

Specifications (measured @ Ta= 25°C, nom. Vin, full load unless otherwise stated)

BASIC CHARACTERISTICS

Parameter	Condition		Min.	Typ.	Max.
Input Filter				Pi-Type	
Input Voltage Range	nom. Vin = 12VDC nom. Vin = 24VDC nom. Vin = 48VDC		9VDC 18VDC 36VDC	12VDC 24VDC 48VDC	18VDC 36VDC 75VDC
Input Surge Voltage	100ms max.	nom. Vin = 12VDC nom. Vin = 24VDC nom. Vin = 48VDC			25VDC 50VDC 100VDC
Under Voltage Lockout (UVLO)	nom. Vin = 12VDC	DC-DC ON DC-DC OFF		8VDC	9VDC
	nom. Vin = 24VDC	DC-DC ON DC-DC OFF		16VDC	18VDC
	nom. Vin = 48VDC	DC-DC ON DC-DC OFF		32VDC	36VDC
Output Voltage Trimming	refer to "OUTPUT VOLTAGE TRIMMING"		-10%		+10%
Input Reflected Ripple Current ⁽⁵⁾				20mA _{p-p}	
Minimum Load			0%		
Start-up Time	Power up ON/OFF CTRL			30ms 30ms	
ON/OFF CTRL ⁽⁶⁾	Positive Logic	DC-DC ON DC-DC OFF	Open or 3.0VDC < V _{CTRL} < 12VDC Short or 0VDC < V _{CTRL} < 1.2VDC		
	Negative Logic	DC-DC ON DC-DC OFF	Short or 0VDC < V _{CTRL} < 1.2VDC Open or 3.0VDC < V _{CTRL} < 12VDC		
Input Current of CTRL pin	DC-DC ON		-0.5mA		+0.5mA
Standby Current	DC-DC OFF			3mA	
Internal Operating Frequency			387kHz	430kHz	473kHz
Ripple and Noise	measured at 20MHz BW with a 1μF/50V MLCC	3.3V _{out} , 5V _{out} 12V _{out} , 15V _{out}		100mV _{p-p} 150mV _{p-p}	

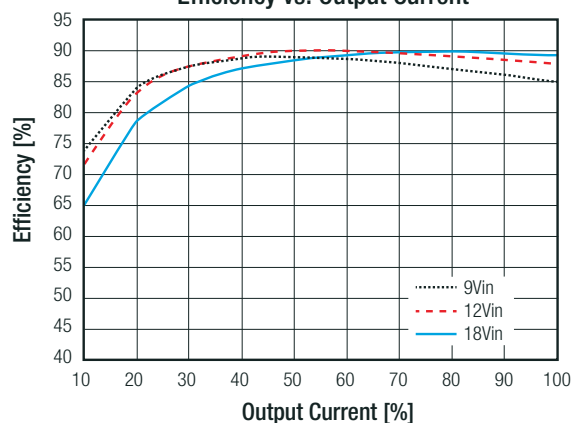
Notes:

Note5: Simulated source impedance of 12μH. 12μH inductor in series with +Vin

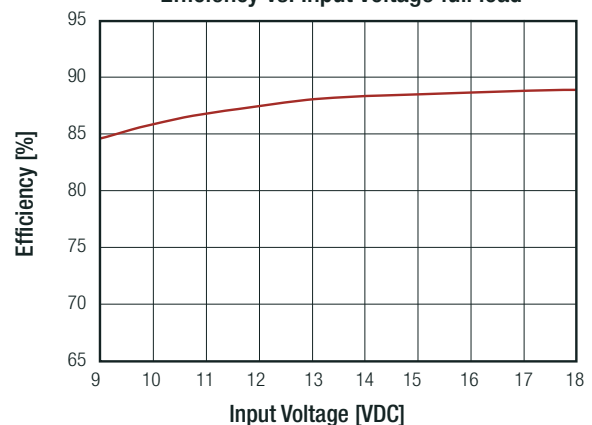
Note6: The ON/OFF control function can be positive or negative logic. The pin voltage is referenced to -Vin pin

