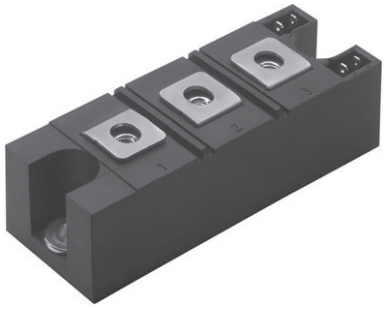
Thyristor/Thyristor, 150 A (New INT-A-PAK Power Module)



New INT-A-PAK

FEATURES

- Electrically isolated by DBC ceramic (Al_2O_3)
- 3500 V_{RMS} isolating voltage
- Industrial standard package
- High surge capability
- Glass passivated chips
- Simple mounting
- UL approved file E78996
- Designed and qualified for multiple level
- Material categorization: For definitions of compliance please see www.vishay.com/doc?99912

RoHS COMPLIANT

APPLICATIONS

- Battery charges
- Welders
- Power converters

PRODUCT SUMMARY	
$I_{T(AV)}$	150 A
Type	Modules - Thyristor, Standard
Package	INT-A-PAK
Circuit	Two SCRs doubler circuit

MAJOR RATINGS AND CHARACTERISTICS			
SYMBOL	CHARACTERISTICS	VALUES	UNITS
$I_{T(AV)}$	85 °C	150	A
$I_{T(RMS)}$		330	A
I_{TSM}	50 Hz	4000	
	60 Hz	4200	
I^2t	50 Hz	80	kA^2s
	60 Hz	73	
$I^2\sqrt{t}$		800	$kA^2\sqrt{s}$
V_{RRM}		400	V
T_{Stg}	Range	-40 to 150	°C
T_J	Range	-40 to 125	

ELECTRICAL SPECIFICATIONS

VOLTAGE RATINGS			
TYPE NUMBER	V_{RRM}/V_{DRM}, MAXIMUM REPETITIVE PEAK REVERSE VOLTAGE V	V_{RSM}/V_{DSM}, MAXIMUM NON-REPETITIVE PEAK REVERSE VOLTAGE V	I_{RRM}/I_{DRM} AT 125 °C mA
VS-VSKT152/04PbF	400	500	50

ON-STATE CONDUCTION						
PARAMETER	**SYMBOL**	**TEST CONDITIONS**			**VALUES**	**UNITS**
Maximum average on-state current at case temperature	$I_{T(AV)}$	180° conduction half sine wave			150	A
					85	°C
Maximum RMS on-state current	$I_{T(RMS)}$	As AC switch			330	A
Maximum peak, one-cycle on-state, non-repetitive surge current	I_{TSM}	t = 10 ms	No voltage reapplied	Sine half wave, initial T_J = T_J maximum	4000	
		t = 8.3 ms			4200	
		t = 10 ms	100 % V_{RRM} reapplied		3350	
		t = 8.3 ms			3500	
Maximum I^2t for fusing	I^2t	t = 10 ms	No voltage reapplied		80	kA^2s
		t = 8.3 ms			73	
		t = 10 ms	100 % V_{RRM} reapplied		56	
		t = 8.3 ms			51	
Maximum $I^2\sqrt{t}$ for fusing	$I^2\sqrt{t}$	t = 0.1 ms to 10 ms, no voltage reapplied			800	$kA^2\sqrt{s}$
Value of threshold voltage	$V_{T(TO)}$	T_J maximum			0.82	V
On-state slope resistance	r_t				1.44	mΩ
Maximum on-state voltage drop	V_{TM}	$I_{pk} = \pi \times I_{T(AV)}$, T_J = 25 °C			1.48	V
Maximum holding current	I_H	T_J = 25 °C, anode supply = 6 V, resistive load, gate open circuit			200	mA
Maximum latching current	I_L	T_J = 25 °C, anode supply = 6 V, resistive load			400	

