

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

BASIC CHARACTERISTICS					
Parameter	Condition		Min.	Typ.	Max.
Input Voltage Range	nom. Vin= 12V		9VDC	12VDC	18VDC
	nom. Vin= 24V		18VDC	24VDC	36VDC
	nom. Vin= 48V		36VDC	48VDC	75VDC
Under Voltage Lockout (UVLO)	Vin = 12V	DC-DC ON DC-DC OFF		8VDC	9VDC
	Vin = 24V	DC-DC ON DC-DC OFF		16VDC	17.8VDC
	Vin = 48V	DC-DC ON DC-DC OFF		33VDC	36VDC
Input Filter ⁽⁵⁾					L-C Type
Input Reflected Ripple Current ⁽⁶⁾	nominal Vin and full load			30mA _{p-p}	
Input Surge Voltage	Vin= 12V, 100ms max. Vin= 24V, 100ms max. Vin= 48V, 100ms max.				36VDC 50VDC 100VDC
Start-up time	Power up			25ms	
	Remote ON/OFF			25ms	
Operating Frequency Range			270kHz	300kHz	330kHz
Minimum Load			0%		
Ripple and Noise	measured by 20MHz bandwidth with a 0.1µF/50V MLCC	3.3V _{out} , 5V _{out} 12V _{out} , 15V _{out}		50mV _{p-p} 75mV _{p-p}	
		Dual all		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		
Input current of Remote pin (CTRL)				2.5mA	
			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.

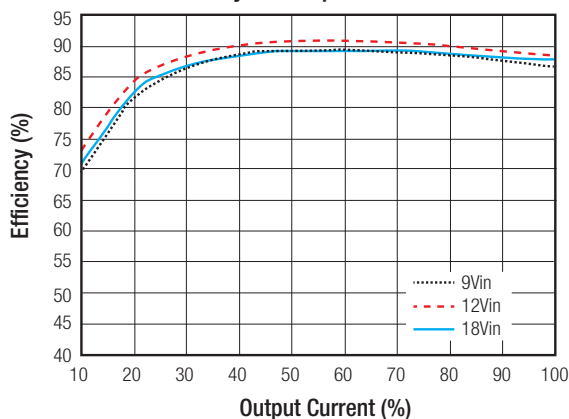
RECOM suggest: Nippon chemi-con KY series, 220µF/100V, ESR 90m Ω.

Note6: Simulated source impedance of 12µH. 12µH inductor in series with +Vin.

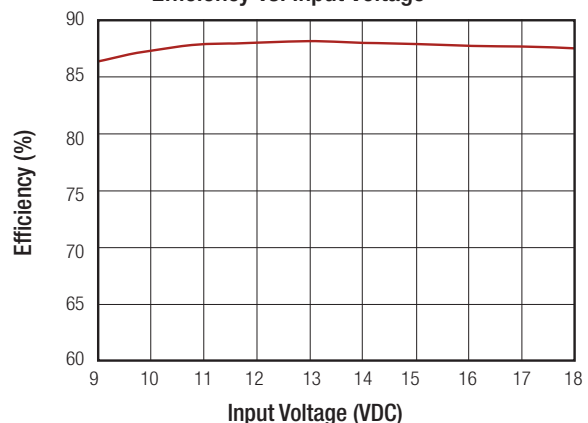
Note7: The ON/OFF control pin voltage is referenced to -Vin pin

RP30-1205SE

Efficiency vs. Output Current



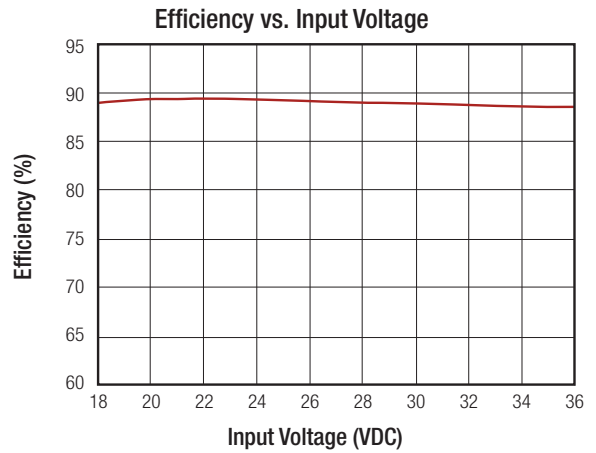
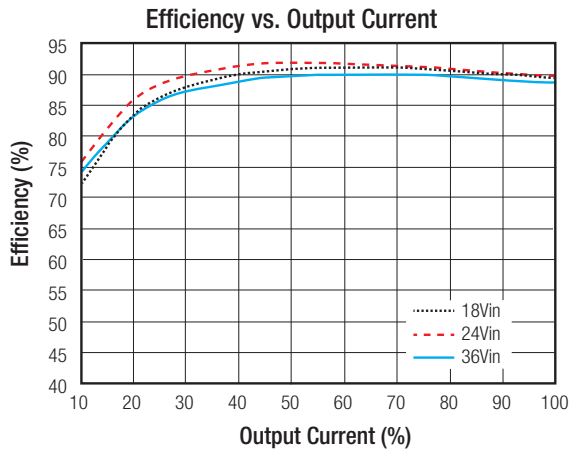
Efficiency vs. Input Voltage



