ASA (6W) Isolated DC/DC Converter Module
Industry Standard Size, 1.25”x0.8”x0.4”
9-36V/18-75V Inputs, 3.3V/5V/±5V/12V/±12V/15V/±15V Outputs

The ASA (6W) Isolated DC/DC Converter is Astec’s 4:1 wide input voltage family for low power applications. With efficiency up to 81% typical for 5V module, this product is allowed to work at operating temperature range from -40ºC to 71ºC and a wide input voltage range of 4:1. Single-output and dual-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

- **Wide 4：1 input range**
- **High efficiency, 81%@5V**
- **-40°C to 90°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 (200KHz)**
- **Built-in input filter meets EN55022 Class A / FCC part 15 Level A without external components**
- **Recommended external filter configuration can be added to meet EN55022 Class B / FCC part 15 Level B**

Environmental Specifications

- **Operating temperature: -40°C to +71°C**
- **Storage temperature: -55°C to +105°C**
- **MTBF: >1 million hours**
- **RoHS Compliant**

Electrical Parameters

Input

Input range	**9-36 VDC; 18-75 VDC**
Input Surge	**50V / 100ms; 100V / 100ms**
Efficiency	**81% @5V (Typical)**

Output

Regulation (Line, Load, Temp)	**<2%**
Ripple and noise	**2% typical (100mV p-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 (6W) SERIES

THIS SPECIFICATION COVERS THE REQUIREMENTS
FOR AN INDUSTRY STANDARD PACKAGE OF 1.25”x0.8”x0.4”, 4:1 INPUT RANGE,
6W, SINGLE OUTPUT AND DUAL OUTPUT ISOLATED DC/DC CONVERTER

PART NUMBERS

MODEL NAME / SIS CODE	Nominal Vin / Range of Vin	Vout / Iout
ASA01F18-LS	**24V / 9-36V**	**3.3V / 1.2A**
ASA01A18-LS	**24V / 9-36V**	**5V / 1A**
ASA00AA18-LS	**24V / 9-36V**	**±5V / ±0.5A**
ASA00B18-LS	**24V / 9-36V**	**12V / 0.5A**
ASA00BB18-LS	**24V / 9-36V**	**±12V / ±0.25A**
ASA00C18-LS	**24V / 9-36V**	**15V / 0.4A**
ASA00CC18-LS	**24V / 9-36V**	**±15V / ±0.2A**
ASA01F36-LS	**48V / 18-75V**	**3.3V / 1.2A**
ASA01A36-LS	**48V / 18-75V**	**5V / 1A**
ASA00AA36-LS	**48V / 18-75V**	**±5V / ±0.5A**
ASA00B36-LS	**48V / 18-75V**	**12V / 0.5A**
ASA00BB36-LS	**48V / 18-75V**	**±12V / ±0.25A**
ASA00C36-LS	**48V / 18-75V**	**15V / 0.4A**
ASA00CC36-LS	**48V / 18-75V**	**±15V / ±0.2A**

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% (ASAxxxx18-LS)
	48V ±2% (ASAxxxx36-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:	ASAxxxx18-LS	V_I	0	-	36	Vdc
Transient (100ms)	ASAxxxx18-LS	$V_{I, trans}$	0	-	50	Vdc
Continuous:	ASAxxxx36-LS	V_I	0	-	75	Vdc
Transient (100ms)	ASAxxxx36-LS	$V_{I, trans}$	0	-	100	Vdc
b) Operating Temperature						
Ambient	All	T_A	-40		71	ºC
Case Surface		T_C	-40	-	100	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	3.3V	$P_{o, max}$	-	-	4	W
	5V / ±5V	$P_{o, max}$	-	-	5	W
	12V / ±12V	$P_{o, max}$	-	-	6	W
	15V / ±15V	$P_{o, max}$	-	-	6	W

INPUT SPECIFICATIONS

Parameter	Device	Symbol	Min	Typ	Max	Unit
a) Operating Input Voltage	ASAxxxx18-LS	V_I	9	24	36	V_{dc}
	ASAxxxx36-LS	V_I	18	48	75	V_{dc}
b) Maximum Input Current						
ASAxxxx18-LS	3.3V	$I_{I, max}$	-	-	1	A
(V_I = 0 to $V_{I, max}$; Io = $I_{o, max}$)	5V / ±5V	$I_{I, max}$	-	-	1.5	A
	12V / ±12V	$I_{I, max}$	-	-	2	A
	15V / ±15V	$I_{I, max}$	-	-	2	A
ASAxxxx36-LS	3.3V	$I_{I, max}$	-	-	0.6	A
(V_I = 0 to $V_{I, max}$; Io = $I_{o, max}$)	5V / ±5V	$I_{I, max}$	-	-	1	A
	12V / ±12V	$I_{I, max}$	-	-	1	A
	15V / ±15V	$I_{I, max}$	-	-	1	A
c) No Load Input Power (V_I = $V_{I, nom}$)	All	-	-	-	0.4	W
d) Recommended External Fuse Ratings						
ASAxxxx18-LS	3.3V		-	1.5	-	A
	5V / ±5V		-	2	-	A
	12V / ±12V		-	2.5	-	A
	15V / ±15V		-	2.5	-	A
ASAxxxx36-LS	3.3V		-	1	-	A
	5V / ±5V		-	1.5	-	A
	12V / ±12V		-	1.5	-	A
	15V / ±15V		-	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	3.3V	$V_{o, set}$	3.23	3.30	3.37	V_{dc}
($V_I = V_{I, min}$ to $V_{I, max}$; Io = $I_{o, max}$;	5V	$V_{o, set}$	4.90	5.00	5.10	V_{dc}
T_A = 25 ºC)	12V	$V_{o, set}$	11.76	12.00	12.24	V_{dc}
	15V	$V_{o, set}$	14.70	15.00	15.30	V_{dc}
	±5V	$V_{o, set}$	±4.90	±5.00	±5.10	V_{dc}
	±12V	$V_{o, set}$	±11.76	±12.00	±12.24	V_{dc}
	±15V	$V_{o, set}$	±14.70	±15.00	±15.30	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	-	-	-	0.5	%
Cross ($V_I = V_{I, nom}$; Io = $+I_{o, max}$, $-I_{o, min}$ or $+I_{o, min}$, $-I_{o, max}$ to $+I_{o, max}$, $-I_{o, max}$)	±5V/±12V/±15V	-	-	-	4	%
Temperature (Tc = -40ºC to +90ºC)	All	-	-	-	1.0	%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)	3.3V/5V/±5V	-	-	-	100	mVp-p
	12V/±12V/15V/±15V	-	-	-	120	mVp-p
d) Rated Output Current						
Single Output	3.3V	Io	120	-	1200	mA
	5V	Io	100	-	1000	mA
	12V	Io	50	-	500	mA
	15V	Io	40	-	400	mA
Dual Output	±5V	Io	±50	-	±500	mA
	±12V	Io	±25	-	±250	mA
	±15V	Io	±20	-	±200	mA
e) Efficiency						
($V_I = V_{I, nom}$; $I_{o, max}$; T_A = 25°C)	3.3V	-	-	78	-	%
	5V	-	-	81	-	%
	12V	-	-	82	-	%
	15V	-	-	83	-	%
	±5V	-	-	82	-	%
	±12V	-	-	83	-	%
	±15V	-	-	83	-	%
f) Switching Frequency	All	-	180	200	220	KHz

