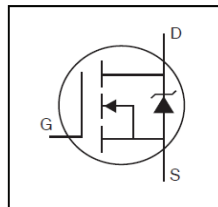
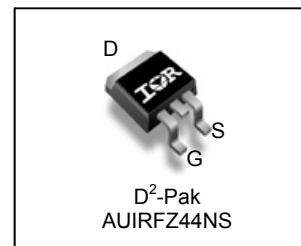


Features

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



V_{DSS}	55V
R_{DS(on)} max.	17.5mΩ
I_D	49A



G	D	S
Gate	Drain	Source

Description

Specifically designed for Automotive applications, this HEXFET® Power MOSFET utilizes the latest processing techniques to achieve extremely low on-resistance per silicon area. Additional features of this design are a 175°C junction operating temperature, fast switching speed and improved repetitive avalanche rating. These features combine to make this design an extremely efficient and reliable device for use in Automotive applications and a wide variety of other applications

Base part number	Package Type	Standard Pack		Orderable Part Number
		Form	Quantity	
AUIRFZ44NS	D²-Pak	Tube	50	AUIRFZ44NS
		Tape and Reel Left	800	AUIRFZ44NSTRL

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	49	A
I _D @ T _C = 100°C	Continuous Drain Current, V _{GS} @ 10V	35	
I _{DM}	Pulsed Drain Current ①	160	
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} (Thermally Limited)	Single Pulse Avalanche Energy (Thermally Limited) ⑥	150	mJ
E _{AS} (Tested)	Single Pulse Avalanche Energy (Tested Limited) ⑤	530	
I _{AR}	Avalanche Current ①	25	A
E _{AR}	Repetitive Avalanche Energy ①	9.4	mJ
dv/dt	Peak Diode Recovery ③	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 _{θJC}	Junction-to-Case	—	1.5	°C/W
R _{θJA}	Junction-to-Ambient (PCB Mount), D² Pak	—	40	

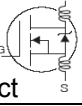
HEXFET® is a registered trademark of Infineon.

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

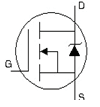
Static @ $T_J = 25^\circ\text{C}$ (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	55	—	—	V	$V_{GS} = 0V, I_D = 250\mu A$
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	0.058	—	V/ $^\circ\text{C}$	Reference to 25°C , $I_D = 1\text{mA}$
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	—	17.5	m Ω	$V_{GS} = 10V, I_D = 25A$ ④
$V_{GS(th)}$	Gate Threshold Voltage	2.0	—	4.0	V	$V_{DS} = V_{GS}, I_D = 250\mu A$
g_{fs}	Forward Trans conductance	19	—	—	S	$V_{DS} = 25V, I_D = 25A$
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		$V_{GS} = -20V$

