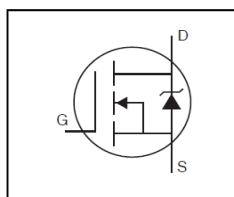
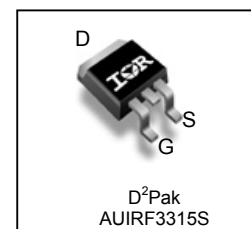


Features

- Advanced Planar Technology
- Low On-Resistance
- 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}	150V
R_{DS(on)} max.	82mΩ
I_D	21A


Description

Specifically designed for Automotive applications, this cellular 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.

G	D	S
Gate	Drain	Source

Base part number	Package Type	Standard Pack		Orderable Part Number
		Form	Quantity	
AUIRF3315S	D²-Pak	Tube	50	AUIRF3315S
		Tape and Reel Left	800	AUIRF3315STRL

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°C	Continuous Drain Current, V _{GS} @ 10V	21	A
I _D @ T _C = 100°C	Continuous Drain Current, V _{GS} @ 10V	15	
I _{DM}	Pulsed Drain Current ①	84	
P _D @ T _A = 25°C	Maximum Power Dissipation	3.8	W
P _D @ T _C = 25°C	Maximum Power Dissipation	94	
	Linear Derating Factor	0.63	W/°C
V _{GS}	Gate-to-Source Voltage	± 20	V
E _{AS}	Single Pulse Avalanche Energy (Thermally Limited) ②	350	mJ
I _{AR}	Avalanche Current ①	12	A
E _{AR}	Repetitive Avalanche Energy ⑤	9.4	mJ
dv/dt	Peak Diode Recovery ③	2.5	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 _{θJC}	Junction-to-Case⑥	—	1.6	°C/W
R _{θJA}	Junction-to-Ambient (PCB Mount, steady state) ⑤		40	

HEXFET® is a registered trademark of Infineon.

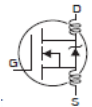
*Qualification standards can be found at www.infineon.com

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

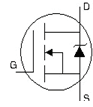
	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	150	—	—	V	$V_{GS} = 0V, I_D = 250\mu A$
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	0.187	—	V/ $^\circ\text{C}$	Reference to 25°C , $I_D = 1mA$
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	—	82	m Ω	$V_{GS} = 10V, I_D = 12A$ ④
$V_{GS(th)}$	Gate Threshold Voltage	2.0	—	4.0	V	$V_{DS} = V_{GS}, I_D = 250\mu A$
I_{DSS}	Drain-to-Source Leakage Current	—	—	25	μA	$V_{DS} = 150V, V_{GS} = 0V$
		—	—	250		$V_{DS} = 120V, V_{GS} = 0V, T_J = 125^\circ\text{C}$
I_{GSS}	Gate-to-Source Forward Leakage	—	—	100	nA	$V_{GS} = 20V$
	Gate-to-Source Reverse Leakage	—	—	-100		$V_{GS} = -20V$