RP30-1205SF

Efficiency vs. Output Current



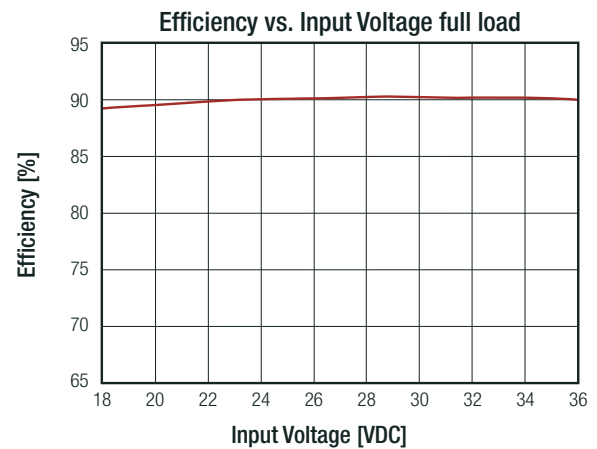
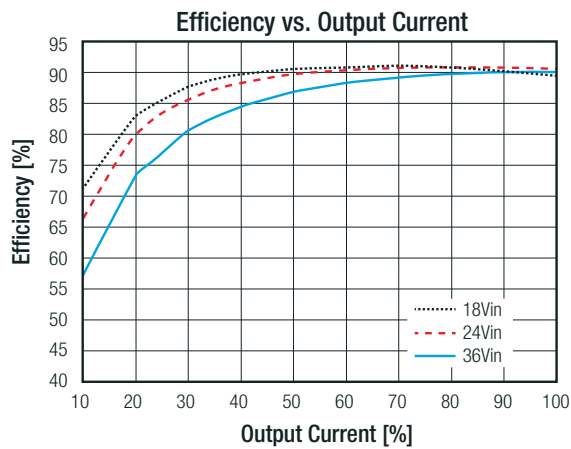
Efficiency vs. Input Voltage full load



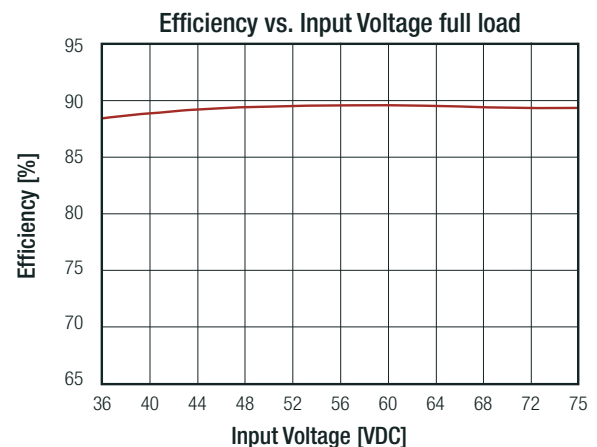
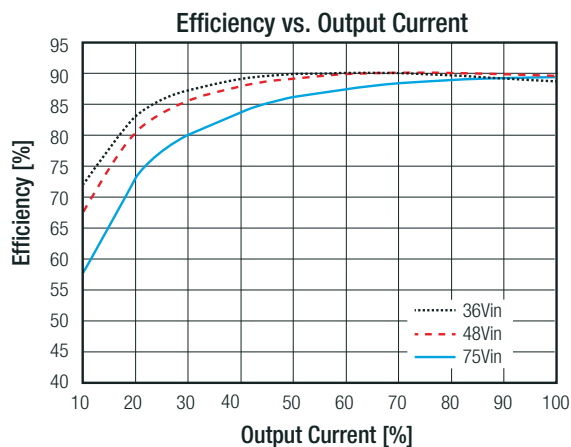
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Specifications (measured @ $T_a = 25^\circ\text{C}$, nom. Vin, full load unless otherwise stated)

RP30-2405SF



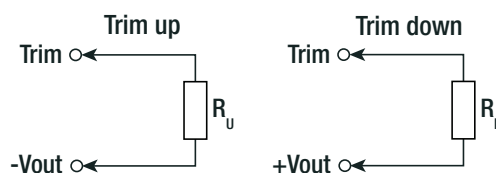
RP30-4805SF



OUTPUT VOLTAGE 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.



