

Features

- 4:1 Wide input voltage range
- 1.6kVDC isolation
- UL60950-1, EN50155 certified
- Efficiency up to 88%
- Protected outputs
- High input voltage range (110VDC)

Regulated Converter



RP08-AW

8 Watt
DIP24/SMD
Single and Dual Output



UL60950-1 certified
 EN50155 certified



https://www.recom-power.com/pdf/Powerline_DC-DC/RSPxxx-168.pdf

Description

The RP08-AW series wide range input DC/DC converters are certified to UL60950-1 and cUL 60950-1. This makes them ideal for all telecom and industrial applications where approved safety standards are required. The 24V and 110VDC input versions have been especially designed for railway applications. The DIP24 package is available in both pinned and SMD case styles and meets military standards for thermal shock and vibration tolerance.

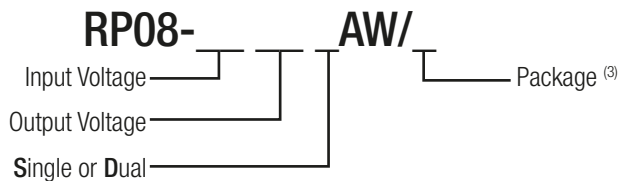
Selection Guide

Part Number	Input Voltage Range [VDC]	Output Voltage [VDC]	Output Current [mA]	Input ⁽¹⁾ Current [mA]	Efficiency ⁽¹⁾ typ. [%]	Max. Capacitive Load ⁽²⁾ [µF]
RP08-243.3SAW ⁽³⁾	9-36	3.3	2400	388	85	1330
RP08-2405SAW ⁽³⁾	9-36	5	1600	383	87	1330
RP08-2412SAW ⁽³⁾	9-36	12	666	387	86	288
RP08-2415SAW ⁽³⁾	9-36	15	533	387	86	200
RP08-483.3SAW ⁽³⁾	18-75	3.3	2400	194	85	1330
RP08-4805SAW ⁽³⁾	18-75	5	1600	192	87	1330
RP08-4812SAW ⁽³⁾	18-75	12	666	191	87	288
RP08-4815SAW ⁽³⁾	18-75	15	533	189	88	200
RP08-1103.3SAW ⁽³⁾	43-160	3.3	2400	86	84	1330
RP08-11005SAW ⁽³⁾	43-160	5	1600	86	85	1330
RP08-11012SAW ⁽³⁾	43-160	12	666	84	86	288
RP08-11015SAW ⁽³⁾	43-160	15	533	85	86	200
RP08-2405DAW ⁽³⁾	9-36	±5	±800	397	84	±900
RP08-2412DAW ⁽³⁾	9-36	±12	±333	387	86	±133
RP08-2415DAW ⁽³⁾	9-36	±15	±267	388	86	±90
RP08-4805DAW ⁽³⁾	18-75	±5	±800	198	84	±900
RP08-4812DAW ⁽³⁾	18-75	±12	±333	191	87	±133
RP08-4815DAW ⁽³⁾	18-75	±15	±267	192	87	±90
RP08-11005DAW ⁽³⁾	43-160	±5	±800	89	82	±900
RP08-11012DAW ⁽³⁾	43-160	±12	±333	85	85	±133
RP08-11015DAW ⁽³⁾	43-160	±15	±267	86	85	±90

Notes:

- Note1: Maximum value at nominal input voltage and full load
 Note2: Max Cap Load is tested at minimum Vin and constant resistive load

Model Numbering



Ordering Examples

- RP08-4805AW/SMD = 48V Input, 5V Output, SMD Package
 RP08-2405AW = 24V Input, 5V Output, DIP24 Package

Notes:

- Note3: No suffix for standard package (DIP24), add suffix "SMD" for SMD package

