

### *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 -40°C to 71°C 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" x 0.80" x 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 / FCC Class A without external components

#### 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





## Technical Reference Note ASA (6W) Family



### 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
ASA01AA36-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



## Technical Reference Note ASA (6W) Family



### 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	°C
Case Surface		$T_C$	-40	-	100	°C
c) Storage Temperature	All	$T_{STG}$	-55	-	105	°C
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



## Technical Reference Note ASA (6W) Family



### INPUT SPECIFICATIONS

Parameter	Device	Symbol	Min	Typ	Max	Unit	
a) Operating Input Voltage	ASAx18-LS	$V_I$	9	24	36	$V_{dc}$	
	ASAx36-LS	$V_I$	18	48	75	$V_{dc}$	
b) Maximum Input Current ( $V_I = 0$ to $V_{I,max}$ ; $I_o = I_{o,max}$ )	ASAx18-LS	3.3V	$I_{I,max}$	-	-	1	A
		5V / $\pm 5V$	$I_{I,max}$	-	-	1.5	A
		12V / $\pm 12V$	$I_{I,max}$	-	-	2	A
		15V / $\pm 15V$	$I_{I,max}$	-	-	2	A
	ASAx36-LS	3.3V	$I_{I,max}$	-	-	0.6	A
		5V / $\pm 5V$	$I_{I,max}$	-	-	1	A
		12V / $\pm 12V$	$I_{I,max}$	-	-	1	A
		15V / $\pm 15V$	$I_{I,max}$	-	-	1	A
	c) No Load Input Power ( $V_I = V_{I,nom}$ )	All	-	-	-	0.4	W
	d) Recommended External Fuse Ratings	ASAx18-LS	3.3V	-	1.5	-	A
			5V / $\pm 5V$	-	2	-	A
			12V / $\pm 12V$	-	2.5	-	A
15V / $\pm 15V$			-	2.5	-	A	
ASAx36-LS		3.3V	-	1	-	A	
		5V / $\pm 5V$	-	1.5	-	A	
		12V / $\pm 12V$	-	1.5	-	A	
		15V / $\pm 15V$	-	1.5	-	A	

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



## Technical Reference Note ASA (6W) Family



### OUTPUT SPECIFICATIONS

Parameter	Device	Symbol	Min	Typ	Max	Unit
a) Output Voltage Setpoint ( $V_I = V_{I, \min}$ to $V_{I, \max}$ ; $I_o = I_{o, \max}$ ; $T_A = 25^\circ\text{C}$ )	3.3V	$V_{o, \text{set}}$	3.23	3.30	3.37	$V_{dc}$
	5V	$V_{o, \text{set}}$	4.90	5.00	5.10	$V_{dc}$
	12V	$V_{o, \text{set}}$	11.76	12.00	12.24	$V_{dc}$
	15V	$V_{o, \text{set}}$	14.70	15.00	15.30	$V_{dc}$
	±5V	$V_{o, \text{set}}$	±4.90	±5.00	±5.10	$V_{dc}$
	±12V	$V_{o, \text{set}}$	±11.76	±12.00	±12.24	$V_{dc}$
	±15V	$V_{o, \text{set}}$	±14.70	±15.00	±15.30	$V_{dc}$
b) Output Regulation: Line ( $V_I = V_{I, \max}$ to $V_{I, \min}$ ; $I_o = I_{o, \max}$ )  Load ( $V_I = V_{I, \text{nom}}$ ; $I_o = I_{o, \min}$ to $I_{o, \max}$ )  Cross ( $V_I = V_{I, \text{nom}}$ ; $I_o = +I_{o, \max}, -I_{o, \min}$ or $+I_{o, \min}, -I_{o, \max}$ to $+I_{o, \max}, -I_{o, \max}$ )  Temperature ( $T_c = -40^\circ\text{C}$ to $+90^\circ\text{C}$ )	All	-	-	-	0.5	%
	All	-	-	-	0.5	%
	±5V/±12V/±15V	-	-	-	4	%
	All	-	-	-	1.0	% $V_o$
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  Dual Output	3.3V	$I_o$	120	-	1200	mA
	5V	$I_o$	100	-	1000	mA
	12V	$I_o$	50	-	500	mA
	15V	$I_o$	40	-	400	mA
	±5V	$I_o$	±50	-	±500	mA
	±12V	$I_o$	±25	-	±250	mA
	±15V	$I_o$	±20	-	±200	mA
e) Efficiency ( $V_I = V_{I, \text{nom}}$ ; $I_o, \text{max}$ ; $T_A = 25^\circ\text{C}$ )	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) Dynamic Response : ( $\Delta I_o/\Delta t = 0.08A/\mu s$ ; $V_I = V_{I, nom}$ ; $T_A = 25^\circ C$ )						
Load Change from $I_o = 50\%$ to 100% of $I_{o, max}$	3.3V/5V/ $\pm 5V$	-	-	-	5	% $V_o$
	12V/ $\pm 12V$ /15V/ $\pm 15V$	-	-	-	2	% $V_o$
Peak Deviation Settling Time (to $V_{o, nom}$ )	All	-	-	-	300	$\mu sec$
h) Output Voltage Overshoot ( $I_o = I_{o, max}$ ; $T_A = 25^\circ C$ )	All	-	-	1	4	% $V_o$