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Specifications (measured @ Ta= 25°C, nom. Vin, full load unless otherwise stated)

RP30-xx3.3SF											
Trim up	1	2	3	4	5	6	7	8	9	10	[%]
Vout =	3.333	3.366	3.399	3.432	3.465	3.498	3.531	3.564	3.597	3.63	[VDC]
R _u =	57.93	26.16	15.58	10.28	7.11	4.99	3.48	2.34	1.46	0.75	[kΩ]
Trim down	1	2	3	4	5	6	7	8	9	10	[%]
Vout =	3.267	3.234	3.201	3.168	3.135	3.102	3.069	3.036	3.003	2.97	[VDC]
R _d =	69.47	31.23	18.49	12.12	8.29	5.74	3.92	2.56	1.50	0.65	[kΩ]
RP30-xx05SF											
Trim up	1	2	3	4	5	6	7	8	9	10	[%]
Vout =	5.05	5.10	5.15	5.20	5.25	5.30	5.35	5.4	5.45	5.50	[VDC]
R _u =	36.57	16.58	9.92	6.58	4.59	3.25	2.30	1.59	1.03	0.59	[kΩ]
Trim down	1	2	3	4	5	6	7	8	9	10	[%]
Vout =	4.95	4.90	4.85	4.80	4.75	4.70	4.65	4.60	4.55	4.50	[VDC]
R _d =	45.53	20.61	12.31	8.15	5.66	4.00	2.81	1.92	1.23	0.68	[kΩ]
RP30-xx12SF											
Trim up	1	2	3	4	5	6	7	8	9	10	[%]
Vout =	12.12	12.24	12.36	12.48	12.60	12.72	12.84	12.96	13.08	13.20	[VDC]
R _u =	367.91	165.95	98.64	64.98	44.78	31.32	21.70	14.49	8.88	4.39	[kΩ]
Trim down	1	2	3	4	5	6	7	8	9	10	[%]
Vout =	11.88	11.76	11.64	11.52	11.40	11.28	11.16	11.04	10.92	10.8	[VDC]
R _d =	460.99	207.95	123.60	81.42	56.12	39.25	27.20	18.16	11.13	5.51	[kΩ]
RP30-xx15SF											
Trim up	1	2	3	4	5	6	7	8	9	10	[%]
Vout =	15.15	15.3	15.45	15.60	15.75	15.90	16.05	16.20	16.35	16.50	[VDC]
R _u =	404.18	180.59	106.06	68.80	46.44	31.53	20.88	12.90	6.69	1.72	[kΩ]
Trim down	1	2	3	4	5	6	7	8	9	10	[%]
Vout =	14.85	14.70	14.55	14.40	14.25	14.10	13.95	13.80	13.65	13.50	[VDC]
R _d =	499.82	223.41	131.27	85.20	57.56	39.14	25.97	16.10	8.42	2.282	[kΩ]

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 Dual	±0.5% ±1.0%
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 unless otherwise stated)

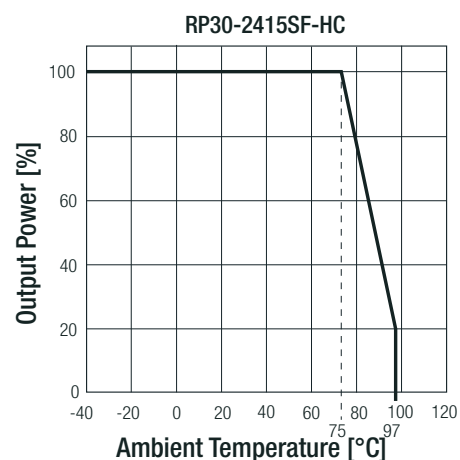
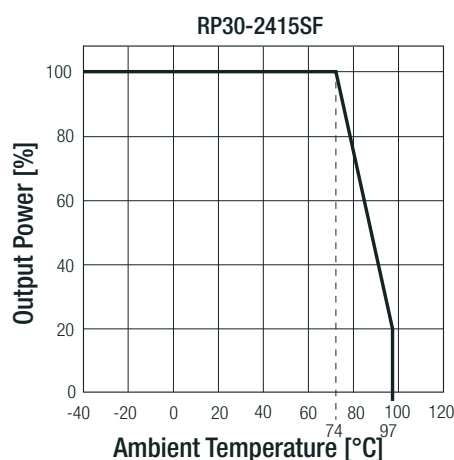
PROTECTIONS

