

MJB5742T4G

NPN Silicon Power Darlington Transistors

The Darlington transistors are designed for high-voltage power switching in inductive circuits.

Features

- These Devices are Pb-Free and are RoHS Compliant

Applications

- Small Engine Ignition
- Switching Regulators
- Inverters
- Solenoid and Relay Drivers
- Motor Controls

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	$V_{CEO(sus)}$	400	Vdc
Collector-Emitter Voltage	V_{CEV}	800	Vdc
Emitter-Base Voltage	V_{EB}	8	Vdc
Collector Current – Continuous	I_C	8	Adc
Collector Current – Peak (Note 1)	I_{CM}	16	Adc
Base Current – Continuous	I_B	2.5	Adc
Base Current – Peak (Note 1)	I_{BM}	5	Adc
Total Device Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	2 0.016	W W/ $^\circ\text{C}$
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	100 0.8	W W/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	T_J, T_{stg}	-65 to +150	$^\circ\text{C}$

THERMAL CHARACTERISTICS

Characteristics	Symbol	Max	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	1.25	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	62.5	$^\circ\text{C}/\text{W}$
Maximum Lead Temperature for Soldering Purposes 1/8" from Case for 5 Seconds	T_L	275	$^\circ\text{C}$

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

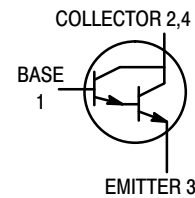
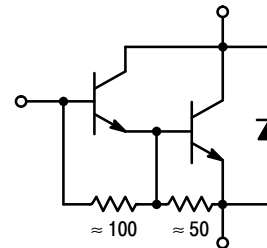
1. Pulse Test: Pulse Width = 5 ms, Duty Cycle $\leq 10\%$.



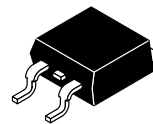
ON Semiconductor®

<http://onsemi.com>

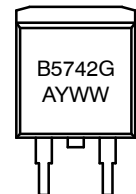
POWER DARLINGTON TRANSISTORS 8 AMPERES, 400 VOLTS 100 WATTS



MARKING DIAGRAM



D²PAK
CASE 418B
STYLE 1



B5742 = Specific Device Code
A = Assembly Location
Y = Year
WW = Work Week
G = Pb-Free Package

ORDERING INFORMATION

Device	Package	Shipping†
MJB5742T4G	D ² PAK (Pb-Free)	800 / Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

MJB5742T4G

ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
----------------	--------	-----	-----	-----	------

OFF CHARACTERISTICS (Note 2)

Collector–Emitter Sustaining Voltage (I _C = 50 mA, I _B = 0)	V _{CEO(sus)}	400	–	–	Vdc
Collector Cutoff Current (V _{CEV} = Rated Value, V _{BE(off)} = 1.5 Vdc) (V _{CEV} = Rated Value, V _{BE(off)} = 1.5 Vdc, T _C = 100°C)	I _{CEV}	–	–	1 5	mAdc
Emitter Cutoff Current (V _{EB} = 8 Vdc, I _C = 0)	I _{EBO}	–	–	75	mAdc

SECOND BREAKDOWN

Second Breakdown Collector Current with Base Forward Biased	I _{S/b}	See Figure 6			
Clamped Inductive SOA with Base Reverse Biased	RBSOA	See Figure 7			

ON CHARACTERISTICS (Note 2)

DC Current Gain (I _C = 0.5 Adc, V _{CE} = 5 Vdc) (I _C = 4 Adc, V _{CE} = 5 Vdc)	h _{FE}	50 200	100 400	– –	–
Collector–Emitter Saturation Voltage (I _C = 4 Adc, I _B = 0.2 Adc) (I _C = 8 Adc, I _B = 0.4 Adc) (I _C = 4 Adc, I _B = 0.2 Adc, T _C = 100°C)	V _{CE(sat)}	– – –	– – –	2 3 2.2	Vdc
Base–Emitter Saturation Voltage (I _C = 4 Adc, I _B = 0.2 Adc) (I _C = 8 Adc, I _B = 0.4 Adc) (I _C = 4 Adc, I _B = 0.2 Adc, T _C = 100°C)	V _{BE(sat)}	– – –	– – –	2.5 3.5 2.4	Vdc
Diode Forward Voltage (Note 3) (I _F = 5 Adc)	V _f	–	–	2.5	Vdc

