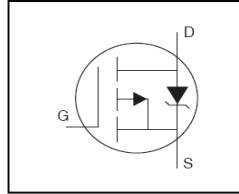
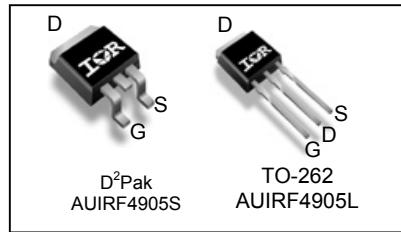


Features

- Advanced Planar Technology
- P-Channel MOSFET
- Low On-Resistance
- 150°C Operating Temperature
- Fast Switching
- Repetitive Avalanche Allowed up to Tjmax
- Lead-Free, RoHS Compliant
- Automotive Qualified *



HEXFET® Power MOSFET	
V _{DSS}	-55V
R _{DS(on)} max.	20mΩ
I _D (Silicon Limited)	-70A
I _D (Package Limited)	-42A



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	
AUIRF4905L	TO-262	Tube	50	AUIRF4905L
AUIRF4905S	D²-Pak	Tube	50	AUIRF4905S
		Tape and Reel Left	800	AUIRF4905STRL

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 (Silicon Limited)	-70	A
I _D @ T _C = 100°C	Continuous Drain Current, V _{GS} @ 10V (Silicon Limited)	-44	
I _D @ T _C = 25°C	Continuous Drain Current, V _{GS} @ 10V (Package Limited)	-42	
I _{DM}	Pulsed Drain Current ①	-280	
P _D @ T _C = 25°C	Maximum Power Dissipation	170	W
	Linear Derating Factor	1.3	W/°C
V _{GS}	Gate-to-Source Voltage	± 20	V
E _{AS}	Single Pulse Avalanche Energy (Thermally Limited) ②	140	mJ
E _{AS} (tested)	Single Pulse Avalanche Energy Tested Value ⑥	790	
I _{AR}	Avalanche Current ①	See Fig.15,16, 12a, 12b	
E _{AR}	Repetitive Avalanche Energy ①	mJ	
T _J	Operating Junction and	-55 to + 150	°C
T _{STG}	Storage Temperature Range		
	Soldering Temperature, for 10 seconds (1.6mm from case)		

Thermal Resistance

Symbol	Parameter	Typ.	Max.	Units
R _{θJC}	Junction-to-Case ⑧	—	0.75	°C/W
R _{θJA}	Junction-to-Ambient (PCB Mount, steady state) ⑦⑧		40	

HEXFET® is a registered trademark of Infineon.

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

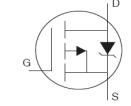
Static @ $T_J = 25^\circ\text{C}$ (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(\text{BR})\text{DSS}}$	Drain-to-Source Breakdown Voltage	-55	—	—	V	$V_{GS} = 0V, I_D = -250\mu\text{A}$
$\Delta V_{(\text{BR})\text{DSS}}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	-0.054	—	V/ $^\circ\text{C}$	Reference to 25°C , $I_D = -1\text{mA}$
$R_{\text{DS(on)}}$	Static Drain-to-Source On-Resistance	—	—	20	$\text{m}\Omega$	$V_{GS} = -10V, I_D = -42\text{A}$ ③
$V_{GS(\text{th})}$	Gate Threshold Voltage	-2.0	—	-4.0	V	$V_{DS} = V_{GS}, I_D = -250\mu\text{A}$
g_{fs}	Forward Trans conductance	19	—	—	S	$V_{DS} = -25V, I_D = -42\text{A}$
I_{DSS}	Drain-to-Source Leakage Current	—	—	-25	μA	$V_{DS} = -55V, V_{GS} = 0V$
		—	—	-250		$V_{DS} = -44V, V_{GS} = 0V, T_J = 125^\circ\text{C}$
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)