SWITCHING					
PARAMETER	**SYMBOL**	**TEST CONDITIONS**		**VALUES**	**UNITS**
Typical delay time	t_{gd}	T_J = 25 °C	Gate current = 1 A, dI_g/dt = 1 A/µs V_d = 0.67 % V_{DRM}	1	µs
Typical rise time	t_{gr}			2	
Typical turn-off time	t_q	I_{TM} = 300 A, - dI/dt = 15 A/µs; T_J = T_J maximum V_R = 50 V; dV/dt = 20 V/µs; gate 0 V, 100 Ω		50 to 200	

BLOCKING				
PARAMETER	**SYMBOL**	**TEST CONDITIONS**	**VALUES**	**UNITS**
Maximum peak reverse and off-state leakage current	I_{RRM}, I_{DRM}	T_J = 125 °C	50	mA
RMS insulation voltage	V_{INS}	50 Hz, circuit to base, all terminals shorted, t = 1 s	3500	V
Critical rate of rise of off-state voltage	dV/dt	T_J = T_J maximum, exponential to 67 % rated V_{DRM}	1000	V/µs

TRIGGERING					
PARAMETER	**SYMBOL**	**TEST CONDITIONS**		**VALUES**	**UNITS**
Maximum peak gate power	P_{GM}	$t_p \leq 5$ ms, $T_J = T_J$ maximum		12	W
Maximum average gate power	$P_{G(AV)}$	f = 50 Hz, $T_J = T_J$ maximum		3	
Maximum peak gate current	I_{GM}	$t_p \leq 5$ ms, $T_J = T_J$ maximum		3	A
Maximum peak negative gate voltage	$-V_{GT}$			10	V
Maximum required DC gate voltage to trigger	V_{GT}	T_J = - 40 °C	Anode supply = 6 V, resistive load; R_a = 1 Ω	4	
		T_J = 25 °C		2.5	
		$T_J = T_J$ maximum		1.7	
Maximum required DC gate current to trigger	I_{GT}	T_J = - 40 °C		270	mA
		T_J = 25 °C		150	
		$T_J = T_J$ maximum		80	
Maximum gate voltage that will not trigger	V_{GD}	$T_J = T_J$ maximum, rated V_{DRM} applied		0.3	V
Maximum gate current that will not trigger	I_{GD}			10	mA
Maximum rate of rise of turned-on current	dI/dt	$T_J = T_J$ maximum, I_{TM} = 400 A rated V_{DRM} applied		300	A/µs

THERMAL AND MECHANICAL SPECIFICATIONS				
PARAMETER	**SYMBOL**	**TEST CONDITIONS**	**VALUES**	**UNITS**
Maximum junction operating temperature range	T_J		- 40 to 125	°C
Maximum storage temperature range	T_{Stg}		- 40 to 150	
Maximum thermal resistance, junction to case per junction	R_{thJC}	DC operation	0.18	K/W
Maximum thermal resistance, case to heatsink per module	R_{thCS}	Mounting surface smooth, flat and greased	0.05	
Mounting torque ± 10 % — IAP to heatsink		A mounting compound is recommended and the torque should be rechecked after a period of 3 hours to allow for the spread of the compound. Lubricated threads.	4 to 6	Nm
Mounting torque ± 10 % — busbar to IAP				
Approximate weight			200	g
			7.1	oz.
Case style			INT-A-PAK	

ΔR CONDUCTION PER JUNCTION											
DEVICES	**SINUSOIDAL CONDUCTION AT T_J MAXIMUM**					**RECTANGULAR CONDUCTION AT T_J MAXIMUM**					**UNITS**
	180°	**120°**	**90°**	**60°**	**30°**	**180°**	**120°**	**90°**	**60°**	**30°**	
VSKT152/04PbF	0.007	0.010	0.013	0.016	0.017	0.009	0.012	0.014	0.016	0.017	K/W

Note

- Table shows the increment of thermal resistance R_{thJC} when devices operate at different conduction angles than DC