OUTPUT SPECIFICATIONS (Cont.)

Parameter	Device	Symbol	Min	Typ	Max	Unit
g) External Load Capacitance						
Single Output	3.3V	-	-	-	300	uF
	5V	-	-	-	200	uF
	12V	-	-	-	80	uF
	15V	-	-	-	33	uF
Dual Output	±5V	-	-	-	±200	uF
	±12V				±22	uF
	±15V				±10	uF
h) Dynamic Response : ($\Delta Io/\Delta t = 0.08A/\mu s$; $V_I = V_{I, nom}$; $T_A = 25°C$)						
Load Change from Io = 50% to 100% of $I_{o, max}$	3.3V/5V/±5V	-	-	-	5	%Vo
	12V/±12V/15V/±15V	-	-	-	2	%Vo
Peak Deviation Settling Time (to $V_{o, nom}$)	All	-	-	-	300	µsec
i) Output Voltage Overshoot ($Io = I_{o, max}$; $T_A = 25°C$)	All	-	-	1	4	%Vo

FEATURE SPECIFICATIONS

Parameter	Device	Symbol	Min	Typ	Max	Unit
Undervoltage Lockout						
Turn-on Point	ASAxxxx18-LS	-	-	-	9	V
	ASAxxxx36-LS	-	-	-	18	V
Turn-off Point	ASAxxxx18-LS	-	-	5	-	V
	ASAxxxx36-LS	-	-	10	-	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

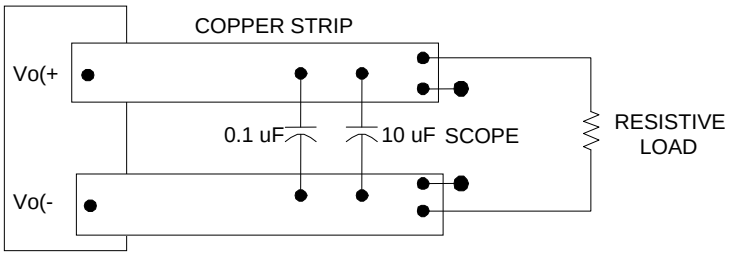
Basic Operation and Features

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 9V-36V and 18V-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.

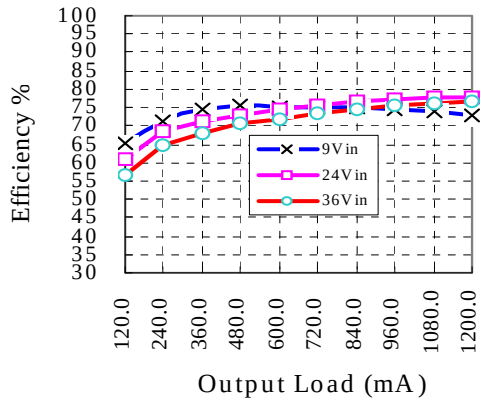
TEST SETUP



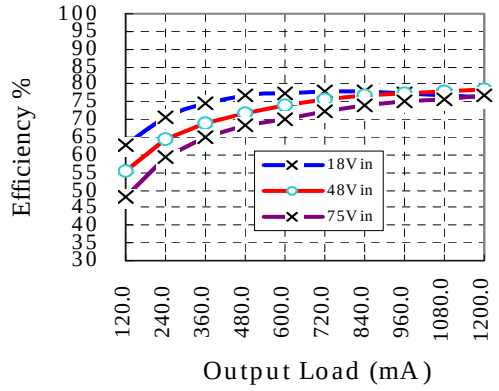
Note: Use a 0.1µF @50V X7R ceramic capacitor and a 10µF @25V tantalum capacitor. Scope measurement should be made using a BNC socket. Position the load between 51 mm and 76 mm (2 in. and 3 in.) from module.

