

V_{DSS}	600V
$R_{DS(on)}$ (Max.)	0.196Ω
I_D	20A
P_D	120W

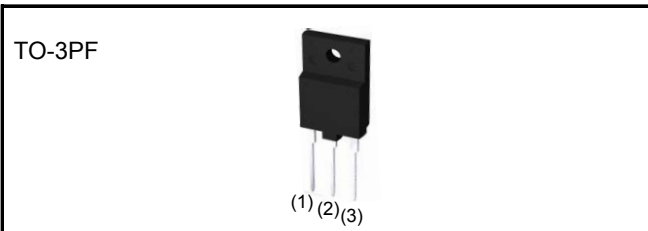
●Features

- 1) Low on-resistance.
- 2) Fast switching speed.
- 3) Gate-source voltage (V_{GSS}) guaranteed to be $\pm 20V$.
- 4) Drive circuits can be simple.
- 5) Parallel use is easy.
- 6) Pb-free lead plating ; RoHS compliant

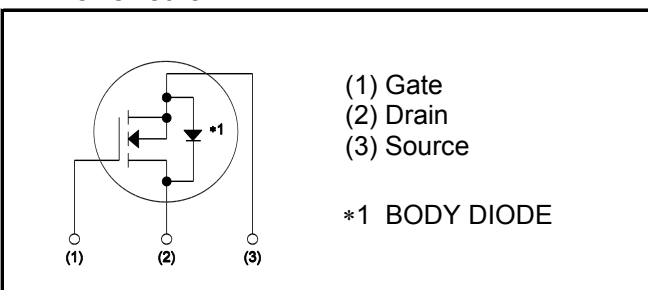
●Application

Switching Power Supply

●Outline



●Inner circuit



●Packaging specifications

Type	Packaging	Tube
	Reel size (mm)	-
	Tape width (mm)	-
	Basic ordering unit (pcs)	360
	Taping code	C8
	Marking	R6020ENZ

●Absolute maximum ratings ($T_a = 25^\circ C$)

Parameter		Symbol	Value	Unit
Drain - Source voltage		V_{DSS}	600	V
Continuous drain current	$T_c = 25^\circ C$	I_D^{*1}	± 20	A
	$T_c = 100^\circ C$	I_D^{*1}	± 9.4	A
Pulsed drain current		$I_{D,pulse}^{*2}$	± 60	A
Gate - Source voltage		V_{GSS}	± 20	V
Avalanche energy, single pulse		E_{AS}^{*3}	418	mJ
Avalanche energy, repetitive		E_{AR}^{*3}	0.63	mJ
Avalanche current, repetitive		I_{AR}	3.4	A
Power dissipation ($T_c = 25^\circ C$)		P_D	120	W
Junction temperature		T_j	150	$^\circ C$
Range of storage temperature		T_{stg}	-55 to +150	$^\circ C$
Reverse diode dv/dt		dv/dt *4	15	V/ns

●Absolute maximum ratings

Parameter	Symbol	Conditions	Values	Unit
Drain - Source voltage slope	dv/dt	$V_{DS} = 480V$ $T_j = 25^\circ C$	50	V/ns

●Thermal resistance

Parameter	Symbol	Values			Unit
		Min.	Typ.	Max.	
Thermal resistance, junction - case	R_{thJC}	-	-	1.04	$^\circ C/W$
Thermal resistance, junction - ambient	R_{thJA}	-	-	40	$^\circ C/W$
Soldering temperature, wavesoldering for 10s	T_{sold}	-	-	265	$^\circ C$

●Electrical characteristics ($T_a = 25^\circ C$)

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Drain - Source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 1mA$	600	-	-	V
Zero gate voltage drain current	I_{DSS}	$V_{DS} = 600V, V_{GS} = 0V$ $T_j = 25^\circ C$	-	0.1	100	μA
		$T_j = 125^\circ C$	-	-	1000	
Gate - Source leakage current	I_{GSS}	$V_{GS} = \pm 20V, V_{DS} = 0V$	-	-	± 100	nA
Gate threshold voltage	$V_{GS(th)}$	$V_{DS} = 10V, I_D = 1mA$	2	-	4	V
Static drain - source on - state resistance	$R_{DS(on)}^{*5}$	$V_{GS} = 10V, I_D = 9.5A$ $T_j = 25^\circ C$	-	0.170	0.196	Ω
		$T_j = 125^\circ C$	-	0.360	-	
Gate input resistance	R_G	$f = 1MHz, \text{open drain}$	-	5.8	-	Ω

●Electrical characteristics ($T_a = 25^\circ\text{C}$)

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Transconductance	g_{fs}^{*5}	$V_{DS} = 10\text{V}, I_D = 10\text{A}$	5	10	-	S
Input capacitance	C_{iss}	$V_{GS} = 0\text{V}$	-	1400	-	pF
Output capacitance	C_{oss}	$V_{DS} = 25\text{V}$	-	1200	-	
Reverse transfer capacitance	C_{rss}	$f = 1\text{MHz}$	-	130	-	
Effective output capacitance, energy related	$C_{o(er)}$	$V_{GS} = 0\text{V}$ $V_{DS} = 0\text{V to } 480\text{V}$	-	56	-	pF
Effective output capacitance, time related	$C_{o(tr)}$		-	266	-	
Turn - on delay time	$t_{d(on)}^{*5}$	$V_{DD} \approx 480\text{V}, V_{GS} = 10\text{V}$	-	35	-	ns
Rise time	t_r^{*5}	$I_D = 10\text{A}$	-	53	-	
Turn - off delay time	$t_{d(off)}^{*5}$	$R_L = 47.5\Omega$	-	150	-	
Fall time	t_f^{*5}	$R_G = 10\Omega$	-	67	-	

●Gate Charge characteristics ($T_a = 25^\circ\text{C}$)

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Total gate charge	Q_g^{*5}	$V_{DD} \approx 480\text{V}$	-	60	-	nC
Gate - Source charge	Q_{gs}^{*5}	$I_D = 20\text{A}$	-	8	-	
Gate - Drain charge	Q_{gd}^{*5}	$V_{GS} = 10\text{V}$	-	33	-	
Gate plateau voltage	$V_{(plateau)}$	$V_{DD} \approx 480\text{V}, I_D = 20\text{A}$	-	6.9	-	V

*1 Limited only by maximum temperature allowed.

