig 12b. Unclamped Inductive Waveforms

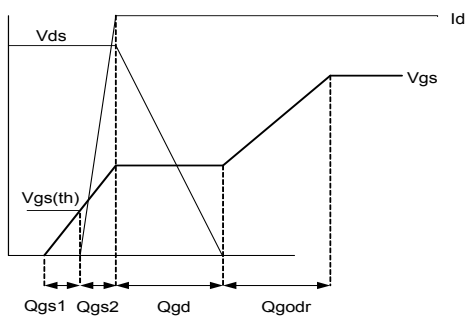


Fig 13a. Gate Charge Waveform

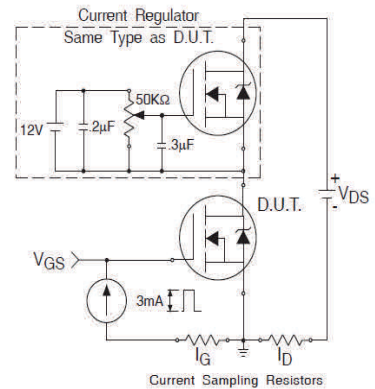
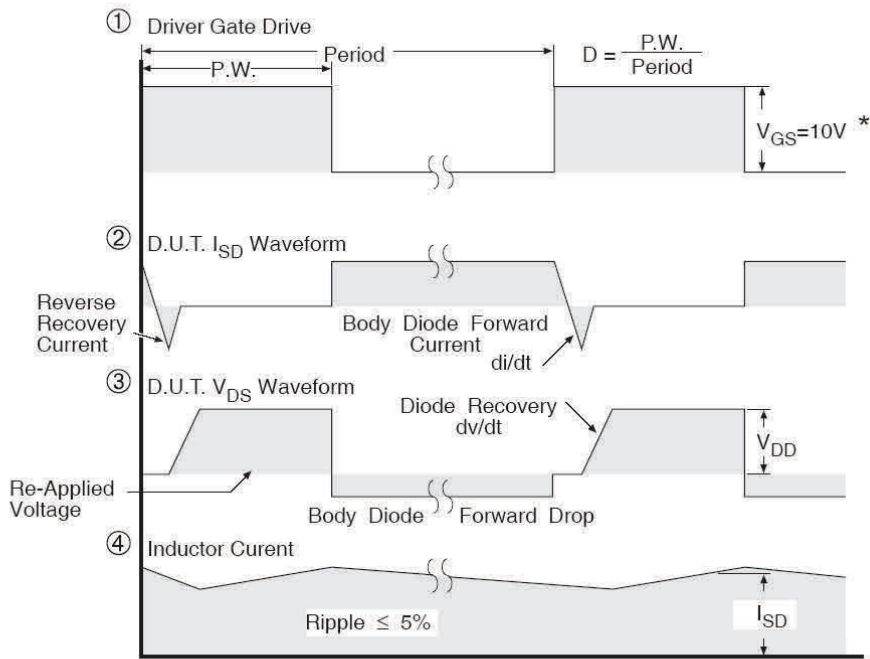
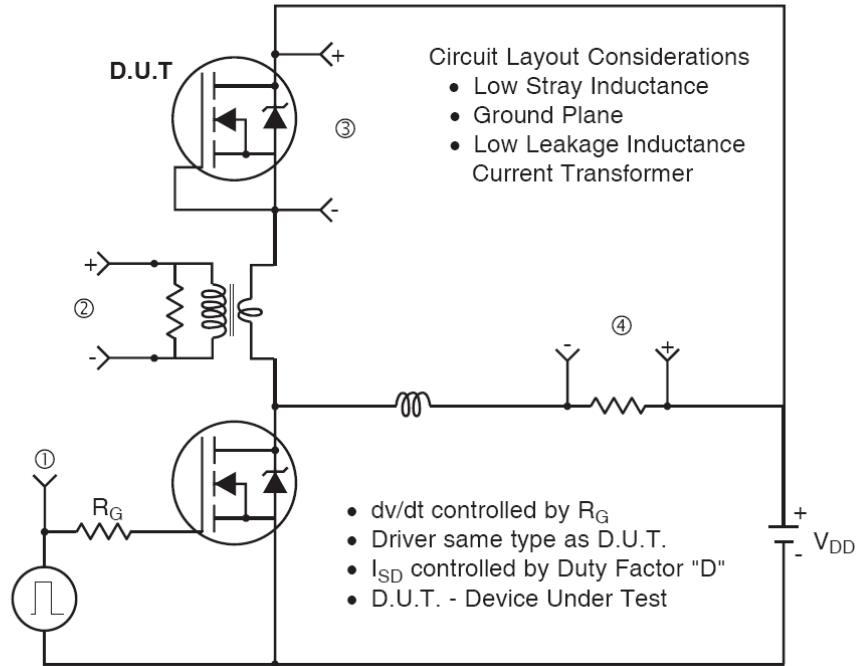


