

# Features

- 3W isolated DC/DC converter
- High 5.2kVDC/1min isolation
- Wide operating temperature range: -40°C to +85°C
- Ideal for IGBT/Si/SiC/GaN gate drive power
- IEC/EN/UL CSA 62368-1 certified
- Less than 10pF isolation capacitance
- Compact DIP16 SMD package

# Unregulated Converters



## RA3

**3 Watt SMD Single and Dual Output**



### Description

The RA3 series features 3-watt DC/DC converters which are especially designed to power transistor gate drivers. The modules are available with input voltages of 5, 12, or 24VDC with single or dual asymmetric outputs to cover the latest Si, SiC, and GaN transistors on the market today. The compact SMD design ensures that required board space is minimal - especially on multilayer PCBs. The modules offer a robust 5.2kVDC/1min isolation and an isolation capacitance less than 10pF. The operating temperature range of -40C to +85°C at full load meets harsh environmental requirements for renewable energy such as solar inverters, induction heating, telecom, EV battery chargers, and motor drives.



### Selection Guide

Part Number	nom. Input Voltage [VDC]	Output Voltage 1/2 [VDC]	Output Current [mA]	Efficiency typ. <sup>(1)</sup> [%]	max. Capacitive Load <sup>(2)</sup> [µF]
RA3-0508S/SMD	5	8	375	81	470
RA3-050701D/SMD	5	+7/ -1	+420/ -100	79	200/ 680
RA3-051503D/SMD	5	+15/ -3	+100/ -500	78	150/ 680
RA3-051505D/SMD	5	+15/-5	+100/-300	81	47/ 680
RA3-052005D/SMD	5	+20/ -5	+75/ -300	80	47/ 680
RA3-1208S/SMD	12	8	375	81	470
RA3-1209S/SMD	12	9	334	80	470
RA3-120701D/SMD	12	+7/ -1	+420/ -100	82	200/ 680
RA3-121503D/SMD	12	+15/ -3	+100/ -500	79	150/ 680
RA3-121505D/SMD	12	+15/-5	+100/-300	81	47/ 680
RA3-122005D/SMD	12	+20/ -5	+75/ -300	80	47/ 680
RA3-2408S/SMD	24	8	375	82	470
RA3-240701D/SMD	24	+7/ -1	+420/ -100	80	200/ 680
RA3-241503D/SMD	24	+15/ -3	+100/ -500	80	150/ 680
RA3-241505D/SMD	24	+15/-5	+100/-300	81	47/ 680
RA3-242005D/SMD	24	+20/ -5	+75/ -300	81	47/ 680



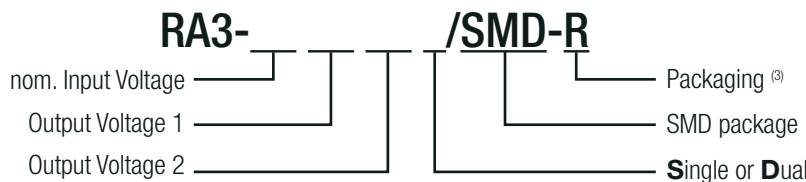
**UL US E224736**

UL62368-1 3rd Ed. certified  
 CAN/CSA-C22.2 No. 62368-1 certified  
 IEC/EN62368-1 2nd & 3rd Ed. certified  
 EN61204-3 compliant  
 CB Report

#### Notes:

- Note1: Efficiency is tested at nominal input and full load at +25°C ambient  
 Note2: Max Cap Load is tested at nominal input and constant resistive load

### Model Numbering



#### Notes:

- Note3: without suffix, standard tube packaging  
 add suffix "-R" for tape and reel packaging, refer to "PACKAGING INFORMATION"

#### Ordering Examples:

RA3-0508S/SMD	5Vin	8Vout	-	Single	SMD	
RA3-122005D/SMD	12Vin	+20Vout	-05Vout	Dual	SMD	
RA3-121503D/SMD-R	12Vin	+15Vout	-03Vout	Dual	SMD	tape and reel packaging