*2 $P_W \leq 10\mu\text{s}$, Duty cycle $\leq 1\%$

*3 $I_D = 3.4\text{A}$, $V_{DD} = 50\text{V}$

*4 Reference measurement circuits Fig.5-1.

*5 Pulsed

●Body diode electrical characteristics (Source-Drain) ($T_a = 25^\circ\text{C}$)

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Inverse diode continuous, forward current	I_S^{*1}	$T_c = 25^\circ\text{C}$	-	-	20	A
Inverse diode direct current, pulsed	I_{SM}^{*2}		-	-	60	A
Forward voltage	V_{SD}^{*5}	$V_{GS} = 0\text{V}, I_S = 10\text{A}$	-	-	1.5	V
Reverse recovery time	t_{rr}^{*5}	$I_S = 20\text{A}$ $di/dt = 100\text{A}/\mu\text{s}$	-	550	-	ns
Reverse recovery charge	Q_{rr}^{*5}		-	10.4	-	μC
Peak reverse recovery current	I_{rrm}^{*5}		-	38	-	A

●Typical Transient Thermal Characteristics

Symbol	Value	Unit
R_{th1}	0.129	K/W
R_{th2}	0.627	
R_{th3}	1.22	

Symbol	Value	Unit
C_{th1}	0.00475	Ws/K
C_{th2}	0.0387	
C_{th3}	1.06	



●Electrical characteristic curves

Fig.1 Power Dissipation Derating Curve

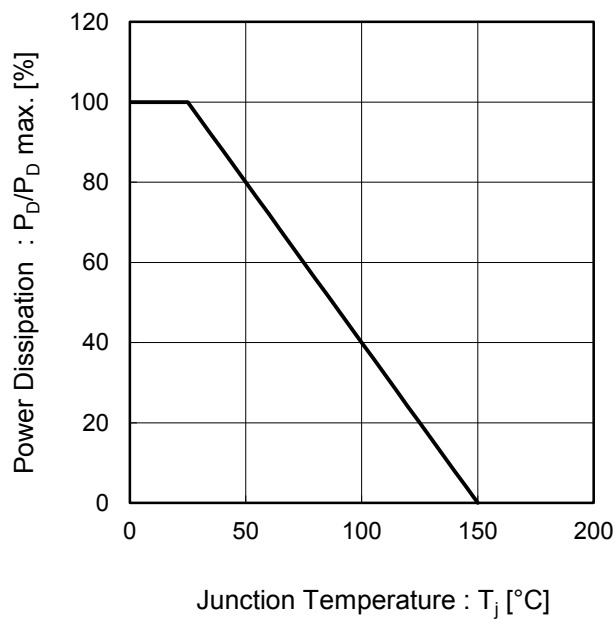


Fig.2 Maximum Safe Operating Area

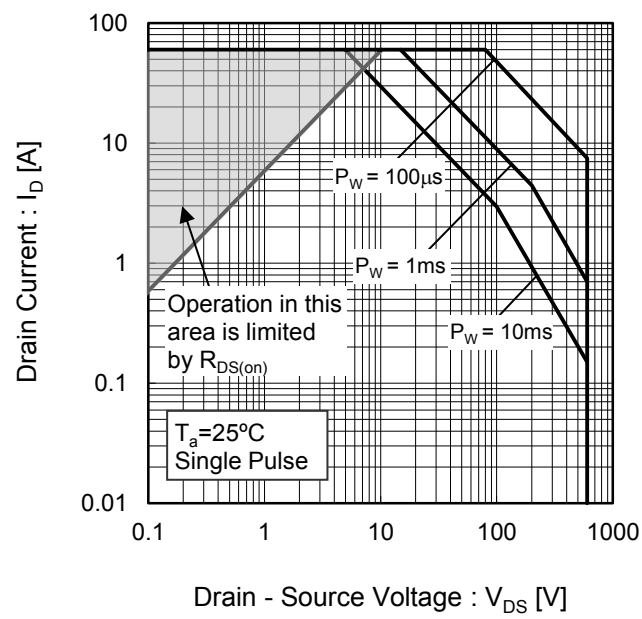


Fig.3 Normalized Transient Thermal Resistance vs. Pulse Width

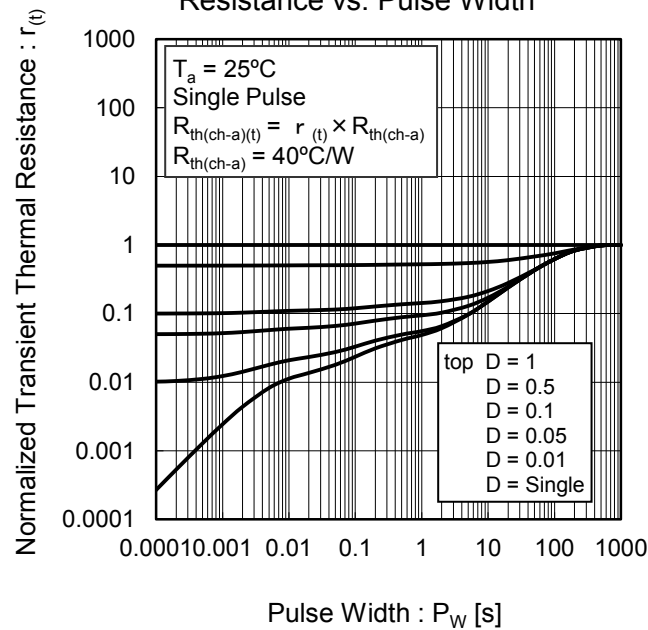
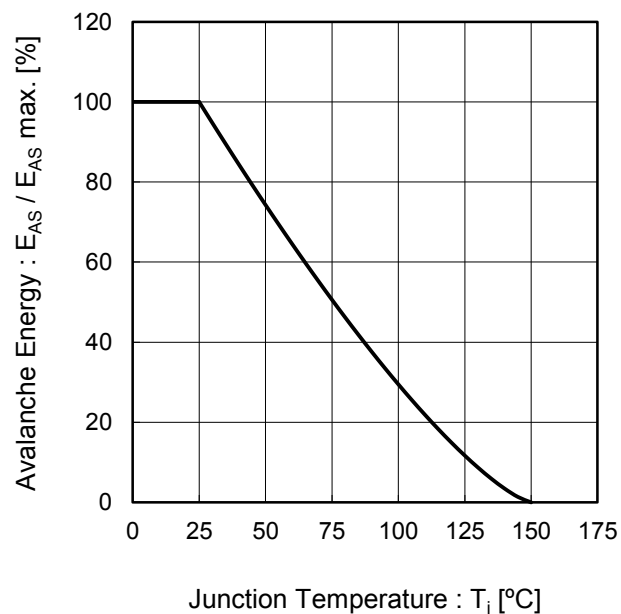


