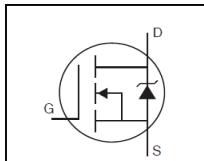
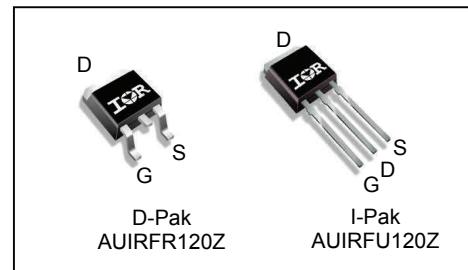


Features

- Advanced Process Technology
- Ultra Low On-Resistance
- 175°C Operating Temperature
- Fast Switching
- Repetitive Avalanche Allowed up to Tjmax
- Lead-Free, RoHS Compliant
- Automotive Qualified *



V_{DSS}	100V
$R_{DS(on)}$	typ.
	max.
I_D	8.7A



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	
AUIRFU120Z	I-Pak	Tube	75	AUIRFU120Z
AUIRFR120Z	D-Pak	Tube	75	AUIRFR120Z
		Tape and Reel Left	3000	AUIRFR120ZTRL

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, $V_{GS} @ 10\text{V}$	8.7	A
$I_D @ T_C = 100^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10\text{V}$	6.1	
I_{DM}	Pulsed Drain Current ①	35	
$P_D @ T_C = 25^\circ\text{C}$	Maximum Power Dissipation	35	W
	Linear Derating Factor	0.23	W/ $^\circ\text{C}$
V_{GS}	Gate-to-Source Voltage	± 20	V
E_{AS}	Single Pulse Avalanche Energy (Thermally Limited) ②	18	mJ
E_{AS} (Tested)	Single Pulse Avalanche Energy Tested Value ⑥	20	
I_{AR}	Avalanche Current ①	See Fig.15,16, 12a, 12b	A
E_{AR}	Repetitive Avalanche Energy ⑤		mJ
T_J	Operating Junction and	-55 to + 175	$^\circ\text{C}$
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	—	4.28	$^\circ\text{C/W}$
$R_{\theta JA}$	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
$V_{(\text{BR})\text{DSS}}$	Drain-to-Source Breakdown Voltage	100	—	—	V	$V_{GS} = 0V, I_D = 250\mu\text{A}$
$\Delta V_{(\text{BR})\text{DSS}}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	0.084	—	V/ $^\circ\text{C}$	Reference to 25°C , $I_D = 1\text{mA}$
$R_{\text{DS}(\text{on})}$	Static Drain-to-Source On-Resistance	—	150	190	$\text{m}\Omega$	$V_{GS} = 10\text{V}, I_D = 5.2\text{A}$ 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	16	—	—	S	$V_{DS} = 25\text{V}, I_D = 5.2\text{A}$
I_{DSS}	Drain-to-Source Leakage Current	—	—	20	μA	$V_{DS} = 100\text{V}, V_{GS} = 0\text{V}$
		—	—	250		$V_{DS} = 100\text{V}, V_{GS} = 0\text{V}, T_J = 125^\circ\text{C}$
I_{GSS}	Gate-to-Source Forward Leakage	—	—	200	nA	$V_{GS} = 20\text{V}$
	Gate-to-Source Reverse Leakage	—	—	-200		$V_{GS} = -20\text{V}$

