

1.3 to 10.8W DC-DC Converters

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Industrial



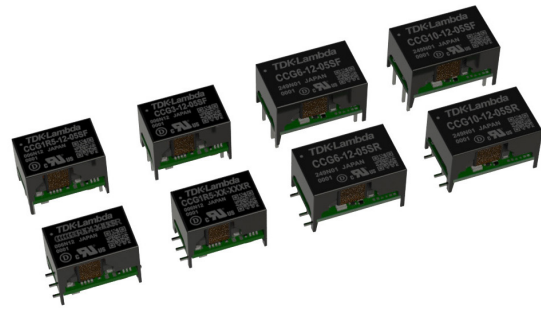
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The space saving CCG1R5 to CCG10 series of isolated DC-DC converters operate from wide range 4.5 to 18V, 9 to 36Vdc or 18 to 76V inputs with 1.3W to 10.8W power levels and output voltages from 3.3V to 30V (1). Single output models can be adjusted -5% 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. Both through hole and surface mount packages are offered.

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
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	S = Single Output D = Dual Output	Mounting Type F = Through hole R = Surface Mount

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	120 / 240	
CCG3-12-12Dx ⁽¹⁾		24	0.13	3.12	0.31	84	120 / 240	
CCG6-12-12Dx ⁽¹⁾		24	0.25	6	0.568	88	120 / 240	
CCG10-12-12Dx ⁽¹⁾		24	0.42	10.08	0.944	89	120 / 240	
CCG1R5-12-15Dx ⁽¹⁾		30	0.05	1.5	0.16	78	150 / 300	
CCG3-12-15Dx ⁽¹⁾		30	0.1	3	0.298	84	150 / 300	
CCG6-12-15Dx ⁽¹⁾		30	0.2	6	0.568	88	150 / 300	
CCG10-12-15Dx ⁽¹⁾		30	0.34	10.2	0.944	90	150 / 300	
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	120 / 240	
CCG3-24-12Dx ⁽¹⁾		24	0.13	3.12	0.157	83	120 / 240	
CCG6-24-12Dx ⁽¹⁾		24	0.25	6	0.284	88	120 / 240	
CCG10-24-12Dx ⁽¹⁾		24	0.42	10.08	0.472	89	120 / 240	
CCG1R5-24-15Dx ⁽¹⁾		30	0.05	1.5	0.078	80	150 / 300	
CCG3-24-15Dx ⁽¹⁾		30	0.1	3	0.152	82	150 / 300	
CCG6-24-15Dx ⁽¹⁾		30	0.2	6	0.284	88	150 / 300	
CCG10-24-15Dx ⁽¹⁾		30	0.34	10.2	0.472	90	150 / 300	
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	120 / 240	
CCG3-48-12Dx ⁽¹⁾	24		0.13	3.12	0.078	83	120 / 240	
CCG6-48-12Dx ⁽¹⁾	24		0.25	6	0.144	87	120 / 240	
CCG10-48-12Dx ⁽¹⁾	24		0.42	10.08	0.239	88	120 / 240	
CCG1R5-48-15Dx ⁽¹⁾	30		0.05	1.5	0.041	76	150 / 300	
CCG3-48-15Dx ⁽¹⁾	30		0.1	3	0.075	83	150 / 300	
CCG6-48-15Dx ⁽¹⁾	30		0.2	6	0.144	87	150 / 300	
CCG10-48-15Dx ⁽¹⁾	30		0.34	10.2	0.239	89	150 / 300	
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)
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 report on website for external filtering circuitry
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)	µF	CCG1R5, CCG3: 3.3-5V: 220, 12-15V: 100		CCG6, CCG10: 3.3-5V: 470, 12-15V: 220	
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/s ²) X,Y,Z 1 hour each			
Shock (Non operating)	-	490.3m/s ² , 11ms, ±X, ±Y, ±Z 3 times each			

