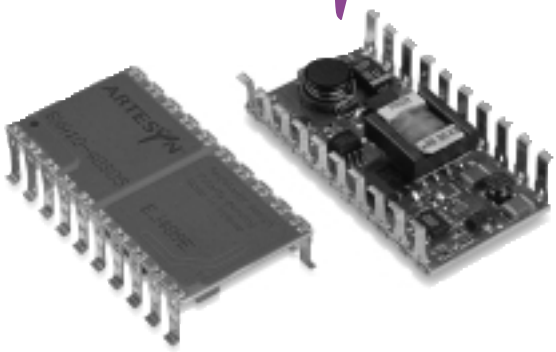
ARTESYN TECHNOLOGIES

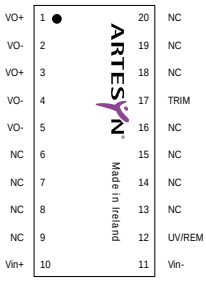
SXA10 SERIES

Single output



- **Surface mount isolated DC/DC converter**
- **High reliability, rugged design**
- **Low weight, open frame package**
- **3:1 input voltage range 27-75V**
- **Adjustable Undervoltage Lockout (UVLO)**
- **Full operation over the temperature range of -40°C to +85°C ambient with natural convection, up to 100°C with forced air**
- **Capable of delivering 10% extra power from -10°C to 70°C**
- **Low power dissipation for any overload condition**
- **Compliant with industry standard reflow profiles**
- **Excellent output voltage accuracy, 0.1% typical regulation**
- **Complies with ETS 300 132-2, ETS 300 386-1**
- **Environmentally friendly construction and packaging**

Pinout Diagram
SXA10 Single Output



[5 YEAR WARRANTY]

CE (LVD) c UL us SP TÜV

The SXA10 series is targeted specifically at telecommunications, data networking, mobile infrastructure, industrial and computer distributed power applications. An open frame topology combining a custom IC, conservative component deratings and extensive qualification ensures enhanced performance and reliability. All models have remote enable, output voltage trim and adjustable undervoltage lockout setting. The products are manufactured in a fully automated process utilising established and proven mechanical construction technologies. Supplied in JEDEC standard trays, these products are optimized for automated assembly using standard pick and place equipment and using industry standard reflow profiles.

Stresses in excess of the absolute maximum ratings can cause permanent damage to the device. Operation of the device is not implied at these or any other conditions in excess of those given in the data sheet. Exposure to absolute maximum ratings can adversely affect device reliability.

ABSOLUTE MAXIMUM RATINGS		MINIMUM	TYPICAL	MAXIMUM
Input voltage, continuous		-0.3V		75V
Input voltage, peak/surge	2s max.	-0.3V		100V
UV/REM (pin 12)		-0.3V		7V
Hot spot	(See Note 6)	-40°C		115°C
Storage temperature		-40°C		125°C
Output voltage during trim up	% of nominal output (Vo)			140%
Input undervoltage lockout set-point (See Note 1)	Output not trimmed up (all models)	27V		
Reflow peak	20 seconds			245°C

SPECIFICATION

All specifications apply over 27-75V input, no load to rated load and -40°C to 110°C Hot spot (output diode tab temperature, See Note 6), unless otherwise stated.

OUTPUT SPECIFICATIONS		MINIMUM	TYPICAL	MAXIMUM
Voltage setpoint accuracy (See Note 7)	2.5V, 3.3V, 5V 12V			±1.0% ±1.5%
Voltage adjustability	(See Note 4)			See model table
Line regulation	2.5V, 3.3V, 5V 12V		9mV 15mV	25mV 40mV
Load regulation				See model table
Output current	(Io)			See model table
Extended output current For input from 36 to 75V and ambient between -10°C and 70°C	(Io ext) (See Note 3)			+10%