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

BASIC CHARACTERISTICS

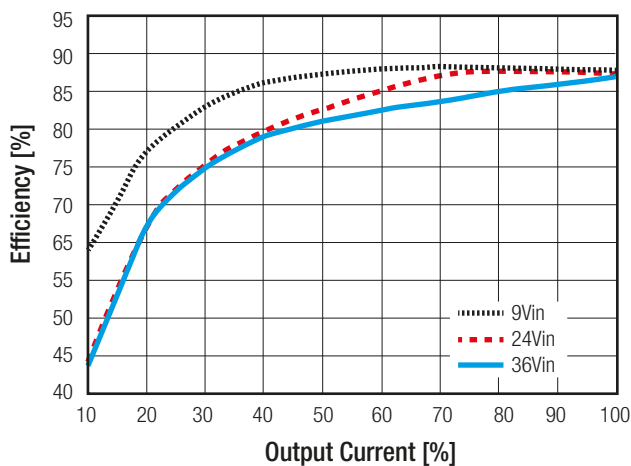
Parameter	Condition		Min.	Typ.	Max.
Input Filter			Pi-Type		
Input Voltage Range	nom. Vin = 24V nom. Vin = 48V nom. Vin = 110V		9VDC 18VDC 43VDC	24VDC 48VDC 110VDC	36VDC 75VDC 160VDC
Input Surge Voltage	100ms max.	Vin = 24V Vin = 48V Vin = 110V			50VDC 100VDC 170VDC
Under Voltage Lockout (UVLO)	Vin= 24V	DC-DC ON DC-DC OFF		8VDC	9VDC
	Vin= 48V	DC-DC ON DC-DC OFF		16VDC	18VDC
	Vin=110V	DC-DC ON DC-DC OFF		40VDC	43VDC
Input reflected Ripple Current				20mA _{p-p}	
Start-up time	Power up ON/OFF CTRL			450ms 5ms	
Operating Frequency Range			270kHz	300kHz	330kHz
Minimum Load			0%		
ON/OFF CTRL ⁽⁴⁾	Positive Logic	DC-DC ON DC-DC OFF	Open or $3.0 < V_r < 12VDC$ Short or $0 < V_r < 1.2VDC$		
Input current of Remote pin (CTRL)			DC-DC ON	-0.5mA	+0.5mA
Standby Current			DC-DC OFF	2.5mA	
Ripple and Noise	20MHz bandwidth	Vin = 24V, 48V Vin = 110V		50mV _{p-p} 75mV _{p-p}	

Notes:

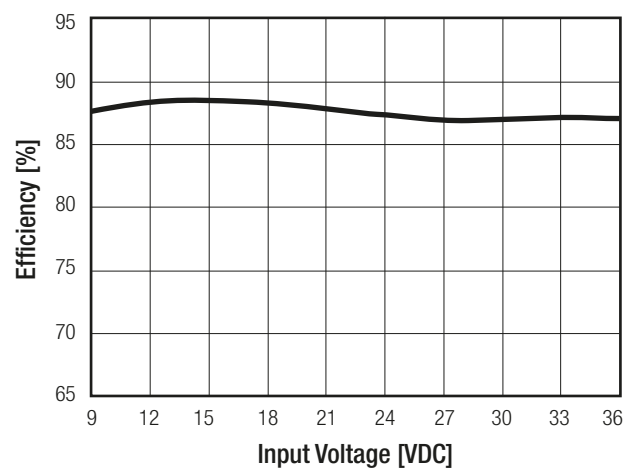
Note4: The ON/OFF control pin voltage is referenced to -Vin pin