Fig 13b. Gate Charge Test Circuit

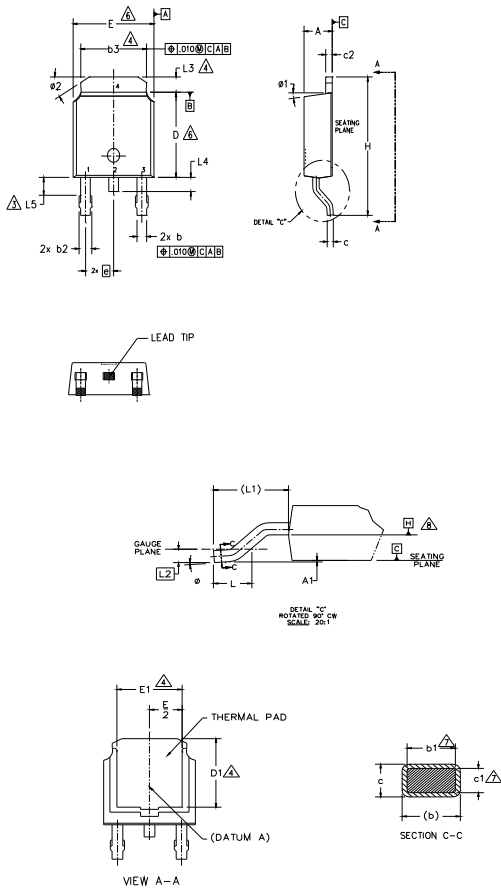
Peak Diode Recovery dv/dt Test Circuit



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

Fig 14. Peak Diode Recovery dv/dt Test Circuit for N-Channel HEXFET® Power MOSFETs

D-Pak (TO-252AA) Package Outline (Dimensions are shown in millimeters (inches))



NOTES:

- 1.- DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994
- 2.- DIMENSION ARE SHOWN IN INCHES [MILLIMETERS].
- 3.- LEAD DIMENSION UNCONTROLLED IN L5.
- 4.- DIMENSION D1, E1, L3 & b3 ESTABLISH A MINIMUM MOUNTING SURFACE FOR THERMAL PAD.
- 5.- SECTION C-C DIMENSIONS APPLY TO THE FLAT SECTION OF THE LEAD BETWEEN .005 AND 0.10 [0.13 AND 0.25] FROM THE LEAD TIP.
- 6.- DIMENSION D & E DO NOT INCLUDE MOLD FLASH. MOLD FLASH SHALL NOT EXCEED .005 [0.13] PER SIDE. THESE DIMENSIONS ARE MEASURED AT THE OUTMOST EXTREMES OF THE PLASTIC BODY.
- 7.- DIMENSION b1 & c1 APPLIED TO BASE METAL ONLY.
- 8.- DATUM A & B TO BE DETERMINED AT DATUM PLANE H.
- 9.- OUTLINE CONFORMS TO JEDEC OUTLINE TO-252AA.