Parameter	Condition		Value
Short Circuit Protection (SCP)			continuous, automatic recovery
Over Voltage Protection (OVP)	zener diode clamp	3.3Vout 5Vout 12Vout 15Vout	3.9VDC 6.2VDC 15VDC 18VDC
Over Load Protection (OLP)	% Iout rated		150% typ.
Over Temperature Protection (OTP)			115°C typ.
Isolation Voltage ⁽⁷⁾	I/P to O/P I/P to O/P to case		1.6kVDC/ 1 minute 1.6kVDC/ 1 minute
Isolation Resistance	Viso= 500VDC		1GΩ min.
Isolation Capacitance			1500pF max.
Notes:			
Note7: For repeat Hi-Pot testing, reduce the time and/or the test voltage			
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 +74°C -40°C to +97°C
Maximum Case Temperature			+105°C
Temperature Coefficient			±0.02%/K max.
Thermal Impedance	@ natural convection 0.1m/s	without heat-sink with heat-sink	12K/W 10K/W
Operating Humidity	non-condensing		5% - 95% RH
Thermal Shock			according to MIL-STD-810F
Vibration			according to MIL-STD-810F
MTBF	MIL-HDBK-217F, G.B. Bellcore TR-NWT-000332 ⁽⁹⁾		1453 x 10 ³ hours 3173 x 10 ³ hours

Derating Graph ⁽¹⁰⁾



Notes:

Note9: BELLCORE TR-NWT-000332. Case I: 50% Stress, Temperature at 40°C (Ground fixed and controlled environment)
MIL-HDBK-217F Notice2 @ TA= 25°C, Full load (Ground, Benign, controlled environment)

Note10: 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 RECOM Techsupport for detailed information

Specifications (measured @ Ta= 25°C, nom. Vin, full load unless otherwise stated)

SAFETY AND CERTIFICATIONS

Certificate Type (Safety)	Condition	Standard
Information Technology Equipment, General Requirements for Safety	E196683	UL60950-1, 2nd Edition 2011 CAN/CSA-C22.2 No. 60950-1, 2nd Edition 2011
EAC	RU-AT.49.09571	TP TC 004/2011
RoHS2		RoHS-2011/65/EU + AM-2015/863

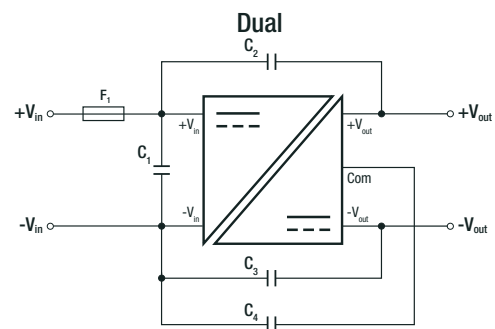
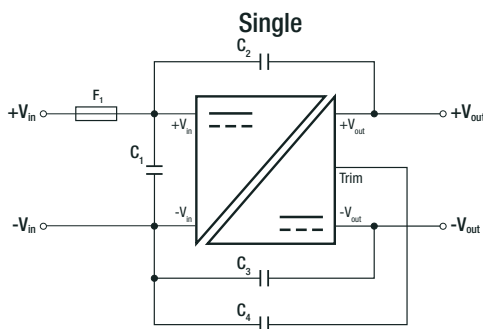
EMC Compliance