RP08-2405SAW

Efficiency vs. Output Current



Efficiency vs. Input Voltage

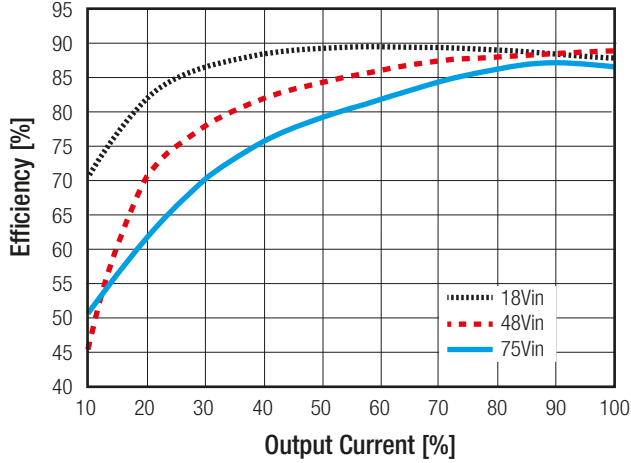


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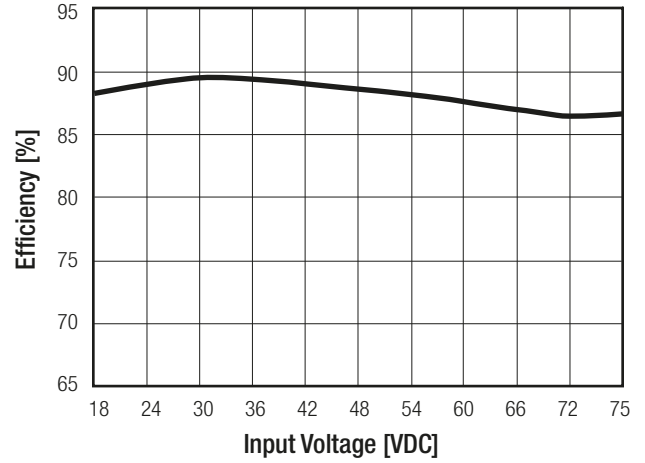
Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

RP08-4805SAW

Efficiency vs. Output Current

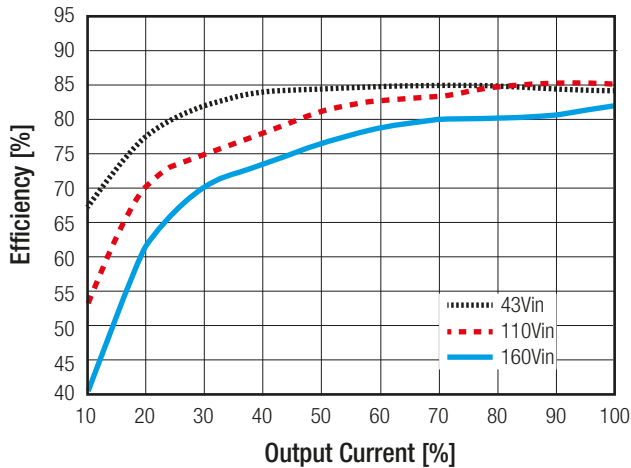


Efficiency vs. Input Voltage

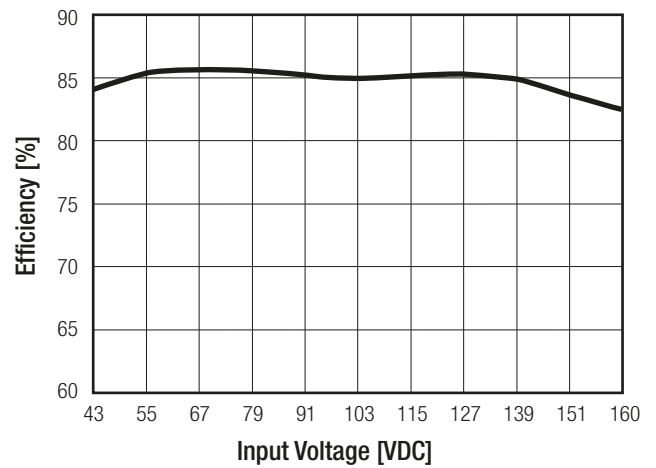


RP08-11005SAW

Efficiency vs. Output Current



Efficiency vs. Input Voltage



REGULATIONS

Parameter	Condition			Value
Output Voltage Accuracy				±1.0%
Line Voltage Regulation	low line to high line, full load			±0.2%
Load Voltage Regulation	no load to full load	DIP24	Single Dual	±0.5% ±1.0%
		SMD	Single, Dual	±1.0%
	10% load to 90% load	DIP24	Single Dual	±0.3% ±0.8%
		SMD	Single, Dual	±0.8%
Cross Regulation	asymmetrical 25%<->100% load			±5.0%
Transient Response recovery time	25% load step change			250µs typ.

