



### Features

- 2" x 4" x 1.3" Package
- Suitable for 1U Applications
- Class I and Class II versions
- 110W w/air, 80W convection cooled
- Universal Input 90-264Vac
- Efficiency 87% typical
- Approved to CSA/EN/IEC/UL60601-1, 3<sup>rd</sup> Edition
- 2 x MOPP Isolation
- Power Fail Signal
- Remote Sense (optional)
- 3 Year Warranty
- RoHS Compliant



### Description

The MINT3110 Series are medical grade, high efficiency, triple output power supplies in a small 2" x 4" size. The MINT3110 family is ideal for medical applications in surgical and laboratory instruments requiring low leakage, multiple outputs and small footprint. Surpassing the strict requirements of IEC 60601-1 3<sup>rd</sup> edition, the MINT3110 models feature outputs of 5±12V, 5±15V, 5±24V, Power Fail/DC OK signal, very low earth leakage current of 200µA, Class B Conducted EMI, 2 MOPP (means of patient protection) isolation, and are available in Class I and Class II configurations.

### Model Selection

Model Number	Volts*		Output Current**		Ripple & Noise***	Total Regulation	OVP Threshold
			w/200LFM air	Convection			
MINT3110A0508K01	V1	5V	14.0A	10.0A	1.0% pk-pk	±2%	7.5V max.
	V2	12V	6.0A	4.5A	1.0% pk-pk	±3%	115%-135%
	V3	-12V	1.0A	1.0A	2.0% pk-pk	±10%	115%-135%
MINT3110A1708K01	V1	5V	14.0A	10.0A	1.0% pk-pk	±2%	7.5V max.
	V2	15V	4.5A	3.5A	1.0% pk-pk	±3%	115%-135%
	V3	-15V	1.0A	1.0A	2.0% pk-pk	±10%	115%-135%
MINT3110A1908K01	V1	5V	12.0A	8.0A	1.0% pk-pk	±2%	7.5V max.
	V2	24V	4.0A	3.0A	1.0% pk-pk	±3%	115%-135%
	V3	-24V	1.0A	1.0A	2.0% pk-pk	±10%	115%-135%

Notes: \* 5V output is adjustable with +/-10% range  
 \*\* Total convection power is 80 Watts.  
 \*\*\* Measured with noise probe directly across output terminals, and load terminated with 0.1µF ceramic and 10µF low ESR capacitors. Ripple & Noise of V2 at no load is 2% maximum.

### General Specifications

<b>AC Input</b>	100-240Vac, ±10%, 47-63Hz, 1Ø 120-370Vdc	<b>Turn On Time</b>	Less than 2 sec. @115Vac (inversely proportional to input voltage and thermistor temperature)
<b>Input Current</b>	115Vac: 1.5A, 230Vac: 0.75A	<b>Hold-up Time</b>	16mS typical at 110W, 120Vac input

## General Specifications (continued)

<b>Inrush Current</b>	264Vac, cold start: will not exceed 45A	<b>Signals</b>	AC Power Fail, DC OK
<b>Input Fuses</b>	F1, F2: 2.5A, 250Vac fuses provided on all models	<b>Overload Protection</b>	150%-300% above rating for V2 & V3, 110%-200% for V1. Hiccup Mode
<b>Earth Leakage Current</b>	<290 $\mu$ A@264Vac, 60Hz, NC	<b>Short Circuit Protection</b>	Provided - no damage will occur if the output is shorted.
<b>Efficiency</b>	87% typical at 230Vac	<b>Overvoltage Protection</b>	See models chart for trip range.
<b>Output Power</b>	110W continuous with 200 lfm airflow, 80W convection cooled – See chart for specific voltage model ratings.	<b>Switching Frequency</b>	PFC: Variable 30-400kHz. Main Converter: Variable 35-180kHz, 65-70kHz at full load.
<b>Transient Response</b>	500 $\mu$ S typ. for return to within 0.5% of nominal, 50% load step. $\Delta i/\Delta t < 0.2A/\mu S$ . Max Volt Deviation = 3%	<b>Isolation</b>	Input-Output: 4000Vac, 2 x MOPP Input-Ground: 1800Vac, 1 x MOPP Output-Ground: 500Vac
<b>Ripple and Noise</b>	See models chart	<b>Operating Temperature</b>	-10°C to +70°C
<b>Output Voltage</b>	See models chart	<b>Temperature Derating</b>	Derate output power linearly above 50°C to 50% at 70°C
<b>Voltage Adjustability</b>	+/-10% from nominal on 5V output	<b>Storage Temperature</b>	-40°C to +85°C
<b>Minimum Load</b>	Not required	<b>Altitude</b>	Operating: -500 to 10,000 ft. Non-operating: -500 to 40,000 ft.
<b>Total Regulation</b>	See models chart	<b>Relative Humidity</b>	5% to 95%, non-condensing
<b>Vibration</b>	Operating: 0.003g <sup>2</sup> /Hz, 1.5grms overall, 3 axes, 10 min/axis Non-Operating: 0.026g <sup>2</sup> /Hz, 5.0grms overall, 3 axes, 1 hr/axis	<b>Shock</b>	Operating: Half-sine, 20gpk, 10ms, 3 axes, 6 shocks total Non-Operating: Half-sine, 40 gpk, 10 ms, 3 axes, 6 shocks total
<b>Dimensions</b>	W: 2.0" x L: 4.0" x H: 1.3"	<b>Safety Standards</b>	EN/CSA/UL/IEC 60601-1, 3 <sup>rd</sup> Edition
<b>Weight</b>	200g	<b>MTBF</b>	245,000 hours, 25°C Ambient, 110Vac input

## Auxiliary Signals

<b>AC Power Fail:</b>	During normal operation, stays HIGH. Signal goes LOW with at least 6mS warning before loss of DC output from AC failure.	<b>DC OK:</b>	Open collector logic signal goes and stays HIGH 100mS to 500mS after main output reaches regulation.
<b>Remote Sense:</b>	(5V output, optional) Will compensate for 0.5V drop min. Will operate without remote sense connected. Reverse connection protected.		