Condition	Standard / Criterion
Electromagnetic compatibility of multimedia equipment - Emission requirements	EN55032, Class A and B
Information technology equipment - Immunity characteristics - Limits and methods of measurement	EN55024:2010 + A1:2015
ESD Electrostatic discharge immunity test	Air ±8kV and Contact ±6kV
Radiated, radio-frequency, electromagnetic field immunity test	10 V/m
Fast Transient and Burst Immunity ⁽¹¹⁾	±2kV
Surge Immunity ⁽¹¹⁾	±1kV
Immunity to conducted disturbances, induced by radio-frequency fields	10 Vr.m.s

Notes:

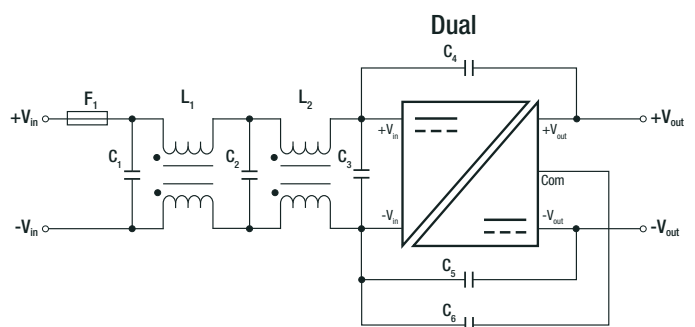
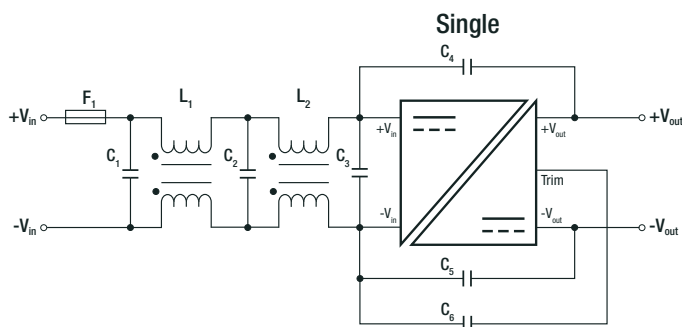
Note11: An external input filter capacitor is required if the module has to meet EN61000-4-4, EN61000-4-5
Recom suggests Nippon chemi-con KY series 12Vin, 24Vin=330µF/50V or 48Vin=220µF/100V

EMC Filtering Suggestions according to EN55032



Component List Class A

MODEL	C1	C2	C3/C4
RP30-12xxSF, RP30-12xxDF	10µF/25V, 1812 MLCC	1000pF/2kV, 1808 MLCC	1000pF/2kV, 1808 MLCC
RP30-24xxSF, RP30-24xxDF	4.7µF/50V, 1812 MLCC	1000pF/2kV, 1808 MLCC	1000pF/2kV, 1808 MLCC
RP30-48xxSF, RP30-48xxDF	2.2µF/100V, 1812 MLCC	1000pF/2kV, 1808 MLCC	1000pF/2kV, 1808 MLCC



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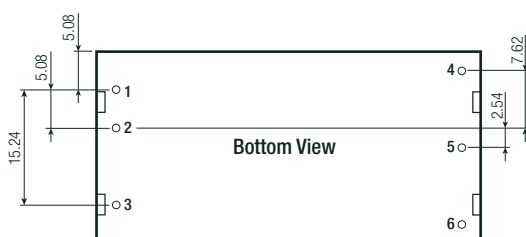
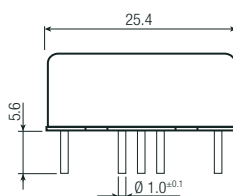
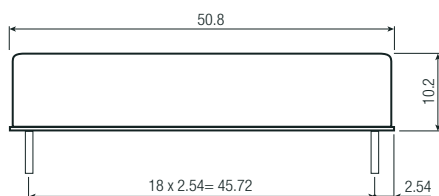
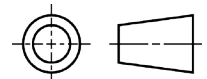
Component List Class B

