

1.3 to 10.8W DC-DC Converters

<https://product.tdk.com/en/power/ccg>
www.emea.lambda.tdk.com/ccg



Industrial



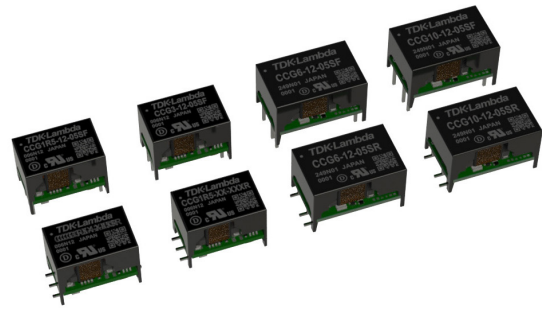
Test



COMM



Broadcast



The space saving CCG1R5 to CCG10 series of isolated DC-DC converters operate from wide range 4.5 to 18V, 9 to 36Vdc or 18 to 76V inputs with 1.3W to 10.8W power levels and output voltages from 3.3V to 30V ⁽¹⁾. Single output models can be adjusted -5% to +10% by using the trim terminal. The CCG can operate in ambient temperatures of up to -40 to +100°C (model dependent) and have an input to output isolation of 1,500Vdc. The CCG series is available in through-hole or surface mount packages, with an option for a double sided board coating for rail applications and other harsh environments.

Features	Benefits
• Wide 4:1 Input Ranges	• Supports Dual 5/12V 12/24V or 24/48V System Voltages
• Space Saving Package Sizes	• Less Board Area Needed
• Certified to IEC62368-1	• Easier System Compliance
• Reduced Derating at High Ambient Temperatures	• More Useable Power
• No Silicone Potting	• Reduced Quality Risk During Surface Mount Reflow Process

Part Numbering Scheme

CCG	1R5	-12	-03	S	F	C	TR
Series Name CCG	Output Power 1R5 = 1.5W 3 = 3W 6 = 6W 10 = 10W	Input Voltage 12 = 4.5 - 18V 24 = 9 - 36V 48 = 18 - 76V	Output Voltage 03 = 3.3V 05 = 5V 12 = 12V 15 = 15V	Output S = Single D = Dual	Mounting Type F = Through hole R = Surface Mount	Board Coating Blank = No coating C = Coating	Tray Packaging Blank = 1 to 20 units TR = 40 units*

* Order multiples of 40, Surface Mount models only. Contact factory for the availability of tray packaging of models with board coating.

Related Products

Type	Part Number	Description
Isolated DC-DC Converter	CCG15-30	15-30W, 9 up to 76Vin, Single or Dual Output, 1x1 inch
Evaluation Kit	CCG-EVK-D0	Evaluation board (no module) for CCG15 or CCG30
Isolated DC-DC Converter	PXD40	40W, 9-36 or 18-75Vin, Single or Dual Outputs, 2x1 inch
DC-DC Non-isolated Buck Converter	i3A	100W, 9-53Vin, Output 5-30V 4.5A; 3.3-16.5V 8A, 1/32nd brick
DC-DC Non-isolated Buck Converter	i6A4W	250W, 9-53Vin, Output 3.3-40V 10A; 3.3-15V 20A, 16th brick
DC-DC Non-isolated Buck Converter	i7A	400-750W, 9 up to 60Vin, 0.8 up to 24Vout, 33A, 45A, 60A, 16th brick pinout
Ruggedized DC-DC Buck-Boost Converter	RGC	300W, 9-53Vin, Output 9.6-48V 8A; 5-28V 12.5A, 16th brick pinout
Isolated DC-DC Converter	PYD20	20W, 8.5-160Vin, Single or Dual Outputs, 2x1 inch
Isolated DC-DC Converter	PYQ50	30-50W, 14-160Vin, Single Output, Quarter brick