### 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	-	-	$M\Omega$
Calculated MTBF ( $I_o = I_{o, max}$ ; $T_A = 25^\circ C$ )	All	-	1M	-	-	Hours
Weight	All	-	-	-	20	g

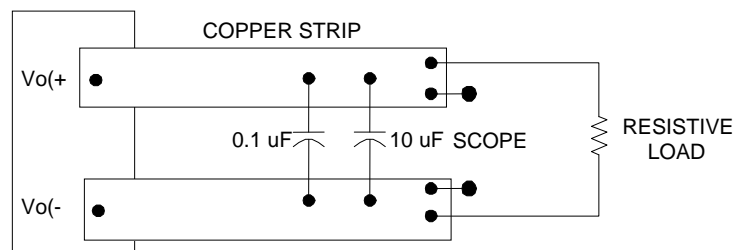
## Basic Operation and Features

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.

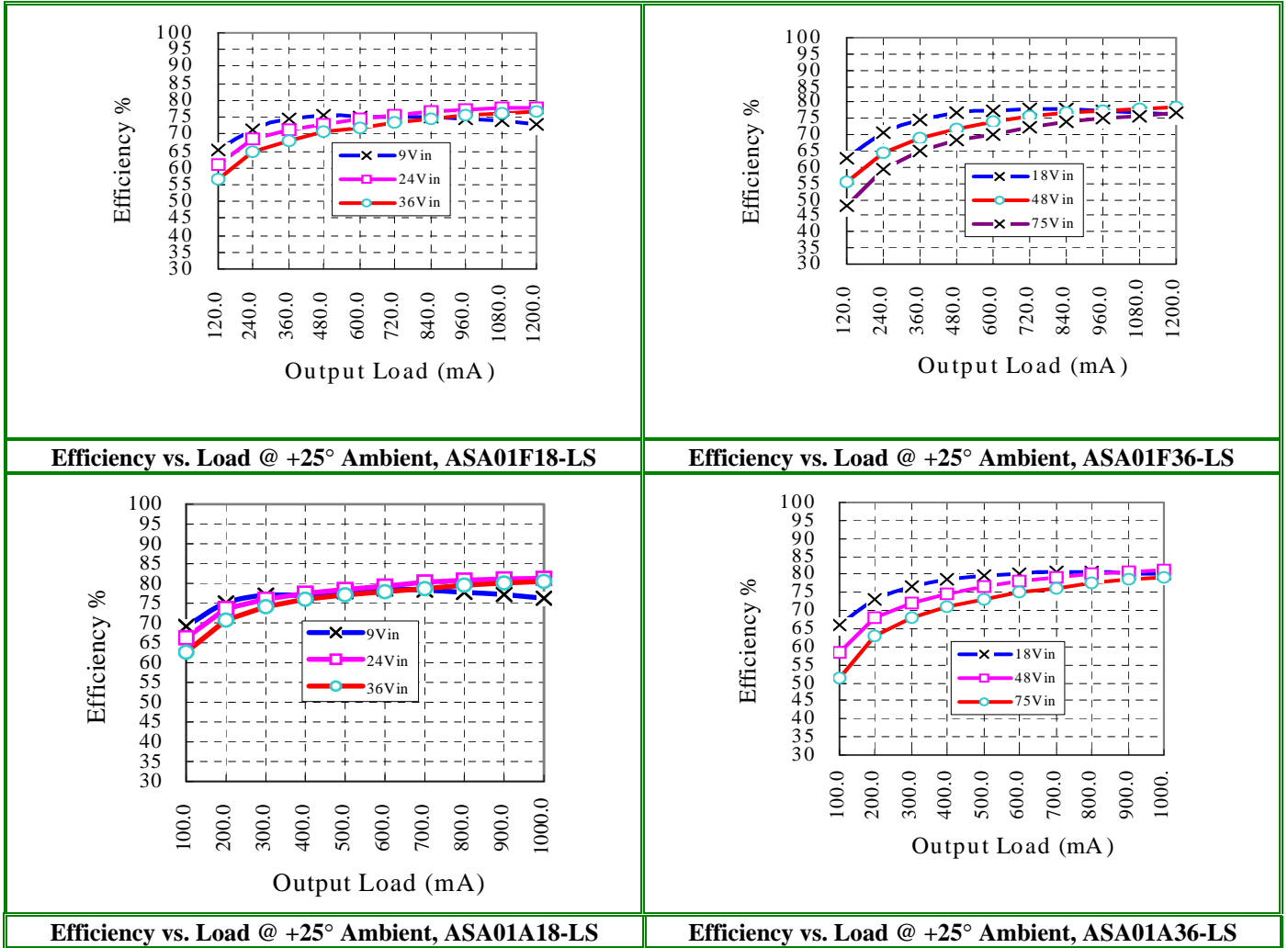
## TEST SETUP



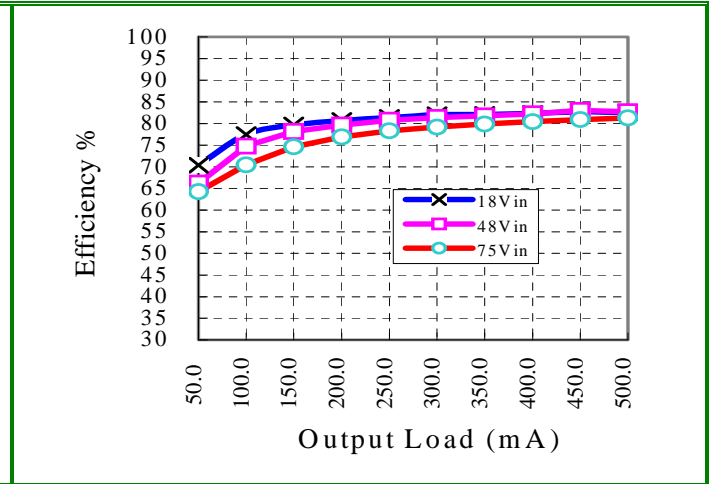
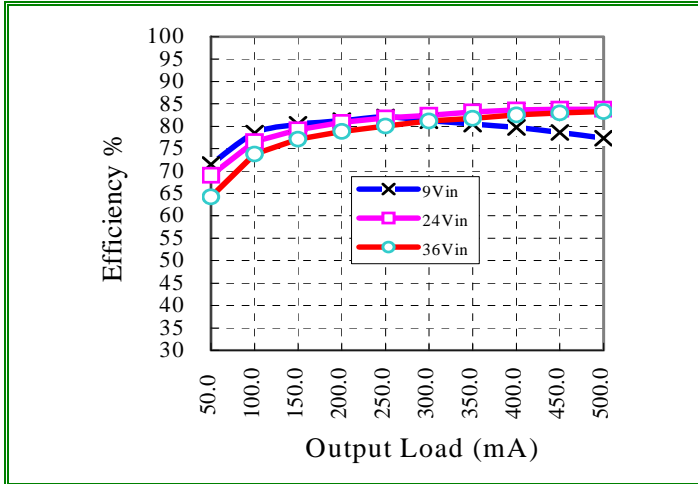