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

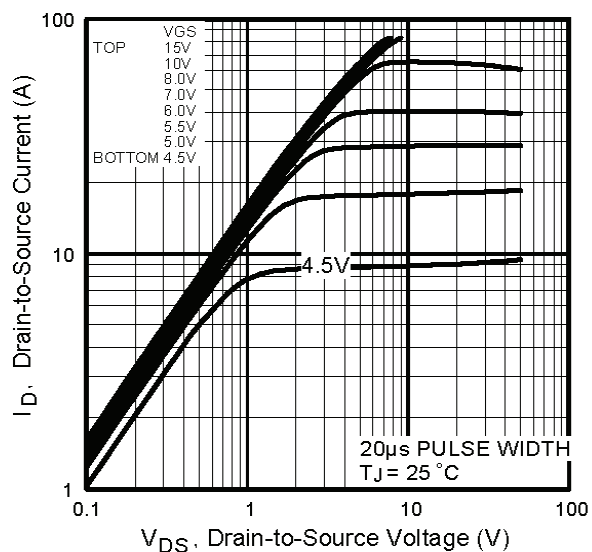
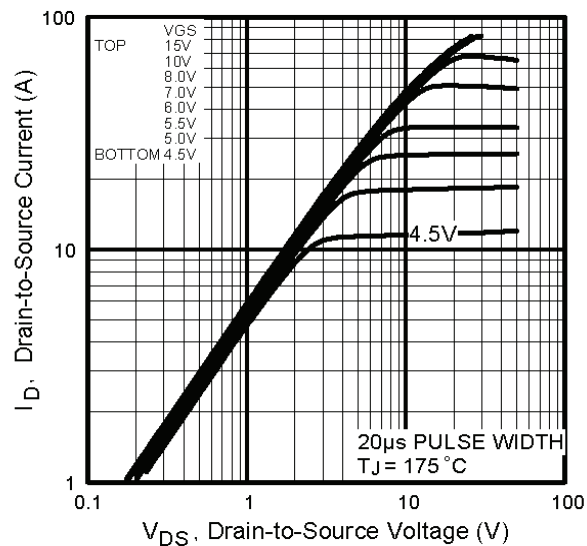
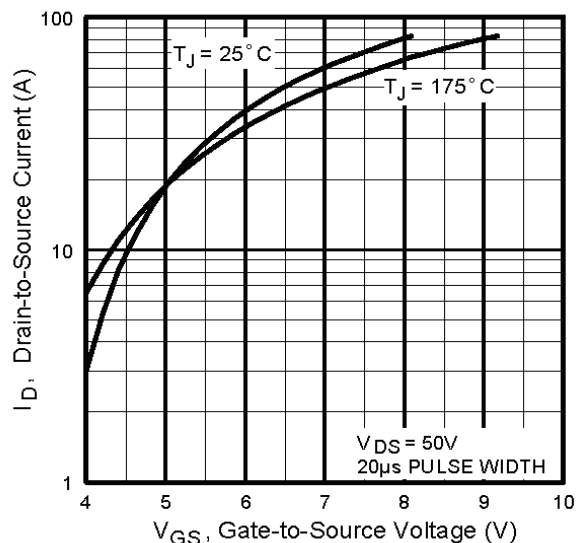
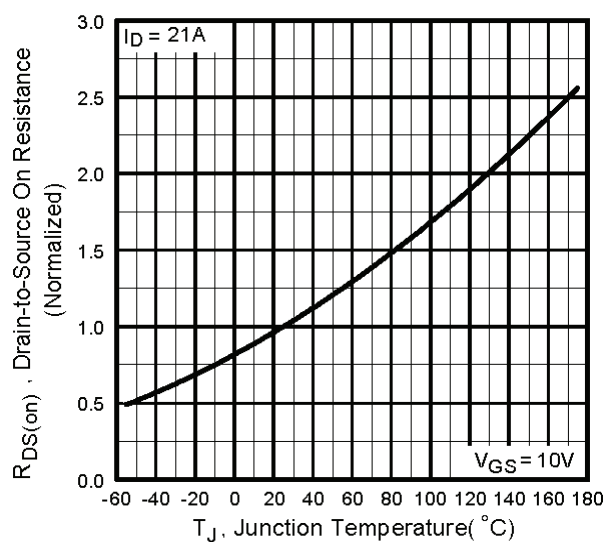
Q_g	Total Gate Charge	—	—	95	nC	$I_D = 12A$ $V_{DS} = 120V$ $V_{GS} = 10V$ ④
Q_{gs}	Gate-to-Source Charge	—	—	11		
Q_{gd}	Gate-to-Drain Charge	—	—	47		
$t_{d(on)}$	Turn-On Delay Time	—	9.6	—	ns	$V_{DD} = 75V$ $I_D = 12A$ $R_G = 5.1\Omega$, $R_D = 5.9\Omega$, ④
t_r	Rise Time	—	32	—		
$t_{d(off)}$	Turn-Off Delay Time	—	49	—		
t_f	Fall Time	—	38	—		
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	—	1300	—	pF	$V_{GS} = 0V$ $V_{DS} = 25V$ $f = 1.0MHz$, See Fig.5
C_{oss}	Output Capacitance	—	300	—		
C_{rss}	Reverse Transfer Capacitance	—	160	—		

