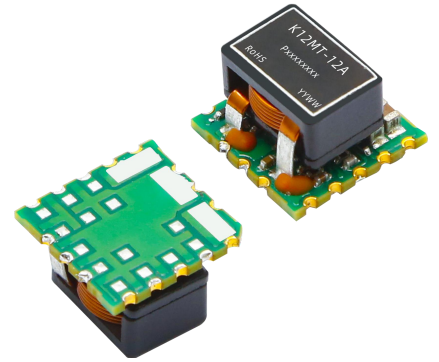## FEATURES

1. High efficiency up to 95%

2. Wide input voltage range: 4.5VDC-14.4VDC

3. Adjustable output voltage: 0.6VDC-5.5VDC

4. Operating ambient temperature range:-40℃ to +85℃

5. Output short-circuit protection

6. Fast transient response

7. SENSE, TRIM, PGOOD function

8. Compact SMD package: 12.20 x 12.20 x 8.70mm

Selection Guide

Part No.[1]	Input Voltage (VDC)		Output		Full Load Efficiency(%) Min./Typ.	Capacitive Load (µF)
	Nominal (Range)	Max[2]	Voltage[3] (VDC)	Current (A) Min./Max.		
K12MT-12A-P	12 (4.5-14.4)	15	0.6-5.5	0/12	92/95	1000
K12MT-12A-N		15	0.6-5.5	0/12	92/95	1000

Notes: ① "P" and "N" respectively indicate that the remote control pin (ON/OFF) is controlled by positive and negative logic;
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 "Typical Application Circuit" for specific output voltage regulation;
④ When Vo≥3.3VDC,please ensure the input/output voltage difference is greater than or equal to 2VDC;
⑤ 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		–	5260/35	–	mA
Start-up Voltage[1]			–	–	4.5	VDC
Reverse Polarity at Input		Avoid				
Hot Plug		Unavailable				
Input Filter		Capacitance filter				
ON/OFF[2]	Module on	K12MT-12A-P (positive logic)	ON/OFF pin pulled high (3VDC ~ Vin) or open			
		K12MT-12A-N (negative logic)	ON/OFF pin pulled low to GND (-0.2VDC~ 0.4VDC) or open			
	Module off	K12MT-12A-P (positive logic)	ON/OFF pin pulled low to GND (-0.2VDC ~ 0.3VDC)			
		K12MT-12A-N (negative logic)	ON/OFF pin pulled high (3VDC~ Vin)			
	Input current when off		–	–	1	mA

Note: ① When Vo=3.3VDC, the maximum start-up voltage is 5VDC. When Vo=5VDC, the maximum start-up voltage is 7VDC;
② The ON/OFF pin voltage is referenced to GND;
③ Unless otherwise specified, all indicators in the table are Vo=5VDC.

Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Voltage Accuracy	Full load, Input voltage range	TRIM resistor with 0.1% tolerance	–	–	±1	%
		TRIM resistor with 1% tolerance	–	–	±3	
Linear Regulation	Full load, Input voltage range	Vo≥2.5VDC	–	–	±30	mV
		Vo＜2.5VDC	–	–	±10	
Load Regulation	Nominal input voltage, 10%-100% load		–	–	±10	
Ripple & Noise*	20MHz bandwidth, nominal input voltage, 10%-100% load		–	50	100	mVp-p
Trim			0.6	–	5.5	VDC
Sense function			–	–	0.5	V
Transient Response Deviation	Nominal input voltage, 50%-100%-50% load, Tip and barrel method	Vo=0.6VDC Co=3*47µF//4*330µF	–	±50	–	mV
		Vo=1.2VDC Co=3*47µF//4*330µF	–	±50	–	
		Vo=1.8VDC Co=3*47µF//4*330µF	–	±100	–	
		Vo=2.5VDC Co=3*47µF//4*330µF	–	±100	–	
		Vo=3.3VDC Co=3*47µF//4*330µF	–	±100	–	
		Vo=5VDC Co=3*47µF//4*330µF	–	±100	–	
Short-circuit Protection	Nominal input voltage		Continuous, self-recovery			
Temperature Coefficient	Full load		–	±0.2	–	%/°C

Note: * ① The test output of ripple and noise should be connected with 0.1µF // 22µF ceramic capacitor; Using typical application circuits in the design reference, the ripple can be further reduced to 30mV
　　　② Unless otherwise specified, all indicators in the table are Vo=5VDC.

General Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Operating Temperature	See Fig.1	-40	–	+85	°C
Storage Temperature		-55	–	+125	
Storage Humidity	Non-condensing	5	–	95	%RH
Reflow Soldering Temperature		Peak temp.≤245°C, maximum duration time≤60s over 217°C. For actual application, please refer to IPC/JEDEC J-STD-020D.1.			
Switching Frequency	Full load, nominal input voltage	–	700	–	kHz
MTBF	MIL-HDBK-217F@25°C	18595	–	–	k hours
MSL	IPC/JEDEC J-STD-020D.1	MSL3			

Mechanical Specifications

Dimensions	12.20 x 12.20 x8.70mm
Weight	2.50g(Typ.)
Cooling Method	Free air convection

Typical Characteristic Curves

Vo = 1.2V Temperature Derating Curve

- Vin=5V 20LFM (Natural Convection)
- Vin=12V 20LFM (Natural Convection)
- Vin=5V 0LFM
- Vin=12V 0LFM

load current (A)

Safe Operating Area

Operating Temperature (℃)

Vo = 5V Temperature Derating Curve

- Vin=12V 20LFM (Natural Convection)
- Vin=12V 0LFM

load current (A)

Safe Operating Area

Operating Temperature (℃)

Fig. 1

Efficiency Vs input Voltage
(Vout=5V, Io=12A)

Efficiency (%)

K12MT-12A

Input Voltage (V)

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

Efficiency (%)

K12MT-12A

Output Current Percentage (%)

Remote Sense Application

1. Remote Sense Connection if not used

VOUT
VS+(Sense)
TRIM
GND

+
C

LOAD

The line must be kept as short as possible
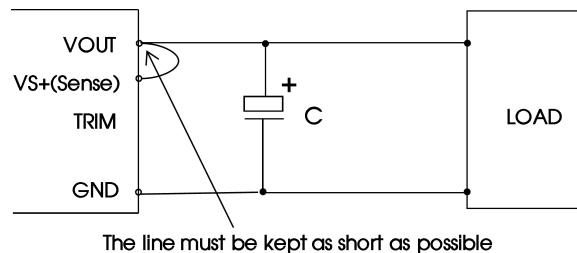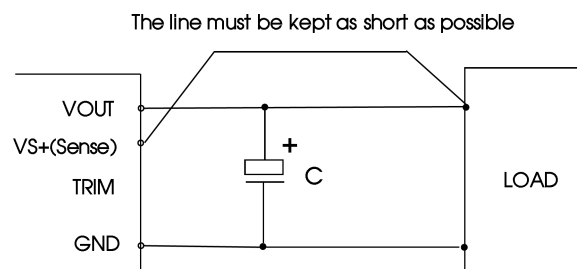
Notes：

1. If the sense function is not used for remote regulation the user must connect the VS+(Sense) to VOUT at the DC-DC converter pins and will compensate for voltage drop across pins only;

2. The connections between sense lines and their respective power lines 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

The line must be kept as short as possible

VOUT
VS+(Sense)
TRIM
GND

+
C

LOAD

Notes:

1. Using remote sense with long wires may cause unstable output, 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
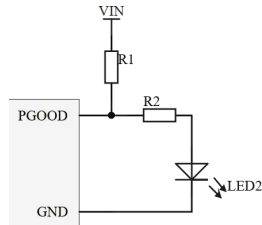
PGOOD recommended circuit

Table 1

VIN	3.3VDC
R1	100kΩ
R2	25-500Ω
LED2	MS-PT2012ZGSC

Notes:

1. PGOOD is the power good detection pin. When the product is working normally, PGOOD at a high impedance, and LED2 on. when the product is abnormal, which means the voltage on the Vref(FB) pin is not within ±10% of the 0.6V, PGOOD is pulled to low level(0-0.8VDC), and LED2 off;