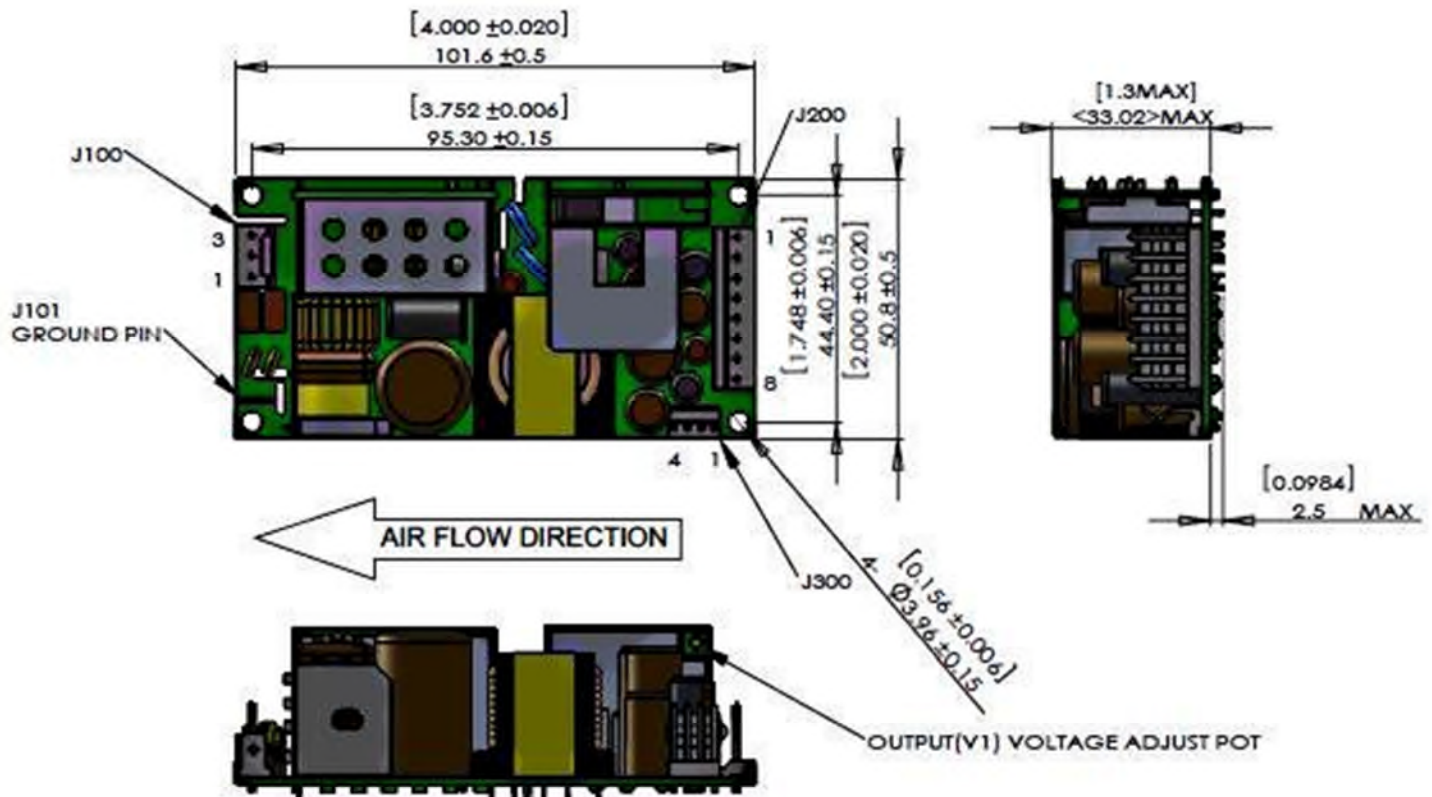
### Notes:

- Specifications are for convection rating at factory settings at 115 Vac input, 25°C ambient unless otherwise stated.
- For DC input an external DC safety rated fuse must be used.

## EMI/EMC Compliance

Conducted Emissions	EN55011/22 Class B, FCC Part 15, Subpart B, Class B
Radiated Emissions	EN55011/22 Class A; FCC Part 15, Subpart A, Class A
Static Discharge Immunity	EN61000-4-2, Criteria A, 6kV Contact Discharge, 8kV air discharge
Radiated RF Immunity	EN61000-4-3, 3V/m, Criteria A
EFT/Burst Immunity	EN61000-4-4, 2kV/5kHz, Criteria A
Line Surge Immunity	EN61000-4-5, 1kV differential, 2kV common-mode, Criteria A
Conducted RF Immunity	EN61000-4-6, 3Vrms, Criteria A
Power Frequency Magnetic Field Immunity	EN61000-4-8, 3A/m, Criteria A
Voltage Dip Immunity	EN61000-4-11, 0% Vin, 0.5cycle; 40% Vin, 5 cycles; 70% Vin, 25 cycles; Criteria A
Line Harmonic Emissions	EN61000-3-2, Class A, B, C, & D
Flicker Test	EN61000-3-3, Complies (dmax<6%)

## Mechanical Drawing



### Notes:

- All dimensions in inches (mm), tolerance is  $\pm .02$ ".
- Mounting holes should be grounded for EMI purpose
- Mounting J101 is safety ground connection
- This power supply requires mounting on metal standoffs 0.20" (5 m) in height.

### Connector Information

Input Connector J100	Ground J101	DC Output Connector J200			Signal Connector J300
PIN 1) AC NEUTRAL PIN 2) EMPTY PIN 3) AC LINE	0.187" FASTON TAB	PIN 1) +V1 PIN 2) +V1 PIN 3) GND	PIN 4) GND PIN 5) GND PIN 6) GND	PIN 7) V2 PIN 8) V3	PIN 1) Power Fail/DC OK PIN 2) GND PIN 3) +Remote Sense PIN 4) -Remote Sense
Mating Connector: Molex 09-50-3031 Pins= 08-52-0072	Mating Connector: Molex 01-90020001	Mating Connector: JST VHR-8N Pins = SVH-21T-P1.1			Mating Connector: Molex 51065-0400 Pins = 50212-8100

### Isolation Specifications

Parameter	Conditions/Description	Min	Nom	Max	Units
Insulation Safety Rating	Input/Ground Input/Output Output/Ground	Basic (1 MOPP) Reinforced (2 MOPP) Operational			
Electric Strength Test Voltage	Input/Ground Input/Output Output/Ground	1800 4000 500	-	-	Vac Vac Vac

### Leakage Current

Parameter	Conditions/Description	Max
Earth Leakage Current	Normal Condition (NC) Single Fault Condition (SFC)	290µA 420µA
Touch Current	Normal Condition (NC) Single Fault Condition (SFC)	90µA 170µA

### Input Specifications

All specifications apply over specified input voltage, output load, and temperature range, unless otherwise noted.