Fig.4 Avalanche Energy Derating Curve vs Junction Temperature



●Electrical characteristic curves

Fig.5 Typical Output Characteristics(I)

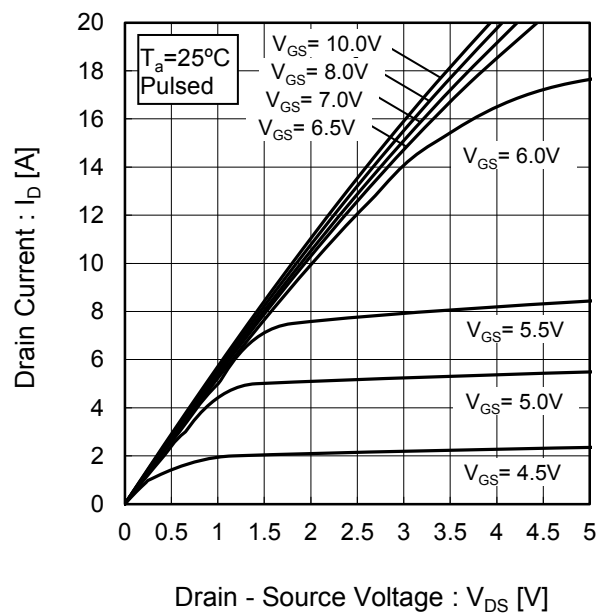


Fig.6 Typical Output Characteristics(II)

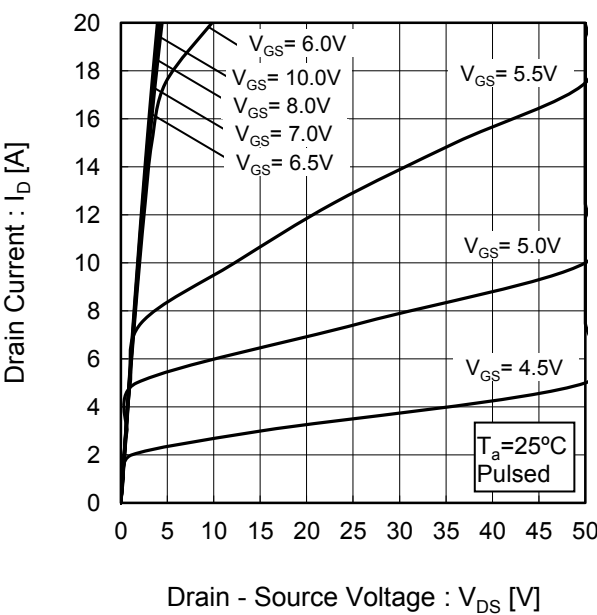


Fig.7 $T_j = 150^\circ\text{C}$ Typical Output Characteristics(I)

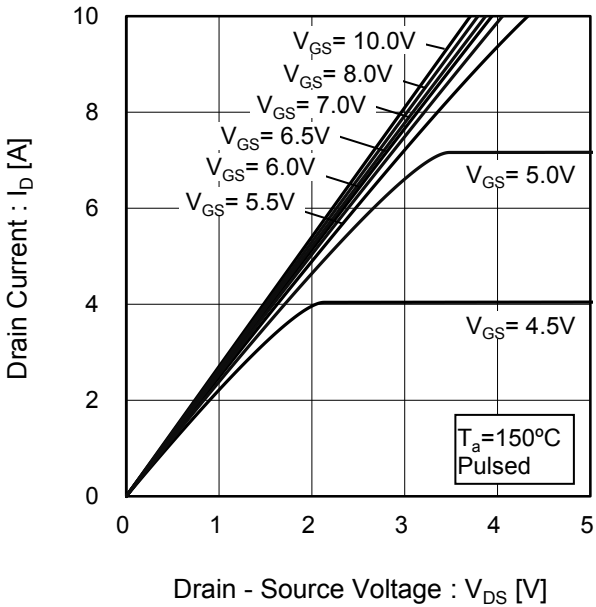
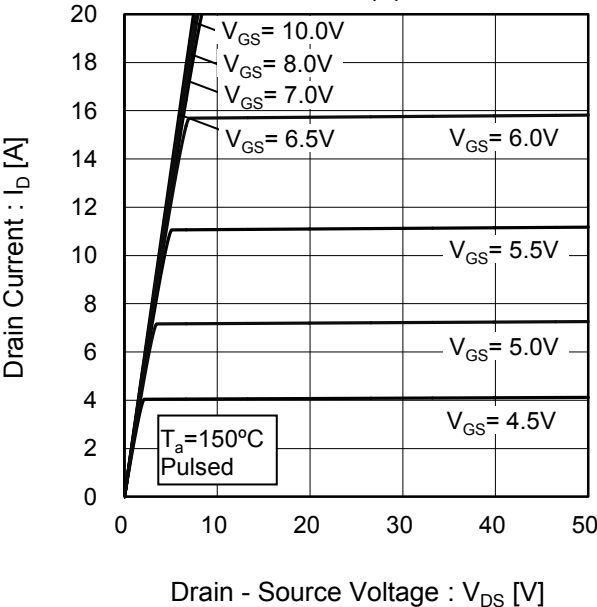


Fig.8 $T_j = 150^\circ\text{C}$ Typical Output Characteristics(II)



