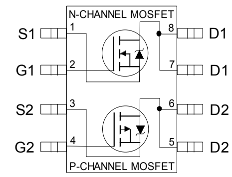
Features

- Advanced Planar Technology
- Low On-Resistance
- Logic Level Gate Drive
- Dual N and P Channel MOSFET
- Dynamic dv/dt Rating
- 150°C Operating Temperature
- Fast Switching
- Lead-Free, RoHS Compliant
- Automotive Qualified *



Top View

	N-CH	P-CH
V_{DSS}	30V	-30V
$R_{DS(on)}$ max.	0.05Ω	0.10Ω
I_D	4.7A	-3.5A

SO-8
AUIRF7309Q

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	
AUIRF7309Q	SO-8	Tape and Reel	4000	AUIRF7309QTR

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
		N-Channel	P-Channel	
I_D @ T_A = 25°C	10 Sec. Pulsed Drain Current, V_{GS} @ 10V	4.7	-3.5	A
I_D @ T_A = 25°C	Continuous Drain Current, V_{GS} @ 10V	4.0	-3.0	
I_D @ T_A = 70°C	Continuous Drain Current, V_{GS} @ 10V	3.2	-2.4	
I_{DM}	Pulsed Drain Current ①	16	-12	
P_D @T_A = 25°C	Maximum Power Dissipation ④	1.4		W
	Linear Derating Factor④	0.011		W/°C
V_{GS}	Gate-to-Source Voltage	± 20		V
dv/dt	Peak Diode Recovery dv/dt ②	6.9	-6.0	V/ns
T_J T_{STG}	Operating Junction and Storage Temperature Range	-55 to + 150		°C

Thermal Resistance

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JA}$	Junction-to-Ambient (PCB Mount, steady state) ④	——	90	°C/W

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

Static @ T_J = 25°C (unless otherwise specified)

	Parameter		Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	N-Ch	30	—	—	V	V_{GS} = 0V, I_D = 250µA
		P-Ch	-30	—	—		V_{GS} = 0V, I_D = -250µA
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	N-Ch	—	0.032	—	V/°C	Reference to 25°C, I_D = 1mA
		P-Ch	—	-0.037	—		Reference to 25°C, I_D = -1mA
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	N-Ch	—	—	0.050	Ω	V_{GS} = 10V, I_D = 2.4A ③
			—	—	0.080		V_{GS} = 4.5V, I_D = 2.0A ③
		P-Ch	—	—	0.10		V_{GS} = -10V, I_D = -1.8A ③
			—	—	0.16		V_{GS} = -4.5V, I_D = -1.5A ③
$V_{GS(th)}$	Gate Threshold Voltage	N-Ch	1.0	—	3.0	V	V_{DS} = V_{GS}, I_D = 250µA
		P-Ch	-1.0	—	-3.0		V_{DS} = V_{GS}, I_D = -250µA
gfs	Forward Trans conductance	N-Ch	5.2	—	—	S	V_{DS} = 15V, I_D = 2.4A
		P-Ch	2.5	—	—		V_{DS} = -24V, I_D = -1.8A
I_{DSS}	Drain-to-Source Leakage Current	N-Ch	—	—	1.0	µA	V_{DS} =24V, V_{GS} = 0V
		P-Ch	—	—	-1.0		V_{DS} = -24V,V_{GS} = 0V
		N-Ch	—	—	25		V_{DS} =24V, V_{GS} = 0V ,T_J =125°C
		P-Ch	—	—	-25		V_{DS} = -24V,V_{GS} = 0V,T_J =125°C
I_{GSS}	Gate-to-Source Forward Leakage	N-P	—	—	± 100	nA	V_{GS} = ± 20V
	Gate-to-Source Reverse Leakage	N-P	—	—	± 100		V_{GS} = ± 20V

Dynamic Electrical Characteristics @ T_J = 25°C (unless otherwise specified)

	Parameter		Min.	Typ.	Max.	Units	Conditions
Q_g	Total Gate Charge	N-Ch	—	—	25	nC	N-Channel
		P-Ch	—	—	25		I_D = 2.6A, V_{DS} = 16V,V_{GS} = 4.5V③
Q_{gs}	Gate-to-Source Charge	N-Ch	—	—	2.9		
		P-Ch	—	—	2.9		P-Channel
Q_{gd}	Gate-to-Drain Charge	N-Ch	—	—	7.9		I_D = -2.2A,V_{DS} = -16V,V_{GS} = -4.5V
		P-Ch	—	—	9.0		
$t_{d(on)}$	Turn-On Delay Time	N-Ch	—	6.8	—	ns	N-Channel
		P-Ch	—	11	—		V_{DD} = 10V,I_D = 2.6A,R_G = 6.0Ω,
t_r	Rise Time	N-Ch	—	21	—		R_D = 3.8Ω
		P-Ch	—	17	—		
$t_{d(off)}$	Turn-Off Delay Time	N-Ch	—	22	—		P-Channel
		P-Ch	—	25	—		V_{DD} = -10V,I_D = -2.2A,R_G = 6.0Ω,
t_f	Fall Time	N-Ch	—	7.7	—		R_D = 4.5Ω
		P-Ch	—	18	—		
L_D	Internal Drain Inductance	N-P	—	4.0	—	nH	Between lead, 6mm(0.25n) from
L_S	Internal Source Inductance	N-P	—	6.0	—		package and center of die contact
C_{iss}	Input Capacitance	N-Ch	—	520	—	pF	N-Channel
		P-Ch	—	440	—		V_{GS} = 0V,V_{DS} = 15V,f = 1.0MHz
C_{oss}	Output Capacitance	N-Ch	—	180	—		③
		P-Ch	—	200	—		P-Channel
C_{rss}	Reverse Transfer Capacitance	N-Ch	—	72	—		V_{GS} = 0V,V_{DS} = -15V,f = 1.0MHz
		P-Ch		93	—		