Model Selector							
Model Letter "x" indicates mounting type x=F through hole, x=R surface mount	Input Voltage (V)	Output Voltage (V)	Output Current (A)	Maximum Power (W)	Input Current at nominal input (A)	Efficiency (%) (100% load, nominal input)	Line / Load Regulation (mV)
CCG1R5-12-03Sx	4.5 - 18	3.3	0.4	1.32	0.149	74	20 / 20
CCG3-12-03Sx		3.3	0.8	2.64	0.282	78	20 / 20
CCG6-12-03Sx		3.3	1.6	5.28	0.537	82	20 / 20
CCG10-12-03Sx		3.3	2.6	8.58	0.813	88	20 / 20
CCG1R5-12-05Sx		5	0.3	1.5	0.158	79	20 / 20
CCG3-12-05Sx		5	0.6	3	0.309	81	20 / 20
CCG6-12-05Sx		5	1.2	6	0.581	86	20 / 20
CCG10-12-05Sx		5	2	10	0.926	90	20 / 20
CCG1R5-12-12Sx		12	0.13	1.56	0.165	79	48 / 48
CCG3-12-12Sx		12	0.25	3	0.301	83	48 / 48
CCG6-12-12Sx		12	0.5	6	0.562	89	48 / 48
CCG10-12-12Sx		12	0.9	10.8	1.000	90	48 / 48
CCG1R5-12-15Sx		15	0.1	1.5	0.158	79	60 / 60
CCG3-12-15Sx		15	0.2	3	0.294	85	60 / 60
CCG6-12-15Sx		15	0.4	6	0.556	90	60 / 60
CCG10-12-15Sx		15	0.7	10.5	0.972	90	60 / 60
CCG1R5-12-12Dx ⁽¹⁾		24	0.065	1.56	0.167	78	60 / 120
CCG3-12-12Dx ⁽¹⁾		24	0.13	3.12	0.31	84	60 / 120
CCG6-12-12Dx ⁽¹⁾		24	0.25	6	0.568	88	60 / 120
CCG10-12-12Dx ⁽¹⁾		24	0.42	10.08	0.944	89	60 / 120
CCG1R5-12-15Dx ⁽¹⁾		30	0.05	1.5	0.16	78	75 / 150
CCG3-12-15Dx ⁽¹⁾		30	0.1	3	0.298	84	75 / 150
CCG6-12-15Dx ⁽¹⁾		30	0.2	6	0.568	88	75 / 150
CCG10-12-15Dx ⁽¹⁾		30	0.34	10.2	0.944	90	75 / 150
CCG1R5-12-12Dx		±12	±0.065	1.56	0.167	78	60 / 120
CCG3-12-12Dx		±12	±0.13	3.12	0.31	84	60 / 120
CCG6-12-12Dx		±12	±0.25	6	0.568	88	60 / 120
CCG10-12-12Dx		±12	±0.42	10.08	0.944	89	60 / 120
CCG1R5-12-15Dx		±15	±0.05	1.5	0.16	78	75 / 150
CCG3-12-15Dx		±15	±0.1	3	0.298	84	75 / 150
CCG6-12-15Dx		±15	±0.2	6	0.568	88	75 / 150
CCG10-12-15Dx		±15	±0.34	10.2	0.944	90	75 / 150
CCG1R5-24-03Sx	9 - 36	3.3	0.4	1.32	0.075	73	20 / 20
CCG3-24-03Sx		3.3	0.8	2.64	0.143	77	20 / 20
CCG6-24-03Sx		3.3	1.6	5.28	0.272	81	20 / 20
CCG10-24-03Sx		3.3	2.6	8.58	0.411	87	20 / 20
CCG1R5-24-05Sx		5	0.3	1.5	0.08	78	20 / 20
CCG3-24-05Sx		5	0.6	3	0.152	82	20 / 20
CCG6-24-05Sx		5	1.2	6	0.294	85	20 / 20
CCG10-24-05Sx		5	2	10	0.468	89	20 / 20
CCG1R5-24-12Sx		12	0.13	1.56	0.079	82	48 / 48
CCG3-24-12Sx		12	0.25	3	0.151	83	48 / 48
CCG6-24-12Sx		12	0.5	6	0.284	88	48 / 48
CCG10-24-12Sx		12	0.9	10.8	0.5	90	48 / 48
CCG1R5-24-15Sx		15	0.1	1.5	0.076	82	60 / 60
CCG3-24-15Sx		15	0.2	3	0.149	84	60 / 60
CCG6-24-15Sx		15	0.4	6	0.281	89	60 / 60
CCG10-24-15Sx		15	0.7	10.5	0.486	90	60 / 60

Notes

- (1) ±12V dual output models can provide a 24V single output by utilizing just the +Vout and -Vout pins, leaving the COM unconnected. Similarly ±15V dual output models can be used as a 30V single output

