

Features

Regulated Converters

- 4:1 Wide Input Voltage Range
- 1.6kVDC Isolation
- UL Certified
- Efficiency up to 88%
- Six-Sided Continuous Shield
- Available as Power Module (RPM30-EW)

RECOM
DC/DC Converter

RP30-EW

**30 Watt
Single &
Dual
Output**



Description

The RP30-EW series wide input range DC/DC converters are certified to UL 60950-1 and to cUL 60950-1. This makes them ideal for all telecom and industrial applications where approved safety standards are required. The industry standard 2" x 1.6" package 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]
RP30-243.3SEW ^(3,4)	10-40	3.3	6000	948	87	19500
RP30-2405SEW ^(3,4)	10-40	5	6000	1437	87	10200
RP30-2412SEW ^(3,4)	10-40	12	2500	1437	87	3300
RP30-2415SEW ^(3,4)	10-40	15	2000	1420	88	1100
RP30-483.3SEW ^(3,4)	18-75	3.3	6000	474	87	19500
RP30-4805SEW ^(3,4)	18-75	5	6000	710	88	10200
RP30-4812SEW ^(3,4)	18-75	12	2500	718	87	3300
RP30-4815SEW ^(3,4)	18-75	15	2000	710	88	1100
RP30-2412DEW ^(3,4)	10-40	±12	±1250	1488	84	±1000
RP30-2415DEW ^(3,4)	10-40	±15	±1000	1471	85	±680
RP30-4812DEW ^(3,4)	18-75	±12	±1250	735	85	±1000
RP30-4815DEW ^(3,4)	18-75	±15	±1000	726	86	±680



Notes:

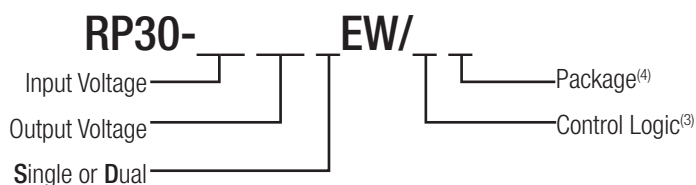
Note1: Maximum value at nominal input voltage and full load.

Note2: Test by minimum Vin and constant resistor load.



UL US
E196683

Model Numbering



Ordering Examples

RP30-2405SEW = 24V Input, 5V Output, Positive Logic CTRL pin.

RP30-4812DEW/N-HC = 48V Input, ±12V Output, Negative Logic CTRL pin, Heat-sink fitted

Notes:

Note3: no suffix for CTRL function with Positive Logic (1=ON, 0=OFF)
add "N" for CTRL function with Negative Logic (0=ON, 1=OFF)

Note4: add suffix -HC for premounted Heat-sink and clips

UL60950-1 Certified

Specifications measured at $T_a = 25^\circ\text{C}$, nominal input voltage, full load otherwise noted

BASIC CHARACTERISTICS					
Parameter	Condition		Min.	Typ.	Max.
Input Voltage Range	nom. Vin = 24V nom. Vin = 48V		10VDC 18VDC	24VDC 48VDC	40VDC 75VDC
Under Voltage Lockout (UVLO)	Vin = 24V	DC-DC ON DC-DC OFF		8VDC	10VDC
	Vin = 48V	DC-DC ON DC-DC OFF		16VDC	18VDC
Input Filter ⁽⁵⁾	L-C Type				
Input Reflected Ripple Current ⁽⁶⁾	nominal Vin and full load			20mA _{p-p}	
Input Surge Voltage	Vin= 24V, 100ms max. Vin= 48V, 100ms max.				50VDC 100VDC
Start-up time	Power up Remote ON/OFF			10ms 10ms	
Operating Frequency Range			270kHz	300kHz	330kHz
Minimum Load	% of full load	Single Dual	0% 10%		
Ripple and Noise	measured by 20Mhz bandwidth with a 0.1μF/50V MLCC	Others 5V _{out} 12V _{out} , 15V _{out}		60mV _{p-p} 75mV _{p-p} 100mV _{p-p}	
Remote ON/OFF ⁽⁷⁾	Positive Logic	DC-DC ON DC-DC OFF	Open or 3.0V < Vr < 12V Short or 0V <Vr < 1.2V		
	Negative Logic	DC-DC ON DC-DC OFF	Short or 0V <Vr < 1.2V Open or 3.0V < Vr < 12V		
Input current of Remote pin (CTRL)		DC-DC OFF		3mA	
		DC-DC ON	-0.5mA		0.5mA

Notes:

Note5: An external filter capacitor is required for normal operation. The capacitor should be capable of handling 1A ripple current for 48V/24V models.