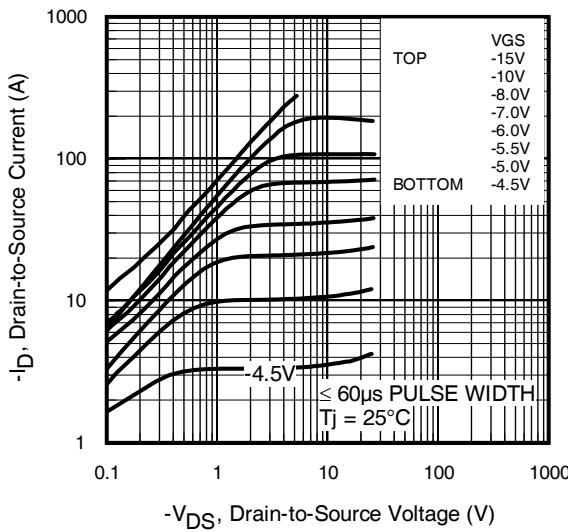
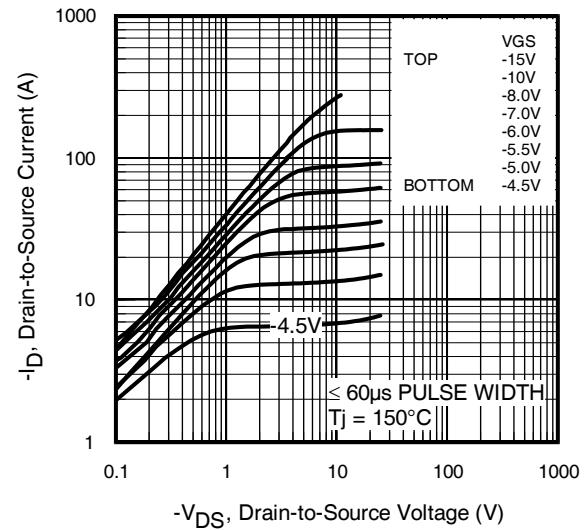
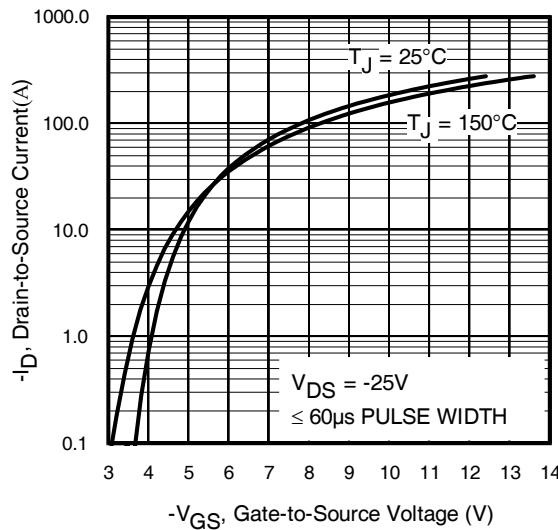
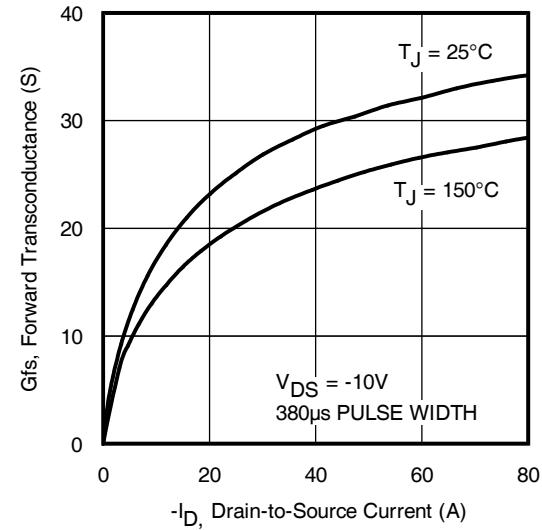
Q_g	Total Gate Charge	—	120	180	nC	$I_D = -42\text{A}$ $V_{DS} = -44V$ $V_{GS} = -10V$ ③
Q_{gs}	Gate-to-Source Charge	—	32	—		
Q_{gd}	Gate-to-Drain Charge	—	53	—		
$t_{d(\text{on})}$	Turn-On Delay Time	—	20	—	ns	$V_{DD} = -28V$ $I_D = -42\text{A}$ $R_G = 2.6\Omega$, $V_{GS} = -10V$ ③
t_r	Rise Time	—	99	—		
$t_{d(\text{off})}$	Turn-Off Delay Time	—	51	—		
t_f	Fall Time	—	64	—		
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	—	3500	—	pF	$V_{GS} = 0V$ $V_{DS} = -25V$ $f = 1.0\text{MHz}$
C_{oss}	Output Capacitance	—	1250	—		$V_{GS} = 0V, V_{DS} = -1.0V$ $f = 1.0\text{MHz}$
C_{rss}	Reverse Transfer Capacitance	—	450	—		$V_{GS} = 0V, V_{DS} = -44V$ $f = 1.0\text{MHz}$
C_{oss}	Output Capacitance	—	4620	—		$V_{GS} = 0V, V_{DS} = 0V$ $f = 1.0\text{MHz}$
$C_{oss \text{ eff.}}$	Effective Output Capacitance	—	940	—		$V_{GS} = 0V, V_{DS} = 0V$ to $-44V$ ④

Diode Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I_s	Continuous Source Current (Body Diode)	—	—	-42	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I_{sM}	Pulsed Source Current (Body Diode) ①	—	—	-280		
V_{SD}	Diode Forward Voltage	—	—	-1.3	V	$T_J = 25^\circ\text{C}, I_s = -42\text{A}, V_{GS} = 0V$ ③
t_{rr}	Reverse Recovery Time	—	61	92	ns	$T_J = 25^\circ\text{C}, I_F = -42\text{A}, V_{DD} = -28V$
Q_{rr}	Reverse Recovery Charge	—	150	220	nC	$dI/dt = 100\text{A}/\mu\text{s}$ ③
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 $T_J = 25^\circ\text{C}$, $L = 0.16\text{mH}$, $R_G = 25\Omega$, $I_{AS} = -42\text{A}$, $V_{GS} = -10V$. Part not recommended for use above this value.
- ③ Pulse width $\leq 1.0\text{ms}$; duty cycle $\leq 2\%$.
- ④ $C_{oss \text{ eff.}}$ is a fixed capacitance that gives the same charging time as C_{oss} while V_{DS} is rising from 0 to 80% V_{DSS} .
- ⑤ Limited by $T_{J\text{max}}$, see Fig.12a, 12b, 15, 16 for typical repetitive avalanche performance.
- ⑥ This value determined from sample failure population, starting $T_J = 25^\circ\text{C}$, $L = 0.08\text{mH}$, $R_G = 25\Omega$, $I_{AS} = 66\text{A}$, $V_{GS} = 10V$.
- ⑦ This is applied to D² Pak, 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_0 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 Typical Forward Transconductance vs. Drain Current