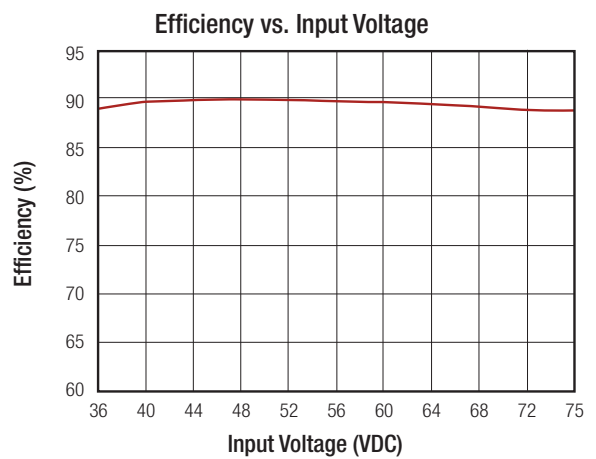
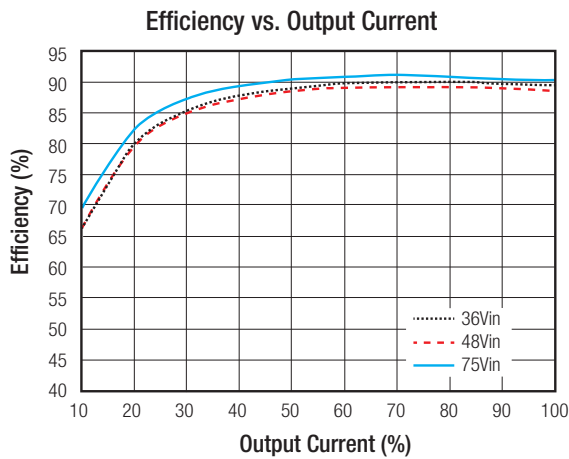
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RP30-2405SE



RP30-4805SE



REGULATIONS

Parameter	Condition		Value
Output Voltage Accuracy			±1%
Voltage Adjustability			±10%
Line Voltage Regulation	low line to high line at full load	Single Dual	±0.2% ±0.5%
Load Voltage Regulation	no load to full load	Single Dual	±0.5% ±1.0%
Cross Regulation	asymmetrical 25% <-> 100% load		±5%
Transient Response recovery time	25% load step change		300µs typ.

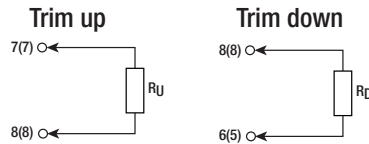
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External Output Trimming

Output Voltage Trimming

Single output Powerline Plus 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 trim tables 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-xx3.3SE

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

RP30-xx05SE

Trim up	1	2	3	4	5	6	7	8	9	10	%
V _{out} =	5.05	5.01	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-xx12SE

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-xx15SE

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

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Dual Output Voltage Trim Tables											
RP30-xx12DE											
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-xx15DE											
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

