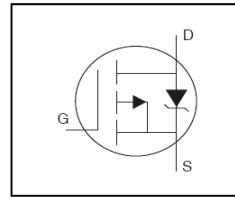
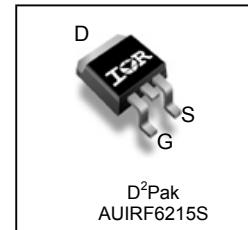


Features

- Advanced Planar Technology
- Low On-Resistance
- P-Channel MOSFET
- Dynamic dv/dt Rating
- 175°C Operating Temperature
- Fast Switching
- Fully Avalanche Rated
- Repetitive Avalanche Allowed up to T_{jmax}
- Lead-Free, RoHS Compliant
- Automotive Qualified *



HEXFET® Power MOSFET	
V_{DSS}	-150V
$R_{DS(on)}$ max.	0.29Ω
I_D	-13A



G	D	S
Gate	Drain	Source

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.

Base part number	Package Type	Standard Pack		Orderable Part Number
		Form	Quantity	
AUIRF6215S	D²-Pak	Tube	50	AUIRF6215S
		Tape and Reel Left	800	AUIRF6215STRL

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 @ $T_C = 25^\circ\text{C}$	Continuous Drain Current, V_{GS} @ -10V	-13	A
I_D @ $T_C = 100^\circ\text{C}$	Continuous Drain Current, V_{GS} @ -10V	-9.0	
I_{DM}	Pulsed Drain Current ①	-44	
P_D @ $T_A = 25^\circ\text{C}$	Maximum Power Dissipation	3.8	W
P_D @ $T_C = 25^\circ\text{C}$	Maximum Power Dissipation	110	
	Linear Derating Factor	0.71	W/°C
V_{GS}	Gate-to-Source Voltage	± 20	V
E_{AS}	Single Pulse Avalanche Energy (Thermally Limited) ②	310	mJ
I_{AR}	Avalanche Current ①	-6.6	A
E_{AR}	Repetitive Avalanche Energy ①	11	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
$R_{\theta JC}$	Junction-to-Case ④	—	1.4	°C/W
$R_{\theta JA}$	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
$V_{(\text{BR})\text{DSS}}$	Drain-to-Source Breakdown Voltage	-150	—	—	V	$V_{GS} = 0\text{V}, I_D = -250\mu\text{A}$
$\Delta V_{(\text{BR})\text{DSS}}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	-0.20	—	V/ $^\circ\text{C}$	Reference to 25°C , $I_D = -1\text{mA}$
$R_{\text{DS}(\text{on})}$	Static Drain-to-Source On-Resistance	—	—	0.29	Ω	$V_{GS} = -10\text{V}, I_D = -6.6\text{A}$ ④
		—	—	0.58		$V_{GS} = -10\text{V}, I_D = -6.6\text{A}, T_J = 150^\circ\text{C}$ ④
$V_{GS(\text{th})}$	Gate Threshold Voltage	-2.0	—	-4.0	V	$V_{DS} = V_{GS}, I_D = -250\mu\text{A}$
g_{fs}	Forward Trans conductance	3.6	—	—	S	$V_{DS} = -25\text{V}, I_D = -6.6\text{A}$
I_{DSS}	Drain-to-Source Leakage Current	—	—	-25	μA	$V_{DS} = -150\text{V}, V_{GS} = 0\text{V}$
		—	—	-250		$V_{DS} = -120\text{V}, V_{GS} = 0\text{V}, T_J = 150^\circ\text{C}$
I_{GSS}	Gate-to-Source Forward Leakage	—	—	-100	nA	$V_{GS} = -20\text{V}$
	Gate-to-Source Reverse Leakage	—	—	100		$V_{GS} = 20\text{V}$