| SYMBOL | DIMENSIONS | | | | NOTES |
|--------|-------------|-------|-----------|------|-------|
| | MILLIMETERS | | INCHES | | |
| | MIN. | MAX. | MIN. | MAX. | |
| A | 2.18 | 2.39 | .086 | .094 | |
| A1 | - | 0.13 | - | .005 | |
| b | 0.64 | 0.89 | .025 | .035 | |
| b1 | 0.65 | 0.79 | .025 | .031 | 7 |
| b2 | 0.76 | 1.14 | .030 | .045 | |
| b3 | 4.95 | 5.46 | .195 | .215 | 4 |
| c | 0.46 | 0.61 | .018 | .024 | |
| c1 | 0.41 | 0.56 | .016 | .022 | 7 |
| c2 | 0.46 | 0.89 | .018 | .035 | |
| D | 5.97 | 6.22 | .235 | .245 | 6 |
| D1 | 5.21 | - | .205 | - | 4 |
| E | 6.35 | 6.73 | .250 | .265 | 6 |
| E1 | 4.32 | - | .170 | - | 4 |
| e | 2.29 BSC | | .090 BSC | | |
| H | 9.40 | 10.41 | .370 | .410 | |
| L | 1.40 | 1.78 | .055 | .070 | |
| L1 | 2.74 BSC | | .108 REF. | | |
| L2 | 0.51 BSC | | .020 BSC | | |
| L3 | 0.89 | 1.27 | .035 | .050 | 4 |
| L4 | - | 1.02 | - | .040 | |
| L5 | 1.14 | 1.52 | .045 | .060 | 3 |
| ø | 0" | 10" | 0" | 10" | |
| ø1 | 0" | 15" | 0" | 15" | |
| ø2 | 25" | 35" | 25" | 35" | |

LEAD ASSIGNMENTS

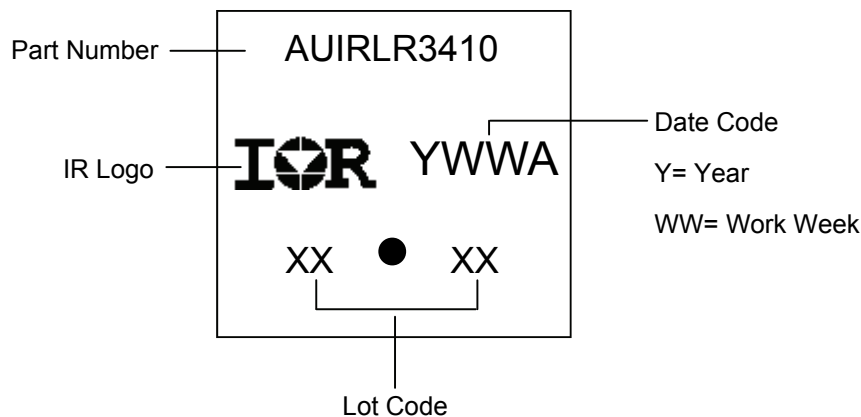
HEXFET

- 1.- GATE
- 2.- DRAIN
- 3.- SOURCE
- 4.- DRAIN

IGBT & CoPAK

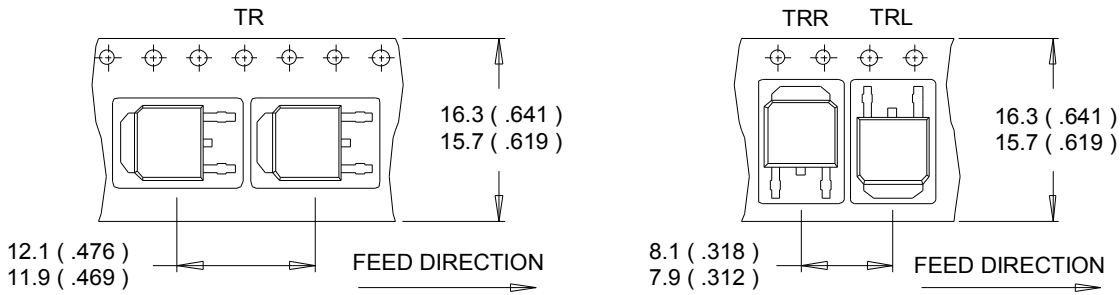
- 1.- GATE
- 2.- COLLECTOR
- 3.- EMITTER
- 4.- COLLECTOR