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

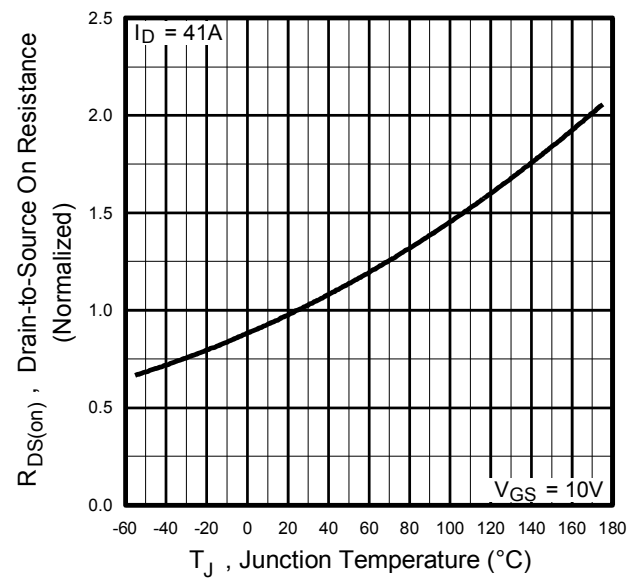
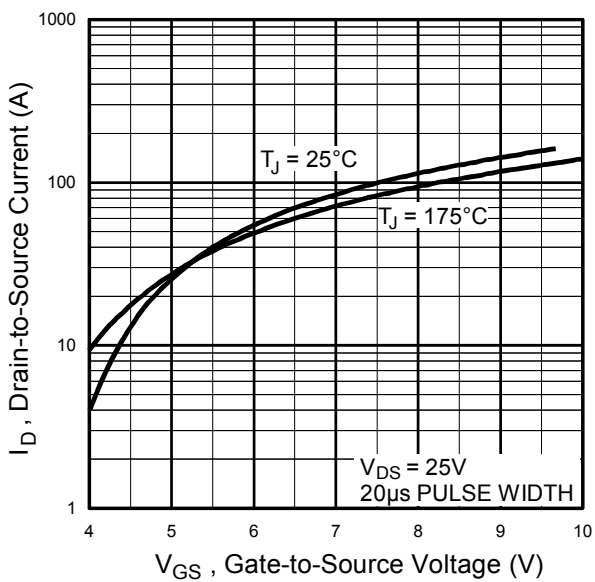
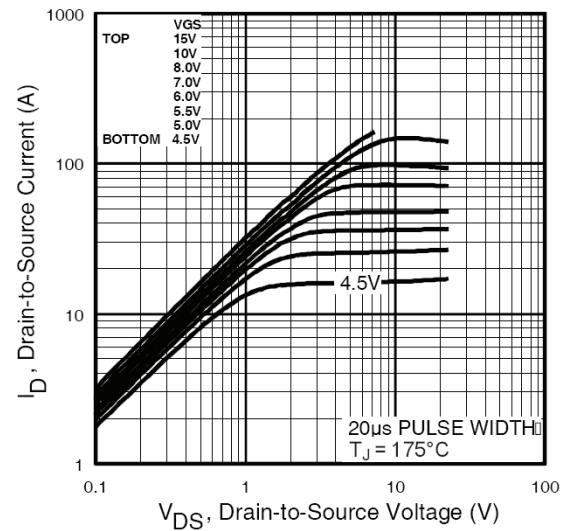
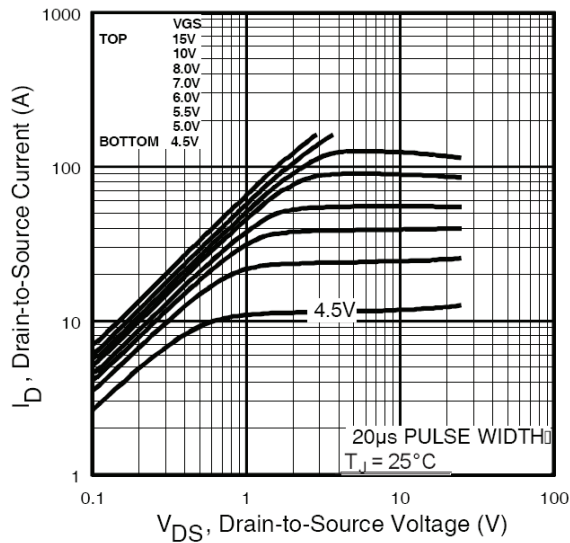
Q_g	Total Gate Charge	—	—	63	nC	$I_D = 25A$ $V_{DS} = 44V$ $V_{GS} = 10V$, See Fig. 6 and 13 ④
Q_{gs}	Gate-to-Source Charge	—	—	14		
Q_{gd}	Gate-to-Drain Charge	—	—	23		
$t_{d(on)}$	Turn-On Delay Time	—	12	—	ns	$V_{DD} = 28V$ $I_D = 25A$ $R_G = 12\Omega$ $V_{GS} = 10V$, See Fig. 10 ④
t_r	Rise Time	—	60	—		
$t_{d(off)}$	Turn-Off Delay Time	—	44	—		
t_f	Fall Time	—	45	—		
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	—	1470	—	pF	$V_{GS} = 0V$ $V_{DS} = 25V$ $f = 1.0\text{MHz}$, See Fig. 5
C_{oss}	Output Capacitance	—	360	—		
C_{rss}	Reverse Transfer Capacitance	—	88	—		

