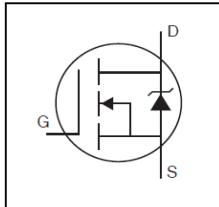


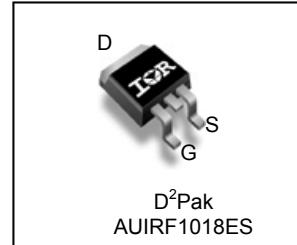
HEXFET® Power MOSFET

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}	60V
R_{DS(on)} typ.	7.1mΩ
	8.4mΩ
I_D	79A



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	
AUIRF1018ES	D ² -Pak	Tube	50	AUIRF1018ES
		Tape and Reel Left	800	AUIRF1018ESTRL

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

Symbol	Parameter	Max.	Units
I _D @ T _C = 25°C	Continuous Drain Current, V _{GS} @ 10V	79	A
I _D @ T _C = 100°C	Continuous Drain Current, V _{GS} @ 10V	56	
I _{DM}	Pulsed Drain Current ①	315	
P _D @ T _C = 25°C	Maximum Power Dissipation	110	W
	Linear Derating Factor	0.76	W/°C
V _{GS}	Gate-to-Source Voltage	± 20	V
E _{AS}	Single Pulse Avalanche Energy (Thermally Limited) ②	88	mJ
I _{AR}	Avalanche Current ①	47	A
E _{AR}	Repetitive Avalanche Energy ①	11	mJ
dv/dt	Peak Diode Recovery ③	21	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 ④	—	1.32	°C/W
R _{θJA}	Junction-to-Ambient (PCB Mount), D ² Pak ⑦	—	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	60	—	—	V	$V_{GS} = 0V, I_D = 250\mu\text{A}$
$\Delta V_{(\text{BR})\text{DSS}}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	0.073	—	V/ $^\circ\text{C}$	Reference to $25^\circ\text{C}, I_D = 5\text{mA}$ ①
$R_{DS(\text{on})}$	Static Drain-to-Source On-Resistance	—	7.1	8.4	$\text{m}\Omega$	$V_{GS} = 10V, I_D = 47\text{A}$ ④
$V_{GS(\text{th})}$	Gate Threshold Voltage	2.0	—	4.0	V	$V_{DS} = V_{GS}, I_D = 100\mu\text{A}$
g_{fs}	Forward Trans conductance	110	—	—	S	$V_{DS} = 50V, I_D = 47\text{A}$
R_G	Internal Gate Resistance	—	0.73	—	Ω	
I_{DSS}	Drain-to-Source Leakage Current	—	—	20	μA	$V_{DS} = 60V, V_{GS} = 0V$
		—	—	250		$V_{DS} = 48V, V_{GS} = 0V, T_J = 125^\circ\text{C}$
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)