Model Selector							
Model Letter "x" indicates mounting type x=F through hole, x=R surface mount	Input Voltage (V)	Output Voltage (V)	Output Current (A)	Maximum Power (W)	Input Current at nominal input (A)	Efficiency (%) (100% load, nominal input)	Line / Load Regulation (mV)
CCG1R5-24-12Dx ⁽¹⁾	9 - 36	24	0.065	1.56	0.08	81	60 / 120
CCG3-24-12Dx ⁽¹⁾		24	0.13	3.12	0.157	83	60 / 120
CCG6-24-12Dx ⁽¹⁾		24	0.25	6	0.284	88	60 / 120
CCG10-24-12Dx ⁽¹⁾		24	0.42	10.08	0.472	89	60 / 120
CCG1R5-24-15Dx ⁽¹⁾		30	0.05	1.5	0.078	80	75 / 150
CCG3-24-15Dx ⁽¹⁾		30	0.1	3	0.152	82	75 / 150
CCG6-24-15Dx ⁽¹⁾		30	0.2	6	0.284	88	75 / 150
CCG10-24-15Dx ⁽¹⁾		30	0.34	10.2	0.472	90	75 / 150
CCG1R5-24-12Dx		±12	±0.065	1.56	0.08	81	60 / 120
CCG3-24-12Dx		±12	±0.13	3.12	0.159	83	60 / 120
CCG6-24-12Dx		±12	±0.25	6	0.284	88	60 / 120
CCG10-24-12Dx		±12	±0.42	10.08	0.472	89	60 / 120
CCG1R5-24-15Dx		±15	±0.05	1.5	0.078	80	75 / 150
CCG3-24-15Dx		±15	±0.1	3	0.152	82	75 / 150
CCG6-24-15Dx		±15	±0.2	6	0.284	88	75 / 150
CCG10-24-15Dx		±15	±0.34	10.2	0.472	90	75 / 150
CCG1R5-48-03Sx	18 - 76	3.3	0.4	1.32	0.038	72	20 / 20
CCG3-48-03Sx		3.3	0.8	2.64	0.071	77	20 / 20
CCG6-48-03Sx		3.3	1.6	5.28	0.136	81	20 / 20
CCG10-48-03Sx		3.3	2.6	8.58	0.205	87	20 / 20
CCG1R5-48-05Sx		5	0.3	1.5	0.041	76	20 / 20
CCG3-48-05Sx		5	0.6	3	0.078	80	20 / 20
CCG6-48-05Sx		5	1.2	6	0.149	84	20 / 20
CCG10-48-05Sx		5	2	10	0.234	89	20 / 20
CCG1R5-48-12Sx		12	0.13	1.56	0.041	79	48 / 48
CCG3-48-12Sx		12	0.25	3	0.076	82	48 / 48
CCG6-48-12Sx		12	0.5	6	0.144	87	48 / 48
CCG10-48-12Sx		12	0.9	10.8	0.25	90	48 / 48
CCG1R5-48-15Sx		15	0.1	1.5	0.041	77	60 / 60
CCG3-48-15Sx		15	0.2	3	0.075	83	60 / 60
CCG6-48-15Sx		15	0.4	6	0.142	88	60 / 60
CCG10-48-15Sx		15	0.7	10.5	0.243	90	60 / 60
CCG1R5-48-12Dx ⁽¹⁾		24	0.065	1.56	0.042	78	60 / 120
CCG3-48-12Dx ⁽¹⁾		24	0.13	3.12	0.078	83	60 / 120
CCG6-48-12Dx ⁽¹⁾		24	0.25	6	0.144	87	60 / 120
CCG10-48-12Dx ⁽¹⁾		24	0.42	10.08	0.239	88	60 / 120
CCG1R5-48-15Dx ⁽¹⁾		30	0.05	1.5	0.041	76	75 / 150
CCG3-48-15Dx ⁽¹⁾		30	0.1	3	0.075	83	75 / 150
CCG6-48-15Dx ⁽¹⁾		30	0.2	6	0.144	87	75 / 150
CCG10-48-15Dx ⁽¹⁾		30	0.34	10.2	0.239	89	75 / 150
CCG1R5-48-12Dx		±12	±0.065	1.56	0.042	78	60 / 120
CCG3-48-12Dx		±12	±0.13	3.12	0.078	83	60 / 120
CCG6-48-12Dx		±12	±0.25	6	0.144	87	60 / 120
CCG10-48-12Dx		±12	±0.42	10.08	0.239	88	60 / 120
CCG1R5-48-15Dx		±15	±0.05	1.5	0.041	76	75 / 150
CCG3-48-15Dx		±15	±0.1	3	0.075	83	75 / 150
CCG6-48-15Dx		±15	±0.2	6	0.144	87	75 / 150
CCG10-48-15Dx		±15	±0.34	10.2	0.239	89	75 / 150

Notes

- (1) ±12V dual output models can provide a 24V single output by utilizing just the +Vout and -Vout pins, leaving the COM unconnected. Similarly +/-15V dual output models can be used as a 30V single output