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

**BASIC CHARACTERISTICS**

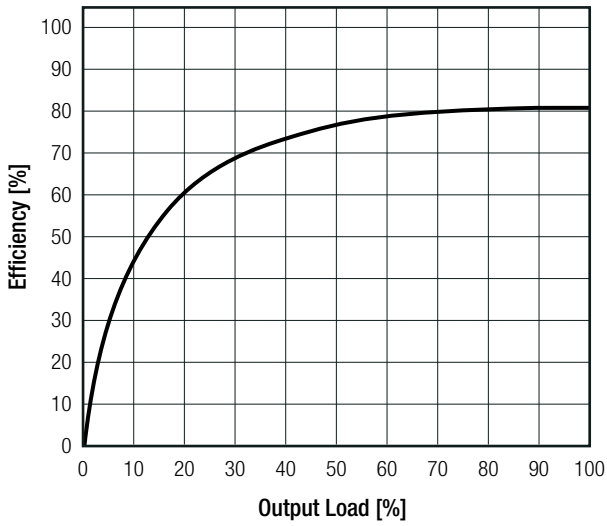
Parameter	Condition	Min.	Typ.	Max.
Internal Input Filter				internal capacitors
Input Voltage Range			±10%	
Minimum Load		0%		
Internal Operating Frequency	100% load at nominal V <sub>IN</sub>	20kHz		
Output Ripple and Noise <sup>(4)</sup>	20MHz BW			220mVp-p

**Notes:**

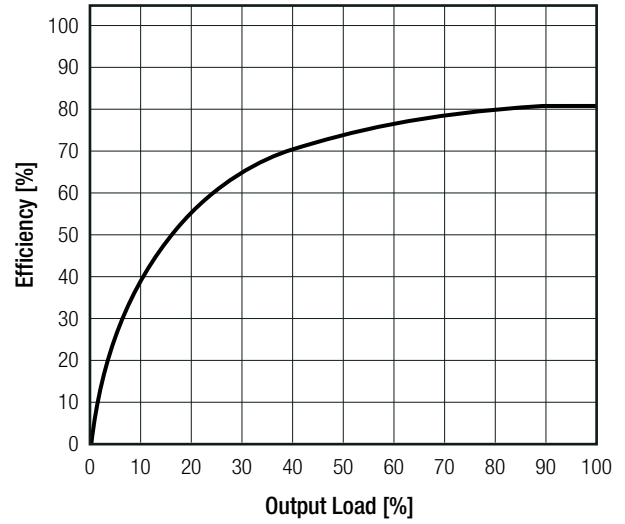
Note4: Measurements are made with a 0.1µF MLCC across output (low ESR)