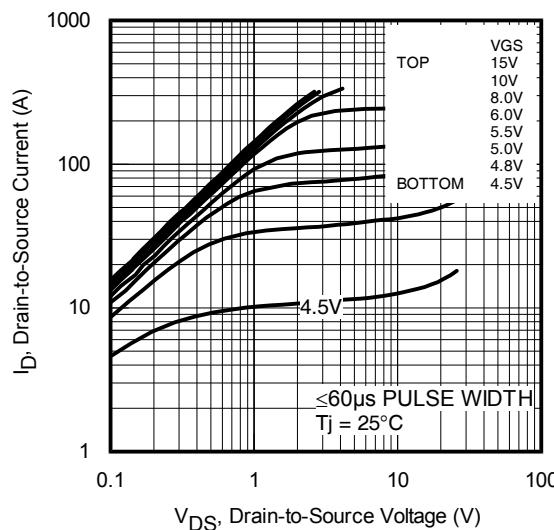
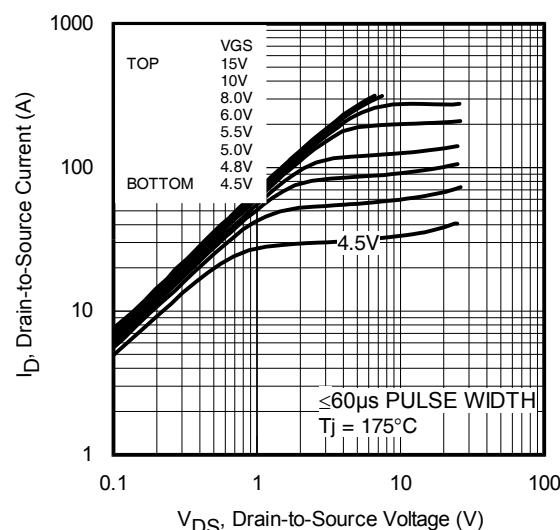
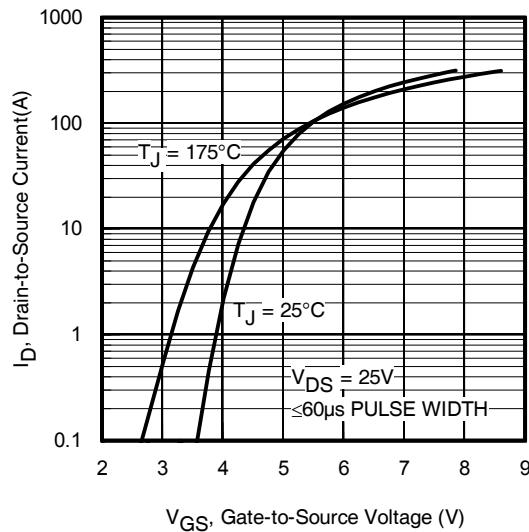
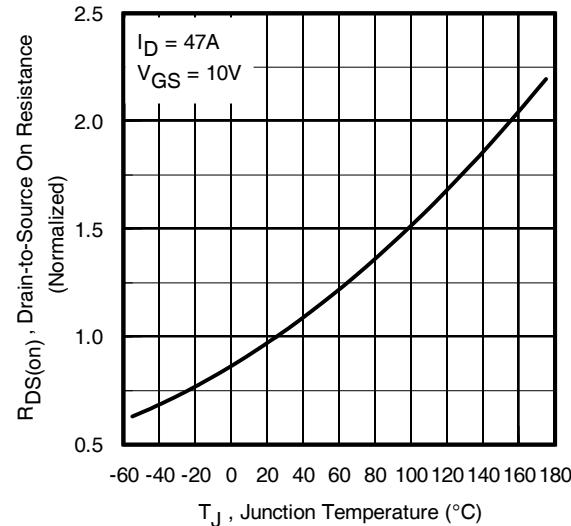
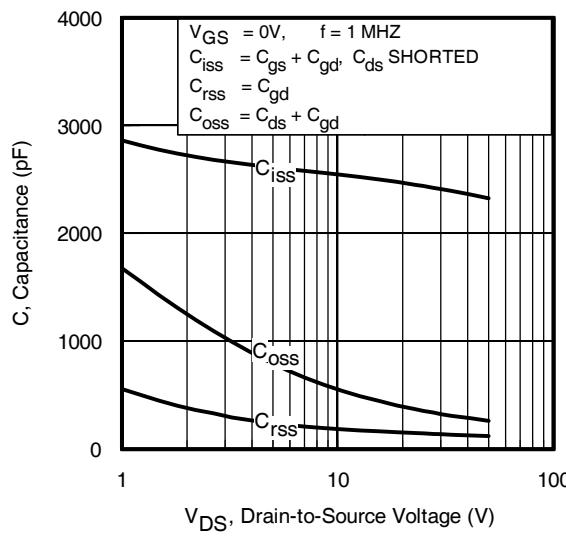
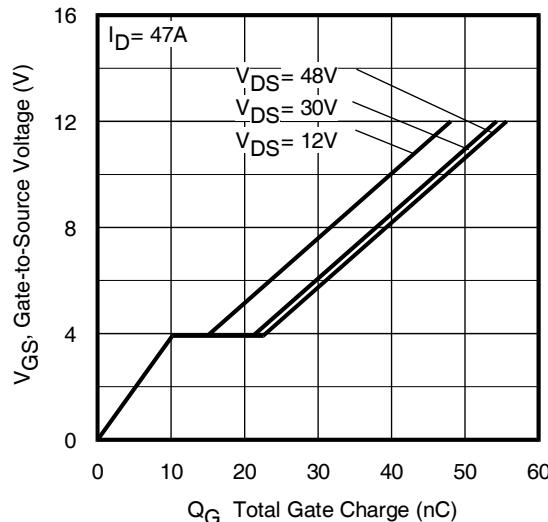
Q_g	Total Gate Charge	—	46	69	nC	$I_D = 47\text{A}$ $V_{DS} = 30V$ $V_{GS} = 10V$ ④
Q_{gs}	Gate-to-Source Charge	—	10	—		
Q_{gd}	Gate-to-Drain Charge	—	12	—		
Q_{sync}	Total Gate Charge Sync. ($Q_g - Q_{gd}$)	—	34	—		
$t_{d(on)}$	Turn-On Delay Time	—	13	—	ns	$V_{DD} = 39V$ $I_D = 47\text{A}$ $R_G = 10\Omega$ $V_{GS} = 10V$ ④
t_r	Rise Time	—	35	—		
$t_{d(off)}$	Turn-Off Delay Time	—	55	—		
t_f	Fall Time	—	46	—		
C_{iss}	Input Capacitance	—	2290	—	pF	$V_{GS} = 0V$ $V_{DS} = 50V$ $f = 1.0\text{MHz}$
C_{oss}	Output Capacitance	—	270	—		
C_{rss}	Reverse Transfer Capacitance	—	130	—		
$C_{oss \text{ eff. (ER)}}$	Effective Output Capacitance (Energy Related)	—	390	—		$V_{GS} = 0V, V_{DS} = 0V$ to $60V$ ⑥
$C_{oss \text{ eff. (TR)}}$	Effective Output Capacitance (Time Related)	—	630	—		$V_{GS} = 0V, V_{DS} = 0V$ to $60V$ ⑤