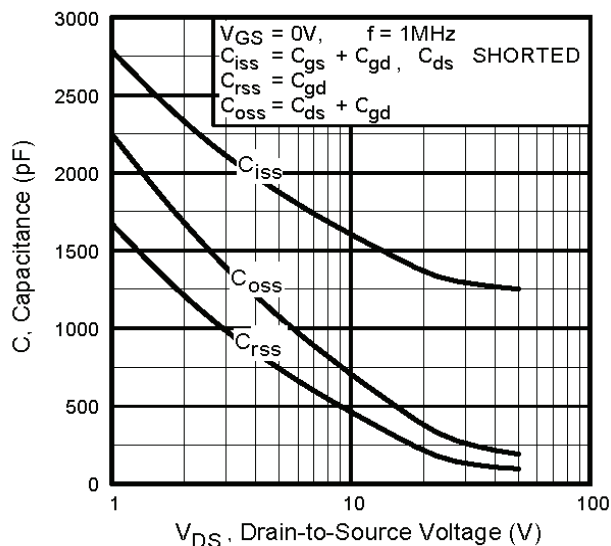
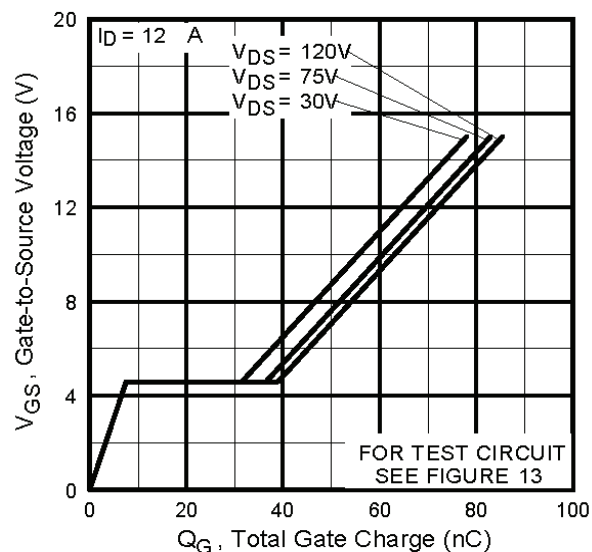
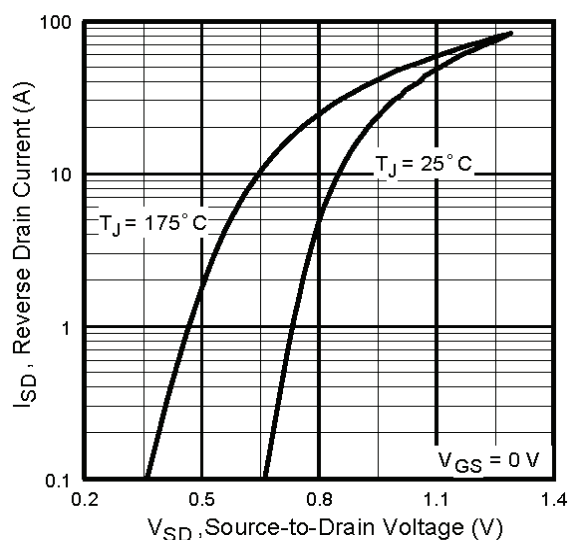
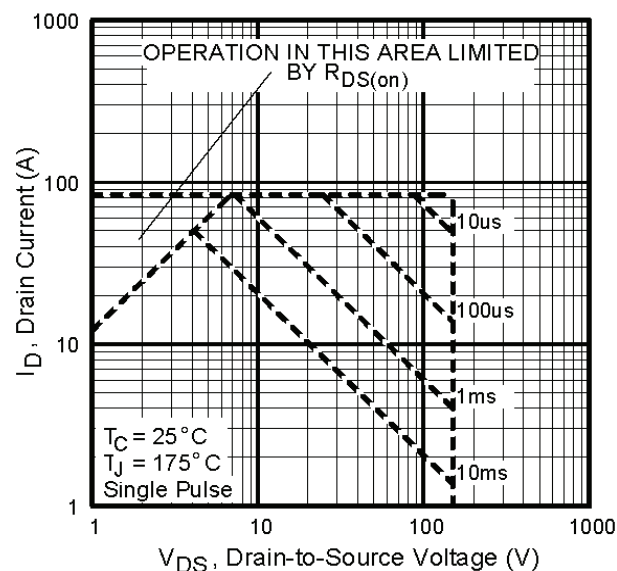