Note: Use a  $0.1 \mu\text{F}$  @50V X7R ceramic capacitor and a  $10 \mu\text{F}$  @25V tantalum capacitor. Scope measurement should be made using a BNC socket. Position the load between 51 mm and 76 mm (2 in. and 3 in.) from module.

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

Performance Curves – Efficiency Curve

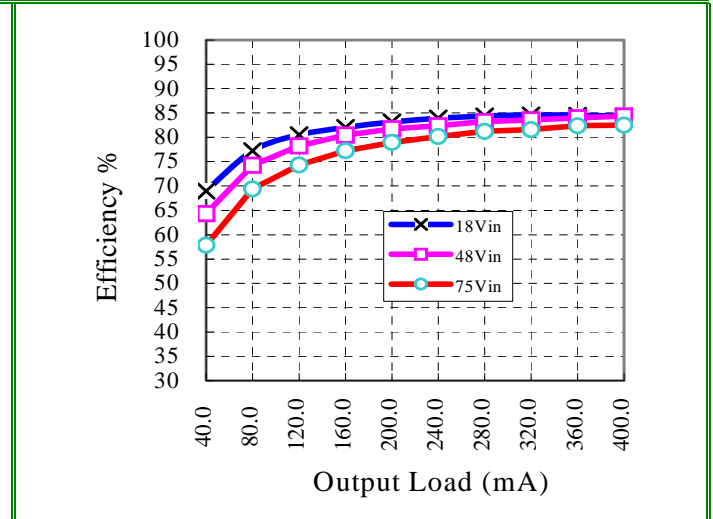
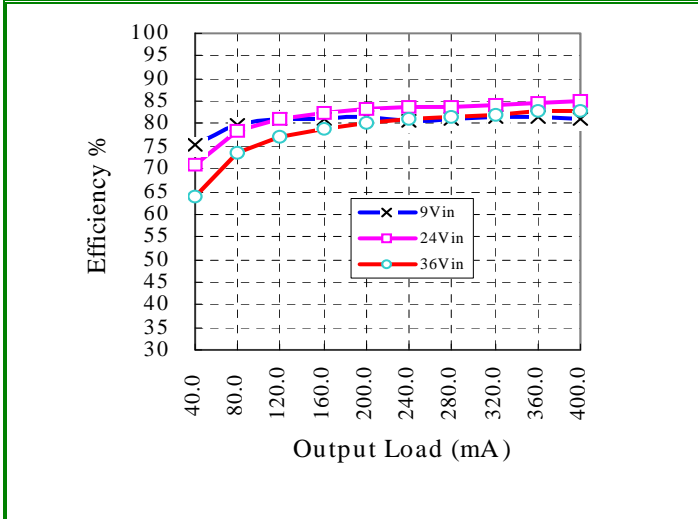