Diode Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	79	A	MOSFET symbol showing the integral reverse p-n junction diode.
I_{SM}	Pulsed Source Current (Body Diode) ①	—	—	315		
V_{SD}	Diode Forward Voltage	—	—	1.3	V	$T_J = 25^\circ\text{C}, I_S = 47\text{A}, V_{GS} = 0V$ ④
t_{rr}	Reverse Recovery Time	—	26	39	ns	$T_J = 25^\circ\text{C}$ $V_{DD} = 51V$
		—	31	47		$T_J = 125^\circ\text{C}$ $I_F = 47\text{A}$,
Q_{rr}	Reverse Recovery Charge	—	24	36	nC	$T_J = 25^\circ\text{C}$ $di/dt = 100\text{A}/\mu\text{s}$ ④
		—	35	53		$T_J = 125^\circ\text{C}$
I_{RRM}	Reverse Recovery Current	—	1.8	—	A	$T_J = 25^\circ\text{C}$
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.
- ② Limited by $T_{J\text{max}}$, starting $T_J = 25^\circ\text{C}$, $L = 0.08\text{mH}$, $R_G = 25\Omega$, $I_{AS} = 47\text{A}$, $V_{GS} = 10V$. Part not recommended for use above this value.
- ③ $I_{SD} \leq 47\text{A}$, $di/dt \leq 1668\text{A}/\mu\text{s}$, $V_{DD} \leq V_{(\text{BR})\text{DSS}}$, $T_J \leq 175^\circ\text{C}$.
- ④ Pulse width $\leq 400\mu\text{s}$; duty cycle $\leq 2\%$.
- ⑤ $C_{oss \text{ eff. (TR)}}$ is a fixed capacitance that gives the same charging time as C_{oss} while V_{DS} is rising from 0 to 80% V_{DSS} .
- ⑥ $C_{oss \text{ eff. (ER)}}$ is a fixed capacitance that gives the same energy as C_{oss} while V_{DS} is rising from 0 to 80% V_{DSS} .
- 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
- ⑧ R_0 is measured at T_J approximately 90°C .
- ⑨ This is only applied to TO-220.


