DC/DC Converter

K12MT-6A Series

MORNSUN®

Non-isolated & regulated 6A single output POL power converter

RoHS

3 years Warranty

FEATURES

- High efficiency up to 94%
- Wide input voltage range: 4.5VDC-14.4VDC
- Adjustable output voltage: 0.6VDC-5.5VDC
- Operating ambient temperature range: -40℃ to +85℃
- Output short-circuit protection
- High-speed transient response
- Compact SMD package: 12.20 x 12.20 x 8.70mm
- SENSE, TRIM, PGOOD

K12MT-6A series is a 6A non-isolated switching regulator. The output voltage is accurately adjustable from 0.6V to 5.5V, and the product is featured with high efficiency, fast transient response, output short-circuit protection. 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.		
--	K12MT-6A-P(N)	12 (4.5-14.4)	15	0.6-5.5	6/0	91/94	1000

Notes: ① "P" indicates that the ON/OFF pin is positive logic control, "N" indicates that the ON/OFF pin is negative logic control;
② Exceeding the maximum input voltage may cause permanent damage;
③ The default output voltage is 0.6VDC, which can be adjusted to 1.2VDC, 1.8VDC, 2.5VDC, 3.3VDC, 5VDC. See Trim instructions for specific output voltage adjustment;
④ Unless 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		--	2660/1	--	mA
Start-up Voltage①			--	--	4.5	VDC
Reverse Polarity Input			Avoid / Not protected			
Hot Plug			Unavailable			
Input Filter			Capacitance filter			
ON/OFF②	Module on	K12MT-6A-P (Positive logic)	ON/OFF pin open or pulled high (3VDC ~ Vin)			
		K12MT-6A-N (Negative logic)	ON/OFF pin open or pulled low to GND (-0.2VDC ~ 0.2VDC)			
	Module off	K12MT-6A-P(Positive logic)	ON/OFF pin pulled low to GND (-0.2VDC ~ 0.2VDC)			
		K12MT-6A-N (Negative logic)	ON/OFF pin pulled high (3VDC ~ Vin)			
	Input current when off		--	--	1	mA

Notes: ① Start-up voltage is 8VDC Max. under the 5VDC output voltage;
② The ON/OFF pin voltage is referenced to GND;
③ 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	Input voltage range, 0% -100% load	TRIM resistor with 0.1% tolerance	--	--	±1	%
		TRIM resistor with 1% tolerance	--	--	±3	
Linear Regulation	Full load, input voltage range	Vout≥2.5VDC	--	--	±0.4	%
		Vout<2.5VDC	--	--	±5	mV

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Load Regulation	Nominal input voltage, 10% -100% load	Vout＜5VDC	--	--	±10	mV
		Vout≥5VDC	--	--	±20	
Ripple & Noise①	20MHz bandwidth, nominal input voltage, 10%-100% load		--	50	100	mVp-p
Trim			0.6	--	5.5	VDC
Sense			--	--	0.5	V
Transient Response Deviation	Nominal input voltage, 50%-100%-50% load step change, di/dt=2.5A/us	Vout=0.6VDC Co=2*47μF + 4*330μF	--	±15	--	mV
		Vout=1.2VDC Co=47μF + 3*330μF	--	±25	--	
		Vout=1.8VDC Co=47μF + 330μF	--	±50	--	
		Vout=2.5VDC Co=3*47μF	--	±65	--	
		Vout=3.3VDC Co=3*47μF	--	±70	--	
		Vout=5VDC Co=2*47μF	--	±120	--	
Short-circuit Protection	Nominal input voltage		Re-power on or ON/OFF reset to recover			
Temperature Coefficient	100% load		--	--	±0.4	%/℃

Notes: ① Ripple & noise test needs to be connected to 0.1μF + 22μF ceramic capacitors;
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.			
Vibration		10-150Hz, 5G, 0.75mm. along X, Y and Z			
Switching Frequency	Full load, nominal input voltage	--	500	--	kHz
MTBF	MIL-HDBK-217F@25℃	18595	--	--	k hours

Mechanical Specifications

Dimensions	12.20 x 12.20 x 8.70mm
Weight	2.5g (Typ.)
Cooling Method	Nature convection

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Typical Characteristic Curves