Efficiency vs. Load @ +25° Ambient, ASA00B18-LS

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

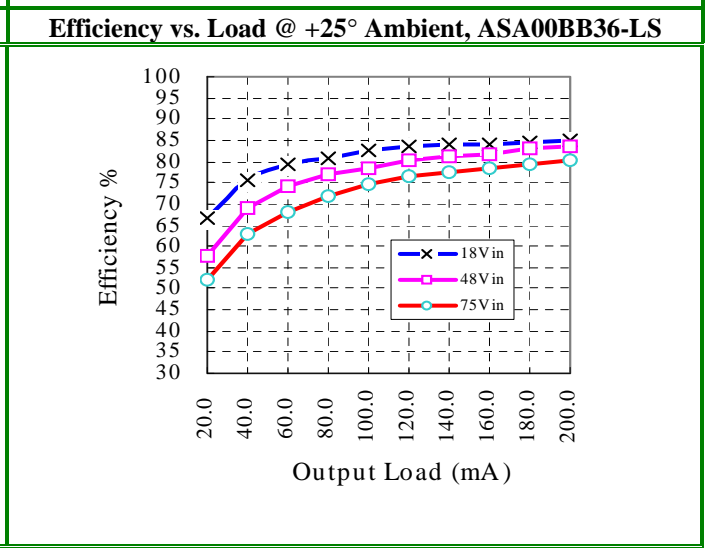
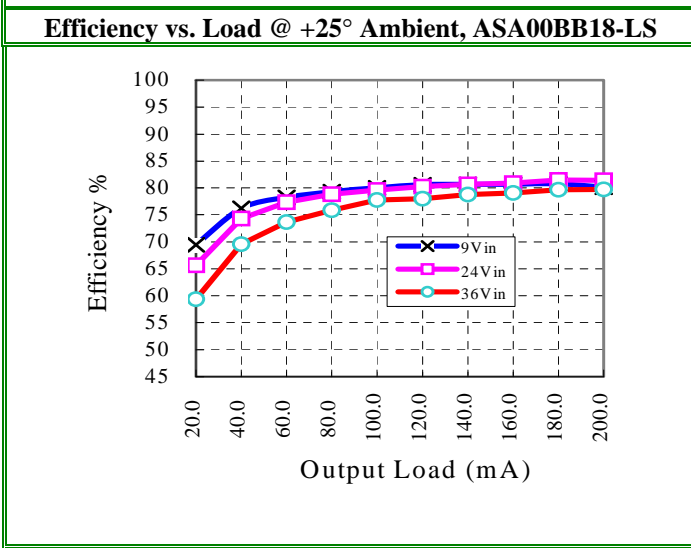