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

PROTECTIONS

Parameter	Condition		Value
Short Circuit Protection (SCP)			continuous, automatic recovery
Over Voltage Protection (OVP)	Single Output	3.3Vout	3.9VDC typ.
		5Vout	6.2VDC typ.
		12Vout	15VDC typ.
		15Vout	18VDC typ.
Over Load Protection (OLP)	% of Iout rated		150% typ.
Isolation Voltage	DIP24	I/P to O/P, I/P (O/P) to case	1.6kVDC/1 minute
	SMD	I/P to O/P I/P (O/P) to case	1.6kVDC/1 minute 1.0kVDC/1 minute
Isolation Resistance	500VDC		1GΩ min.
Isolation Capacitance			1500pF max.
Insulation Grade			functional

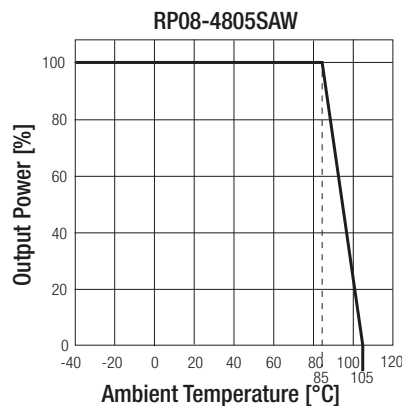
Notes:

Note5: This power module is not internally fused. An input line fuse must always be used
Recom suggests: 24Vin=T2A; 48Vin=T1A; 110Vin=T0.5A slow blow

ENVIRONMENTAL

Parameter	Condition	Value
Operating Temperature Range ⁽⁶⁾	without derating	-40°C to +85°C
	with derating	-40°C to +105°C
Maximum Case Temperature		+105°C
Temperature Coefficient		±0.02%/°C max.
Thermal Impedance	natural convection (20LFM, 0.1m/s)	20°C/Watt
Operating Altitude		4000m
Operating Humidity	non-condensing	5% - 95% RH
Pollution Degree		PD2
Shock		MIL-STD-810F
Thermal Shock		MIL-STD-810F
Vibration		MIL-STD-810F
Fire protection on railway vehicles		according to EN45545-2:2013 standard
MTBF ⁽⁷⁾	MIL-HDBK-217F	2832 x 10 ³ hours
	Bellcore-TR-NWT-000332	2350 x 10 ³ hours

Derating Graph ⁽⁸⁾



Notes:

Note6: Converter can meet the railway T2 and TX temperature requirement

Note7: BELLCORE TR-NWT-000332. Case I: 50% Stress, Temperature at 40°C (Ground Benign and controlled environment)
MIL-HDBK-217F, Notice 2, Full Load, 25°C, Ground Benign

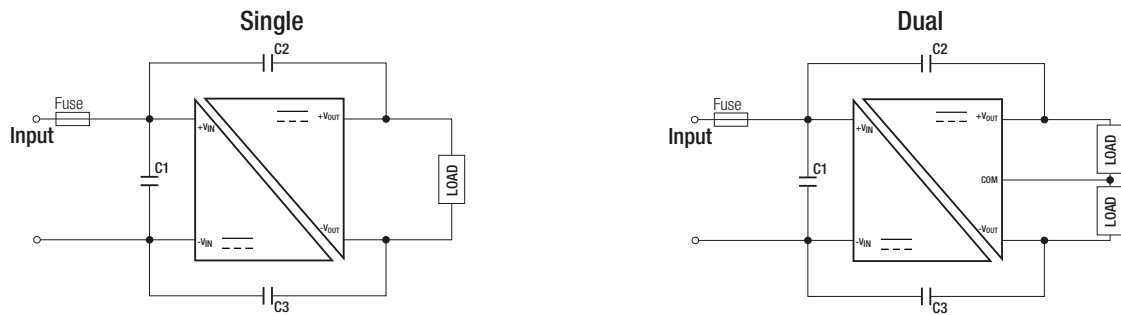
Note8: Derating graphs are valid only for the shown part numbers. If you need detailed derating-information about a partnumber not shown here please contact our technical support service at techsupportAT@recom-power.com