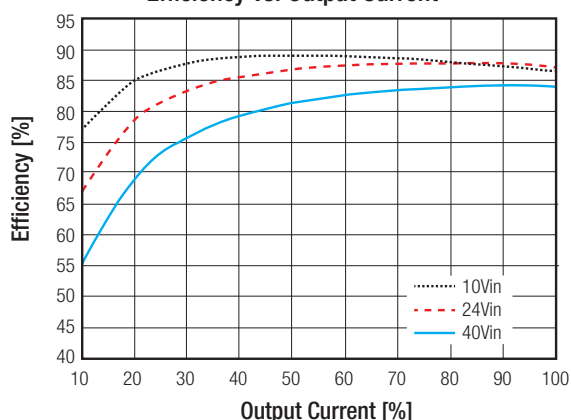
RECOM suggest: Nippon chemi-con KY series, 220 μF /100V, ESR 90m Ω .

Note6: Simulated source impedance of 12 μH . 12 μH inductor in series with + V_{in} .

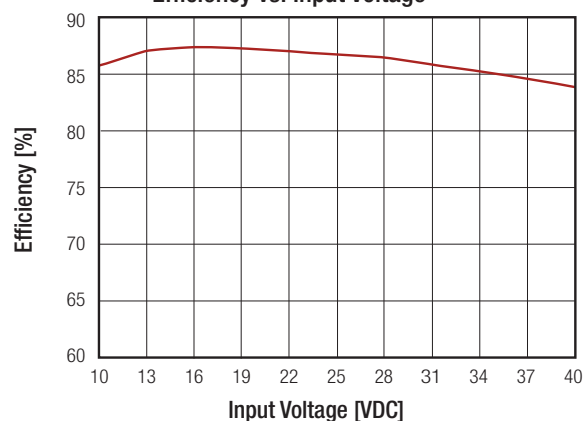
Note7: The ON/OFF control function can be positive or negative logic. The pin voltage is referenced to - V_{in} pin.

RP30-2405SE

Efficiency vs. Output Current



Efficiency vs. Input Voltage

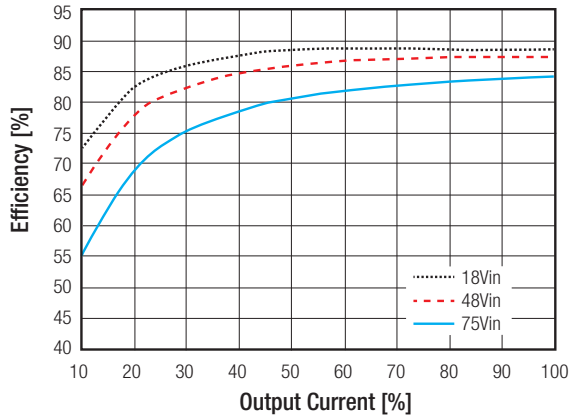


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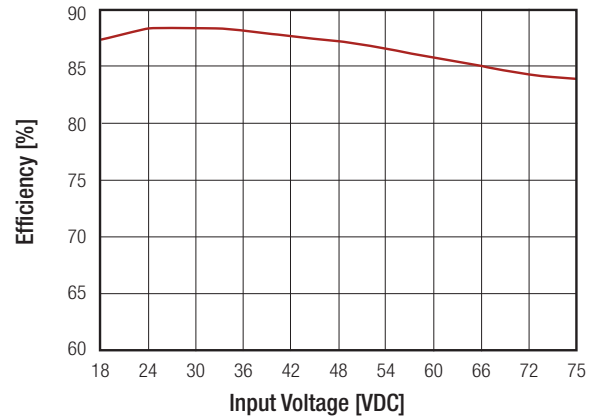
Specifications measured at $T_a = 25^\circ\text{C}$, nominal input voltage, full load otherwise noted

RP30-4805EW

Efficiency vs. Output Current



Efficiency vs. Input Voltage



REGULATIONS

Parameter	Condition	Value
Output Voltage Accuracy		$\pm 1\%$
Voltage Adjustability		$\pm 10\%$
Line Voltage Regulation	low line to high line at full load	$\pm 0.5\%$
Load Voltage Regulation ⁽⁸⁾	no load to full load	Single Dual $\pm 0.5\%$ $\pm 1.0\%$
Cross Regulation	asymmetrical 25% < 100% load	$\pm 5\%$
Transient Response recovery time	25% load step change	250 μs

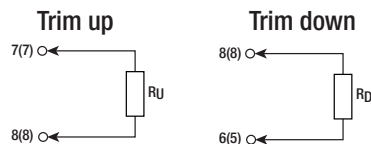
Notes:

Note8: The dual output required a minimum 10% loading on the output to maintain specified regulation. Operation under no-load condition will not damage these devices, however they may not meet all listed specification.