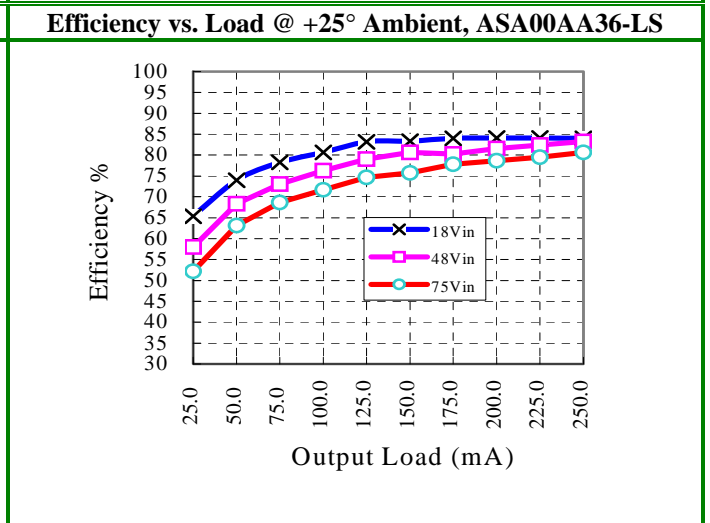
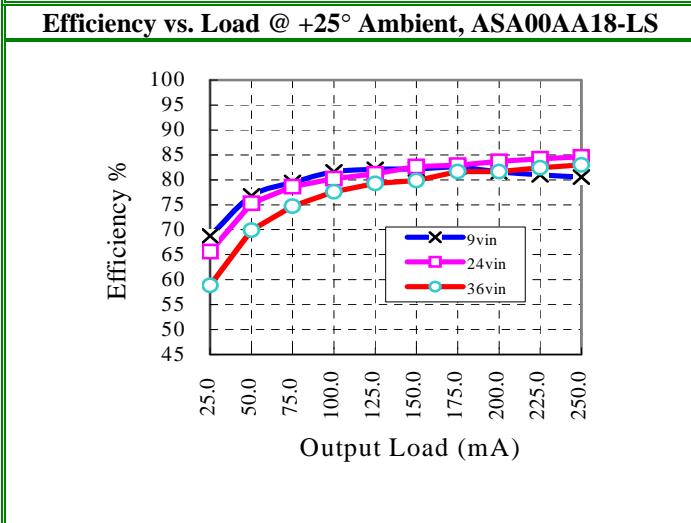
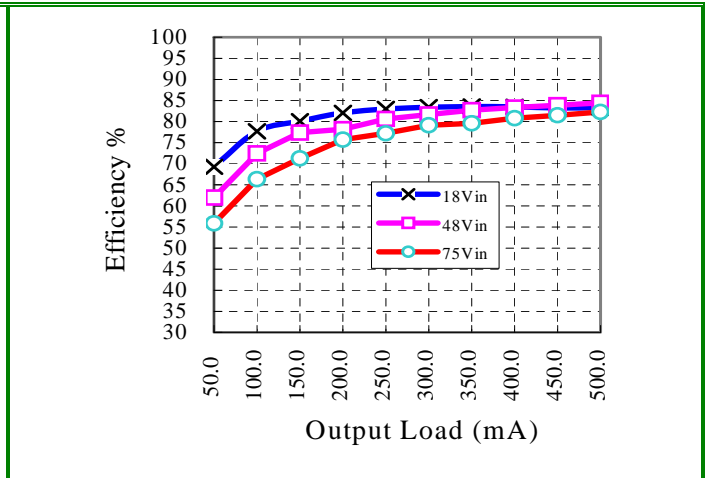
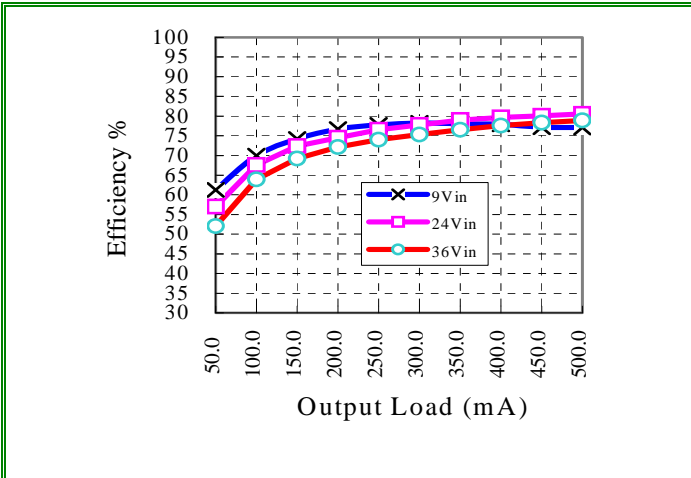