SWITCHING CHARACTERISTICS

Typical Resistive Load (Table 1)					
Delay Time	(V _{CC} = 250 Vdc, I _{C(pk)} = 6 A I _{B1} = I _{B2} = 0.25 A, t _p = 25 μs, Duty Cycle ≤ 1%)	t _d	–	0.04	– μs
Rise Time		t _r	–	0.5	– μs
Storage Time		t _s	–	8	– μs
Fall Time		t _f	–	2	– μs
Inductive Load, Clamped (Table 1)					
Voltage Storage Time	(I _{C(pk)} = 6 A, V _{CE(pk)} = 250 Vdc I _{B1} = 0.06 A, V _{BE(off)} = 5 Vdc)	t _{sv}	–	4	– μs
Crossover Time		t _c	–	2	– μs

2. Pulse Test: Pulse Width 300 μs, Duty Cycle = 2%.

3. The internal Collector–to–Emitter diode can eliminate the need for an external diode to clamp inductive loads. Tests have shown that the Forward Recovery Voltage (V_f) of this diode is comparable to that of typical fast recovery rectifiers.

MJB5742T4G

TYPICAL CHARACTERISTICS

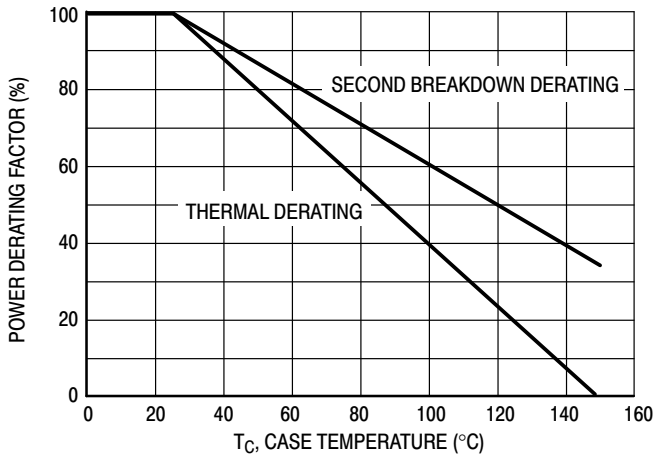


Figure 1. Power Derating

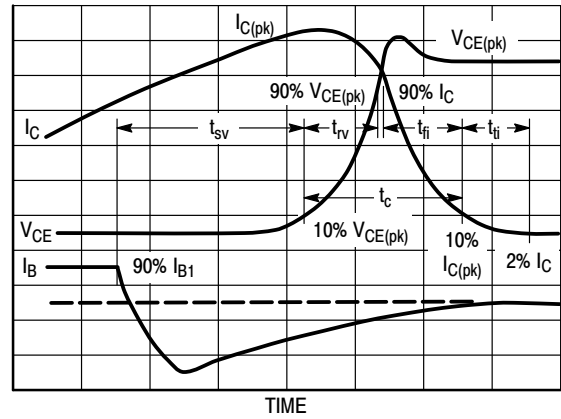


Figure 2. Inductive Switching Measurements

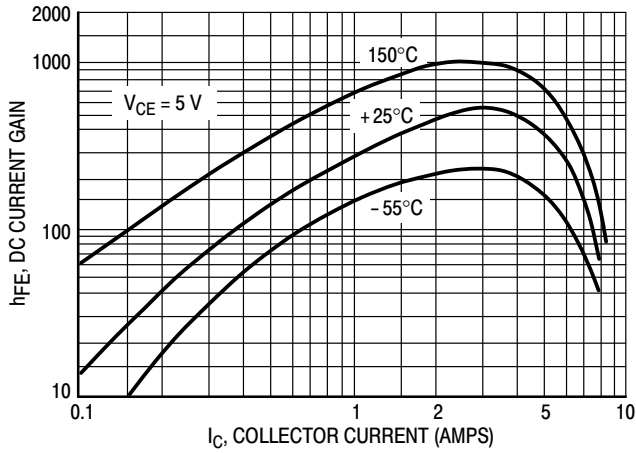


Figure 3. DC Current Gain

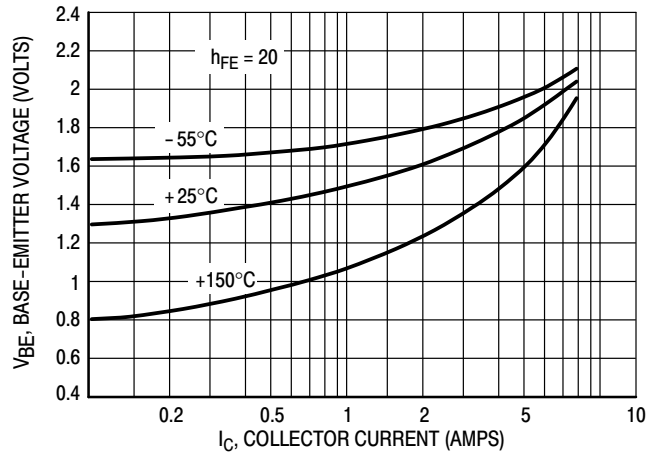


Figure 4. Base-Emitter Voltage

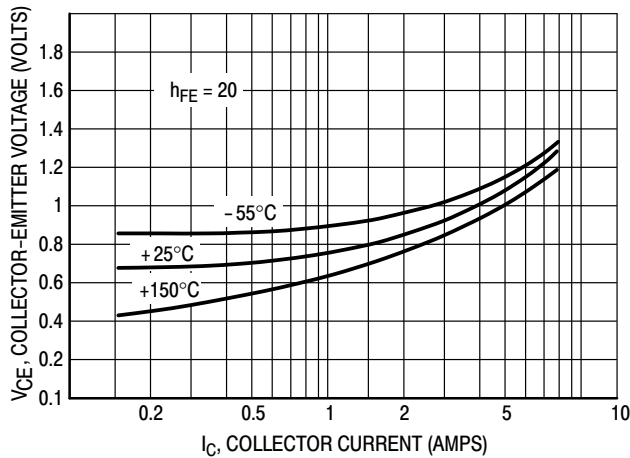


Figure 5. Collector-Emitter Saturation Voltage

MJB5742T4G

Table 1. Test Conditions for Dynamic Performance

REVERSE BIAS SAFE OPERATING AREA AND INDUCTIVE SWITCHING		RESISTIVE SWITCHING
TEST CIRCUITS	<p>DUTY CYCLE $\leq 10\%$ $t_r, t_f \leq 10$ ns</p> <p>NOTE: PW and V_{CC} Adjusted for Desired I_C R_B Adjusted for Desired I_{B1}</p>	<p>*SELECTED FOR ≥ 1 kV</p>
CIRCUIT VALUES	<p>COIL DATA: FERROXCUBE CORE #6656 FULL BOBBIN (~16 TURNS) #16</p> <p>GAP FOR 200 μH/20 A $L_{coil} = 200$ μH</p> <p>$V_{CC} = 30$ V $V_{CE(pk)} = 250$ Vdc $I_{C(pk)} = 6$ A</p>	<p>$V_{CC} = 250$ V $D1 = 1N5820$ OR EQUIV.</p>