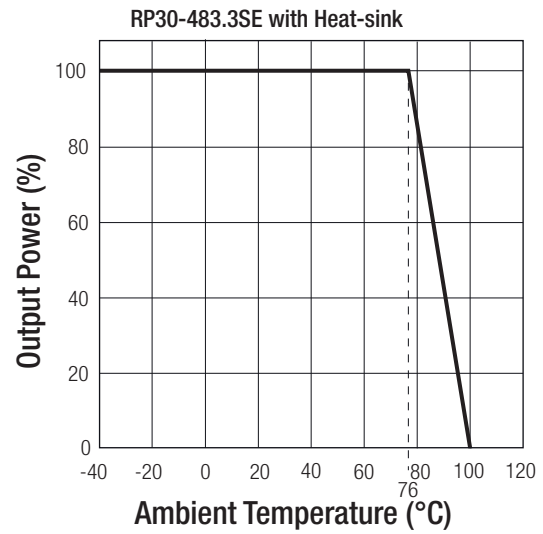
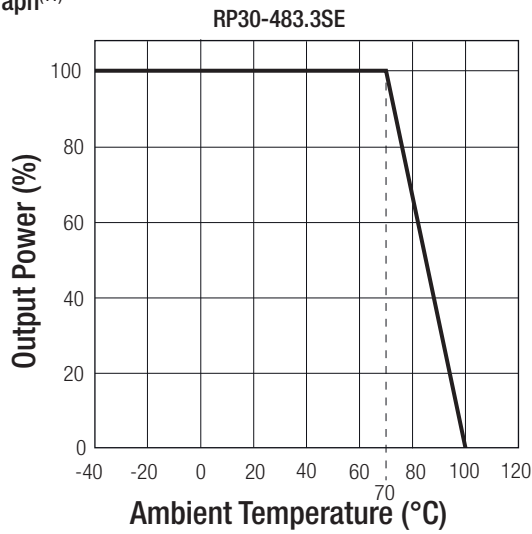
PROTECTIONS		
Parameter	Condition	Value
Short Circuit Protection (SCP)		Continuous, automatic recovery
Over Voltage Protection (OVP)	Zener Diode Clamp	3.3V _{out} 3.9VDC 5V _{out} 6.2VDC 12V _{out} 15VDC 15V _{out} 18VDC
Over Load Protection (OLP)	% of I _{out} rated	150% typ.
Over Temperature Protection (OTP)		115°C typ.
Isolation Voltage	I/P to O/P I/P to O/P to case	1.6kVDC/ 1 minute 1.6kVDC/ 1 minute
Isolation Resistance	500VDC	1GΩ min.
Isolation Capacitance		1000pF max.
Notes:		
Note8: This power module is not internally fused. An input line fuse must always be used.		

ENVIRONMENTAL		
Parameter	Condition	Value
Operating Temperature Range	without derating with derating	-40°C to +70°C -40°C to +100°C
Maximum Case Temperature		+100°C
Temperature Coefficient		±0.02%/°C max.
Thermal Impedance	Natural convection (20LFM) Natural convection (20LFM) with Heat Sink	10°C/Watt 8.24°C/Watt
Operating Humidity		5% - 95% RH
Thermal Shock		MIL-STD-810F
Vibration		MIL-STD-810F
MTBF	MIL-HDBK-217F Bellcore TR-NWT-000332 ⁽¹⁰⁾	1283 x 10 ³ hours 1535 x 10 ³ hours

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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

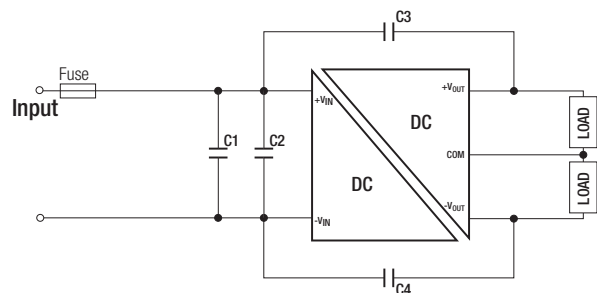
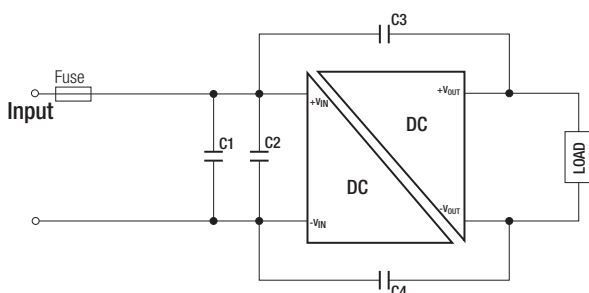
SAFETY AND CERTIFICATIONS

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 B
Surge ⁽¹³⁾	$\pm 1\text{kV}$	EN61000-4-5, Criteria B
Conducted Immunity	10 Vr.m.s	EN61000-4-6, Criteria A

Notes:

Note10: The standard modules meet EMI Class A or Class B with external components, see filter suggestions below.
 Note11: 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 $\mu\text{F}/100\text{V}$