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

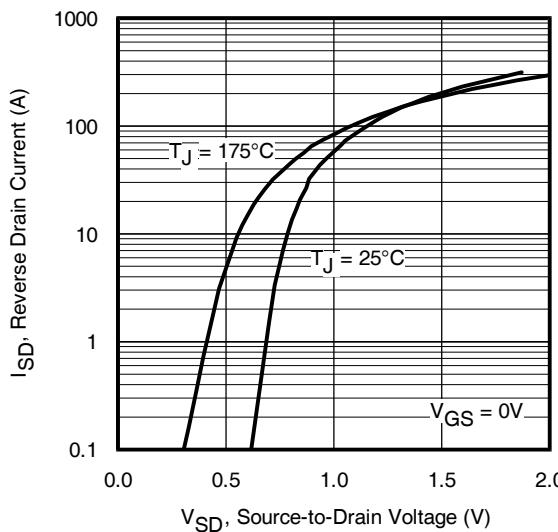


Fig. 7 Typical Source-to-Drain Diode Forward Voltage

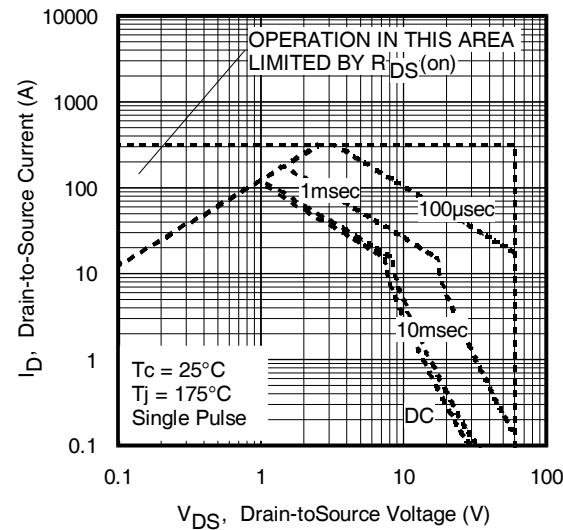


Fig 8. Maximum Safe Operating Area

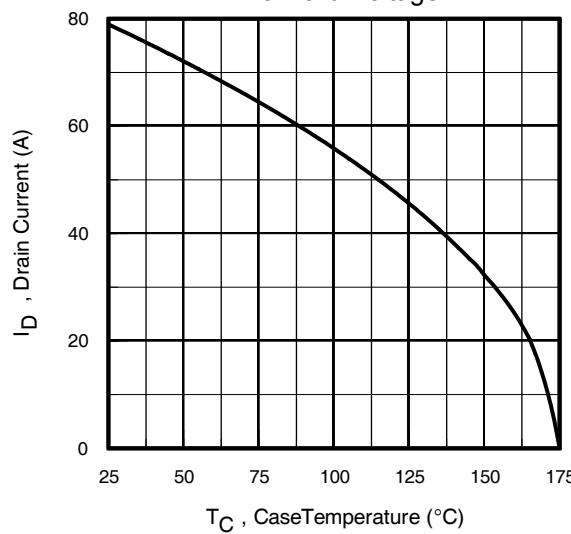


Fig 9. Maximum Drain Current vs. Case Temperature

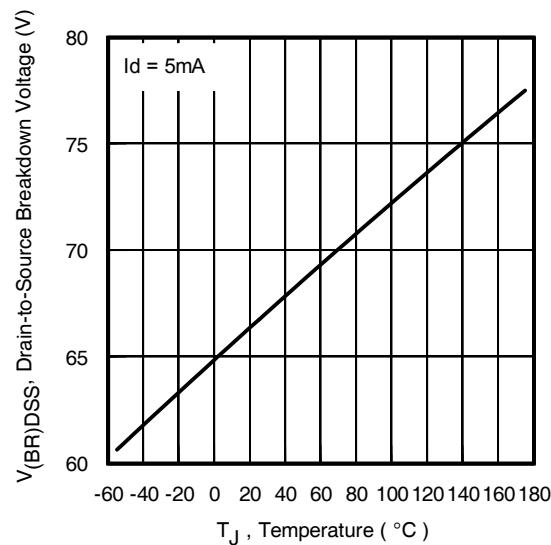


Fig 10. Drain-to-Source Breakdown Voltage

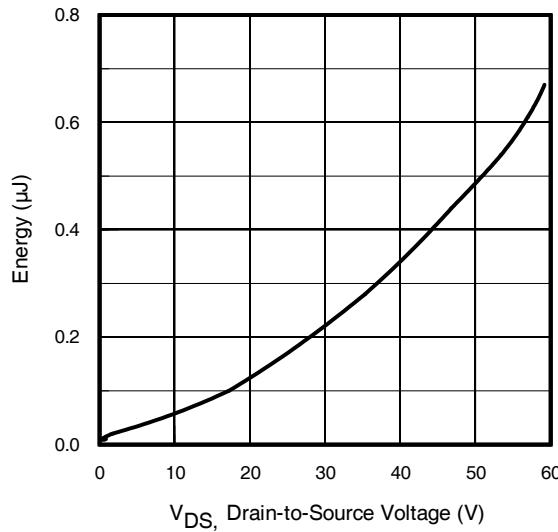


Fig 11. Typical Coss Stored Energy

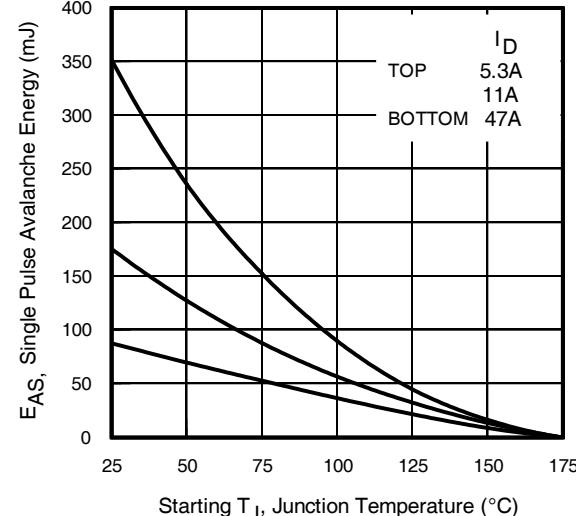


Fig 12. Maximum Avalanche Energy vs. Drain Current

