

Features

Regulated Converters

- 3W power in SMD package
- 4:1 Input voltage range
- Efficiency up to 84%
- 1.6kVDC/1min isolation
- Regulated output
- -40°C to +71°C at full load
- Continuous short circuit protected



R3M

3 Watt
SMD
Single & Dual
Output



Description

The R3M is an isolated 3W DC/DC converter in a compact SMD package available with 4:1 inputs covering 5, 12, 24, and 48V rails providing single or dual regulated, short-circuit protected outputs. There is no minimum load requirement. Isolation is 1.6kVDC/1min, and the operating temperature is from -40°C up to +71°C without derating. Class A and Class B EMC conformity requires only a few external components. Standard packaging is tube.

Selection Guide

Part Number	Input Voltage Range ⁽¹⁾ [VDC]	nom. Output Voltage [VDC]	Output Current [mA]	Efficiency typ. ⁽²⁾ [%]	max. Capacitive Load ⁽³⁾ [μF]
R3M-xx3.3S/SMD	4.5-18, 9-36, 18-75	3.3	700	76-77	4700
R3Mxx05S/SMD	4.5-18, 9-36, 18-75	5	600	80	2530
R3Mxx09S/SMD	4.5-18, 9-36, 18-75	9	333	81	1470
R3M-xx12S/SMD	4.5-18, 9-36, 18-75	12	250	83	1220
R3M-xx15S/SMD	4.5-18, 9-36, 18-75	15	200	83-84	1000
R3M-xx24S/SMD	4.5-18, 9-36, 18-75	24	125	82	470
R3M-xx05D/SMD	4.5-18, 9-36, 18-75	±5	±300	80	±1470
R3M-xx12D/SMD	4.5-18, 9-36, 18-75	±12	±125	82	±680
R3M-xx15D/SMD	4.5-18, 9-36, 18-75	±15	±100	82	±470

Notes:

Note1: Refer to "Input Voltage Range"

Note2: Efficiency is tested at nominal input and full load at +25°C ambient

Note3: Max Cap Load is tested at nominal input and full resistive load

Model Numbering



Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

BASIC CHARACTERISTICS						
Parameter		Condition		Min.	Typ.	Max.
Input Voltage Range		nom. V _{IN} = 12VDC		4.5VDC	12VDC	18VDC
		nom. V _{IN} = 24VDC		9VDC	24VDC	36VDC
		nom. V _{IN} = 48VDC		18VDC	48VDC	75VDC
Input Surge Voltage		1 second max.	nom. V _{IN} = 12VDC			25VDC
			nom. V _{IN} = 24VDC			50VDC
			nom. V _{IN} = 48VDC			100VDC
continued on next page						

Specifications (measured @ $T_a = 25^\circ\text{C}$, nom. V_{in} , full load and after warm-up unless otherwise stated)

BASIC CHARACTERISTICS

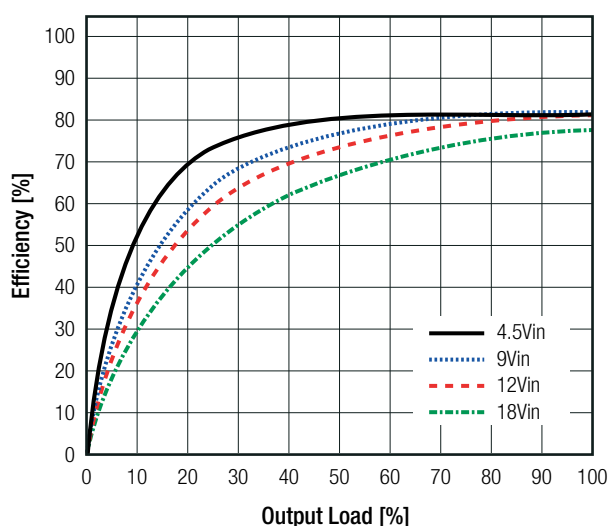
Parameter	Condition	Min.	Typ.	Max.
Quiescent Current	nom. $V_{in} = 12\text{VDC}$		40mA	
	nom. $V_{in} = 24\text{VDC}$		20mA	
	nom. $V_{in} = 48\text{VDC}$		15mA	
Start-up time	power up, CTRL ON/OFF		10ms	20ms
ON/OFF CTRL ⁽⁴⁾	DC-DC ON	open or high impedance		
	DC-DC OFF	2mA	3mA	4mA
Standby Current	DC-DC OFF		2.5mA	
Internal Operating Frequency		100kHz		
Output Ripple and Noise	20MHz BW		50mVp-p	
Reflected Back Ripple Current	with external components	nom. $V_{in} = 12\text{VDC}$	20mA _{p-p}	
		nom. $V_{in} = 24\text{VDC}$	30mA _{p-p}	
		nom. $V_{in} = 48\text{VDC}$	20mA _{p-p}	