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

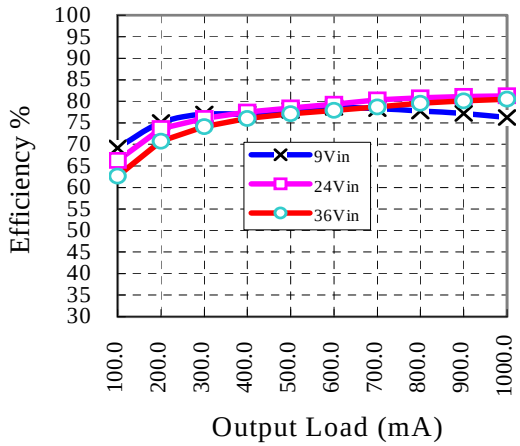
Performance Curves – Efficiency Curve



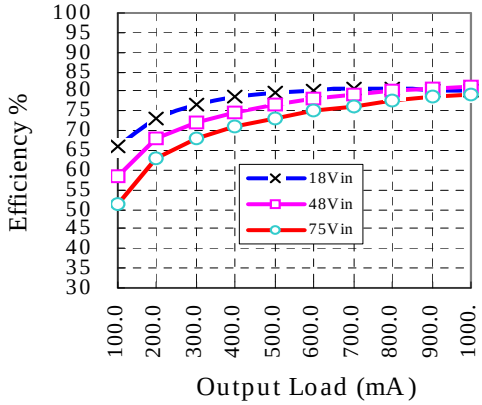
Efficiency vs. Load @ +25° Ambient, ASA01F18-LS



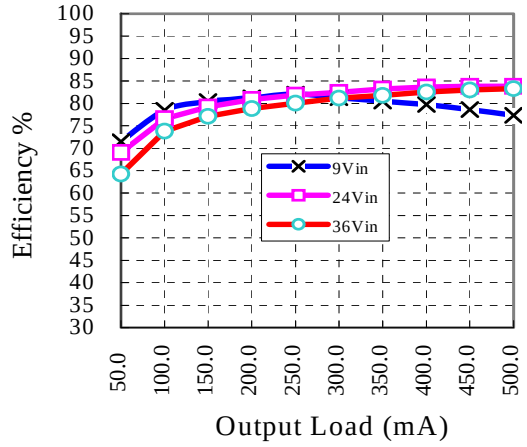
Efficiency vs. Load @ +25° Ambient, ASA01F36-LS



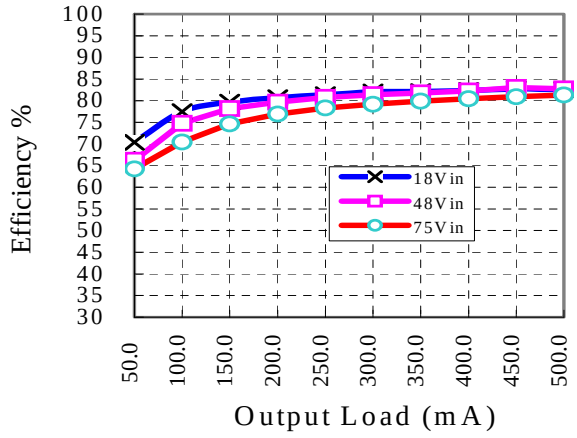
Efficiency vs. Load @ +25° Ambient, ASA01A18-LS



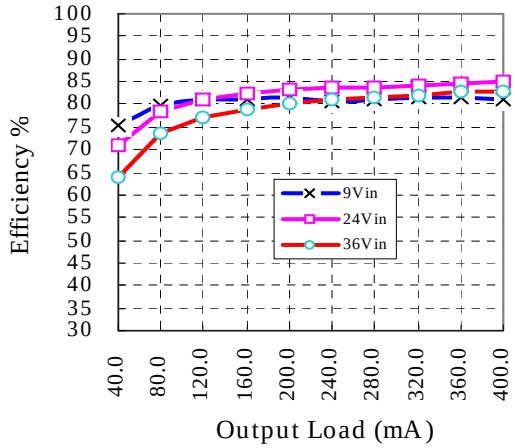
Efficiency vs. Load @ +25° Ambient, ASA01A36-LS



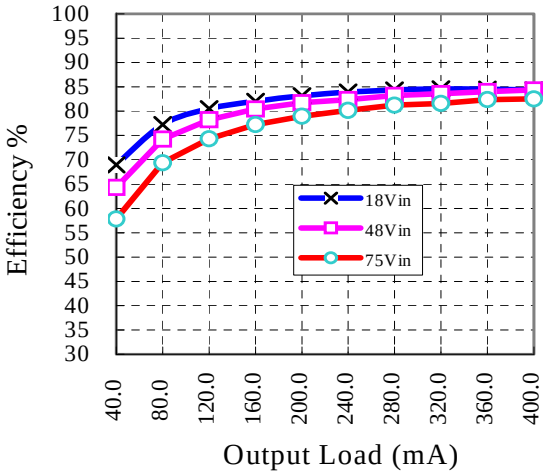
Efficiency vs. Load @ +25° Ambient, ASA00B18-LS



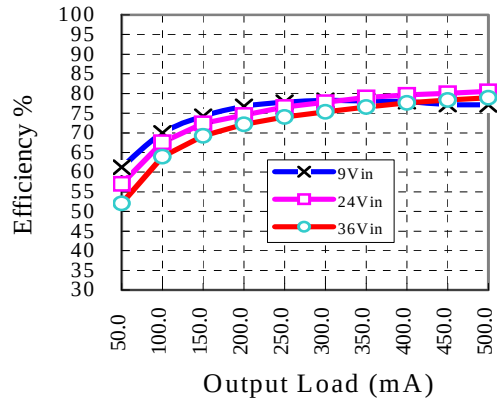
Efficiency vs. Load @ +25° Ambient, ASA00B36-LS



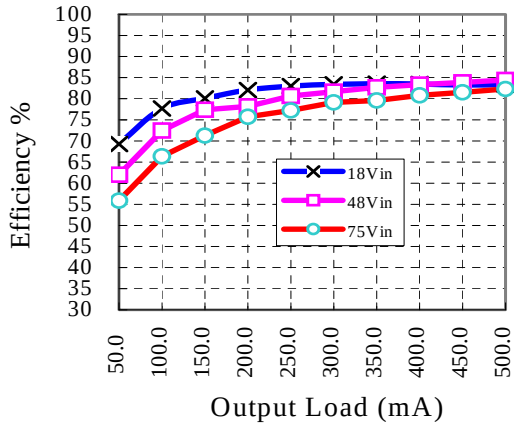
Efficiency vs. Load @ +25° Ambient, ASA00C18-LS