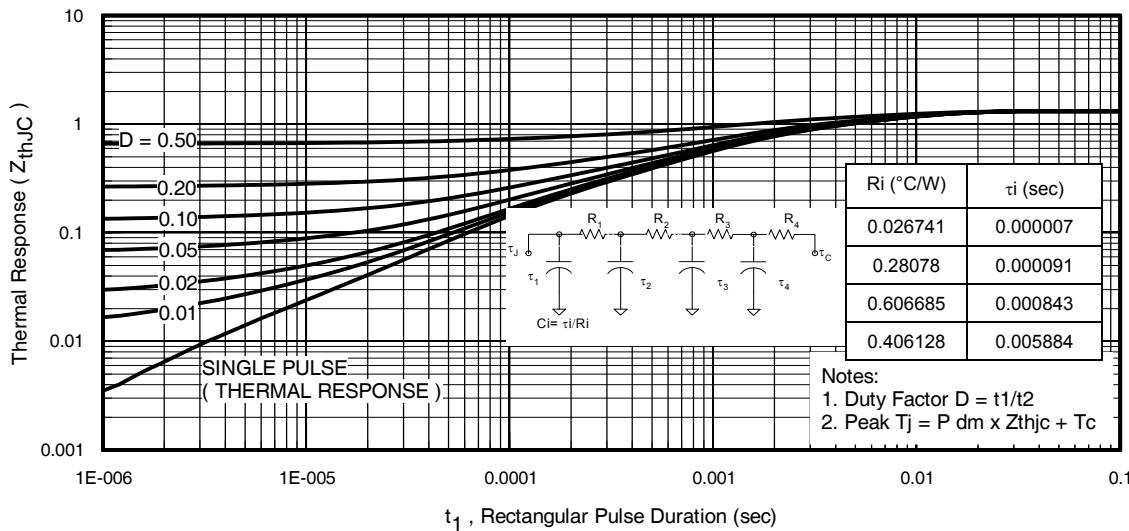


Fig 13. Maximum Effective Transient Thermal Impedance, Junction-to-Case

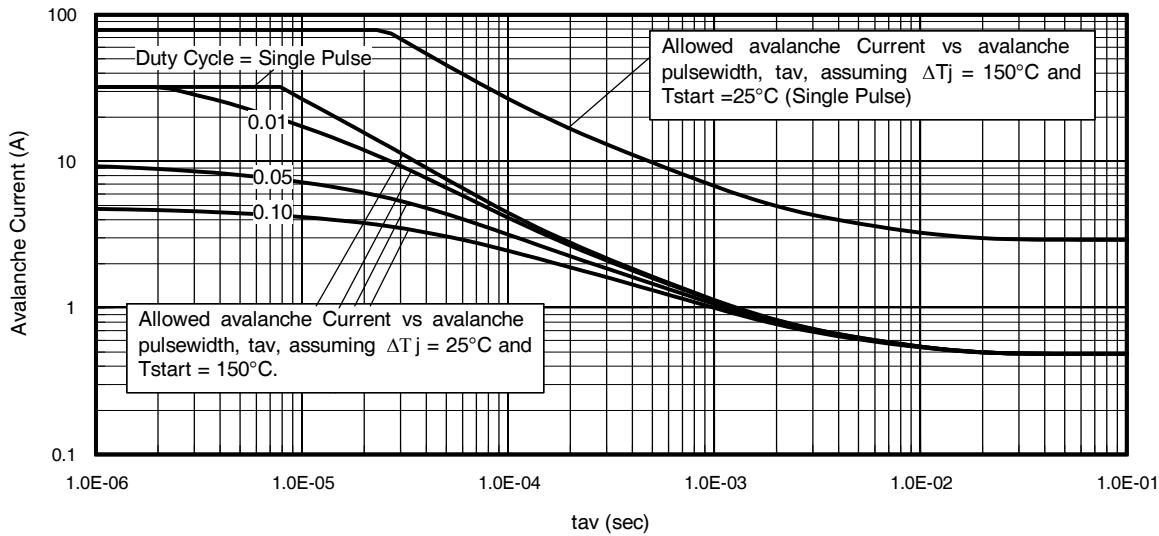


Fig 14. Avalanche Current vs. Pulse width

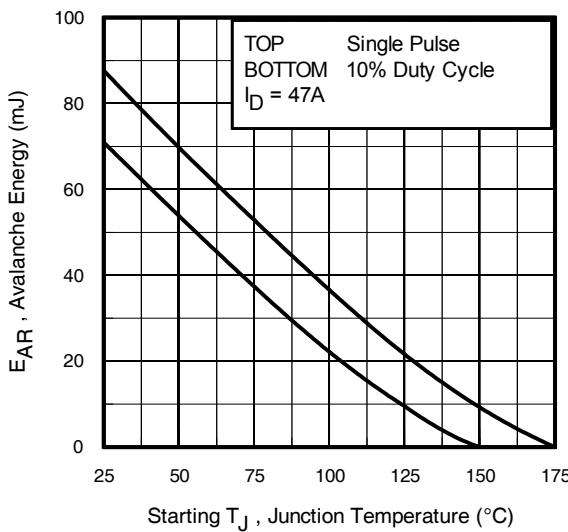


Fig 15. Maximum Avalanche Energy vs. Temperature

Notes on Repetitive Avalanche Curves , Figures 14, 15: (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 18a, 18b.
 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 13, 14).
- tav = Average time in avalanche.
 D = Duty cycle in avalanche = $tav \cdot f$
 $Z_{thJC}(D, tav)$ = Transient thermal resistance, see Figures 13)