Diode Characteristics

	Parameter		Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	N-Ch	—	—	1.8	A	
		P-Ch	—	—	-1.8		
I_{SM}	Pulsed Source Current (Body Diode) ①	N-Ch	—	—	16		
		P-Ch	—	—	-12		
V_{SD}	Diode Forward Voltage	N-Ch	—	—	1.0	V	T_J = 25°C,I_S = 1.8A,V_{GS} = 0V ③
		P-Ch	—	—	-1.0		T_J = 25°C,I_S = -1.8A,V_{GS} = 0V ③
t_{rr}	Reverse Recovery Time	N-Ch	—	47	71	ns	N-Channel
		P-Ch	—	53	80		T_J = 25°C ,I_F = 2.6A, di/dt = 100A/µs ③
Q_{rr}	Reverse Recovery Charge	N-Ch	—	56	84	nC	P-Channel
		P-Ch		66	99		T_J = 25°C,I_F = -2.2A, di/dt = 100A/µs 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. 23)
② N-Channel $I_{SD} \leq$ 2.4A, di/dt $\leq$ 73A/µs, $V_{DD} \leq V_{(BR)DSS}$, $T_J \leq$ 150°C.
P-Channel $I_{SD} \leq$ -1.8A, di/dt $\leq$ 90A/µs, $V_{DD} \leq V_{(BR)DSS}$, $T_J \leq$ 150°C
③ Pulse width $\leq$ 300µs; duty cycle $\leq$ 2%.
④ When mounted on 1" square PCB (FR-4 or G-10 Material). For recommended footprint and soldering techniques refer to application note #AN-994