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

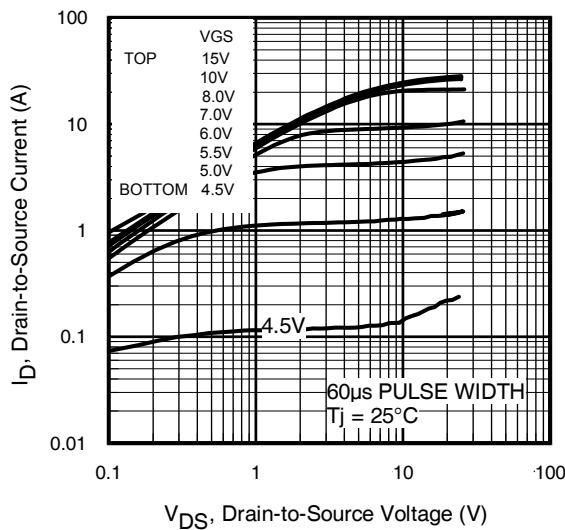
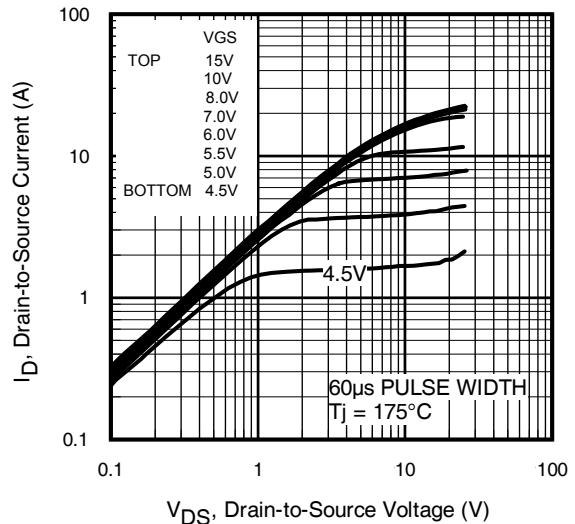
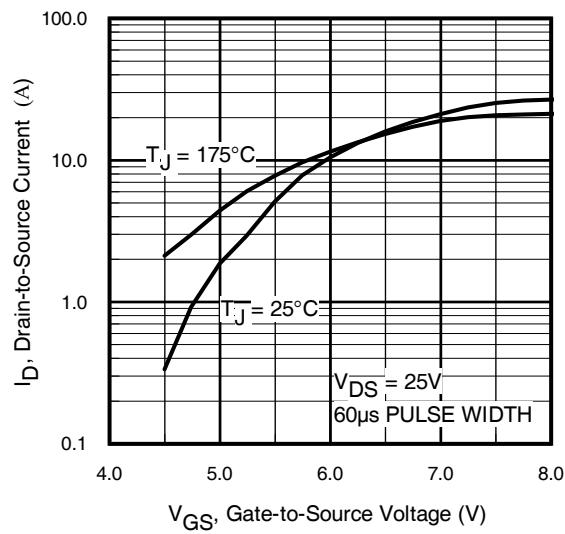
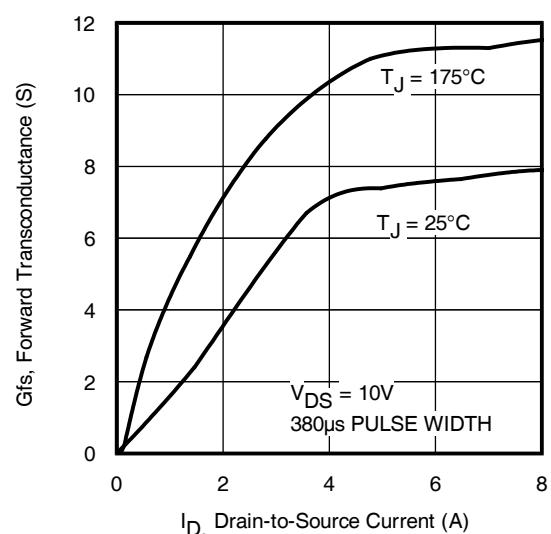
Q_g	Total Gate Charge	—	6.9	10	nC	$I_D = 5.2\text{A}$ $V_{DS} = 80\text{V}$ $V_{GS} = 10\text{V}$ ③
Q_{gs}	Gate-to-Source Charge	—	1.6	—		
Q_{gd}	Gate-to-Drain Charge	—	3.1	—		
$t_{d(on)}$	Turn-On Delay Time	—	8.3	—		$V_{DD} = 50\text{V}$ $I_D = 5.2\text{A}$
t_r	Rise Time	—	26	—		$R_G = 53\Omega$ $V_{GS} = 10\text{V}$ ③
$t_{d(off)}$	Turn-Off Delay Time	—	27	—	ns	
t_f	Fall Time	—	23	—		
L_D	Internal Drain Inductance	—	4.5	—		Between lead, 6mm (0.25in.) from package and center of die contact
L_S	Internal Source Inductance	—	7.5	—		
C_{iss}	Input Capacitance	—	310	—		
C_{oss}	Output Capacitance	—	41	—		
C_{rss}	Reverse Transfer Capacitance	—	24	—		
C_{oss}	Output Capacitance	—	150	—	pF	$V_{GS} = 0\text{V}, V_{DS} = 1.0\text{V}$ $f = 1.0\text{MHz}$
C_{oss}	Output Capacitance	—	26	—		$V_{GS} = 0\text{V}, V_{DS} = 80\text{V}$ $f = 1.0\text{MHz}$
$C_{oss\ eff.}$	Effective Output Capacitance	—	57	—		$V_{GS} = 0\text{V}, V_{DS} = 0\text{V to } 80\text{V}$ ④

Diode Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I_s	Continuous Source Current (Body Diode)	—	—	8.7	A	MOSFET symbol showing the integral reverse p-n junction diode.
I_{sM}	Pulsed Source Current (Body Diode) ①	—	—	35		
V_{SD}	Diode Forward Voltage	—	—	1.3		$T_J = 25^\circ\text{C}, I_s = 5.2\text{A}, V_{GS} = 0\text{V}$ ③
t_{rr}	Reverse Recovery Time	—	24	36		$T_J = 25^\circ\text{C}, I_F = 5.2\text{A}, V_{DD} = 50\text{V}$ $dI/dt = 100\text{A}/\mu\text{s}$ ③
Q_{rr}	Reverse Recovery Charge	—	23	35		
t_{on}	Forward Turn-On Time	Intrinsic turn-on time is negligible (turn-on is dominated by $L_D + L_S$)				

Notes:

- ① Repetitive rating; pulse width limited by max. junction temperature. (See fig. 11)
- ② Limited by $T_{J\max}$, starting $T_J = 25^\circ\text{C}$, $L = 1.29\text{mH}$, $R_G = 25\Omega$, $I_{AS} = 5.2\text{A}$, $V_{GS} = 10\text{V}$. Part not recommended for use above this value.
- ③ Pulse width $\leq 1.0\text{ms}$; duty cycle $\leq 2\%$.
- ④ $C_{oss\ eff.}$ 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 $T_{J\max}$, see Fig.12a, 12b, 15, 16 for typical repetitive avalanche performance.
- ⑥ This value determined from sample failure population. 100% tested to this value in production.
- 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