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

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

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

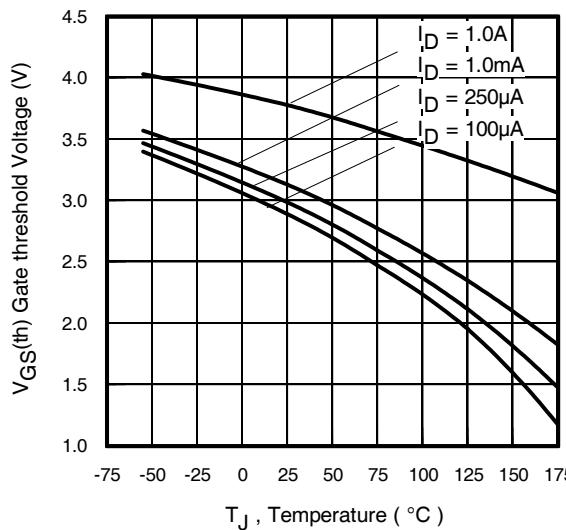


Fig. 16. Threshold Voltage vs. Temperature

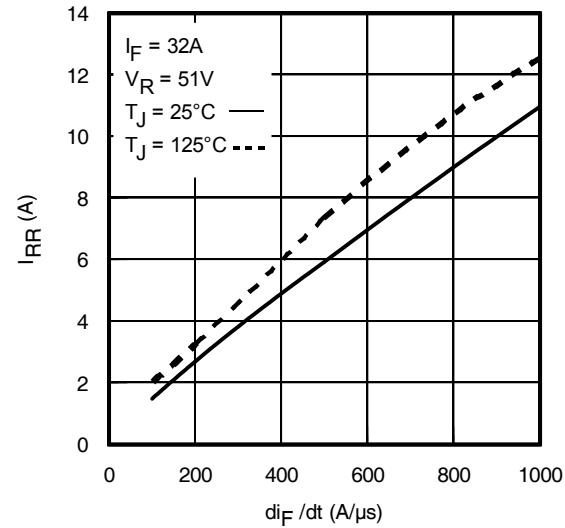


Fig. 17 - Typical Recovery Current vs. di_F/dt

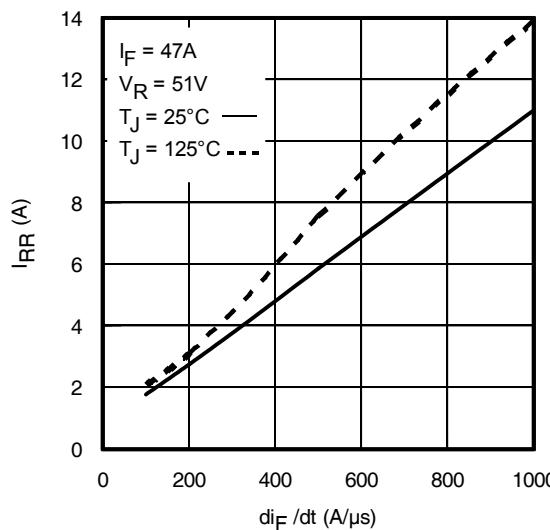


Fig. 18 - Typical Recovery Current vs. di_F/dt

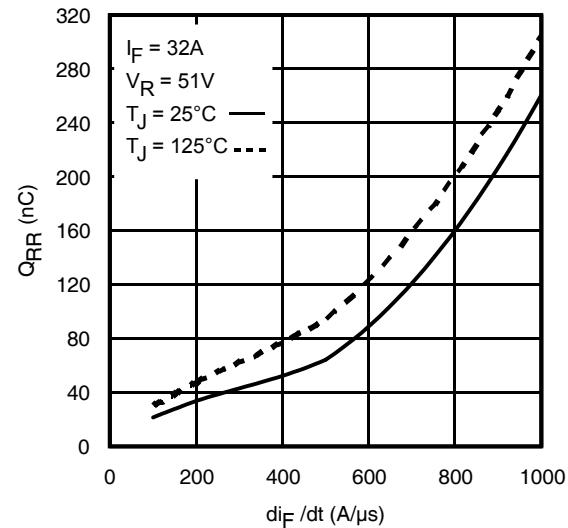


Fig. 19 - Typical Stored Charge vs. di_F/dt

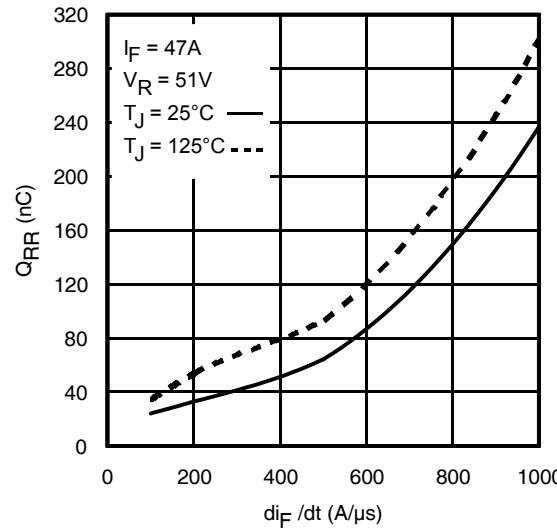


Fig. 20 - Typical Stored Charge vs. di_F/dt

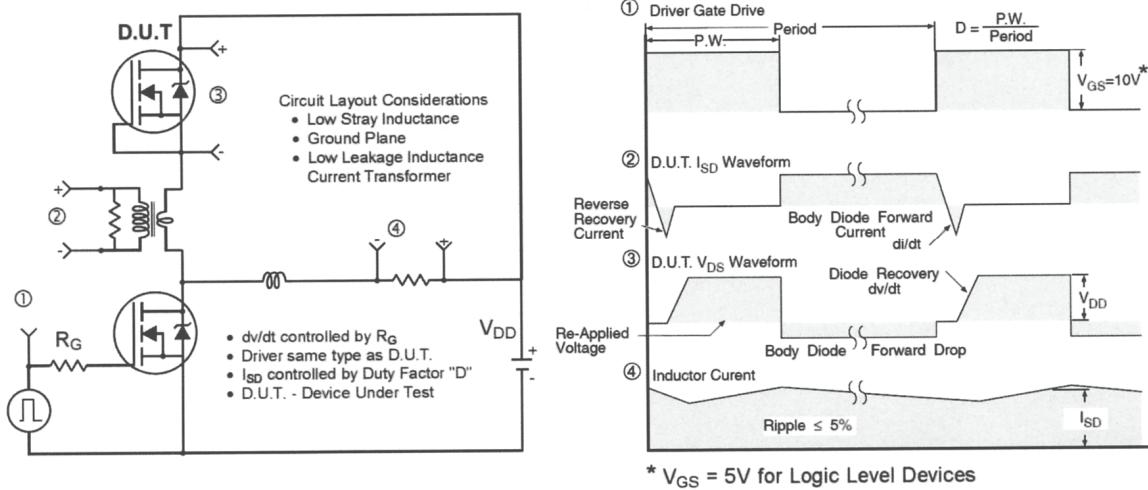


Fig 21. Peak Diode Recovery dv/dt Test Circuit for N-Channel HEXFET® Power MOSFETs