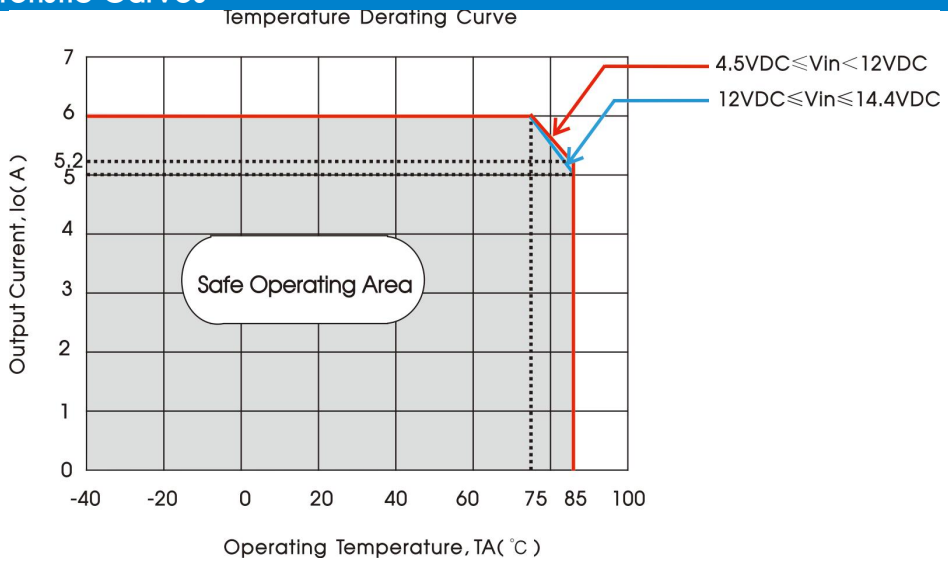
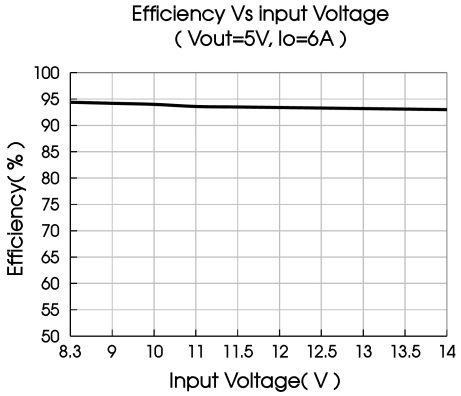
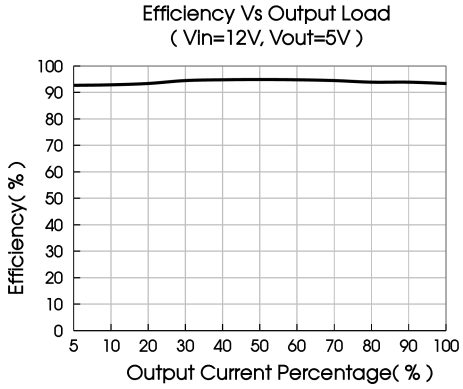


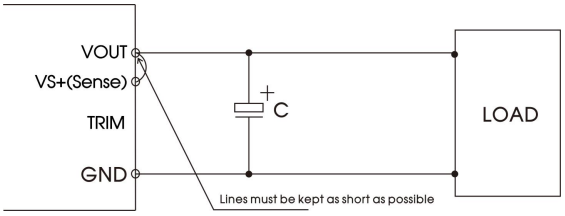
Fig. 1





Remote Sense Application

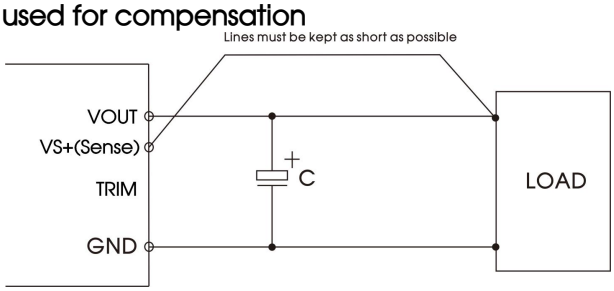
1. Remote sense connection if not used



Notes:

1. If the sense function is not used for remote regulation the user must connect the Sense to Vout at the DC-DC converter pins and will compensate for voltage drop across pins only;
2. The connections between Sense and Vout must be kept as short as possible, otherwise they may be picking up noise, interference and/or causing unstable operation of the power module.