Specifications		
Model		CCG1R5-10, CCG3
Input		
Input Voltage Range	Vdc	See model selector table
No Load Power Consumption ⁽²⁾	W	0.15 to 0.75. See evaluation data on website.
Efficiency	-	See model selector table
Conducted & Radiated EMI	-	EN55011/EN55032-A, FCC Class A, VCCI-A (External components are required, consult Evaluation Data on website) ⁽³⁾
Immunity	-	See Immunity table
Safety Certifications and Markings	-	IEC/UL/CSA/EN62368-1, CE Mark and UKCA Mark

Immunity				
Test	Standard	Test Level	Criteria	Notes: See IEC61000 immunity test reports on website for external filtering circuitry ⁽³⁾
ESD	EN61000-4-2	3	B	Air ± 8kV
Radiated Susceptibility	EN61000-4-3	2/3	A	Lvl 2: 3V/m(1.4-6.0GHz) Lvl 3: 10V/m(80-1000MHz)
Electrical Fast Transient Burst	EN61000-4-4	4	B	± 4kV for input and output
Surge	EN61000-4-5	3	B	Normal mode ± 2kV
Conducted Susceptibility	EN61000-4-6	3	A	10V(150kHz-80MHz)
Magnetic Fields	EN61000-4-8	4	A	30A/m(50Hz, 60Hz)

Specifications					
Model		CCG1R5	CCG3	CCG6	CCG10
Output					
Output Voltage Tolerance	%	±2			
Output Voltage Adjustment	%	Single output only. -5, +10			
Switching Frequency	kHz	400 (fixed)			
Cross Regulation	mV	Dual output only. ±12V: 480, ±15V: 600 (Asymmetrical, one output at 20%, the other at 100%			
External Load Capacitance (Maximum)	uF	CCG1R5, CCG3: 3.3-5V: 220, 12-15V: 100 CCG1R5, CCG3: ±12-15V: ±100, 24-30V: 47		CCG6, CCG10: 3.3-5V: 470, 12-15V: 220 CCG6, CCG10: ±12-15V: ±220, 24-30V: 100	
Ripple & Noise	mV	200			
Temperature Coefficient	%/°C	0.02			
Minimum Load	-	No minimum load required			
Overcurrent Protection	%	Hiccup mode. >105%			
Overvoltage Protection	-	-			
Overtemperature Protection	-	-			
Remote Sense	-	No remote sense			
Remote On/Off	-	Negative Logic ON: Short , OFF: Open			
Parallel Operation	-	Not possible			
Environmental					
Operating Temperature (Ambient) ⁽³⁾	°C	-40 to +100		-40 to +95	-40 to +90
Maximum Transformer Temperature	°C	112 to 130 (See instruction manual on website for limits and measurement)			
Storage Temperature	°C	-55 to +125			
Humidity (non condensing)	%RH	5 - 95 (Operating & storage)			
Cooling	-	Convection or forced air			
Altitude	m	5,000			
Withstand Voltage	Vac/Vdc	Input to output 1,500Vdc or 1,000Vac for 1 minute			
Vibration (Non operating)	-	10-55Hz (Sweep for 1min.) Amplitude 1.65 mm Constant (Maximum 98m/s2) X,Y,Z 1 hour each			
Shock (Non operating)	-	490.3m/s², 11ms, ±X, ±Y, ±Z 3 times each			

Specifications

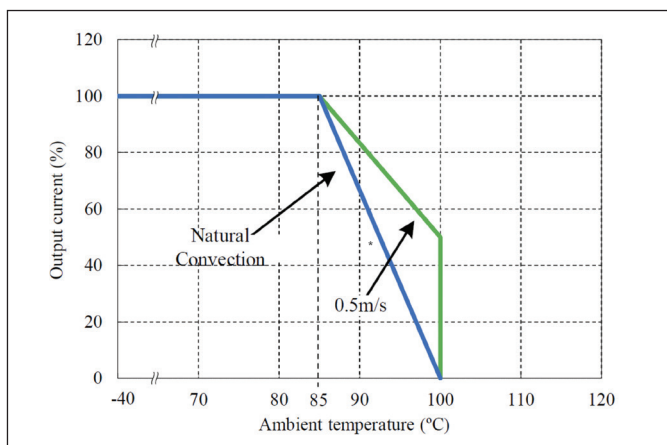
Model		CCG1R5	CCG3	CCG6	CCG10
Other					
Weight (Typ)	g	3		4	
Size (LxWxH)	mm	15.7 x 10.4 x 11.8		19 x 12.4 x 11.5 (11.8 for SMD version)	
Size (LxWxH)	Inches	0.62 x 0.41 x 0.46		0.75 x 0.49 x 0.45 (0.46 for SMD version)	
Case Material	-	Non-conductive black plastic			
MTBF - Telcordia SR-332 issue 3 ⁽³⁾	Hours	4,000,000 to 11,883,918, 40°C full load. See reliability data on the website			
Warranty	yrs	5			

Notes

(2) Off-load power consumption can be reduced to typically <0.1W using the remote on/off function - See evaluation data and installation manual.