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

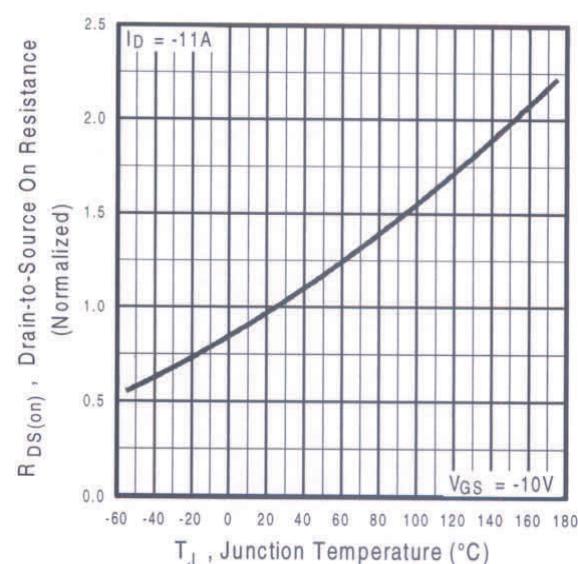
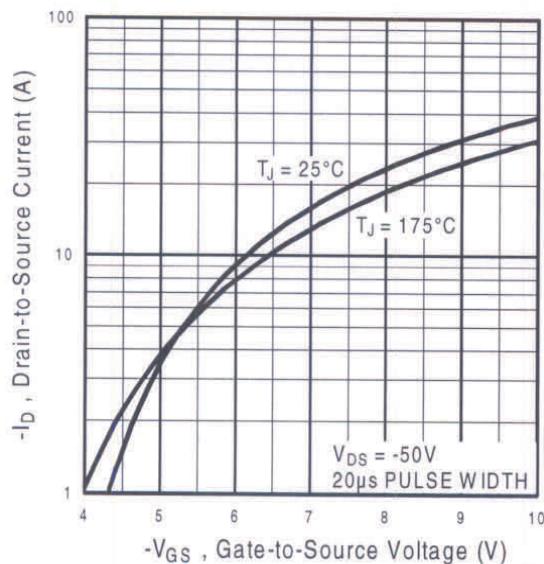
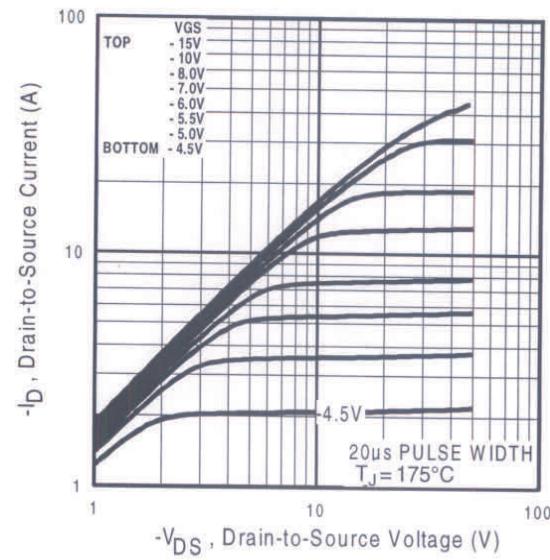
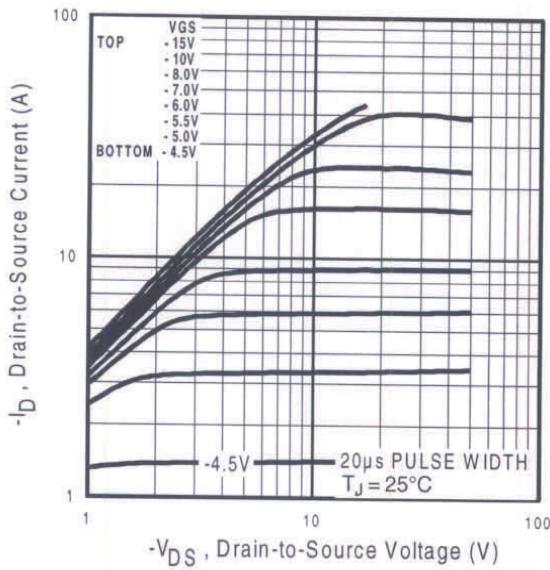
Q_g	Total Gate Charge	—	—	66	nC	$I_D = -6.6\text{A}$ $V_{DS} = -120\text{V}$ $V_{GS} = -10\text{V}$ ④
Q_{gs}	Gate-to-Source Charge	—	—	8.1		
Q_{qd}	Gate-to-Drain Charge	—	—	35		
$t_{d(\text{on})}$	Turn-On Delay Time	—	14	—	ns	$V_{DD} = -75\text{V}$ $I_D = -6.6\text{A}$ $R_G = 6.8\Omega$, $R_D = 12\Omega$ ④
t_r	Rise Time	—	36	—		
$t_{d(\text{off})}$	Turn-Off Delay Time	—	53	—		
t_f	Fall Time	—	37	—		
L_s	Internal Source Inductance	—	7.5	—	nH	Between lead, 6mm (0.25in.) from package and center of die contact
C_{iss}	Input Capacitance	—	860	—	pF	$V_{GS} = 0\text{V}$
C_{oss}	Output Capacitance	—	220	—		$V_{DS} = -25\text{V}$
C_{rss}	Reverse Transfer Capacitance	—	130	—		$f = 1.0\text{MHz}$, See Fig.5