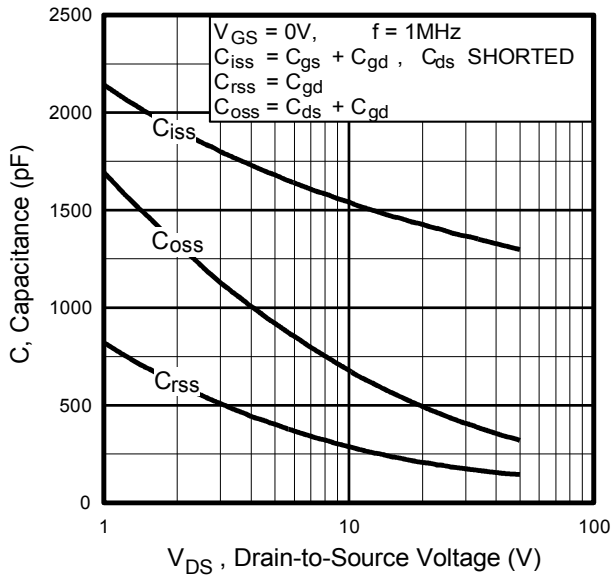
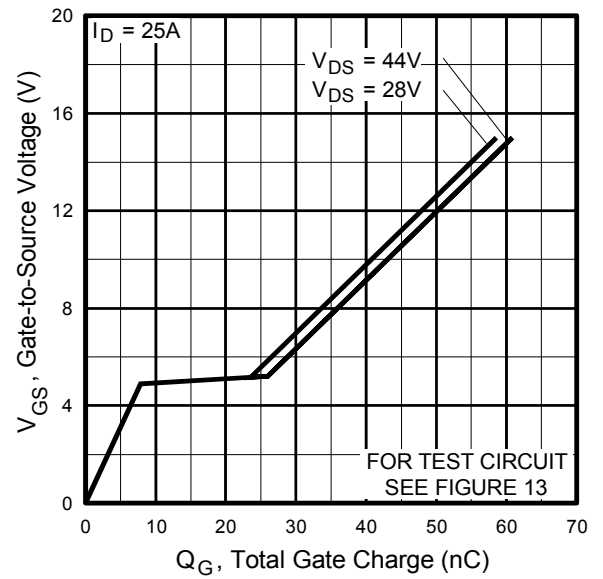
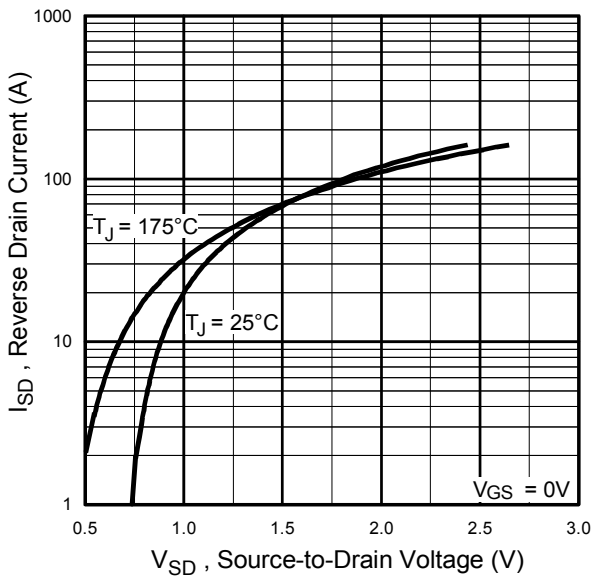
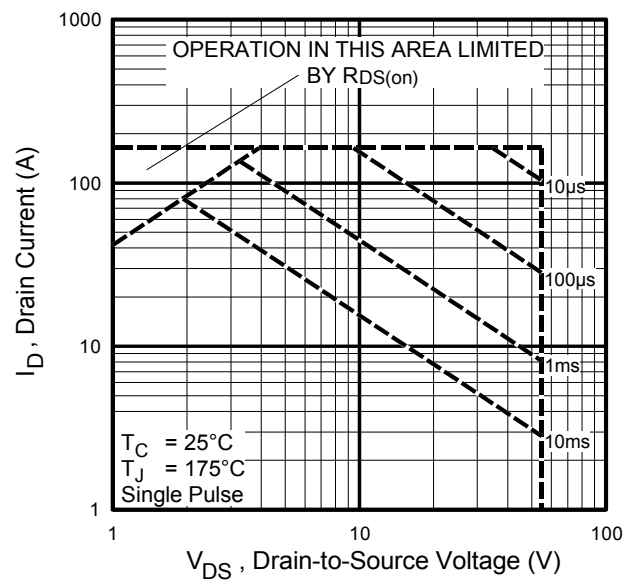
Diode Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	49	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I_{SM}	Pulsed Source Current (Body Diode) ①	—	—	160		
V_{SD}	Diode Forward Voltage	—	—	1.3	V	$T_J = 25^\circ\text{C}, I_S = 25A, V_{GS} = 0V$ ④
t_{rr}	Reverse Recovery Time	—	63	95	ns	$T_J = 25^\circ\text{C}, I_F = 25A$
Q_{rr}	Reverse Recovery Charge	—	170	260	nC	$di/dt = 100A/\mu s$ 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 $T_J = 25^\circ\text{C}$, $L = 0.48\text{mH}$, $R_G = 25\Omega$, $I_{AS} = 25A$, $V_{GS} = 10V$. (See fig.12)
- ③ $I_{SD} \leq 25A$, $di/dt \leq 230A/\mu s$, $V_{DD} \leq V_{(BR)DSS}$, $T_J \leq 175^\circ\text{C}$.
- ④ Pulse width $\leq 400\mu s$; duty cycle $\leq 2\%$.
- ⑤ This is a typical value at device destruction and represents operation outside rated limits.
- ⑥ This is a calculated value limited to $T_J = 175^\circ\text{C}$.




