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

RECOM
DC/DC Converter

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

R3M- ☐☐ **/SMD**

- ☐☐ — nom. Input Voltage / nom. Output Voltage
- /SMD — Case Style
- ☐☐ — **S**ingle/**D**ual

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

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

BASIC CHARACTERISTICS

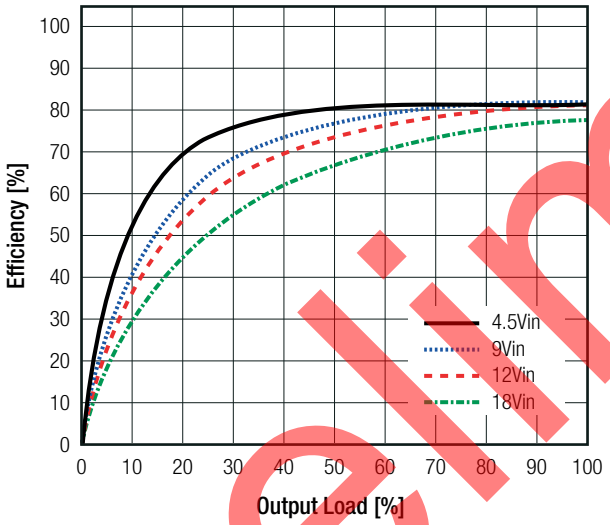
Parameter	Condition		Min.	Typ.	Max.
Quiescent Current	nom. V_{IN}= 12VDC			40mA	
	nom. V_{IN}= 24VDC			20mA	
	nom. V_{IN}= 48VDC			15mA	
Start-up time	power up, CTRL ON/OFF			10ms	20ms
ON/OFF CTRL [4]	DC-DC ON		open or high impedance		
	DC-DC OFF		2mA	3mA	4mA
Standby Current	DC-DC OFF			2.5mA	
Internal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

Notes:

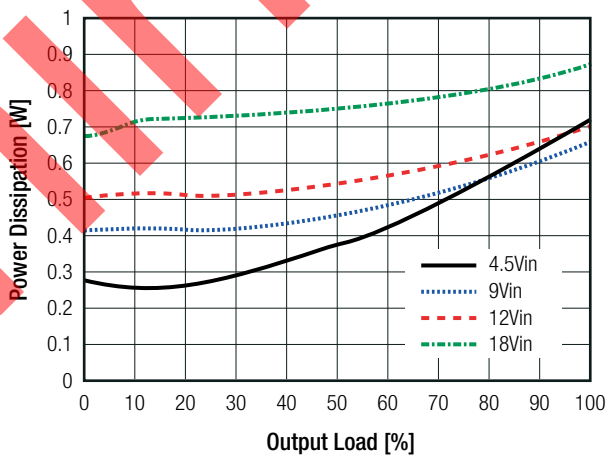
Note4: Refer to ***"ON/OFF CTRL"***

R3M-1212S

Efficiency vs. Load

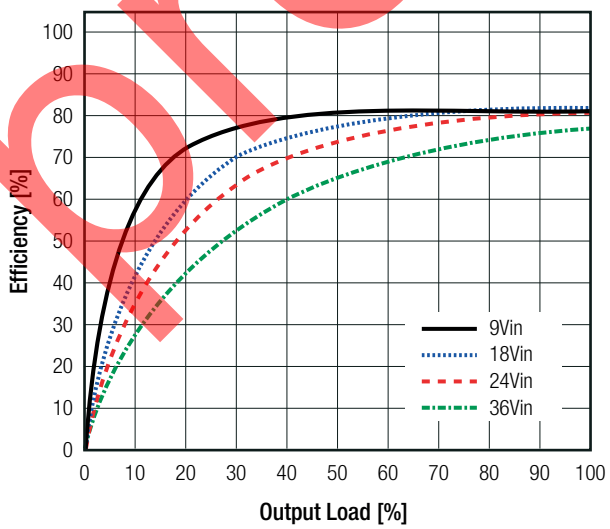


Power Dissipation vs. Load

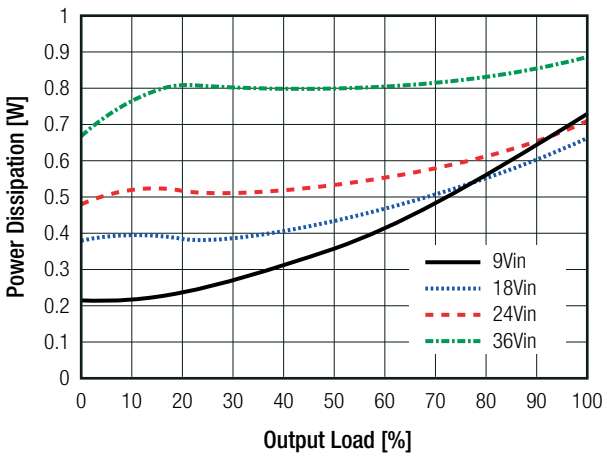


R3M-2405S

Efficiency vs. Load



Power Dissipation vs. Load



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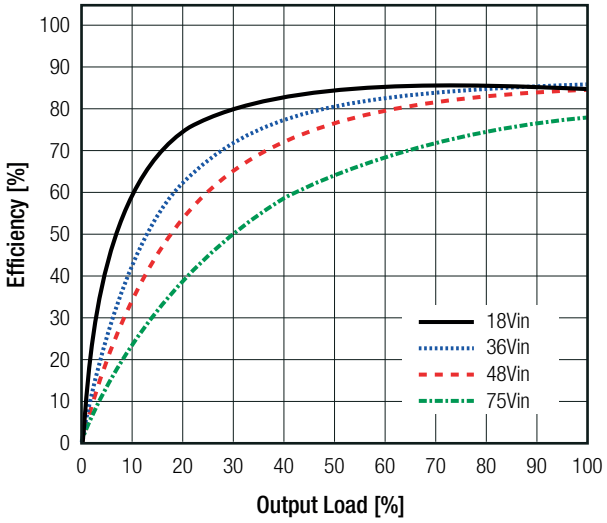
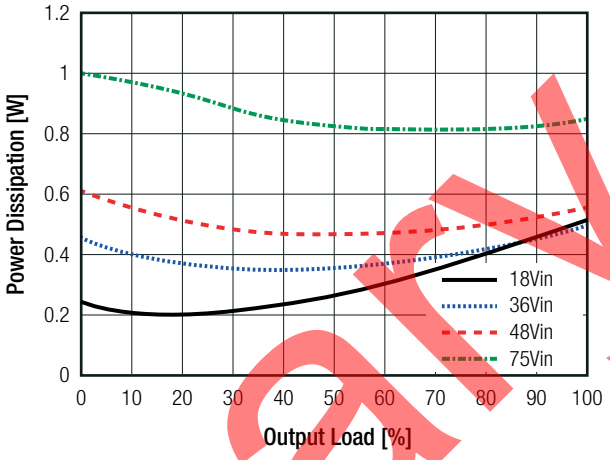
Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

R3M-4812S

Efficiency vs. Load

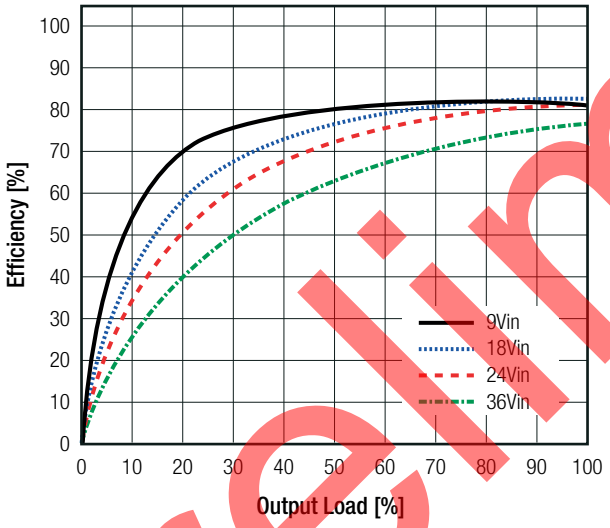


Power Dissipation vs. Load

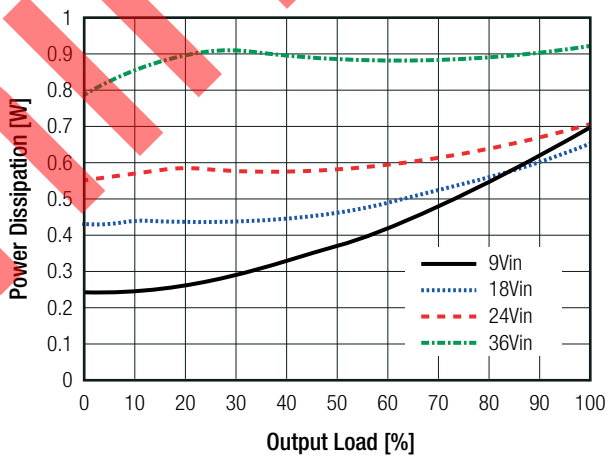


R3M-2405D

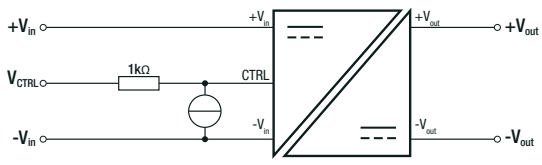
Efficiency vs. Load



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.