Diode Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I_s	Continuous Source Current (Body Diode)	—	—	-11	A	MOSFET symbol showing the integral reverse p-n junction diode.
I_{sM}	Pulsed Source Current (Body Diode) ①	—	—	-44		
V_{SD}	Diode Forward Voltage	—	—	-1.6	V	$T_J = 25^\circ\text{C}, I_s = -6.6\text{A}, V_{GS} = 0\text{V}$ ④
t_{rr}	Reverse Recovery Time	—	160	240	ns	$T_J = 25^\circ\text{C}, I_F = -6.6\text{A}$
Q_{rr}	Reverse Recovery Charge	—	1.2	1.7	μC	$di/dt = 100\text{A}/\mu\text{s}$ 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 $T_{J\text{max}}$, starting $T_J = 25^\circ\text{C}$, $L = 14\text{mH}$, $R_G = 25\Omega$, $I_{AS} = -6.6\text{A}$. (See fig.12)
- ③ $I_{SD} \leq -6.6\text{A}$, $di/dt \leq 620\text{A}/\mu\text{s}$, $V_{DD} \leq V_{(\text{BR})\text{DSS}}$, $T_J \leq 175^\circ\text{C}$.
- ④ Pulse width $\leq 300\mu\text{s}$; 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_0 is measured at T_J of approximately 90°C