Parameter	Conditions/Description	Min	Nom	Max	Units
Input Voltage		90	115/230	264	Vac
Input Frequency		47	50/60	63	Hz
Input Current	115Vac/max load			1.5	A
Input Current	230Vac/max load			0.75	A
Inrush Current	264Vac, cold start, 25°C	-	-	45	A
Efficiency	$V_i$ nom, $I_o$ nom MINT3110A0508K01 MINT3110A1708K01 MINT3110A1908K01	-	87%	-	%

### Output Specifications

Parameter	Conditions/Description	Min	Nom	Max	Units
Output Current V1 Output Current V2 Output Current V3	MINT3110A0508K01	0 0 0	10.0 4.5 1	14.0 6.0 1	ADC
Output Current V1 Output Current V2 Output Current V3	MINT3110A1708K01	0 0 0	10.0 3.5 1	14.0 4.5 1	ADC
Output Current V1 Output Current V2 Output Current V3	MINT3110A1908K01	0 0 0	8.0 3.0 1	12.0 4.0 1	ADC

**Output Specifications** (continued)

Parameter	Conditions/Description	Min	Nom	Max	Units
Static Line Regulation V1	$V_i$ min- $V_i$ max, $V_i$ nom, 0-100% $I_{o1}$ max	-2	-	2	% $V_o$ nom
Static Line Regulation V2	$V_i$ min- $V_i$ max, $V_i$ nom, 0-100% $I_{o2}$ max	-3	-	3	% $V_o$ nom
Static Line Regulation V3	$V_i$ min- $V_i$ max, $V_i$ nom, 0-100% $I_{o3}$ max	-10	-	10	% $V_o$ nom
Static Load Regulation V1 (Droop Characteristic)	$V_i$ min- $V_i$ max, $V_i$ nom, 0-100% $I_{o1}$ max	-2	-	2	% $V_o$ nom
Static Load Regulation V2 (Droop Characteristic)	$V_i$ min- $V_i$ max, $V_i$ nom, 0-100% $I_{o2}$ max	-3	-	3	% $V_o$ nom
Static Load Regulation V3 (Droop Characteristic)	$V_i$ min- $V_i$ max, $V_i$ nom, 0-100% $I_{o3}$ max	-10	-	10	% $V_o$ nom
Hold-Up Time	$V_{in} = 120Vac, P_o = 110W$	16	-	-	mS
Dynamic Load Regulation V1, V2, V3	Load change =50%, $di/dt = 0.2A/\mu S$	0	-	3	% $V_o$ nom
Start-Up Time	$V_{in} = 115Vac, I_o$ nom	0	-	2	S
Ripple & Noise V1	20MHz bandwidth	0	-	1%	% $V_o$ nom
Ripple & Noise V2	20MHz bandwidth	0	-	1%	% $V_o$ nom
Ripple & Noise V3	20MHz bandwidth	0	-	2%	% $V_o$ nom

**Protection**

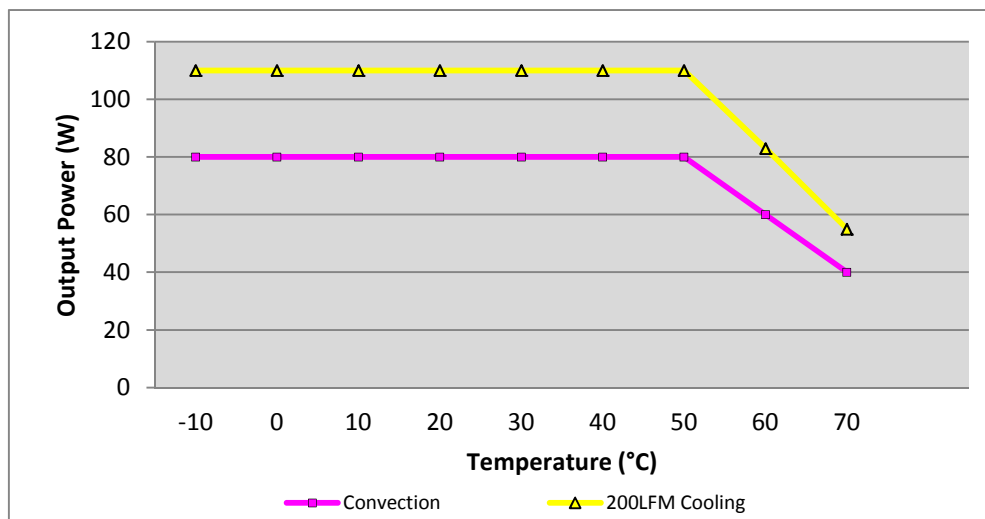
All specifications apply over specified input voltage, output load, and temperature range, unless otherwise noted.

Parameter	Conditions/Description	Min	Nom	Max	Units
Input Fuse	T2.5A/250V internal fuse in both line & neutral	Not user accessible			
Input Transient Protection	2KV(CM) and 1KV(DM) surge			2	KV (CM)
Short Circuit Protection		Hiccup Mode			
Overload Protection		Hiccup Mode			
Overvoltage Protection	Latching Type, recycle AC input to reset	See models chart for trip ranges			