External Output Trimming

Output Voltage Trimming

Single output Powerline converters offer the feature of trimming the output voltage over a certain range around the nominal value by using external trim resistors. No general equation can be given for calculating the trim resistors, but the following trimtables give typical values for choosing these trimming resistors. If voltages between the given trim points are required, extrapolate between the two nearest given values to work out the resistor required or use a variable resistor to set the output voltage. Output can be externally trimmed by using the method shown below.



RP30-xx3.3SEW

Trim up	1	2	3	4	5	6	7	8	9	10	%
V _{out} =	3.333	3.366	3.399	3.432	3.465	3.498	3.531	3.564	3.597	3.63	Volts
R _U =	57.93	26.16	15.58	10.28	7.11	4.99	3.48	2.34	1.46	0.75	KOhms
Trim down	1	2	3	4	5	6	7	8	9	10	%
V _{out} =	3.267	3.234	3.201	3.168	3.135	3.102	3.069	3.036	3.003	2.97	Volts
R _D =	69.47	31.23	18.49	12.12	8.29	5.74	3.92	2.56	1.50	0.65	KOhms

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Specifications measured at $T_a = 25^\circ\text{C}$, nominal input voltage, full load otherwise noted

RP30-xx05SEW											
Trim up	1	2	3	4	5	6	7	8	9	10	%
V _{out} =	5.05	5.10	5.15	5.20	5.25	5.30	5.35	5.4	5.45	5.50	Volts
R _u =	36.57	16.58	9.92	6.58	4.59	3.25	2.30	1.59	1.03	0.59	KOhms
Trim down	1	2	3	4	5	6	7	8	9	10	%
V _{out} =	4.95	4.90	4.85	4.80	4.75	4.70	4.65	4.60	4.55	4.50	Volts
R _d =	45.53	20.61	12.31	8.15	5.66	4.00	2.81	1.92	1.23	0.68	KOhms
RP30-xx12SEW											
Trim up	1	2	3	4	5	6	7	8	9	10	%
V _{out} =	12.12	12.24	12.36	12.48	12.60	12.72	12.84	12.96	13.08	13.20	Volts
R _u =	367.91	165.95	98.64	64.98	44.78	31.32	21.70	14.49	8.88	4.39	KOhms
Trim down	1	2	3	4	5	6	7	8	9	10	%
V _{out} =	11.88	11.76	11.64	11.52	11.40	11.28	11.16	11.04	10.92	10.8	Volts
R _d =	460.99	207.95	123.60	81.42	56.12	39.25	27.20	18.16	11.13	5.51	KOhms
RP30-xx15SEW											
Trim up	1	2	3	4	5	6	7	8	9	10	%
V _{out} =	15.15	15.3	15.45	15.60	15.75	15.90	16.05	16.20	16.35	16.50	Volts
R _u =	404.18	180.59	106.06	68.80	46.44	31.53	20.88	12.90	6.69	1.72	KOhms
Trim down	1	2	3	4	5	6	7	8	9	10	%
V _{out} =	14.85	14.70	14.55	14.40	14.25	14.10	13.95	13.80	13.65	13.50	Volts
R _d =	499.82	223.41	131.27	85.20	57.56	39.14	25.97	16.10	8.42	2.282	KOhms
Dual Output Voltage Trim Tables											
RP30-xx12DEW											
Trim up	1	2	3	4	5	6	7	8	9	10	%
V _{out} =	24.24	24.48	24.72	24.96	25.20	25.44	25.68	25.92	26.16	26.40	Volts
R _u =	218.21	98.10	58.07	38.05	26.04	18.03	12.32	8.03	4.69	2.02	KOhms
Trim down	1	2	3	4	5	6	7	8	9	10	%
V _{out} =	23.76	23.52	23.28	23.04	22.80	22.56	22.32	22.08	21.84	21.6	Volts
R _d =	273.44	123.02	72.87	47.80	32.76	22.73	15.57	10.20	6.02	2.67	KOhms
RP30-xx15DEW											
Trim up	1	2	3	4	5	6	7	8	9	10	%
V _{out} =	30.30	30.60	30.90	31.20	31.50	31.80	32.10	32.40	32.70	33.00	Volts
R _u =	268.29	120.64	71.43	46.82	32.06	22.21	15.10	9.91	5.81	2.53	KOhms
Trim down	1	2	3	4	5	6	7	8	9	10	%
V _{out} =	29.70	29.40	29.10	28.80	28.50	28.20	27.90	27.60	27.30	27.00	Volts
R _d =	337.71	152.02	90.13	59.18	40.61	28.23	19.39	12.76	7.60	3.47	KOhms