●Electrical characteristic curves

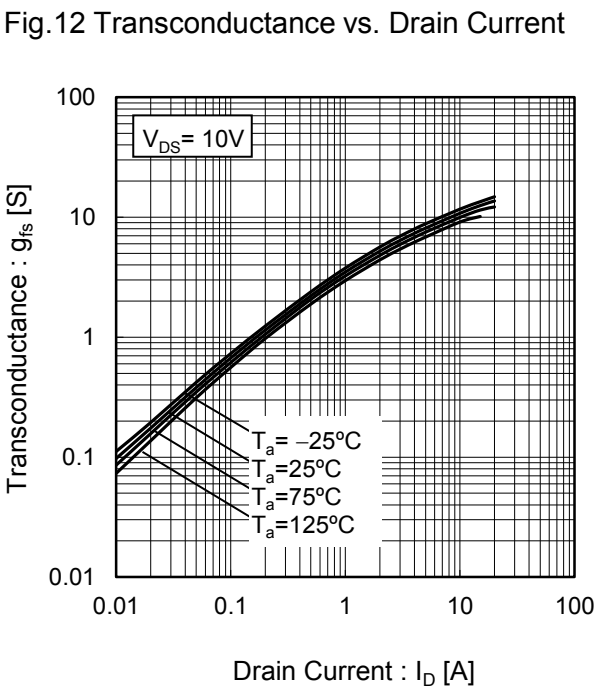
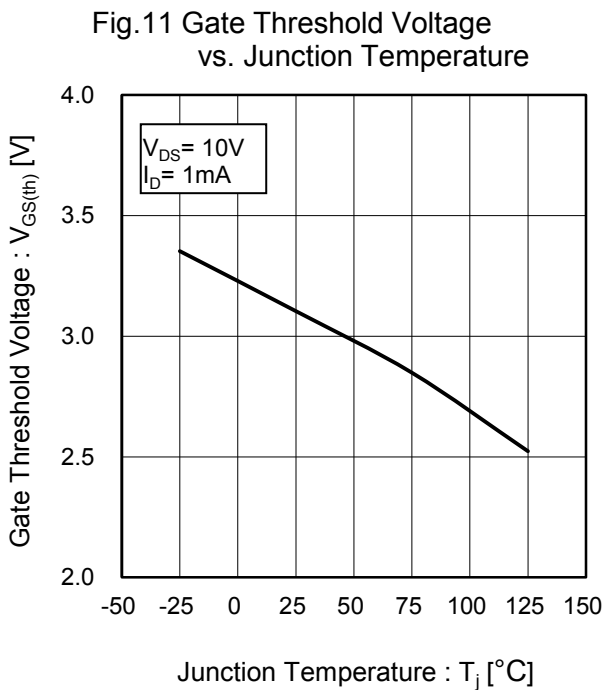
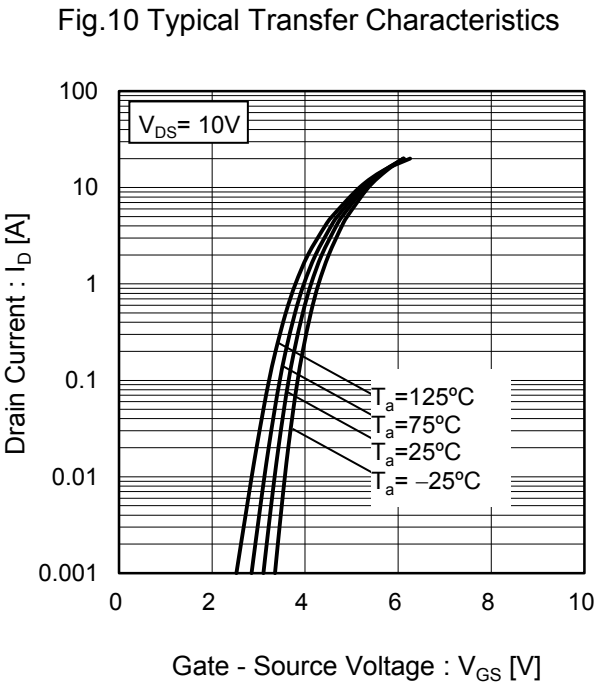
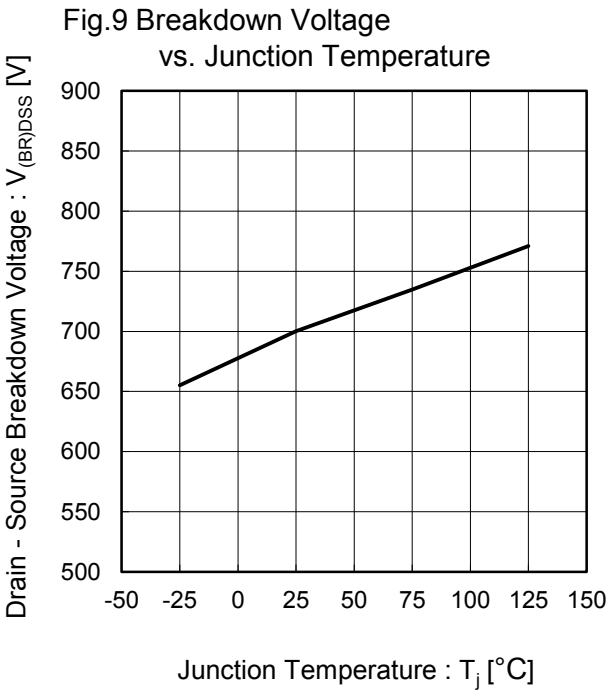


Fig.13 Static Drain - Source On - State Resistance vs. Gate Source Voltage

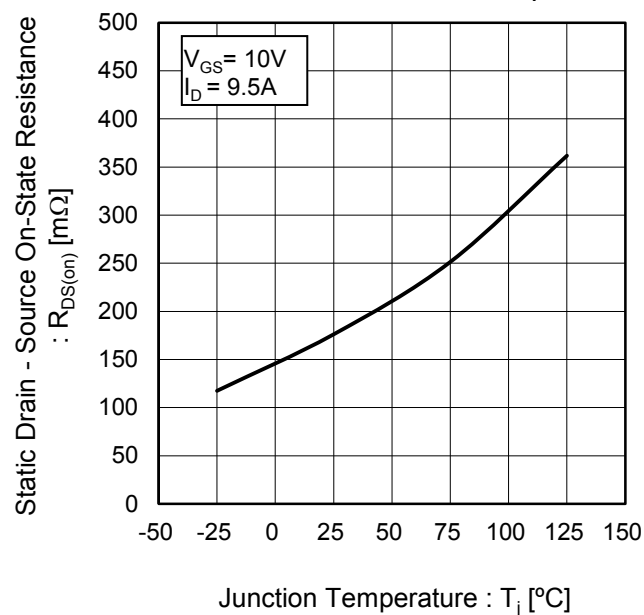
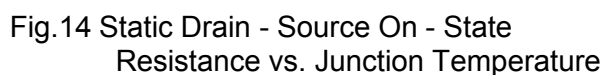