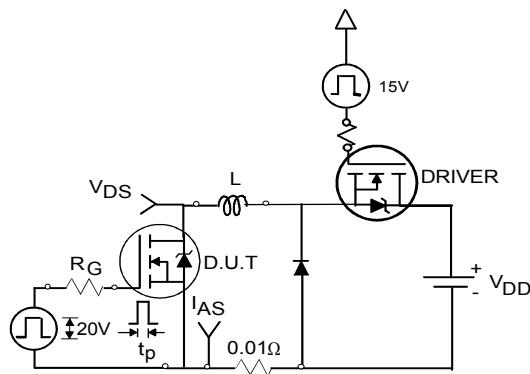


Fig 22a. Unclamped Inductive Test Circuit

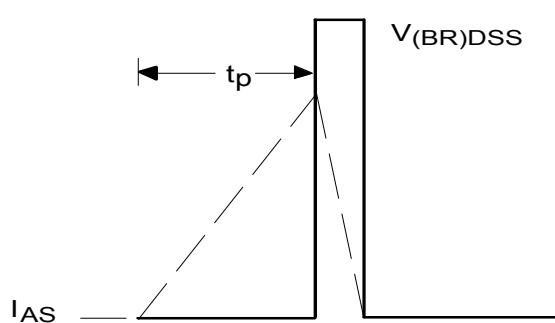


Fig 22b. Unclamped Inductive Waveforms

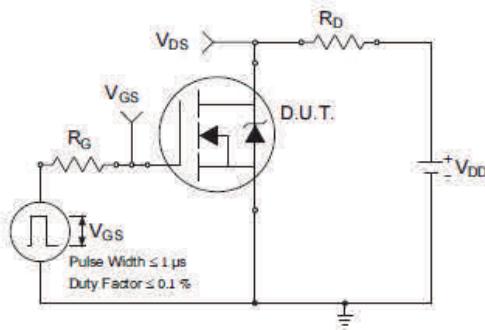


Fig 23a. Switching Time Test Circuit

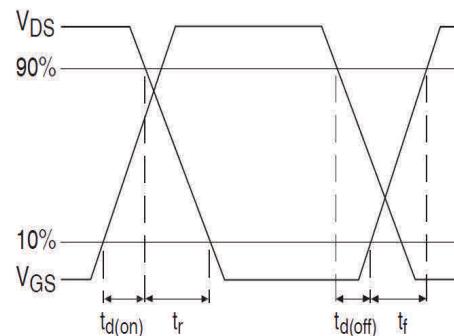


Fig 23b. Switching Time Waveforms

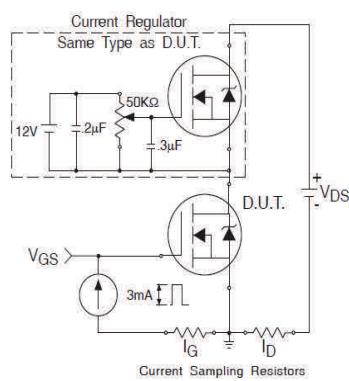


Fig 24a. Gate Charge Test Circuit

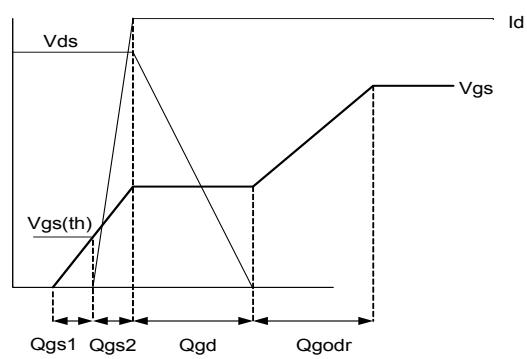
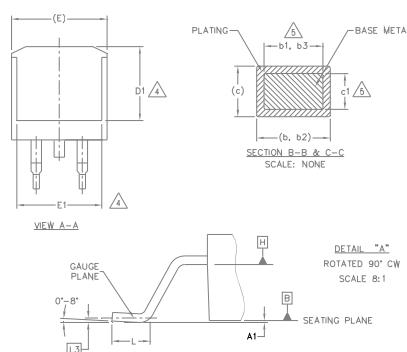
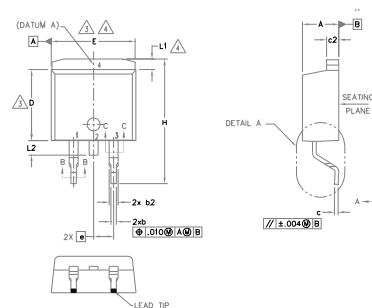