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

SAFETY AND CERTIFICATIONS		
Certificate Type (Safety)	Report / File Number	Standard
Information Technology Equipment, General Requirements for Safety	E196683	UL60950-1, 2nd Edition, 2014 C22.2 No. 60950-1-07, 2nd Edition, 2014
Information Technology Equipment, General Requirements for Safety (LVD)	TW1708010-001	IEC60950-1:2005, 2nd Edition + A2:2013 EN60950-1:2006 + A2:2013
RoHS2+		RoHS-2011/65/EU + AM-2015/863
Railways	Condition	Standard / Criterion
Railway Applications - Electrical Equipment used on rolling stock	15A100701E-C	EN50155:2007
Environmental testing Part 2-1: Tests – Test A: Cold	temperature: -25°C, Dwell Time: 2 hours	EN60068-2-1:2007
Environmental testing Part 2-2: Tests – Test B: Dry heat	temperature: +70°C, Dwell Time: 6 hours	EN60068-2-2:2007
Environmental testing Part 2-30: Tests - Test Db: Damp heat, cyclic (12 h + 12 h cycle)	temperature: +25 to +55°C humidity: 90% to 100%RH test Duration: 24 hours/cycle, 2 cycles	EN60068-2-30:2005
Railway applications - Fire protection on railway vehicles Part2: Requirements for fire behaviour of materials and components		EN45545-2:2013
Fire hazard testing Part 2-11: Glowing/hot-wire based test methods – Glow-wire flammability test method for end-products	glow-wire test	EN60695-2-11
Fire hazard testing Part 11-10: Test flames – 50 W horizontal and vertical flame test methods	vertical flame test	EN60695-11-10
EMC Compliance Railway	Condition	Standard / Criterion
Railway applications - Electromagnetic compatibility		EN50121-3-2:2006
Industrial, scientific and medical equipment – Radio frequency disturbance characteristics – Limits and methods of measurement		EN55011
ESD Electrostatic discharge immunity test	Air ±2, 4,8kV, Contact ±2, 4, 6kV	EN61000-4-2, Criteria A
Radiated, radio-frequency, electromagnetic field immunity test	20V/m (80-1000MHz) 10V/m (1400-2100MHz) 5V/m (2100-2500MHz)	EN61000-4-3, Criteria A
Fast Transient and Burst Immunity	DC Power Port: ±2kV	EN61000-4-4, Criteria A
Surge Immunity	DC Power Port: Line-Line ±0.5, 1kV DC Power Port: Line-Earth ±0.5, 1.2kV	EN61000-4-5, Criteria A
Immunity to conducted disturbances, induced by radio-frequency fields	DC Power Port 10V	EN61000-4-6, Criteria A
EMC Compliance Multimedia and IT	Condition	Standard / Criterion
Electromagnetic compatibility of multimedia equipment –Emission Requirements		EN55032:2015+AC:2016-07, Class B
Information technology equipment - Immunity characteristics - Limits and methods of measurement		EN55024:2010 + A1:2015
ESD Electrostatic discharge immunity test	Air ±2, 4, 8kV, Contact ±2, 4, 6kV	IEC61000-4-2:2008, Criteria A
Radiated, radio-frequency, electromagnetic field immunity test	20V/m (80-1000MHz)	IEC61000-4-3:2006+A1:2007 + A2:2010, Criteria A
Fast Transient and Burst Immunity	DC Power Port: ±2kV	IEC61000-4-4:2012, Criteria A
Surge Immunity	DC Power Port: ±2kV	IEC61000-4-5:2014, Criteria A
Immunity to conducted disturbances, induced by radio-frequency fields	DC Power Port 10V	IEC61000-4-6:2013, Criteria A
Power Magnetic Field Immunity	50Hz 100A 1 minute 50Hz 1000A 1 second	IEC61000-4-8:2009, Criteria A
Notes:		
Note9: The standard modules meet EMI Class A or Class B with external components, see filter suggestions below on next page		
Note10: An external input filter capacitor is required if the module has to meet EN61000-4-4, EN61000-4-5 Recom suggests Nippon chemi-con KY series 24Vin, 48Vin=220µF/100V or 110Vin=150µF/200V		

