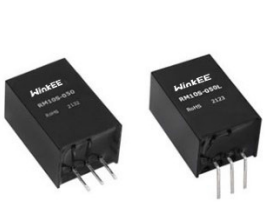
RM05SU Series

0.5A, Non-isolated SIP Package Switching Regulators

Features

- Rated current: 0.5A Max
- Non-isolated, step-down switching regulators
- Input range: 9~90VDC
- Regulated single output with low ripple and noise
- High efficiency up to 95%
- Operating temperature range: -40 ~ +85°C ambient
- RoHS compliant
- Compact SIP3 package
- Compatible with LM78 linear regulators
- Continuous short circuit protection
- Designed to meet: UL/IEC/EN 62368-1
- 5 year warranty



Overview

The RM05SU series are non-isolated switching regulators, pin to pin compatible with LM78 family linear regulators. Unlike those linear regulators, the RM series switching regulators are high efficiency up to 95%. They do not need for any heatsink because very little energy is wasted as heat. Besides, these converters accept very wide input voltage range 9~90VDC, operate over wide ambient temperature range -40 ~ +85°C, and are short circuit and overheat protected. These converters are especially suitable for applications such portable devices, where energy saving, space saving and high performance are essential.

Model Numbers

Model Number	Input Voltage Range [VDC]			V_{OUT} [VDC]	I_{OUT} [mA] Max.	Efficiency [%] Typ.		Capacitive Load [uF] Max.
	Nominal	Min.	Max.			Min. V_{IN}	Max. V_{IN}	
RM05SU-033	48	9	90	3.3	500	82	75	100
RM05SU-050	48	9	90	5	500	87	81	100
RM05SU-065	48	9	90	6.5	500	91	84	100
RM05SU-090	48	14	90	9	500	92	86	100
RM05SU-120	48	18	90	12	500	93	89	100
RM05SU-150	48	20	90	15	500	94	90	100
RM03SU-024	48	36	90	24	300	95	91	100

* Only typical models are listed. Contact our sales agent for availability of other models.
* Add suffix "L" for pins bended to L shape. See Mechanical Specifications for details. E.g. RM05SU-050L, RM05SU-150L

Electrical Specifications

Unless otherwise indicated, specifications are measured at T_A=25°C, nominal input voltage, full load after warm up.

Parameters	Conditions	Min.	Typ.	Max.	Unit	Note
No load input current	V_{IN} = Min. to Max.	-	0.2	1.5	mA	
Output voltage accuracy Full load	RM05SU-033 Other models	-	±3 ±2	±4 ±3	%	
Line regulation V_{IN} = Min. to Max.		-	±0.6	±1	%	
Load regulation I_{OUT} = 10%~100%		-	±0.5	±1	%	
Temperature coefficiency	-40°C~+85°C	-	-	±0.03	%/°C	
Output ripple and noise	20MHz bandwidth	-	40	80	mVp-p	
Dynamic load response I_{OUT}=25%~50%~75% of $I_{OUT, rated}$	Peak deviation Recovery time	-	±0.4 1	±1.5 1.5	V_{OUT} % mS	
Minimum load required		10	-	-	%	
Output short circuit protection		Continuous, automatic recovery				
Input filter		Capacitor				

General Specifications

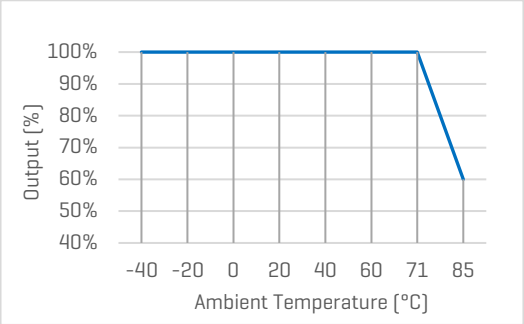
Parameters	Conditions	Min.	Typ.	Max.	Unit	Note
Operating temperature	See "Derating Curve"	-40	-	+85	°C	
Storage temperature		-55	-	+125	°C	
Storage humidity	Non-condensing	5	-	95	%RH	
Maximum case temperature		-	65	100	°C	
Switching frequency	Full load	120	-	800	KHz	
Pin soldering resistance 1.5mm away from case for 10 sec		-	-	300	°C	
Case material		Black plastic UL94-V0				
Cooling method		Free air convection				
Design based on standards		UL/EN/IEC 62368-1				
Safety certifications		EN 62368-1				
EMC	Emissions Immunity	CISPR32, EN55032 Class B* (external circuit required) IEC/EN61000-4-2, 3, 4, 6				
MTBF	MIL-HDBK-217F	>2,000,000 Hours, T_A=25°C				
Size	Default package Suffix "L" package	11.5 x 9.0 x 17.5 mm 19.0 x 11.5 x 9.0 mm				
Weight		4g Typ.				

