



Low Power-Loss Voltage Regulators

TO-220 Type

(Ta = 25°C)

Model No.	Features	Absolute maximum ratings				Electrical characteristics			Built-in functions						Package	
		Output current I _o (A)	Input voltage V _{in} (V)	Power dissipation (W)		Output voltage V _o ^{*3} (V) TYP.	Output voltage precision (%)	Dropout voltage V _{i-o} ^{*5} (V)	Overheat protection	Overcurrent protection	ON/OFF control	Low dissipation current at OFF state	Variable output voltage	Lead forming available		
				Pd ^{*1}	Pd ^{*2}											
PQxxxRDA1SZH series	ASO protection function, low dissipation current at OFF state (I _{qs} : 5 μA (MAX.))	1	24	1.4	15	3.3, 5, 9, 12	±3	0.5	○	○	○	○			TO-220	A
PQxxxRDA2SZH series		2	20			3.3, 5, 9, 12	±2.5	1.0	○	○	○	○				A
PQ30RV11J00H	Variable output voltage	1	35	1.5	18	1.5 to 30	±2 ^{*4}	0.5	○	○	△ ^{*6}		○	○	TO-220	B
PQ30RV21J00H		2							○	○	△ ^{*6}		○	○		B
PQ30RV31J00H		3		2	20				○	○	△ ^{*6}		○	○		B

*1 At self-cooling

*2 With infinite heat sink attached

*3 The xxx in the model No. refer to the output voltage values of the model (e.g. 050 for 5 V, 120 for 12 V, 015 for 1.5 V).

*4 Reference voltage precision

*5 Current ratings are defined individually.

*6 △ : Available by adding circuit

*7 Refer to page 35

Surface Mount Type Low Power-Loss Voltage Regulators

SOT-89 Type

(Ta = 25°C)

Model No.	Features	Absolute maximum ratings			Electrical characteristics			Built-in functions					Package
		Output current I _o (A)	Input voltage V _{in} (V)	Power dissipation Pd ^{*1} (W)	Output voltage V _o ^{*2} (V) TYP.	Output voltage precision (%)	Dropout voltage V _{i-o} ^{*3} (V)	Overheat protection	Overcurrent protection	ON/OFF control	Low dissipation current at OFF state	Variable output voltage	
PQ1LAXx5MSPQ	Compact, high radiation package, ceramic capacitor compatible	0.5	15	0.9	1.2, 1.5, 1.8, 2.5, 3.3, 5.0	±2.0	0.7	○	○	○	○		SOT-89
PQ1LAX95MSPQ	Ceramic capacitor compatible, variable output voltage				1.5 to 9.0	±2.0 ^{*4}		○	○	○	○		

*1 When mounted on a board

*2 The xx in the model No. refer to the output voltage values of the model (e.g. 25 for 2.5 V, 50 for 5.0 V).

*3 Current ratings are defined individually.

*4 Reference voltage precision

Notice

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●SC-63 Type (1) Output Voltage Fixed Type

(Ta = 25°C)

Model No.	Features	Absolute maximum ratings			Electrical characteristics				Built-in functions						Package Package shape type ^{*4}			
		Output current I _o (A)			Input voltage V _{in} (V)	Power dissipation P _d ^{*1} (W)	Output voltage V _o ^{*2} (V) TYP.	Output voltage precision (%)	Dropout voltage V _{I-O} ^{*3} (V)	Overheat protection	Overcurrent protection	ON/OFF control	Low dissipation current at OFF state	Variable output voltage		Taped package		
		0.5	1	1.5														
PQxxxDNA1ZPH series	Ceramic capacitor compatible, ASO protection function, low dissipation current at OFF state (I _{qs} : 5 μA (MAX.)), solder dip compatible lead shape	○			24	8	3.3, 5, 9, 12	±2.5	0.5	○	○	○	○	-	○	SC-63	F	
PQxxxENA1ZPH series	Minimum operating input voltage: 2.35 V, ceramic capacitor compatible, solder dip compatible lead shape	○			10	8	1.5, 1.8, 2.5, 3.3	±2.0	0.3	○	○	○	○	-	○		F	
PQxxxENB1ZPH series		○				5	1.2, 1.5, 1.8, 2.5, 3.3			○	○	○	○	-	○		F	
PQxxxENAHZPH series				○			1.5, 1.8, 2.5, 3.3			0.9	○	○	○	○	-		○	F
PQxxxGN01ZPH series		Minimum operating input voltage: 1.7 V (Dual power supply type), ceramic capacitor compatible, solder dip compatible lead shape	○				5.5			8	1.0, 1.2	±30 mV	-	○	○			
PQxxxGN1HZPH series				○						○	○			-	○		F	