Efficiency vs. Load @ +25° Ambient, ASA00C18-LS

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



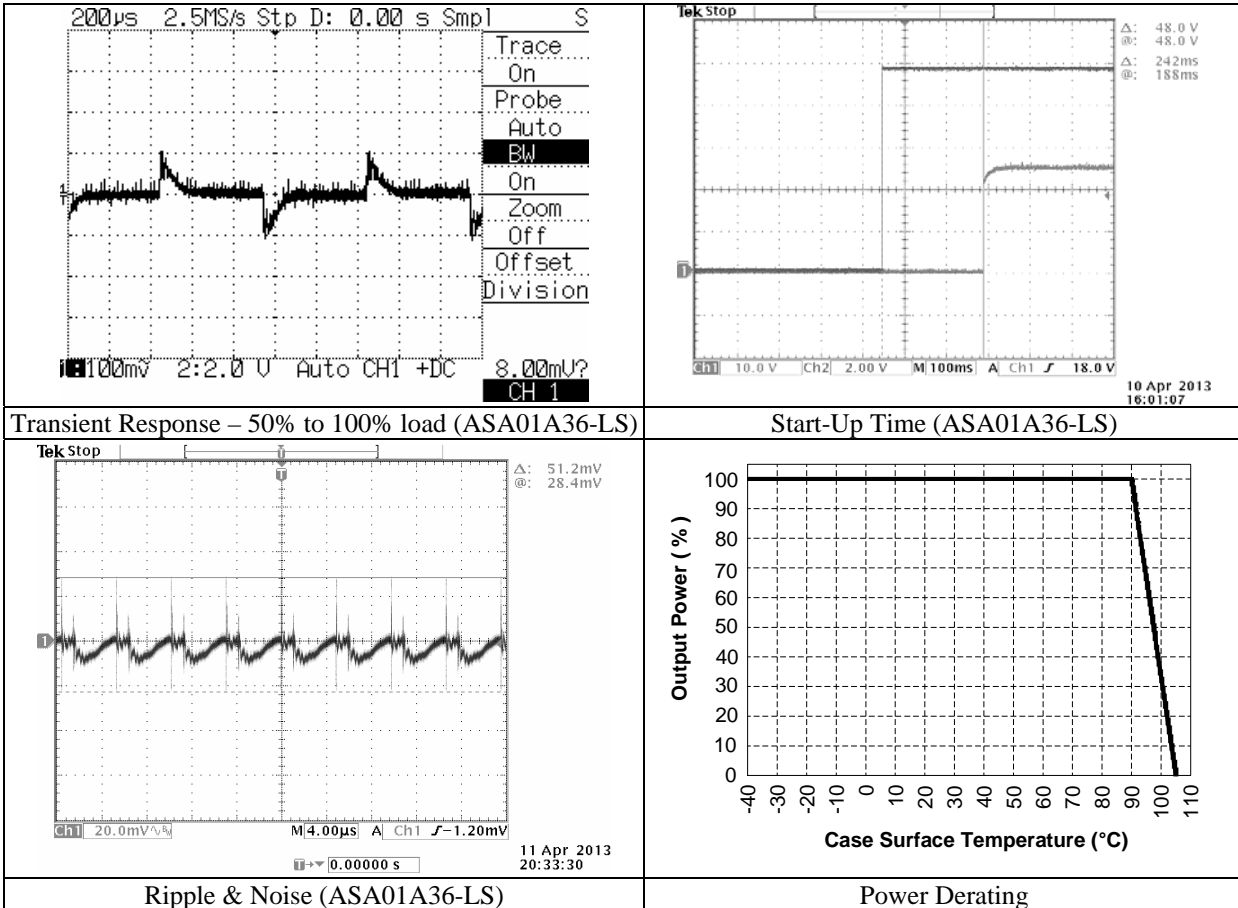
# Technical Reference Note ASA (6W) Family



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

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

### Performance Curves



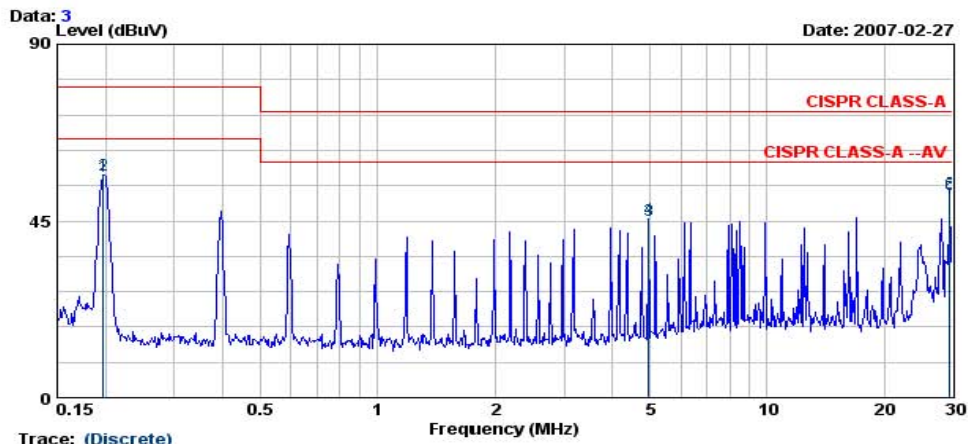


# Technical Reference Note ASA (6W) Family



## Conducted EMI Performance

EUT : Converter Power: 24Vdc  
 M/N: ASA01A18-L Test mode : FULL LOAD  
 POL: LINE ENGINEER : AGUN Temp: 24.1 Humidity : 55%



Trace: (Discrete)