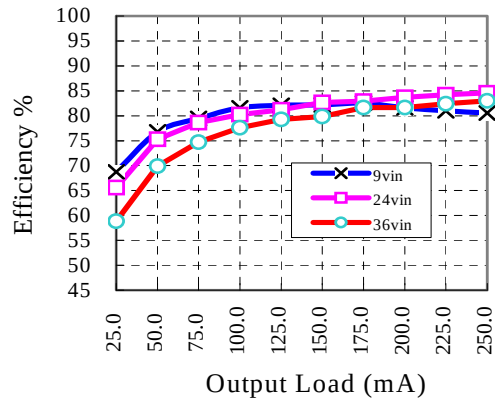
Efficiency vs. Load @ +25° Ambient, ASA00C36-LS



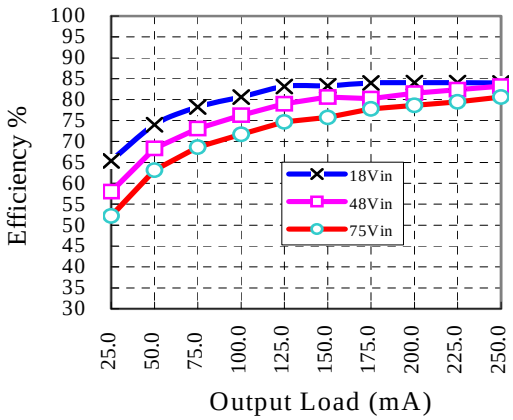
Efficiency vs. Load @ +25° Ambient, ASA00AA18-LS



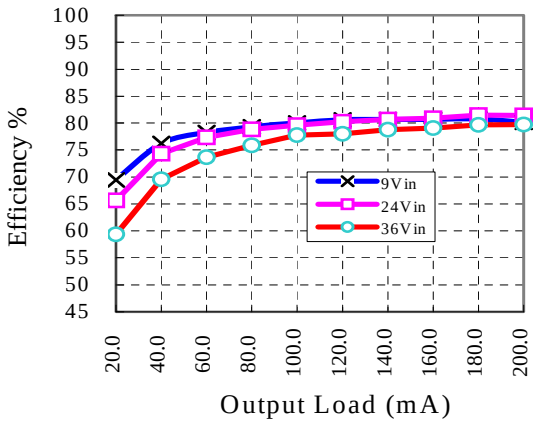
Efficiency vs. Load @ +25° Ambient, ASA00AA36-LS



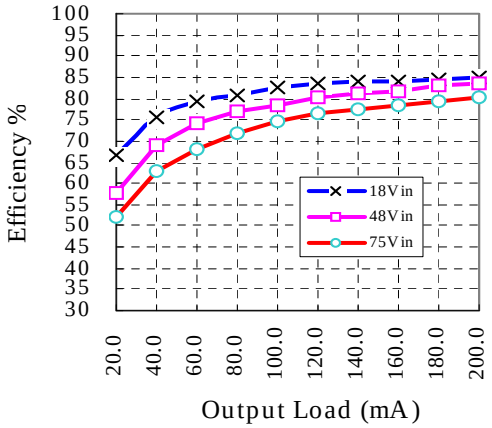
Efficiency vs. Load @ +25° Ambient, ASA00BB18-LS



Efficiency vs. Load @ +25° Ambient, ASA00BB36-LS

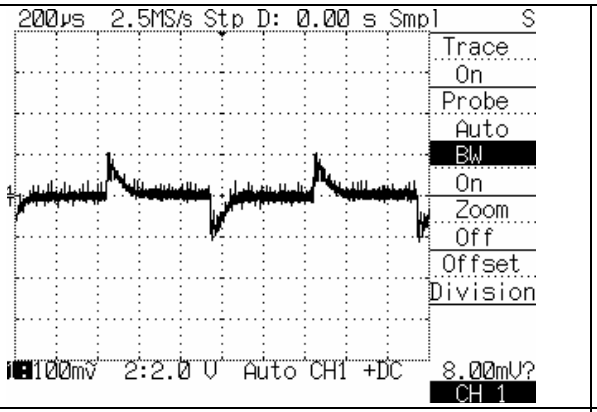


Efficiency vs. Load @ +25° Ambient, ASA00CC18-LS

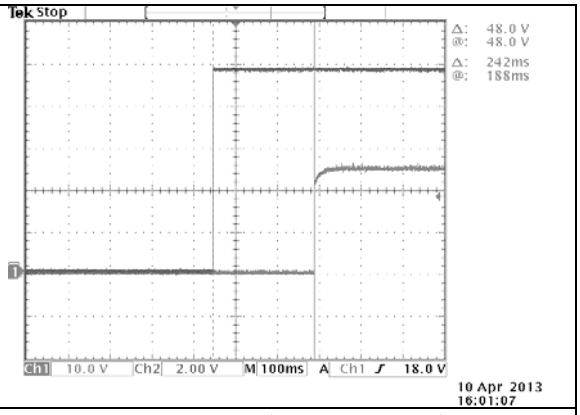


Efficiency vs. Load @ +25° Ambient, ASA00CC36-LS

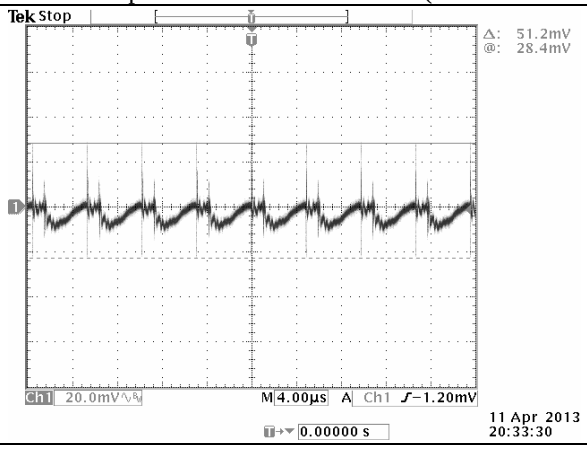
Performance Curves



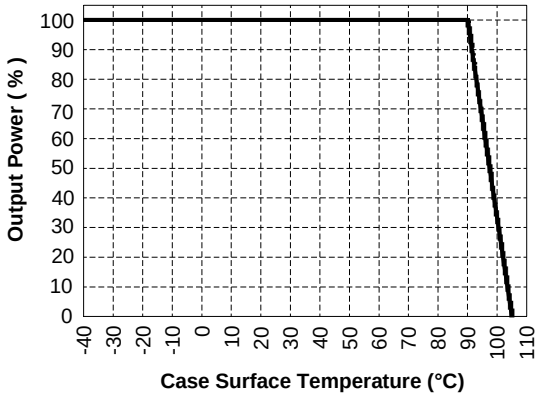
Transient Response – 50% to 100% load (ASA01A36-LS)