**Efficiency vs. Load**

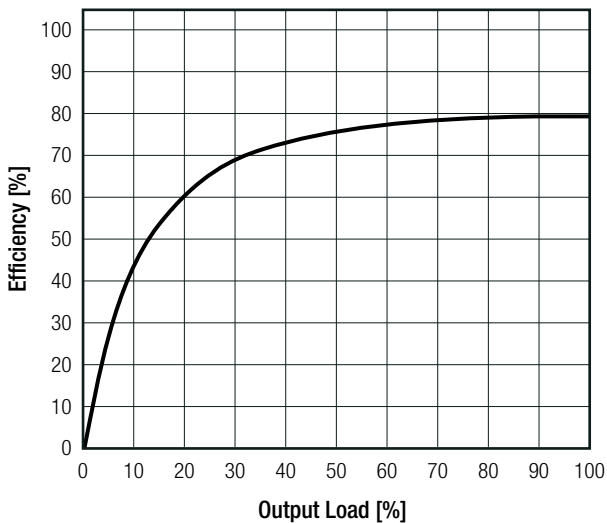
**RA3-0508S/SMD**



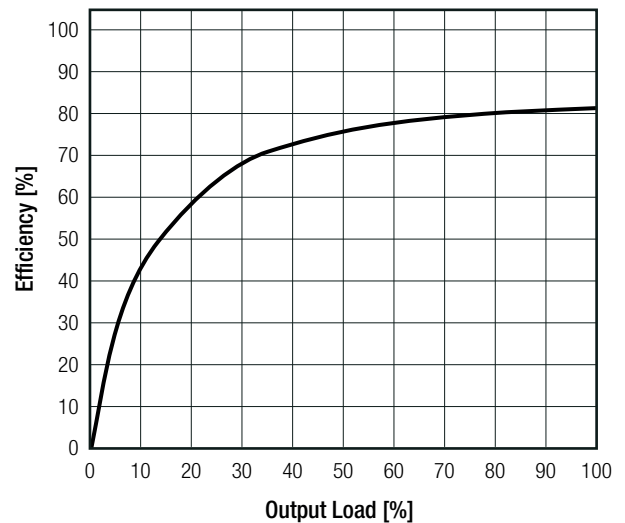
**RA3-1209S/SMD**



**RA3-0511503D/SMD**



**RA3-242005D/SMD**



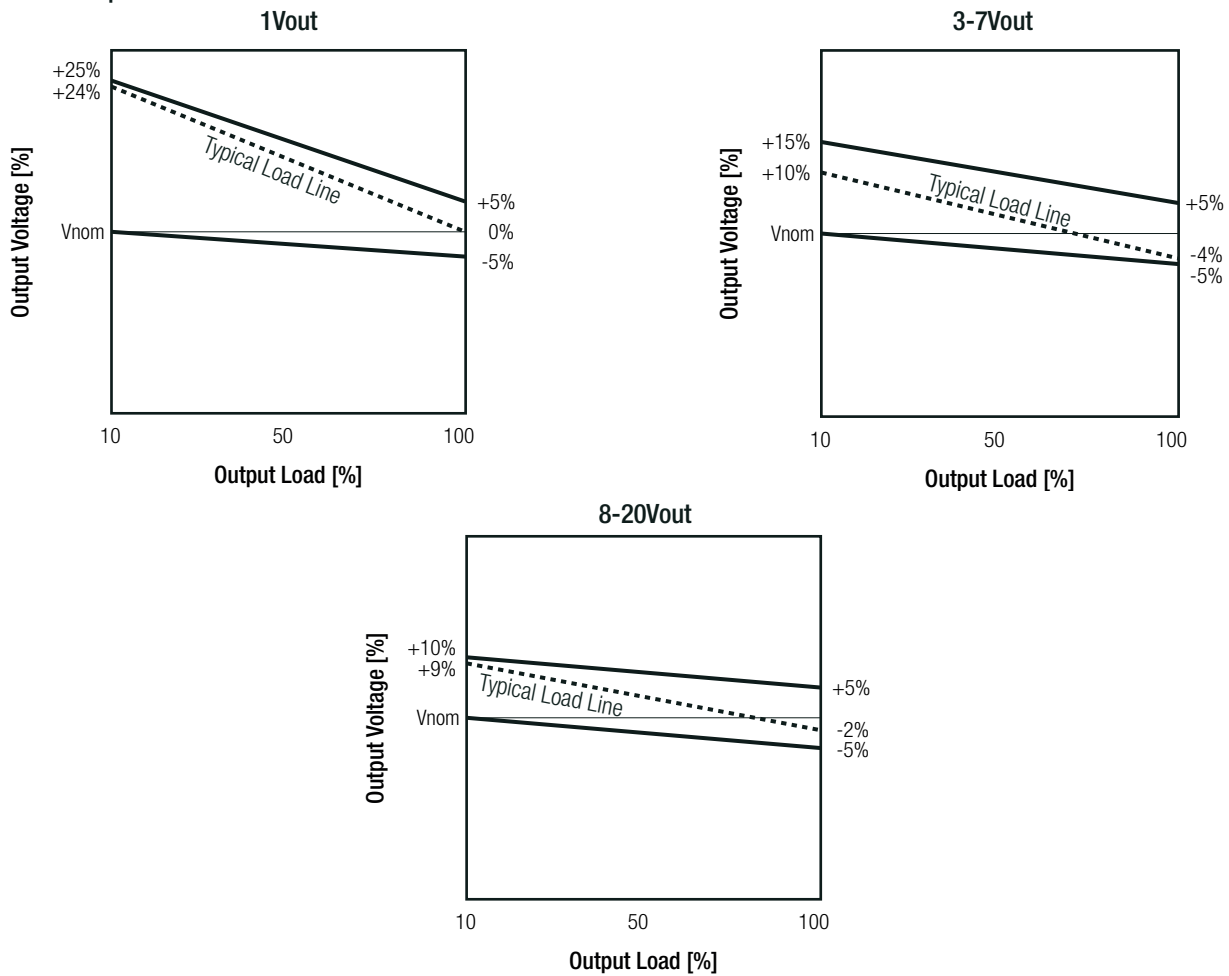
**Specifications** (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