Specifications measured at Ta = 25°C, nominal input voltage, full load otherwise noted

PROTECTIONS

Parameter	Condition		Value
Short Circuit Protection (SCP)			continuous, automatic recovery
Over Voltage Protection (OVP)	Zener Diode Clamp	3.3Vout	3.9VDC
		5Vout	6.2VDC
		12Vout	15VDC
		15Vout	18VDC
Over Load Protection (OLP)	% of lout rated		150% max.
Over Temperature Protection (OTP)			115°C typ.
Isolation Voltage	I/P to O/P		1.6kVDC/1minute
	I/P to O/P to case		1.6kVDC/1minute
Isolation Resistance	500VDC		1GΩ min.
Isolation Capacitance			1000pF max.

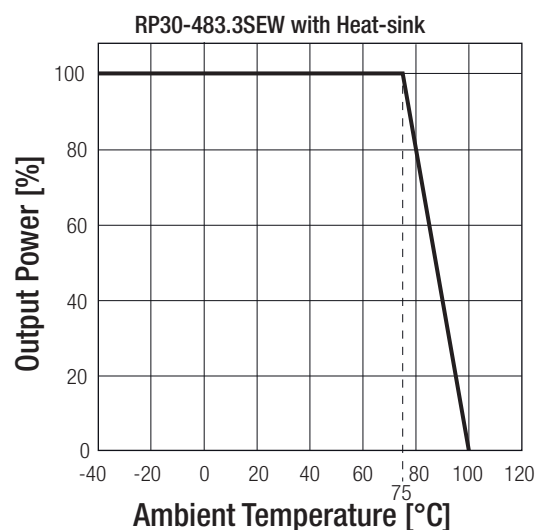
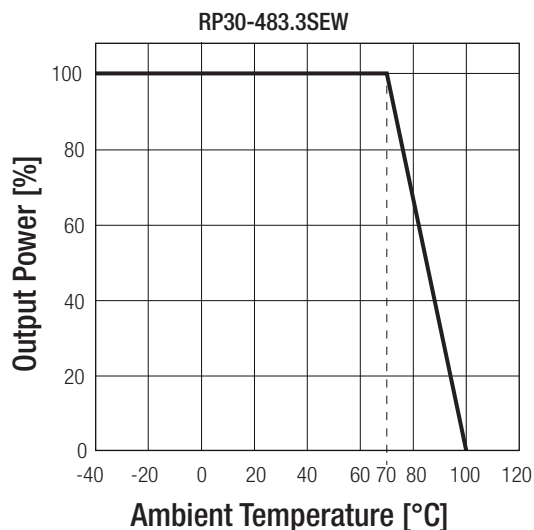
Notes:

Note9: This power module is not internally fused. An input line fuse must always be used.

ENVIRONMENTAL

Parameter	Condition		Value
Operating Temperature Range	without derating		-40°C to +70°C
	with derating		-40°C to +100°C
Maximum Case Temperature			+100°C
Temperature Coefficient			±0.02%/°C max.
Thermal Impedance ⁽¹⁰⁾	Natural convection (20LFM)		10°C/Watt
	Natural convection (20LFM) with Heat-sink		8.24°C/Watt
Operating Humidity			5% - 95% RH
Thermal Shock			MIL-STD-810F
Vibration			MIL-STD-810F
MTBF	MIL-HDBK-217F		759.8 x 10 ³ hours
	Bellcore TR-NWT-000332 ⁽¹¹⁾		1315 x 10 ³ hours

Derating Graph⁽¹¹⁾



Notes:

Note10: BELLCORE TR-NWT-000332. Case I: 50% Stress, Temperature at 40°C (Ground fixed and controlled environment).