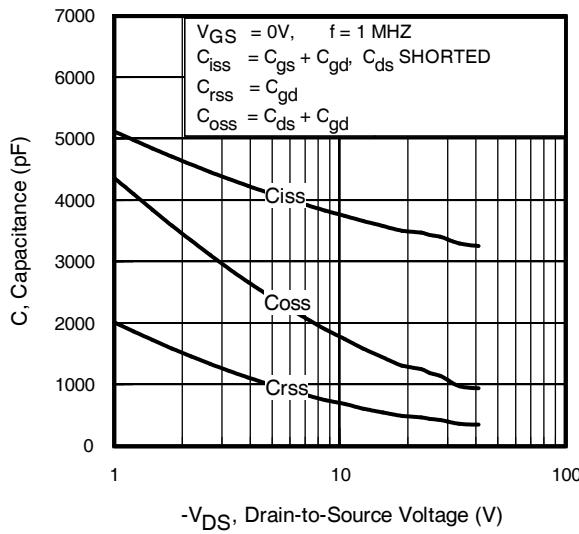


Fig. 5. Typical Capacitance vs. Drain-to-Source Voltage

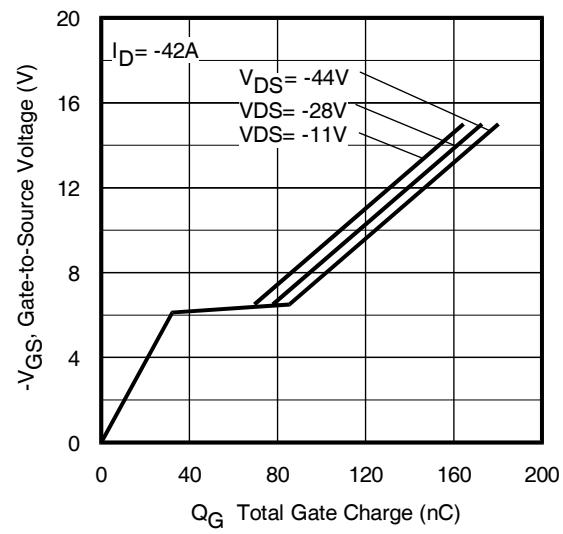


Fig. 6. Typical Gate Charge vs. Gate-to-Source Voltage

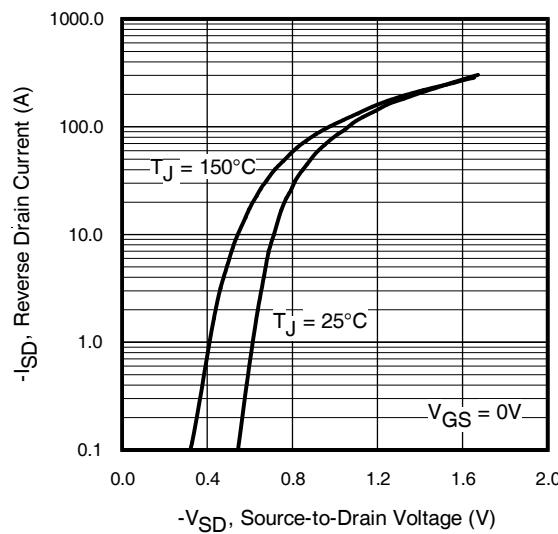


Fig. 7 Typical Source-to-Drain Diode Forward Voltage

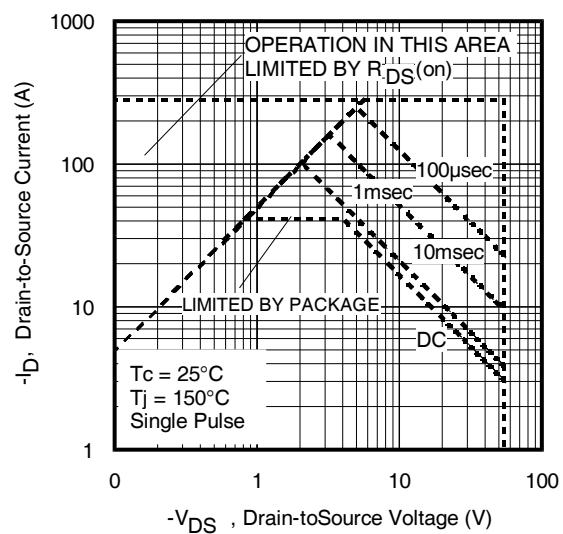


Fig. 8. Maximum Safe Operating Area

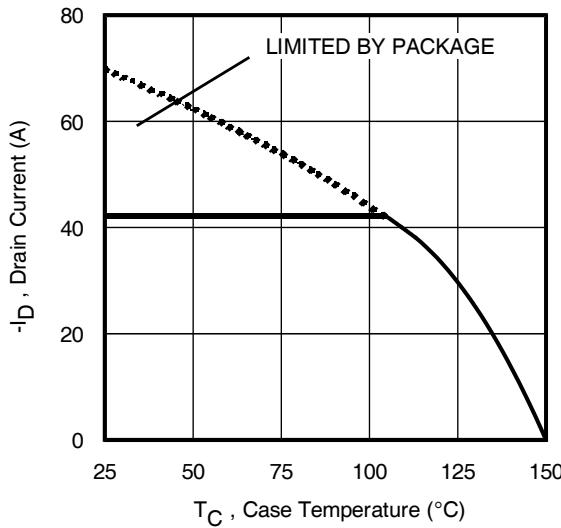