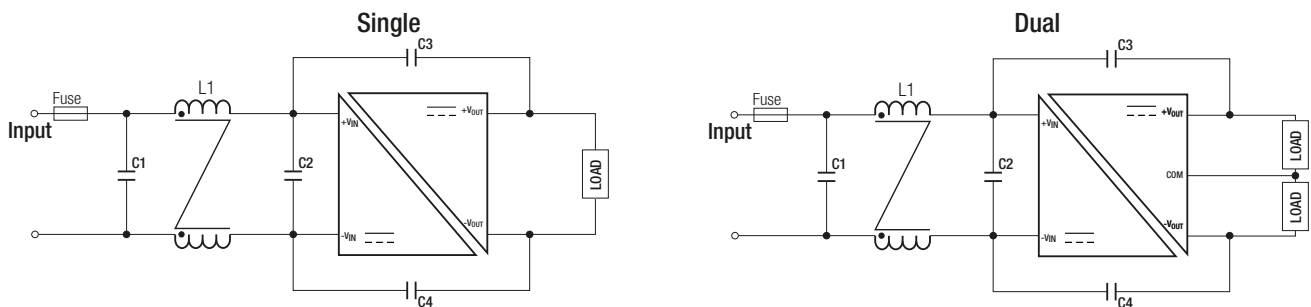
Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

EMI Filtering Class A



MODEL	C1	C2	C3
RP08-24xxS_DW RP08-24xxS_DW/SMD	1.0µF/50V, 1210MLCC	N/A	1000pF/2kV, 1206 MLCC
RP08-48xxS_DW RP08-48xxS_DW/SMD	0.47µF/100V, 1810MLCC	N/A	1000pF/2kV, 1206 MLCC
RP08-110xxS_DW RP08-110xxS_DW/SMD	1µF/250V, 1812 MLCC	1µF/250V, 1812 MLCC	1000pF/2kV, 1206 MLCC

EMI Filtering Class B



MODEL	C1	C2	C3/C4	L1
RP08-24xxS_DW RP08-24xxS_DW/SMD	4.7µF/50V, 1812 MLCC	N/A	1000pF/2kV, 1206 MLCC	CMC: 325µH ref.: WE 744290321 or CMC-06
RP08-48xxS_DW RP08-48xxS_DW/SMD	1.5µF/100V, 1812 MLCC	1.5µF/100V, 1812 MLCC	1000pF/2kV, 1206 MLCC	CMC: 325µH ref.: WE 744290321 or CMC-06
RP08-110xxS_DW RP08-110xxS_DW/SMD	1µF/250V, 1812 MLCC	N/A	1000pF/2kV, 1206 MLCC	CMC: 497µH ref.: WE 7448013501

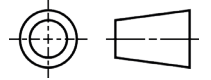
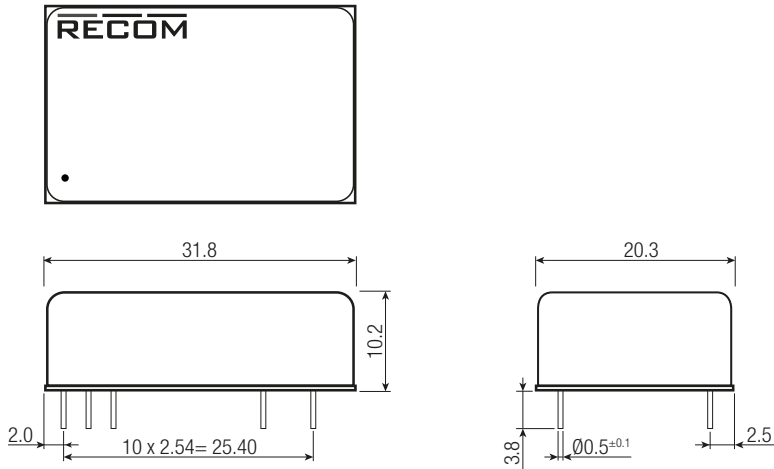
DIMENSIONS and PHYSICAL CHARACTERISTICS

Parameter	Type	Value
Material	case	nickel coated copper
	base	non-conductive black plastic (UL94-V2)
	potting	epoxy (UL94-V0)
Package Dimensions (LxWxH)	DIP	31.8 x 20.3 x 10.2mm
	SMD	32.0 x 20.3 x 11.2mm
Package Weight	DIP	18g
	SMD	20g

