ASA (10W) Isolated DC/DC Converter Module
Industry Standard Size, 1.25”x0.8”x0.4”
18-36V/36-75V Inputs, 2.5V/3.3V/5V/12V Outputs

The ASA (10W) Isolated DC/DC Converter is Astec’s 2:1 input voltage family for low power applications. With efficiency up to 83% typical for 5V module, this product is allowed to work at operating temperature range from -40ºC to 60ºC and an input voltage range of 2:1. Single-output models are available for a wide range of applications in telecommunication, transportation equipment, etc.. Housed in small package, 1.25”x0.8”x0.4”, with industry standard pinout, ASA family eases the PCB designs and mechanical designs of customers’ end products.

Industry Standard Size
1.25” ×0.80” × 0.40”

Special Features

- **2：1 input range**
- **High efficiency, 83%@5V**
- **-40°C to 85°C case surface operating temperature**
- **Input / Output isolation 1.5KVdc**
- **Low output ripple and noise**
- **Shielded metal case with size (1.25”x0.8”x0.4”)**
- **Industrial standard pinout**
- **Lead-free soldering pins**
- **Fixed switching frequency (350KHz)**
- **Built-in input filter meets EN55022 / FCC Class A without external components**

Environmental Specifications

- **Operating temperature: -40°C to +60°C**
- **Storage temperature: -55°C to +105°C**
- **MTBF: >1 million hours**
- **RoHS Compliant**

Electrical Parameters

Input

Input range	**18-36 VDC; 36-75 VDC**
Input Surge	**50V / 100ms; 100V / 100ms**
Efficiency	**83% @5V (Typical)**

Output

Regulation (Line, Load, Temp)	**<2%**
Ripple and noise	**2% typical (100mVp-p max @5V)**
Transient Response	**5% max deviation with 50% load to full load 300uS (max) recovery**
Short Circuit Protection	**Indefinite**

Safety

UL, cUL 60950 Recognized (File no. E186249)
EN 60950
IEC 60950

ASA (10W) SERIES

THIS SPECIFICATION COVERS THE REQUIREMENTS
FOR AN INDUSTRY STANDARD PACKAGE OF 1.25”x0.8”x0.4”,
2:1 INPUT RANGE, 10W, SINGLE OUTPUT ISOLATED DC/DC CONVERTER

PART NUMBERS

MODEL NAME / SIS CODE	Nominal Vin / Range of Vin	Vout / Iout
ASA03G24-LS	**24V / 18-36V**	**2.5V / 3A**
ASA03F24-LS	**24V / 18-36V**	**3.3V / 3A**
ASA02A24-LS	**24V / 18-36V**	**5V / 2A**
ASA00B24-LS	**24V / 18-36V**	**12V / 0.833A**
ASA03G48-LS	**48V / 36-75V**	**2.5V / 3A**
ASA03F48-LS	**48V / 36-75V**	**3.3V / 3A**
ASA02A48-LS	**48V / 36-75V**	**5V / 2A**
ASA00B48-LS	**48V / 36-75V**	**12V / 0.833A**

ELECTRICAL SPECIFICATIONS

Unless otherwise indicated, specifications apply over all operating input voltage and temperature conditions. Standard test condition on a single unit:-

Tambient :	25°C
+Vin :	24V ±2% (ASAxxx24-LS)
	48V ±2% (ASAxxx48-LS)
–Vin :	Return pin for +Vin
+Vout :	Connect to load
–Vout :	Connect to load (return)

ABSOLUTE MAXIMUM RATINGS

Stresses in excess of the absolute maximum ratings can cause permanent damage to the device. These are absolute stress ratings only. Functional operation of the device is not implied at these or any other conditions in excess of those given in the operational sections of the IPS. Exposure to absolute maximum ratings for extended periods can adversely affect device reliability.