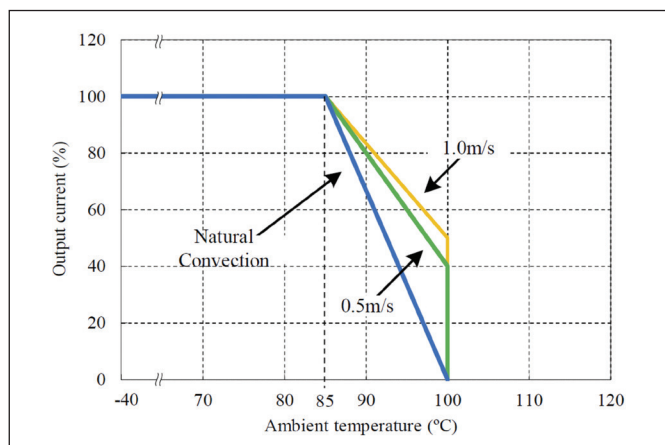
(3) [See website for derating, detailed specifications, test methods and installation manual](#)

CCG1R5 Output Current vs. Ambient Temperature (*)

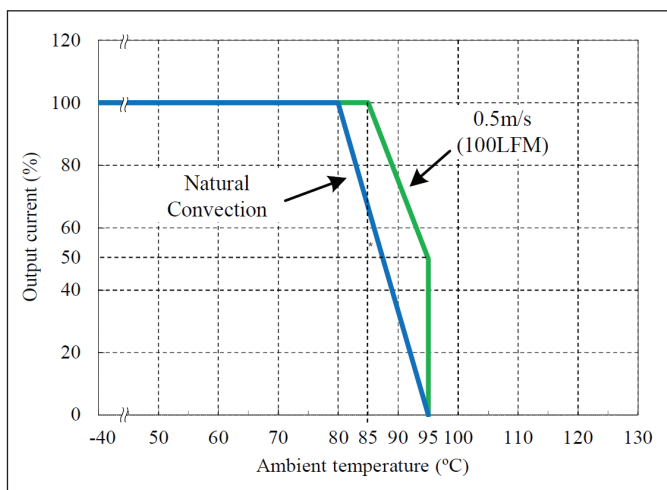


(*) Derating varies by model number, see [Instruction Manual](#) on the Tech Notes webpage⁽³⁾

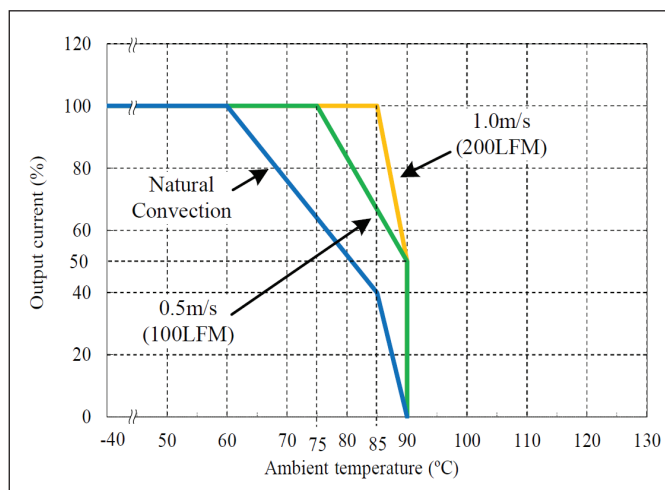
CCG3 Output Current vs. Ambient Temperature (*)