REGULATIONS			
Parameter	Condition		Value
Output Accuracy	V <sub>OUT</sub> = 1-3VDC others		±10.0% max. ±5.0% max.
Line Regulation	low line to high line, full load		±1.2% typ. of 1.0% V <sub>IN</sub>
Load Regulation <sup>(5)</sup>	10% to 100% load	1VDC	25.0% max.
		V <sub>OUT</sub> = 3-7VDC	15.0% max.
		8-20VDC	10.0% max.

**Notes:**

Note5: Operation below 10% load will not harm the converter, but specifications may not be met

**Tolerance Envelope**



PROTECTIONS			
Parameter	Type		Value
Isolation Voltage <sup>(6)</sup>	I/P to O/P	for 1 minute	5.2kVDC 4.0kVAC
Isolation Resistance			15GΩ min.
Isolation Capacitance			10pF max.
Isolation Grade			functional

**Notes:**

Note6: For repeat Hi-Pot testing, reduce the time and/or the test voltage

Note7: Refer to local safety regulations if input over-current protection is also required. Recommended fuse: slow blow type

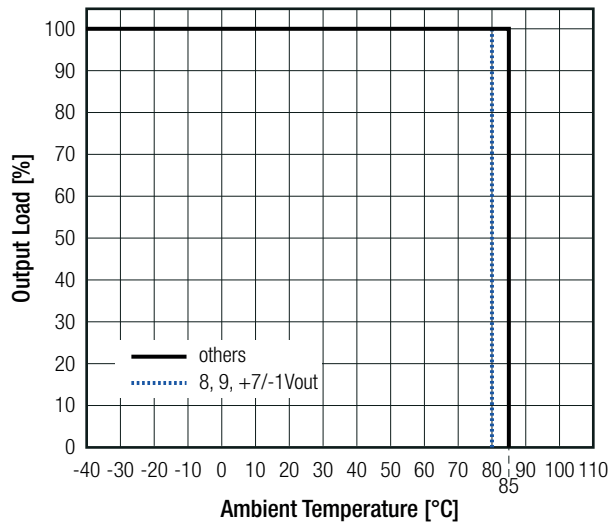
### Specifications (measured @ $T_a = 25^\circ\text{C}$ , nom. $V_{in}$ , full load and after warm-up unless otherwise stated)

#### ENVIRONMENTAL

Parameter	Condition		Value
Operating Temperature Range	@ natural convection 0.1m/s	refer to "Derating Graph"	-40°C to +85°C
Maximum Case Temperature			+105°C
Temperature Coefficient	$V_{out} =$	1VDC 3-20VDC	$\pm 0.02\%/K$ $\pm 0.03\%/K$
Thermal Impedance			30K/W
Operating Altitude			5000m
Operating Humidity	non-condensing		5% - 95% RH max.
Pollution Degree			PD2
Vibration			MIL-STD-202G
MTBF	according to MIL-HDBK-217F, G.B.	+25°C + 80°C	12000 x 10 <sup>3</sup> hours 3300 x 10 <sup>3</sup> hours

#### Derating Graph

(@ Chamber and natural convection 0.1m/s)