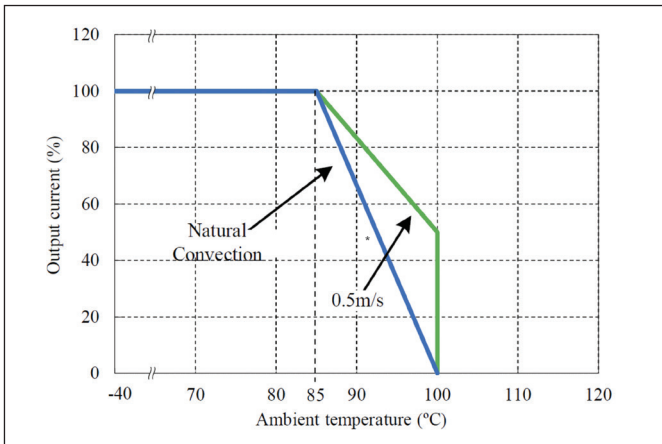
Specifications		CCG1R5	CCG3	CCG6	CCG10
Other					
Weight (Typ)	g	3		4	
Size (LxWxH)	mm	15.7 x 10.4 x 11.5		19 x 12.4 x 11.5 (11.8 for SMD version)	
Size (LxWxH)	Inches	0.62 x 0.41 x 0.45		0.75 x 0.49 x 0.45 (0.46 for SMD version)	
Case Material	-	Non-conductive black plastic			
MTBF - Telcordia SR-332 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

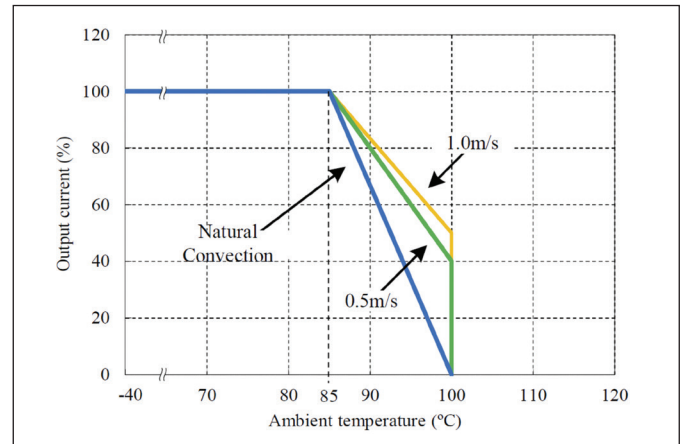
(2) Off-load power consumption can be reduced to typically <0.1W using the remote on/off function - See evaluation data and installation manual.

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

CCG1R5 Output Current vs. Ambient Temperature (*)

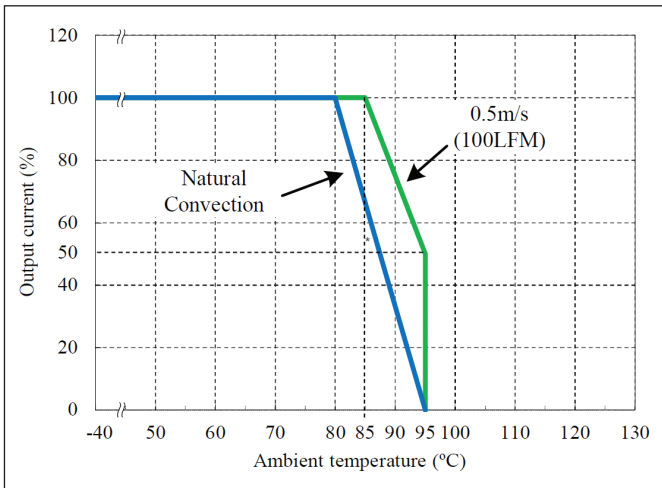


CCG3 Output Current vs. Ambient Temperature (*)

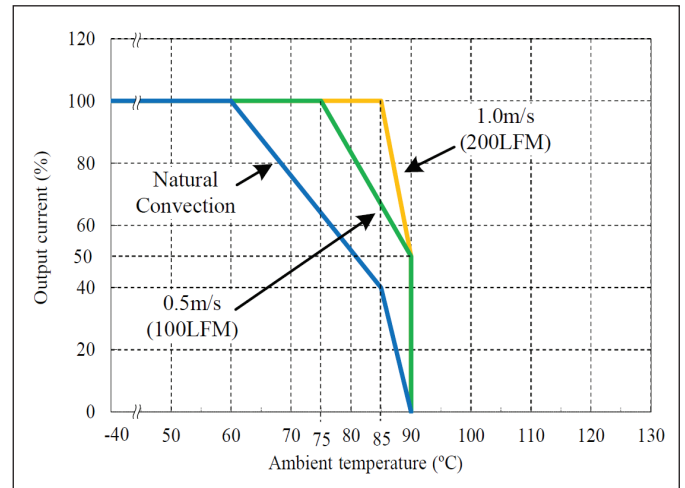


(*) Derating varies by model number, see [Installation Manual](#).