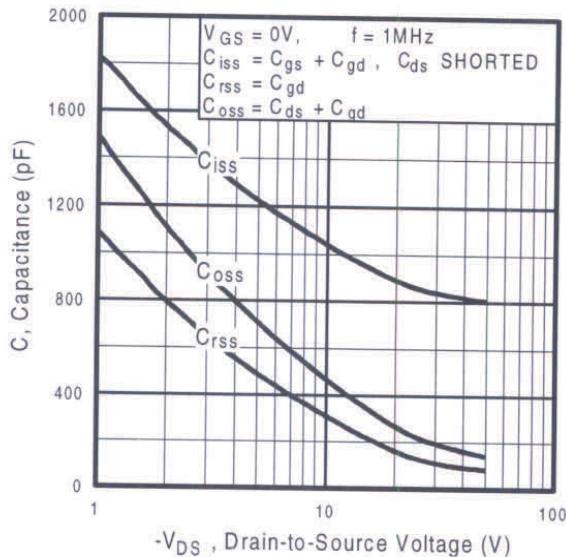


Fig. 5. Typical Capacitance vs. Drain-to-Source Voltage

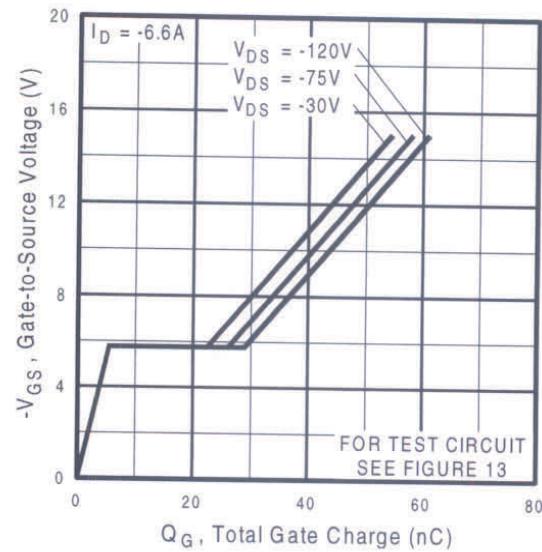


Fig. 6. Typical Gate Charge vs. Gate-to-Source Voltage

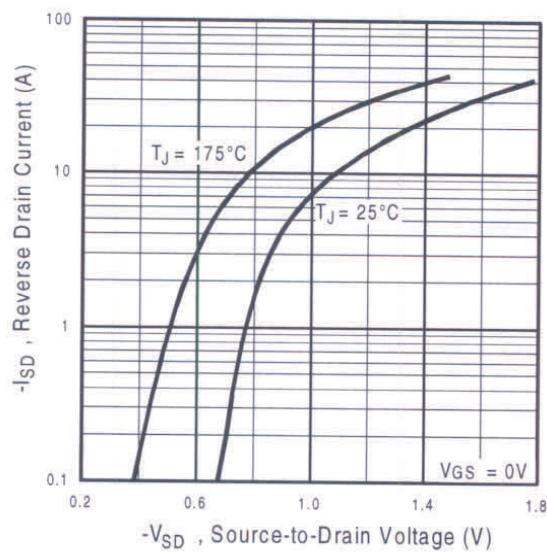


Fig. 7 Typical Source-to-Drain Diode Forward Voltage

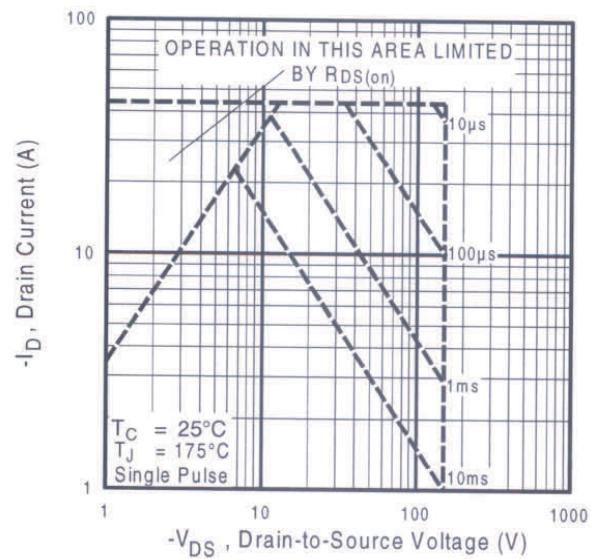


Fig. 8. Maximum Safe Operating Area

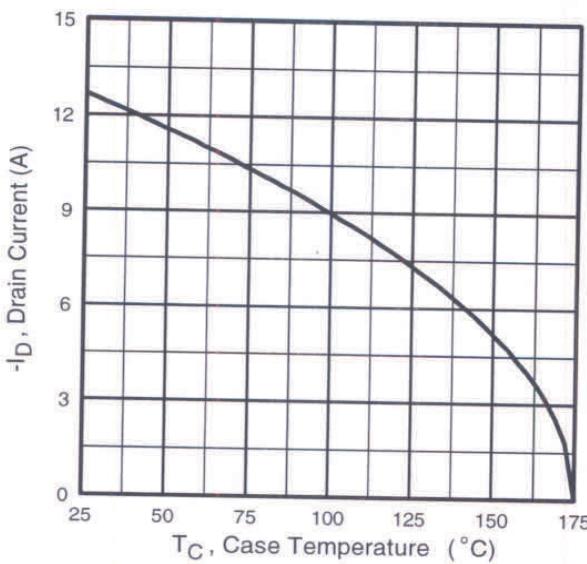