**Fig. 1** Typical Output Characteristics**Fig. 2** Typical Output Characteristics**Fig. 3** Typical Transfer Characteristics**Fig. 4** Typical Forward Transconductance Vs. Drain Current

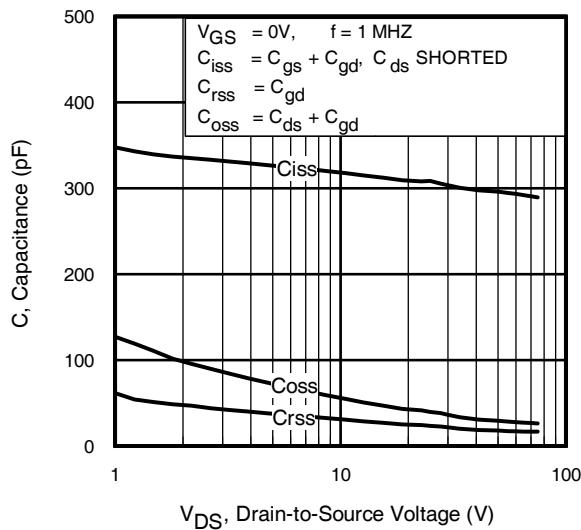


Fig 5. Typical Capacitance vs.
Drain-to-Source Voltage

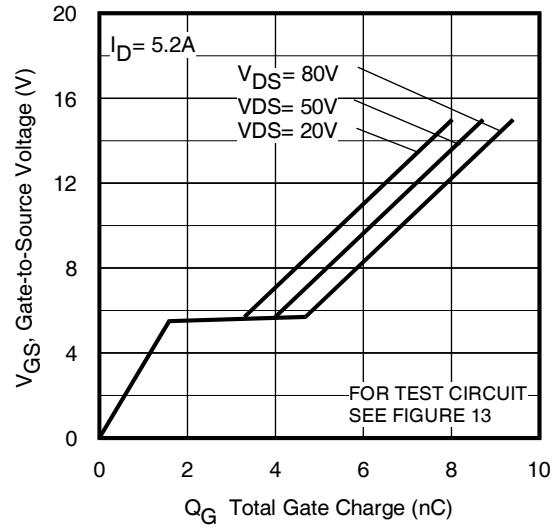


Fig 6. Typical Gate Charge vs.
Gate-to-Source Voltage

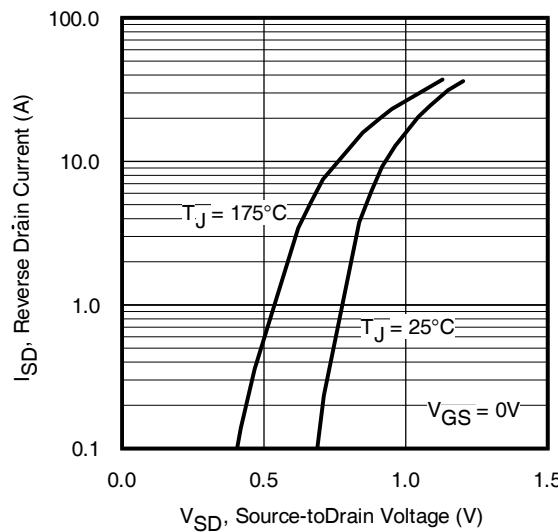


Fig. 7 Typical Source-to-Drain Diode
Forward Voltage

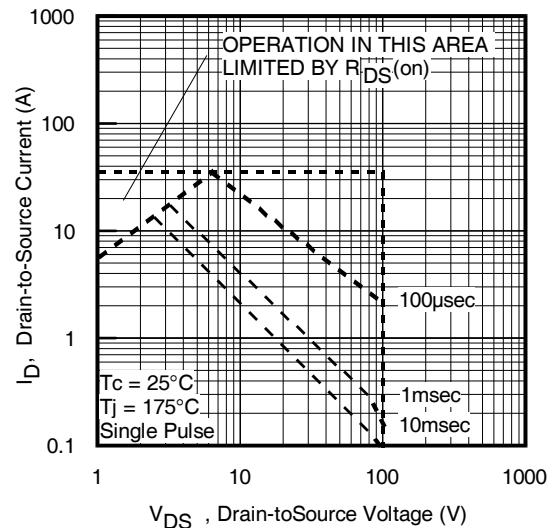


Fig 8. Maximum Safe Operating Area

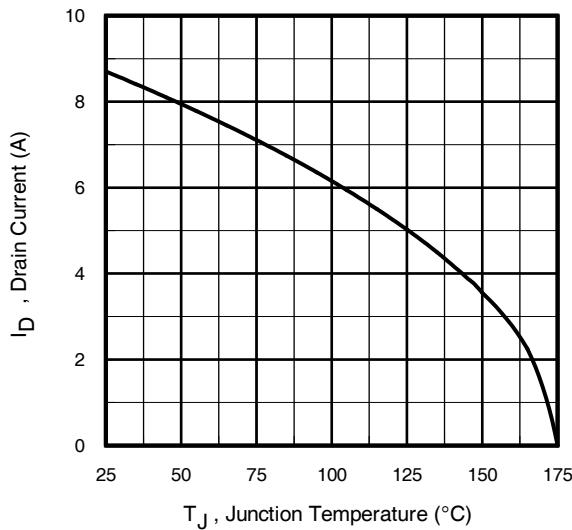