Start-Up Time (ASA01A36-LS)



Ripple & Noise (ASA01A36-LS)

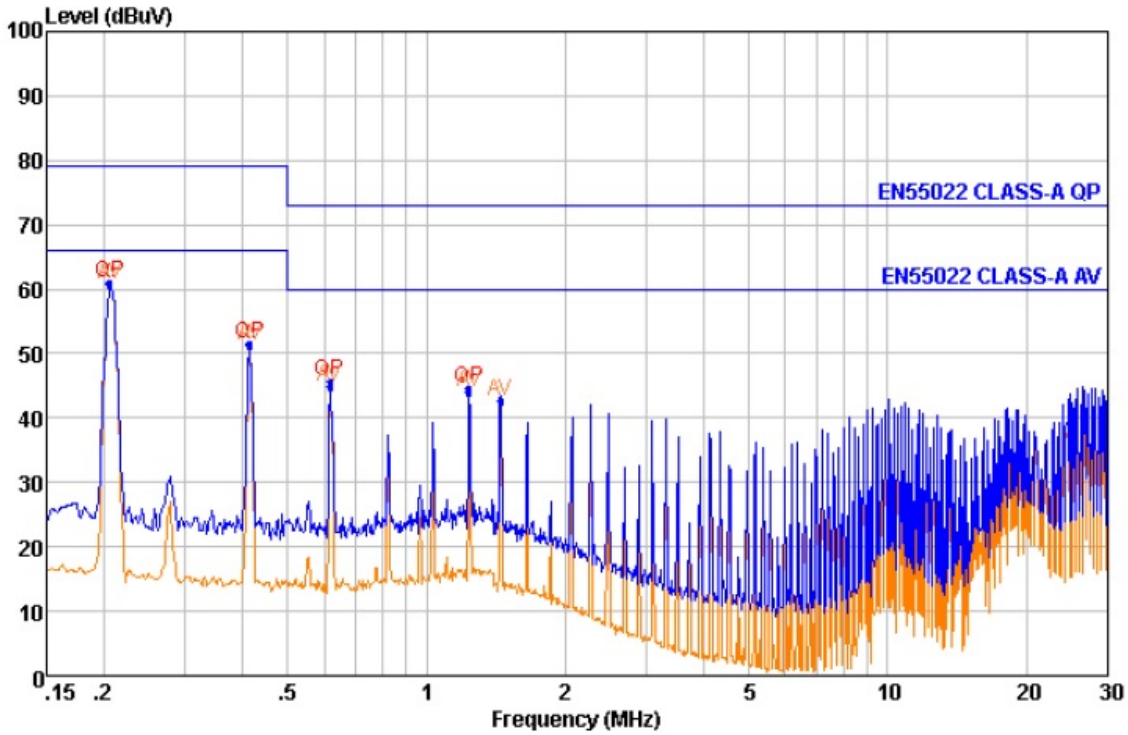


Power Derating

Conducted EMI Performance

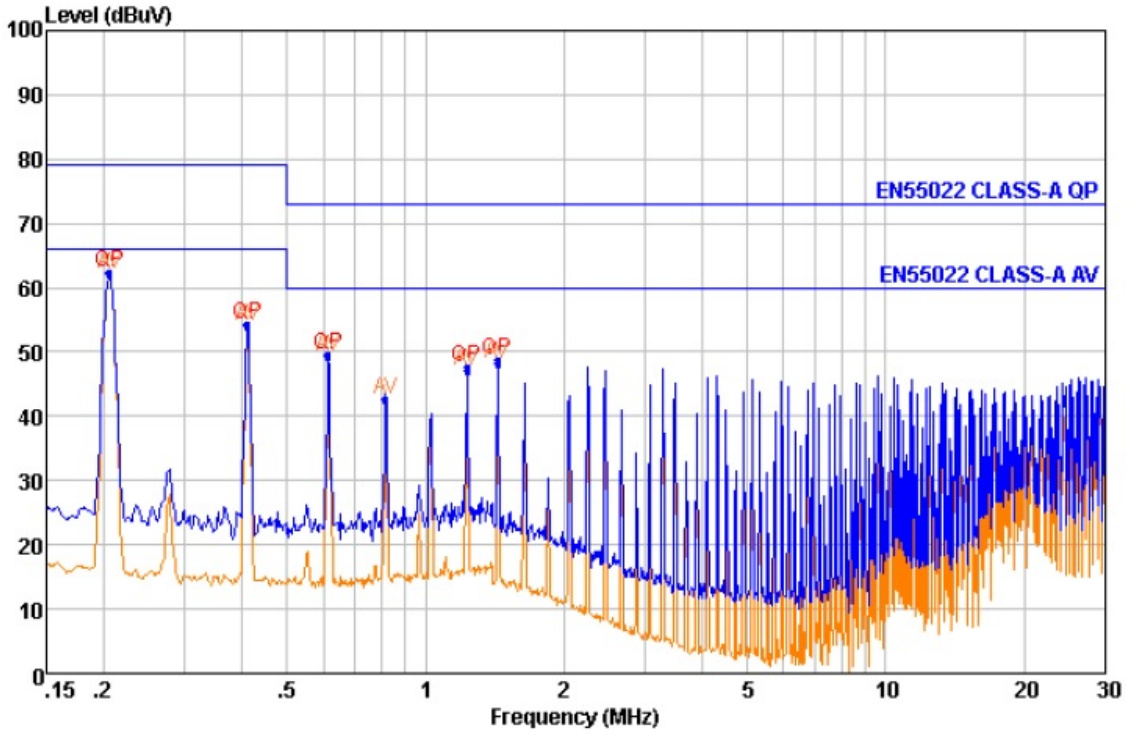
Compliance with EN55022 Class A / FCC part 15 Level A without external components

```
Condition  : EN55022 CLASS-A QP LINE
EUT        :
Model No.  : ASA01A18-LS
EUT Status : DC24V
Test Mode  : LINE
Test Date  : 2016-11-02
Remark     : FULL LOAD
```