**Characteristic Curves**

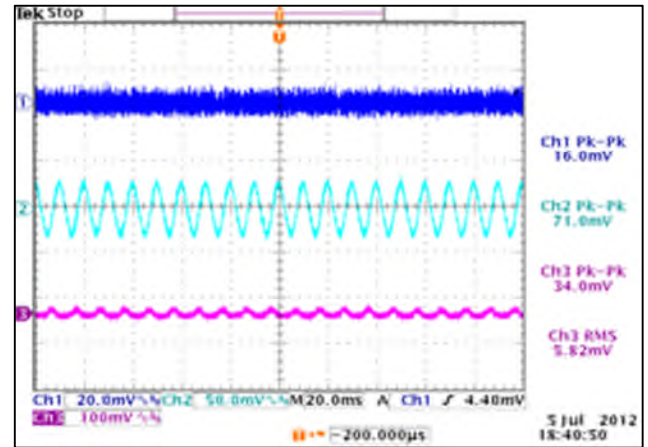
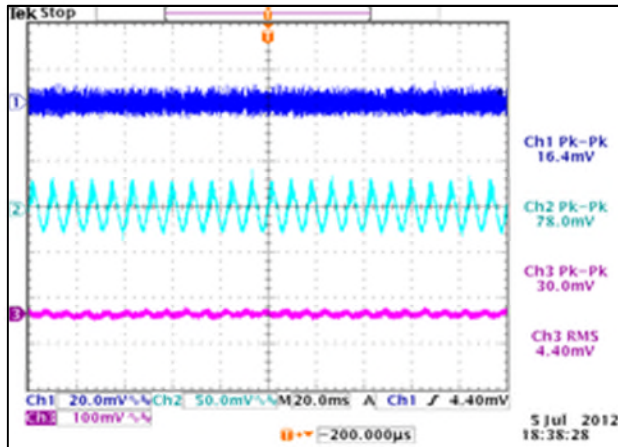
**Output vs. Temperature**

80W convection cooled and 110W continuous with 200 LFM airflow. Derate output power to 50% at 70°C.



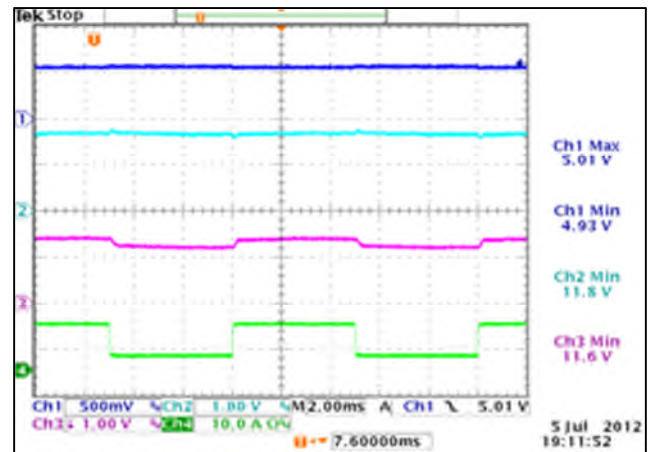
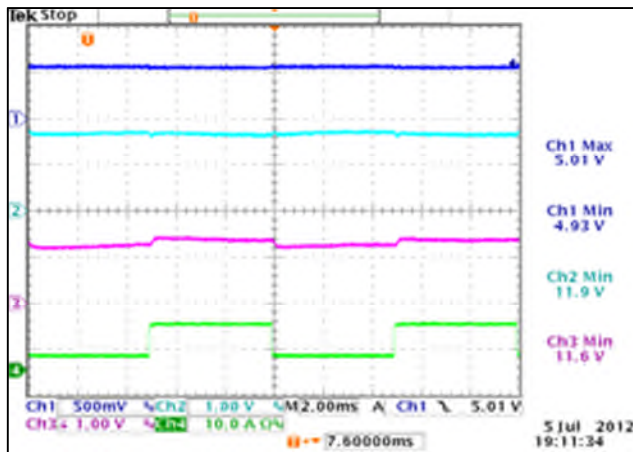
### Ripple & Noise

To verify that the output ripple and noise does not exceed the level specified in the product specification. Measured using a scope probe socket with 0.1µF ceramic and a 10µF electrolytic capacitor connected in parallel across it, BW limit with 20MHz.



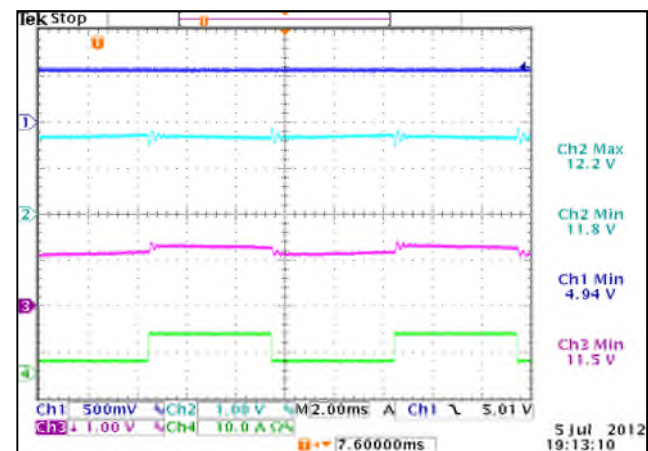
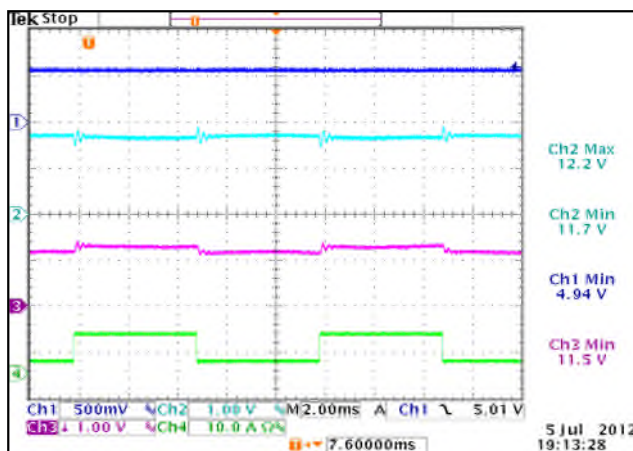
### Output Transient Response V1

50% load step within the regulation limits of minimum and maximum load,  $di/dt < 0.2A/\mu\text{Sec}$ . Recovery time not specified as there is no laps in regulation with a 50% Load Step. Maximum voltage deviation is 3%.



