DC/DC Converter

K12T-6A Series

MORNSUN®

Non-isolated & regulated 6A single output

POL power converter

FEATURES

- High efficiency up to 94%
- Operating ambient temperature range: -40℃ to +85℃
- Input under-voltage protection, output short-circuit, over-current protection
- High-speed transient response
- Compact SMD package
- EN62368 approved

CE RoHS 3 years Warranty

K12T-6A series is a 6A non-isolated switching regulator. The output voltage is accurately adjustable from 0.75V to 5.0V, and the product is featured with high efficiency, fast transient response, input under-voltage, output short circuit, over-current protection. They meet CLASS B of CISPR32/EN55032 EMI standards by adding the recommended external components and they are widely used in applications such as communications, computer network industry, power distributed architecture, workstations, servers, LANs/WANs and provide high current with fast transient response for high-speed chips such as FPGA, DSP, and ASIC.

Selection Guide

Certification	Part No.①	Input Voltage (VDC)		Output		Efficiency(%) Min./Typ.	Capacitive Load(μF) Max.	
		Nominal (Range)	Max.②	Voltage(VDC)③ (Range)	Current (A) Max./Min.		1mΩ≤ESR<10 mΩ	ESR≥10 mΩ
CE	K12T-6A-P	12 (8.3~14)	15	0.75~5.0	6/0	90/94	1000	3000
	K12T-6A-N							

Notes: ① "P" indicates that the Ctrl pin is positive logic control, "N" indicates that the Ctrl pin is negative logic control;
② Exceeding the maximum input voltage may cause permanent damage;
③ The default output voltage is 0.75VDC, which can be adjusted to 1.2VDC, 1.8VDC, 2.5VDC, 3.3VDC, 5VDC. See Trim instructions for specific output voltage adjustment;
④Unless otherwise specified, parameters in this table were measured under the 5VDC output voltage.

Input Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Current (full load/no-load)	Nominal input voltage		--	2660/20	--	mA
Start-up Voltage			--	--	8	VDC
Under-voltage Protection			6	--	--	
Reverse Polarity Input			Avoid / Not protected			
Hot Plug			Unavailable			
Input Filter			Capacitance filter			
Ctrl*	Module on	K12T-6A-P (Positive logic)	Ctrl pin open or pulled high (Vin-2.5V ~ Vin)			
		K12T-6A-N (Negative logic)	Ctrl pin open or pulled low to GND (0 ~ 0.5VDC)			
	Module off	K12T-6A-P (Positive logic)	Ctrl pin pulled low to GND (0 ~ 0.5VDC)			
		K12T-6A-N (Negative logic)	Ctrl pin pulled high (Vin-2.5V ~ Vin)			
	Input current when off		--	1	--	mA

Notes: * 1. The Ctrl pin voltage is referenced to GND;
2. Unless otherwise specified, parameters in this table were measured under the 5VDC output voltage.

Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Voltage Accuracy	Full load, nominal input voltage	--	±1.0	±2.0	%
Linear Regulation	Full load, input voltage range	--	±0.3	--	
Load Regulation	Nominal input, 0% -100% load	--	±0.4	--	

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Ripple & Noise*	20MHz bandwidth, nominal input, 100% load	--	35	75	mVp-p
Trim		0.75	--	5.0	VDC
Temperature Coefficient	100% load	--	±0.02	--	%/℃
Transient Response Deviation	Nominal input, 50%-100%-50% load step change, di/dt=2.5A/us, with external 2 x 150 µF polymer capacitors	--	±70	--	mV
Transient Recovery Time		--	20	--	us
Over-current Protection	Nominal input	140	160	--	%Io
Short-circuit Protection	Nominal input	Continuous, self-recovery			

Notes: * 1. The "parallel cable" method is used for Ripple and Noise test, please refer to DC-DC Converter Application Notes for specific information;
2. Unless otherwise specified, parameters in this table were measured under the 5VDC output voltage.

General Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Operating Temperature	See Fig. 1	-40	--	+85	℃
Storage Temperature		-55	--	+125	
Storage Humidity	Non-condensing	5	--	95	%RH
Reflow Soldering Temperature		Peak temp. Tc ≤245℃, maximum duration time≤60s over 217℃. For actual application, please refer to IPC/JEDEC J-STD-020D.1.			
Switching Frequency	Full load, nominal input voltage input	--	350	--	kHz
MTBF	MIL-HDBK-217F@25℃	1000	--	--	k hours

Mechanical Specifications

Dimensions	20.30 x 11.40 x 6.60 mm
Weight	3.9g (Typ.)
Cooling Method	Nature convection or forced convection