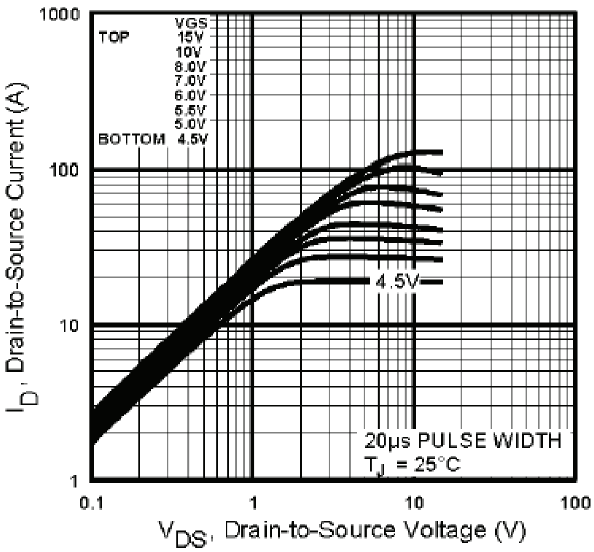


Fig. 1 Typical Output Characteristics
T_J = 25°C

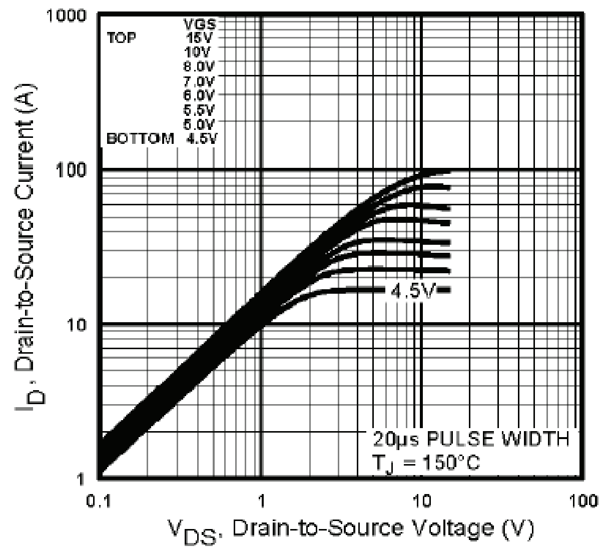


Fig. 2 Typical Output Characteristics
T_J = 150°C

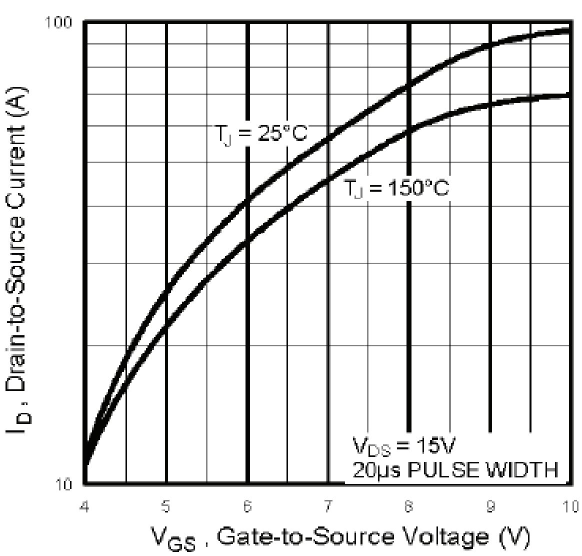


Fig. 3 Typical Transfer Characteristics

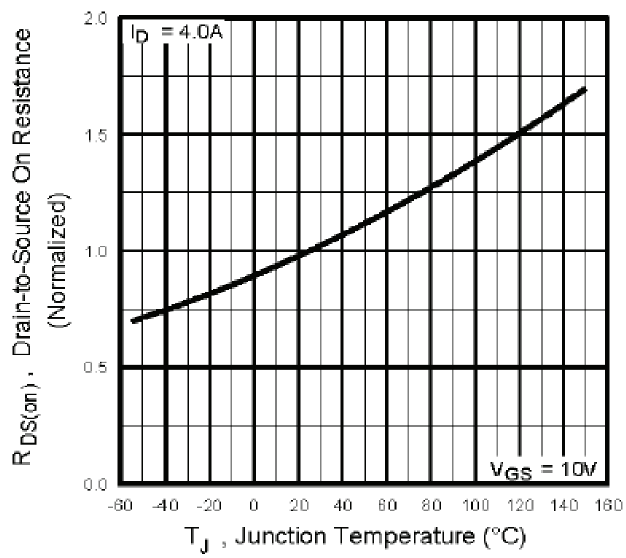


Fig. 4 Normalized On-Resistance
vs. Temperature

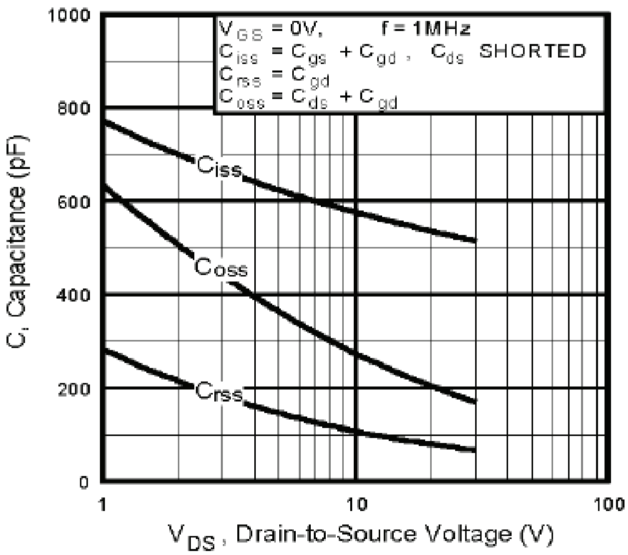


Fig 5. Typical Capacitance vs. Drain-to-Source Voltage

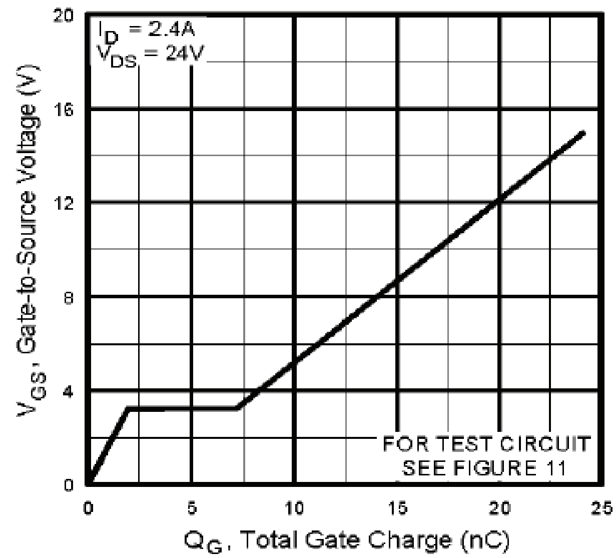


Fig 6. Typical Gate Charge vs. Gate-to-Source Voltage

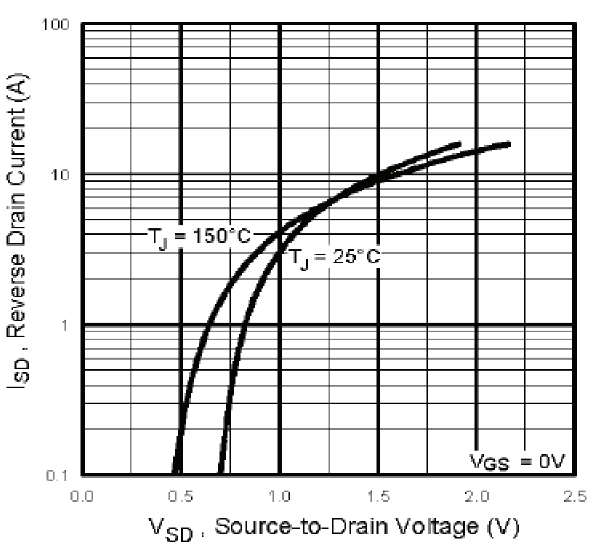


Fig. 7 Typical Source-to-Drain Diode Forward Voltage