Fig 9. Maximum Drain Current vs. Case Temperature

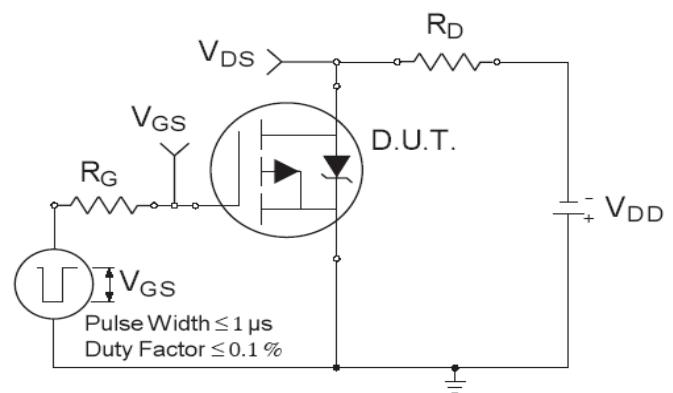


Fig 10a. Switching Time Test Circuit

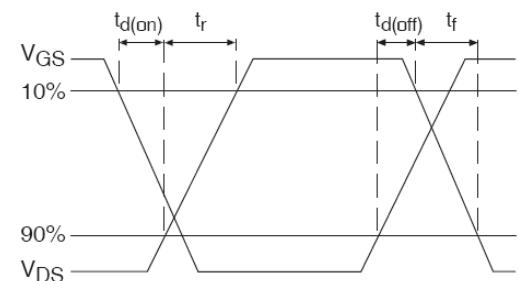


Fig 10b. Switching Time Waveforms

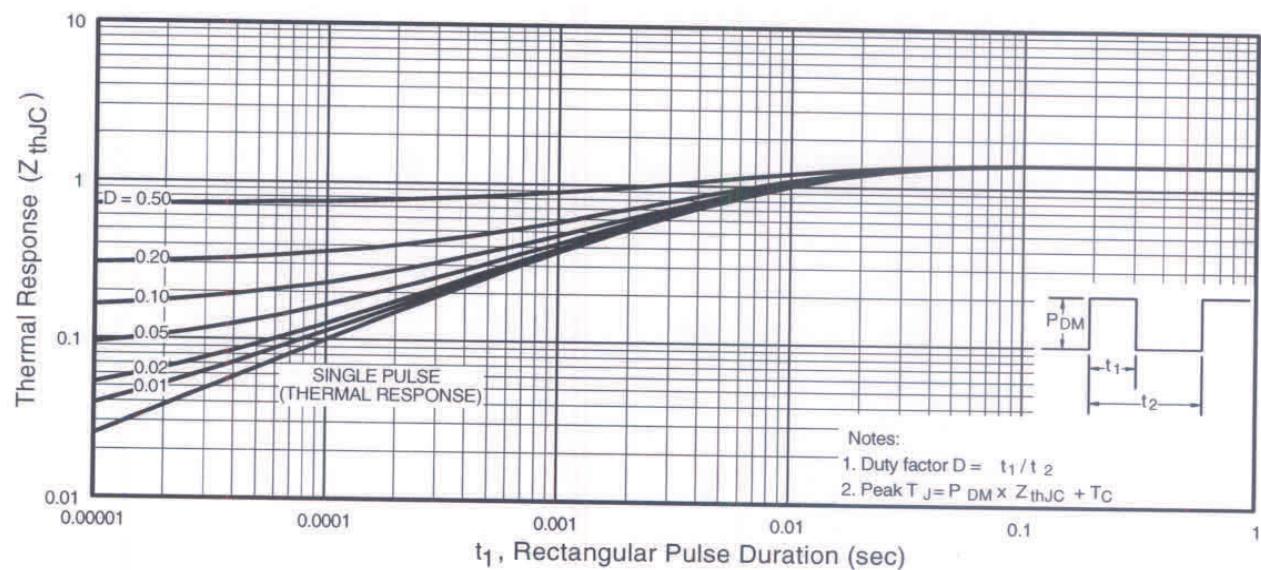


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Case

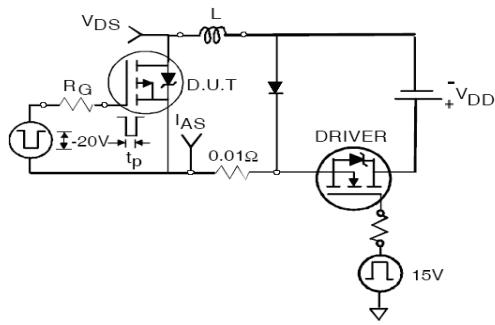


Fig 12a. Unclamped Inductive Test Circuit