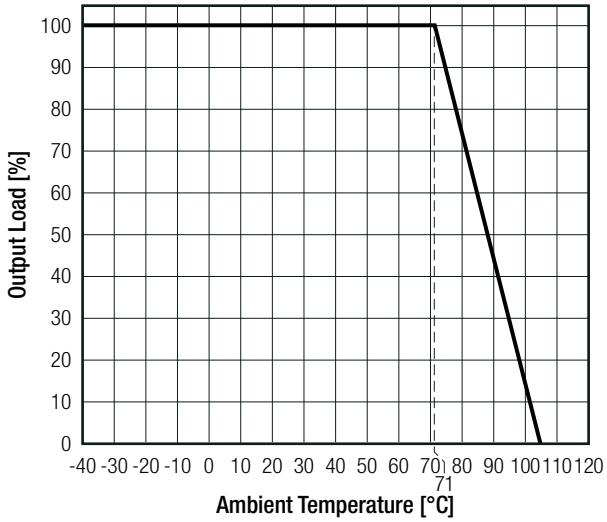
Notes:

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 ***"tc point"***		+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 10³ hours

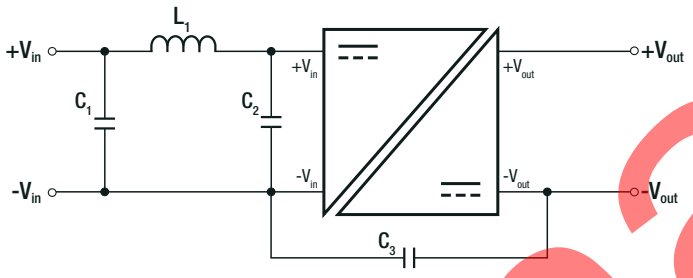
Derating Graph
(@ Chamber and natural convection 0.1m/s)



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

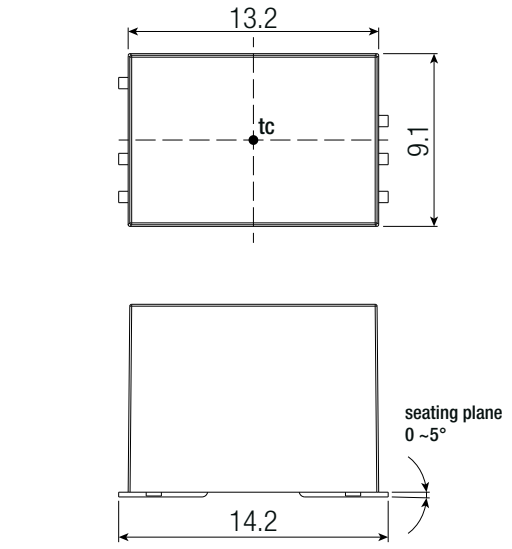
Model	C1, C2	C3	L1
R3M-12xxS	22µF	220pF	6.8µH
R3M-24xxS	10µF	470pF	15µH
R3M-48xxS	2.2µF	680pF	68µH

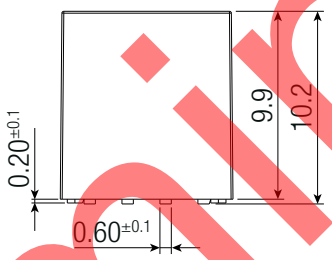
Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

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)

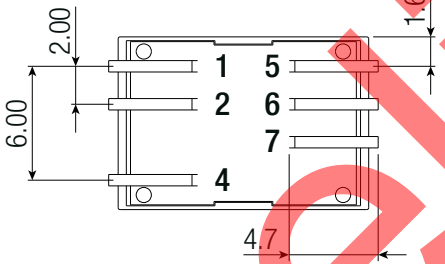




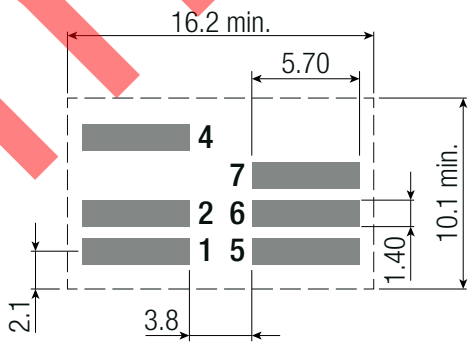
Pinning Information

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

NC= no connection



Recommended Footprint Details



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

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.