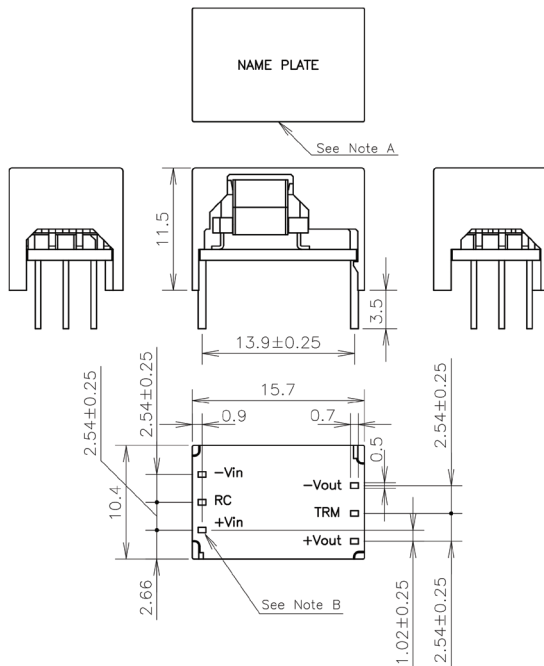
CCG6 Output Current vs. Ambient Temperature (*)



CCG10 Output Current vs. Ambient Temperature (*)



Outline Drawing Single Output CCG1R5 and CCG3 Through Hole (F suffix)

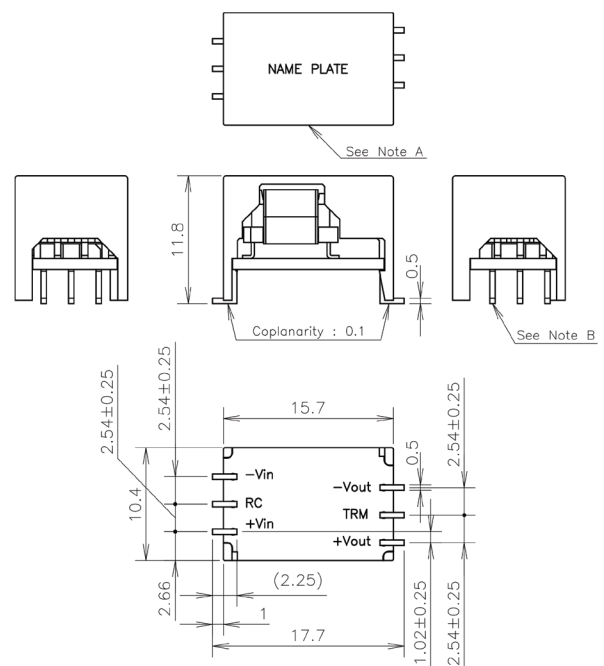


Notes :

- A: Model name, country of manufacture, Lot No., Serial No. and safety marking (For only approved products) are shown here.
- B: Input, Output and signal terminals : 6-0.7x0.5±0.05
- C: Unless otherwise specified dimensional tolerance : ±0.5

Unit mm

Outline Drawing Single Output CCG1R5 and CCG3 Surface Mount (R suffix)

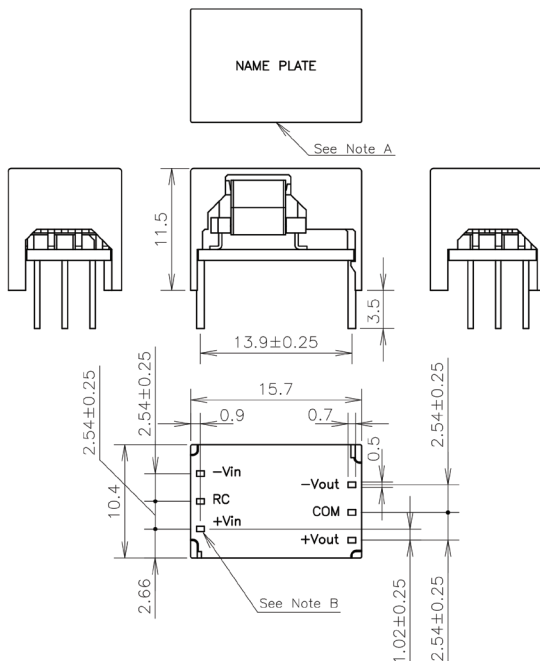


Notes :

- A: Model name, country of manufacture, Lot No., Serial No. and safety marking (For only approved products) are shown here.
- B: Input, Output and signal terminals : 6-0.5x0.5±0.05
- C: Unless otherwise specified dimensional tolerance : ±0.5

Unit mm

Outline Drawing Dual Output CCG1R5 and CCG3 Through Hole (F suffix)