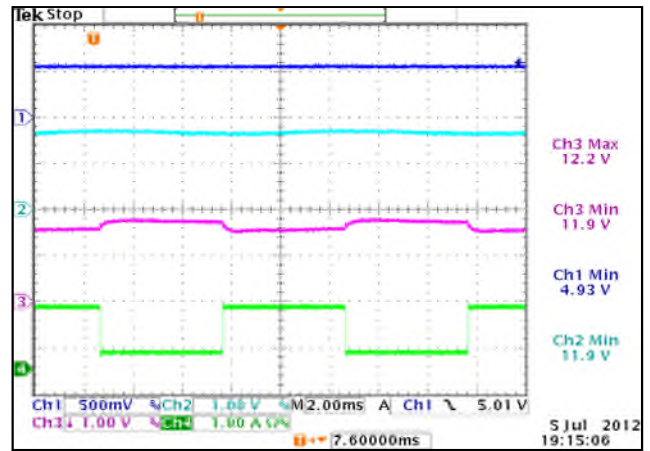
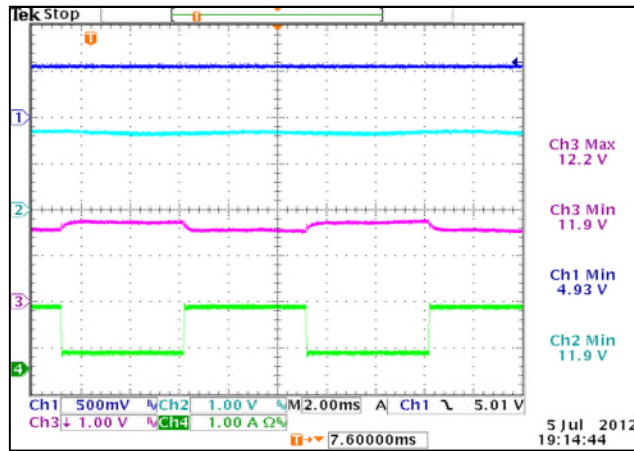
### Output Transient Response V2

50% load step within the regulation limits of minimum and maximum load,  $di/dt < 0.2A/\mu\text{Sec}$ . Recovery time not specified as there is no laps in regulation with a 50% Load Step. Maximum voltage deviation is 3%.



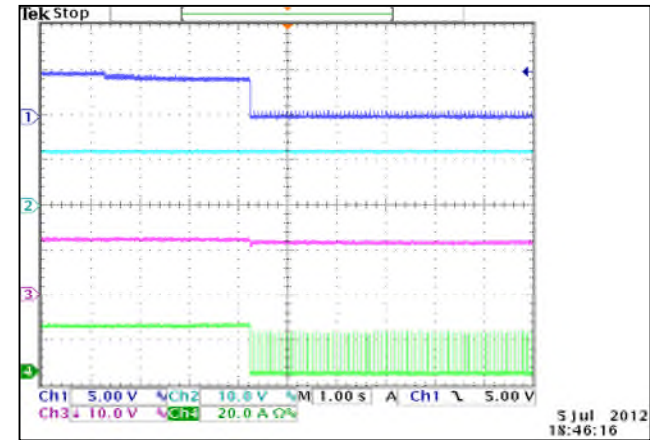
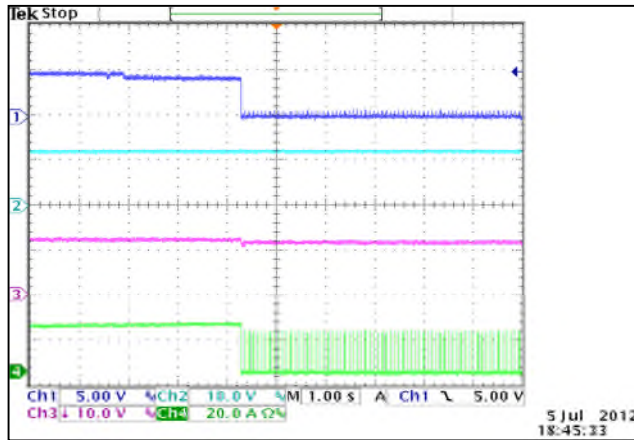
### Output Transient Response V3

50% load step within the regulation limits of minimum and maximum load,  $di/dt < 0.2A/\mu\text{Sec}$ . Recovery time not specified as there is no laps in regulation with a 50% Load Step. Maximum voltage deviation is 3%.



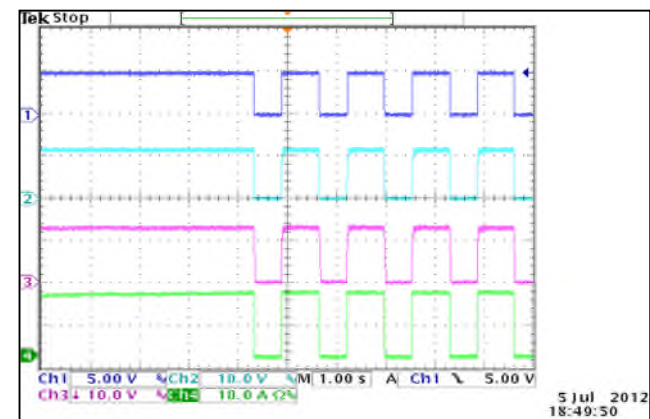
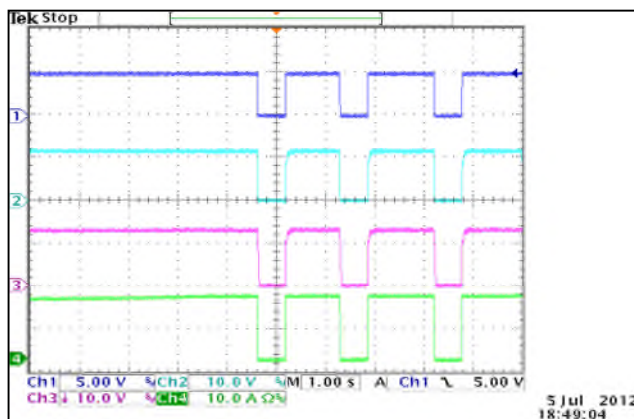
### Output Overload Characteristic V1

Supply shall protect itself against Overload conditions. The Power Supply shall recover from Overload Conditions without operator intervention.