Notes:

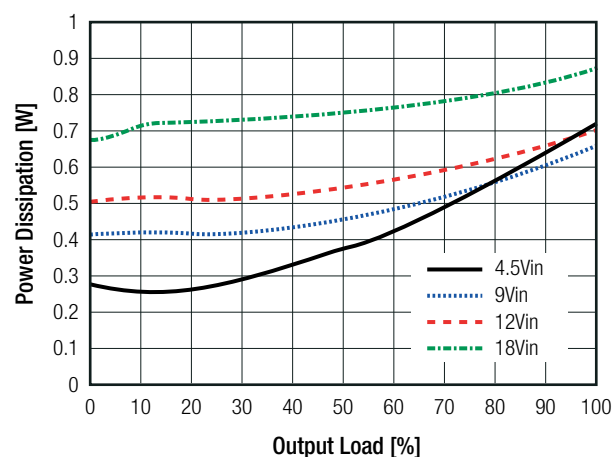
Note4: Refer to "ON/OFF CTRL"

R3M-1212S

Efficiency vs. Load

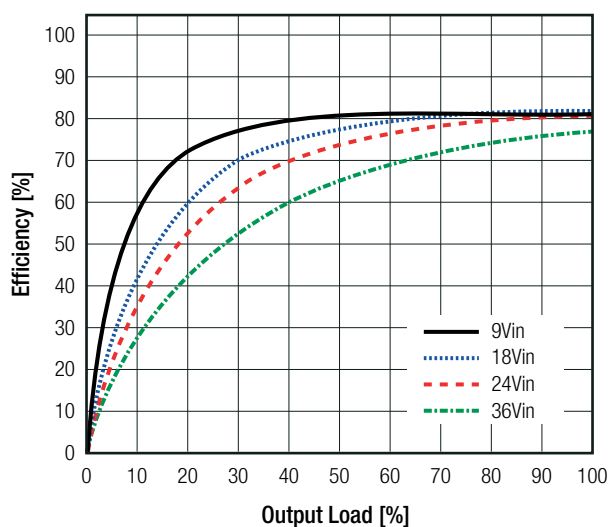


Power Dissipation vs. Load

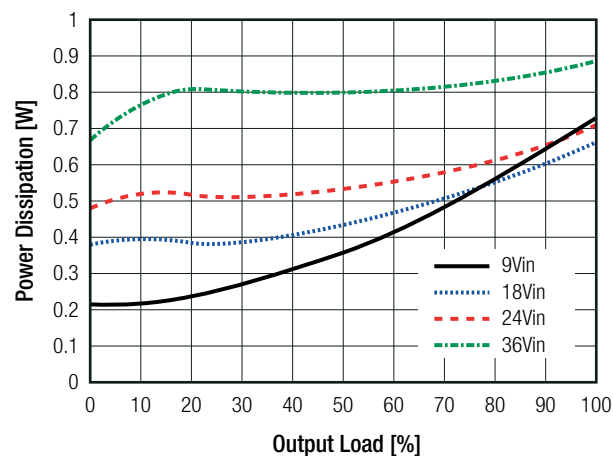


R3M-2405S

Efficiency vs. Load