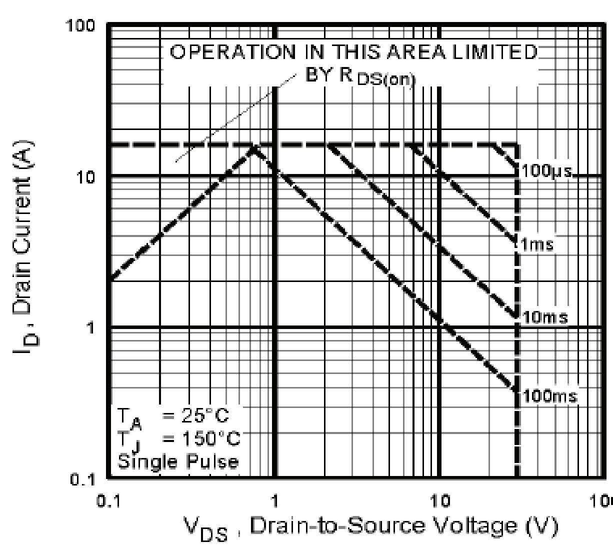


Fig 8. Maximum Safe Operating Area

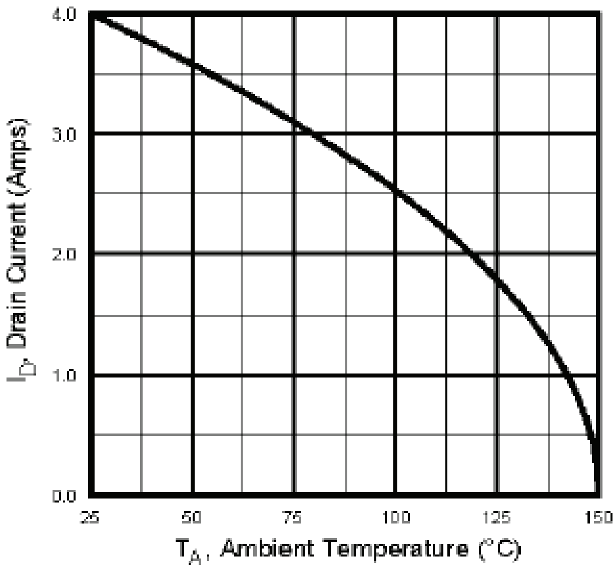


Fig 9. Maximum Drain Current vs. Case Temperature

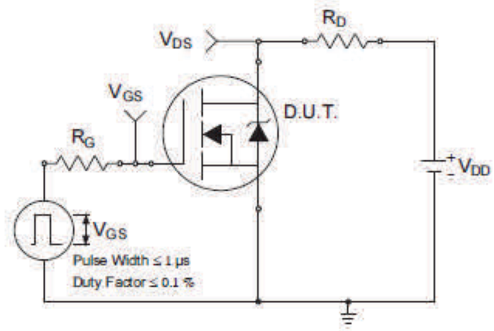


Fig 10a. Switching Time Test Circuit

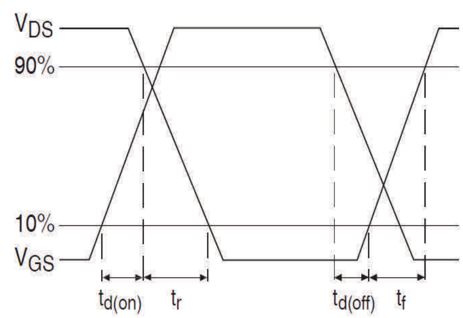


Fig 10b. Switching Time Waveforms

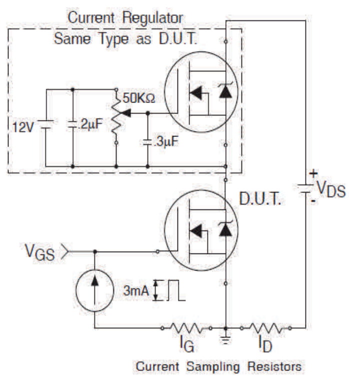


Fig 11a. Gate Charge Test Circuit

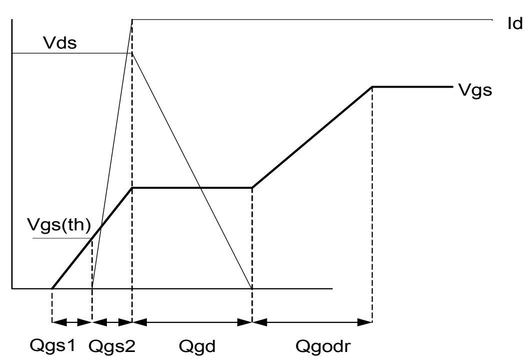


Fig 11b. Basic Gate Charge Waveform

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

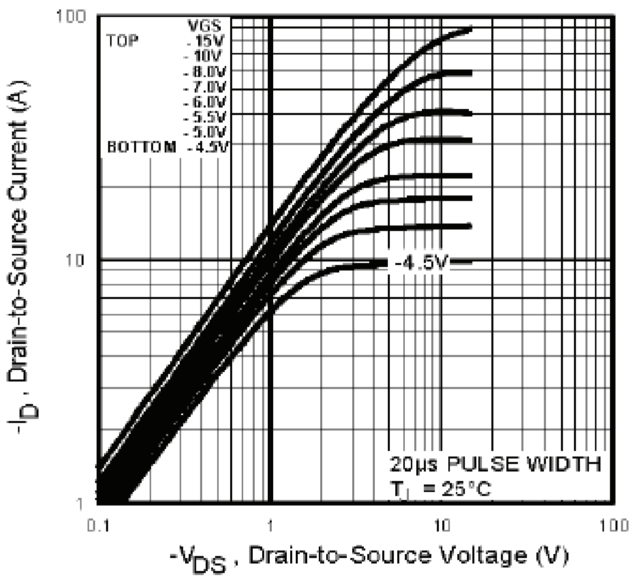


Fig. 12 Typical Output Characteristics