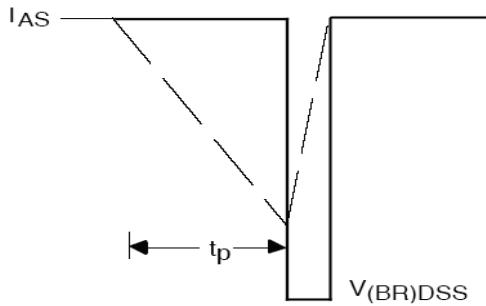


Fig 12b. Unclamped Inductive Waveforms

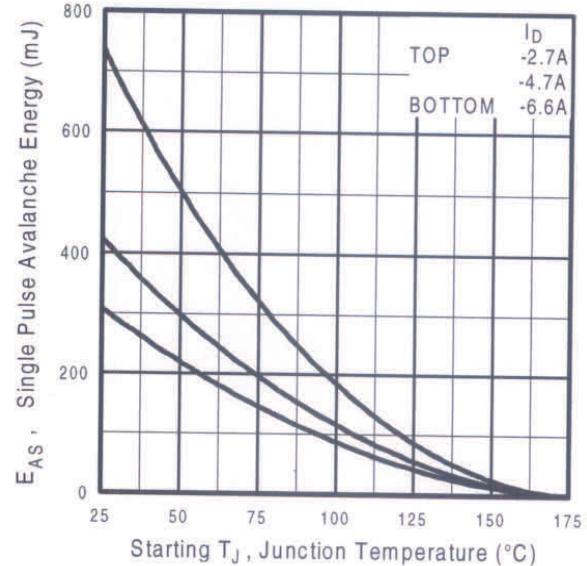


Fig 12c. Maximum Avalanche Energy vs. Drain Current

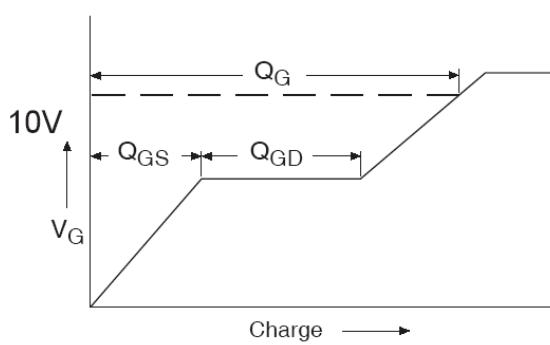


Fig 13a. Gate Charge Waveform

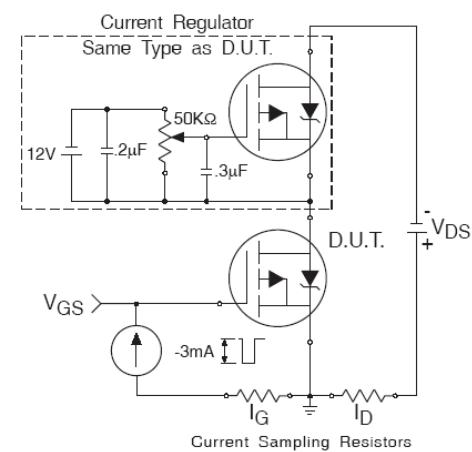
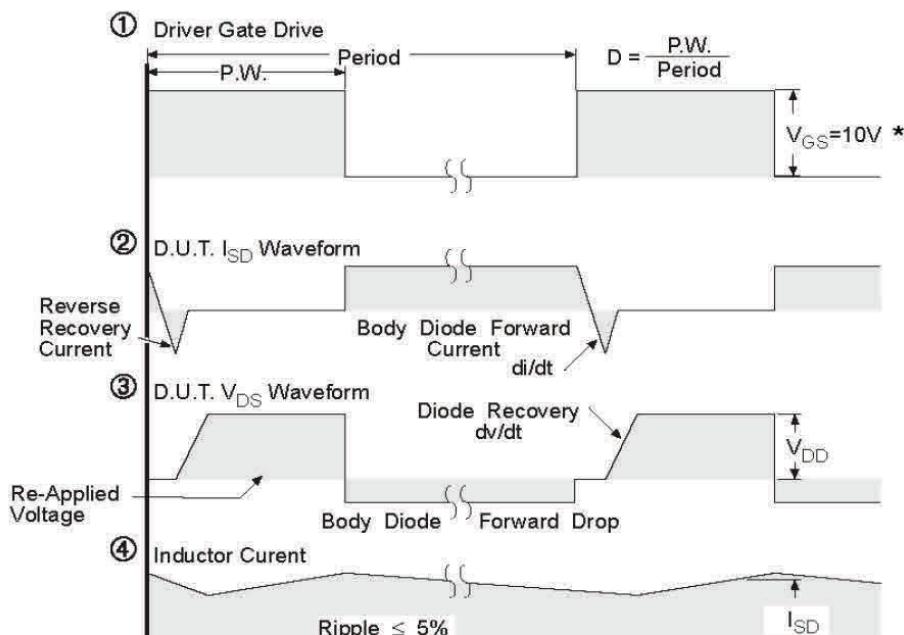
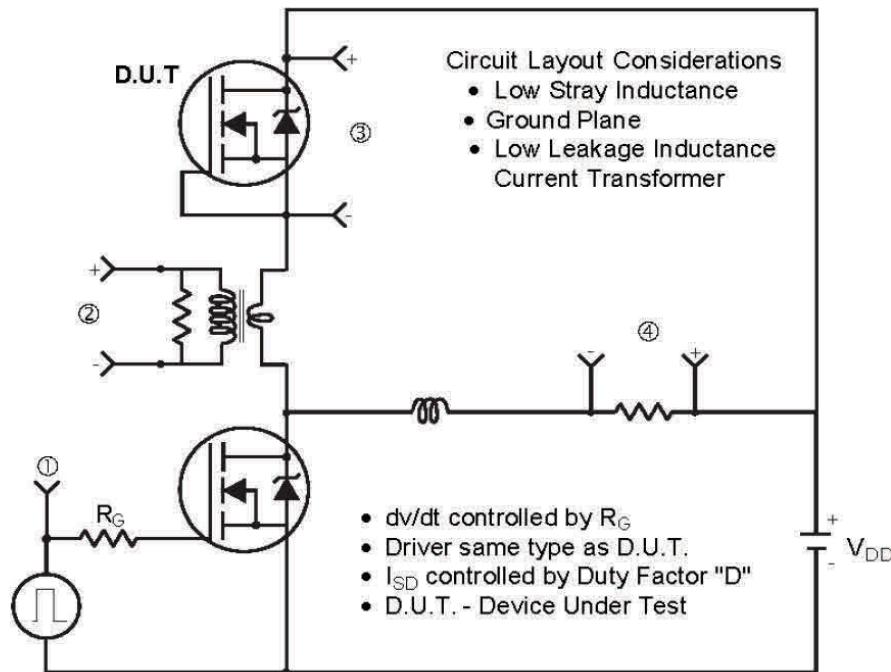