Fig.15 Static Drain - Source On - State Resistance vs. Drain Current

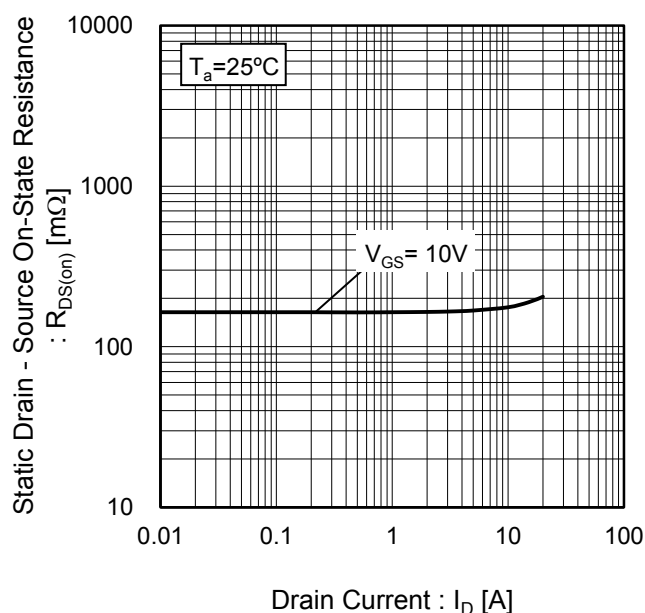
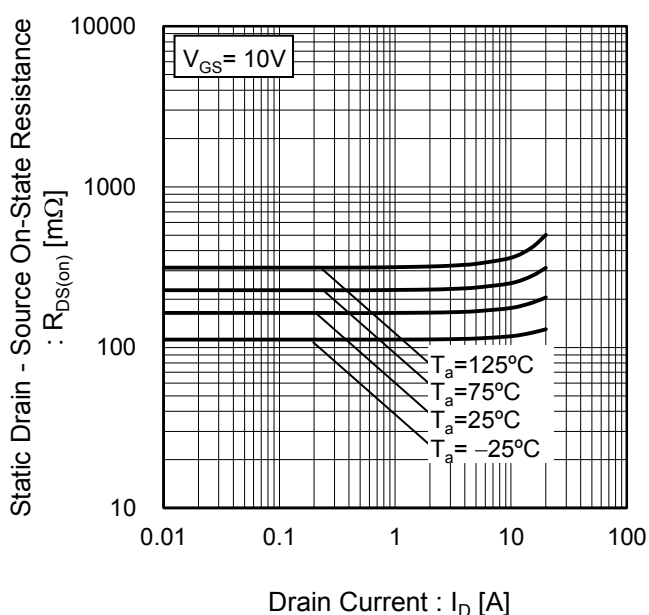