D-Pak (TO-252AA) Part Marking Information



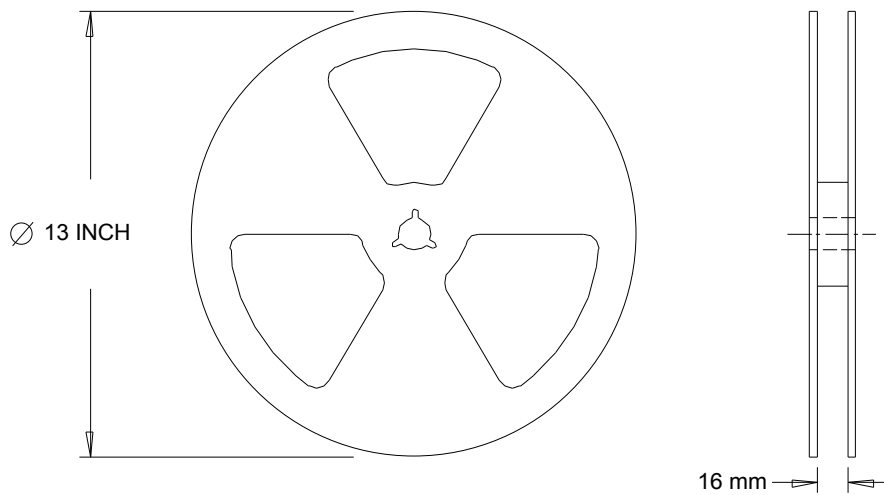
Note: For the most current drawing please refer to IR website at <http://www.irf.com/package/>

D-Pak (TO-252AA) Tape & Reel Information (Dimensions are shown in millimeters (inches))



NOTES :

1. CONTROLLING DIMENSION : MILLIMETER.
2. ALL DIMENSIONS ARE SHOWN IN MILLIMETERS (INCHES).
3. OUTLINE CONFORMS TO EIA-481 & EIA-541.



NOTES :

1. OUTLINE CONFORMS TO EIA-481.

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

Qualification Information

| | | | |
|-----------------------------------|----------------------|---|------|
| Qualification Level | | Automotive (per AEC-Q101) | |
| | | Comments: This part number(s) passed Automotive qualification. Infineon's Industrial and Consumer qualification level is granted by extension of the higher Automotive level. | |
| Moisture Sensitivity Level | | D-Pak | MSL1 |
| ESD | Machine Model | Class M4 [†] AEC-Q101-002 | |
| | Human Body Model | Class H1C [†] AEC-Q101-001 | |
| | Charged Device Model | Class C5 [†] AEC-Q101-005 | |
| RoHS Compliant | | Yes | |

† Highest passing voltage.

Revision History

| Date | Comments |
|------------|--|
| 3/17/2014 | <ul style="list-style-type: none"> Added "Logic Level Gate Drive" bullet in the features section on page 1. Updated data sheet with new IR corporate template. |
| 10/29/2015 | <ul style="list-style-type: none"> Updated datasheet with corporate template Corrected ordering table on page 1. |

Published by

Infineon Technologies AG

81726 München, Germany

© Infineon Technologies AG 2015

All Rights Reserved.

IMPORTANT NOTICE

The information given in this document shall in no event be regarded as a guarantee of conditions or characteristics ("Beschaffheitsgarantie"). With respect to any examples, hints or any typical values stated herein and/or any information regarding the application of the product, Infineon Technologies hereby disclaims any and all warranties and liabilities of any kind, including without limitation warranties of non-infringement of intellectual property rights of any third party.

In addition, any information given in this document is subject to customer's compliance with its obligations stated in this document and any applicable legal requirements, norms and standards concerning customer's products and any use of the product of Infineon Technologies in customer's applications.

The data contained in this document is exclusively intended for technically trained staff. It is the responsibility of customer's technical departments to evaluate the suitability of the product for the intended application and the completeness of the product information given in this document with respect to such application.

For further information on the product, technology, delivery terms and conditions and prices please contact your nearest Infineon Technologies office (www.infineon.com).

WARNINGS

Due to technical requirements products may contain dangerous substances. For information on the types in question please contact your nearest Infineon Technologies office.

Except as otherwise explicitly approved by Infineon Technologies in a written document signed by authorized representatives of Infineon Technologies, Infineon Technologies' products may not be used in any applications where a failure of the product or any consequences of the use thereof can reasonably be expected to result in personal injury.