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

DIP24 Dimension Drawing (mm)

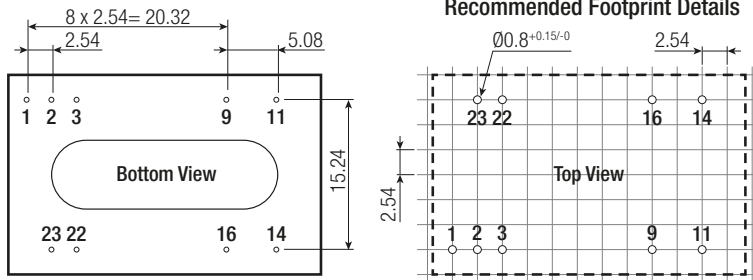


Pin Connections DIP24

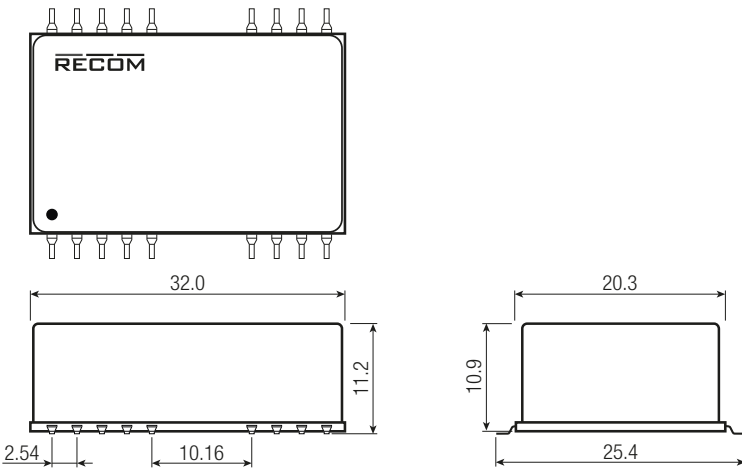
Pin #	Single	Dual
1	Ctrl	Ctrl
2	-Vin	-Vin
3	-Vin	-Vin
9	NC	Com
11	NC	-Vout
14	+Vout	+Vout
16	-Vout	Com
22	+Vin	+Vin
23	+Vin	+Vin

NC = No Connection
Pin Pitch Tolerance $\pm 0.25\text{mm}$
XX.X $\pm 0.5\text{mm}$
XX.XX $\pm 0.25\text{mm}$

Recommended Footprint Details



SMD Dimension Drawing (mm)

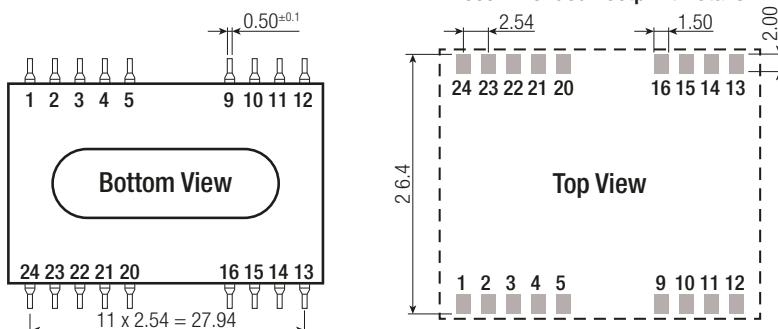


Pin Connections SMD

Pin #	Single	Dual
1	Ctrl	Ctrl
2	-Vin	-Vin
3	-Vin	-Vin
9	NC	Com
11	NC	-Vout
14	+Vout	+Vout
16	-Vout	Com
22	+Vin	+Vin
23	+Vin	+Vin
Others	NC	NC

NC = No Connection
Pin Pitch Tolerance $\pm 0.25\text{mm}$
XX.X $\pm 0.5\text{mm}$
XX.XX $\pm 0.25\text{mm}$

Recommended Footprint Details



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	DIP24	255.0 x 23.0 x 19.0mm
		SMD	255.0 x 32.0 x 16.0mm
Packaging Quantity	DIP24, SMD		7pcs
Storage Temperature Range			-55°C to +125°C
Storage Humidity			5% - 95% RH

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