10 Watt
Surface mount DC/DC converters

OUTPUT SPECIFICATIONS		MINIMUM	TYPICAL	MAXIMUM
Ripple and noise 20MHz bandwidth	SXA10-48S2V5		1.5% pk-pk 15mV rms	4.0% pk-pk 30mV rms
	SXA10-48S3V3		1.5% pk-pk 15mV rms	3.0% pk-pk 35mV rms
	SXA10-48S05		1.0% pk-pk 15mV rms	2.0% pk-pk 30mV rms
	SXA10-48S12		0.5% pk-pk 15mV rms	1.0% pk-pk 30mV rms
Temperature coefficient			±0.002%/°C	±0.010%/°C
Short circuit protection (hiccup)				Continuous
Overload protection	For all overload conditions			Continuous
Load transient response	Peak deviation for 50% to 100% step load Settling time to within 1.0%		1.4% 200µsec	
Line transient response	10V step		0mV	
Voltage overshoot	100% load to no load step		3.0%	5.0%
Capacitive load (See Note 5 and Application Note 102)	@ max. temp. and 75Vin; 2.5V, 3.3V, 5V 12V			 2200µF/A 100µF/A
Start-up time, full resistive load Vin = 36V to Vo in spec.	SXA10-48S2V5 SXA10-48S3V3 SXA10-48S05 SXA10-48S12		11msec 11msec 8msec 25msec	15msec 15msec 15msec 34msec
Rise time	Full resistive load 10% to 90% Vo		4msec	10msec

INPUT SPECIFICATIONS		MINIMUM	TYPICAL	MAXIMUM
Input voltage range	Default	36V		75V
Adjustable input voltage range (See Note 1)	2.5V, 3.3V, 5V, 12V	27V		75V
Input dv/dt	ETS 300-132			5V/ms
Non repetitive input dv/dt				50V/µs
Non repetitive transient input energy				0.1Ws
Input capacitance internal to unit	Ceramic capacitors are fitted internally			2.5µF
Remote ON/OFF	Logic compatibility		Internally pulled high, open collector	
Remote ON threshold (Note 1)	At UV/REM pin	1.6V	1.83V	2.25V
Remote ON/OFF hysteresis		35mV	85mV	135mV
Default input undervoltage lockout (UVLO)	ON threshold OFF threshold	32.15V 29.61V	33.86V 31.48V	35.17V 32.95V
Max. UV/REM source current				750µA
Remote OFF input power	Sleep mode @ Vin = 75V			150mW
Supply voltage ripple rejection	100/120Hz SVR = 20 log (Vin pk-pk/Vout pk-pk)		70dB	
Input current no load			11mA	20mA
Inrush current	ETS 300 132-2			
Recommended input fuse			850mA HRC, anti-surge, rated for 200VDC	

10 Watt
Surface mount DC/DC converters

INPUT VOLTAGE (1)	OUTPUT VOLTAGE RANGE	NOMINAL OUTPUT VOLTAGE	NOMINAL OUTPUT CURRENT (3)	MINIMUM EFFICIENCY (7)	MAXIMUM LOAD REG. (7)	MODEL NUMBER (11)
27-75VDC	2.25 to 2.75V	2.5V	2.75A	76%	20mV	SXA10-48S2V5
27-75VDC	2.97 to 3.63V	3.3V	2.75A	79%	20mV	SXA10-48S3V3
27-75VDC	4.5 to 5.5V	5.0V	2.0A	82%	20mV	SXA10-48S05
27-75VDC	10.8 to 12V	12V	0.833A	84%	30mV	SXA10-48S12

TYPICAL ELECTROMAGNETIC COMPATIBILITY SPECIFICATIONS

Conducted emissions	EN55022, FCC P.15 (Note 9)	Level A
Radiated emissions	EN55022, FCC P.15,	Level A
Electrostatic discharge	EN61000-4-2 (4kV)	Level 2, criterion 2
Radiated immunity	EN61000-4-3 (10V/m)	Level 3, criterion 1
Input transients bursts	EN61000-4-4 (4kV)	Level 4, criterion 2
Surge (signal only)	EN61000-4-5 (500V)	Level 1, criterion 1
Conducted immunity	EN61000-4-6	Level 3, criterion 1
Input transients	ETS 300 132, ETR283	
Public telecom, network equip. EMC	ETS 300 386-1, April 1997	
Digital cellular telecom EMC	ETS 300 342-2, November 1994	

GENERAL SPECIFICATIONS

Efficiency For other operating conditions, refer to Applications Note	(See Note 7)	See model table
Isolation voltage	Input/output, 1 second test	1500VDC
Insulation class (See Note 2)	Operational	EN60950, CSA C22.2 UL1950
Input/output cap. Input/output resistance	(Nominal value)	1500pF $>10^8\Omega$
Switching frequency	Fixed	400kHz, ±10%
Approvals and standards (pending)		EN60950, UL1950 CSA C22.2 No. 950-95 March '98

RELIABILITY AND LIFETIME SPECIFICATIONS

MTBF (parts count)	MIL-HDBK-217F Ground benign	1,000,000 hours @ 30°C,
MTBF	HRD4 issue 4	3,712,000 hours @ 40°C

NOTE: The component top surface contains both input and output voltage potentials. The component may also be at high temperature. Ensure that the unit is accessible only to trained personnel. See Note 2 for further details.