MODEL	C1/C2/C3	C4/C5/C6	L1	L2
RP30-12xxSF RP30-12xxDF	10µF/25V 1812 MLCC	1000pF/2kV 1808 MLCC	CMC: 33.3µH ref.: WE 744842932 ref.: CMC-09	CMC: 55µH ref.: WE 744290560 ref.: CMC-10
RP30-24xxSF RP30-24xxDF	4.7µF/50V 1812 MLCC	1000pF/2kV 1808 MLCC	CMC: 33.3µH ref.: WE 744842932 ref.: CMC-09	CMC: 55µH ref.: WE 744290560 ref.: CMC-10
RP30-48xxSF RP30-48xxDF	2.2µF/100V 1812 MLCC	1000pF/2kV 1808 MLCC	CMC: 33.3µH ref.: WE 744842932 ref.: CMC-09	CMC: 55µH ref.: WE 744290560 ref.: CMC-10

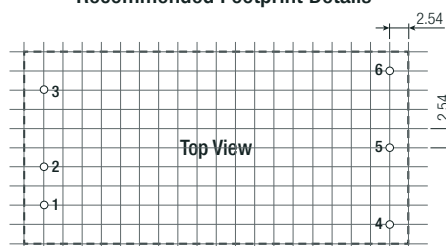
DIMENSIONS and PHYSICAL CHARACTERISTICS

Parameter	Type	Value
Material	case base potting	nickel coated copper FR4 PCB epoxy (UL94V-0)
Dimensions (LxWxH)	without Heat-sink with Heat-sink	50.8 x 25.4 x 10.2mm 56.8 x 25.4 x 16.8mm
Weight	without Heat-sink with Heat-sink	30.5g 41.39g

Dimension Drawing (mm)



Recommended Footprint Details



Pinning Information

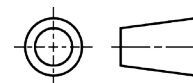
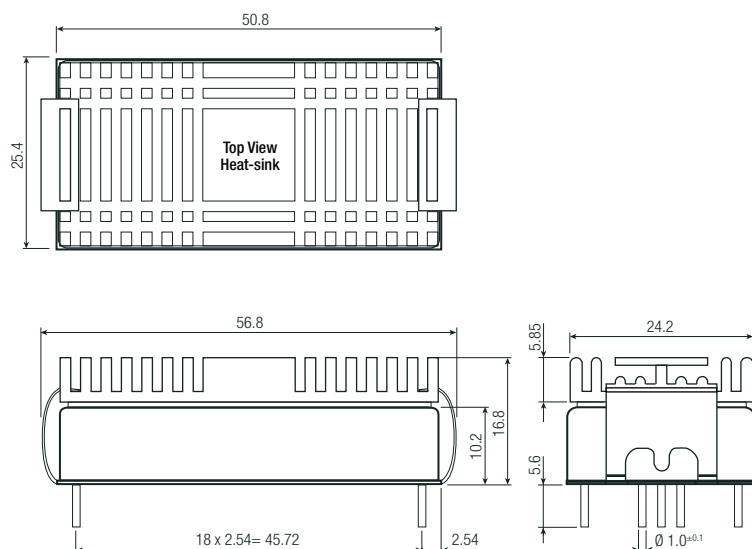
Pin #	Single	Dual
1	+Vin	+Vin
2	-Vin	-Vin
3	CTRL ⁽³⁾	CTRL ⁽³⁾
4	+Vout	+Vout
5	-Vout	Com
6	Trim	-Vout

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

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Specifications (measured @ Ta= 25°C, nom. Vin, full load unless otherwise stated)

Dimension Drawing with Heat-sink (mm)



Pinning Information

Pin #	Single	Dual
1	+Vin	+Vin
2	-Vin	-Vin
3	CTRL ⁽³⁾	CTRL ⁽³⁾
4	+Vout	+Vout
5	-Vout	Com
6	Trim	-Vout

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

PACKAGING INFORMATION

Parameter	Type		Value
Packaging Dimension (LxWxH)	tube	without heat-sink	255.0 x 54.0 x 22.0mm
	tray	with heat-sink	302.5 x 222.0 x 20.0mm
Packaging Quantity	tube	without heat-sink	9pcs
	tray	with heat-sink	20pcs
Storage Temperature Range			-55°C to +125°C
Storage Humidity	non-condensing		5% - 95% RH

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