Fig 9. Maximum Drain Current Vs. Case Temperature

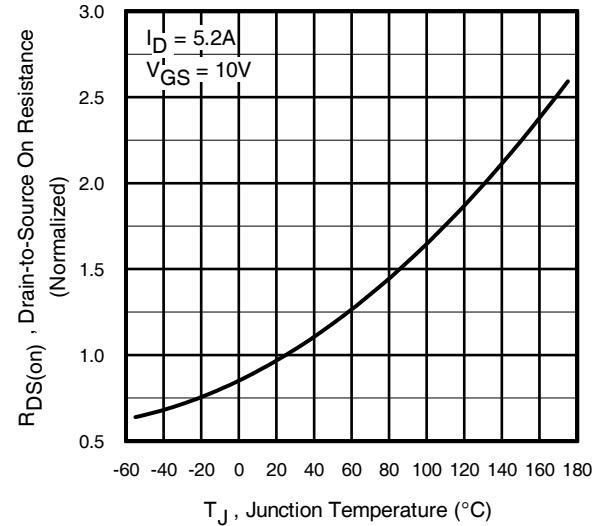


Fig 10. Normalized On-Resistance Vs. Temperature

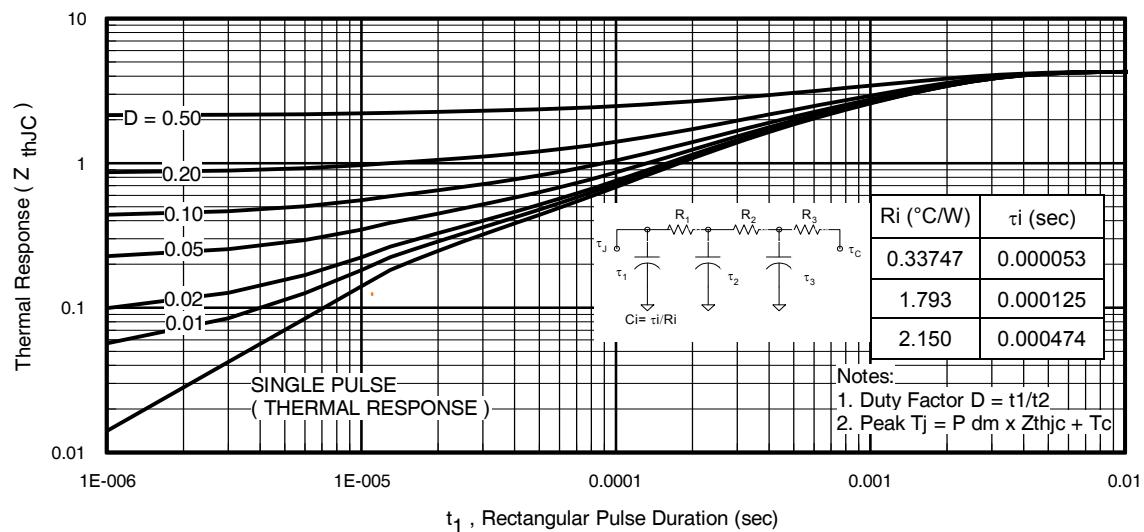


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Case

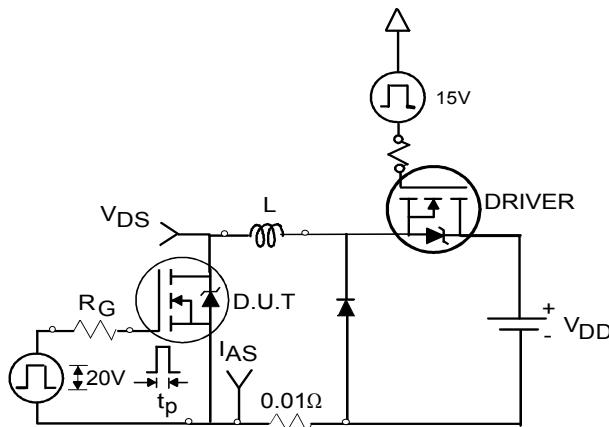


Fig 12a. Unclamped Inductive Test Circuit

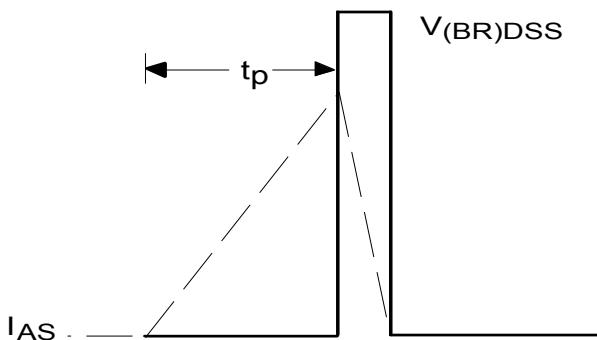


Fig 12b. Unclamped Inductive Waveforms

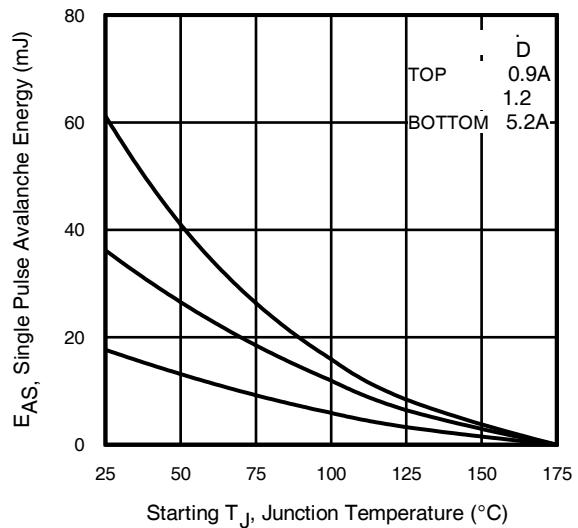


Fig 12c. Maximum Avalanche Energy vs. Drain Current

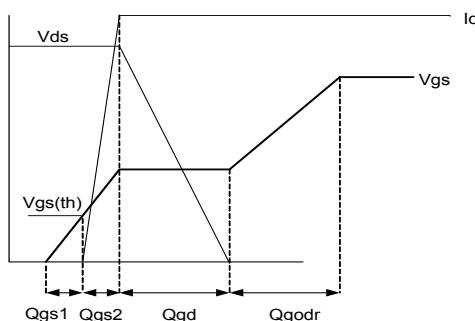


Fig 13a. Gate Charge Waveform

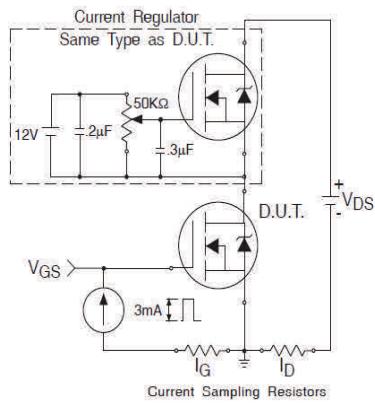


Fig 13b. Gate Charge Test Circuit