NO.	Freq MHz	Level dBuV	Remark	LISN Factor dB	Cable Loss dB	Limit Line dBuV	Margin dB
1	0.206	60.95	QP	9.54	0.40	79.00	-18.05
2	0.206	60.84	Average	9.54	0.40	66.00	-5.16
3	0.415	51.64	QP	9.37	0.43	79.00	-27.36
4	0.415	51.22	Average	9.37	0.43	66.00	-14.78
5	0.617	45.55	QP	9.29	0.45	73.00	-27.45
6	0.617	44.96	Average	9.29	0.45	60.00	-15.04
7	1.236	44.48	QP	9.29	0.47	73.00	-28.52
8	1.236	43.87	Average	9.29	0.47	60.00	-16.13
9	1.449	42.62	Average	9.30	0.48	60.00	-17.38

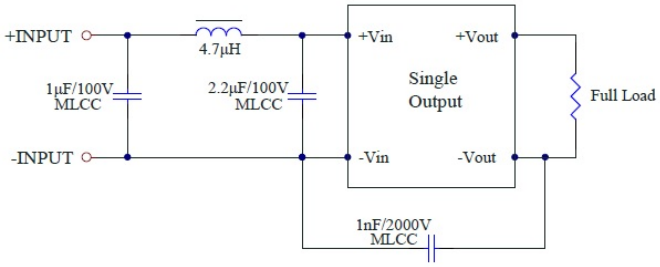
Condition : EN55022 CLASS-A QP NEUTRAL
EUT :
Model No. : ASA01A18-LS
EUT Status : DC24V
Test Mode : NEUTRAL
Test Date : 2016-11-02
Remark : FULL LOAD



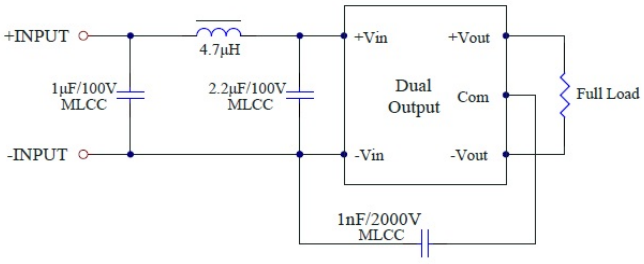
NO.	Freq MHz	Level dBuV	Remark	LISN Factor dB	Cable Loss dB	Limit Line dBuV	Margin dB
1	0.206	62.30	QP	9.37	0.40	79.00	-16.70
2	0.206	62.19	Average	9.37	0.40	66.00	-3.81
3	0.410	54.30	QP	9.36	0.43	79.00	-24.70
4	0.410	54.07	Average	9.36	0.43	66.00	-11.93
5	0.614	49.58	QP	9.36	0.45	73.00	-23.42
6	0.614	49.27	Average	9.36	0.45	60.00	-10.73
7	0.817	42.74	Average	9.36	0.46	60.00	-17.26
8	1.229	47.62	QP	9.38	0.47	73.00	-25.38
9	1.229	47.14	Average	9.38	0.47	60.00	-12.86
10	1.433	48.67	QP	9.38	0.48	73.00	-24.33
11	1.433	48.33	Average	9.38	0.48	60.00	-11.67

Compliance with EN55022 Class B / FCC part 15 Level B with the following recommended external filter configuration :