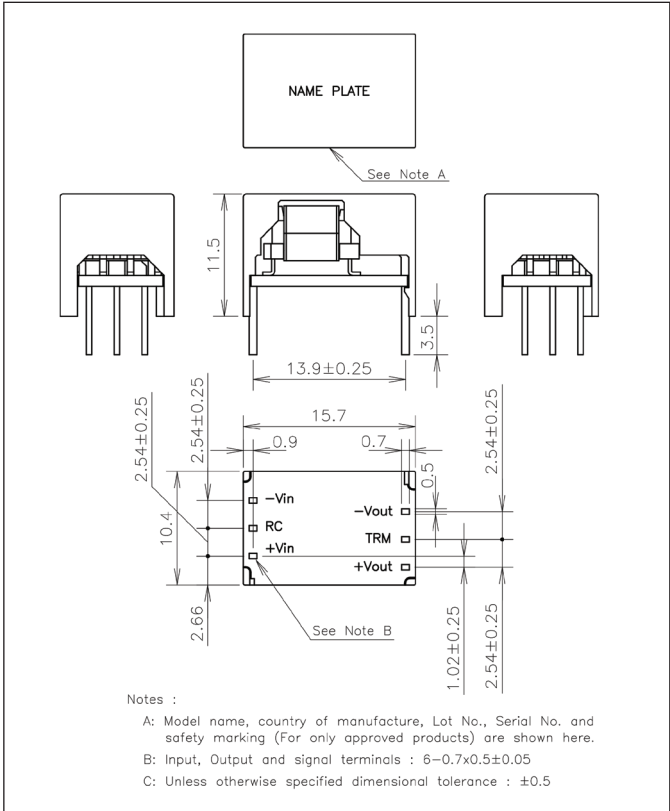
CCG6 Output Current vs. Ambient Temperature (*)



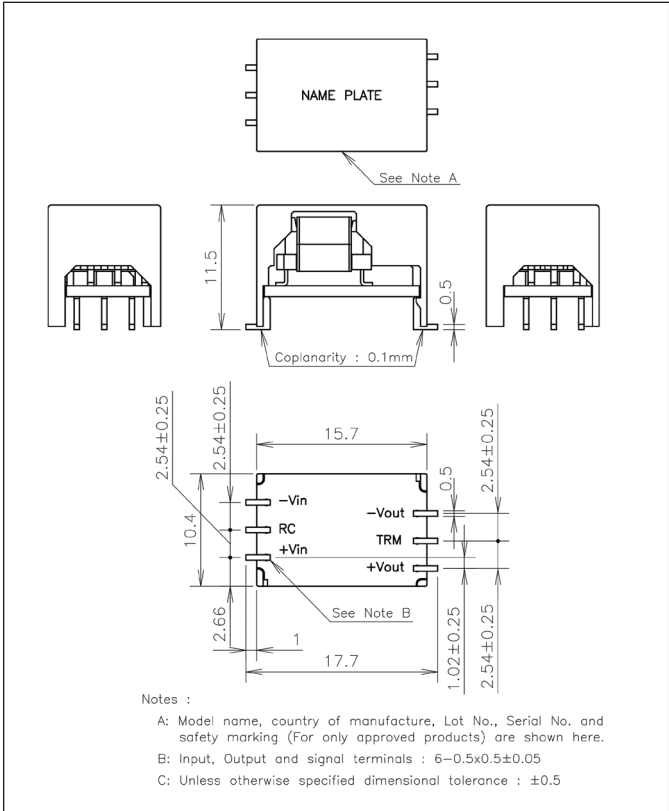
CCG10 Output Current vs. Ambient Temperature (*)