TEST WAVEFORMS	<p>OUTPUT WAVEFORMS</p> <p>t_1 ADJUSTED TO OBTAIN I_C</p> $t_1 \approx \frac{L_{coil} (I_{C(pk)})}{V_{CC}}$ <p>TEST EQUIPMENT SCOPE-TEKTRONICS 475 OR EQUIVALENT</p> $t_2 \approx \frac{L_{coil} (I_{C(pk)})}{V_{clamp}}$	<p>$t_r, t_f < 10$ ns DUTY CYCLE = 1% R_B AND R_C ADJUSTED FOR DESIRED I_B AND I_C</p>

MJB5742T4G

SAFE OPERATING AREA INFORMATION

FORWARD BIAS

There are two limitations on the power handling ability of a transistor: average junction temperature and second breakdown. Safe operating area curves indicate $I_C - V_{CE}$ limits of the transistor that must be observed for reliable operation; i.e., the transistor must not be subjected to greater dissipation than the curves indicate.

The data of Figure 6 is based on $T_C = 25^\circ\text{C}$; $T_{J(pk)}$ is variable depending on power level. Second breakdown pulse limits are valid for duty cycles to 10% but must be derated when $T_C \geq 25^\circ\text{C}$. Second breakdown limitations do not derate the same as thermal limitations. Allowable current at the voltages shown on Figure 6 may be found at any case temperature by using the appropriate curve on Figure 1.

REVERSE BIAS

For inductive loads, high voltage and high current must be sustained simultaneously during turn-off, in most cases, with the base to emitter junction reverse biased. Under these conditions the collector voltage must be held to a safe level at or below a specific value of collector current. This can be accomplished by several means such as active clamping, RC snubbing, load line shaping, etc. The safe level for these devices is specified as Reverse Bias Safe Operating Area and represents the voltage-current condition allowable during reverse biased turnoff. This rating is verified under clamped conditions so that the device is never subjected to an avalanche mode. Figure 7 gives the complete RBSOA characteristics.

The Safe Operating Area figures shown in Figures 6 and 7 are specified ratings for these devices under the test conditions shown.