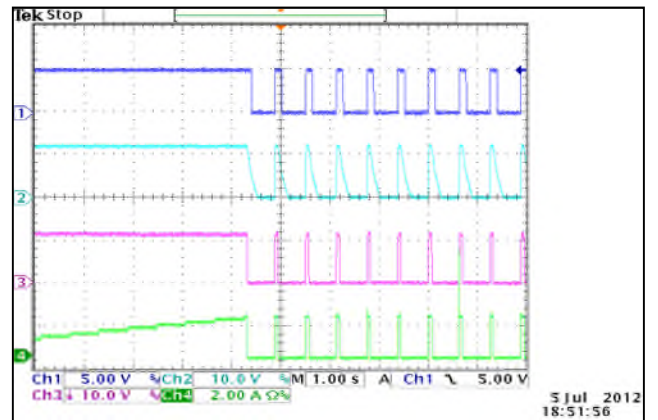
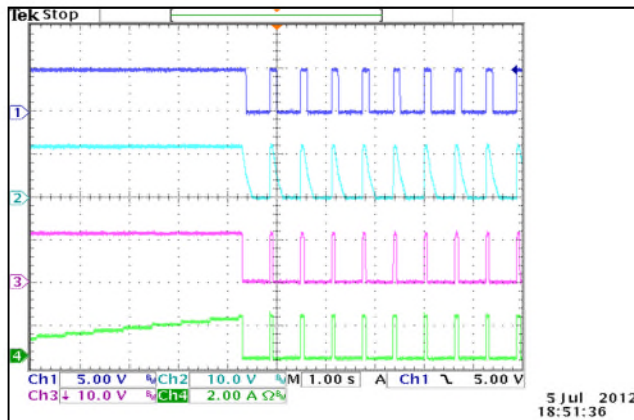
### Output Overload Characteristic V2

Supply shall protect itself against Overload conditions. The Power Supply shall recover from Overload Conditions without operator intervention.



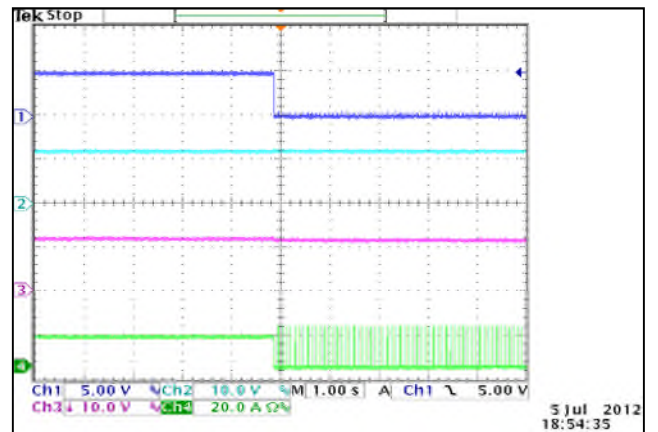
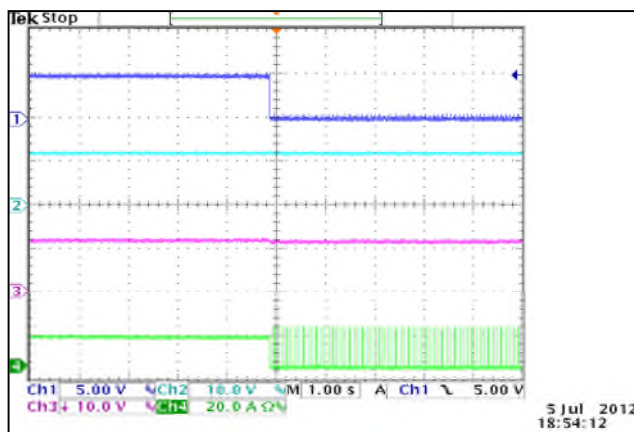
### Output Overload Characteristic V3

Supply shall protect itself against Overload conditions. The Power Supply shall recover from Overload Conditions without operator intervention.



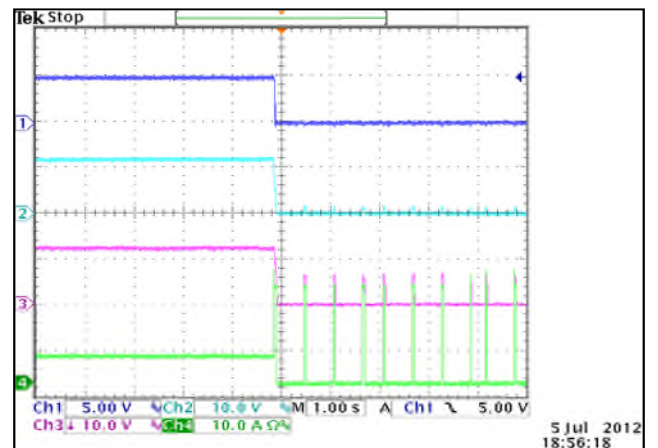
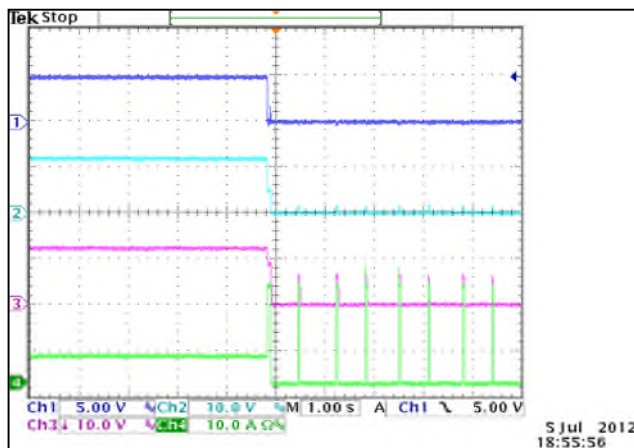
### Output Short Circuit Characteristic V1

Supply shall protect itself against Short Circuit conditions. The Power Supply shall recover from short circuit conditions without operator intervention.