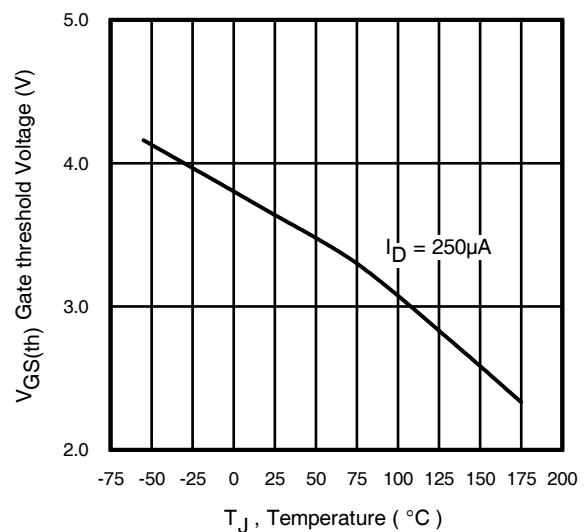


Fig 14. Threshold Voltage Vs. Temperature

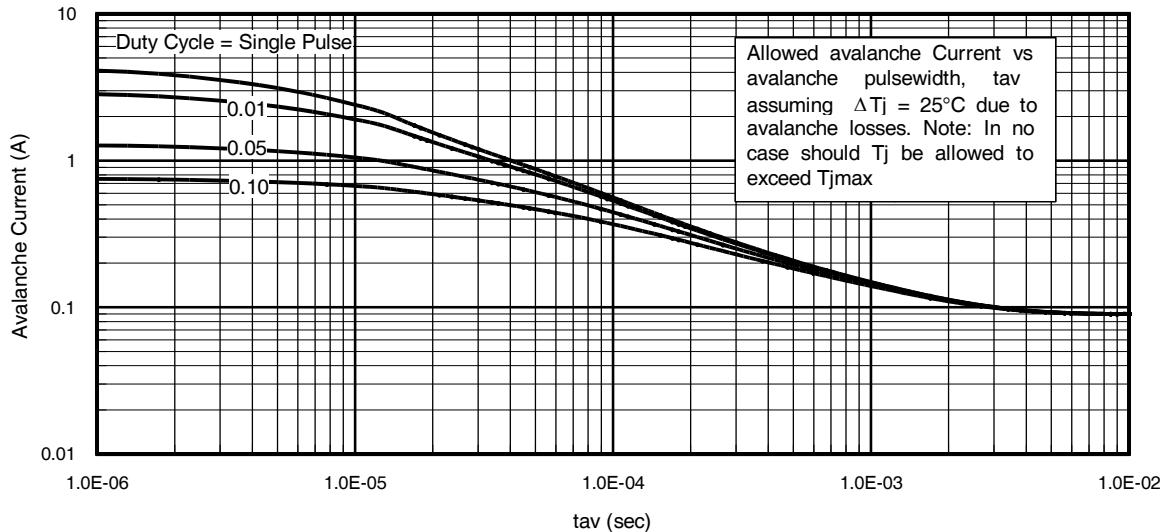


Fig 15. Typical Avalanche Current Vs.Pulsewidth

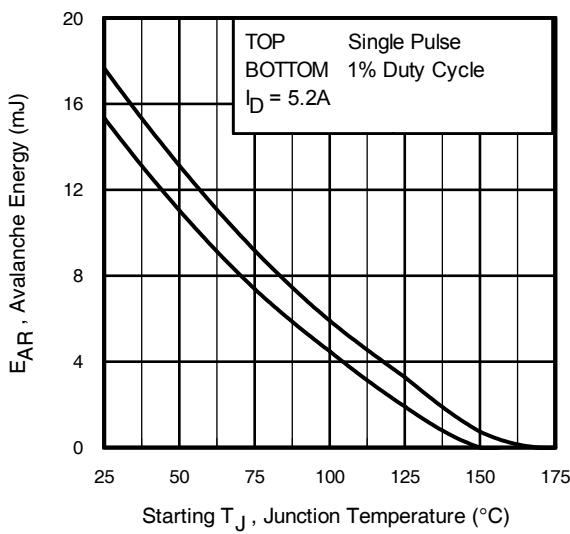


Fig 16. Maximum Avalanche Energy Vs. Temperature

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 $T_{j\max}$. This is validated for every part type.
 2. Safe operation in Avalanche is allowed as long as $T_{j\max}$ is not exceeded.
 3. Equation below based on circuit and waveforms shown in Figures 12a, 12b.
 4. $P_{D(\text{ave})}$ = 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 $T_{j\max}$ (assumed as 25°C in Figure 15, 16).