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

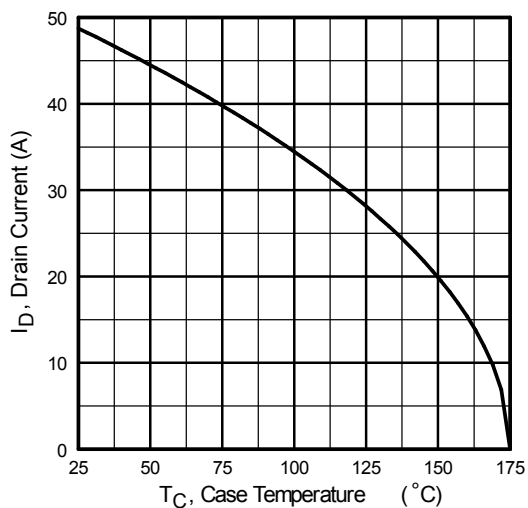


Fig 9. Maximum Drain Current vs. Case Temperature

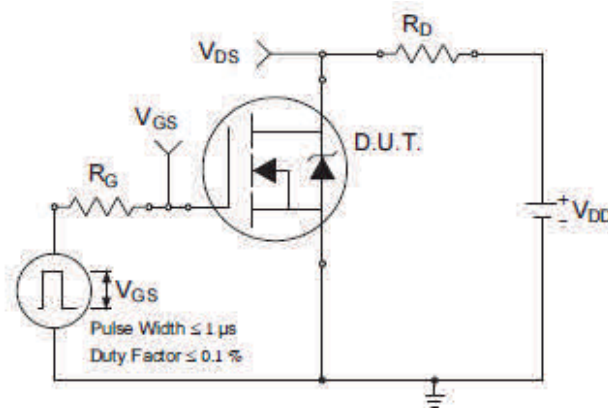


Fig 10a. Switching Time Test Circuit

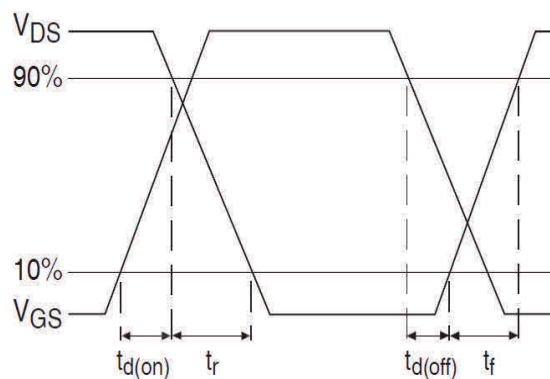