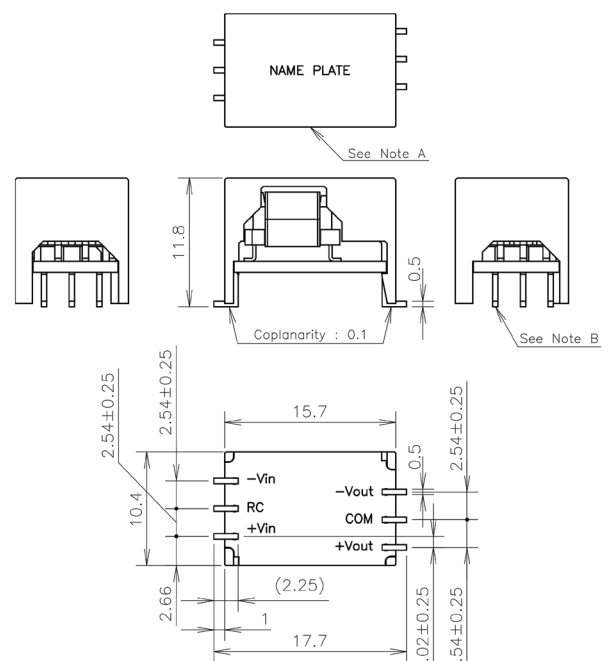


Notes :

- A: Model name, country of manufacture, Lot No., Serial No. and safety marking (For only approved products) are shown here.
- B: Input, Output and signal terminals : 6-0.7x0.5±0.05
- C: Unless otherwise specified dimensional tolerance : ±0.5

Unit mm

Outline Drawing Dual Output CCG1R5 and CCG3 Surface Mount (R suffix)

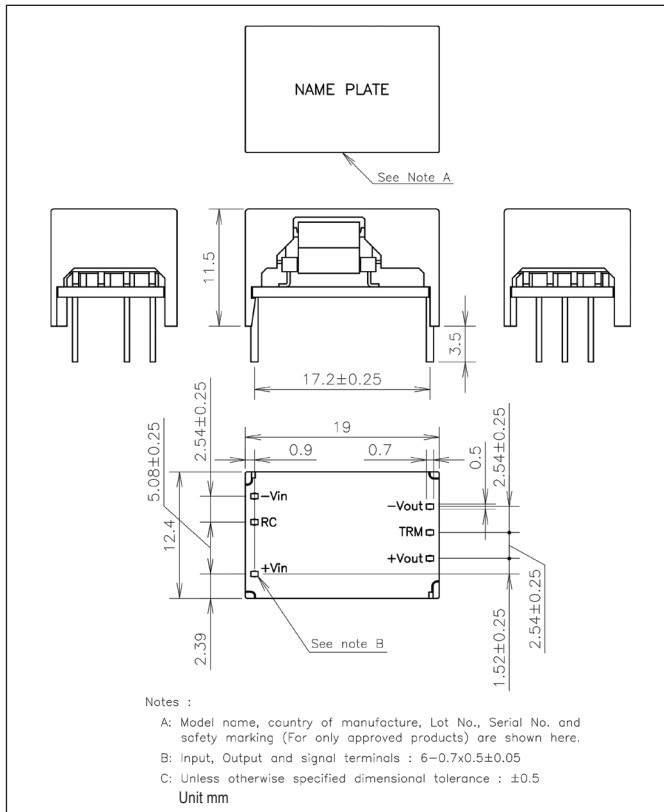


Notes :

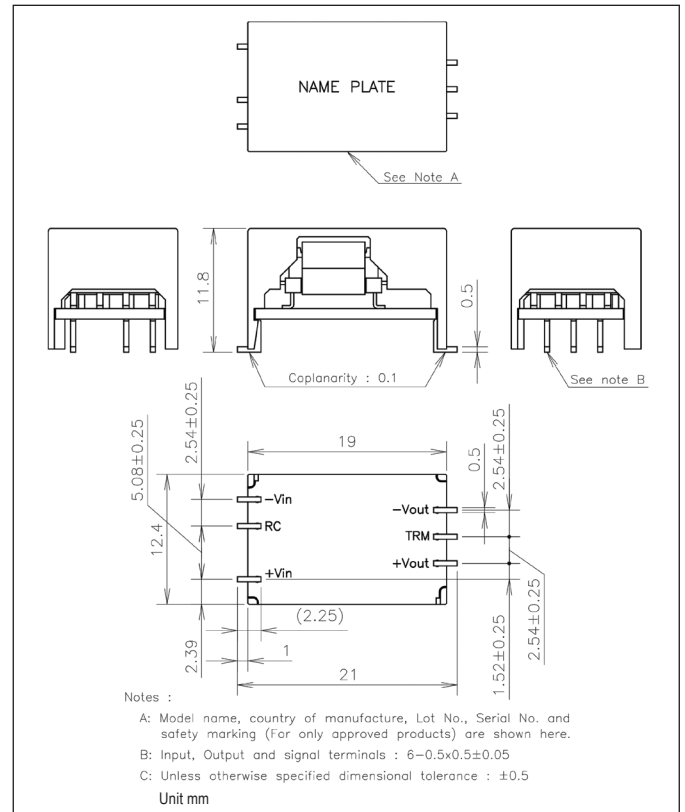
- A: Model name, country of manufacture, Lot No., Serial No. and safety marking (For only approved products) are shown here.
- B: Input, Output and signal terminals : 6-0.5x0.5±0.05
- C: Unless otherwise specified dimensional tolerance : ±0.5