Parameter	Device	Symbol	Min	Typ	Max	Unit
a) Input Voltage:						
Continuous:	ASAxxx24-LS	V_I	0	-	36	Vdc
Transient (100ms)	ASAxxx24-LS	$V_{I, trans}$	0	-	50	Vdc
Continuous:	ASAxxx48-LS	V_I	0	-	75	Vdc
Transient (100ms)	ASAxxx48-LS	$V_{I, trans}$	0	-	100	Vdc
b) Operating Temperature						
Ambient	All	T_A	-40	-	60	ºC
Case Surface		T_C	-40	-	90	ºC
c) Storage Temperature	All	T_{STG}	-55	-	105	ºC
d) Operating Humidity	All	-	-	-	95	%
e) I/O Isolation (Conditions : 0.5mA for 60 sec) Input-Output	All	-	-	-	1500	Vdc
f) Output Power	2.5V	$P_{o, max}$	-	-	7.5	W
	Others	$P_{o, max}$	-	-	10	W

INPUT SPECIFICATIONS

Parameter	Device	Symbol	Min	Typ	Max	Unit
a) Operating Input Voltage	ASAxxx24-LS	V_I	18	24	36	V_{dc}
	ASAxxx48-LS	V_I	36	48	75	V_{dc}
b) Maximum Input Current						
ASAxxx24-LS	2.5V	$I_{I, max}$	-	-	1.5	A
(V_I = 0 to $V_{I, max}$; Io = $I_{o, max}$)	3.3V	$I_{I, max}$	-	-	1.5	A
	5V	$I_{I, max}$	-	-	1.5	A
	12V	$I_{I, max}$	-	-	1.6	A
ASAxxx48-LS	2.5V	$I_{I, max}$	-	-	1	A
(V_I = 0 to $V_{I, max}$; Io = $I_{o, max}$)	3.3V	$I_{I, max}$	-	-	1	A
	5V	$I_{I, max}$	-	-	1	A
	12V	$I_{I, max}$	-	-	1	A
c) No Load Input Power (V_I = $V_{I, nom}$)	All	-	-	-	0.5	W
d) Recommended External Fuse Ratings						
ASAxxx24-LS	2.5V		-	2	-	A
	3.3V		-	2	-	A
	5V		-	2	-	A
	12V		-	2	-	A
ASAxxx48-LS	2.5V		-	1.5	-	A
	3.3V		-	1.5	-	A
	5V		-	1.5	-	A
	12V		-	1.5	-	A

CAUTION: This power module is not internally fused. An input fuse must always be used.

OUTPUT SPECIFICATIONS

Parameter	Device	Symbol	Min	Typ	Max	Unit
a) Output Voltage Setpoint ($V_I = V_{I, min}$ to $V_{I, max}$; Io = $I_{o, max}$; T_A = 25 ºC)	2.5V	$V_{o, set}$	2.45	2.50	2.55	V_{dc}
	3.3V	$V_{o, set}$	3.23	3.30	3.37	V_{dc}
	5V	$V_{o, set}$	4.9	5.00	5.10	V_{dc}
	12V	$V_{o, set}$	11.76	12.00	12.24	V_{dc}
b) Output Regulation: Line ($V_I = V_{I, max}$ to $V_{I, min}$; Io = $I_{o, max}$)	All	-	-	-	0.5	%
Load ($V_I = V_{I, nom}$; Io = $I_{o, min}$ to $I_{o, max}$)	All	-	-	-	1	%
Temperature (Tc = -40ºC to +85ºC)	All	-	-	-	1	%Vo
c) Output Ripple and Noise (Across 1µF @50V, X7R ceramic capacitor & 10µF @25V tantalum capacitor) See Figure 1. Peak-to-Peak (5 Hz to 20 MHz)	2.5V	-	-	-	100	mVp-p
	3.3V	-	-	-	100	mVp-p
	5V	-	-	-	100	mVp-p
	12V	-	-	-	120	mVp-p
d) Rated Output Current	2.5V	Io	300	-	3000	mA
	3.3V	Io	300	-	3000	mA
	5V	Io	200	-	2000	mA
	12V	Io	80	-	833	mA
e) Efficiency ($V_I = V_{I, nom}$; $I_{o, max}$; T_A = 25°C)	2.5V	-	-	77	-	%
	3.3V	-	-	79	-	%
	5V	-	-	83	-	%
	12V	-	-	83	-	%
f) Switching Frequency	All	-	315	350	385	KHz
g) Dynamic Response : (ΔIo/Δt = 0.08A/µs ; $V_I = V_{I, nom}$; T_A = 25°C)						
Load Change from Io = 50% to 100% of $I_{o, max}$	2.5V/3.3V/5V	-	-	-	5	%Vo
	12V	-	-	-	2	%Vo
Peak Deviation Settling Time (to $V_{o, nom}$)	All	-	-	-	300	µsec
h) Output Voltage Overshoot (Io = $I_{o, max}$; T_A = 25°C)	All	-	-	1	5	%Vo