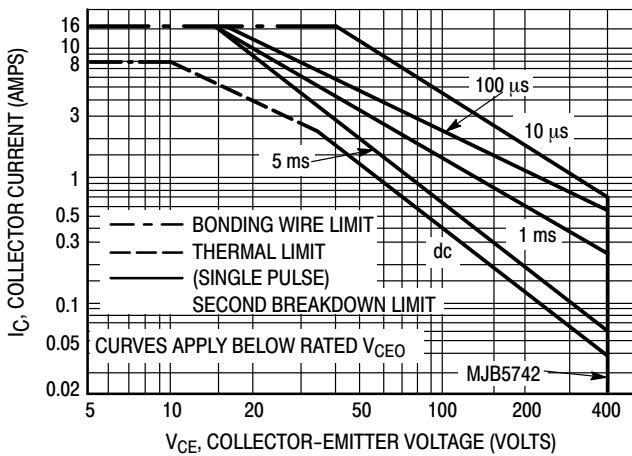


Figure 6. Forward Bias Safe Operating Area

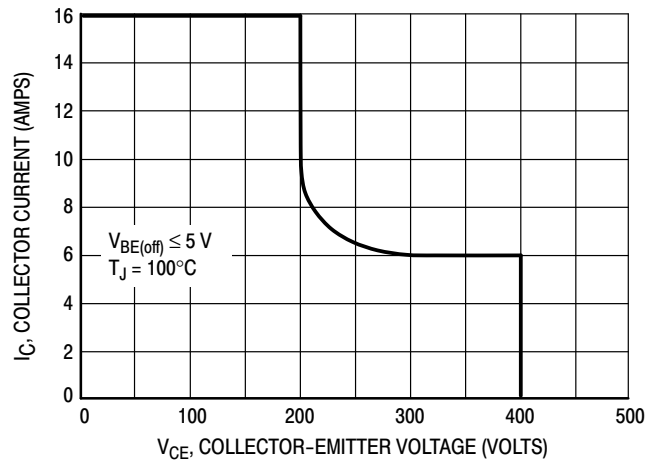


Figure 7. Reverse Bias Safe Operating Area

RESISTIVE SWITCHING PERFORMANCE

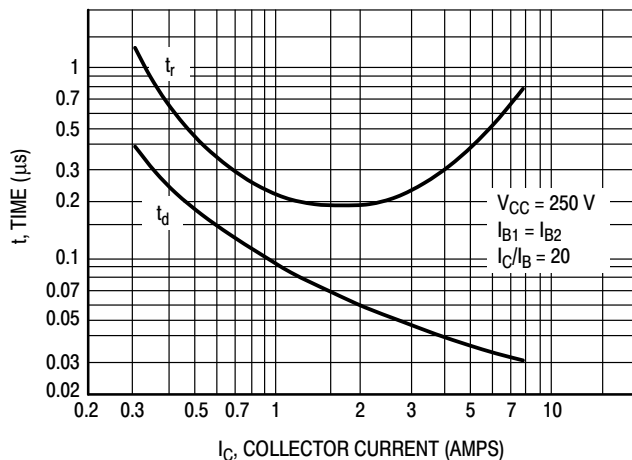


Figure 8. Turn-On Time

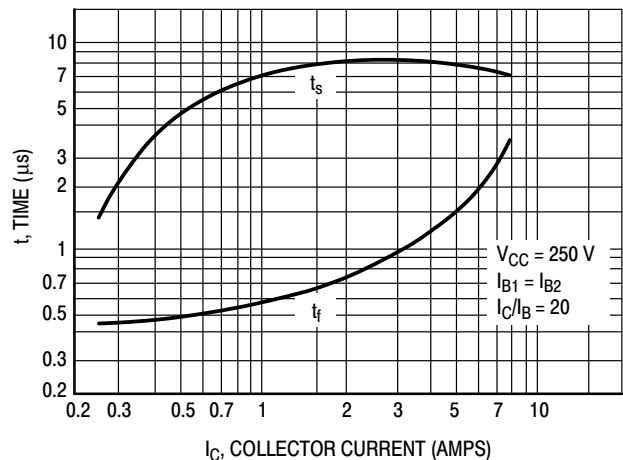
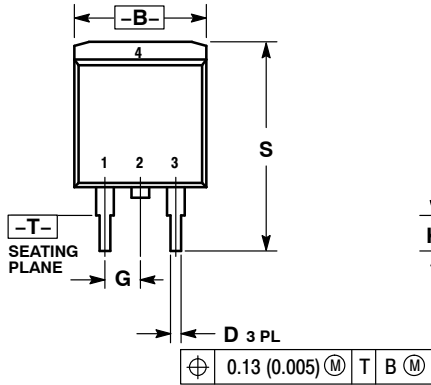