$T_J = 25°C$

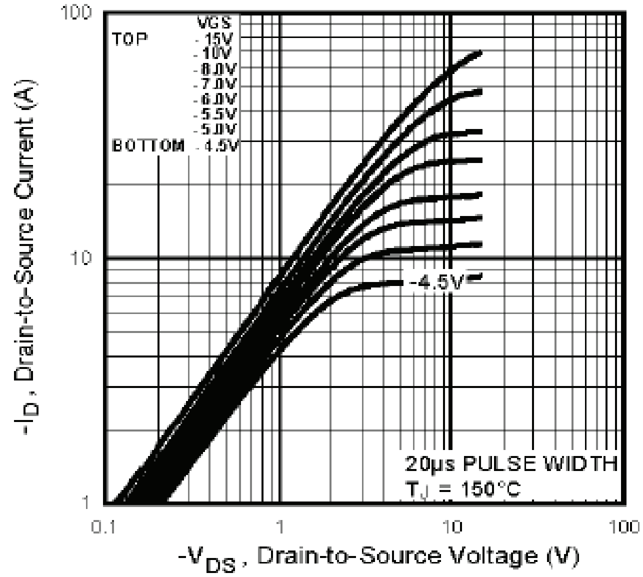


Fig. 13 Typical Output Characteristics
$T_J = 150°C$

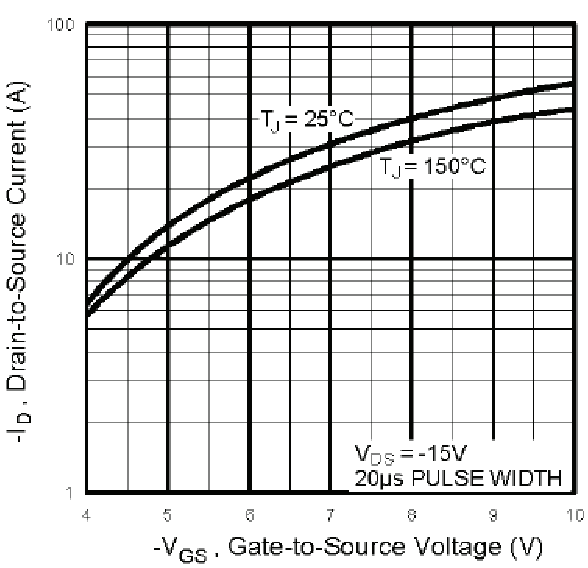


Fig. 14 Typical Transfer Characteristics

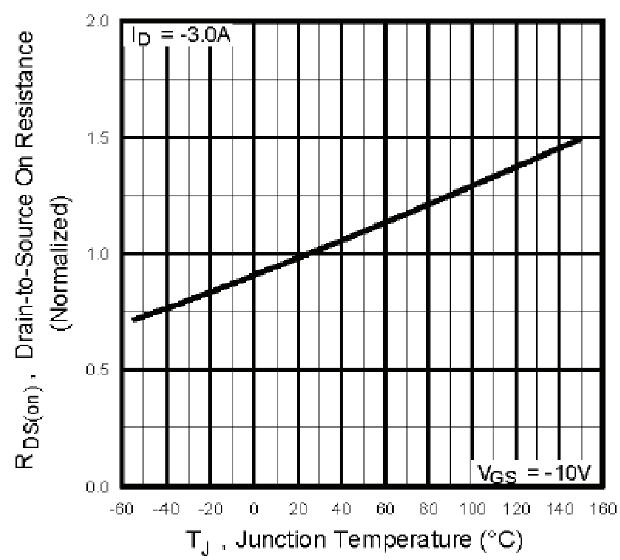


Fig. 15 Normalized On-Resistance
vs. Temperature

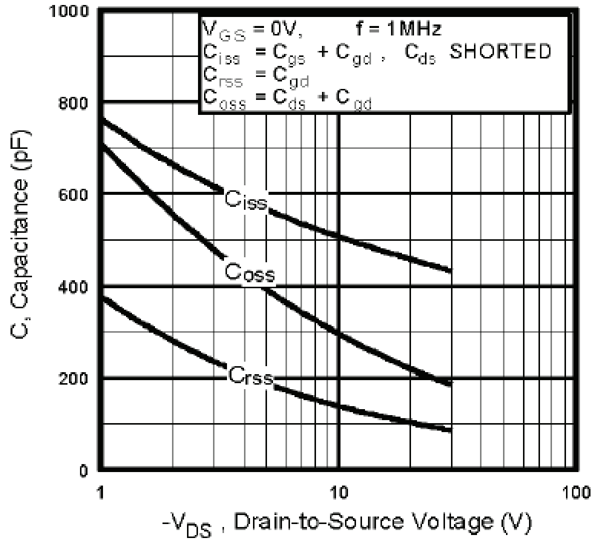


Fig 16. Typical Capacitance vs. Drain-to-Source Voltage

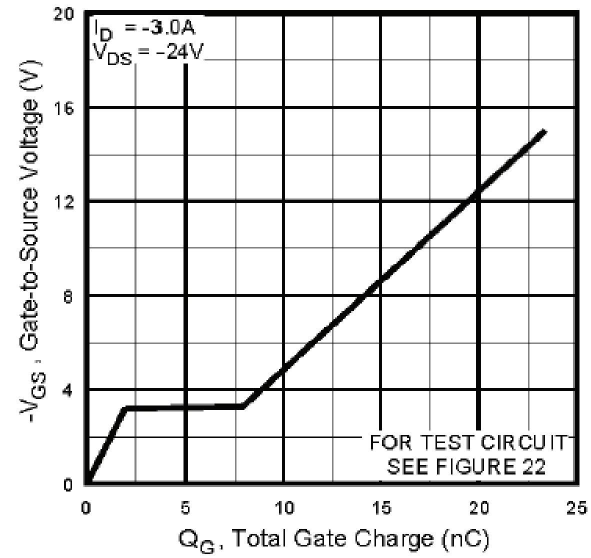


Fig 17. Typical Gate Charge vs. Gate-to-Source Voltage

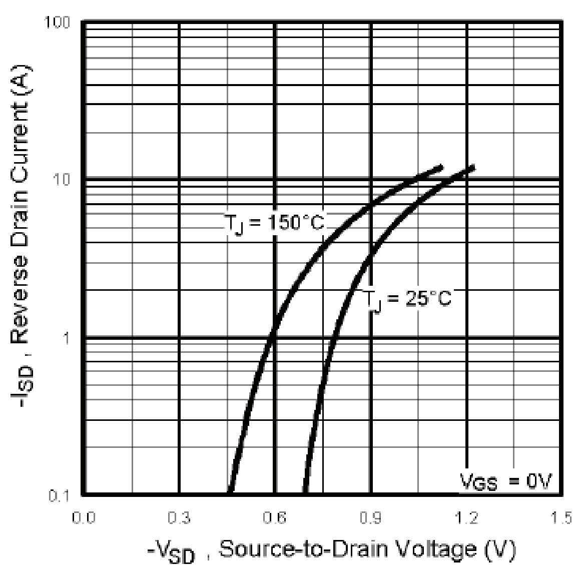


Fig. 18 Typical Source-to-Drain Diode Forward Voltage

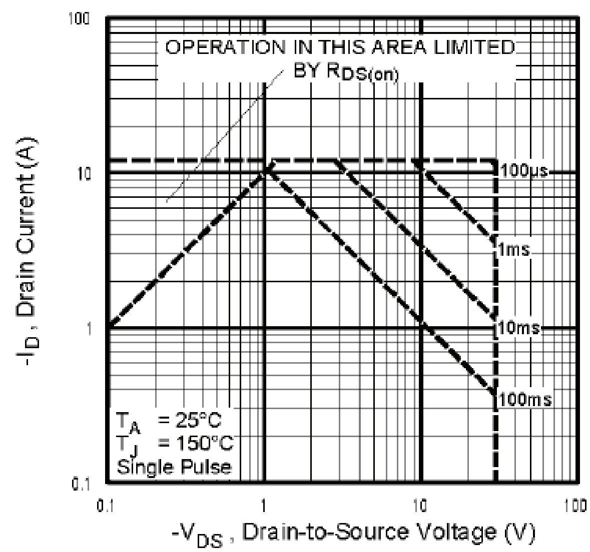