EMI Filtering Class A

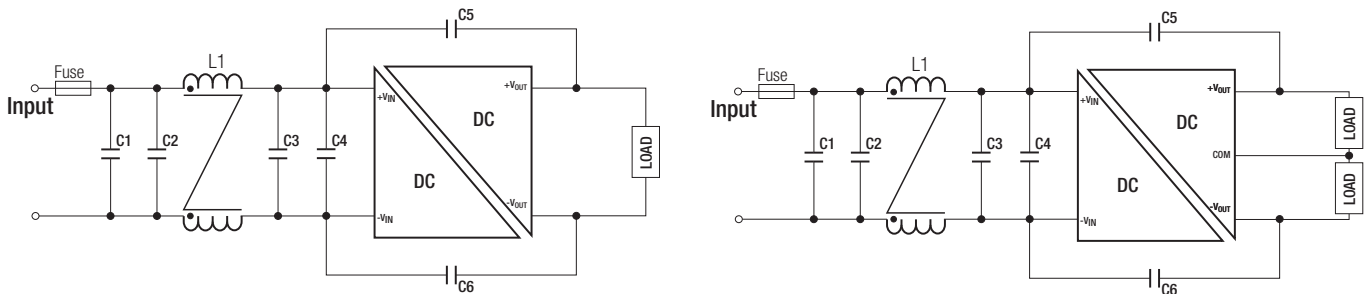


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MODEL	C1	C2	C3/C4
RP30-12xxSE RP30-12xxDE	6.8µF/50V 1812 MLCC	N/A	1000pF/2kV 1808 MLCC
RP30-24xxSE RP30-24xxDE	6.8µF/50V 1812 MLCC	N/A	1000pF/2kV 1808 MLCC
RP30-48xxSE RP30-48xxDE	2.2µF/100V 1812 MLCC	N/A	1000pF/2kV 1808 MLCC

EMI Filtering Class B



MODEL	C1	C2	C3	C4	C5/C6	L1
RP30-12xxSE	4.7µF/50V 1812 MLCC	N/A	4.7µF/50V 1812 MLCC	N/A	1000pF/2kV 1808 MLCC	CMC: 450µH ref.: WE 7448227005 ref.: CMC-05
RP30-24xxSE	6.8µF/50V 1812 MLCC	N/A	6.8µF/50V 1812 MLCC	N/A	1000pF/2kV 1808 MLCC	CMC: 450µH ref.: WE 7448227005 ref.: CMC-05
RP30-48xxSE	2.2µF/100V 1812 MLCC	2.2µF/100V 1812 MLCC	2.2µF/100V 1812 MLCC	2.2µF/100V 1812 MLCC	1000pF/2kV 1808 MLCC	CMC: 450µH ref.: WE 7448227005 ref.: CMC-05

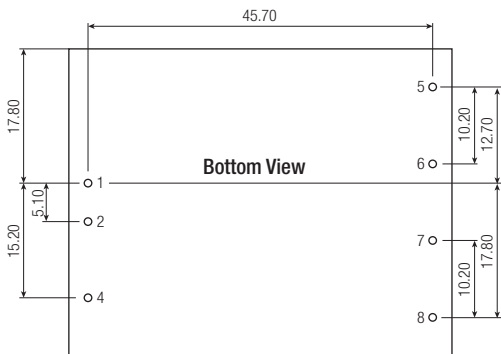
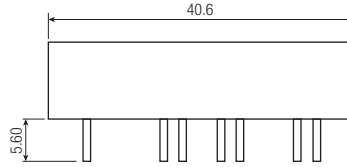
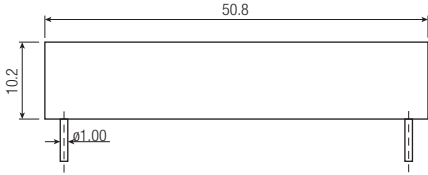
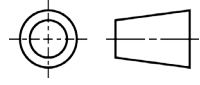
DIMENSIONS and PHYSICAL CHARACTERISTICS

Parameter	Type	Value
Material	Case	Nickel coated copper
	Base	FR4 PCB
	Potting	Epoxy (UL94-V0)
Package Dimensions (LxWxH)		50.8 x 25.4 x 10.2mm
Package Weight	without Heat-sink	48g
	with Heat-sink	65.78

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Dimension Drawing (mm)

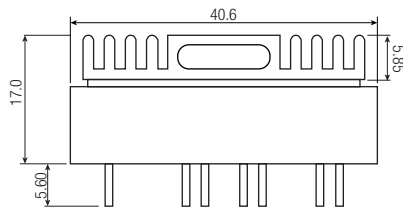
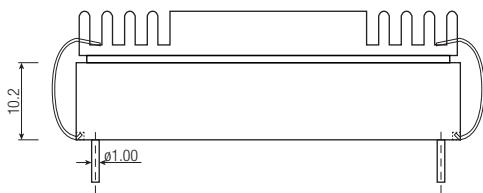
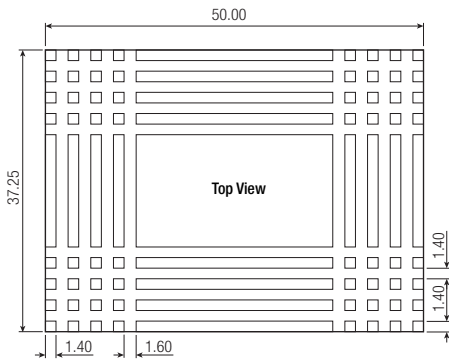


Pin Connections

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 $\pm 0.25\text{mm}$

Dimension Drawing (mm) with Heat-sink



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