Unit mm

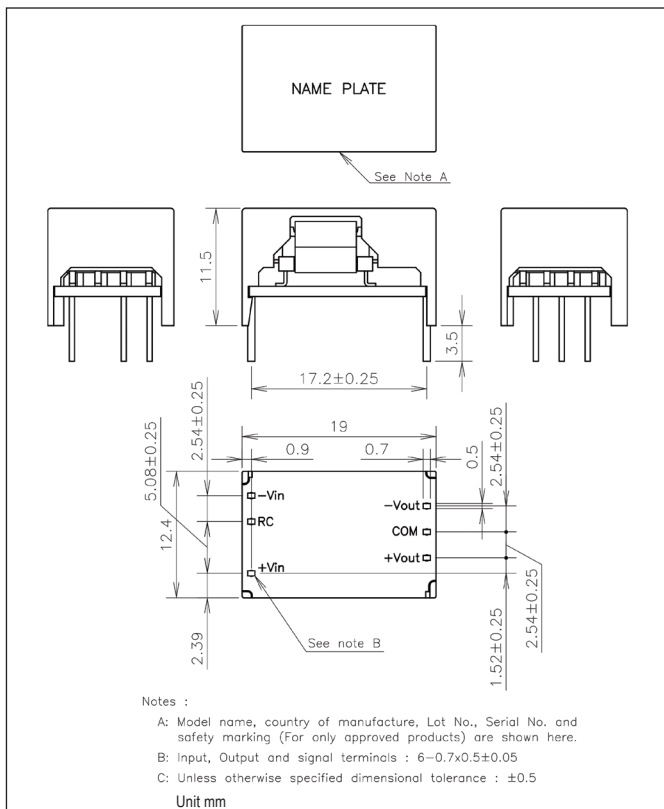
Outline Drawing Single Output CCG6 and CCG10 Through Hole (F suffix)



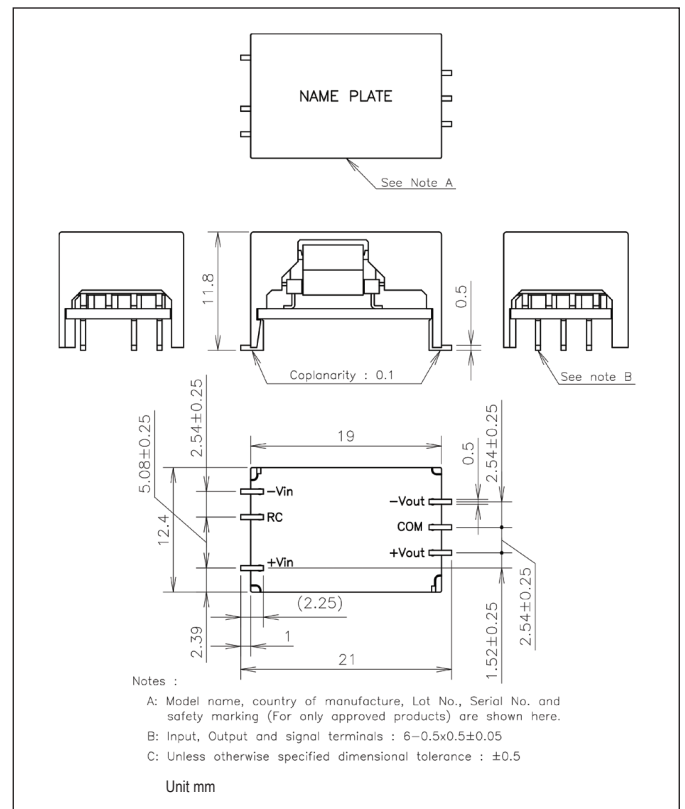
Outline Drawing Single Output CCG6 and CCG10 Surface Mount (R suffix)



Outline Drawing Dual Output CCG6 and CCG10 Through Hole (F suffix)



Outline Drawing Dual Output CCG6 and CCG10 Surface Mount (R suffix)



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