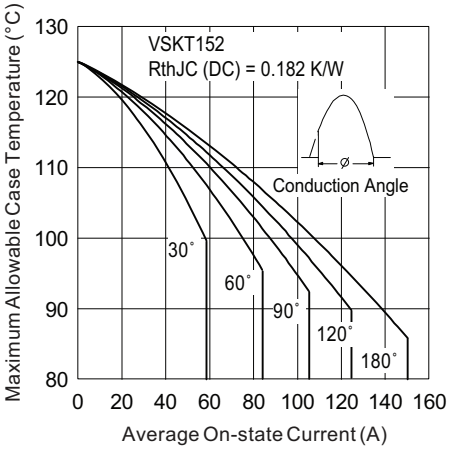


Fig. 1 - Current Ratings Characteristics

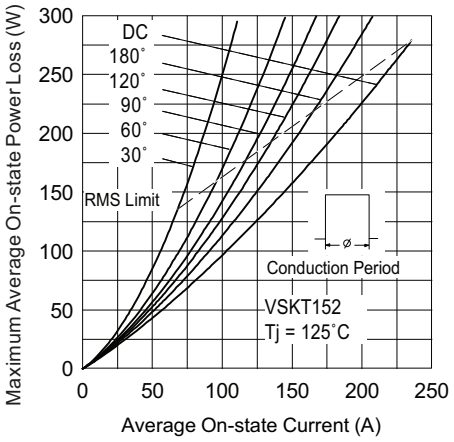


Fig. 4 - Forward Power Loss Characteristics

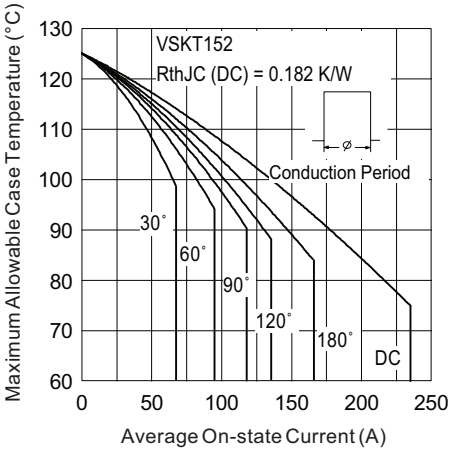


Fig. 2 - Current Ratings Characteristics

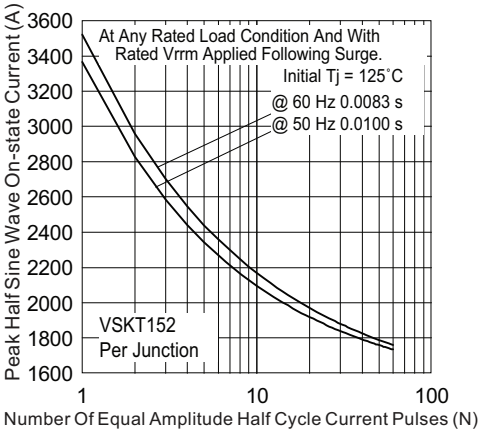


Fig. 5 - Maximum Non-Repetitive Surge Current

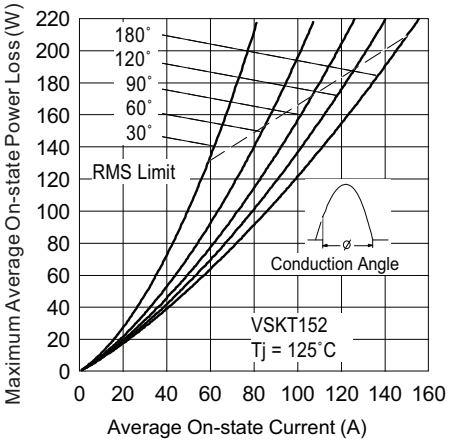


Fig. 3 - Forward Power Loss Characteristics