Note11: Derating graphs are valid only for the shown part numbers. If you need detailed derating-information about a part-number not shown here please contact our technical support service at techsupportAT@recom-power.com

Specifications measured at $T_a = 25^\circ\text{C}$, nominal input voltage, full load otherwise noted

SAFETY AND CERTIFICATIONS

Certificate Type (Safety)	Report / File Number	Standard
UL General Safety	E196683	UL60950-1 1st. Ed.: 2003 C22.2 No. 60950 1st. Ed.: 2003

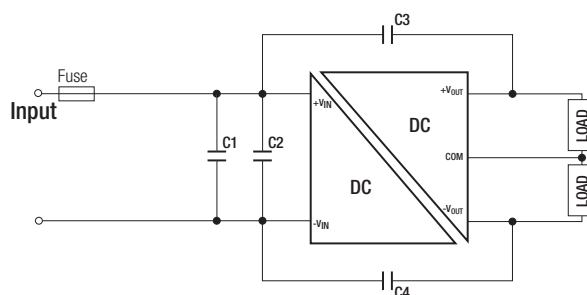
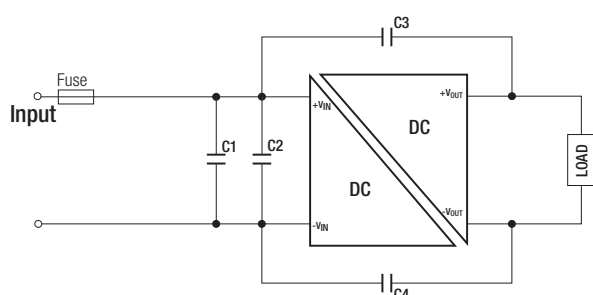
EMC Compliance	Condition	Standard / Criterion
EMI Standard ⁽¹²⁾	with external filter	EN55022, Class A, Class B
ESD	Air $\pm 8\text{kV}$ and Contact $\pm 6\text{kV}$	EN61000-4-2, Criteria B
Radiated Immunity	10 V/m	EN61000-4-3, Criteria A
Fast Transient ⁽¹³⁾	$\pm 2\text{kV}$	EN61000-4-4, Criteria A
Surge ⁽¹³⁾	$\pm 1\text{kV}$	EN61000-4-5, Criteria B
Conducted Immunity	10 V _{r.m.s}	EN61000-4-6, Criteria A

Notes:

Note12: The standard modules meet EMI Class A or Class B with external components, see filter suggestions below.

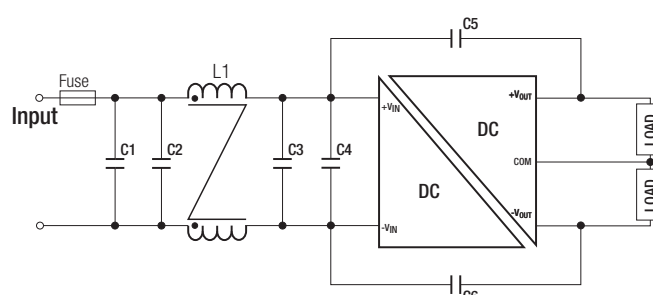
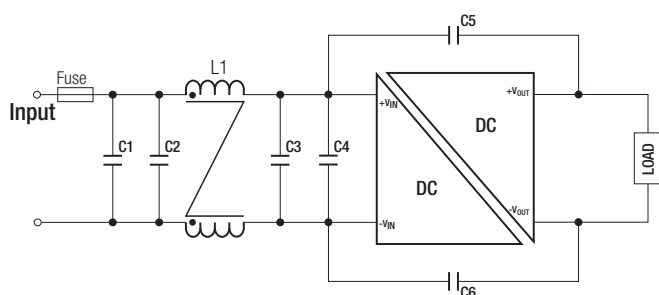
Note13: An external input filter capacitor is required if the module has to meet EN61000-4-4, EN61000-4-5. The filter capacitor Recom suggests: Nippon chemi-con KY series, 220 μF /100V

EMI Filtering Class A



MODEL	C1	C2	C3/C4
RP30-24xxSEW RP30-24xxDEW	6.8 μF /50V 1812 MLCC	N/A	1000pF/2kV 1808 MLCC
RP30-48xxSEW RP30-48xxDEW	2.2 μF /100V 1812 MLCC	2.2 μF /100V 1812 MLCC	1000pF/2kV 1808 MLCC