Fig 19. Maximum Safe Operating Area

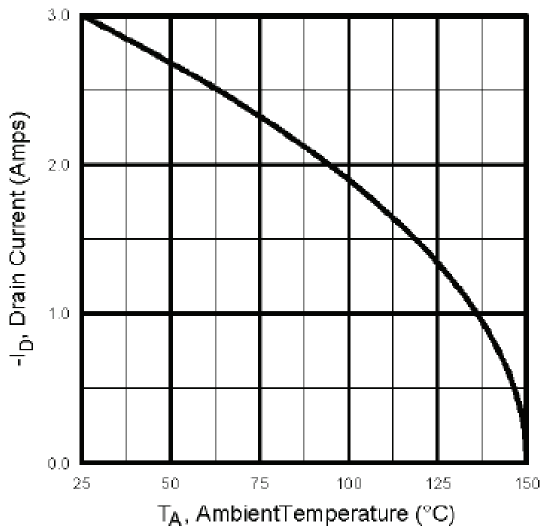


Fig 20. Maximum Drain Current vs. Case Temperature

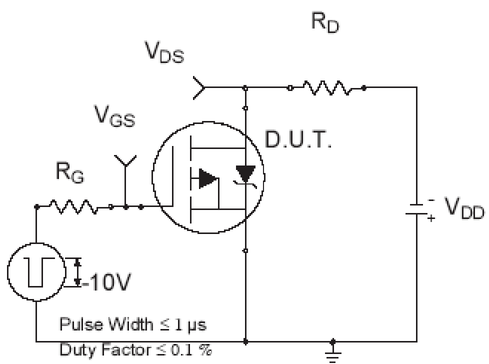


Fig 21a. Switching Time Test Circuit

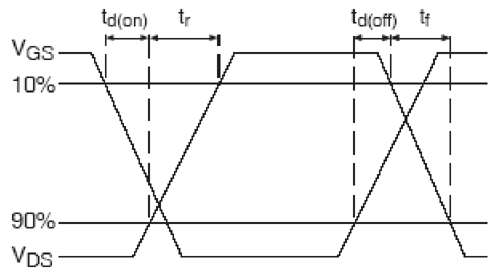


Fig 21b. Switching Time Waveforms

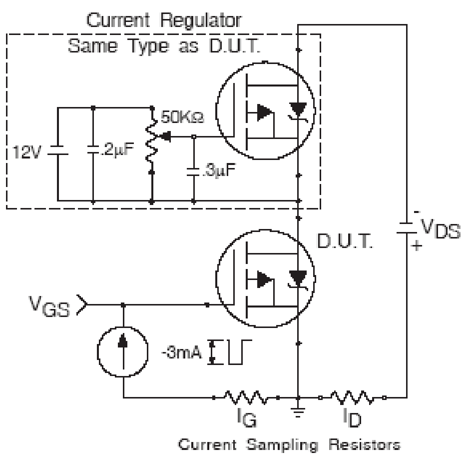


Fig 22a. Gate Charge Test Circuit

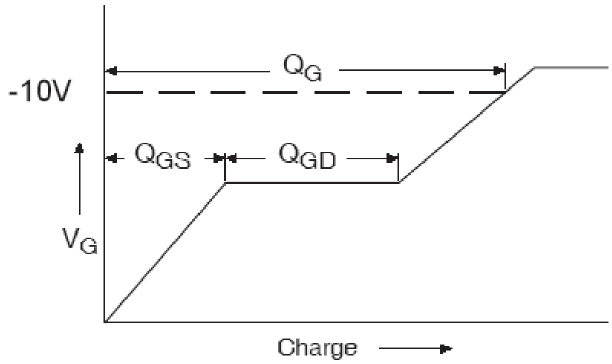


Fig 22b. Basic Gate Charge Waveform

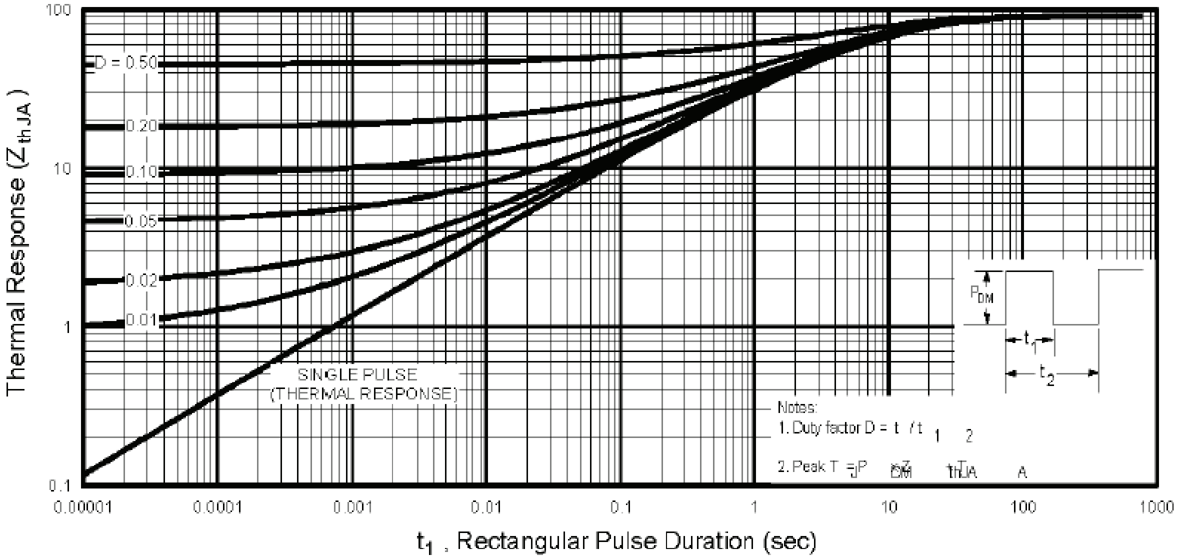


Fig 23. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

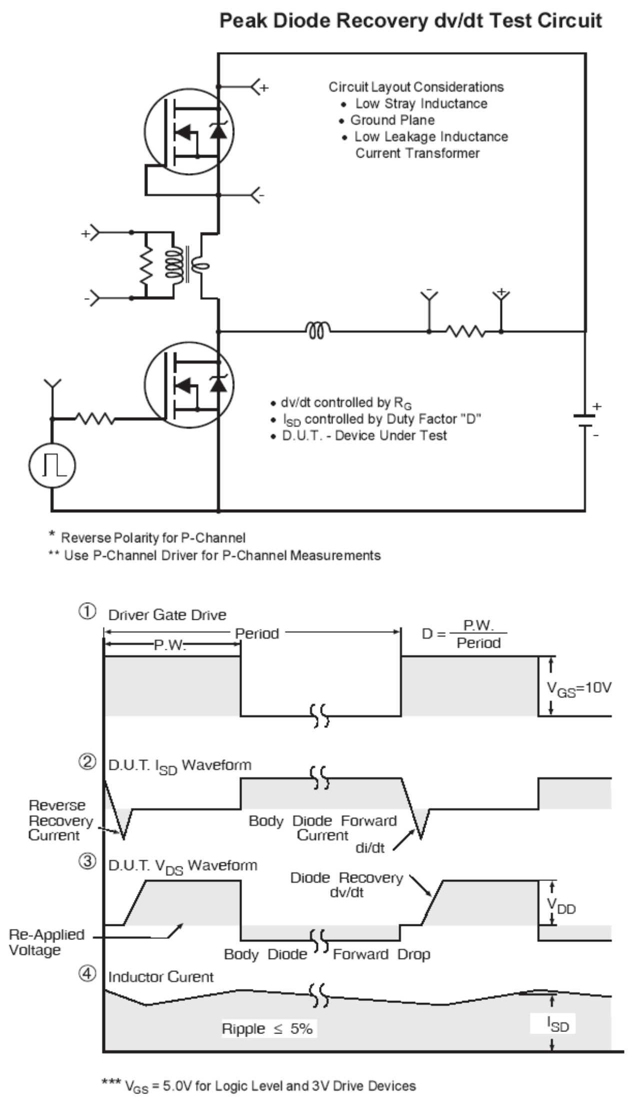
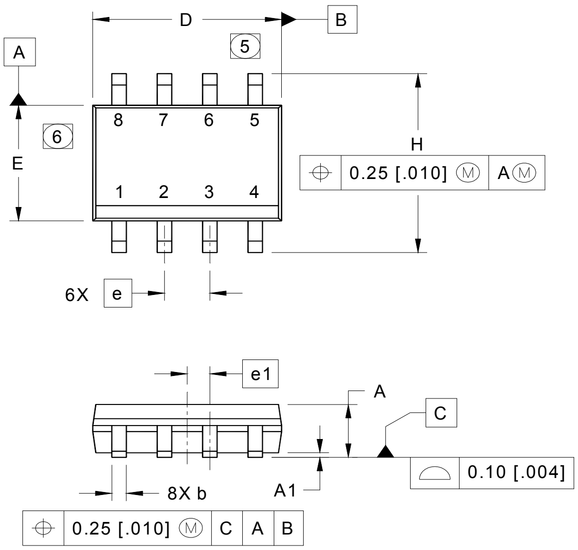