Power Dissipation vs. Load

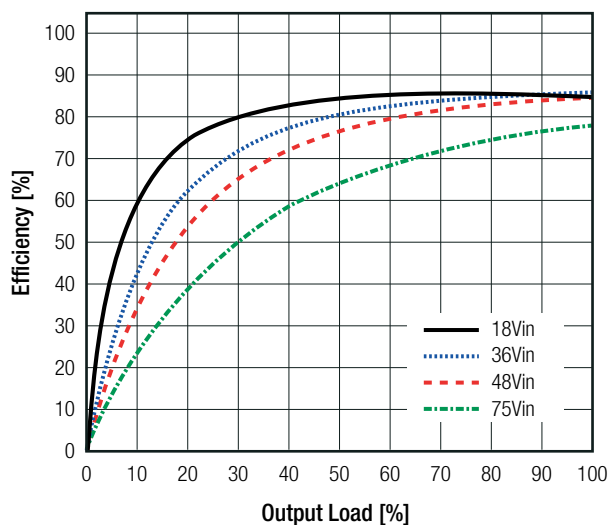


continued on next page

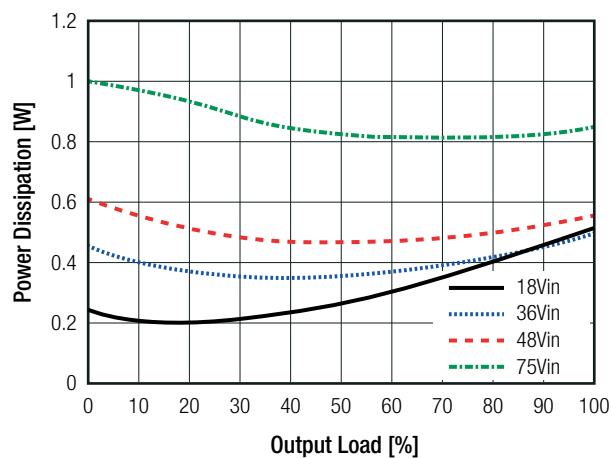
Specifications (measured @ $T_a = 25^\circ\text{C}$, nom. V_{in} , full load and after warm-up unless otherwise stated)