PROCESS SPECIFICATIONS

Solderability	IEC 60068-2-58
Recommended reflow profile	Convection reflow is recommended CECC 00 802 Issue 2 and peak <245°C See Application Note
Solder paste height	0.15mm (6 thou) min.
Clean	Recommended process is no clean. If aqueous, ensure unit is thoroughly dried before applying power

ENVIRONMENTAL SPECIFICATIONS (8)

Vibration (sinusoidal) IEC 60068-2-6 Fc	Frequency Amplitude Acceleration No. cycles	10 to 500Hz 0.75mm 10g 10 per axis
Vibration (random) IEC 60068-2-34 Fd	Frequency Spectral density Duration	10 to 500Hz $0.3g^2$/Hz 10 min. in 3 dir.
MIL202F, method 214A	Condition F	20.71g rms
Bump (half sinus) IEC 60068-2-27 Ea	Peak acceleration Shock duration	200g 3ms
Thermal shock IEC 60068-2-14 Na	Temperature change No. cycles	-40°C to +125°C 500
Humidity IEC 60068-2-56 Cb		90% RH @ 70°C Non-condensing
Accelerated damp heat IEC 60068-2-3 Ca	Temperature Humidity Duration	85°C 85% RH 1,000 hours
Telecoms ETS 300-019-1-3 ETS 300-019-2-3	 Feb. 1992	 Classes 3.1 to 3.5 Vibration/shock class 3M5
Ambient (still air) IEC 60068-2-1 low IEC 60068-2-2 high	Unit mounted vertically in enclosed area, with >3cm² copper trace heat-sinking at each output pin on mounting board	-40°C to +85°C
Ambient airflow	>0.3 $msec^{-1}$ local airflow (60lfm)	-40°C to +100°C
Thermal hot spot for system design (See Note 6)	@ full load maximum ambient and system configured for least airflow	Thermocouple tab of main o/p D-Pak diode -40°C to +110°C
Storage temperature IEC 60068-1	Clause 5.3.1	-40°C to +125°C

PACKAGING (STATIC DISSIPATIVE MATRIX TRAY) SPECS.

Dimensions	See Figure 10
Stack height	0.429 inches (10.89mm) typ.
Weight (unladen)	125g (4.4oz) typ.
Maximum temperature	65°C
Surface resistivity	10^5 to $10^{10}\Omega$/square

JEDEC compliant packaging trays ensure that maximum product integrity is guaranteed right up to the customer's process. Packaging trays are intended for 100% automated handling. There should be no need for manual handling of the converter.

10 Watt
Surface mount DC/DC converters

MECHANICAL SPECIFICATIONS		
Nominal dimensions		2.0 x 1.12 x 0.41 inches 50.8 x 28.5 x 10.4 mm
Weight		14g (0.5oz) typ.
Material	Substrate	Alpha level (0.1µm organosilver plate) on copper conductors on Al_2O_3 ceramic.
	Leads	Phosphor Bronze
	Lead plating	60/40 tin/lead
Material flammability		UL94V-0
Max. lead coplanarity		0.004 inches (100µm)
Leadout		SMT Gullwing

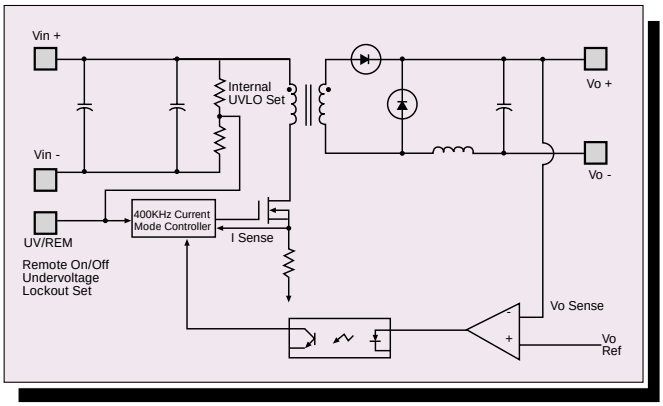


Figure 1 - SXA10 Simplified Schematic

Note 1

To decrease UVLO, connect a resistor from pin 12 (UV/REM) to pin 10 (Vin+). To increase UVLO connect a resistor between pin 11 (Vin-) and pin 12 (UV/REM). Pin 12 must never be connected directly to voltages higher than 7VDC. The same pin operates Remote ON/OFF. The UV/REM pin (pin 12) is internally pulled higher than the Remote on threshold. To turn the unit off use an open collector driver to pull the pin lower than the minimum Remote ON threshold by at least the maximum remote ON/OFF hysteresis. See Application Note for specific details.