Diode Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	21	A	MOSFET symbol showing the integral reverse p-n junction diode.
I_{SM}	Pulsed Source Current (Body Diode) ①	—	—	84		
V_{SD}	Diode Forward Voltage	—	—	1.3	V	$T_J = 25^\circ\text{C}, I_S = 12A, V_{GS} = 0V$ ④
t_{rr}	Reverse Recovery Time	—	174	260	ns	$T_J = 25^\circ\text{C}, I_F = 12A$
Q_{rr}	Reverse Recovery Charge	—	1.2	1.7	μC	$di/dt = 100A/\mu s$ ④
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 Limited by T_{Jmax} , starting $T_J = 25^\circ\text{C}$, $L = 4.9mH$, $R_G = 25\Omega$, $I_{AS} = 12A$. (See fig.12)
- ③ $I_{SD} \leq 12A$, $di/dt \leq 140A/\mu s$, $V_{DD} \leq V_{(BR)DSS}$, $T_J \leq 175^\circ\text{C}$.
- ④ Pulse width $\leq 300\mu s$; duty cycle $\leq 2\%$.
- ⑤ When mounted on 1" square PCB (FR-4 or G-10 Material). For recommended footprint and soldering techniques refer to application note #AN-994
- ⑥ R_θ is measured at T_J of 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