2. Remote sense connection used for compensation



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Notes:

1. Using remote sense with long wires may cause unstable operation, please contact technical support if long wires must be used;
2. We recommend using adequate cross section for PCB-track layout and/or cables to connect the power supply module to the load in order to keep the voltage drop below 0.5V and to make sure the power supply's output voltage remains within the specified range;
3. Note that large wire impedance may cause oscillation of the output voltage and/or increased ripple. Consult technical support or factory for further advice of sense operation.

PGOOD Application

PGOOD recommended circuit

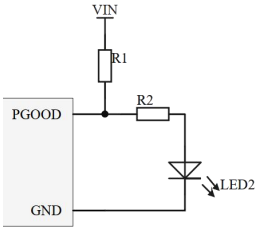

Fig. 2

Table 1

R1	100kΩ
R2	Selecting based on LED2's current in application

Notes:

PGOOD is the power good detection pin. When the product is working normally, PGOOD at a high level, and LED2 on; when the product is abnormal, which means the voltage on the FB pin is not within ±10% of the 0.6V, PGOOD is pulled to ground, and LED2 off.

Design Reference

1. Typical application

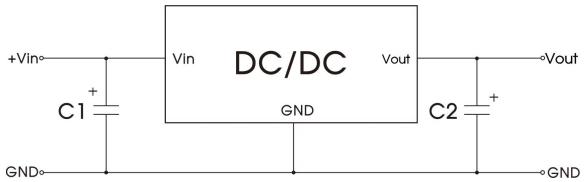

Fig. 3

Table 2

Part No.		C1	C2
K12MT-6A-P(N)	Vout=0.6V	100μF/35V	4*330μF
	Vout=1.2V		2*330μF
	Vout=1.8V		1*330μF
	Vout=2.5V		3*47μF
	Vout=3.3V		3*47μF
	Vout=5V		2*47μF

Notes:

1. The required capacitors C1 and C2 must be connected as close as possible to the terminals of the module, to ensure the stability of the converter;
2. To reduce the output ripple furtherly, increased values and/or tantalum or low ESR polymer capacitors may also be used instead;
3. Refer to Table 2 for C1 and C2 capacitor values;
4. Converter cannot be used for hot swap and with output in parallel.

2. Trim function for output voltage adjustment (open if unused)

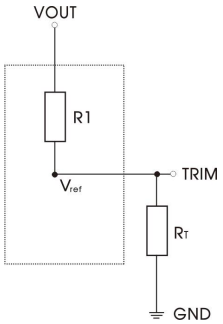

Fig. 4 TRIM resistor connection (dashed line shows internal resistor network)

Table 3

VOUT (VDC)	R_T (kΩ)
0.6	Open
1.2	20
1.8	10
2.5	6.316
3.3	4.444
5	2.727

Calculating Trim resistor (R_T) values: :

$$R_T(k\Omega) = \frac{12}{V_O - 0.6}$$

Notes: 1. R_T : Resistance of Trim; Vout: The trim up voltage;
2. If R_T = ∞ or Trim pin open, Vout = 0.6 VDC.