FEATURE SPECIFICATIONS

Parameter	Device	Symbol	Min	Typ	Max	Unit
Undervoltage Lockout						
Turn-on Point	ASAxxx24-LS	-	-	-	18	V
	ASAxxx48-LS	-	-	-	36	V
Turn-off Point	ASAxxx24-LS	-	-	9	-	V
	ASAxxx48-LS	-	-	20	-	V
Isolation Capacitance	All	-	-	1000	-	PF
Isolation Resistance	All	-	10	-	-	MΩ
Calculated MTBF ($Io = I_{o,max}$; T_A = 25°C)	All	-	1M	-	-	Hours
Weight	All	-	-	-	20	g

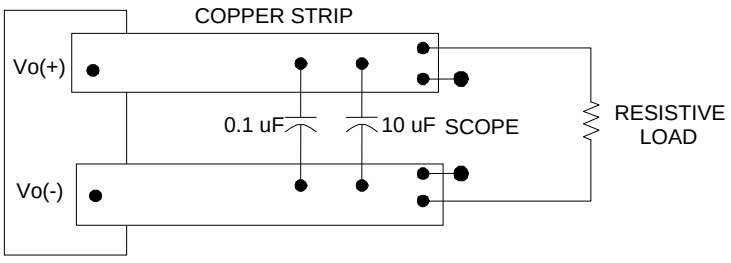
Basic Operation and Features

The ASA converters were designed specifically to address applications where high power density is required.
These modules provide 1500V isolation and operate from the input ranges of 18V-36V and 36V-75V with standard features such as OCP.

Output Overcurrent Protection

To provide protection in an output overload or short circuit condition, the converter is equipped with current limiting circuitry and can endure the fault condition for an unlimited duration. At the point of current-limit inception, the converter goes into “Hiccup Mode”, causing the output current to be limited both in peak and duration. The converter operates normally once the output current is brought back into its specified range.

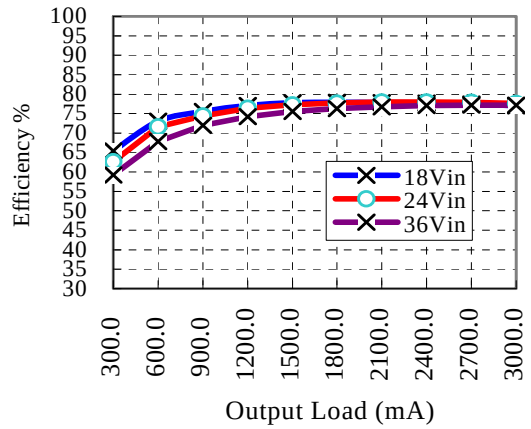
TEST SETUP



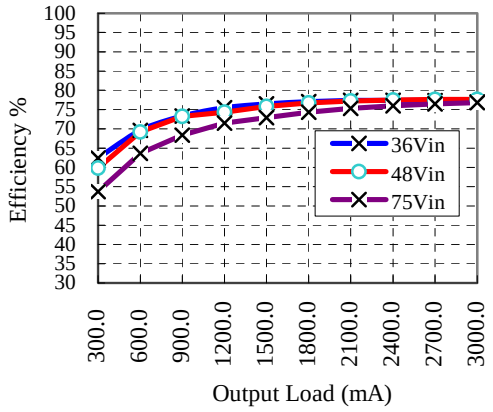
Note: Use a 0.1µF @50V X7R ceramic capacitor and a 10µF @25V tantalum capacitor. Scope measurement should be made using a BNC socket. Position the load between 51 mm and 76 mm (2 in. and 3 in.) from module.