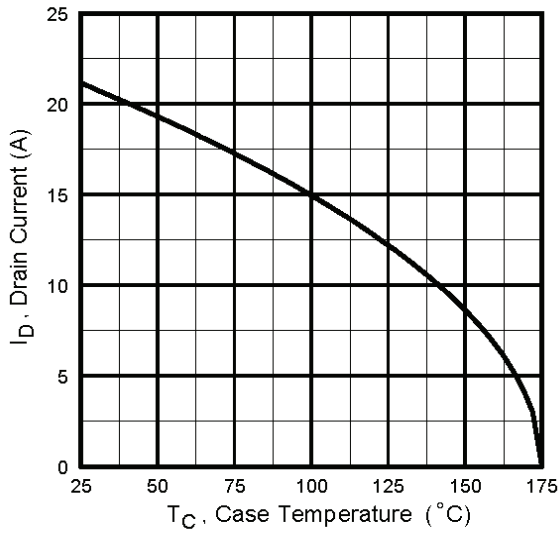


Fig 9. Maximum Drain Current vs. Case Temperature

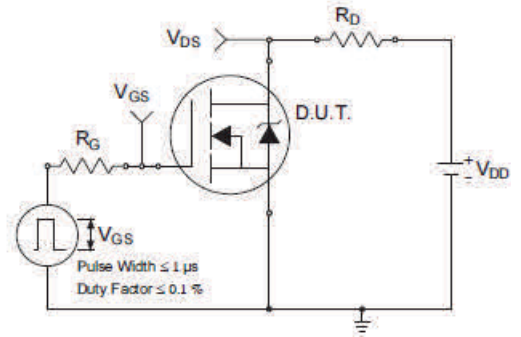


Fig 10a. Switching Time Test Circuit

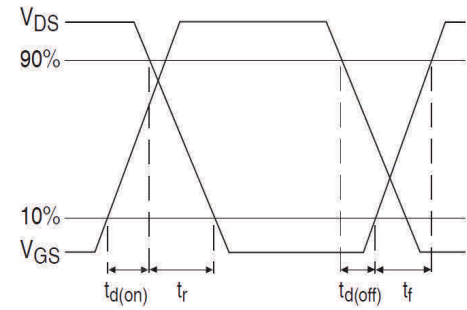


Fig 10b. Switching Time Waveforms

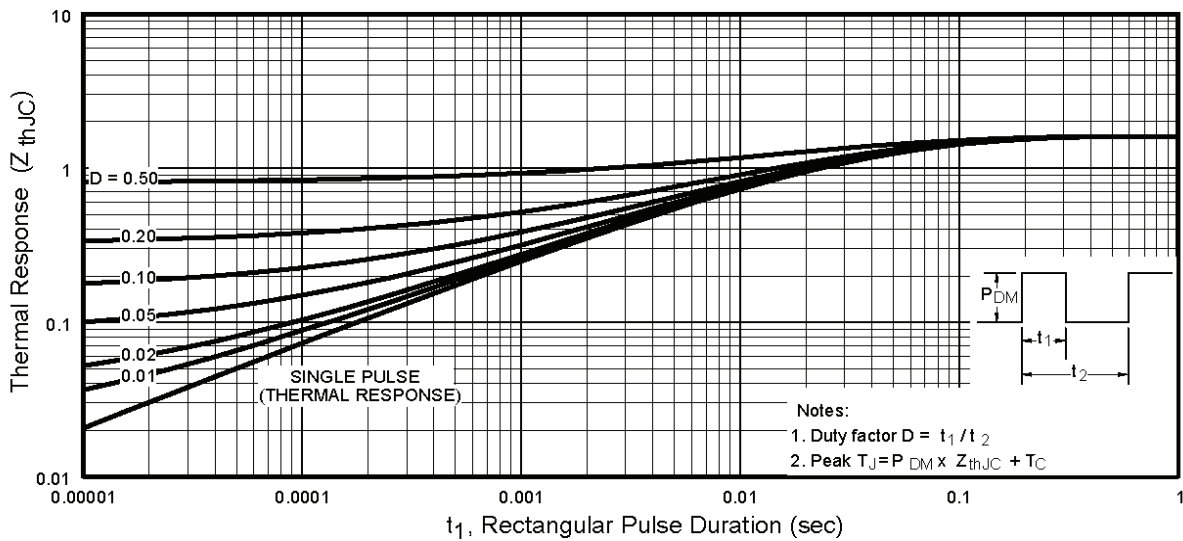
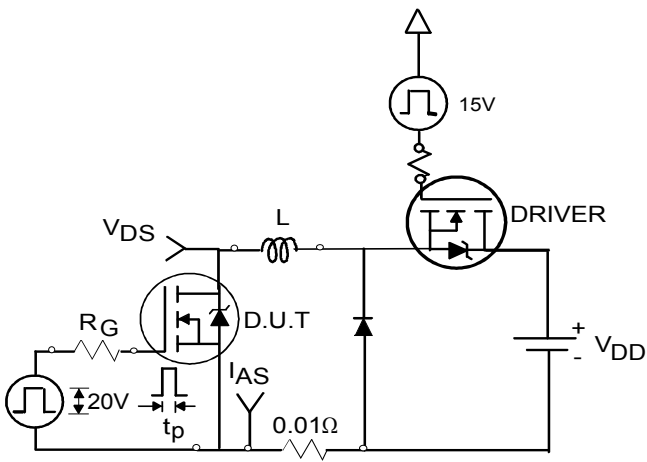
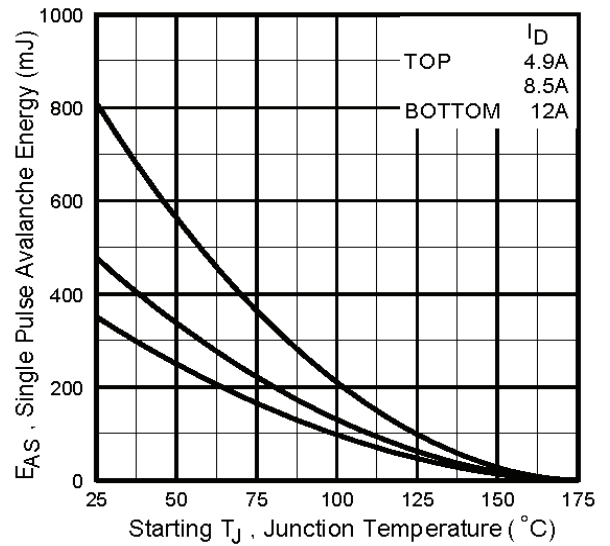
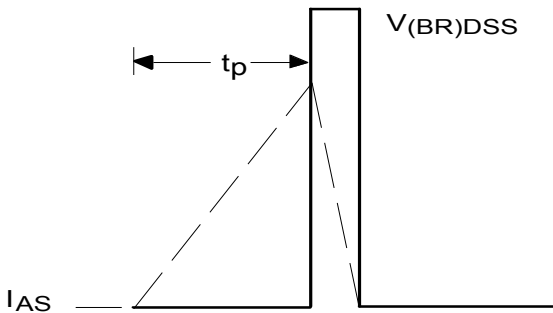
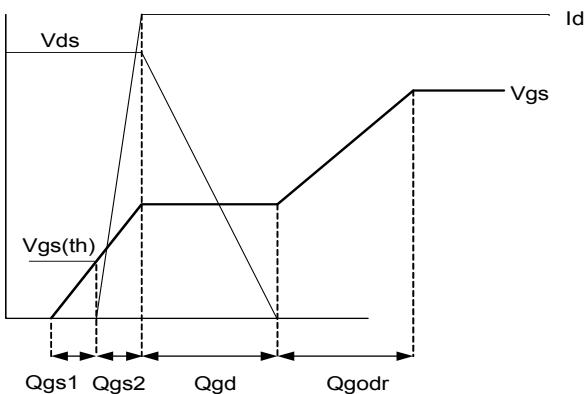
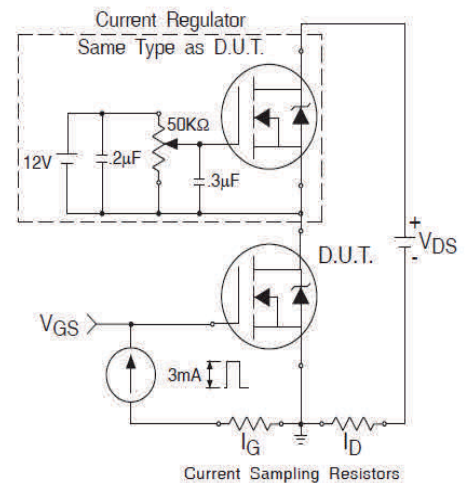