2. PGOOD pin applied voltage is less than or equal to 4V.
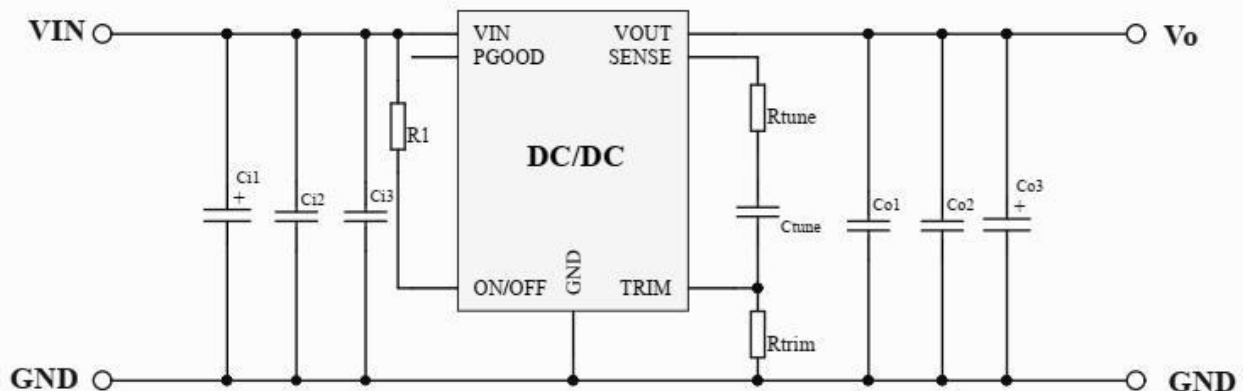
Design Reference

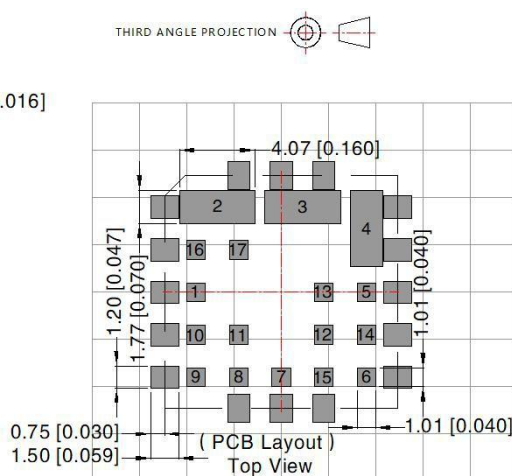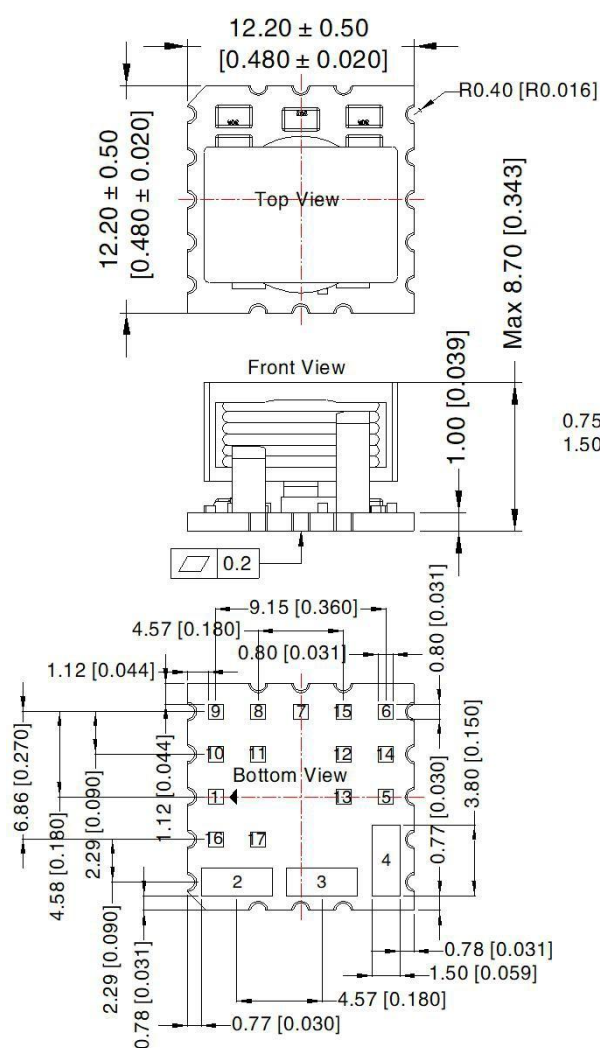## 1. Typical application

Table 2 Recommended device parameters:

Output voltage	Ci1	Ci2	Ci3	R1	Rtune	Ctune	Co1	Co2	Co3	Rtrim(kΩ)
Vo=0.6V	470µF/25V	2*22µF/25V	0.01µF/25V	100kΩ	150Ω	0.012µF/16V	0.01µF/6.3V	3*47µF/6.3V	4*330µF/6.3V	Open
Vo=1.2V					150Ω	0.022µF/16V				20
Vo=1.8V					150Ω	0.022µF/16V				10
Vo=2.5V					180Ω	0.022µF/16V				6.316
Vo=3.3V					180Ω	0.01µF/16V				4.444
Vo=5V					330Ω	0.01µF/16V				2.727

Note:

1. Calculation formula of TRIM resistance Rtrim: $Rtrim(k\Omega) = \dfrac{12}{V_O - 0.6}$

2. In order to ensure the stability of the module, the input end and output end shall be externally connected with C1 and C2 respectively, and the capacitor position shall be close to the pin end of the product;

3. This product does not support hot swap, and the output end cannot be used in parallel.

Dimensions and Recommended Layout

THIRD ANGLE PROJECTION

12.20 ± 0.50
[0.480 ± 0.020]

R0.40 [R0.016]

Top View

12.20 ± 0.50
[0.480 ± 0.020]

Max 8.70 [0.343]

Front View

1.00 [0.039]

0.2

4.07 [0.160]

(PCB Layout)
Top View

0.75 [0.030]
1.50 [0.059]

1.20 [0.047]
1.77 [0.070]
1.01 [0.040]
1.01 [0.040]

Note: Grid 2.54*2.54mm

9.15 [0.360]
4.57 [0.180]
0.80 [0.031]
0.80 [0.031]
1.12 [0.044]

Bottom View

3.80 [0.150]
0.77 [0.030]
0.030]

6.86 [0.270]
4.58 [0.180]
2.29 [0.090]
1.12 [0.044]
2.29 [0.090]
0.78 [0.031]

0.78 [0.031]
0.77 [0.030]
1.50 [0.059]
4.57 [0.180]

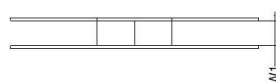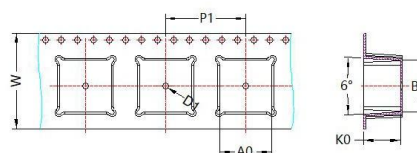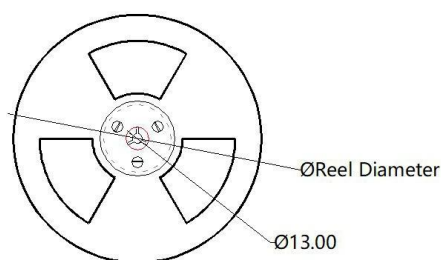| Pin–Out			
Pin	Mark	Pin	Mark
1	ON/OFF	10	PGOOD
2	VIN	11	NC
3	GND	12	NC
4	VOUT	13	NC
5	VS+(SENSE)	14	NC
6	TRIM	15	NC
7	GND	16	NC
8	NC	17	NC
9	NC		

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

ØReel Diameter

Ø13.00

P1
W
A0
6°
B0
K0

W1

User Direction of Feed

Quadrant assignments for PIN 1 orientation in tape

clipped corner
Sprocket holes
Q1 Q2
Q3 Q4
Pocket Quadrants
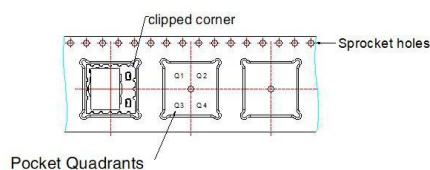
K12MT-12A	Package Type	Pin	MPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Clipped corner Quadrant
K12MT–6A	SMD	17	340	330.0	24.4	12.95	12.95	9.1	20	24	Q2

Notes:

1. If the product works under the minimum required load, it cannot guarantee that the performance of the product complies with all the performance indicators in this manual;

2. The maximum capacitive load is tested under the input voltage range and full load condition;

3. Unless otherwise stated, all indexes in this manual are measured at Ta=25°C, humidity <75%RH, nominal input voltage and rated output load;

4. All index testing methods in this manual are based on the enterprise standards of the company;

5. Our company can provide product customization, specific needs can directly contact our technical staff;

6.AMCHARD reserves the right to make changes to the product at any time without notice.