Fig 10b. Switching Time Waveforms

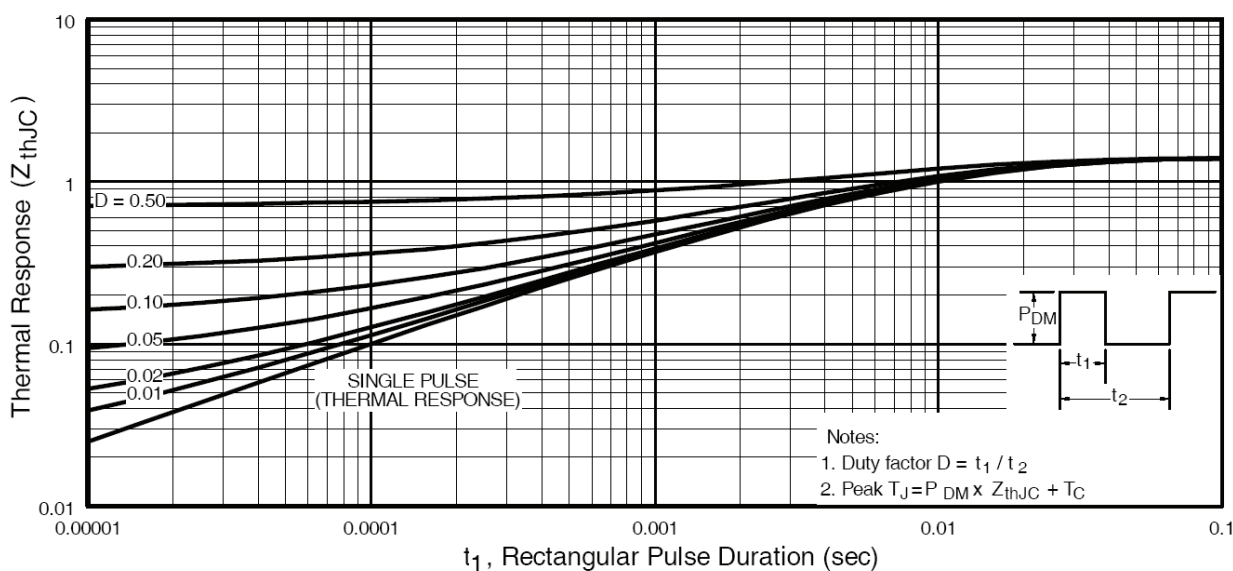
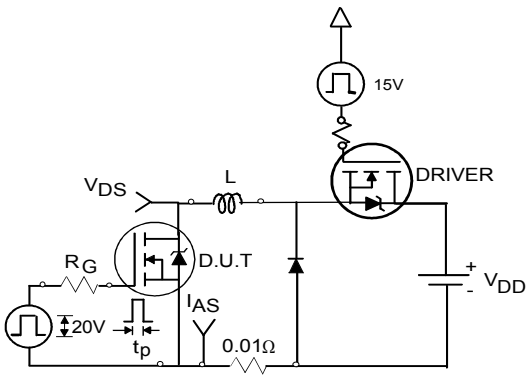
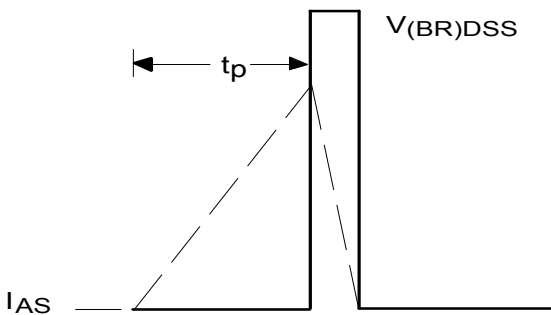
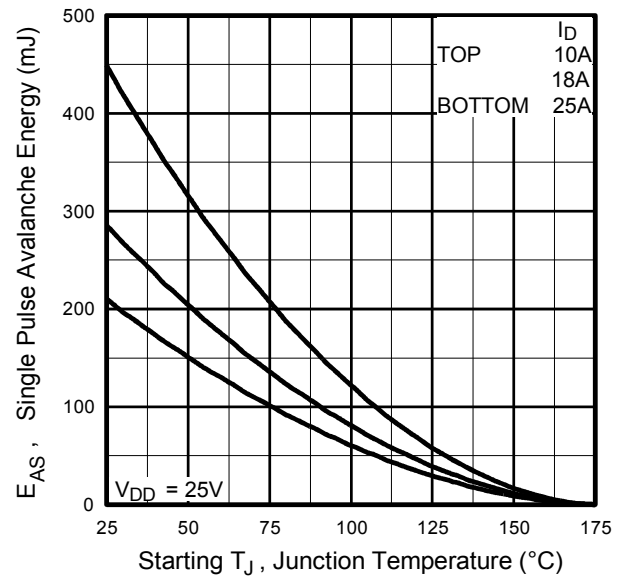
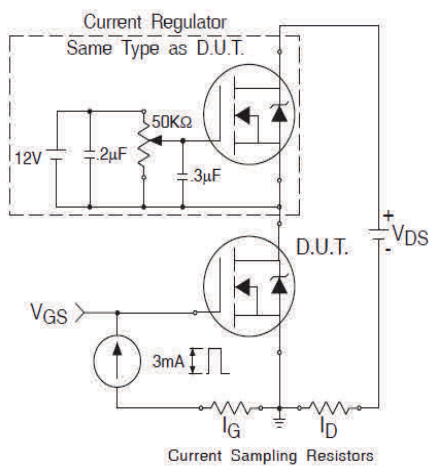
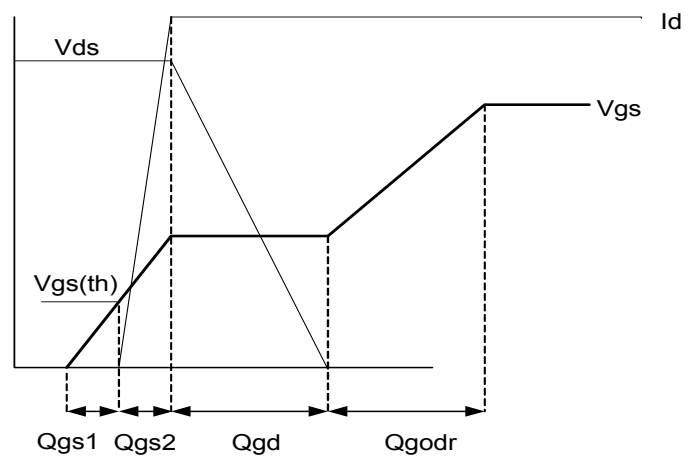