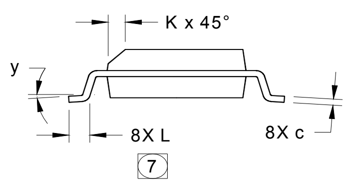


Fig 24. Peak Diode Recovery dv/dt Test Circuit for N & P-Channel HEXFET® Power MOSFETs

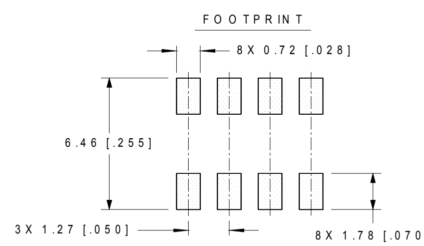
SO-8 Package Outline (Dimensions are shown in millimeters (inches))



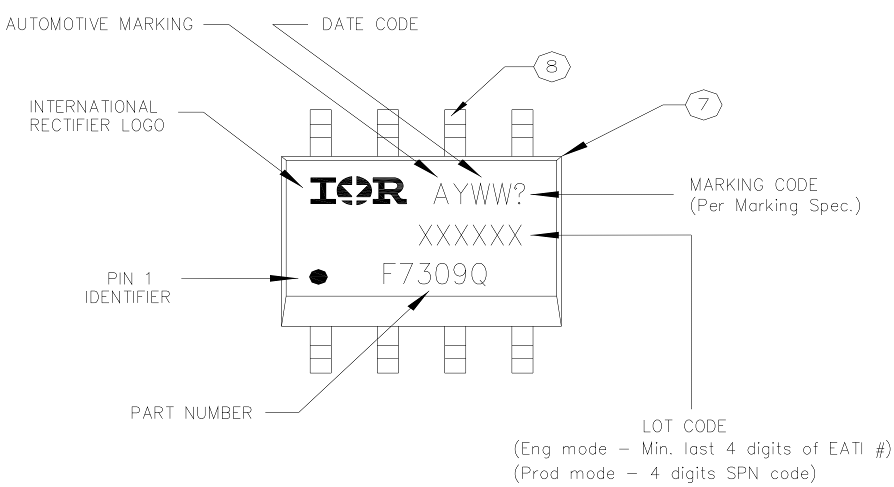
DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.0532	.0688	1.35	1.75
A1	.0040	.0098	0.10	0.25
b	.013	.020	0.33	0.51
c	.0075	.0098	0.19	0.25
D	.189	.1968	4.80	5.00
E	.1497	.1574	3.80	4.00
e	.050 BASIC		1.27 BASIC	
e 1	.025 BASIC		0.635 BASIC	
H	.2284	.2440	5.80	6.20
K	.0099	.0196	0.25	0.50
L	.016	.050	0.40	1.27
y	0°	8°	0°	8°