R3M-4812S

Efficiency vs. Load

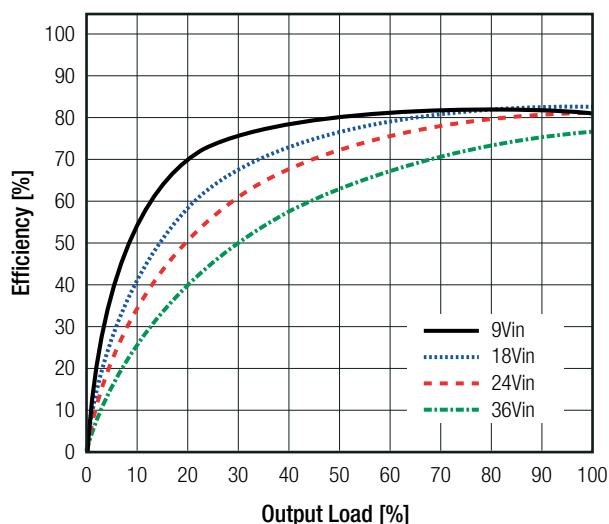


Power Dissipation vs. Load

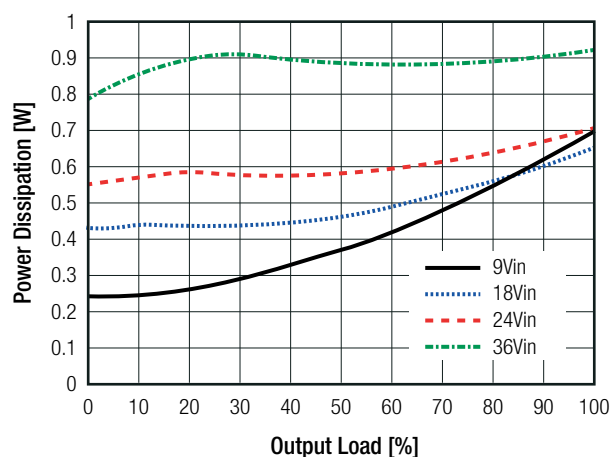


R3M-2405D

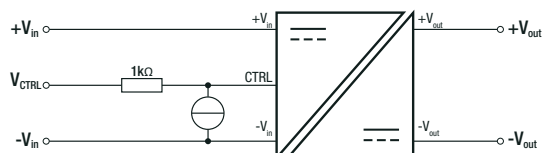
Efficiency vs. Load



Power Dissipation vs. Load



ON/OFF CTRL



DC-DC ON	Open or high impedance
DC-DC OFF	2.0mA to 4.0mA max.

Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

REGULATIONS

Parameter	Condition		Value
Output Accuracy			±1.0% max.
Line Regulation	low line to high line, full load		±0.2% max.
Load Regulation	0% to 100% load	single	1% max.
		dual	1% max.
	10% to 90% load	single	0.5% max.
		dual	0.8% max.
Cross Regulation	asymmetrical 25% / 100% load		±5% max.
Transient Response Recovery Time	25% load step change		±500µs typ.

PROTECTIONS

Parameter	Type		Value
Short Circuit Protection (SCP)			continuous, auto recovery
Isolation Voltage ⁽⁵⁾	I/P to O/P	1 minute	1.6kVDC min.
Isolation Resistance	I/P to O/P, V _{ISO} = 500VDC		1GΩ min.
Isolation Capacitance	I/P to O/P, 100kHz/0.1V		50pF typ.

Notes:

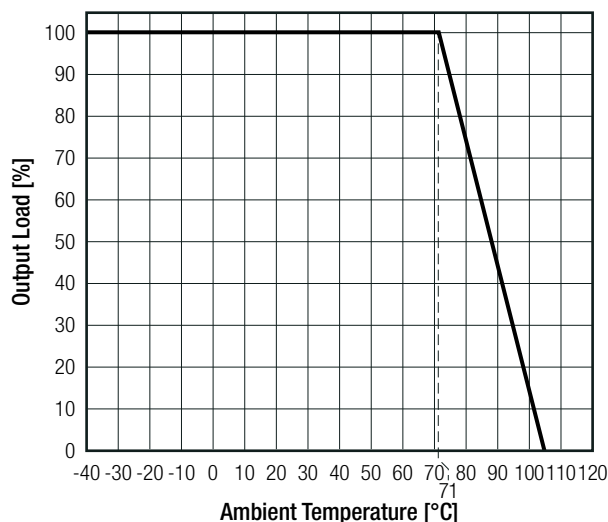
Note5: This power module is not internally fused. An input line fuse must always be used
Recom suggests: 12Vin=T1.6A; 24Vin=T0.8A; 48Vin=T0.5A slow blow

ENVIRONMENTAL

Parameter	Condition		Value
Operating Temperature Range	with derating		-40°C to +105°C
	without derating		-40°C to +71°C
Maximum Case Temperature	measured at " <i>tc point</i> "		+105°C
Operating Humidity	non-condensing		5% - 95% RH max.
Thermal Shock			according to MIL-STD-810F
Vibration			according to MIL-STD-810F
MTBF	according to MIL-HDBK-217F, G.B.	+25°C	5627 x 10 ³ hours

Derating Graph

(@ Chamber and natural convection 0.1m/s)