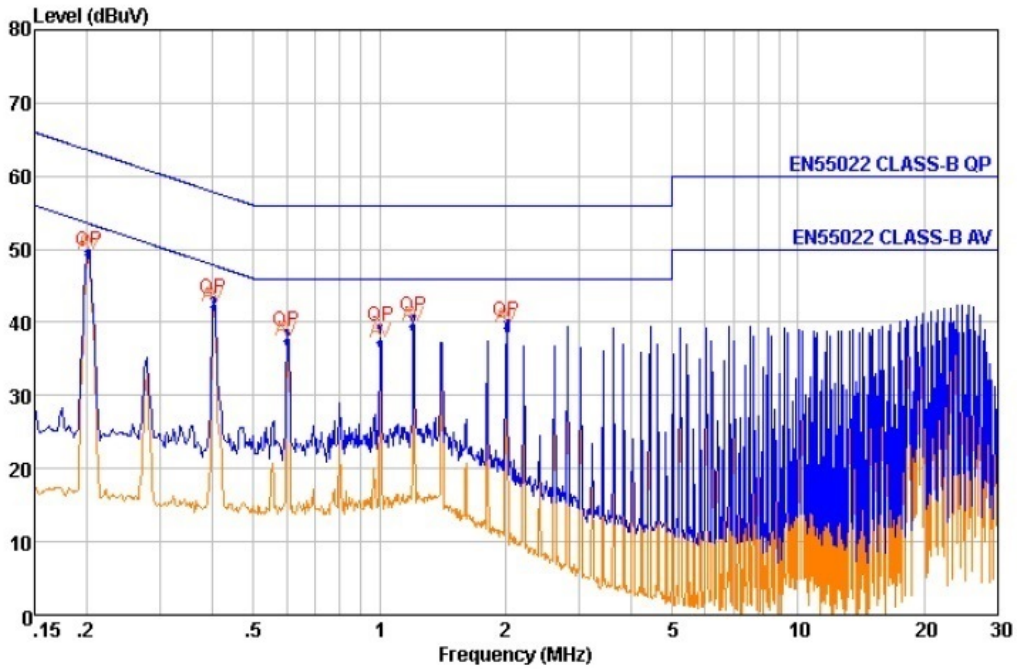
Single output



Dual output

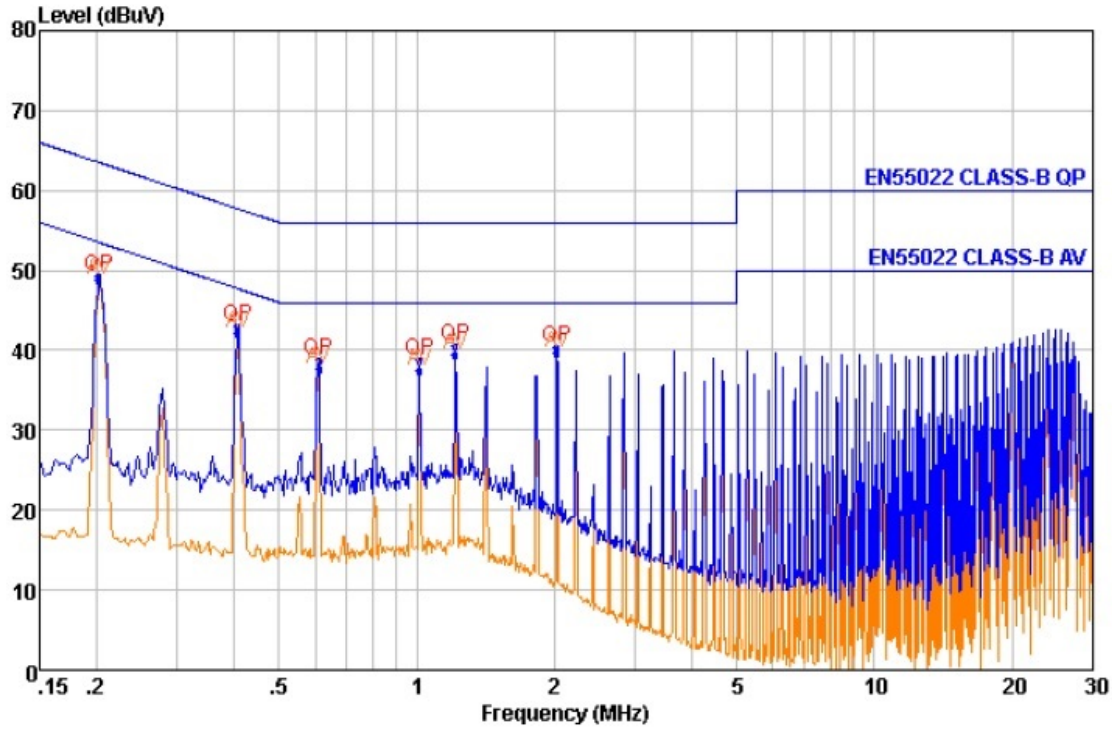



```
Condition  : EN55022 CLASS-B QP LINE
EUT        :
Model No.  : ASA01A18-LS
EUT Status : DC24V
Test Mode  : LINE
Test Date  : 2016-11-02
Remark     : FULL LOAD
```



NO.	Freq MHz	Level dBuV	Remark	LISN Factor dB	Cable Loss dB	Limit Line dBuV	Margin dB
1	0.202	49.65	QP	9.55	0.22	63.54	-13.89
2	0.202	49.29	Average	9.55	0.40	53.54	-4.25
3	0.402	43.19	QP	9.38	0.26	57.81	-14.62
4	0.402	42.02	Average	9.38	0.43	47.81	-5.79
5	0.601	38.68	QP	9.30	0.28	56.00	-17.32
6	0.601	37.55	Average	9.30	0.45	46.00	-8.45
7	1.005	39.41	QP	9.27	0.31	56.00	-16.59
8	1.005	37.30	Average	9.27	0.47	46.00	-8.70
9	1.203	40.75	QP	9.28	0.32	56.00	-15.25
10	1.203	39.53	Average	9.28	0.47	46.00	-6.47
11	2.012	40.04	QP	9.32	0.35	56.00	-15.96
12	2.012	39.24	Average	9.32	0.49	46.00	-6.76

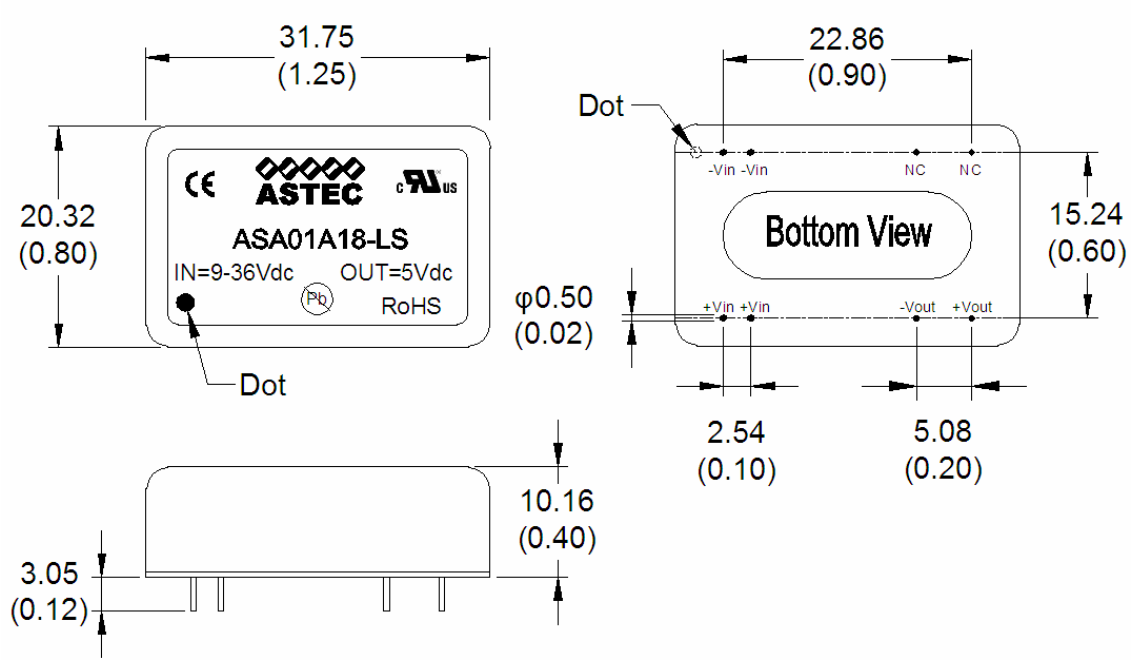
Condition : EN55022 CLASS-B QP NEUTRAL
EUT :
Model No. : ASA01A18-LS
EUT Status : DC24V
Test Mode : NEUTRAL
Test Date : 2016-11-02
Remark : FULL LOAD