Electromagnetic Compatibility (EMC)

|		
Emissions	CE	CISPR32/EN55032 Class B (see Fig.3 for recommended circuit)
	RE	CISPR32/EN55032 Class B (see Fig.3 for recommended circuit)
Immunity	ESD	IEC/EN61000-4-2 Contact ±6kV perf. Criteria B

Typical Characteristic Curves
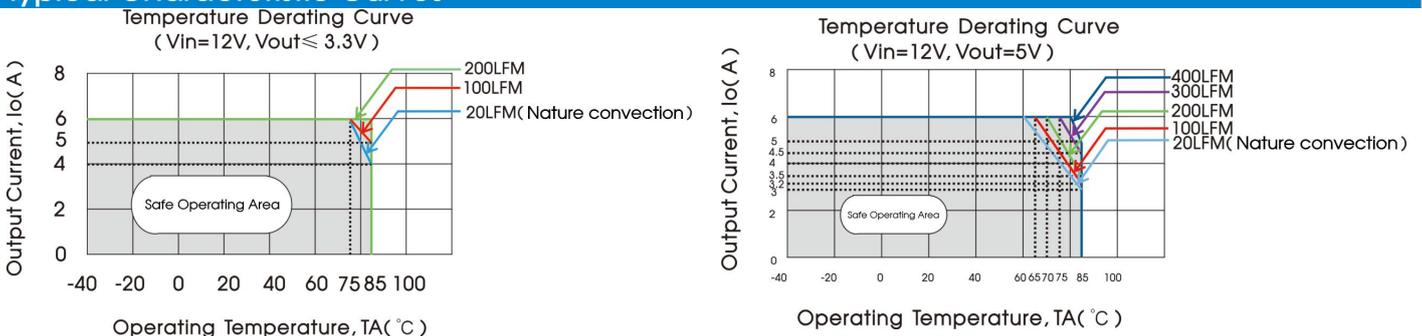
Fig. 1

Efficiency Vs input Voltage
(Vout=0.75V, Io=6A)

K12T-6A

Efficiency(%)

Input Voltage(V)

Efficiency Vs Output Load
(Vin=12V, Vout=0.75V)

K12T-6A

Efficiency(%)

Output Current Percentage(%)
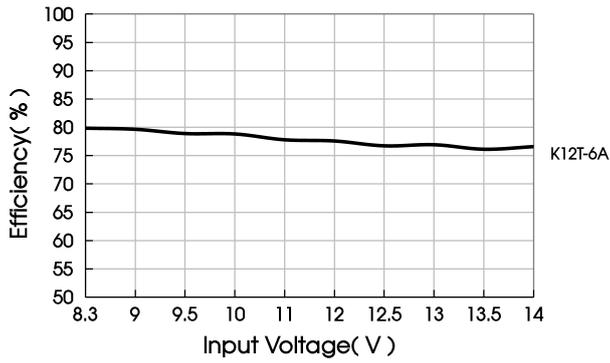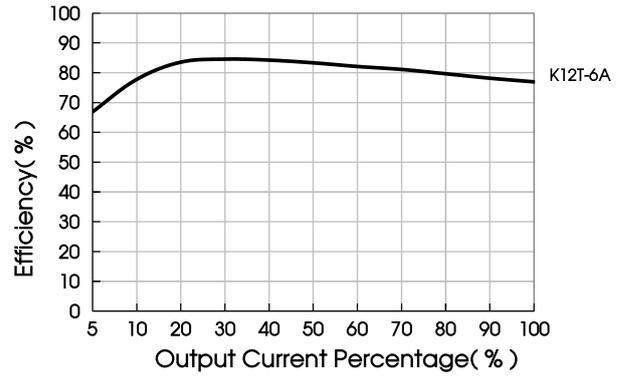
Efficiency Vs input Voltage
(Vout=3.3V, Io=6A)

K12T-6A

Efficiency(%)

Input Voltage(V)

Efficiency Vs Output Load
(Vin=12V, Vout=3.3V)

K12T-6A

Efficiency(%)