Fig.16 Static Drain - Source On - State Resistance vs. Drain Current



●Electrical characteristic curves

Fig.17 Typical Capacitance vs. Drain - Source Voltage

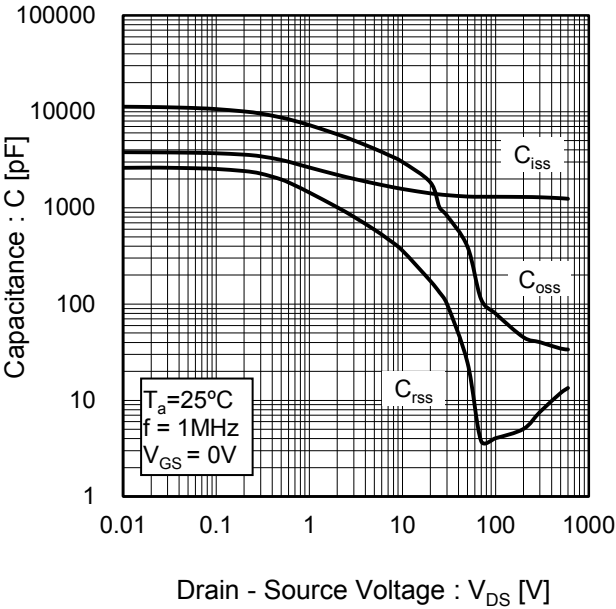


Fig.18 Coss Stored Energy

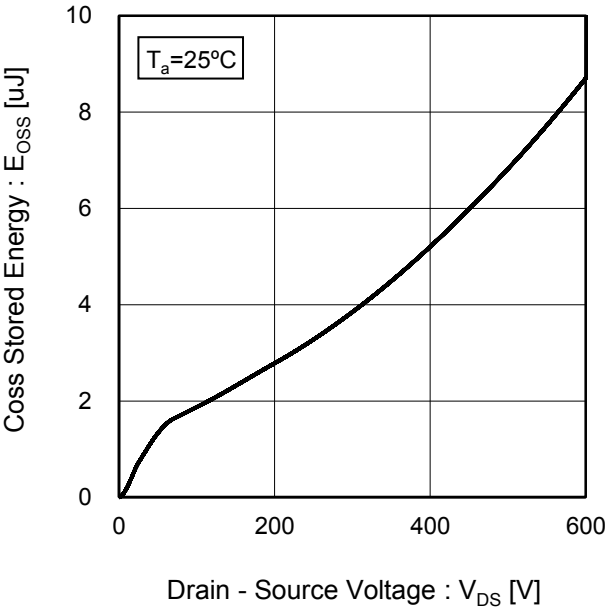


Fig.19 Switching Characteristics

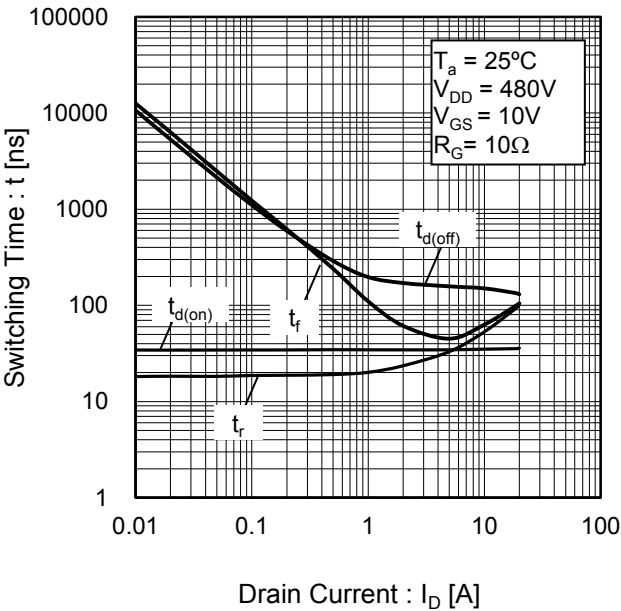
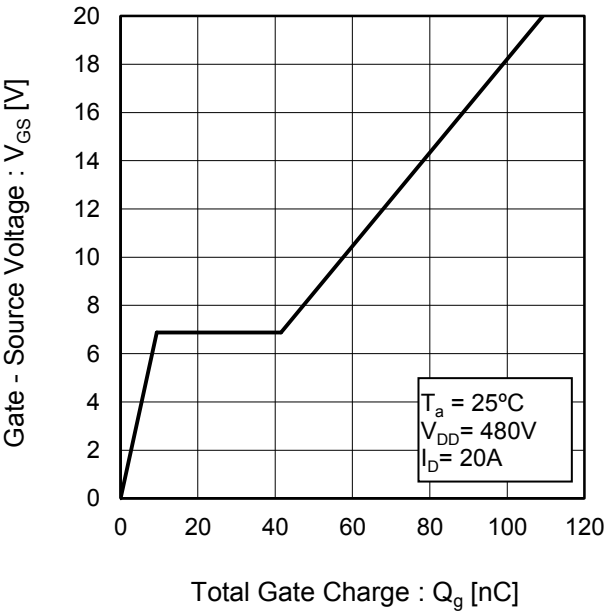


Fig.20 Dynamic Input Characteristics



●Electrical characteristic curves

Fig.21 Inverse Diode Forward Current vs. Source - Drain Voltage

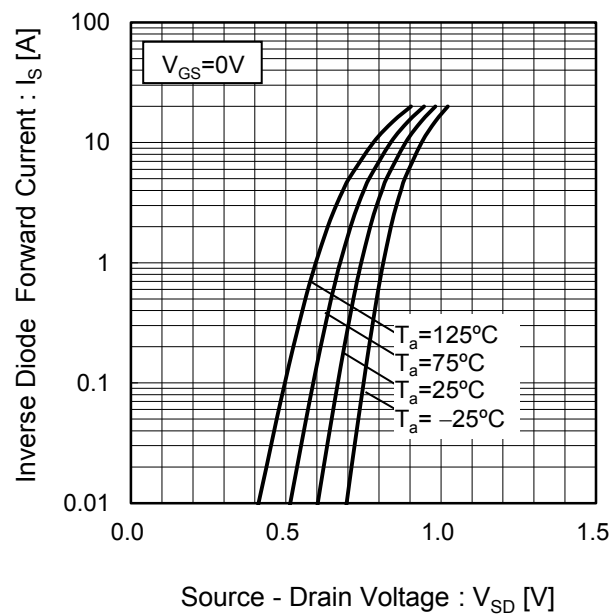
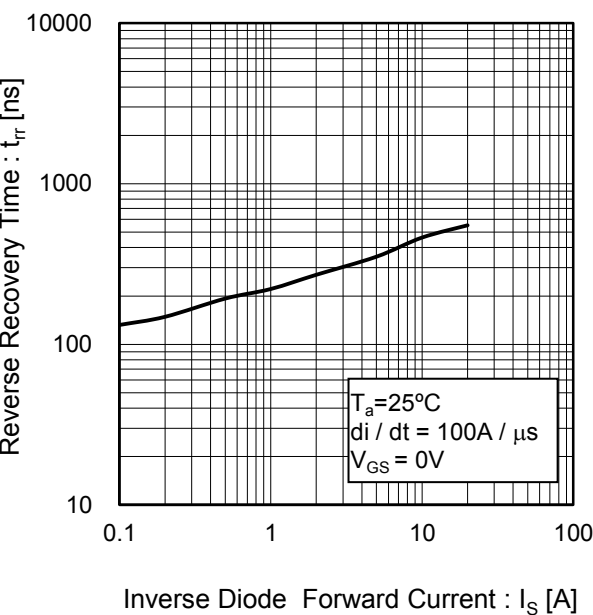