Characteristic Curves

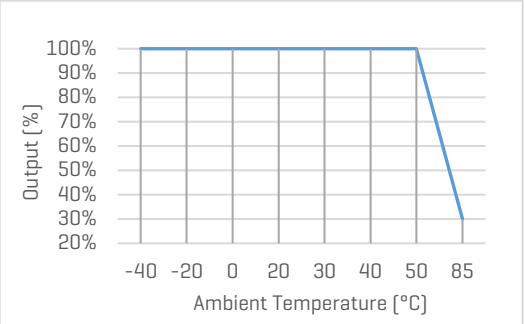
Derating Curve

Output vs Ambient Temperature

V_{IN}<60VDC

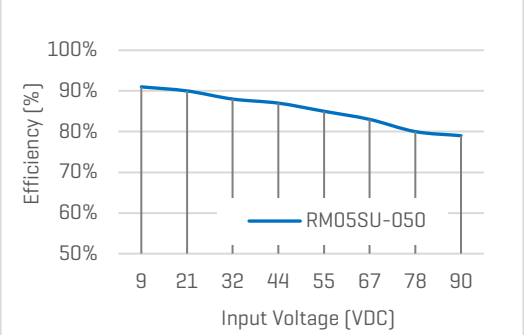


V_{IN}=60~90VDC



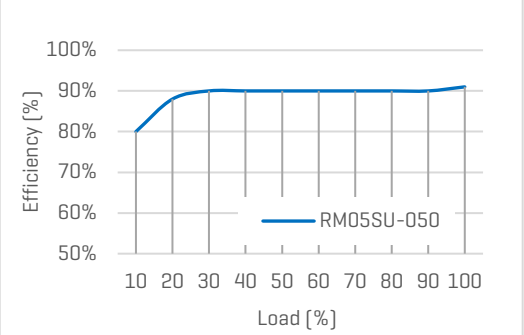
Efficiency vs Input Voltage

Full Load



Efficiency vs Load

Nominal input voltage



Recommended External Circuit

Typical Application Circuit

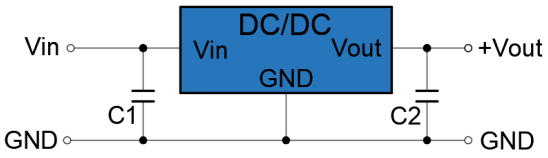


Figure 1: Typical application circuit

[Table 1] Recommended component specifications

Models	C1	C2
V_{OUT}=3.3, 5, 6.5V	47uF, 100V	22uF, 10V
V_{OUT}=9V	47uF, 100V	22uF, 16V
V_{OUT}=12, 15V	47uF, 100V	22uF, 25V
V_{OUT}=24V	47uF, 100V	22uF, 50V

1. C1 and C2 are required for the operating, and to be connected as close to the converter as possible.
2. These converters are not allowed to use in parallel or hot plug without support from properly designed external circuits.