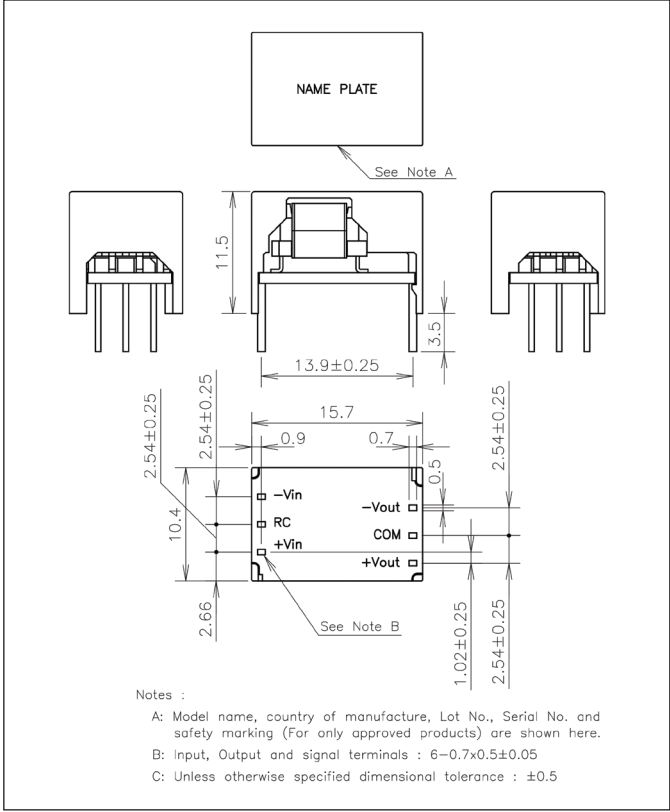
Outline Drawing Single Output CCG1R5 and CCG3 Through Hole (F suffix)



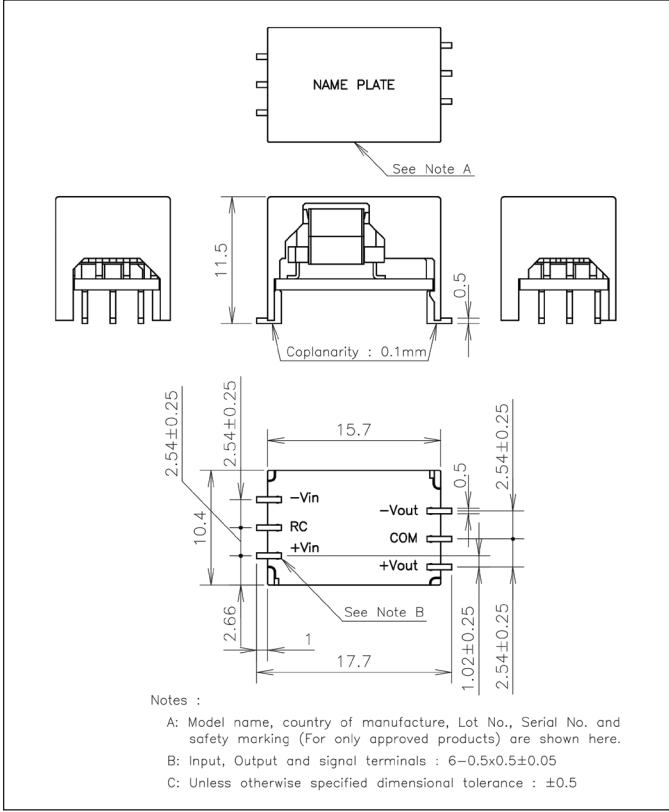
Outline Drawing Single Output CCG1R5 and CCG3 Surface Mount (R suffix)



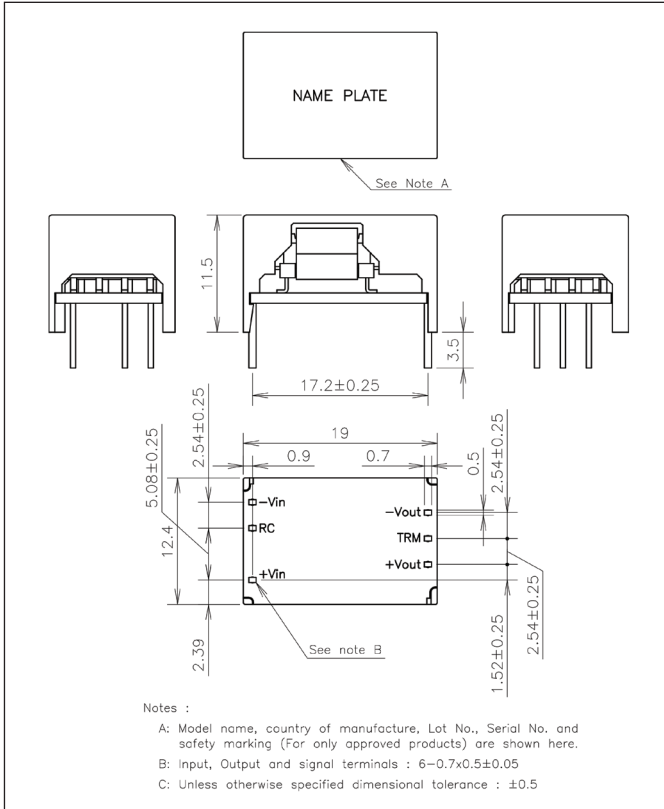
Outline Drawing Dual Output CCG1R5 and CCG3 Through Hole (F suffix)