Figure 1 : Peak-to-Peak Output Noise Measurement Test Setup

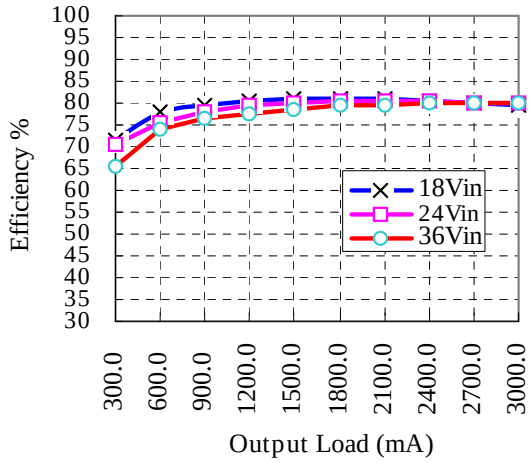
Performance Curves – Efficiency Curve



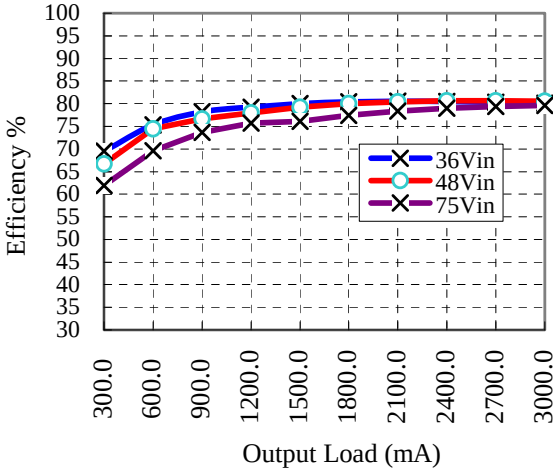
Efficiency vs. Load @ +25° Ambient, ASA03G24-LS



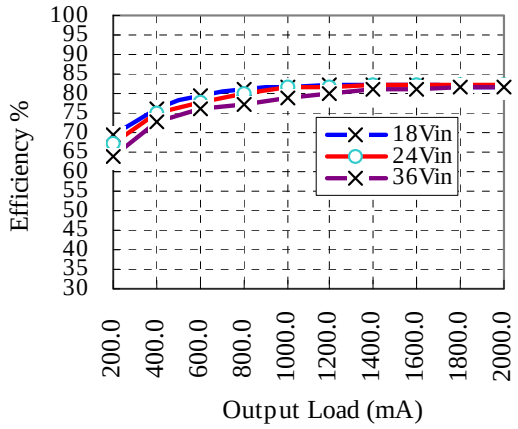
Efficiency vs. Load @ +25° Ambient, ASA03G48-LS



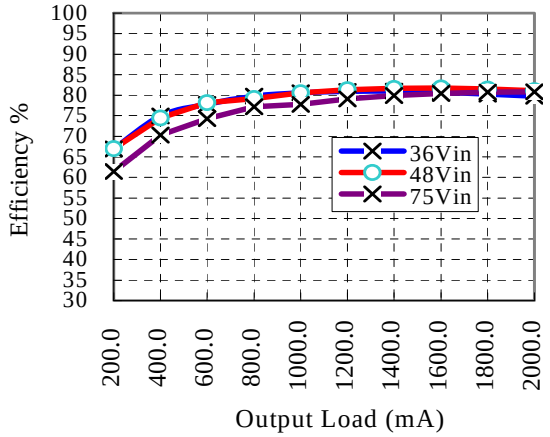
Efficiency vs. Load @ +25° Ambient, ASA03F24-LS