Figure 9. Turn-Off Time

MJB5742T4G

PACKAGE DIMENSIONS

D²PAK 3 CASE 418B-04 ISSUE K



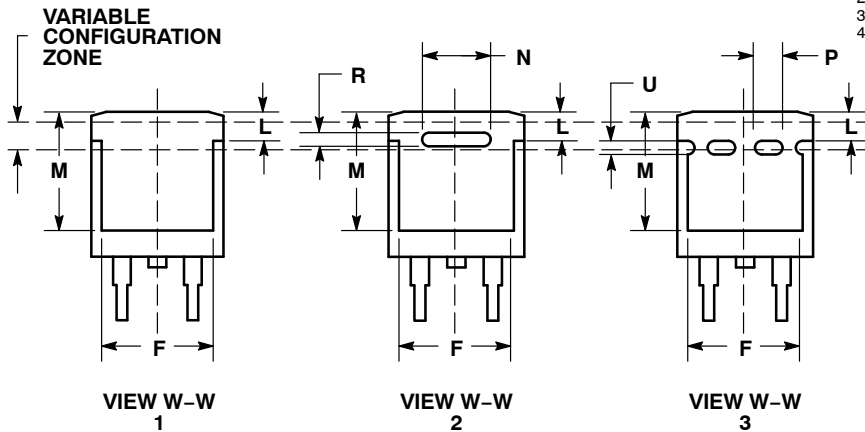
NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. 418B-01 THRU 418B-03 OBSOLETE, NEW STANDARD 418B-04.

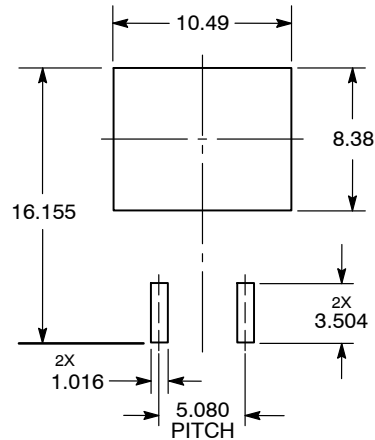
DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.340	0.380	8.64	9.65
B	0.380	0.405	9.65	10.29
C	0.160	0.190	4.06	4.83
D	0.020	0.035	0.51	0.89
E	0.045	0.055	1.14	1.40
F	0.310	0.350	7.87	8.89
G	0.100 BSC		2.54 BSC	
H	0.080	0.110	2.03	2.79
J	0.018	0.025	0.46	0.64
K	0.090	0.110	2.29	2.79
L	0.052	0.072	1.32	1.83
M	0.280	0.320	7.11	8.13
N	0.197 REF		5.00 REF	
P	0.079 REF		2.00 REF	
R	0.039 REF		0.99 REF	
S	0.575	0.625	14.60	15.88
V	0.045	0.055	1.14	1.40

STYLE 1:

- PIN 1. BASE
- COLLECTOR
- EMITTER
- COLLECTOR



SOLDERING FOOTPRINT*



DIMENSIONS: MILLIMETERS

*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

ON Semiconductor and  are registered trademarks of Semiconductor Components Industries, LLC (SCILLC). SCILLC reserves the right to make changes without further notice to any products herein. SCILLC makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does SCILLC assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. "Typical" parameters which may be provided in SCILLC data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. SCILLC does not convey any license under its patent rights nor the rights of others. SCILLC products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the SCILLC product could create a situation where personal injury or death may occur. Should Buyer purchase or use SCILLC products for any such unintended or unauthorized application, Buyer shall indemnify and hold SCILLC and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that SCILLC was negligent regarding the design or manufacture of the part. SCILLC is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:

Literature Distribution Center for ON Semiconductor
P.O. Box 5163, Denver, Colorado 80217 USA
Phone: 303-675-2175 or 800-344-3860 Toll Free USA/Canada
Fax: 303-675-2176 or 800-344-3867 Toll Free USA/Canada
Email: orderlit@onsemi.com

N. American Technical Support: 800-282-9855 Toll Free
USA/Canada
Europe, Middle East and Africa Technical Support:
Phone: 421 33 790 2910
Japan Customer Focus Center
Phone: 81-3-5773-3850

ON Semiconductor Website: www.onsemi.com
Order Literature: <http://www.onsemi.com/orderlit>
For additional information, please contact your local
Sales Representative

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