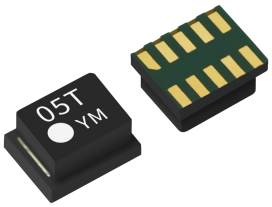
DC/DC Converter

KAP05T-3A

MORNSUN®

Regulated single output

DC-DC converter ultra-thin DFN package



Patent Protection RoHS

FEATURES

- Ultra-small, ultra-thin DFN package(2*2.5*1.4 mm)
- Operating ambient temperature range: -40℃ to +85 ℃
- High efficiency up to 94.5%
- No-load input current as low as 35 uA
- Output short-circuit protection

KAP05T-3A is high efficiency switching regulators. The converters feature high efficiency, low loss and short-circuit protection in a compact DFN package. These products are widely used in applications such as industrial control, instrumentation and electric power.

Selection Guide

Certification	Part No.	Input Voltage (VDC)*	Output		Full Load Efficiency (%) Typ. Vin=5.0V, Vo=4.0V	Capacitive Load (μF) Max.
		Nominal (Range)	Voltage (VDC)	Current (mA) Max.		
--	KAP05T-3A	5 (2.5~5.5)	0.6-4.0	3000	94.5%	470

Note: ①When the input voltage peak exceeds 6VDC, the input end needs to be connected with an external 47uF/16V electrolytic capacitor to prevent the module damage caused by the voltage peak;

②When the output voltage Vo > 3.3V, the maximum output current is 2000mA;

③Ensure that the input-output pressure difference is greater than or equal to 0.5V.

Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Current (no-load)	Vin=5V, Vo=1.2V, Io=0A	--	35	--	uA
Reverse Polarity at Input		Avoid / Not protected			
Input Filter		Capacitance filter			
ENI*	Module on	Ctrl pin pulled high(TTL (1.2~VIN)			
	Module off	Ctrl pin pulled low to GND (0~0.4VDC)			
	Input current when off	--	0.05	--	uA

Note: *The EN pin voltage is referenced to input GND and cannot be suspended.

Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Voltage Accuracy	Full load, input voltage range	--	±1	±3	%
Linear Regulation	Full load, input voltage range	--	0.5	1	
Load Regulation	Nominal input voltage, 0% -100% load	--	1	2	
Ripple & Noise*	20MHz bandwidth, nominal input voltage, full load	--	30	60	mVp-p
Temperature Coefficient	Operating temperature -40℃ to + 85℃	--	±0.02	--	%/℃
Transient Response Deviation	Nominal input voltage, 25% load step change	--	±50	±120	mV
Transient Recovery Time		--	100	500	us
Short-circuit Protection		Continuous, self-recovery			

Note: * The "parallel cable" method is used for ripple and noise test, please refer to DC-DC Converter Application Notes for specific information;

General Specifications

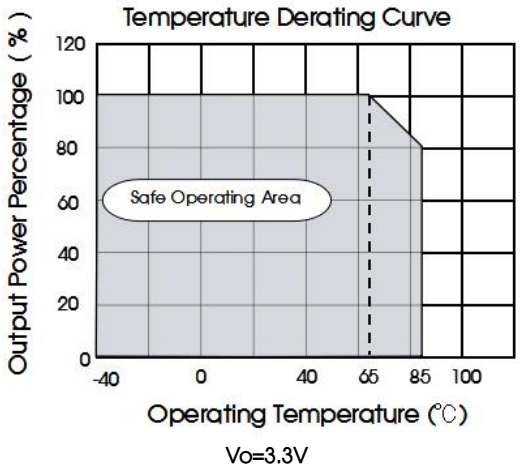
Item	Operating Conditions	Min.	Typ.	Max.	Unit
Operating Temperature	See Fig. 1	-40	--	85	℃
Storage Temperature		-55	--	125	
Storage Humidity	Non-condensing	5	--	95	%RH
Reflow Soldering Temperature		Peak temperature ≤245℃, duration ≤60s max. over 217℃			
Switching Frequency	Full load, nominal input voltage	--	2.2	--	MHz
MTBF	MIL-HDBK-217F@25℃	2000	--	--	k hours
Operating altitude		--	--	2000	m
Vibration		10-150Hz, 5G, 0.75mm. along X, Y and Z			
Moisture Sensitivity Level (MSL)	IPC/JEDEC J-STD-020D.1	Level 3			
Pollution Degree		PD 3			

Note: *Please refer to IPC/JEDEC J-STD-020D.1.