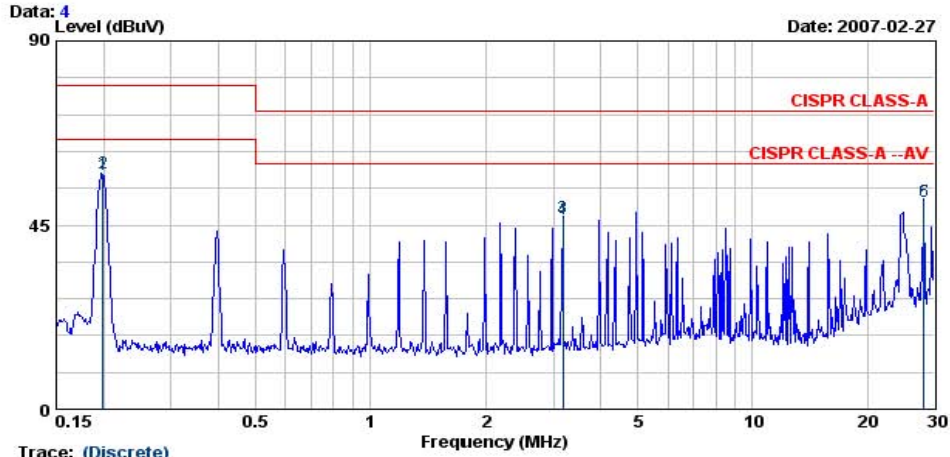
Freq. MHz	LISN Factor dB	Cable Loss dB	Meter Reading dBuV	Measured Level dBuV	Limits dBuV	Over Limits dBuV	Detector
0.198	9.80	0.05	46.37	56.22	79.00	-22.78	QP
0.198	9.80	0.05	46.75	56.60	66.00	-9.40	AVERAGE
4.957	9.82	0.24	34.97	45.03	73.00	-27.97	QP
4.957	9.82	0.24	35.35	45.41	60.00	-14.59	AVERAGE
29.544	10.09	0.27	41.66	52.02	73.00	-20.98	QP
29.544	10.09	0.27	41.49	51.85	60.00	-8.15	AVERAGE



# Technical Reference Note ASA (6W) Family



EUT : Converter Power: 24Vdc  
 M/N: ASA01A18-L Test mode : FULL LOAD  
 POL: NEUTRAL ENGINEER : AGUN Temp: 24.1 Humidity : 55%

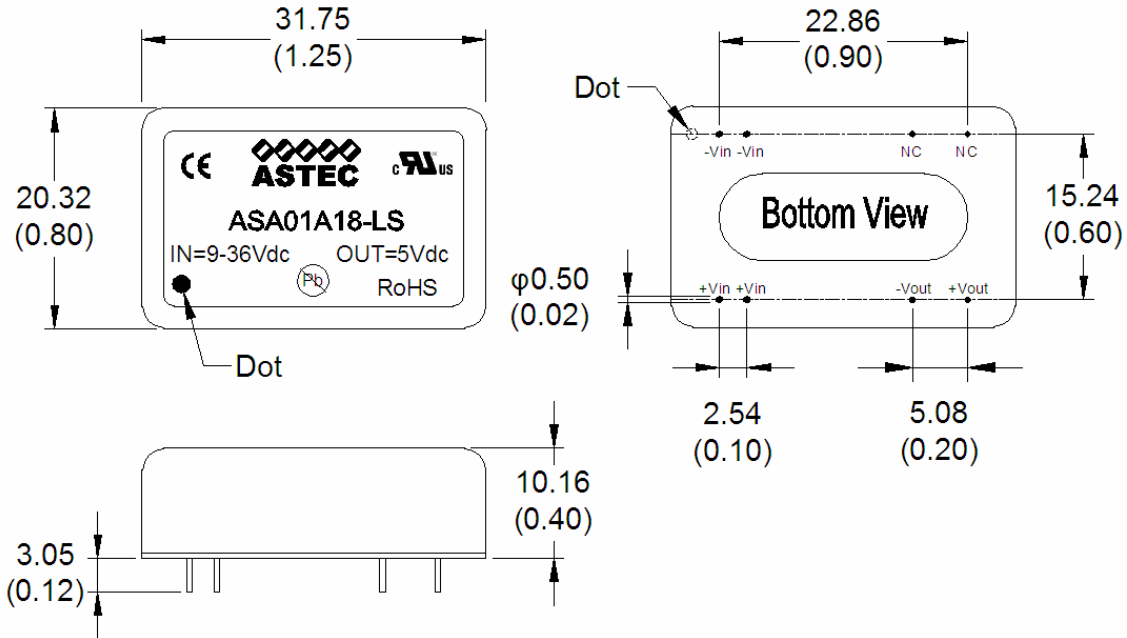


Trace: (Discrete)