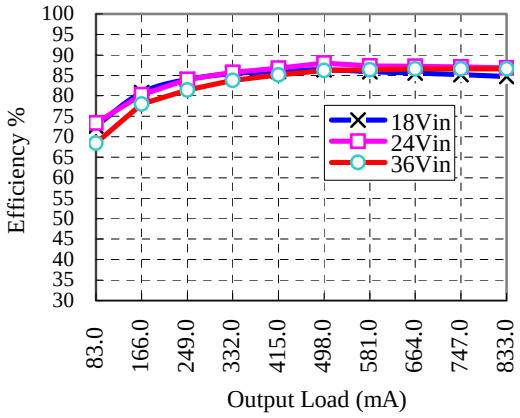
Efficiency vs. Load @ +25° Ambient, ASA03F48-LS



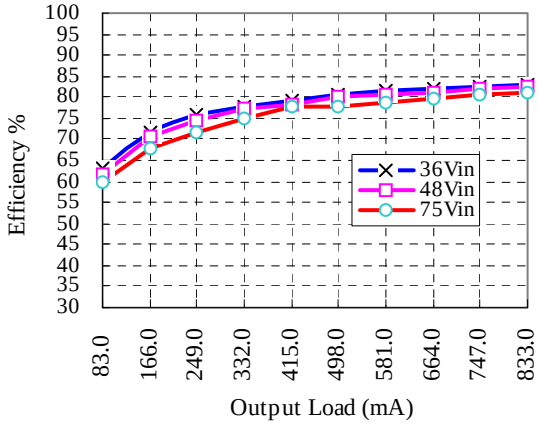
Efficiency vs. Load @ +25° Ambient, ASA02A24-LS