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Case


Fig 12a. Unclamped Inductive Test Circuit

Fig 12b. Unclamped Inductive Waveforms

Fig 12c. Maximum Avalanche Energy vs. Drain Current

Fig 13a. Gate Charge Test Circuit

Fig 13b. Gate Charge Waveform

Peak Diode Recovery dv/dt Test Circuit

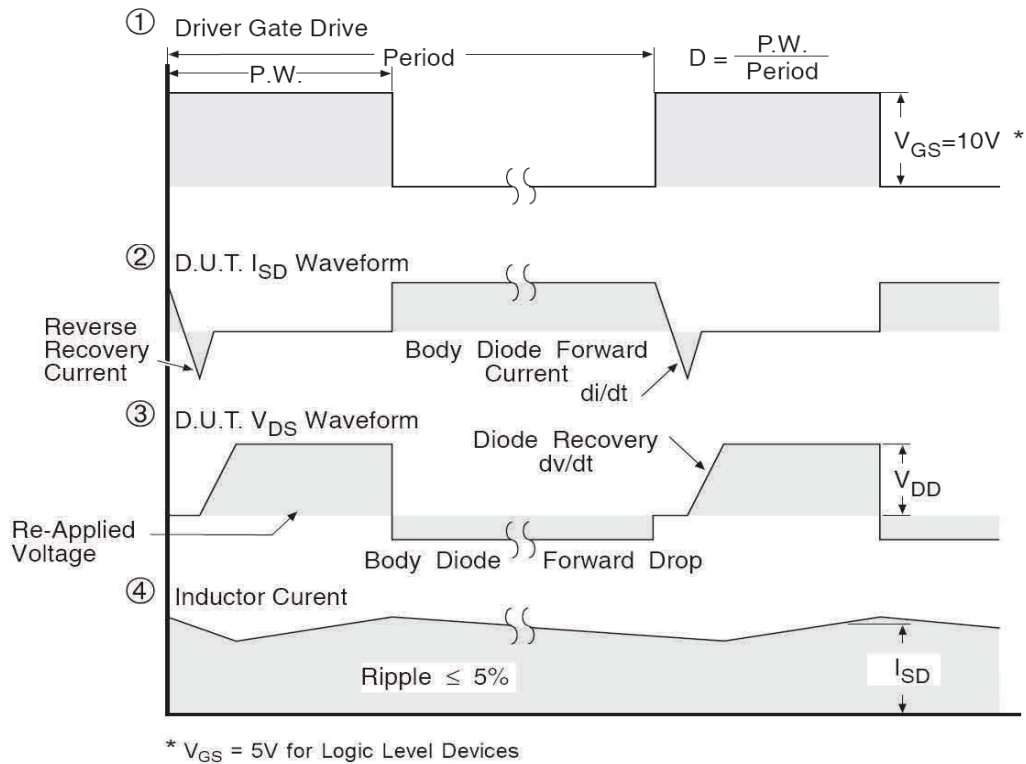
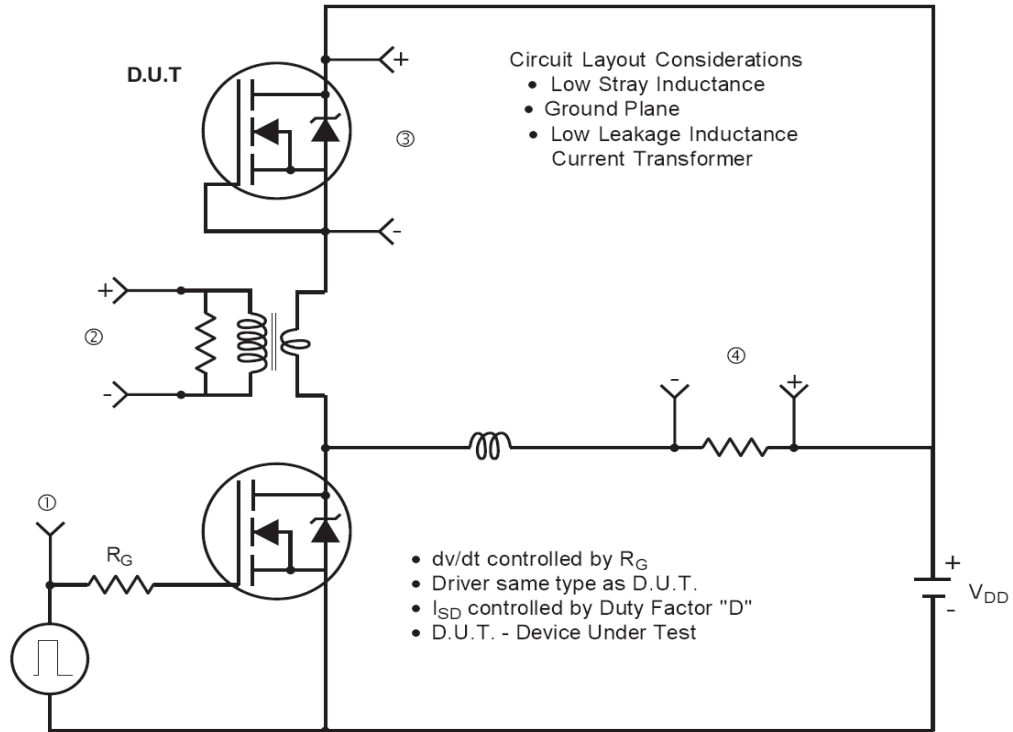
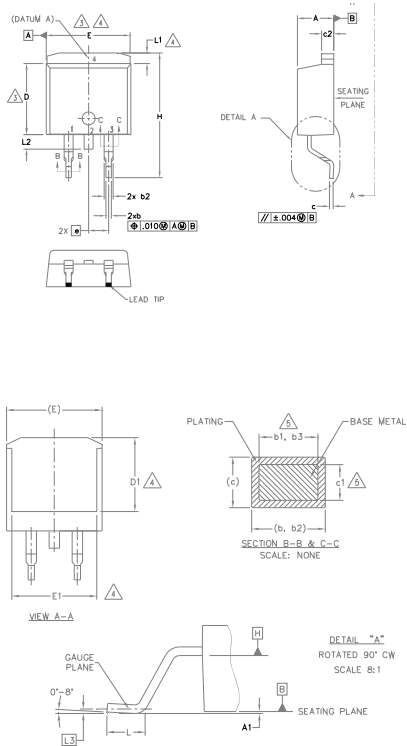