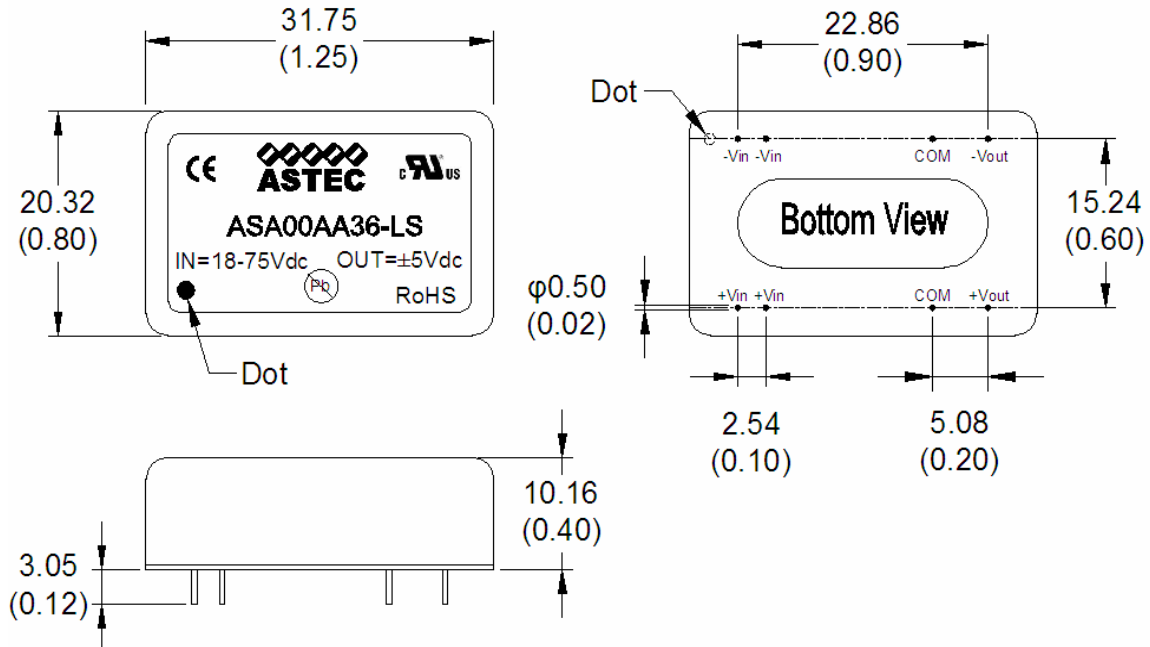
Freq. MHz	LISM Factor dB	Cable Loss dB	Meter Reading dBUV	Measured Level dBUV	Limits dBUV	Over Limits dBUV	Detector
0.199	9.80	0.05	47.37	57.22	79.00	-21.78	QP
0.199	9.80	0.05	47.69	57.54	66.00	-8.46	AVERAGE
3.173	9.87	0.10	36.91	46.87	60.00	-13.13	AVERAGE
3.173	9.87	0.10	36.56	46.52	73.00	-26.48	QP
28.158	10.06	0.37	40.25	50.69	73.00	-22.31	QP
28.158	10.06	0.37	40.22	50.66	60.00	-9.34	AVERAGE

## Mechanical Dimensions and Module Pin Assignment

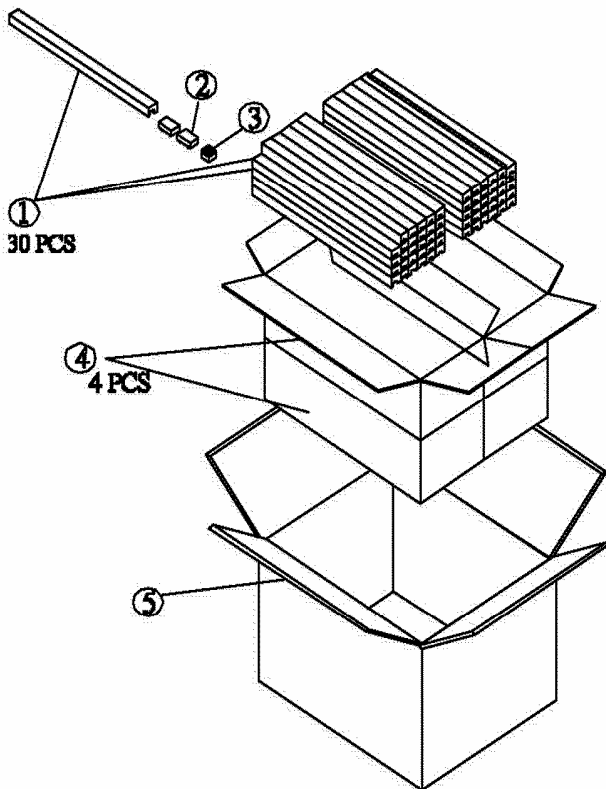
### Single Output



### 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
>3~5	±0.15
>5~30	±0.18
>30~120	±0.20

### Recommended Lead-Free Wave Soldering Temperature Profile