Fig 9. Maximum Drain Current vs.
Case Temperature

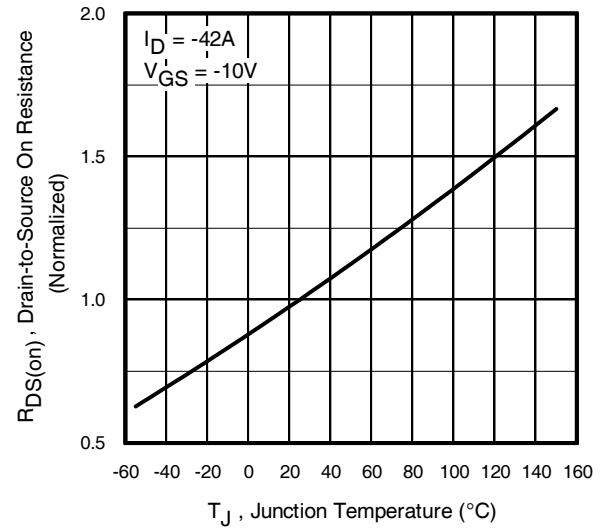


Fig 10. Normalized On-Resistance
vs. Temperature

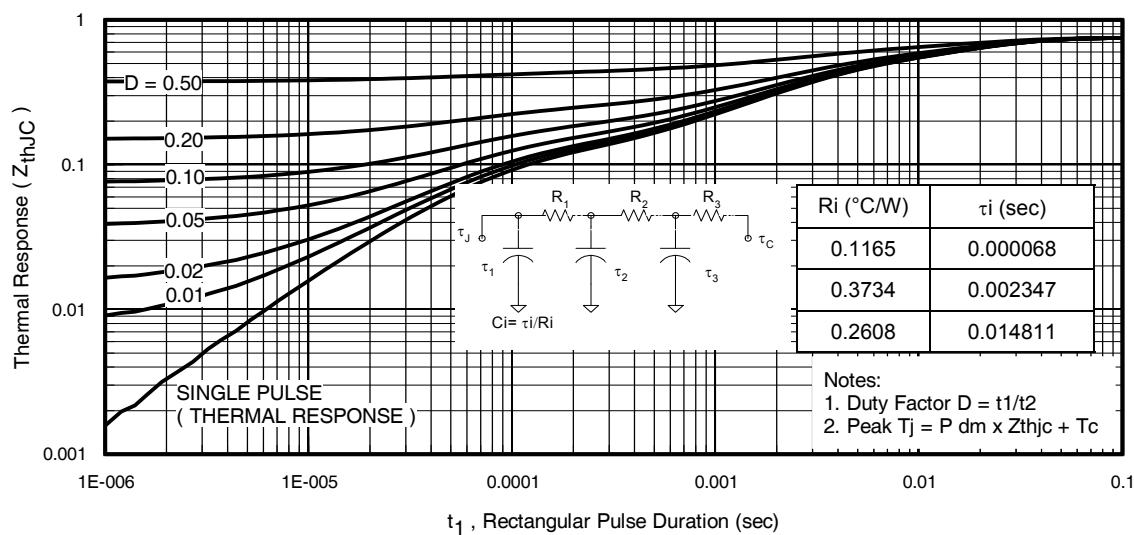


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Case

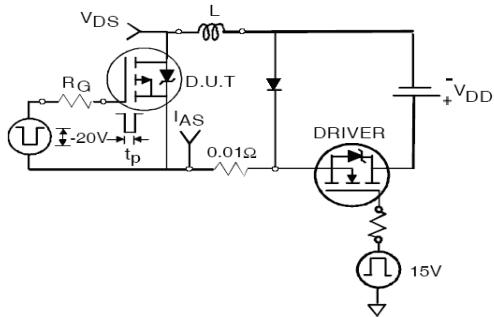


Fig 12a. Unclamped Inductive Test Circuit

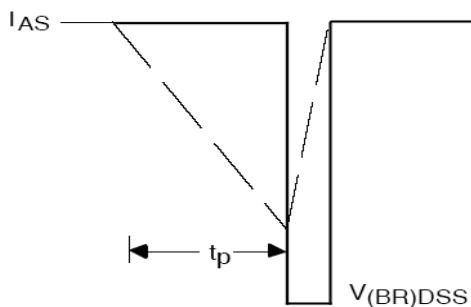


Fig 12b. Unclamped Inductive Waveforms