Output Current Percentage(%)
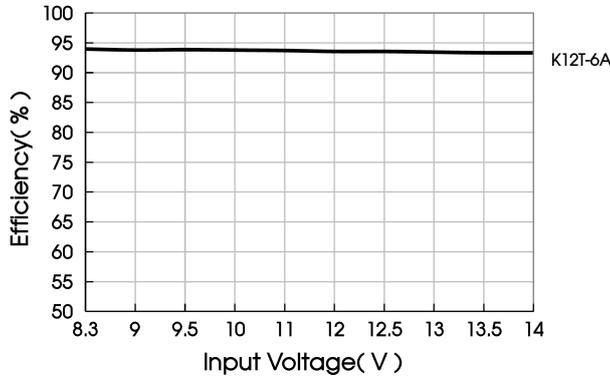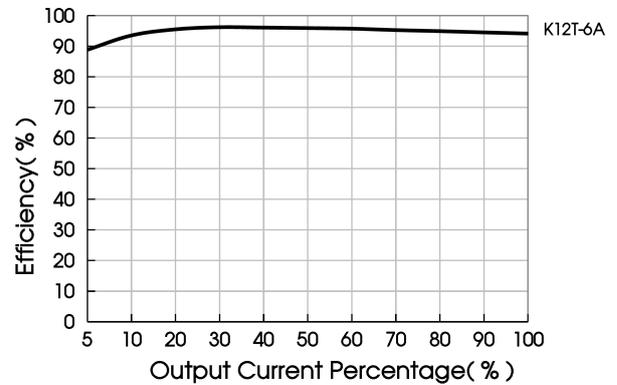
Efficiency Vs input Voltage
(Vout=5V, Io=6A)

K12T-6A

Efficiency(%)

Input Voltage(V)

Efficiency Vs Output Load
(Vin=12V, Vout=5V)

K12T-6A

Efficiency(%)

Output Current Percentage(%)
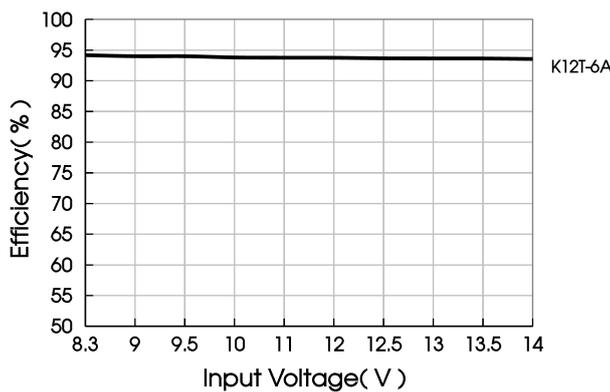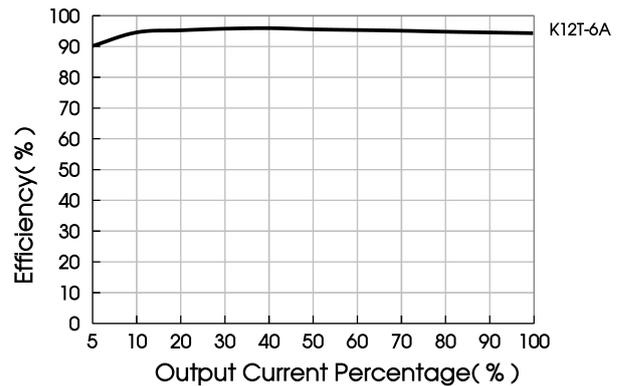
Design Reference

### 1. Typical application

Fig. 2

Table 1

Part No.	C1	C2
K12T-6A-P(N)	100μF/35V	22μF/16V
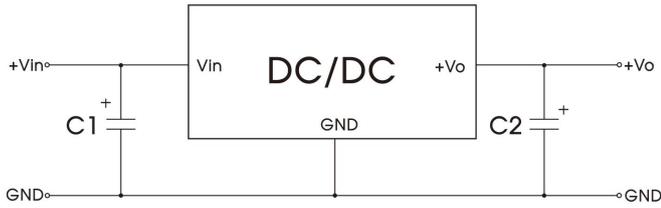
Notes:
1. 100 μF polymer capacitors (C1) is required and should be connected close to the pin terminal, to ensure the stability of the converter;
2. To reduce the output ripple furtherly, increased values and/or tantalum or low ESR electrolytic capacitors may also be used instead;
3. Refer to Table 1 for C1 and C2 capacitor values;
4. Converter cannot be used for hot swap and with output in parallel.