Note 2

Operational Insulation, as defined by CSA 22.2 No 950, UL1950 and EN 60950, is designed into this component. The unit is classified for Pollution Degree 2 Environment. Unit top surface is exposed at input voltage potential and will have same category insulation as input. The unit is designed for 'service access' or 'restricted access' as defined by CSA C22.2 No 950, UL1950.

This product is only for inclusion by professional installers within other equipment and must not be operated as a stand alone product.

Note 3

For applications with input voltages between 36 and 75V, and operating ambient temperatures of -10C to 70C the device will deliver an extra 10% output power. The device will continue to meet all specifications listed in this data sheet. Refer to Figure 5.

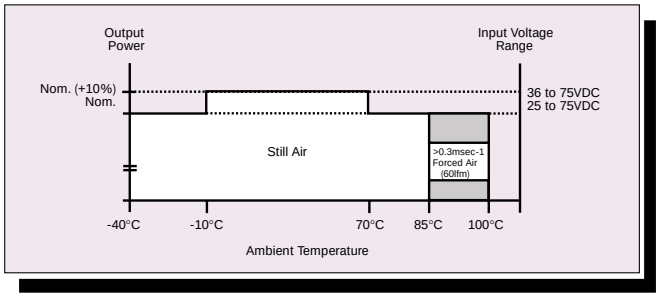


Figure 5 - Output Power Characteristic

Note 4

To trim down connect a resistor between pin 17 (trim) and pin 1 (Vo+). To trim up connect a resistor between pin 2 (Vo-) and pin 17 (trim). See Application Note for specific details.

Note 5

3V3, 5V: Max. capacitive load is limited to 2200µF per rated output Amp to guarantee recovery from overload, @ 75Vin and max. temperature operation. For operation at Vin <65VDC and <70°C ambient; there is no restriction on load capacitance.

12V: See Application Note for more details. Start-up into RC loads is dependant on input voltage and load characteristics at high ambient temperatures.

Note 6

Thermal hot spot is the temperature of the main output diode tab, as shown in Figure 7. This is the optimum measurement point for thermal design considerations when integrating the SXA10 into a system. The tab is at DC potential and may be used with an isolated thermocouple instrument. For a maximally configured system and least airflow, this temperature should stabilise to be less than 110°C. Pin 3 can also be used for thermal hot spot measurements, however its maximum temperature should be less than 95°C.

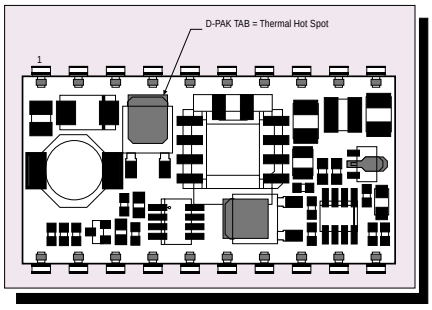


Figure 7 - Thermal Hot Spot

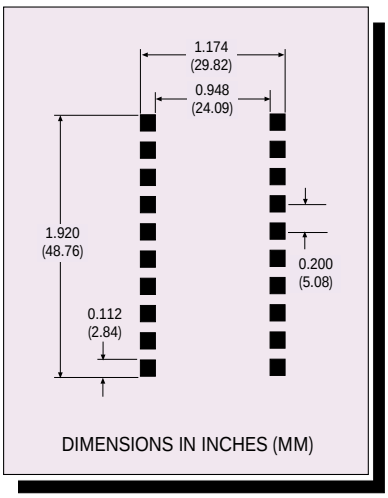
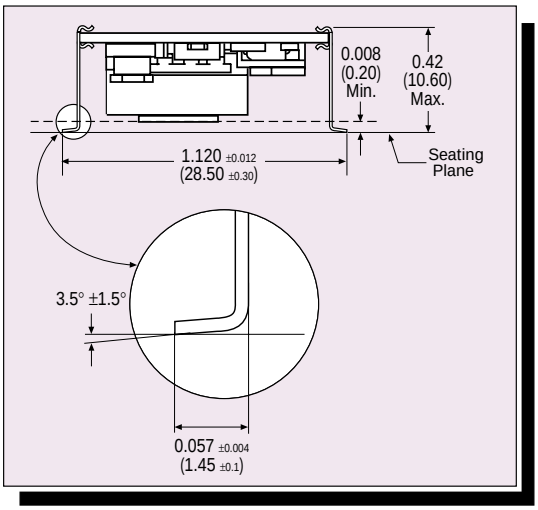