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Case


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

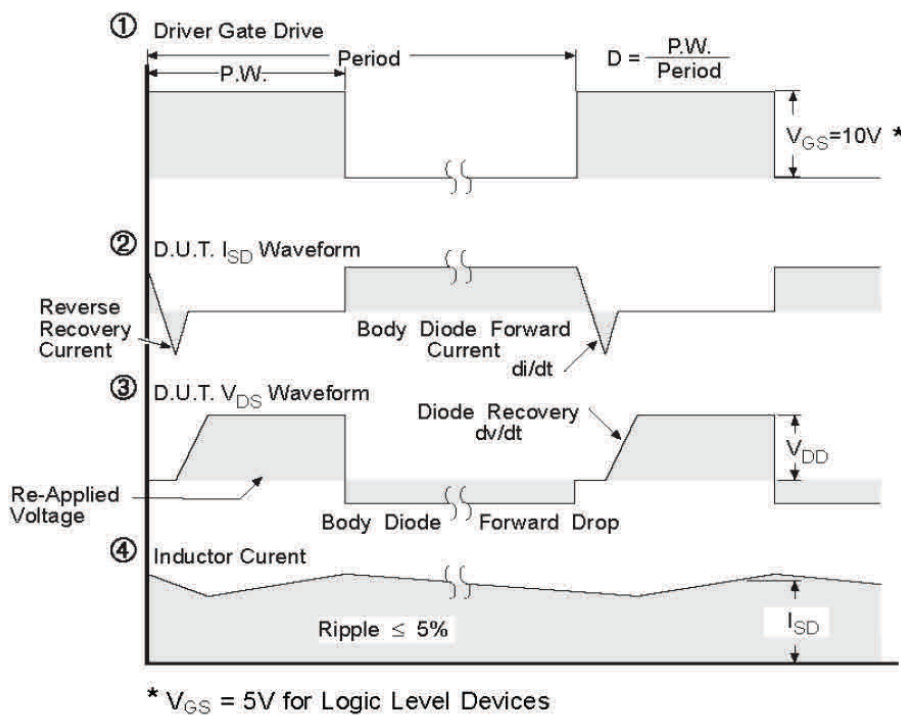
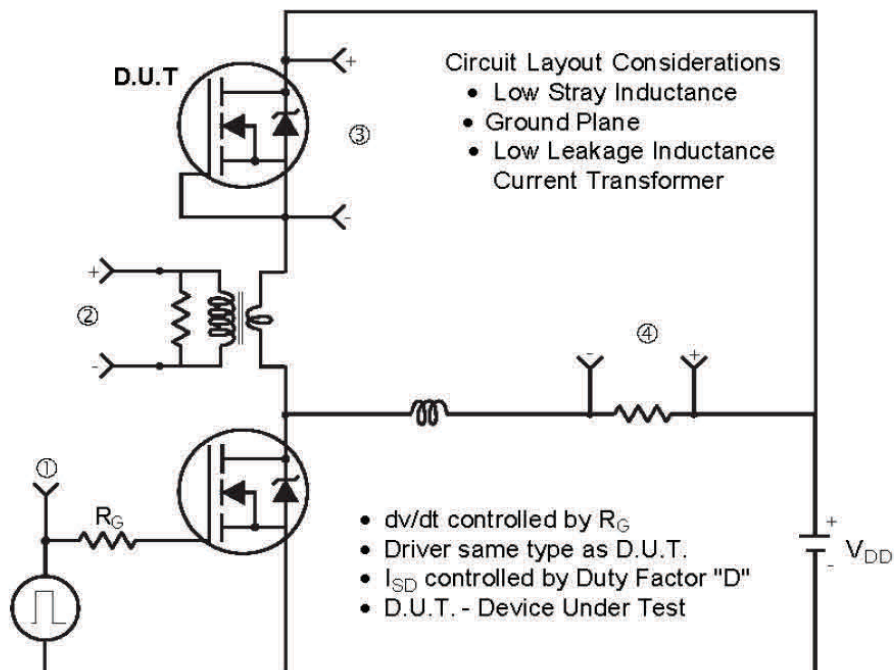
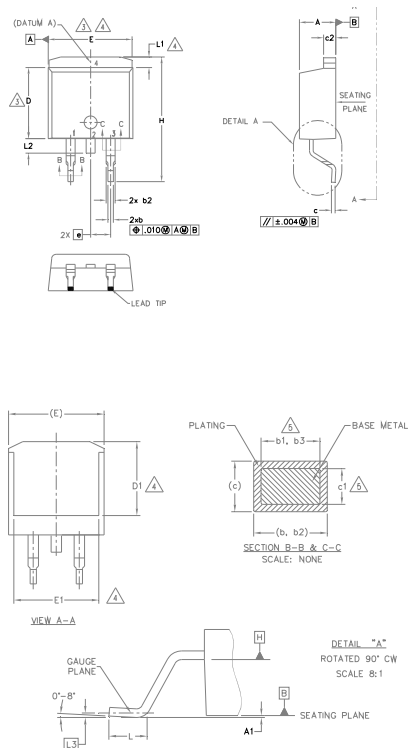