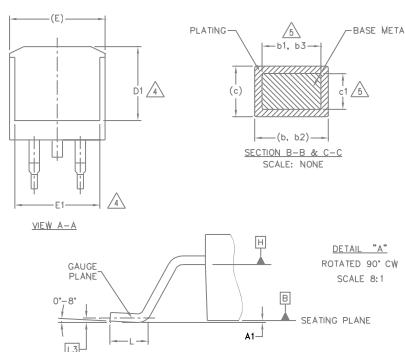
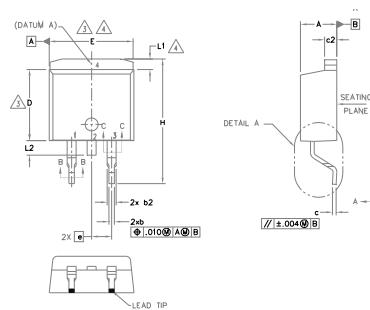
Fig 13b. Gate Charge Test Circuit

Peak Diode Recovery dv/dt Test Circuit



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

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

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

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		
b3	1.14	1.73	.045	.068	5	
c	0.38	0.74	.015	.029		
c1	0.38	0.58	.015	.023	5	
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		
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

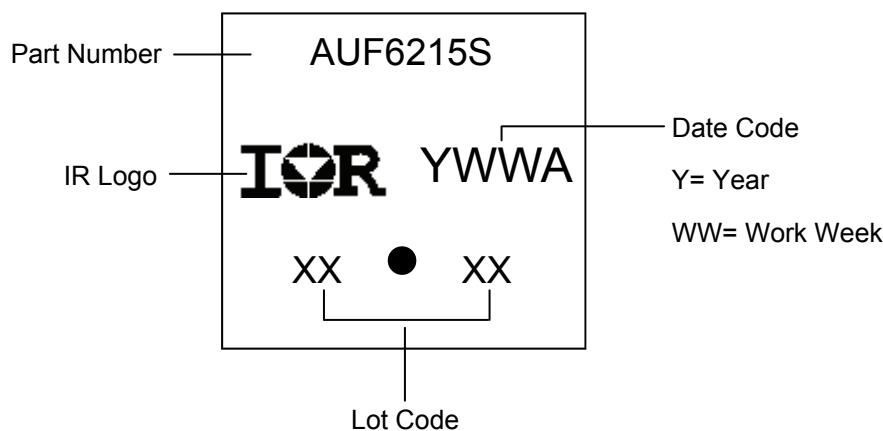
1. - ANODE (TWO DIE) / OPEN (ONE DIE)
2. 4. - CATHODE
3. - ANODE