*1 With infinite heat sink attached

*2 The xxx in the model No. refer to the output voltage values of the model (e.g. 033 for 3.3 V, 050 for 5 V, 120 for 12 V).

*3 Current ratings are defined individually.

*4 Refer to page 35

●SC-63 Type (2) Output Voltage Variable Type

(Ta = 25°C)

Model No.	Features	Absolute maximum ratings			Electrical characteristics				Built-in functions						Package Package shape type ^{*4}		
		Output current I _o (A)			Input voltage V _{in} (V)	Power dissipation P _d ^{*1} (W)	Output voltage V _o (V) TYP.	Output voltage precision (%)	Dropout voltage V _{I-O} ^{*3} (V)	Overheat protection	Overcurrent protection	ON/OFF control	Low dissipation current at OFF state	Variable output voltage		Taped package	
		0.5	1	1.5													
PQ070XNA1ZPH	Minimum operating input voltage: 2.35 V, ceramic capacitor compatible, solder dip compatible lead shape	○			10	8	1.5 to 7	±2.0 ^{*2}	0.5	○	○	○	○	○	○	SC-63	F
PQ070XNAHZPH				○					0.9	○	○	○	○	○	○		F
PQ070XNA2ZPH				○ (2 A)					0.5	○	○	○	○	○	○		F
PQ070XNB1ZPH			○							5	1.2 to 7	0.3	○	○	○		○
PQ035ZN01ZPH	Reference voltage (V _{ref}): 0.6 V, minimum operating input voltage: 1.7 V (Dual power supply type), ceramic capacitor compatible, solder dip compatible lead shape	○			5.5	8	0.8 to 3.5	±30 mV	-	○	○			○	○	F	
PQ035ZN1HZPH				○					-	○	○			○	○	F	
PQ200WNA1ZPH	Minimum operating input voltage: 3.5 V, ASO protection function, low dissipation current at OFF state (I _{qs} : 5 μA (MAX.)), ceramic capacitor compatible, solder dip compatible lead shape	○			24	8	3.0 to 20	±2.5 ^{*2}	0.5	○	○	○	○	○	○	F	
PQ200WN3MZPH	Minimum operating input voltage: 5.5 V, low dissipation current at OFF state (I _{qs} : 5 μA (MAX.)), ceramic capacitor compatible, current limit: 800 mA	○ (0.3)								6.8	5.0 to 20	○	○	○	○	○	F

*1 With infinite heat sink attached

*2 Reference voltage precision

*3 Current ratings are defined individually.

*4 Refer to page 35

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●SOP-8 Type

(Ta = 25°C)

Model No.	Features	Absolute maximum ratings			Electrical characteristics		Built-in functions		Taped package	Package
		Output current I _o (A)	Input voltage V _{in} (V)	Power dissipation Pd* ¹ (W)	Output voltage V _o (V) TYP.	Output voltage precision* ² (mV)	Overheat protection	Overcurrent protection		
PQ1DX095MZPQ	Built-in sink source function (For DDR II memory)	±0.8	6	0.6	V _{DD} x 1/2 (V _{DDQ} : 1.5 V (MIN.))	±25	○	○	○	SOP-8

*1 When mounted on a board
*2 Reference voltage precision

■Surface Mount Type Chopper Regulators (DC-DC Converters)

(Ta = 25°C)