Fig 14. Peak Diode Recovery dv/dt Test Circuit for N-Channel HEXFET® Power MOSFETs

D²-Pak (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	5
A1	0.00	0.254	.000	.010	
b	0.51	0.99	.020	.039	
b1	0.51	0.89	.020	.035	
b2	1.14	1.78	.045	.070	
b3	1.14	1.73	.045	.068	5
c	0.38	0.74	.015	.029	5
c1	0.38	0.58	.015	.023	
c2	1.14	1.65	.045	.065	
D	8.38	9.65	.330	.380	3
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	
L2	—	1.78	—	.070	
L3	0.25 BSC		.010 BSC		

LEAD ASSIGNMENTS

DIODES

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

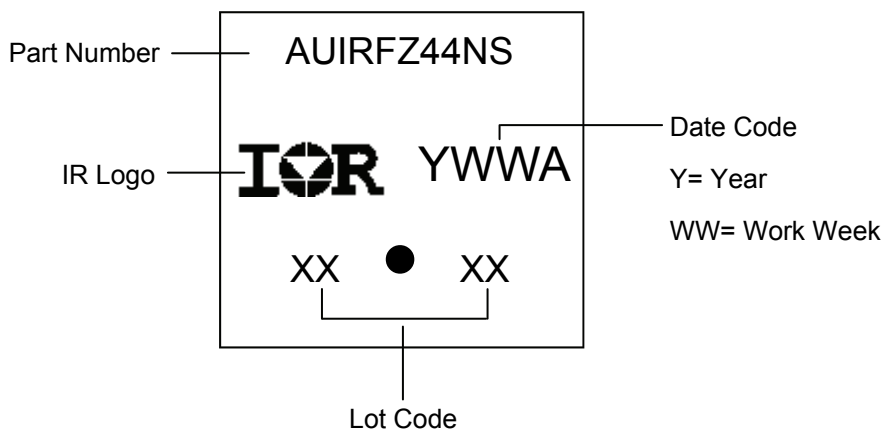
HEXFET

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

IGBTs, CoPACK

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

D²-Pak (TO-263AB) Part Marking Information



Technical drawing of a 2x2 array of microstrip patch antennas. The drawing includes top and bottom views of the antenna array, a side view, and a detailed view of the patch. Dimensions are given in inches and millimeters.

Top View Dimensions:

- Overall width: 11.60 (.457)
- Overall height: 11.40 (.449)
- Distance between patch centers (horizontal): 4.10 (.161)
- Distance between patch centers (vertical): 3.90 (.153)
- Distance from center of array to edge (horizontal): 1.60 (.063)
- Distance from center of array to edge (vertical): 1.50 (.059)
- Distance from center of array to edge (horizontal, inner): 1.85 (.073)
- Distance from center of array to edge (vertical, inner): 1.65 (.065)
- Distance from center of array to edge (horizontal, outer): 10.90 (.429)
- Distance from center of array to edge (vertical, outer): 10.70 (.421)
- Distance from center of array to edge (horizontal, outer, inner): 16.10 (.634)
- Distance from center of array to edge (vertical, outer, inner): 15.90 (.626)

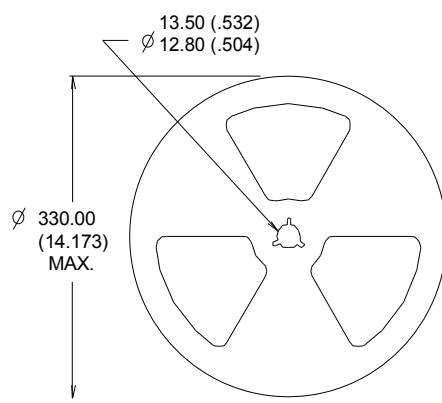
Side View Dimensions:

- Height of antenna: 0.368 (.0145)
- Height of antenna (inner): 0.342 (.0135)
- Distance from center of array to edge (horizontal, outer): 15.42 (.609)
- Distance from center of array to edge (vertical, outer): 24.30 (.957)
- Distance from center of array to edge (horizontal, outer, inner): 15.22 (.601)
- Distance from center of array to edge (vertical, outer, inner): 23.90 (.941)
- Distance from center of array to edge (horizontal, outer, inner): 4.72 (.136)
- Distance from center of array to edge (vertical, outer, inner): 4.52 (.178)

Bottom View Dimensions:

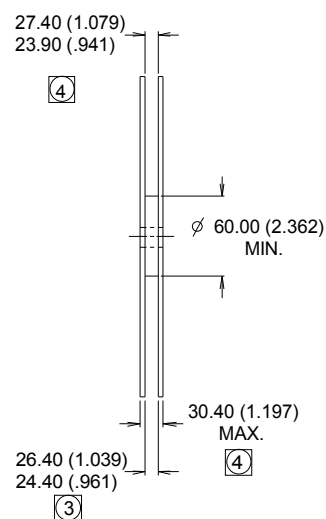
- Distance between patch centers (horizontal): 1.60 (.063)
- Distance between patch centers (vertical): 1.50 (.059)
- Distance from center of array to edge (horizontal): 1.75 (.069)
- Distance from center of array to edge (vertical): 1.25 (.049)

Feed Direction: Indicated by arrows pointing towards the center of the array.



NOTES:

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



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 M3 (+/- 400V) [†] AEC-Q101-002	
	Human Body Model	Class H1B (+/- 1000V) [†] AEC-Q101-001	
	Charged Device Model	Class C5 (+/- 2000V) [†] AEC-Q101-005	
RoHS Compliant		Yes	

† Highest passing voltage.

Revision History

Date	Comments
10/27/2015	- Updated datasheet with corporate template - Corrected ordering table on page 1.
10/25/2017	- Removed TO-262 Pak "AUIRFL3207Z" this devices TO-262 Pak was never released and this part was erroneously added to the datasheet. –All pages - Corrected typo error on part marking on page 8.

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