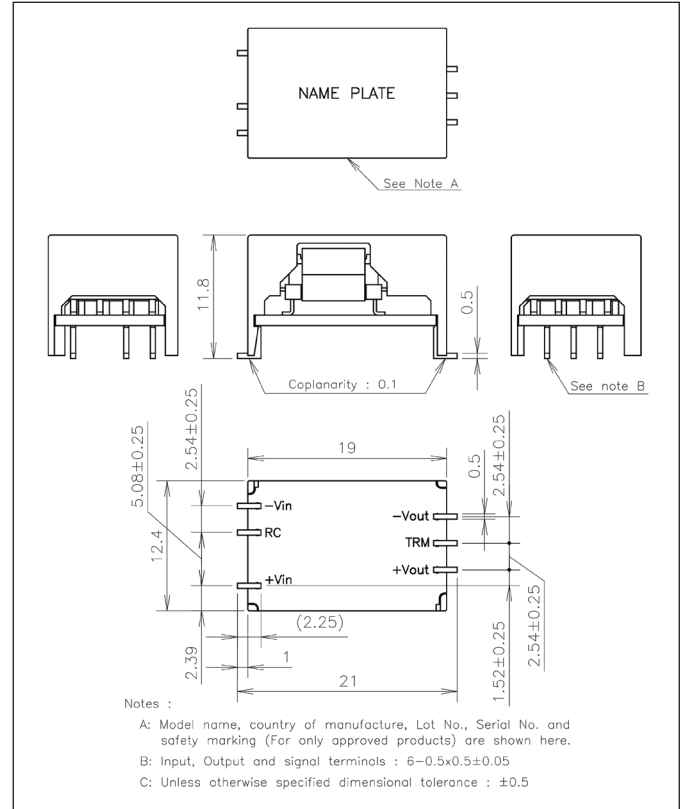
Outline Drawing Dual Output CCG1R5 and CCG3 Surface Mount (R suffix)



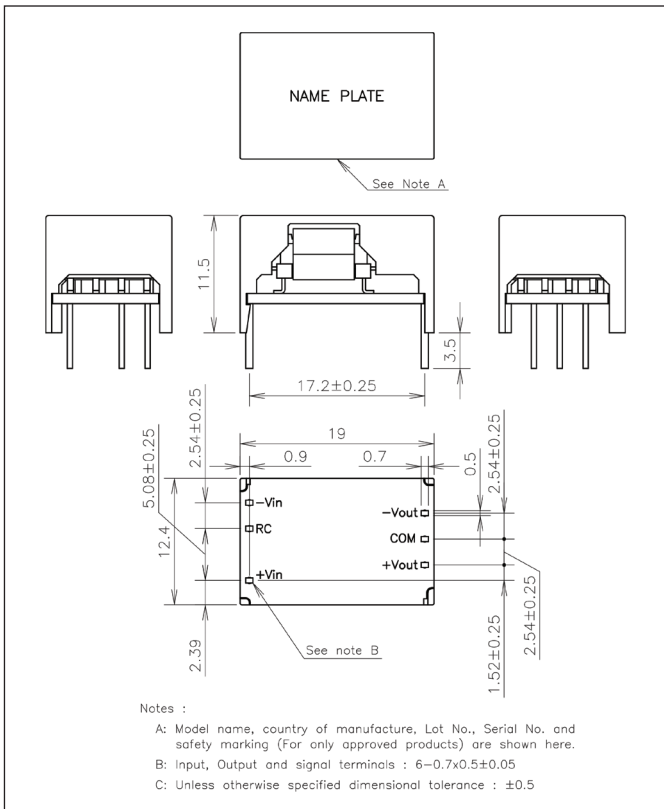
Outline Drawing Single Output CCG6 and CCG10 Through Hole (F suffix)