Efficiency vs. Load @ +25° Ambient, ASA02A48-LS

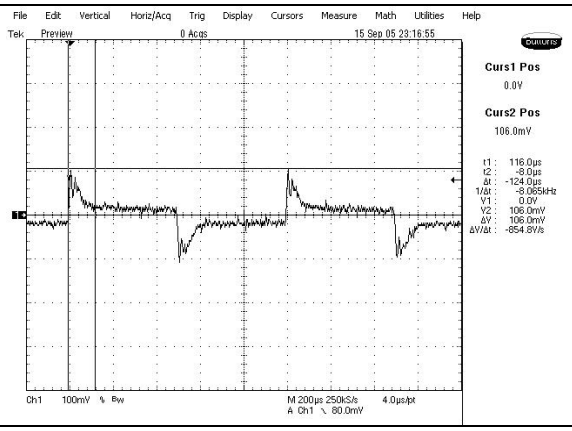


Efficiency vs. Load @ +25° Ambient, ASA00B24-LS

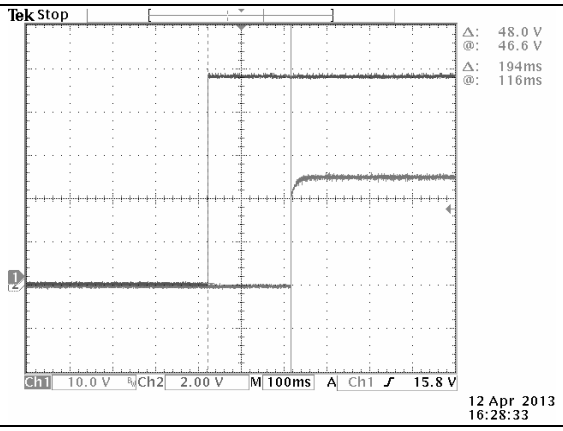


Efficiency vs. Load @ +25° Ambient, ASA00B48-LS

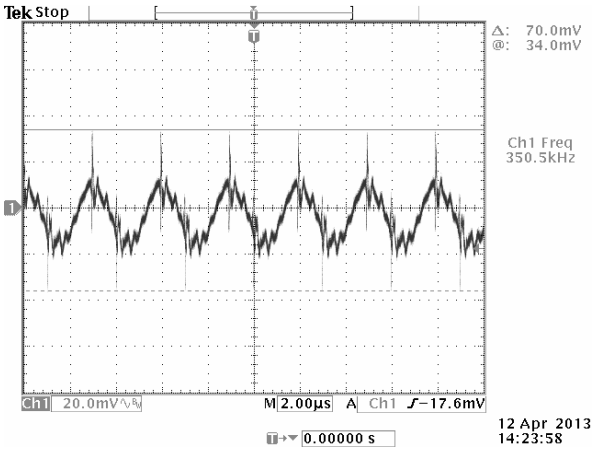
Performance Curves



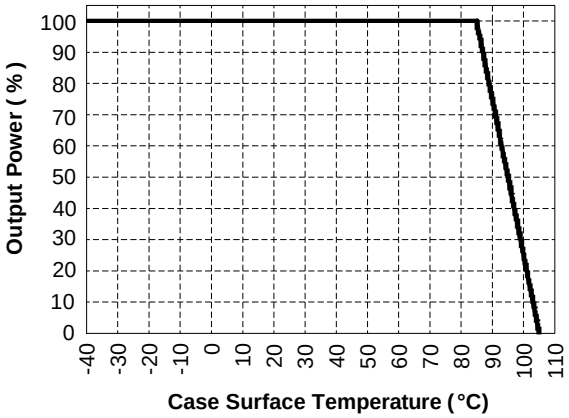
Transient Response – 50% to 100% load (ASA02A48-LS)



Start-Up Time (ASA02A48-LS)



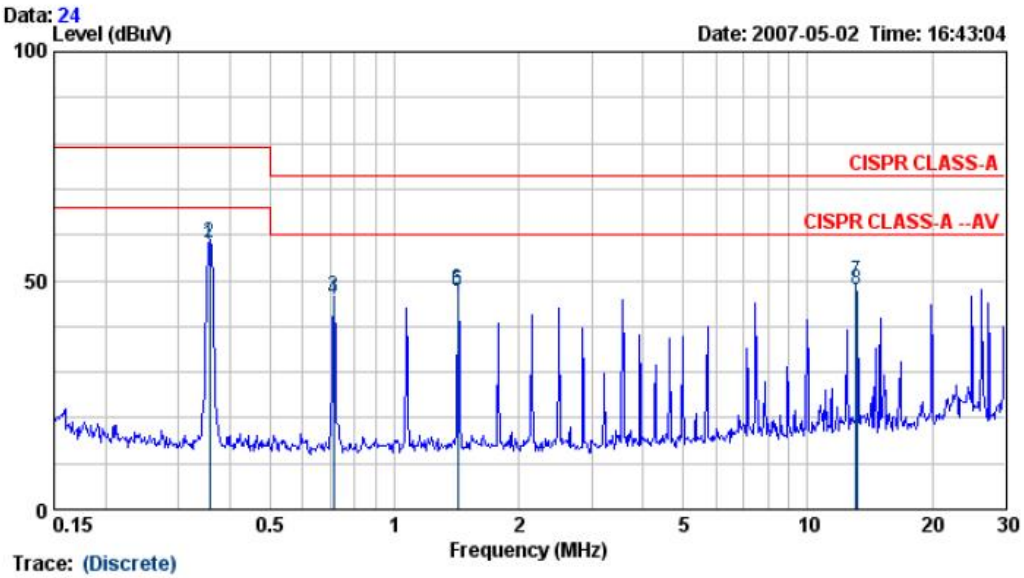
Ripple & Noise (ASA02A48-LS)



Power Derating

Conducted EMI Performance

EUT : Converter Power:24Vdc
M/N: ASA02A24-L Test mode : FULL LOAD
POL: LINE ENGINEER : ERIC Temp: 27.8 Humidity : 58%