Fig 24b. Gate Charge Waveform

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

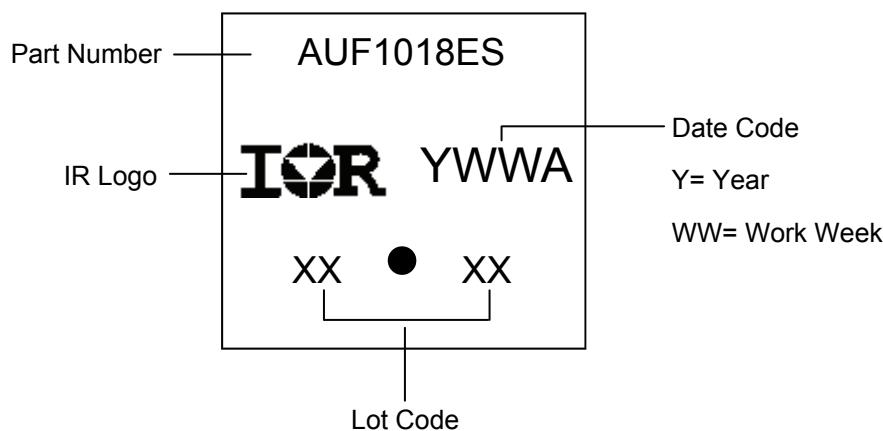
- 1.- ANODE (TWO DIE) / OPEN (ONE DIE)
- 2, 4.- CATHODE
- 3.- ANODE

HEXFET

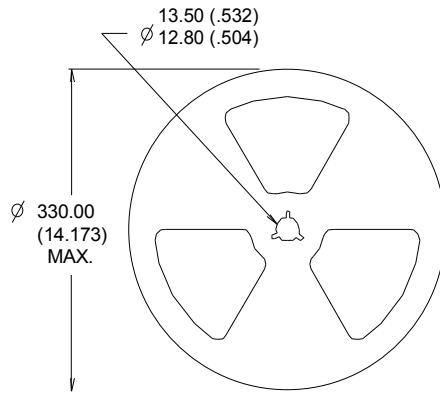
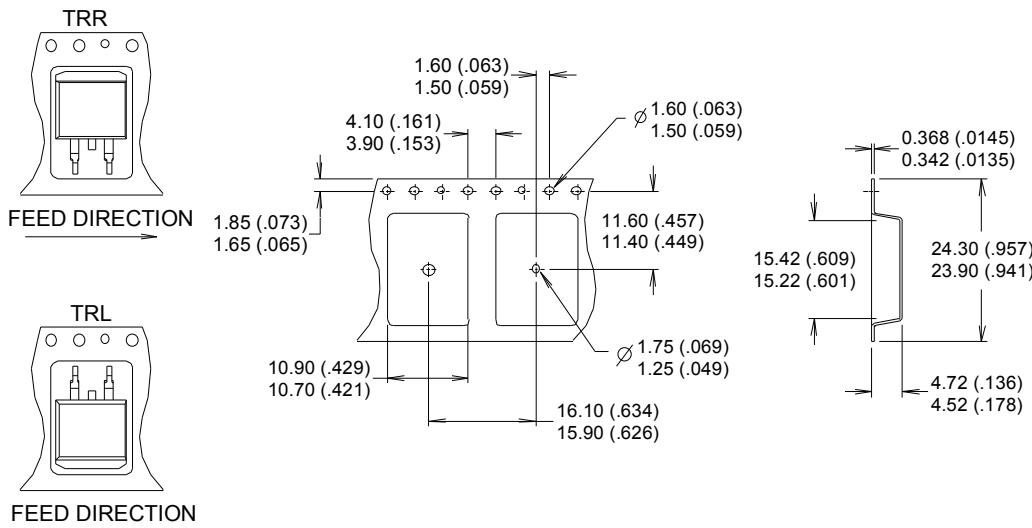
- 1.- GATE
- 2, 4.- DRAIN
- 3.- SOURCE

IGRTs, CoPACK

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

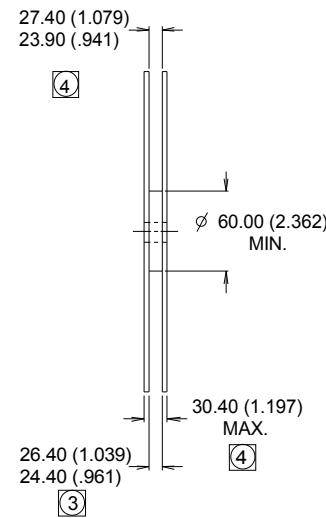
D²Pak (TO-263AB) Part Marking Information

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))

NOTES :

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



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

Qualification Information

		Automotive (per AEC-Q101)	
Qualification Level		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	Human Body Model	Class H1B (+/- 1000V) [†] AEC-Q101-001	
	Charged Device Model	Class C5 (+/- 1000V) [†] AEC-Q101-005	
RoHS Compliant		Yes	

Revision History

Date	Comments
11/23/2015	<ul style="list-style-type: none"> • Updated datasheet with corporate template • Corrected ordering table on page 1. • Added ESD table on page10

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.

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.



Тел: +7 (812) 336 43 04 (многоканальный)
Email: org@lifeelectronics.ru