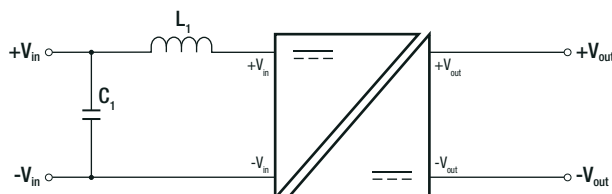


#### SAFETY AND CERTIFICATIONS

Certificate Type (Safety)	Report Number	Standard
Audio/Video, information and communication technology equipment - Part 1: Safety requirements	E224736-A6028-UL	UL62368-1 3rd Edition CAN/CSA-C22.2 No. 62368-1 3rd Ed.
Audio/Video, information and communication technology equipment - Part1: Safety requirements (CB)	2103059-3-CB	IEC62368-1:2014, 2nd Edition
Audio/Video, information and communication technology equipment - Part1: Safety requirements (LVD)		EN62368-1:2014 + A11:2017
Audio/Video, information and communication technology equipment - Part1: Safety requirements (CB)	2103059-4-CB	IEC62368-1:2018, 3rd Edition
Audio/Video, information and communication technology equipment - Part1: Safety requirements (LVD)		EN IEC 62368-1:2020 + A11:2020
RoHS2		RoHS 2011/65/EU + AM2015/863

EMC Compliance	Condition	Standard / Criterion
Electromagnetic Compatibility of Multimedia Equipment - Emission Requirements	without external filter	EN55032, Class A
	see filter suggestion below	EN55032, Class B

#### EMC Filtering Suggestions according to EN55032



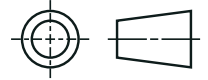
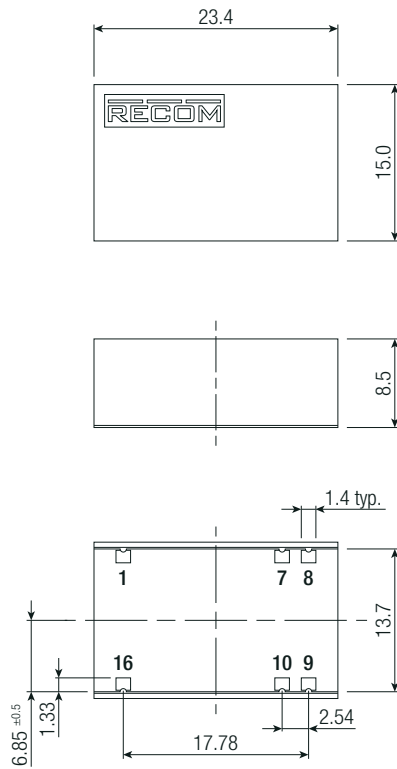
#### Component List Class B

nom. Input Voltage	C1	L1
5VDC, 12VDC	4.7μF	22μH
24VDC	10μF	47μH

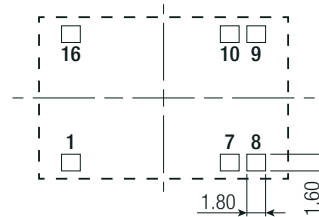
**Specifications** (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

DIMENSION AND PHYSICAL CHARACTERISTICS		
Parameter	Type	Value
Material	case	black plastic, UL94 V-0
Dimension (LxWxH)		23.4 x 15.0 x 8.5mm
Weight		4.0g typ.

**Dimension Drawing (mm)**



**Recommended Footprint Details**  
minimum trace thickness 1mm



**Pinning Information**

Pin #	Single	Dual
1	-Vin	-Vin
7	NC	NC
8	-Vout	Com
9	+Vout	+Vout
10	NC	-Vout
16	+Vin	+Vin

NC= no connection  
Tolerance: ±0.25mm

PACKAGING INFORMATION		
Parameter	Type	Value
Packaging Dimension (LxWxH)	tube reel (diameter + width)	420.0 x 23.0 x 13.9mm Ø330.0 + 50.0mm
Packaging Quantity	tube tape and reel	16pcs 200pcs
Storage Temperature Range		-55°C to +125°C
Storage Humidity	non-condensing	95% RH max.

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