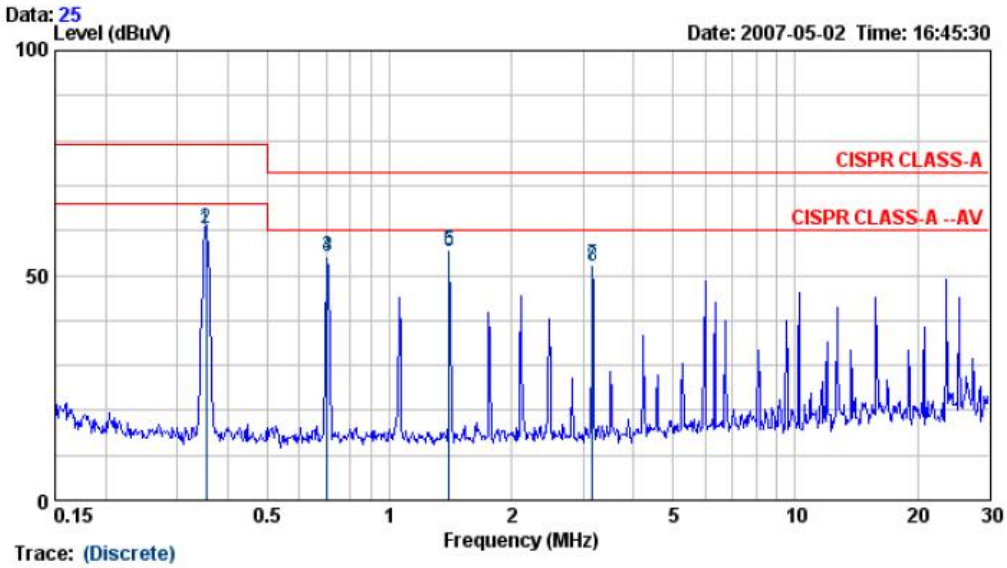


Freq. MHz	LISN Factor dB	Cable Loss dB	Meter Reading dBuV	Measured Level dBuV	Limits dBuV	Over Limits dBuV	Detector
0.358	9.88	0.05	48.08	58.01	79.00	-20.99	QP
0.358	9.88	0.05	48.28	58.21	66.00	-7.79	AVERAGE
0.712	9.90	0.04	36.43	46.37	60.00	-13.63	AVERAGE
0.712	9.90	0.04	36.00	45.94	73.00	-27.06	QP
1.422	9.95	0.05	37.79	47.79	73.00	-25.21	QP
1.422	9.95	0.05	37.86	47.86	60.00	-12.14	AVERAGE
13.108	9.90	0.35	39.68	49.93	73.00	-23.07	QP
13.129	9.90	0.35	37.92	48.17	60.00	-11.83	AVERAGE