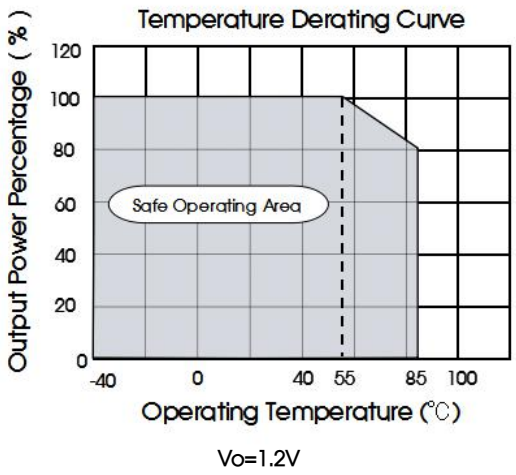
Mechanical Specifications

Dimensions	2.5 x 2.0 x 1.4 mm
Weight	0.027g(Typ.)
Cooling Method	Free air convection

Typical Characteristic Curves

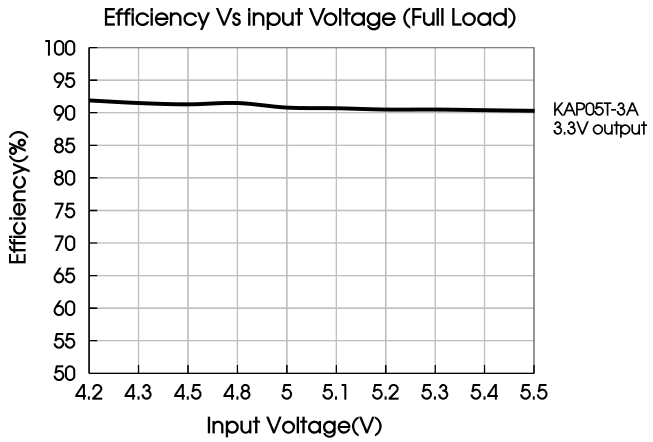


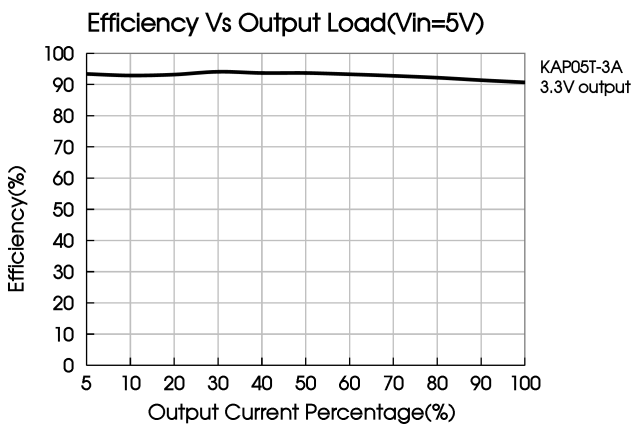
Vo=3.3V



Vo=1.2V

Fig. 1





Design Reference

1. Typical application

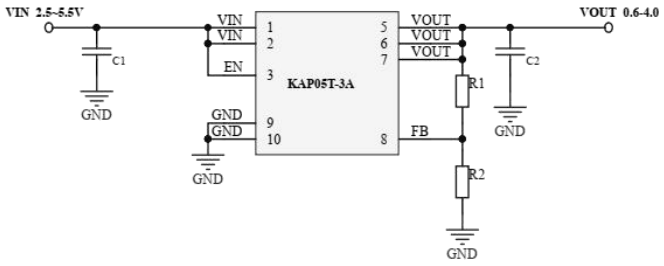


Fig. 2 Typical application circuit

Output voltage	C1/C2 (ceramic capacitor)	R1	R2
0.6V	10uF/16V	100kΩ	--
1.2V		100kΩ	100kΩ
1.8V		150kΩ	300kΩ
3.3V		68kΩ	15kΩ
4.0V		68kΩ	12kΩ

Table 1

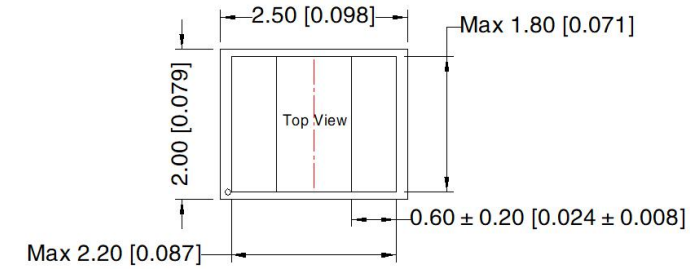
$$V_O = 0.6 \times (1 + \frac{R_1}{R_2})$$

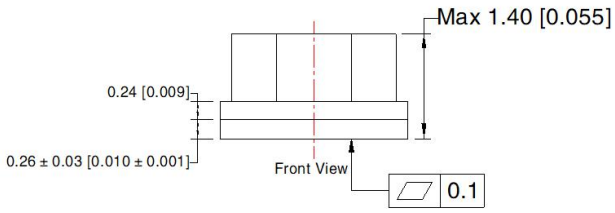
Notes:
1. The required C1 and C2 capacitors must be connected as close as possible to the terminals of the module;
2. Refer to Table 1 for C1 and C2 capacitor values. For certain applications, increased values and/or tantalum or low ESR electrolytic capacitors may also be used instead;
3. Converter cannot be used for hot swap and with output in parallel.