- 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)

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

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

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

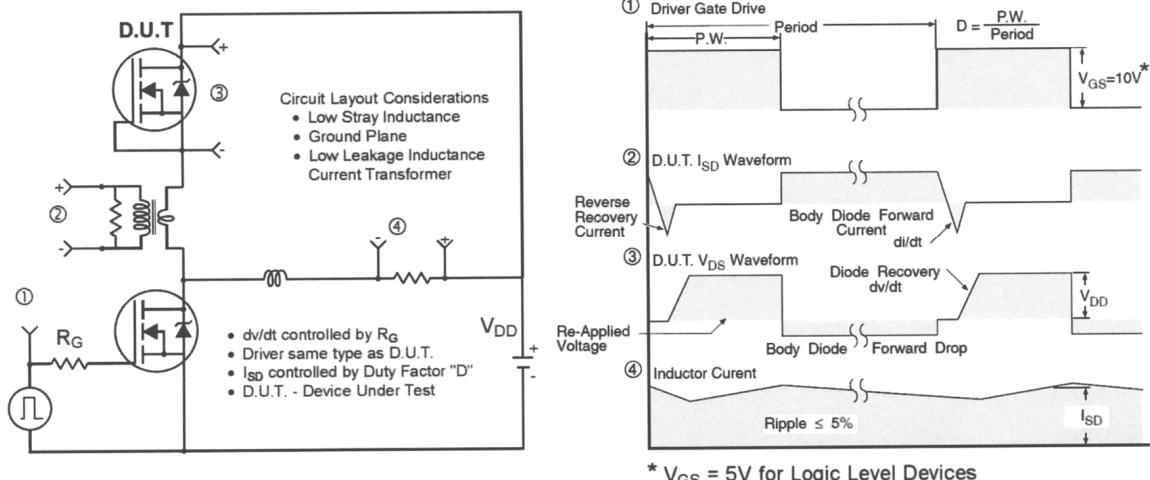
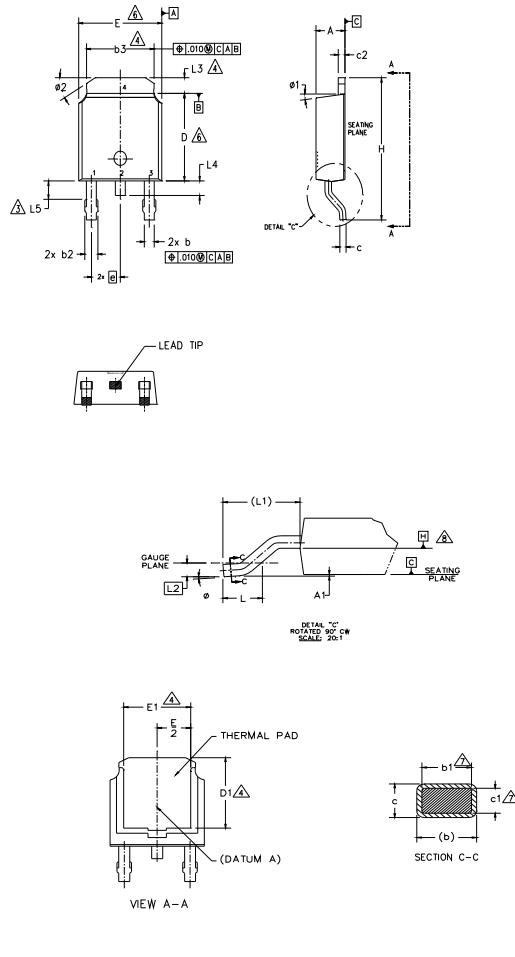


Fig 17. Peak Diode Recovery dv/dt Test Circuit for N-Channel HEXFET® Power MOSFETs



Fig 18a. Switching Time Test Circuit

Fig 18b. Switching Time Waveforms

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 [.013] 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.