EUT : Converter Power:24Vdc

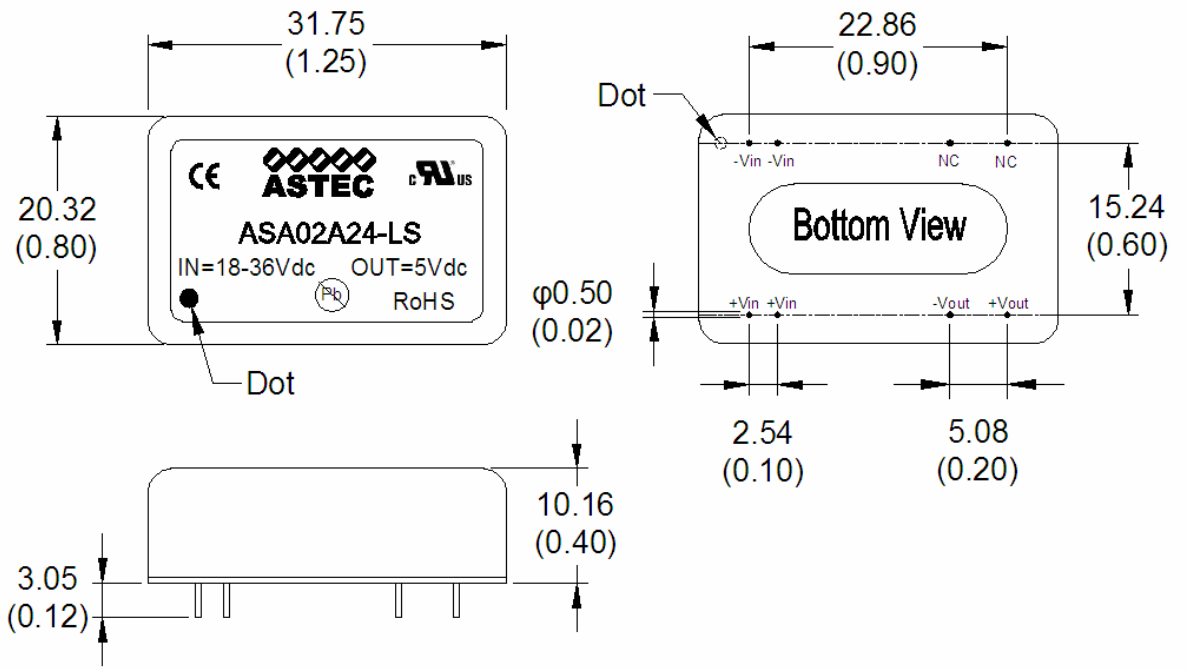
M/N: ASA02A24-L Test mode : FULL LOAD

POL: NEUTRAL ENGINEER : ERIC Temp: 27.8 Humidity : 58%

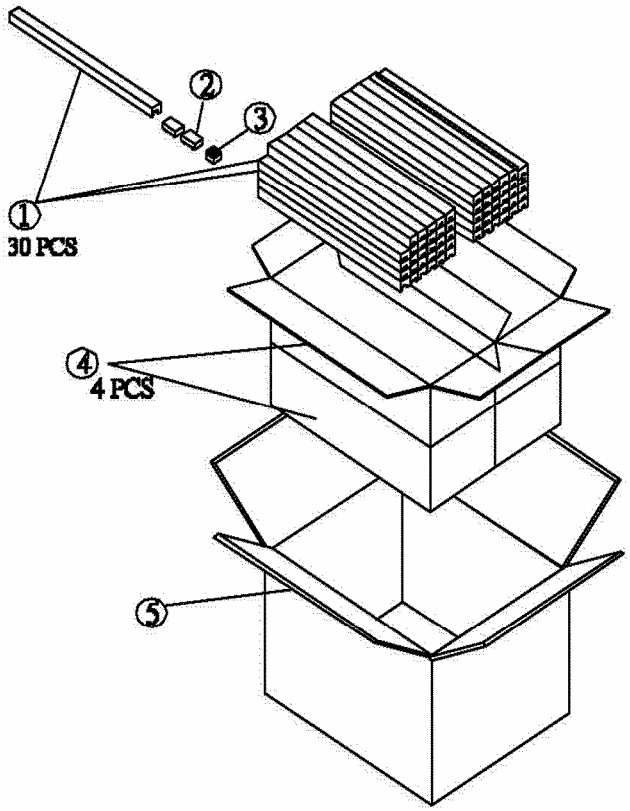


	Freq. MHz	LISN Factor dB	Cable Loss dB	Meter Reading dBuV	Measured Level dBuV	Limits dBuV	Over Limits dBuV	Detector
	0.354	9.88	0.05	50.19	60.12	79.00	-18.88	QP
@	0.354	9.88	0.05	50.51	60.44	66.00	-5.56	AVERAGE
@	0.702	9.90	0.04	44.41	54.35	60.00	-5.65	AVERAGE
	0.702	9.90	0.04	44.21	54.15	73.00	-18.85	QP
	1.406	9.95	0.04	45.32	55.31	73.00	-17.69	QP
@	1.406	9.95	0.04	45.69	55.68	60.00	-4.32	AVERAGE
	3.159	9.87	0.10	42.37	52.33	60.00	-7.67	AVERAGE
	3.159	9.87	0.10	41.93	51.89	73.00	-21.11	QP

Mechanical Dimensions and Module Pin Assignment



Package Information



1. PACKING TUBE: 345*22.2*16.7mm ; ONE TUBE = 10 PCS
2. PRODUCTS: ASA SERIES
3. STOPPER
4. INNER CARTON: 388*159*263mm
   ONE INNER CARTON = 30 TUBES = 300PCS
5. OUTER CARTON: 405*334*263mm
   ONE OUTER CARTON = 4 INNER CARTONS = 1200PCS

STANDARD TOLERANCE LIMITS UNLESS OTHER SPECIFIED.	
RANGE	TOLERANCE
>0~3	±0.10
>3~6	±0.15
>6~30	±0.18
>30~120	±0.20

Recommended Lead-Free Wave Soldering Temperature Profile