2. EMC compliance circuit
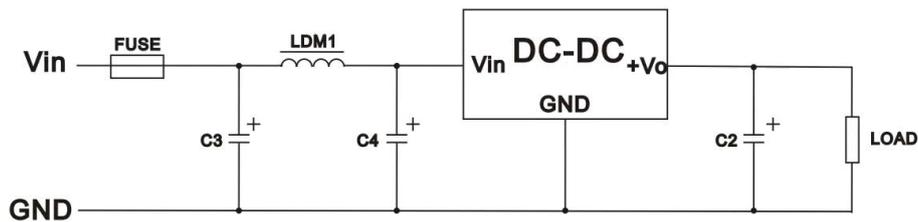
Fig. 3

Table 2

FUSE	C3/C4	LDM1	C2
Selected based on the actual input current in application	100μF /35V	6.8μH	Refer to the Cout in Table 1

### 3. Trim function for output voltage adjustment (open if unused)
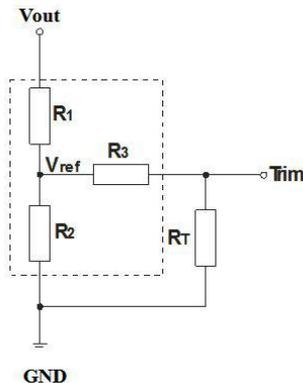
Fig. 4 TRIM resistor connection (dashed line shows internal resistor network)

Table 3

Vo(VDC)	R_T(kΩ)
0.7525	Open
1.2	15.089
1.8	5.873
2.5	3.120
3.3	1.826
5	0.695

Calculating Trim resistor (R_T) values:

$$R_T(\Omega) = \frac{7200}{V_O - 0.7525} - 1000$$

Notes: 1. R_T : Resistance of Trim; Vo: The trim up voltage;
2. If $R_T = \infty$ or Trim pin open, Vo = 0.7525 VDC.

### 4. For additional information please refer to DC-DC converter application notes on www.mornsun-power.com

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Dimensions and Recommended Layout

THIRD ANGLE PROJECTION

2.70 [0.106]

2.10 [0.083]

Note: Gird 2.54*2.54mm

6.60±0.50
[0.260±0.020]

Front View

0.1

20.30±0.50 [0.799±0.020]

4.06 [0.160]

4.06 [0.160]

4.83 [0.190]

11.40±0.50
[0.449±0.020]

Bottom View

4.23 [0.167]

8.89 [0.350]
4.46 [0.175]
1.60 [0.063]

2.20 [0.087]

8.64 [0.340]

8.84 [0.348]
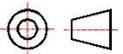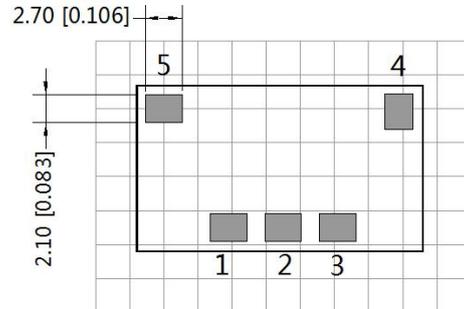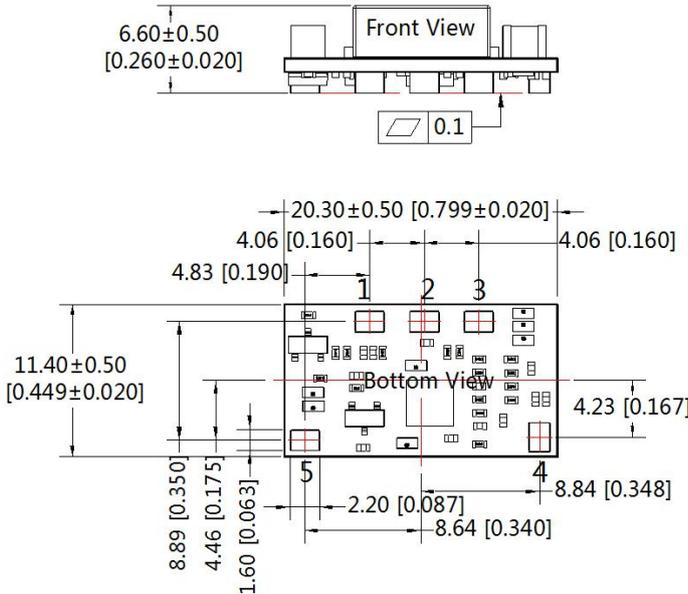
| Pin-Out	
Pin	Mark
1	GND
2	Trim
3	+Vo
4	Ctrl
5	Vin

Note:
Unit: mm[inch]
General tolerances: ± 0.25[± 0.010]
The layout of the device is for reference only ,
please refer to the actual product

Notes:
1. For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number: 58210072;
2. The maximum capacitive load offered were tested at input voltage range and full load;
3. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta=25℃, humidity<75%RH with nominal input voltage, 5VDC output voltage and rated output load;
4. All index testing methods in this datasheet are based on company corporate standards;
5. We can provide product customization service, please contact our technicians directly for specific information;
6. Products are related to laws and regulations: see "Features" and "EMC";
7. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.

MORNSUN Guangzhou Science & Technology Co., Ltd.