EMC Enhancement for EN55032 Class B

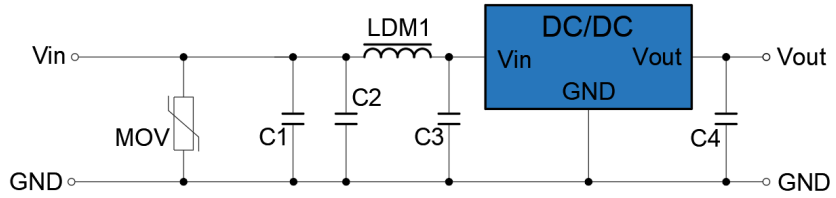


Figure 2: Circuit for EMC enhancement

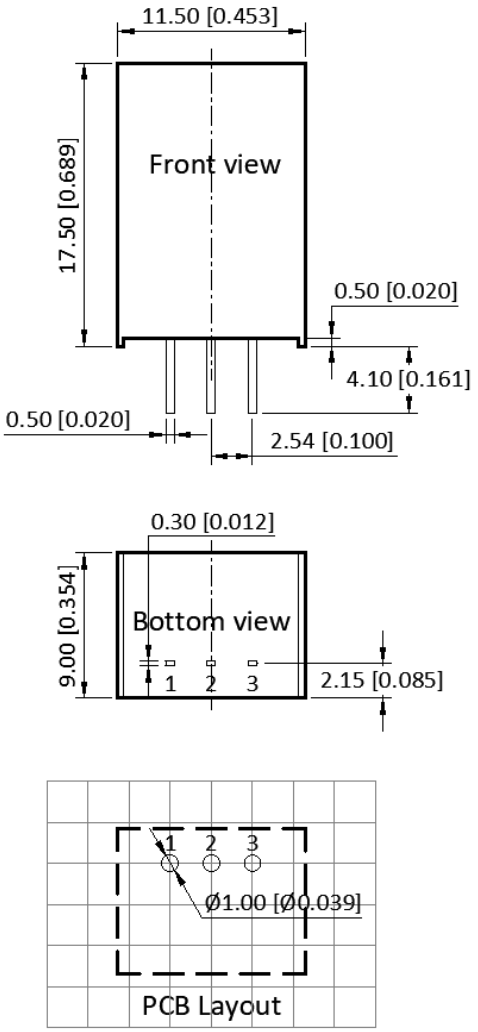
[Table 2] Recommended component spec

Component	MOV	LDM1	C1	C2	C3
Spec	S20K30	120uH	270~470uF	1~3.3uF	0.68~2.2uF

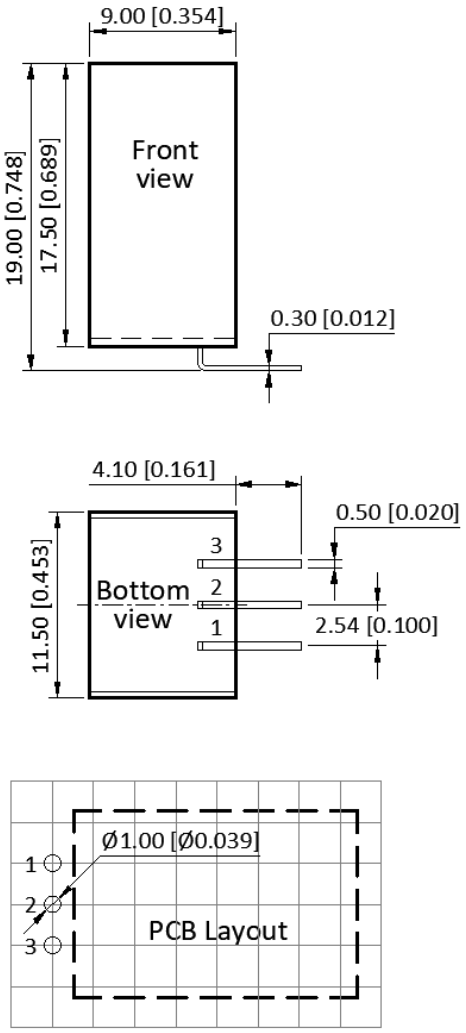
*C4 Refer to C2 in [Table 1]

Mechanical Specifications

Default Package



Suffix "L" Package



Note

* Unless otherwise specified unit: mm [inch]
* General tolerance: ±0.50 [±0.020]
* Pin thickness tolerance: ±0.10 [±0.004]
* Footprint grid: 2.54 x 2.54 mm

Pin Definition

Pin #	Positive Out	Negative Out
1	$+V_{IN}$	$+V_{IN}$
2	GND	$-V_{OUT}$
3	$+V_{OUT}$	GND