Figure 8 - Recommended Pad Position and Dimension SXA10 Single Output



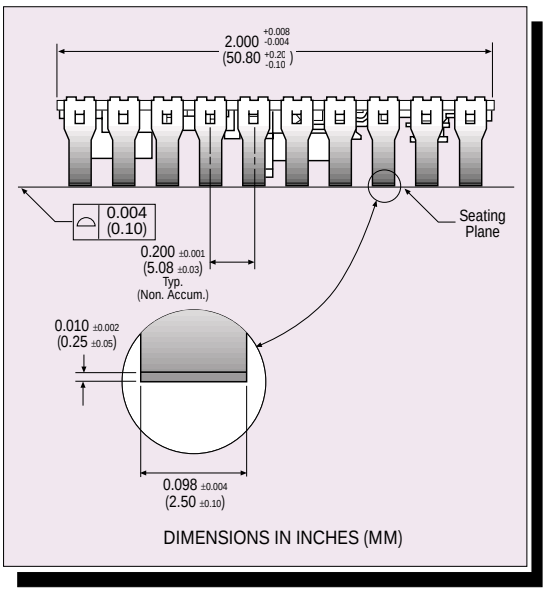


Figure 9 - Dimensioned Product View

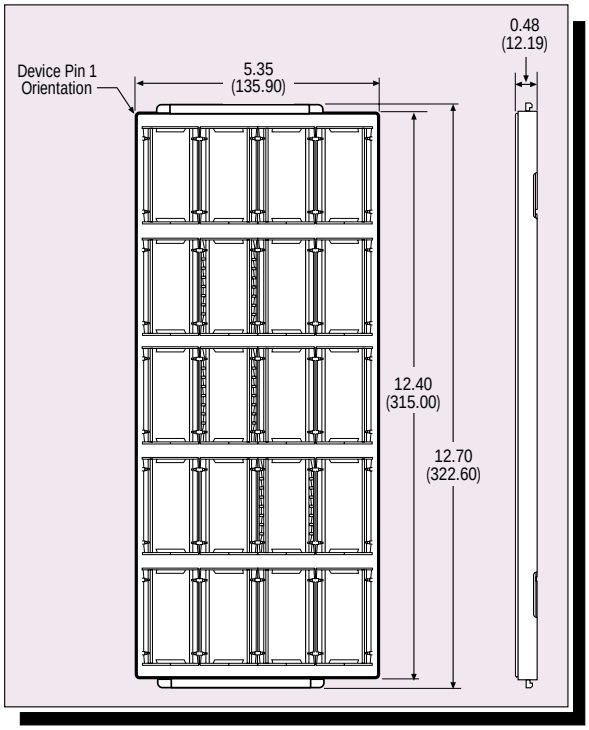


Figure 10 - Matrix Tray Dimensions

Tolerances as per JEDEC standard No. 95-1, section 10.

Note 7

Valid for 48V input, nominal load and 25˚C operation.

Note 8

Component level data is specified for a mounted unit, i.e. includes lead dynamics. System level data may be different due to system and board mounting dynamics.

Note 9

48S12 typically meets level A Quasi peak and level A +5dB Average.

Note 10

For operation at >70% of nominal output current and at <29VDC in; an external series line dampening resistor should be employed. A 0.39Ω resistor should be fitted in series with Vin+. A 1210 package size should be used. The recommended resistor is from KOA; SR73K2ETRDR39F.

Note 11

To order an Evaluation Kit which contains a SXA10 model pre-mounted on a circuit card with test points for easy testing in the laboratory, please add the suffix '-EVAL' to the model number, e.g. SXA10-48S05-EVAL. Please see the SXA10 Evaluation Board user Guide for further details.

Environmental Consideration

Great care has been taken to protect the environment. The units have reduced mass to reduce transportation costs. No encapsulation epoxies are used. The substrate, being ceramic with copper conductors and with only 0.1mm silver pad plating, is environmentally benign. The SnAg component and lead attach solder alloy has 0% lead present. The packaging trays are designed to be both reusable and recyclable.