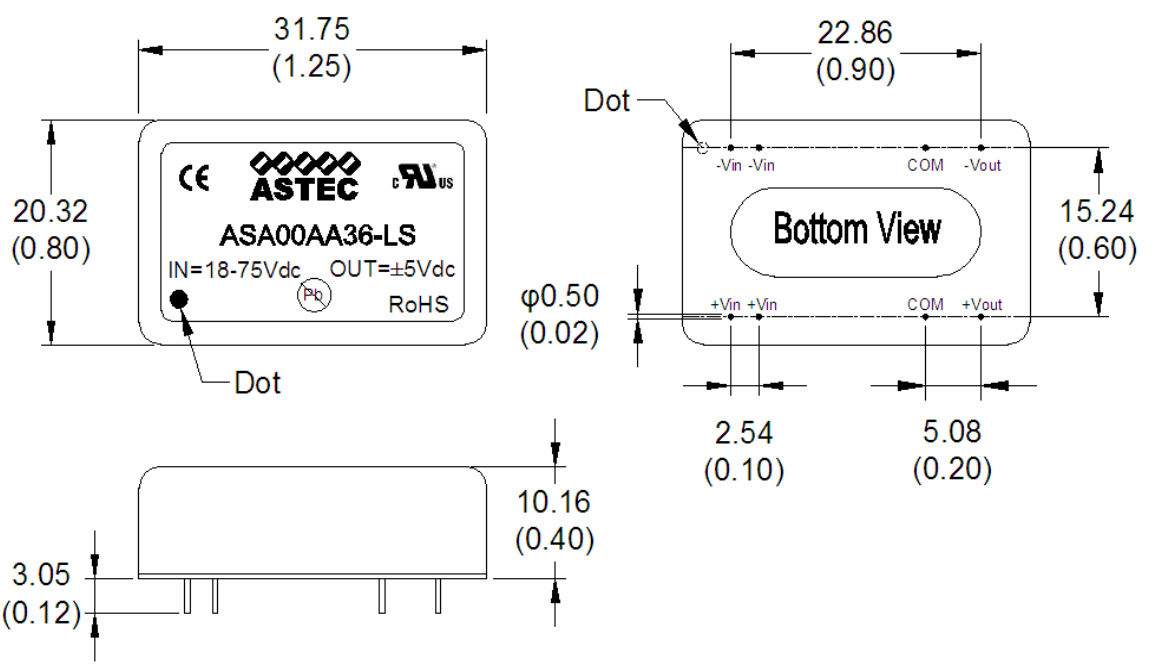
NO.	Freq MHz	Level dBuV	Remark	LISN Factor dB	Cable Loss dB	Limit Line dBuV	Margin dB
1	0.202	49.29	QP	9.37	0.22	63.54	-14.25
2	0.202	48.86	Average	9.37	0.40	53.54	-4.68
3	0.406	43.01	QP	9.36	0.26	57.73	-14.72
4	0.406	42.21	Average	9.36	0.43	47.73	-5.52
5	0.611	38.73	QP	9.36	0.28	56.00	-17.27
6	0.611	37.56	Average	9.36	0.45	46.00	-8.44
7	1.016	38.75	QP	9.37	0.31	56.00	-17.25
8	1.016	37.40	Average	9.37	0.47	46.00	-8.60
9	1.216	40.60	QP	9.38	0.32	56.00	-15.40
10	1.216	39.44	Average	9.38	0.47	46.00	-6.56
11	2.023	40.23	QP	9.39	0.35	56.00	-15.77
12	2.023	39.61	Average	9.39	0.49	46.00	-6.39

Mechanical Dimensions and Module Pin Assignment

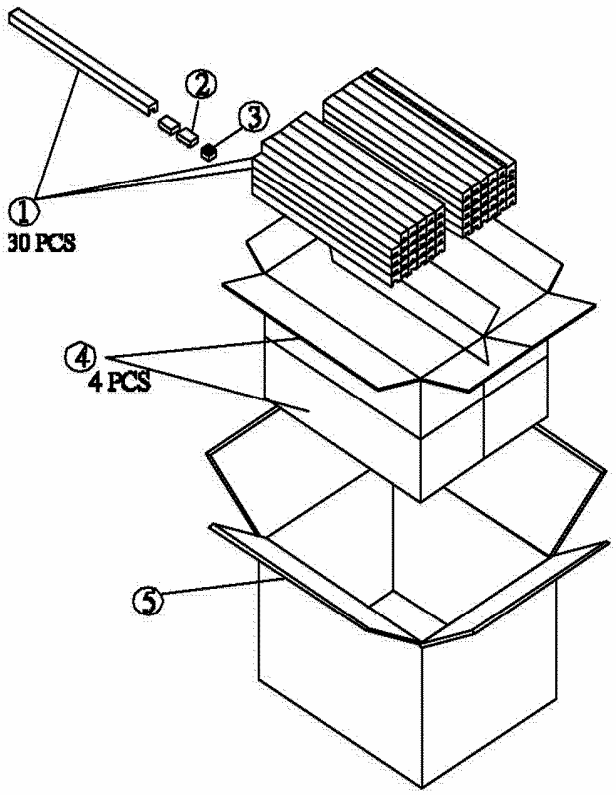
Single Output



Dual Output



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