Fig.22 Reverse Recovery Time vs. Inverse Diode Forward Current



●Measurement circuits

Fig.1-1 Switching Time Measurement Circuit

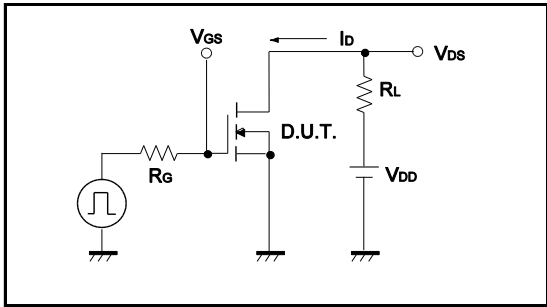


Fig.1-2 Switching Waveforms

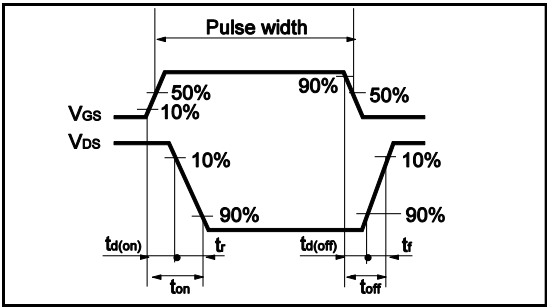


Fig.2-1 Gate Charge Measurement Circuit

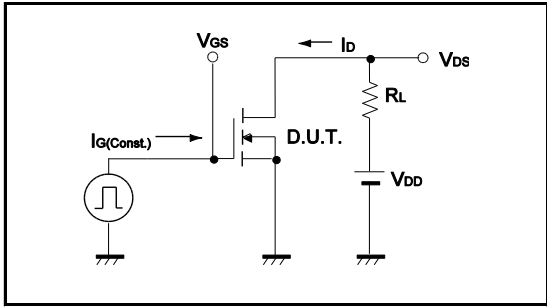


Fig.2-2 Gate Charge Waveform

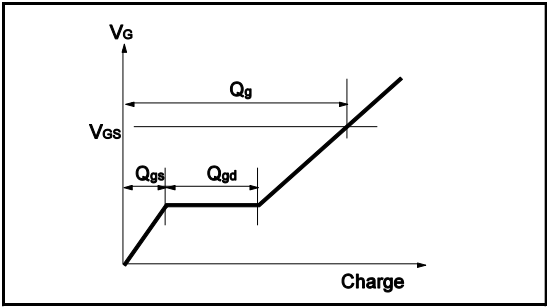


Fig.3-1 Avalanche Measurement Circuit

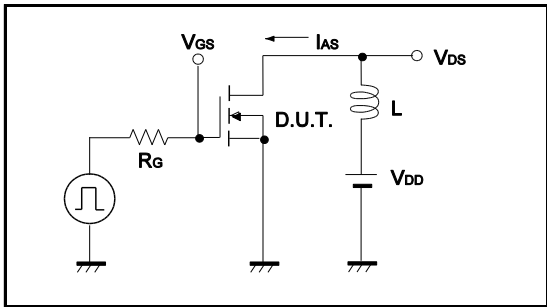


Fig.3-2 Avalanche Waveform

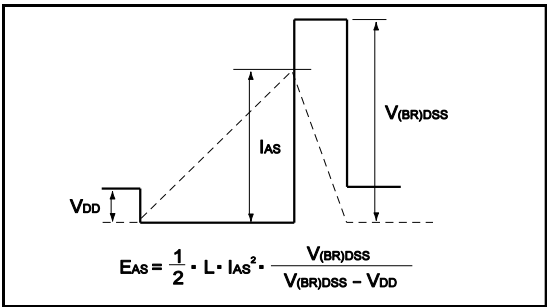


Fig.4-1 dv/dt Measurement Circuit

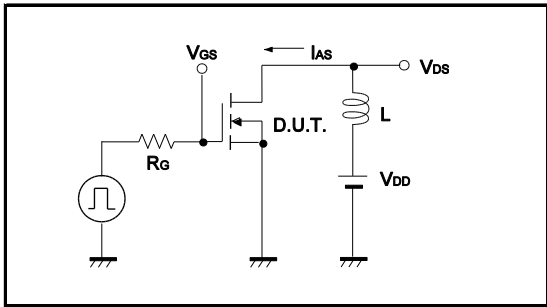


Fig.4-2 dv/dt Waveform

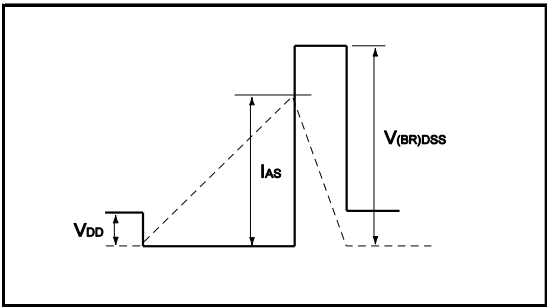


Fig.5-1 di/dt Measurement Circuit

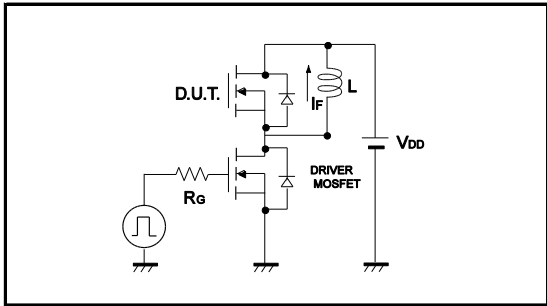
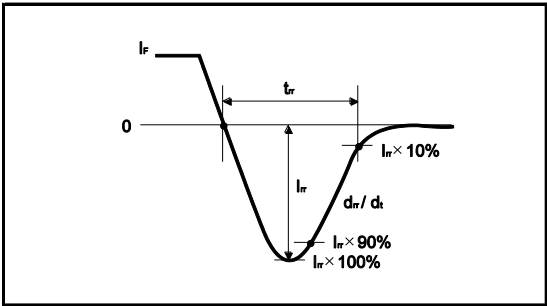
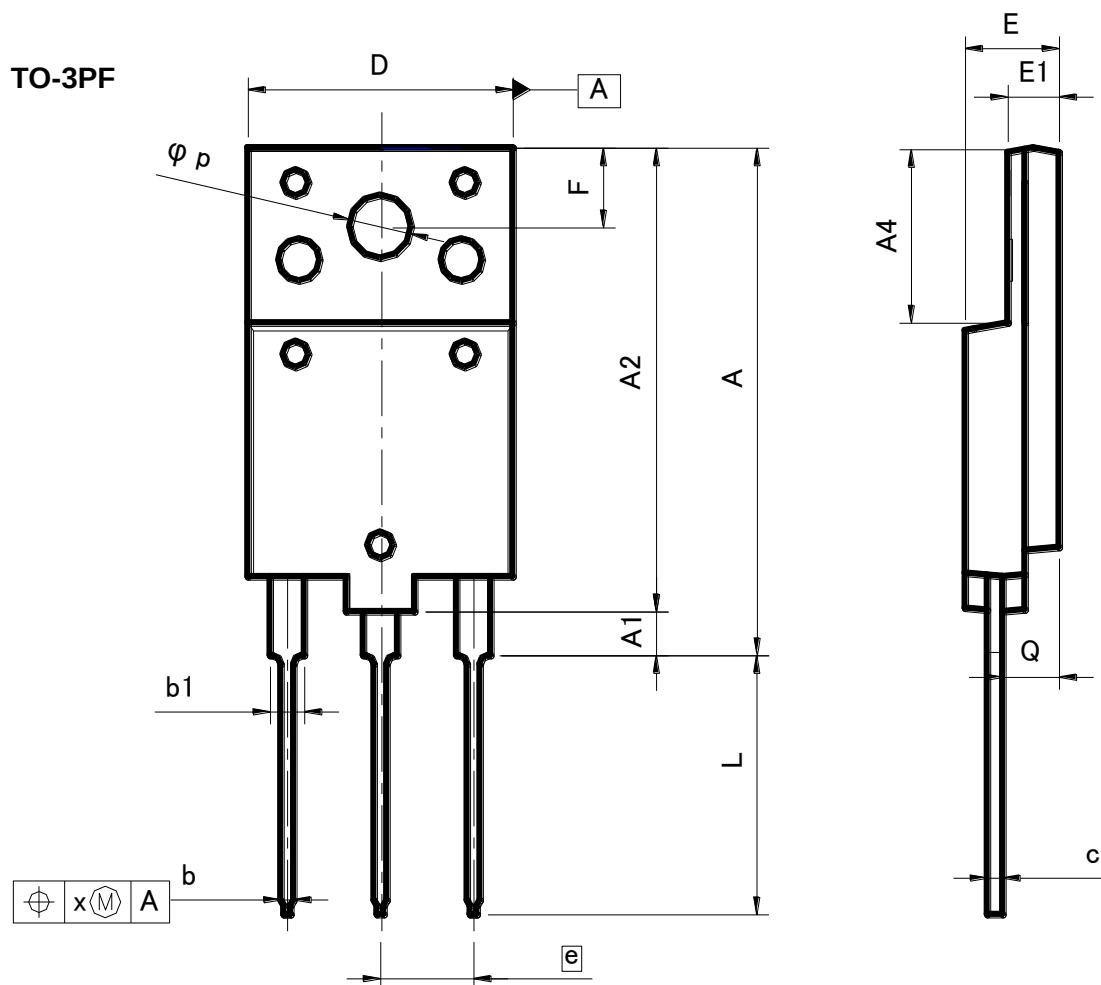