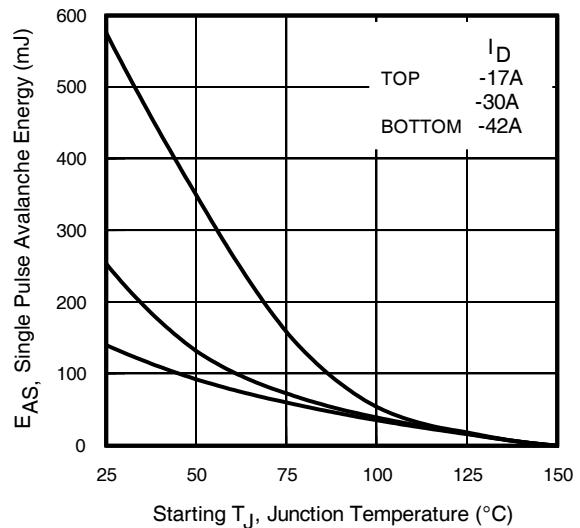


Fig 12c. Maximum Avalanche Energy vs. Drain Current

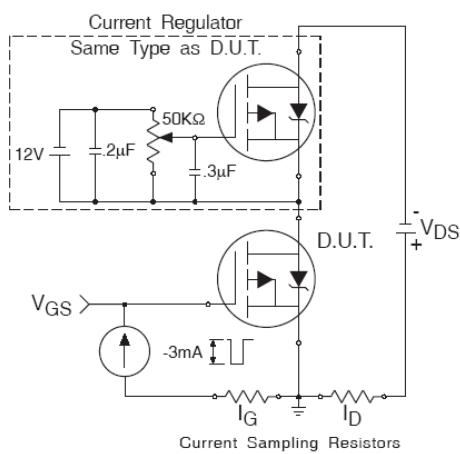


Fig 13a. Gate Charge Test Circuit

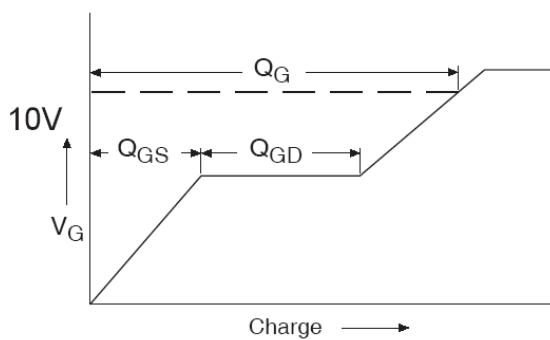


Fig 13b. Gate Charge Waveform

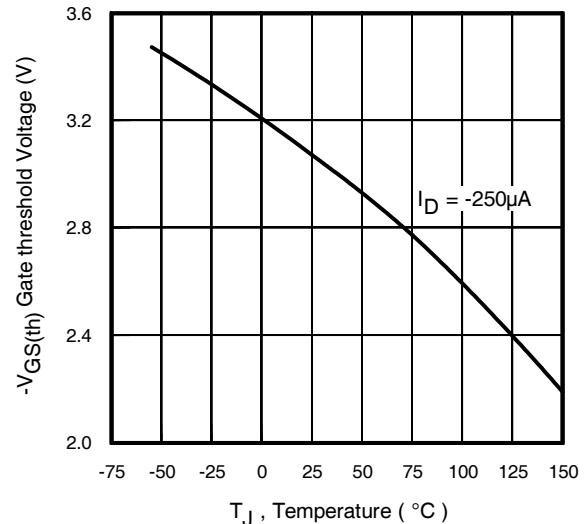


Fig 14. Threshold Voltage vs. Temperature

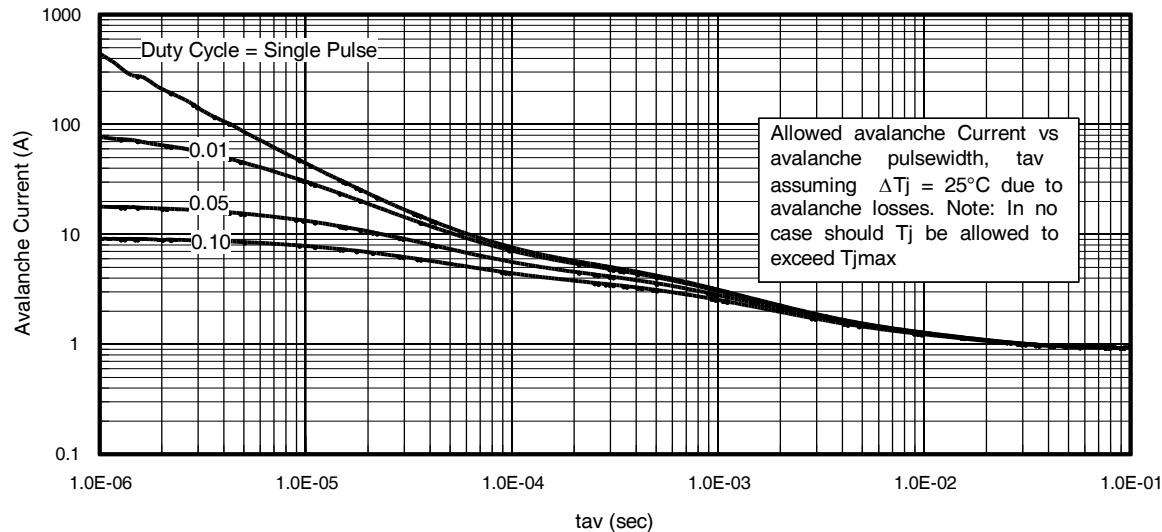
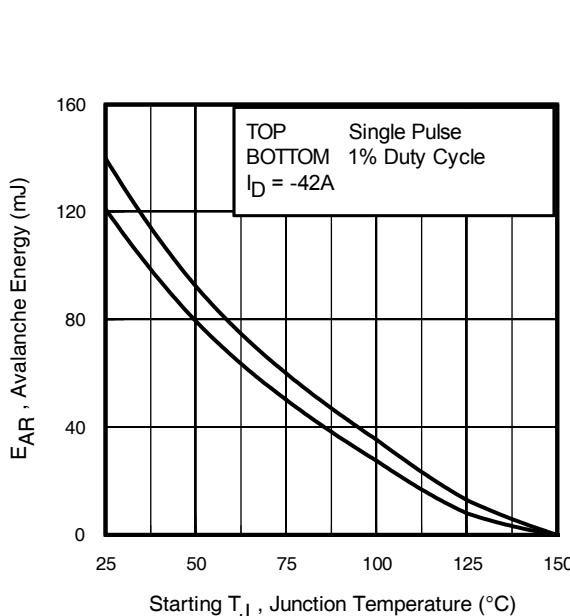