Fig 14. Peak Diode Recovery dv/dt Test Circuit for N-Channel HEXFET® Power MOSFETs

D²Pak (TO-263AB) Package Outline (Dimensions are shown in millimeters (inches))



NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994
2. DIMENSIONS ARE SHOWN IN MILLIMETERS [INCHES].
3. DIMENSION D & E DO NOT INCLUDE MOLD FLASH. MOLD FLASH SHALL NOT EXCEED 0.127 [0.005"] PER SIDE. THESE DIMENSIONS ARE MEASURED AT THE OUTMOST EXTREMES OF THE PLASTIC BODY AT DATUM H.
4. THERMAL PAD CONTOUR OPTIONAL WITHIN DIMENSION E, L1, D1 & E1.
5. DIMENSION b1, b3 AND c1 APPLY TO BASE METAL ONLY.
6. DATUM A & B TO BE DETERMINED AT DATUM PLANE H.
7. CONTROLLING DIMENSION: INCH.
8. OUTLINE CONFORMS TO JEDEC OUTLINE TO-263AB.

SYMBOL	DIMENSIONS				NOTES	
	MILLIMETERS		INCHES			
	MIN.	MAX.	MIN.	MAX.		
A	4.06	4.83	.160	.190		
A1	0.00	0.254	.000	.010		
b	0.51	0.99	.020	.039		
b1	0.51	0.89	.020	.035		5
b2	1.14	1.78	.045	.070	5	
b3	1.14	1.73	.045	.068		
c	0.38	0.74	.015	.029		
c1	0.38	0.58	.015	.023		5
c2	1.14	1.65	.045	.065	3	
D	8.38	9.65	.330	.380		
D1	6.86	—	.270	—		4
E	9.65	10.67	.380	.420		3,4
E1	6.22	—	.245	—	4	
e	2.54 BSC		.100 BSC		4	
H	14.61	15.88	.575	.625		
L	1.78	2.79	.070	.110		
L1	—	1.68	—	.066		4
L2	—	1.78	—	.070		
L3	0.25 BSC		.010 BSC			