HEXFET

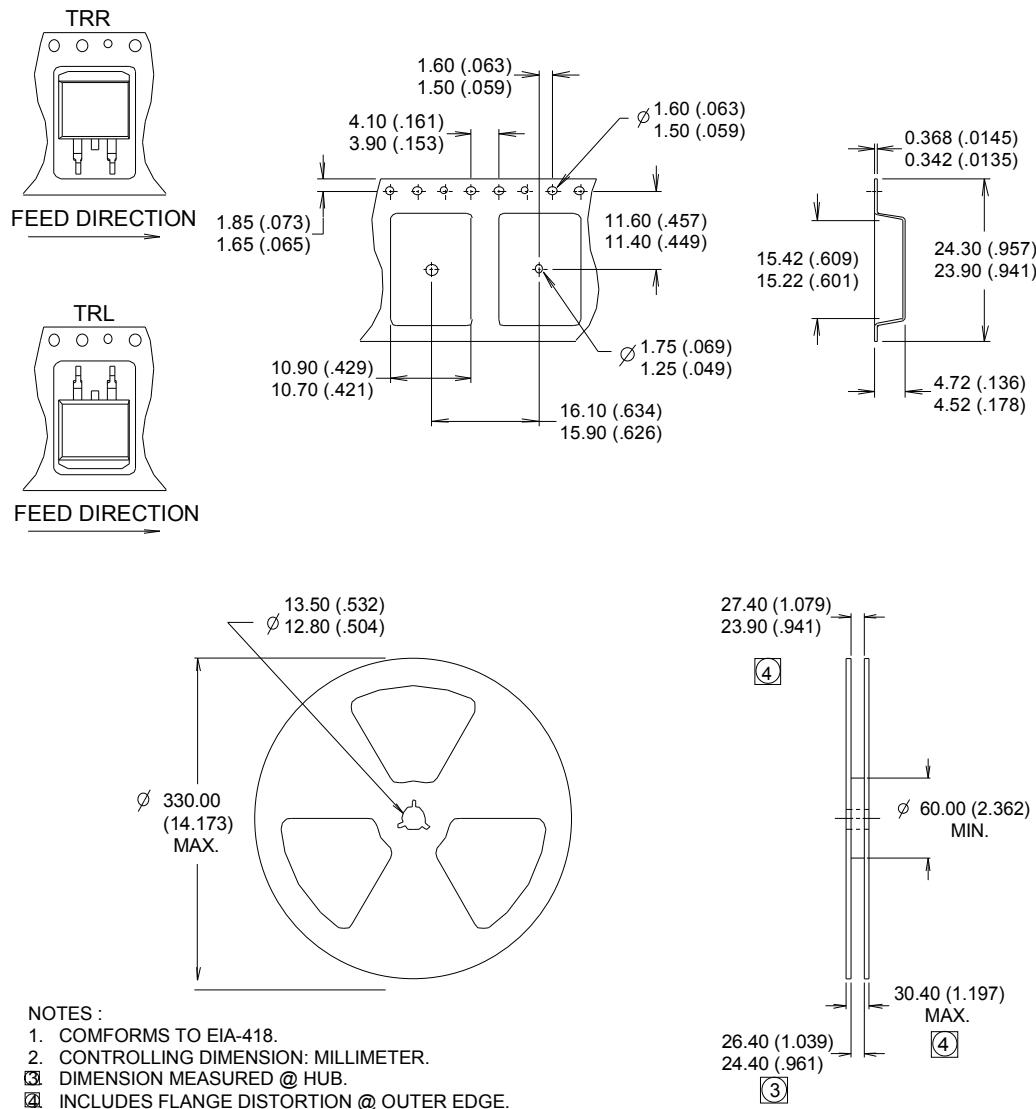
1. - GATE
2. 4. - DRAIN
3. - SOURCE

IGRTs, CoPACK

1. - GATE
2. 4. - 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/>

D²Pak (TO-263AB) Tape & Reel Information (Dimensions are shown in millimeters (inches))

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 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 (+/- 1125V) [†] 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.

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