Fig 15. Avalanche Current vs. Pulse width



Notes on Repetitive Avalanche Curves , Figures 15, 16:
(For further info, see AN-1005 at www.infineon.com)

1. Avalanche failures assumption:
Purely a thermal phenomenon and failure occurs at a temperature far in excess of T_{jmax} . This is validated for every part type.
2. Safe operation in Avalanche is allowed as long as T_{jmax} is not exceeded.
3. Equation below based on circuit and waveforms shown in Figures 12a, 12b.
4. $P_{D(ave)}$ = Average power dissipation per single avalanche pulse.
5. BV = Rated breakdown voltage (1.3 factor accounts for voltage increase during avalanche).
6. I_{av} = Allowable avalanche current.
7. ΔT = Allowable rise in junction temperature, not to exceed T_{jmax} (assumed as 25°C in Figure 14, 15).
 t_{av} = Average time in avalanche.
 D = Duty cycle in avalanche = $t_{av} \cdot f$
 $Z_{thJC}(D, t_{av})$ = Transient thermal resistance, see Figures 13

$$P_{D(ave)} = 1/2 (1.3 \cdot BV \cdot I_{av}) = \Delta T / Z_{thJC}$$

$$I_{av} = 2\Delta T / [1.3 \cdot BV \cdot Z_{th}]$$

$$E_{AS(AR)} = P_{D(ave)} \cdot t_{av}$$

Fig 16. Maximum Avalanche Energy vs. Temperature

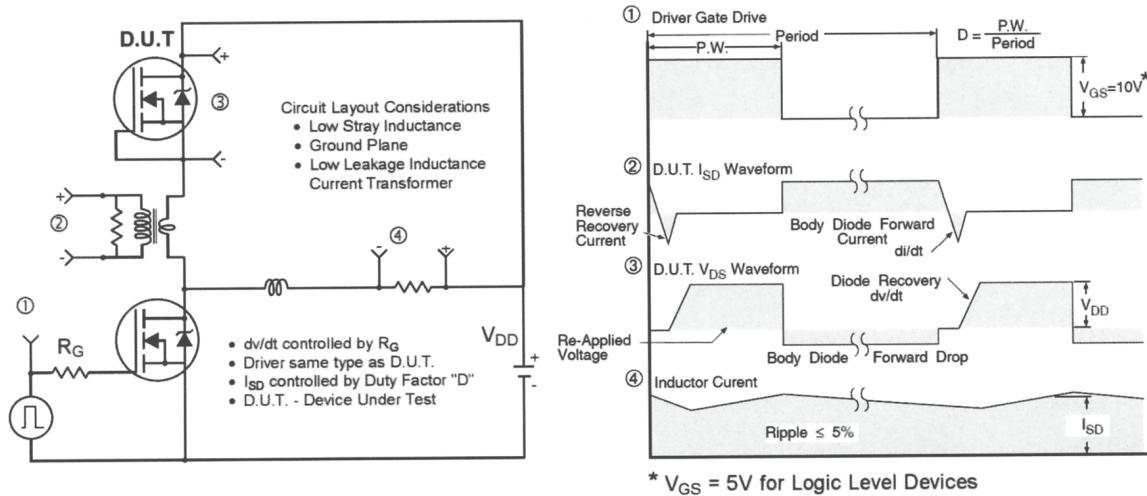


Fig 17. Peak Diode Recovery dv/dt Test Circuit for P-Channel HEXFET® Power MOSFETs

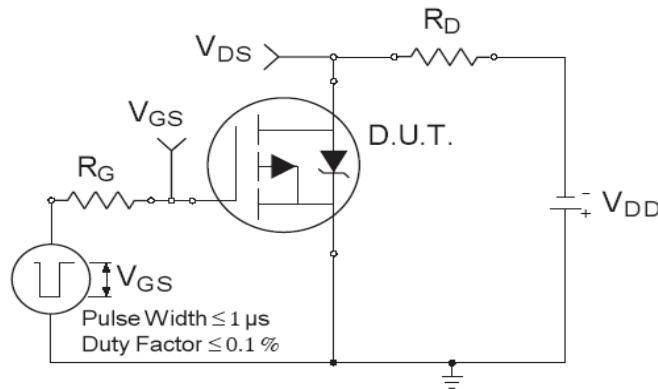


Fig 18a. Switching Time Test Circuit

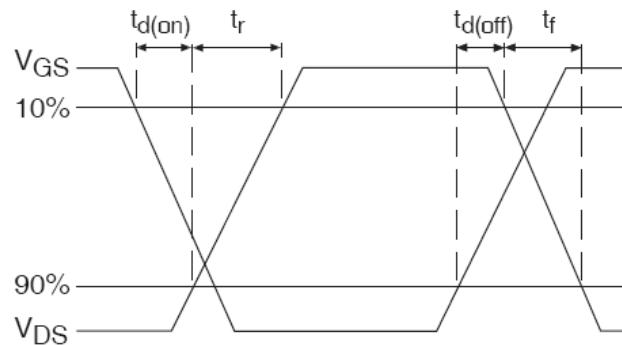
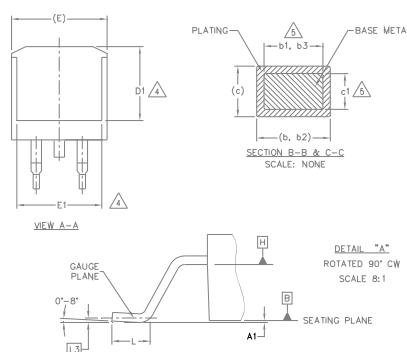
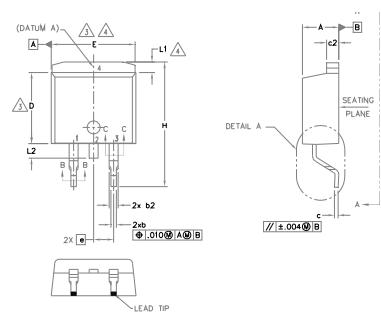