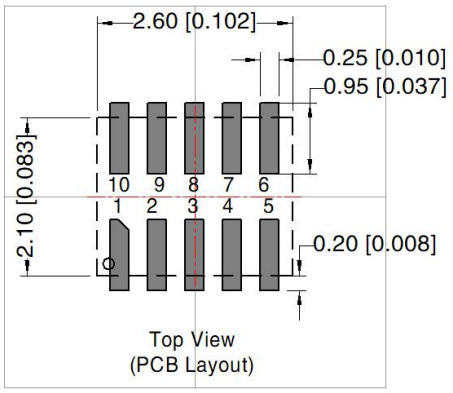
2. For additional information please refer to DC-DC converter application notes on www.mornsun-power.com

Dimensions and Recommended Layout

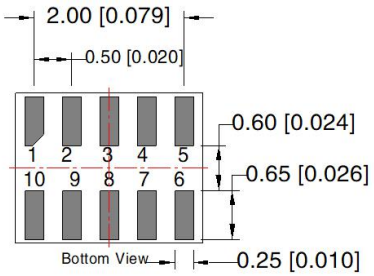
THIRD ANGLE PROJECTION







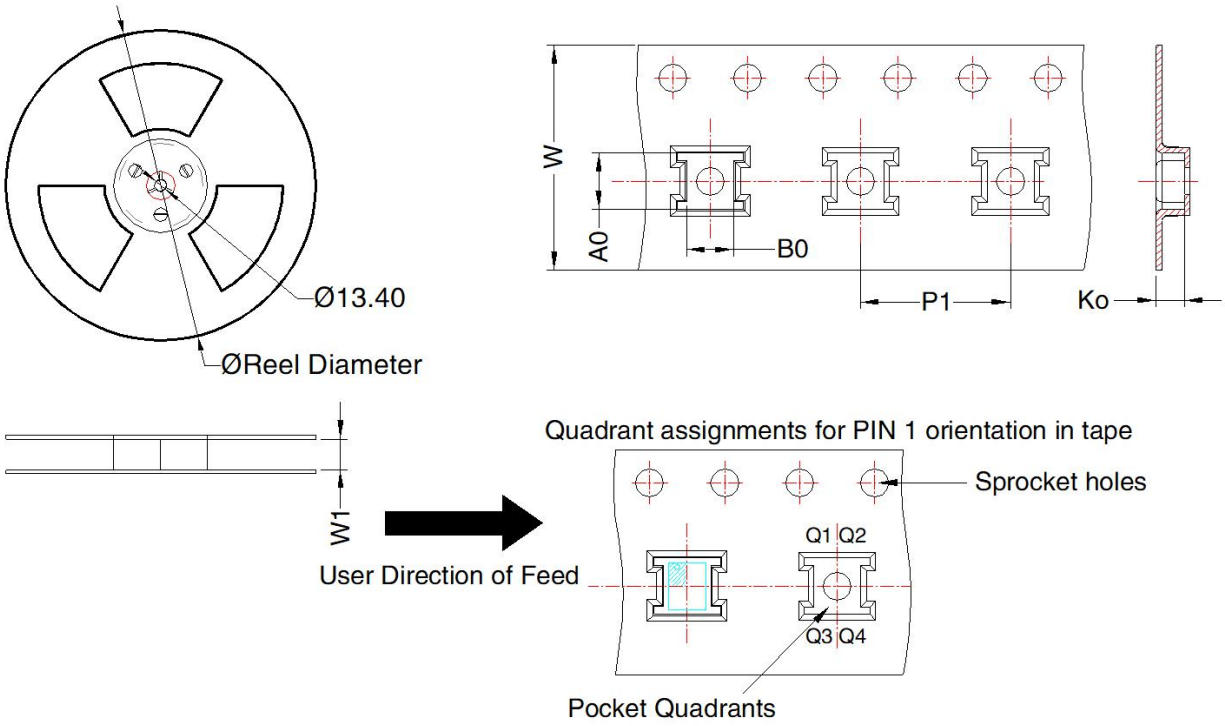
Note: Grid 2.54*2.54mm



Pin-Out	
Pin	Mark
1,2	Vin
3	EN
4	PG
5,6,7	VOUT
8	FB
9,10	GND

Note:
Unit: mm[inch]
General tolerances: ± 0.10[± 0.004]

Tape/Reel packaging



Device	Package Type	Pin	MPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
KAP05T-3A	DFN 2x2.5	8	1300	178.0	12.4	3.0	2.50	1.50	8.0	12.0	Q1

Notes:

1. For additional information on Product Packaging please refer to www.mornsun-power.com. Tape/Reel packaging bag number: 58240114;
2. The maximum capacitive load offered were tested at nominal input voltage 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 and rated output load;
4. All index testing methods in this datasheet are based on our 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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