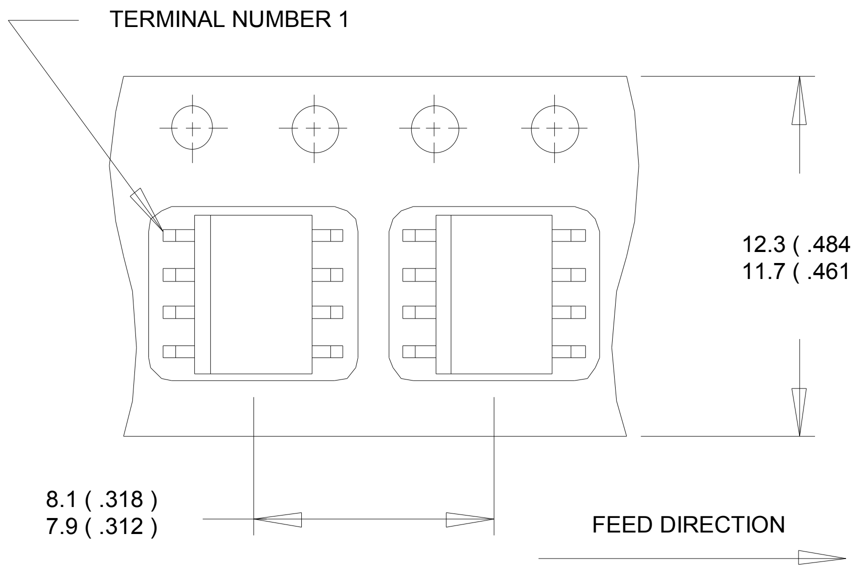
NOTES:
1. DIMENSIONING & TOLERANCING PER ASME Y14.5M-1994.
2. CONTROLLING DIMENSION: MILLIMETER
3. DIMENSIONS ARE SHOWN IN MILLIMETERS [INCHES].
4. OUTLINE CONFORMS TO JEDEC OUTLINE MS-012AA.
5. DIMENSION DOES NOT INCLUDE MOLD PROTRUSIONS. MOLD PROTRUSIONS NOT TO EXCEED 0.15 [.006].
6. DIMENSION DOES NOT INCLUDE MOLD PROTRUSIONS. MOLD PROTRUSIONS NOT TO EXCEED 0.25 [.010].
7. DIMENSION IS THE LENGTH OF LEAD FOR SOLDERING TO A SUBSTRATE.



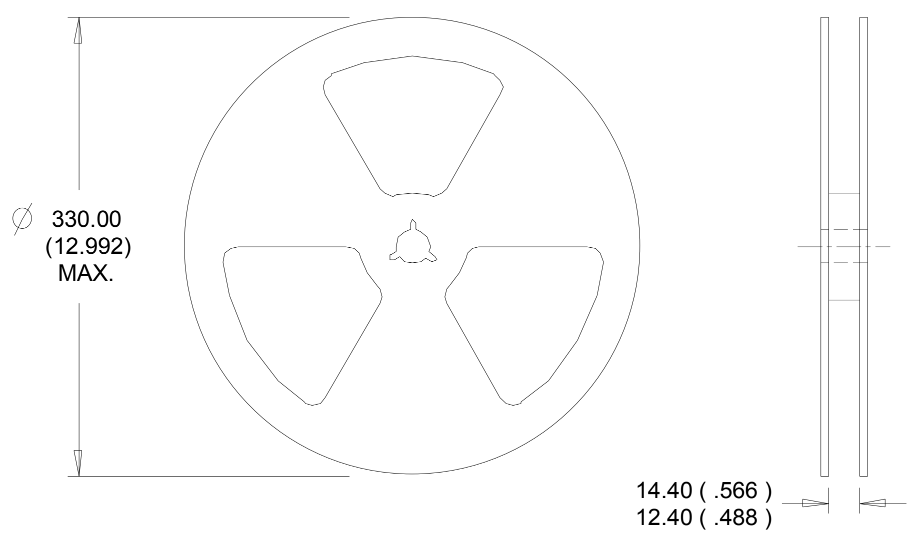
SO-8 Part Marking Information



SO-8 Tape and Reel (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. CONTROLLING DIMENSION : MILLIMETER.
2. OUTLINE CONFORMS TO EIA-481 & EIA-541.

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		SO-8	MSL1
ESD	Machine Model	N CH: Class M2 (+/- 150V)† P CH: Class M2(+/- 150V)† AEC-Q101-002	
	Human Body Model	N CH: Class H1A (+/- 500V)† P CH: Class H0 (+/- 250V)† AEC-Q101-001	
	Charged Device Model	N CH: Class C5 (+/- 2000V)† P CH: Class C5 (+/- 2000V)† AEC-Q101-005	
RoHS Compliant		Yes	

† Highest passing voltage.

Revision History

Date	Comments
3/28/2014	• Added "Logic Level Gate Drive" bullet in the features section on page 1 • Updated data sheet with new IR corporate template
9/30/2015	• Updated datasheet with corporate template • Corrected ordering table on page 1.

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LifeElectronics
Живое партнерство

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 дистрибьюторов 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 дистрибьюторских 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 помогать 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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