Fig 18b. Switching Time Waveforms

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

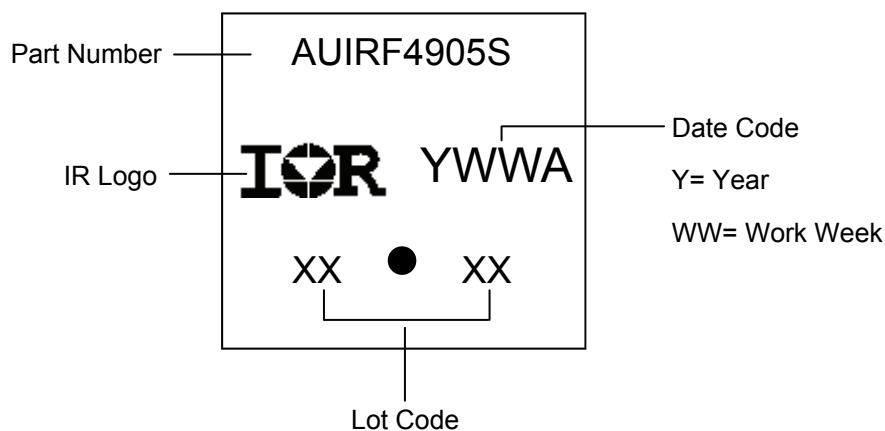
- 1.- ANODE (TWO DIE) / OPEN (ONE DIE)
2. 4.- CATHODE
- 3.- ANODE

HEXFET

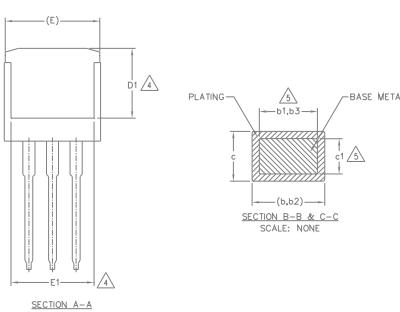
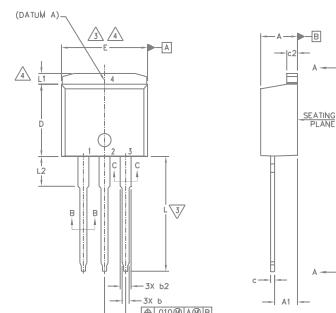
- 1.- GATE
2. 4.- DRAIN
- 3.- SOURCE

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/>

TO-262 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 [.005"] PER SIDE. THESE DIMENSIONS ARE MEASURED AT THE OUTMOST EXTREMES OF THE PLASTIC BODY.
4. THERMAL PAD CONTOUR OPTIONAL WITHIN DIMENSION E, L1, D1 & E1.
5. DIMENSION b1 AND c1 APPLY TO BASE METAL ONLY.
6. CONTROLLING DIMENSION: INCH.
7. OUTLINE CONFORM TO JEDEC TO-262 EXCEPT A1(max.) b(min.) AND D1(min.) WHERE DIMENSIONS DERIVED THE ACTUAL PACKAGE OUTLINE.