Model No.	Features	Absolute maximum ratings		Electrical characteristics					Package	
		Switching current I _{sw} (A)	Power dissipation Pd* ¹ (W)	Input voltage range V _{in} (V)	Output voltage V _o (V)	Output type	Oscillation frequency f _o (Hz) TYP.	Output saturation voltage V _{sat} (V) TYP.	Outline shape type* ⁴	
PQ6CU12X2APQ	<ul style="list-style-type: none"> High switching voltage: 40 V (MAX.) For tuner power supply Variable oscillation frequency Ceramic capacitor compatible 	0.25	0.35	3.0 to 5.5	up to 36	Step-up	300 k to 800 k	R _{on} TYP. 1.7Ω	SOT-23-6W	
PQ1CN38M2ZPH	<ul style="list-style-type: none"> PWM chopper regulator (high oscillation frequency) Output ON/OFF control function Overcurrent/overheat protection circuits For light load 	0.8	8	4.5 to 40	V _{REF} * ³ to 35 (step-down type) / -V _{REF} to -30 (inverting type)	Step-down	300 k	0.9	SC-63	F
PQ1CN41H2ZPH	<ul style="list-style-type: none"> PWM chopper regulator (high oscillation frequency) Overcurrent/overheat protection circuits 	1.5	8			Step-down	300 k	0.9		F
PQ1CX41H2ZPQ	<ul style="list-style-type: none"> Bootstrap system for high efficiency (Efficiency 90% (TYP.)) Low voltage output: 0.8 V (MIN.) Ceramic capacitor compatible 	1.5	0.8 When mounted on board	4.75 to 27	0.8 to 20	Step-down	400 k	R _{Dson} TYP. 0.45Ω	SOP-8	
PQ1CX53H2MPQ	<ul style="list-style-type: none"> Bootstrap system for high efficiency (Efficiency 89% (TYP.)) Low voltage output: 0.8 V (MIN.) Ceramic capacitor compatible 	3.5	2 When mounted on board	4.75 to 27	0.8 to 16	Step-down	400 k	R _{Dson} TYP. 0.15Ω	USB-8	
PQ1CX61H1ZPQ	<ul style="list-style-type: none"> Bootstrap system for high efficiency (Efficiency 88% (TYP.)) Low voltage output: 1.0 V (MIN.) Ceramic capacitor compatible 	1.5	0.8 When mounted on board	4.75 to 28	1.0 to 18.9	Step-down	900 k	R _{Dson} TYP. 0.55Ω	SOP-8	

*1 With infinite heat sink attached or when mounted on a board listed in the specification sheets.
*2 Output variable range (step-down/inversion).
*3 V_{REF} nearly equal to 1.26 V
*4 Refer to page 35

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■ Chopper Regulators (DC-DC Converters)

● TO-220 Type

(Ta = 25°C)

Model No.	Features	Absolute maximum ratings		Electrical characteristics					Package	
		Switching current Isw (A)	Power dissipation Pd*1 (W)	Input voltage range Vin (V)	Output voltage Vo*2 (V)	Output type	Oscillation frequency fo (kHz) TYP.	Output saturation voltage Vsat (V) TYP.	Outline shape type*5	
PQ1CG21H2FZH	<ul style="list-style-type: none"> PWM chopper regulator Built-in overcurrent/overheat protection circuits Output ON/OFF control function 	1.5*3	14	40	VREF*4 to 35 (step-down type)/ -VREF*4 to -30 (inverting type)	Step-down	100	1.0	TO-220	E
PQ1CG41H2FZH	<ul style="list-style-type: none"> PWM chopper regulator (high oscillation frequency) Built-in overcurrent/overheat protection circuits Output ON/OFF control function 						300	1.0		E
PQ1CG2032FZH	<ul style="list-style-type: none"> PWM chopper regulator Built-in overcurrent/overheat protection circuits Output ON/OFF control function 	3.5*3					70	1.4		E
PQ1CG3032FZH	<ul style="list-style-type: none"> PWM chopper regulator (high oscillation frequency) Built-in overcurrent/overheat protection circuits Output ON/OFF control function 						150			E

*1 With infinite heat sink attached

*2 Output voltage variable range

*3 Peak current

*4 VREF nearly equal to 1.26 V (TYP.)

*5 Refer to page 35

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