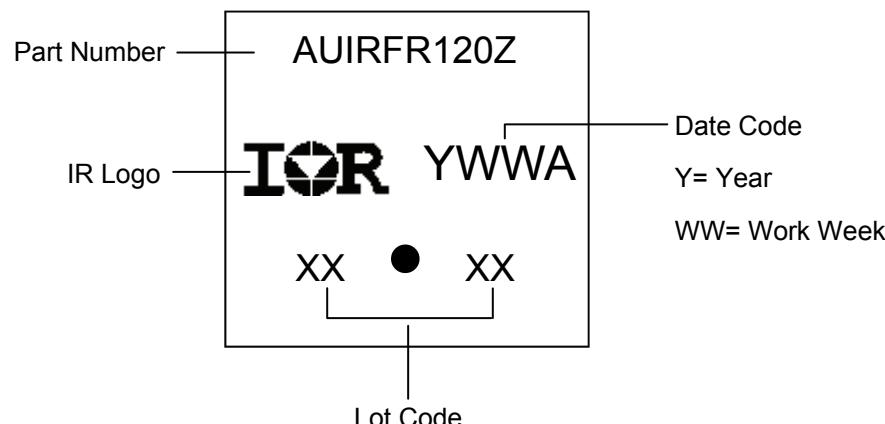
S Y M B O L	DIMENSIONS				N O T E S	
	MILLIMETERS		INCHES			
	MIN.	MAX.	MIN.	MAX.		
A	2.18	2.39	.086	.094		
A1	—	0.13	—	.005		
b	0.64	0.89	.025	.035		
b1	0.65	0.79	.025	.031	7	
b2	0.76	1.14	.030	.045		
b3	4.95	5.46	.195	.215	4	
c	0.46	0.61	.018	.024		
c1	0.41	0.56	.016	.022	7	
c2	0.46	0.89	.018	.035		
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 ASSIGNMENTSHEXFET

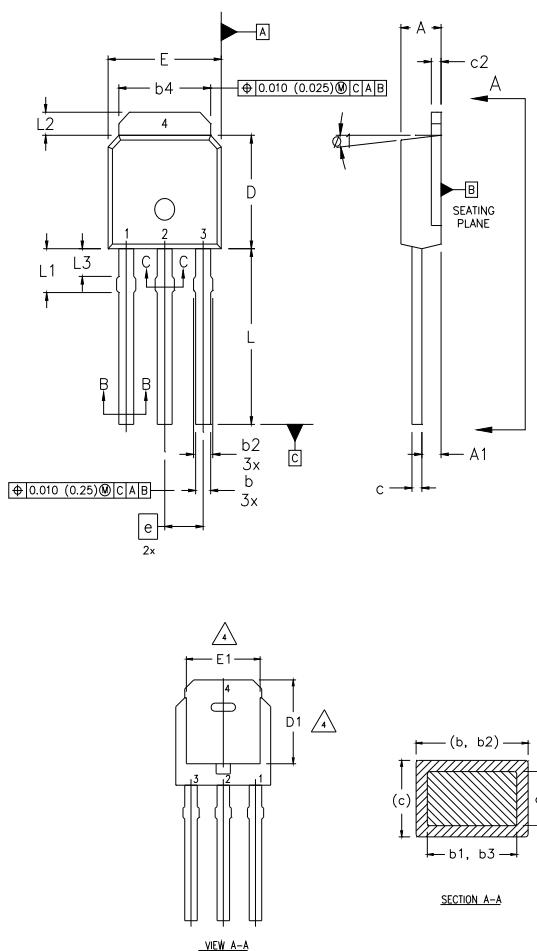
- 1.- GATE
- 2.- DRAIN
- 3.- SOURCE
- 4.- DRAIN

IGBT & CoPAK

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

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

I-Pak (TO-251AA) Package Outline (Dimensions are shown in millimeters (inches))