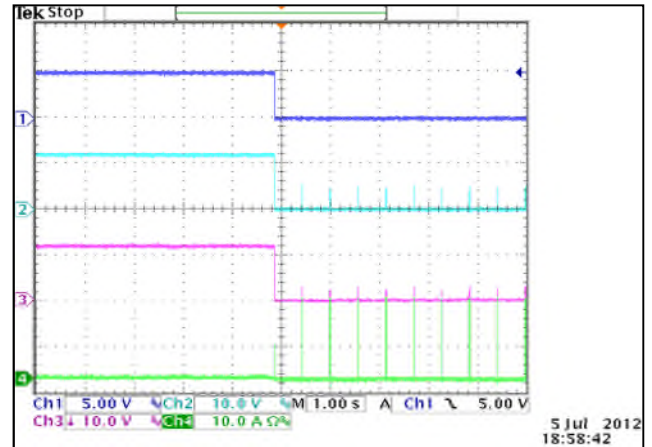
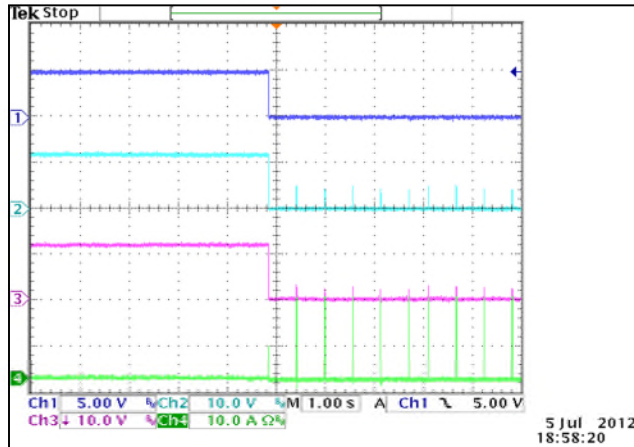
### Output Short Circuit Characteristic V2

Supply shall protect itself against Short Circuit conditions. The Power Supply shall recover from short circuit conditions without operator intervention.



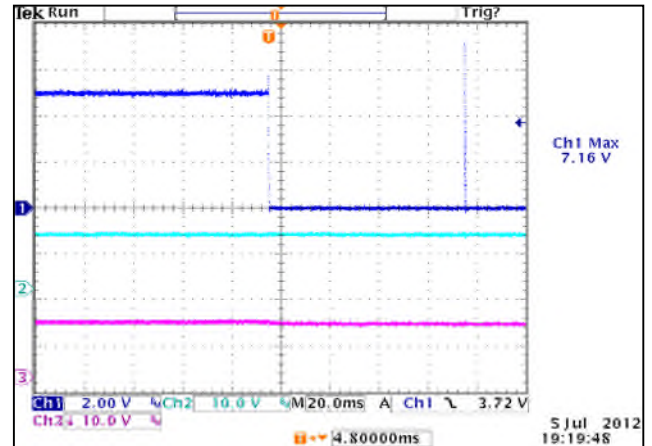
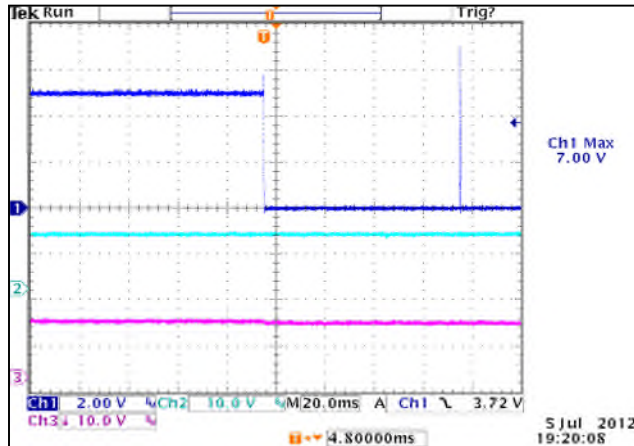
### Output Short Circuit Characteristic V3

Supply shall protect itself against Short Circuit conditions. The Power Supply shall recover from short circuit conditions without operator intervention.



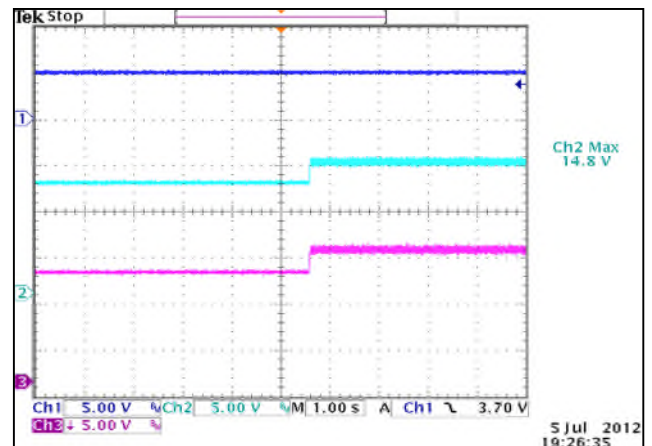
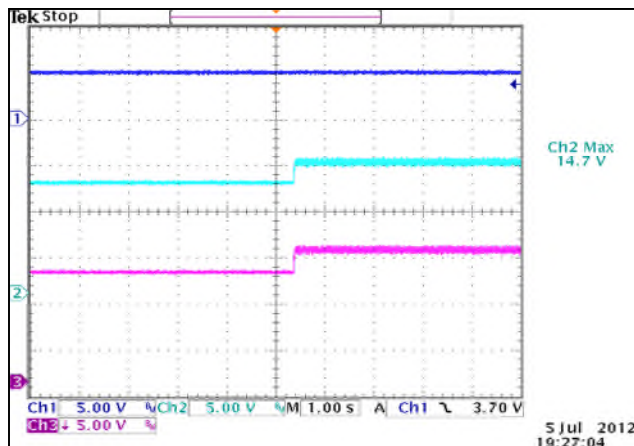
### Output Overvoltage Characteristic V1

Supply shall protect itself against over voltage conditions. The Power Supply shall latch and require AC input recycle to reset.



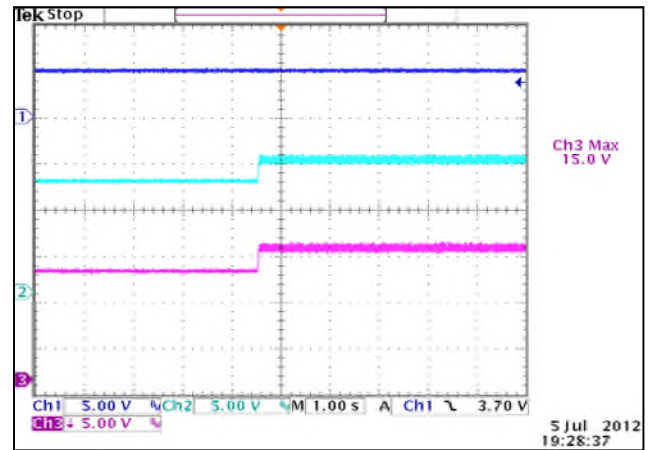
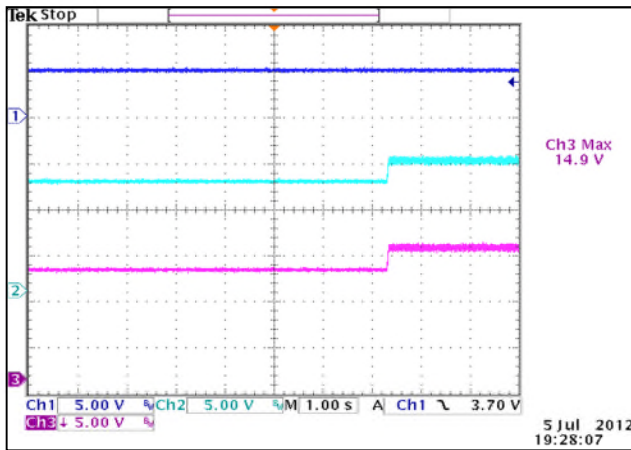
### Output Overvoltage Characteristic V2