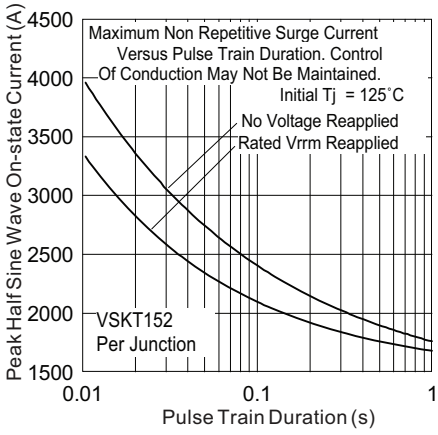


Fig. 6 - Maximum Non-Repetitive Surge Current

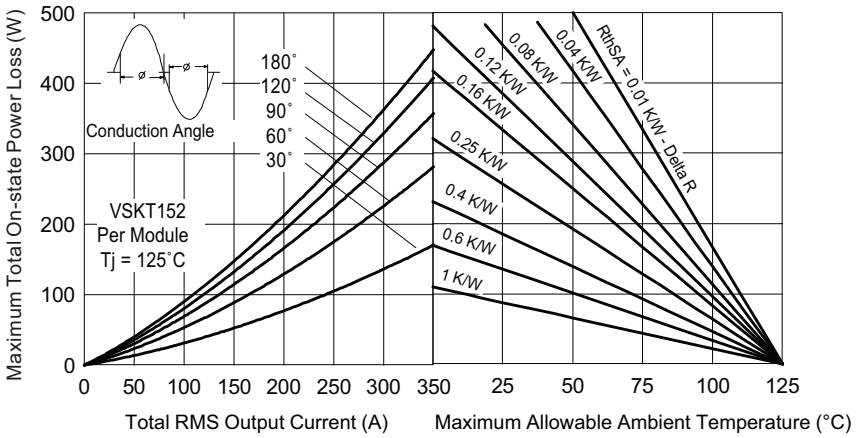


Fig. 7 - On-State Power Loss Characteristics

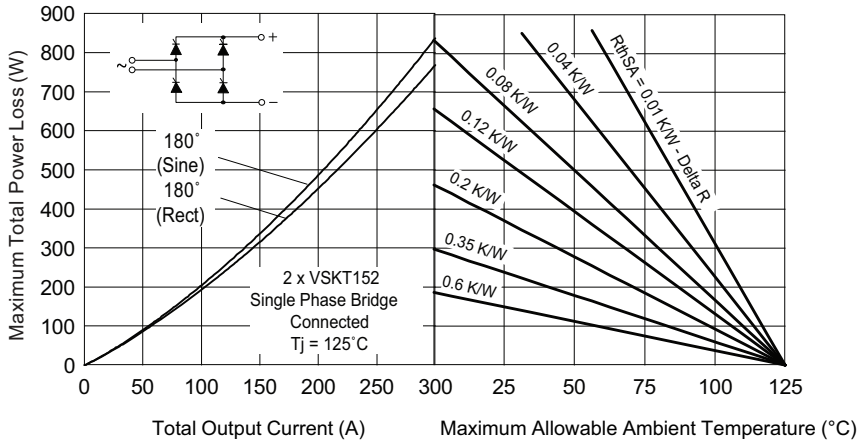


Fig. 8 - On-State Power Loss Characteristics

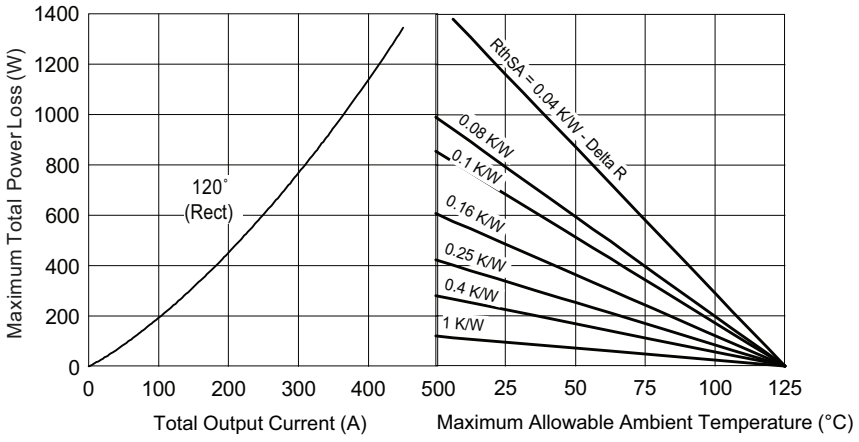


Fig. 9 - On-State Power Loss Characteristics

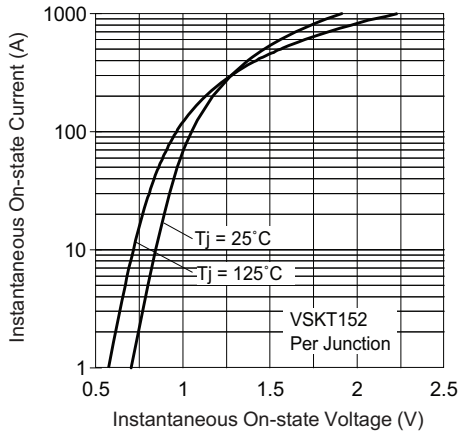


Fig. 10 - On-State Voltage Drop Characteristics