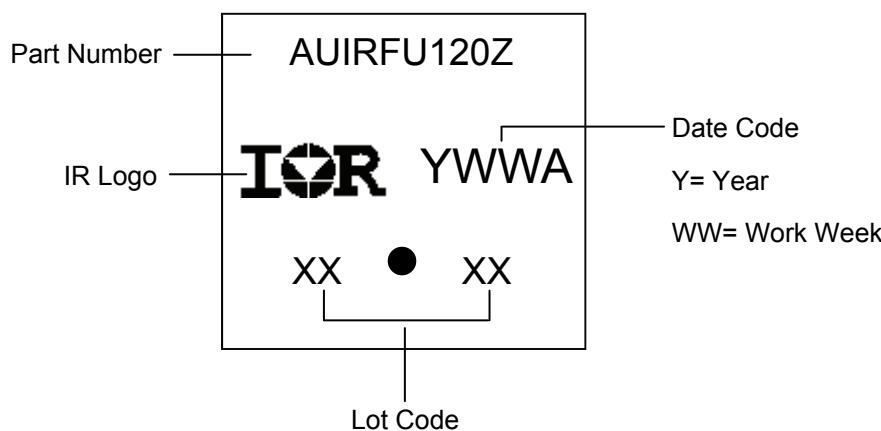


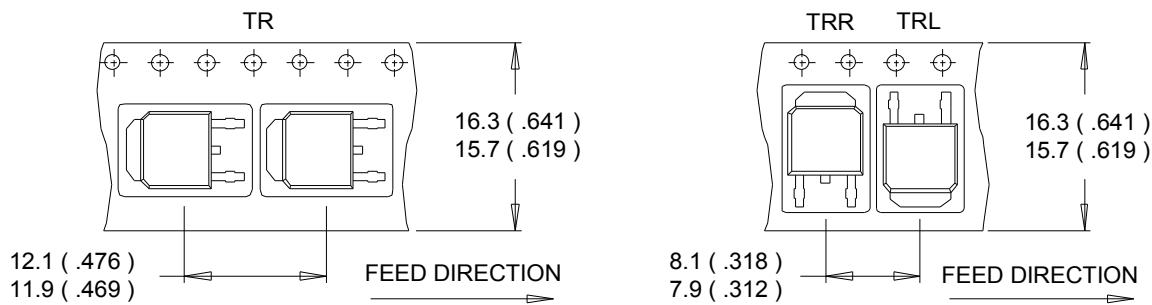
SYMBOL	DIMENSIONS				NOTES	
	MILLIMETERS		INCHES			
	MIN.	MAX.	MIN.	MAX.		
A	2.18	2.39	0.086	.094		
A1	0.89	1.14	0.035	0.045		
b	0.64	0.89	0.025	0.035		
b1	0.64	0.79	0.025	0.031	4	
b2	0.76	1.14	0.030	0.045		
b3	0.76	1.04	0.030	0.041		
b4	5.00	5.46	0.195	0.215	4	
c	0.46	0.61	0.018	0.024		
c1	0.41	0.56	0.016	0.022		
c2	.046	0.86	0.018	0.035		
D	5.97	6.22	0.235	0.245	3, 4	
D1	5.21	—	0.205	—	4	
E	6.35	6.73	0.250	0.265	3, 4	
E1	4.32	—	0.170	—	4	
e	2.29		0.090 BSC			
L	8.89	9.60	0.350	0.380		
L1	1.91	2.29	0.075	0.090		
L2	0.89	1.27	0.035	0.050	4	
L3	1.14	1.52	0.045	0.060	5	
ø1	0°	15°	0°	15°		

LEAD ASSIGNMENTSHEXFET

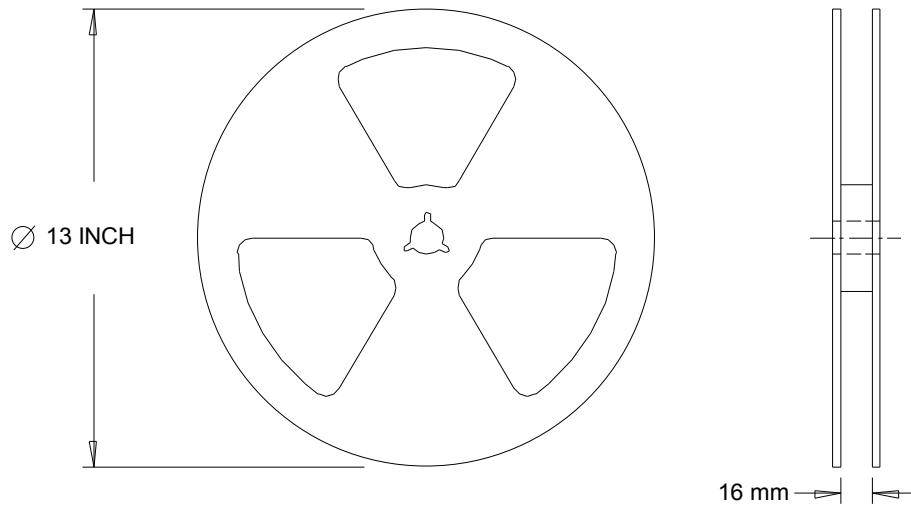
- 1.- GATE
- 2.- DRAIN
- 3.- SOURCE
- 4.- DRAIN

I-Pak (TO-251AA) Part Marking Information



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.

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	I-Pak Class M1B (+/- 100V) [†] AEC-Q101-002	
	Human Body Model	Class H0 (+/- 100V) [†] AEC-Q101-001	
	Charged Device Model	Class C5 (+/- 2000V) [†] AEC-Q101-005	
RoHS Compliant		Yes	

[†] Highest passing voltage.

Revision History

Date	Comments
10/12/2015	<ul style="list-style-type: none"> • Updated datasheet with corporate template • Corrected ordering table on page 1.
10/05/2017	<ul style="list-style-type: none"> • Corrected typo error on part marking on page 9 and 10.

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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

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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

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- 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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