LEAD ASSIGNMENTS

DIODES

- 1.- ANODE (TWO DIE) / OPEN (ONE DIE)
- 2.- CATHODE
- 3.- ANODE

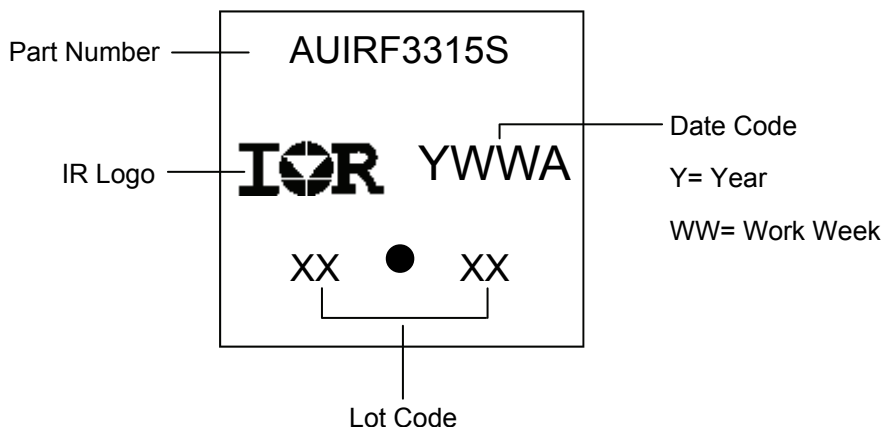
HEXFET

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

IGBTs, CoPACK

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

D²Pak (TO-263AB) Part Marking Information



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

Technical drawing of a 2x2 array of microstrip patch antennas. The drawing includes top and side views of the antenna elements, a detailed plan view of the array, and a cross-sectional view. Dimensions are provided in both inches and millimeters.

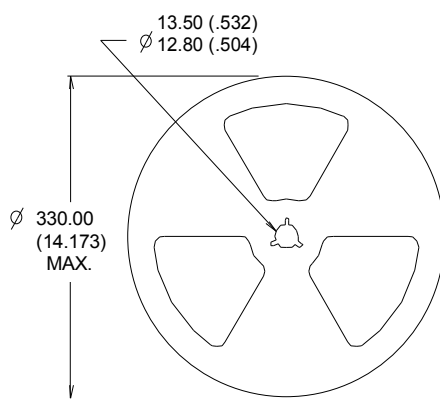
Top View (TRR): Shows the layout of the two rectangular patches. Dimensions include:

- Overall width: 16.10 (.634) / 15.90 (.626)
- Overall height: 11.60 (.457) / 11.40 (.449)
- Distance between patch centers: 10.90 (.429) / 10.70 (.421)
- Distance from left edge to patch center: 4.10 (.161) / 3.90 (.153)
- Distance from top edge to patch center: 1.85 (.073) / 1.65 (.065)
- Distance from right edge to patch center: 1.60 (.063) / 1.50 (.059)
- Distance from bottom edge to patch center: 1.60 (.063) / 1.50 (.059)
- Distance from patch center to right edge: 0.368 (.0145) / 0.342 (.0135)
- Distance from patch center to bottom edge: 0.368 (.0145) / 0.342 (.0135)
- Distance from patch center to left edge: 0.368 (.0145) / 0.342 (.0135)
- Distance from patch center to top edge: 0.368 (.0145) / 0.342 (.0135)

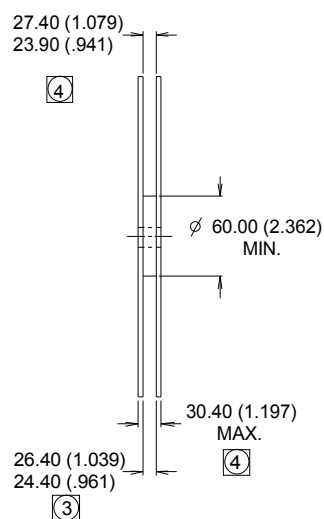
Side View (TRL): Shows the profile of the patches and the feed lines. Dimensions include:

- Overall height: 15.42 (.609) / 15.22 (.601)
- Distance from top edge to patch center: 24.30 (.957) / 23.90 (.941)
- Distance from bottom edge to patch center: 4.72 (.136) / 4.52 (.178)

FEED DIRECTION: Indicated by arrows pointing towards the center of the array.



- NOTES :
1. COMFORMS TO EIA-418.
 2. CONTROLLING DIMENSION: MILLIMETER.
 - ③ DIMENSION MEASURED @ HUB.
 - ④ INCLUDES FLANGE DISTORTION @ OUTER EDGE.



2015-11-13

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 ² -Pak	MSL1
ESD	Machine Model	Class M4 (+/- 600V) [†] AEC-Q101-002	
	Human Body Model	Class H1C (+/- 2000V) [†] AEC-Q101-001	
	Charged Device Model	Class C5 (+/- 2000V) [†] AEC-Q101-005	
RoHS Compliant		Yes	

† Highest passing voltage.

Revision History

Date	Comments
11/13/2015	<ul style="list-style-type: none"> Updated datasheet with corporate template Corrected ordering table on page 1. Corrected typo in test condition current from "43A" to "12A" for VSD and trr/Qrr on page 2.

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 ("Beschaffenheitsgarantie"). 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.