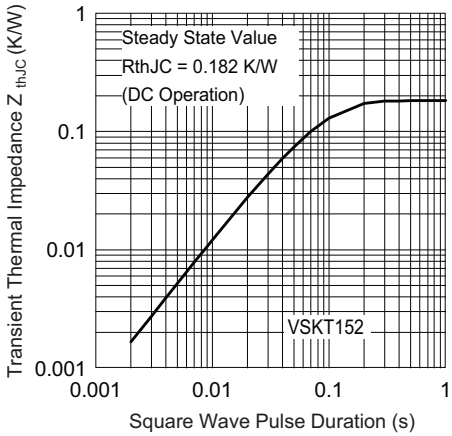


Fig. 11 - Thermal Impedance Z_{thJC} Characteristics

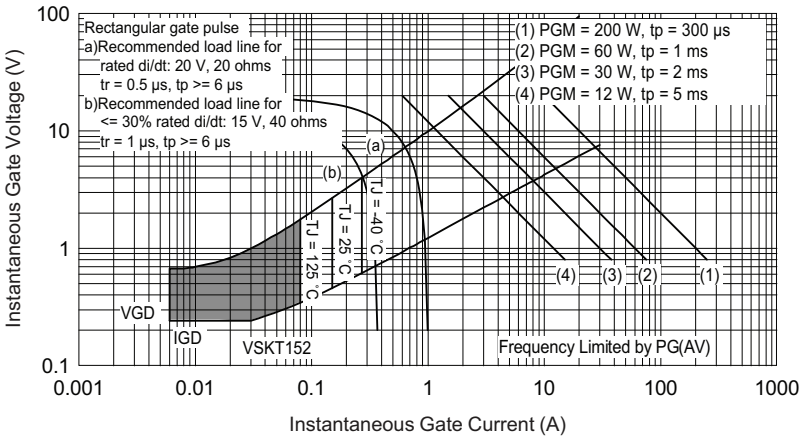


Fig. 12 - Gate Characteristics

ORDERING INFORMATION TABLE

Device code

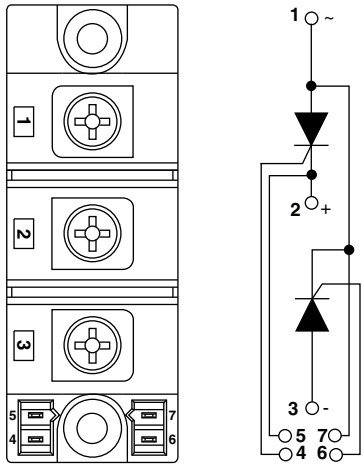
VS-VS	KT	152	04	PbF
1	2	3	4	5

1 - Vishay Semiconductors product
2 - Circuit configuration
3 - Current rating
4 - Voltage rating (04 = 400 V)
5 - PbF = Lead (Pb)-free