EMI Filtering Class B



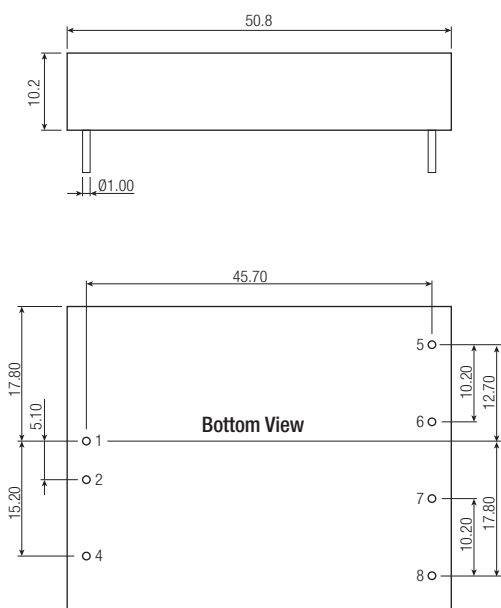
MODEL	C1	C2	C3	C4	C5/C6	L1
RP30-24xxSEW RP30-24xxDEW	6.8 μF /50V 1812 MLCC	N/A	6.8 μF /50V 1812 MLCC	N/A	1000pF/2kV 1808 MLCC	CMC: 450 μH ref.: WE 7448227005 ref.: CMC-05
RP30-48xxSEW RP30-48xxDEW	2.2 μF /100V 1812 MLCC	2.2 μF /100V 1812 MLCC	2.2 μF /100V 1812 MLCC	2.2 μF /100V 1812 MLCC	1000pF/2kV 1808 MLCC	CMC: 450 μH ref.: WE 7448227005 ref.: CMC-05

Specifications measured at Ta = 25°C, nominal input voltage, full load otherwise noted

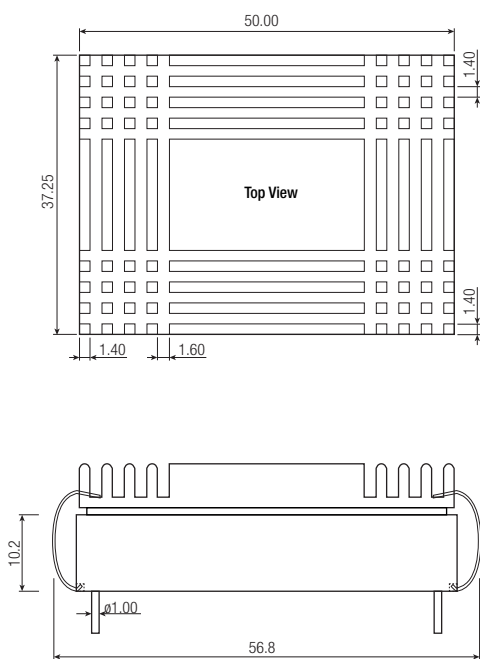
DIMENSIONS and PHYSICAL CHARACTERISTICS

Parameter	Type	Value
Material	Case	Nickel coated copper
	Base	FR4 PCB
	Potting	Epoxy (UL94-V0)
Package Dimensions (LxWxH)	without Heat-sink	50.8 x 40.6 x 10.2mm
	with Heat-sink	56.8 x 40.6 x 17.0mm
Package Weight	without Heat-sink	48g
	with Heat-sink	69.06g

Dimension Drawing (mm)



Dimension Drawing (mm) with Heat-sink



Pin Connections

Pin #	Single	Dual
1	+Vin	+Vin
2	-Vin	-Vin
4	CTRL	CTRL
5	No Pin	+Vout
6	+Vout	Com
7	-Vout	-Vout
8	Trim	Trim

Pin Pitch Tolerance $\pm 0.25\text{mm}$
Pin Dimension Tolerance $\pm 0.1\text{mm}$
Tolerance: X.X $\pm 0.5\text{mm}$
X.XX $\pm 0.25\text{mm}$

Specifications measured at Ta = 25°C, nominal input voltage, full load otherwise noted

PACKAGING INFORMATION		
Parameter	Type	Value
Packaging Quantity	without Heat-sink	5pcs.
	with Heat-sink	15pcs.
Storage Temperature Range		-55°C to +125°C
Storage Humidity		5% - 95% RH