Fig.5-2 di/dt Waveform



●Dimensions (Unit : mm)



DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	26.30	26.70	1.035	1.051
A1	2.30	2.70	0.091	0.106
A2	26.30	26.70	1.035	1.051
A4	9.80	10.20	0.386	0.402
b	0.65	0.95	0.026	0.037
b1	1.80	2.20	0.071	0.087
c	0.80	1.10	0.031	0.043
D	15.30	15.70	0.602	0.618
E	5.30	5.70	0.209	0.224
e	5.45		0.215	-
E1	2.80	3.20	0.110	0.126
F	4.30	4.70	0.169	0.185
L	14.60	15.00	0.575	0.591
p	3.40	3.80	0.134	0.150
Q	3.10	3.50	0.122	0.138
x	-	0.50	-	0.020

Dimension in mm / inches

Notes

- 1) The information contained herein is subject to change without notice.
- 2) Before you use our Products, please contact our sales representative and verify the latest specifications :
- 3) Although ROHM is continuously working to improve product reliability and quality, semiconductors can break down and malfunction due to various factors.
Therefore, in order to prevent personal injury or fire arising from failure, please take safety measures such as complying with the derating characteristics, implementing redundant and fire prevention designs, and utilizing backups and fail-safe procedures. ROHM shall have no responsibility for any damages arising out of the use of our Products beyond the rating specified by ROHM.
- 4) Examples of application circuits, circuit constants and any other information contained herein are provided only to illustrate the standard usage and operations of the Products. The peripheral conditions must be taken into account when designing circuits for mass production.
- 5) The technical information specified herein is intended only to show the typical functions of and examples of application circuits for the Products. ROHM does not grant you, explicitly or implicitly, any license to use or exercise intellectual property or other rights held by ROHM or any other parties. ROHM shall have no responsibility whatsoever for any dispute arising out of the use of such technical information.
- 6) The Products are intended for use in general electronic equipment (i.e. AV/OA devices, communication, consumer systems, gaming/entertainment sets) as well as the applications indicated in this document.
- 7) The Products specified in this document are not designed to be radiation tolerant.
- 8) For use of our Products in applications requiring a high degree of reliability (as exemplified below), please contact and consult with a ROHM representative : transportation equipment (i.e. cars, ships, trains), primary communication equipment, traffic lights, fire/crime prevention, safety equipment, medical systems, servers, solar cells, and power transmission systems.
- 9) Do not use our Products in applications requiring extremely high reliability, such as aerospace equipment, nuclear power control systems, and submarine repeaters.
- 10) ROHM shall have no responsibility for any damages or injury arising from non-compliance with the recommended usage conditions and specifications contained herein.
- 11) ROHM has used reasonable care to ensure the accuracy of the information contained in this document. However, ROHM does not warrant that such information is error-free, and ROHM shall have no responsibility for any damages arising from any inaccuracy or misprint of such information.
- 12) Please use the Products in accordance with any applicable environmental laws and regulations, such as the RoHS Directive. For more details, including RoHS compatibility, please contact a ROHM sales office. ROHM shall have no responsibility for any damages or losses resulting from non-compliance with any applicable laws or regulations.
- 13) When providing our Products and technologies contained in this document to other countries, you must abide by the procedures and provisions stipulated in all applicable export laws and regulations, including without limitation the US Export Administration Regulations and the Foreign Exchange and Foreign Trade Act.
- 14) This document, in part or in whole, may not be reprinted or reproduced without prior consent of ROHM.



Thank you for your accessing to ROHM product informations.
More detail product informations and catalogs are available, please contact us.

ROHM Customer Support System

<http://www.rohm.com/contact/>

Компания «Океан Электроники» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Поставка оригинальных импортных электронных компонентов напрямую с производств Америки, Европы и Азии, а так же с крупнейших складов мира;
- Широкая линейка поставок активных и пассивных импортных электронных компонентов (более 30 млн. наименований);
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Помощь Конструкторского Отдела и консультации квалифицированных инженеров;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Поставка электронных компонентов под контролем ВП;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- При необходимости вся продукция военного и аэрокосмического назначения проходит испытания и сертификацию в лаборатории (по согласованию с заказчиком);
- Поставка специализированных компонентов военного и аэрокосмического уровня качества (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Actel, Aeroflex, Peregrine, VPT, Syfer, Eurofarad, Texas Instruments, MS Kennedy, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Компания «Океан Электроники» является официальным дистрибьютором и эксклюзивным представителем в России одного из крупнейших производителей разъемов военного и аэрокосмического назначения «JONHON», а так же официальным дистрибьютором и эксклюзивным представителем в России производителя высокотехнологичных и надежных решений для передачи СВЧ сигналов «FORSTAR».



JONHON

«JONHON» (основан в 1970 г.)

Разъемы специального, военного и аэрокосмического назначения:

(Применяются в военной, авиационной, аэрокосмической, морской, железнодорожной, горно- и нефтедобывающей отраслях промышленности)

«FORSTAR» (основан в 1998 г.)

ВЧ соединители, коаксиальные кабели,
кабельные сборки и микроволновые компоненты:

(Применяются в телекоммуникациях гражданского и специального назначения, в средствах связи, РЛС, а так же военной, авиационной и аэрокосмической отраслях промышленности).



Телефон: 8 (812) 309-75-97 (многоканальный)

Факс: 8 (812) 320-03-32

Электронная почта: ocean@oceanchips.ru

Web: <http://oceanchips.ru/>

Адрес: 198099, г. Санкт-Петербург, ул. Калинина, д. 2, корп. 4, лит. А