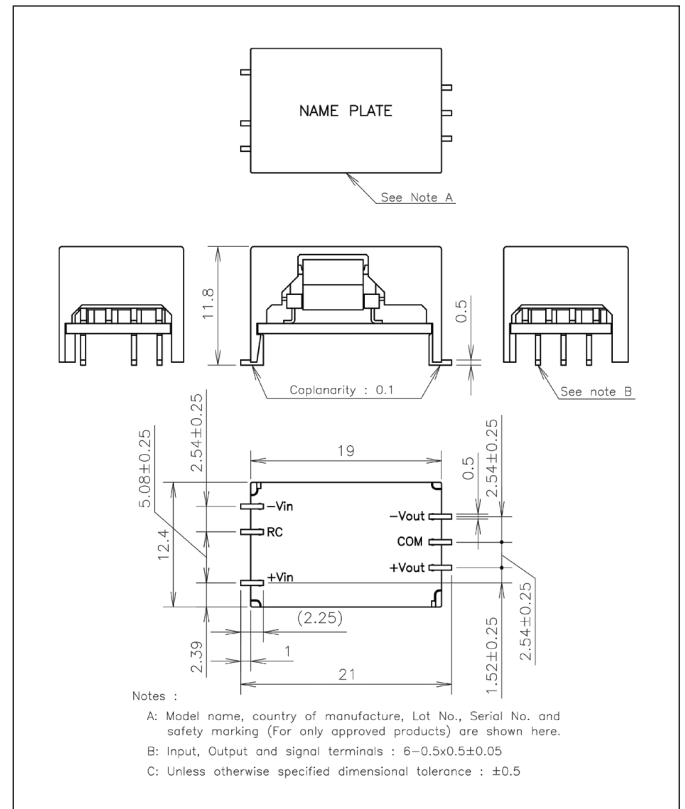
Outline Drawing Single Output CCG6 and CCG10 Surface Mount (R suffix)



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



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





TDK-Lambda France SAS

Tel: +33 1 60 12 71 65
 ttf.fr.powersolutions@tdk.com
 www.emea.lambda.tdk.com/fr



Italy Sales Office

Tel: +39 02 61 29 38 63
 ttf.it.powersolutions@tdk.com
 www.emea.lambda.tdk.com/it



Netherlands

tif.nl.powersolutions@tdk.com
 www.emea.lambda.tdk.com/nl



TDK-Lambda Germany GmbH

Tel: +49 7841 666 0
 tig.powersolutions@tdk.com
 www.emea.lambda.tdk.com/de



Austria Sales Office

Tel: +43 2256 655 84
 tig.at.powersolutions@tdk.com
 www.emea.lambda.tdk.com/at



Switzerland Sales Office

Tel: +41 44 850 53 53
 tig.ch.powersolutions@tdk.com
 www.emea.lambda.tdk.com/ch



Nordic Sales Office

Tel: +45 8853 8086
 tig.dk.powersolutions@tdk.com
 www.emea.lambda.tdk.com/dk



TDK-Lambda UK Ltd.

Tel: +44 (0) 12 71 85 66 66
 tlu.powersolutions@tdk.com
 www.emea.lambda.tdk.com/uk



TDK-Lambda Ltd.

Tel: +9 723 902 4333
 tli.powersolutions@tdk.com
 www.emea.lambda.tdk.com/il-en



TDK-Lambda Americas

Tel: +1 800-LAMBDA-4 or 1-800-526-2324
 tla.powersolutions@tdk.com
 www.us.lambda.tdk.com



TDK Electronics do Brasil Ltda

Tel: +55 11 3289-9599
 sales.br@tdk-electronics.tdk.com
 www.tdk-electronics.tdk.com/en



TDK-Lambda Corporation

Tel: +81-3-6778-1113
 www.jp.lambda.tdk.com



TDK-Lambda (China) Electronics Co. Ltd.

Tel: +86 21 6485-0777
 tlc.powersolutions@tdk.com
 www.lambda.tdk.com.cn



TDK-Lambda Singapore Pte Ltd.

Tel: +65 6251 7211
 tfs.marketing@tdk.com
 www.sg.lambda.tdk.com



TDK India Private Limited, Power Supply Division

Tel: +91 80 4039-0660
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