Note

- To order the optional hardware go to www.vishay.com/doc?95172

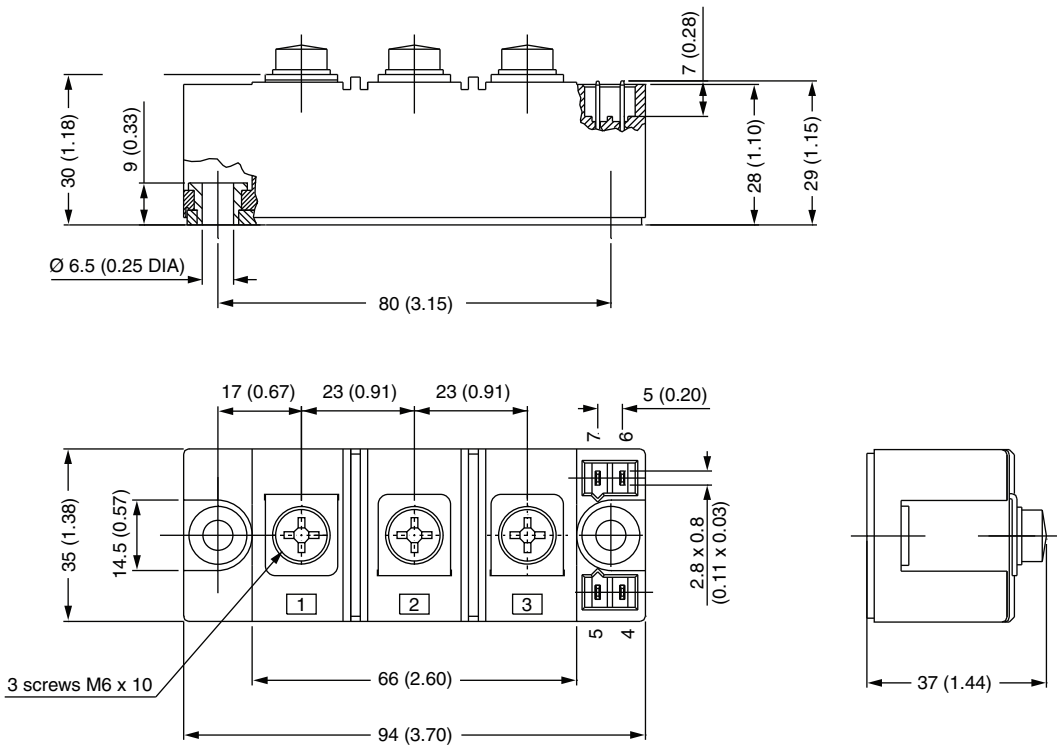
CIRCUIT CONFIGURATION

CIRCUIT DESCRIPTION	CIRCUIT CONFIGURATION CODE	CIRCUIT DRAWING
Two SCRs doubler circuit	T	

LINKS TO RELATED DOCUMENTS	
Dimensions	www.vishay.com/doc?95067

INT-A-PAK IGBT/Thyristor

DIMENSIONS in millimeters (inches)



Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, “Vishay”), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay’s knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer’s responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and/or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer’s technical experts. Product specifications do not expand or otherwise modify Vishay’s terms and conditions of purchase, including but not limited to the warranty expressed therein.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.

Material Category Policy

Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as RoHS-Compliant fulfill the definitions and restrictions defined under Directive 2011/65/EU of The European Parliament and of the Council of June 8, 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (EEE) - recast, unless otherwise specified as non-compliant.

Please note that some Vishay documentation may still make reference to RoHS Directive 2002/95/EC. We confirm that all the products identified as being compliant to Directive 2002/95/EC conform to Directive 2011/65/EU.

Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as Halogen-Free follow Halogen-Free requirements as per JEDEC JS709A standards. Please note that some Vishay documentation may still make reference to the IEC 61249-2-21 definition. We confirm that all the products identified as being compliant to IEC 61249-2-21 conform to JEDEC JS709A standards.

OCEAN CHIPS
Океан Электроники
Поставка электронных компонентов

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**».

AVIC 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).

FORSTAR®

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