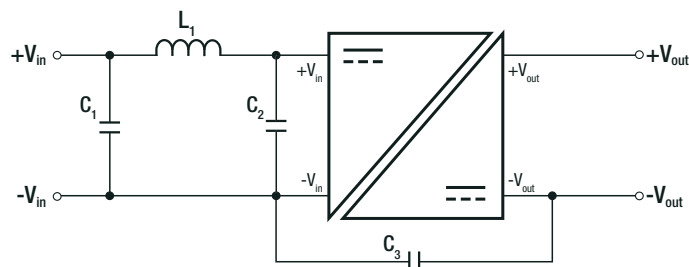


Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

SAFETY AND CERTIFICATIONS

Certificate Type (Safety)	File Number	Standard
RoHS2		RoHS-2011/65/EU + AM-2015/863
EMC Compliance	Condition	Standard / Criterion
Electromagnetic compatibility of multimedia equipment – Emission Requirements	with external filter refer to “EMC Filtering”	EN55032, Class A and B

EMC Filtering Suggestions according to EN55032



Class A Component List

Model	C1	C2	C3	L1
R3M-12xxS	22μF	N/A	220pF	6.8μH
R3M-24xxS	10μF	N/A	470pF	15μH
R3M-48xxS	2.2μF	N/A	680pF	68μH

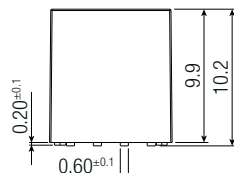
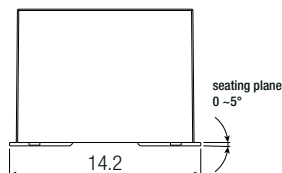
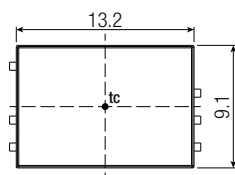
Class B Component List

Model	C1, C2	C3	L1
R3M-12xxS	22μF	220pF	6.8μH
R3M-24xxS	10μF	470pF	15μH
R3M-48xxS	2.2μF	680pF	68μH

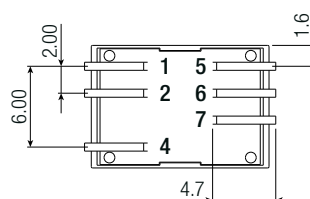
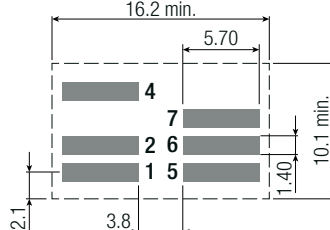
DIMENSION AND PHYSICAL CHARACTERISTICS

Parameter	Type	Value
Material	baseplate/case	black plastic (UL94 V-0)
	potting	silicone (UL94 V-0)
Dimension (LxWxH)		14.2 x 9.1 x 10.2mm
Weight		2.7g typ.

Dimension Drawing standard “/SMD” version (mm)



Recommended Footprint Details



Pinning Information

Pin #	Single	Dual
1	+Vin	+Vin
2	-Vin	-Vin
4	CTRL	CTRL
5	NC	-Vout
6	-Vout	COM
7	+Vout	+Vout

NC= no connection

Tolerance:
xx.x = ±0.5mm
xx.xx = ±0.25mm

Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

PACKAGING INFORMATION

Parameter	Type	Value
Packaging Dimension (LxWxH)	tube	218.0 x 17.2 x 19.9mm
Packaging Quantity		20pcs
Storage Temperature Range	non-condensing	-55°C to +125°C
Storage Humidity		5% to 95% RH max.
Moisture Sensitive Level	MSL peak temp. ⁽⁶⁾	Level 2

Notes:

Note6: The Moisture Sensitivity Level rating is according to the JEDEC industry standard classifications and peak solder temperature

The product information and specifications may be subject to changes even without prior written notice. The product has been designed for various applications; its suitability lies in the responsibility of each customer. The products are not authorized for use in safety-critical applications without RECOM's explicit written consent. A safety-critical application is an application where a failure may reasonably be expected to endanger or cause loss of life, inflict bodily harm or damage property. The applicant shall indemnify and hold harmless RECOM, its affiliated companies and its representatives against any damage claims in connection with the unauthorized use of RECOM products in such safety-critical applications.