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

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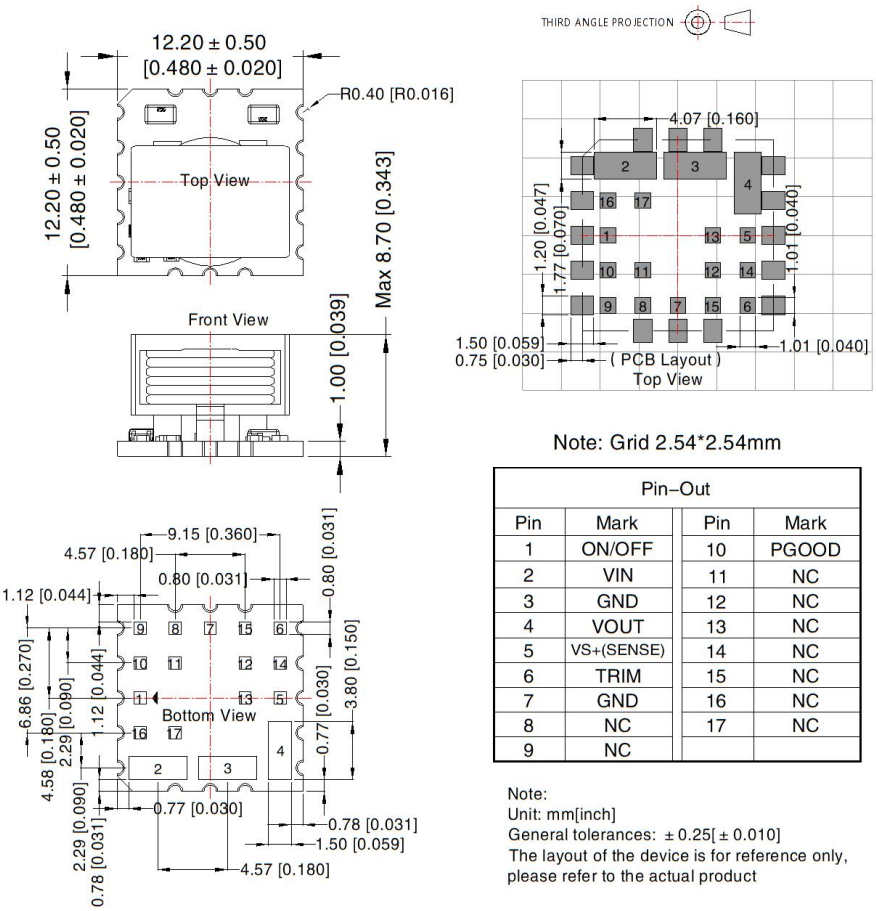
Dimensions and Recommended Layout

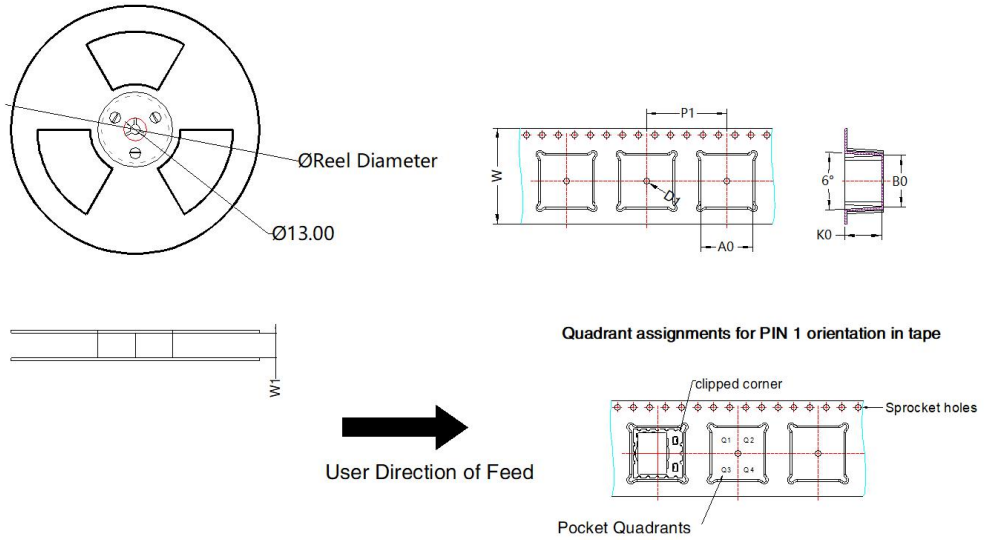


Note: Grid 2.54*2.54mm

Pin–Out			
Pin	Mark	Pin	Mark
1	ON/OFF	10	PGOOD
2	VIN	11	NC
3	GND	12	NC
4	VOUT	13	NC
5	VS+(SENSE)	14	NC
6	TRIM	15	NC
7	GND	16	NC
8	NC	17	NC
9	NC		

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

Tape and Reel Info



Device	Package Type	Pin	MPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Clipped corner Quadrant
K12MT-6A	SMD	17	340	330.0	24.4	12.95	12.95	9.1	20	24	Q2

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Notes:

1. For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number: 58210174;
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.

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