Supply shall protect itself against over voltage conditions. The Power Supply shall latch and require AC input recycle to reset.



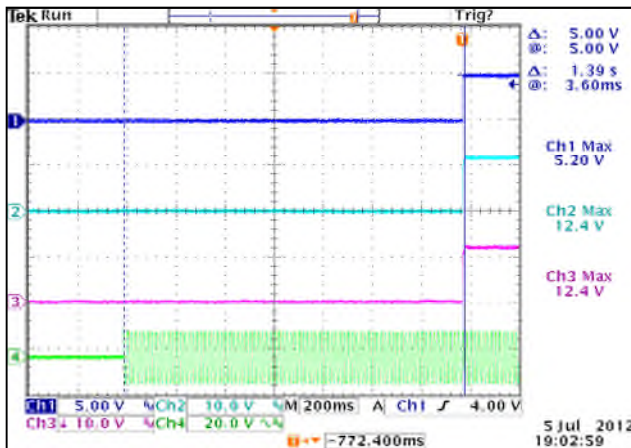
### Output Overvoltage Characteristic V3

Supply shall protect itself against over voltage conditions. The Power Supply shall latch and require AC input recycle to reset.



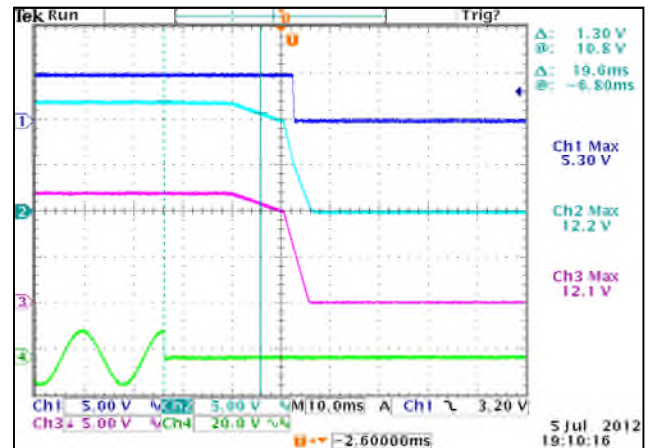
### Startup Time

Start up time is <2seconds



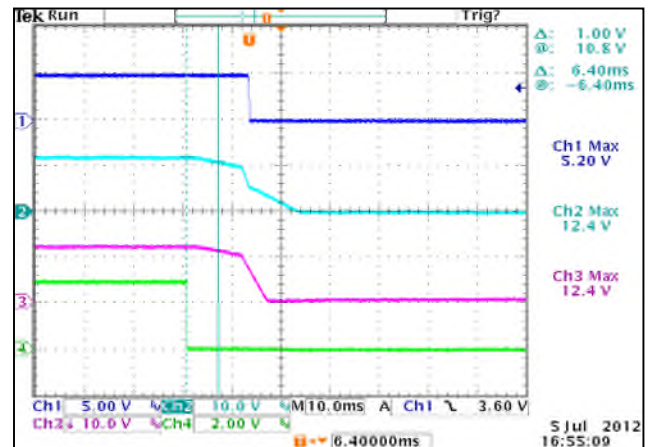
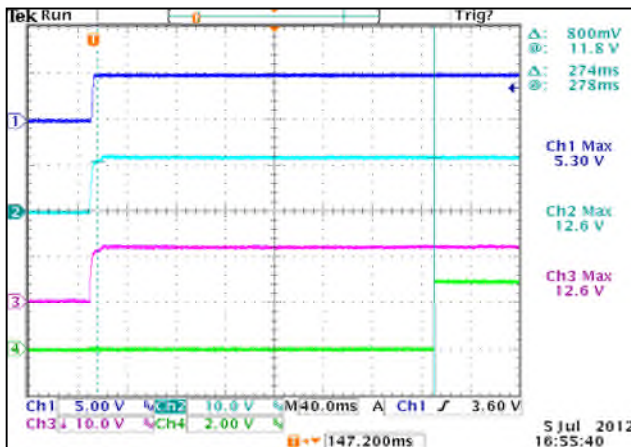
### Hold-up Time

Hold up time is 16mS minimum



### Power Fail Signal Timing

Active Low TTL logic signal goes high 100 - 500 ms after main output; it goes low at least 6 mS before loss of regulation.



## Данный компонент на территории Российской Федерации

### Вы можете приобрести в компании MosChip.

Для оперативного оформления запроса Вам необходимо перейти по данной ссылке:

<http://moschip.ru/get-element>

Вы можете разместить у нас заказ для любого Вашего проекта, будь то серийное производство или разработка единичного прибора.

В нашем ассортименте представлены ведущие мировые производители активных и пассивных электронных компонентов.

Нашей специализацией является поставка электронной компонентной базы двойного назначения, продукции таких производителей как XILINX, Intel (ex.ALTERA), Vicor, Microchip, Texas Instruments, Analog Devices, Mini-Circuits, Amphenol, Glenair.

Сотрудничество с глобальными дистрибьюторами электронных компонентов, предоставляет возможность заказывать и получать с международных складов практически любой перечень компонентов в оптимальные для Вас сроки.

На всех этапах разработки и производства наши партнеры могут получить квалифицированную поддержку опытных инженеров.

Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ РВ 0015-002 и ЭС РД 009

### Офис по работе с юридическими лицами:

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