LEAD ASSIGNMENTS

IGBTs, CoPACK

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

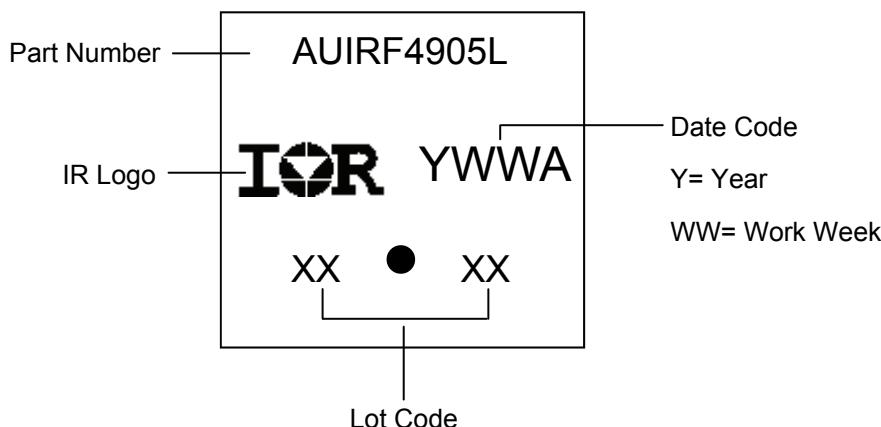
HEXFET

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

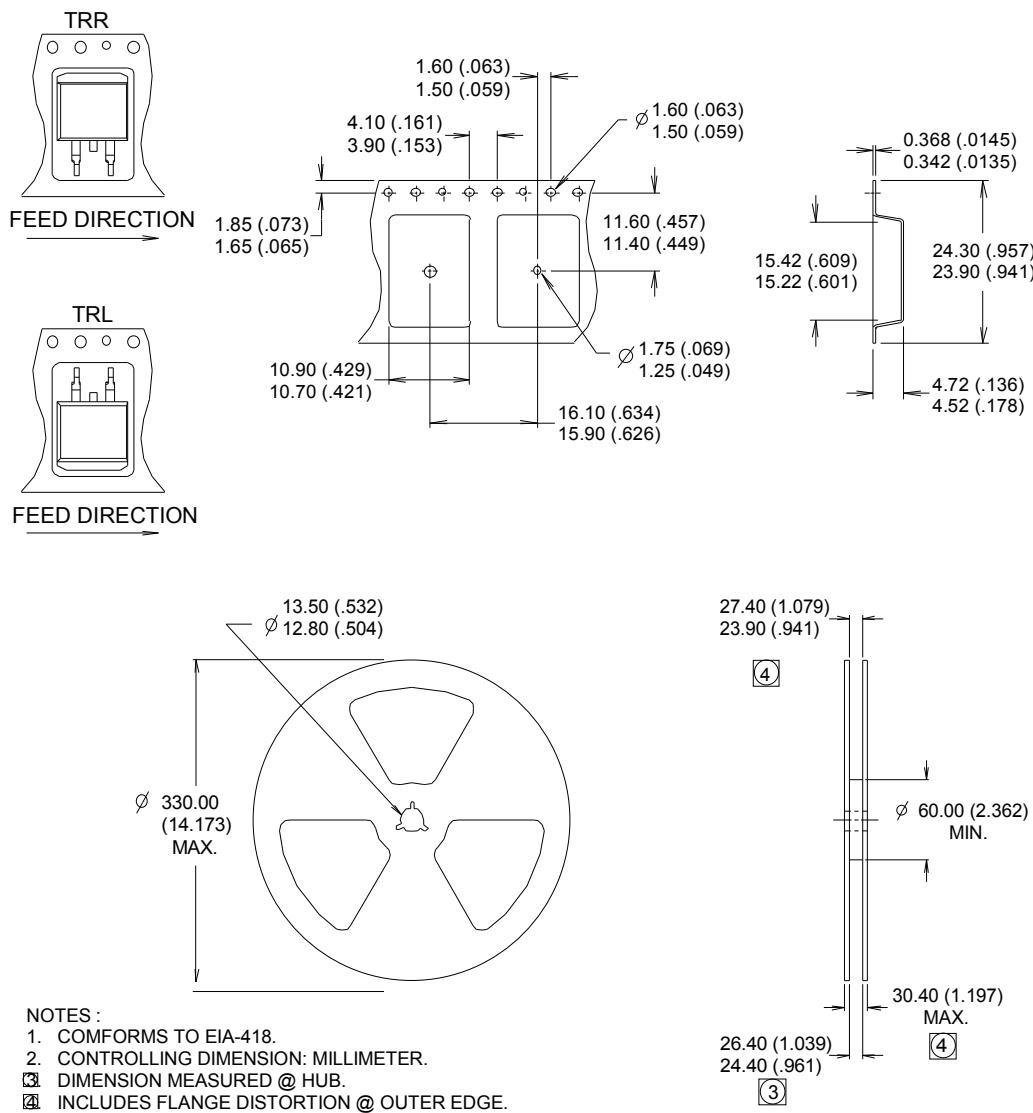
DIODES

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

SYMBOL	DIMENSIONS				NOTES	
	MILLIMETERS		INCHES			
	MIN.	MAX.	MIN.	MAX.		
A	4.06	4.83	.160	.190		
A1	2.03	3.02	.080	.119		
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		
L	13.46	14.10	.530	.555		
L1	—	1.65	—	.065	4	
L2	3.56	3.71	.140	.146		

TO-262 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		TO-262 Pak	MSL1	
		D ² -Pak		
ESD	Machine Model	Class M4 (+/- 425V) [†] AEC-Q101-002		
	Human Body Model	Class H2 (+/- 4000V) [†] 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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ООО "ЛайфЭлектроникс"

"LifeElectronics" LLC

ИНН 7805602321 КПП 780501001 Р/С 40702810122510004610 ФАКБ "АБСОЛЮТ БАНК" (ЗАО) в г.Санкт-Петербурге К/С 30101810900000000703 БИК 044030703

Компания «Life Electronics» занимается поставками электронных компонентов импортного и отечественного производства от производителей и со складов крупных дистрибуторов Европы, Америки и Азии.

С конца 2013 года компания активно расширяет линейку поставок компонентов по направлению коаксиальный кабель, кварцевые генераторы и конденсаторы (керамические, пленочные, электролитические), за счёт заключения дистрибуторских договоров

Мы предлагаем:

- Конкурентоспособные цены и скидки постоянным клиентам.
- Специальные условия для постоянных клиентов.
- Подбор аналогов.
- Поставку компонентов в любых объемах, удовлетворяющих вашим потребностям.
- Приемлемые сроки поставки, возможна ускоренная поставка.
- Доставку товара в любую точку России и стран СНГ.
- Комплексную поставку.
- Работу по проектам и поставку образцов.
- Формирование склада под заказчика.
- Сертификаты соответствия на поставляемую продукцию (по желанию клиента).
- Тестирование поставляемой продукции.
- Поставку компонентов, требующих военную и космическую приемку.
- Входной контроль качества.
- Наличие сертификата ISO.

В составе нашей компании организован Конструкторский отдел, призванный помочь разработчикам, и инженерам.

Конструкторский отдел помогает осуществить:

- Регистрацию проекта у производителя компонентов.
- Техническую поддержку проекта.
- Защиту от снятия компонента с производства.
- Оценку стоимости проекта по компонентам.
- Изготовление тестовой платы монтаж и пусконаладочные работы.



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