

50QBTW12_2.25 Series

50W - Single Output - Wide Input - Isolated & Regulated DC-DC Converter

DC-DC Converter

50 Watt

- ⊕ High efficiency
- ⊕ Fixed switching frequency provides predictable EMI
- ⊕ No life-span constrained capacitor inside
- ⊕ 4:1 & 8:1 & 12:1 Ultra-Wide input range
- ⊕ Isolation 2250V Input-to-output (optional 3000V)
- ⊕ Fully protected: OVP, OTP, OCP and UVLO
- ⊕ Output voltage trim range of -10%, +10%
- ⊕ Single, dual, & multiple outputs available
- ⊕ RoHS compliant

The 50QBTW12_2.25 converter series is composed of isolated, board-mountable, fixed switching frequency dc-dc converters that use synchronous rectification to achieve extremely high power conversion efficiency. These DC-DC converter modules use advanced power processing, control and packaging technologies to enhance the performance, flexibility, reliability and cost effectiveness of mature power components. Each module is six-sided metal case enclosed to provide protection from the harsh environments seen in many industrial and transportation applications.



Common specifications

Short circuit protection:	Hiccup, continous, automatic recovery
Cooling:	Free air convection
Operation case temperature:	-45°C~+115°C
Storage temperature range:	-55°C~+125°C
Over temperature protection:	120°C TYP, auto recovery
Storage humidity range:	95% MAX, non-condensing
Switching frequency:	V _{NOM} : 220kHz MIN, 330kHz MAX
Case material:	Aluminium
MTBF (BellCore-TR-332 @50°C G.B):	TBD (M HR)
Weight:	TBD (g)
Dimensions:	39.7 x 60 x 12.9mm

Input specifications

Item	Test condition	Min	Typ	Max	Units
Transient input voltage ranges (100ms max)	• 50QBTW4_24xx			50	VDC
	• 50QBTW4_48xx			80	VDC
	• 50QBTW12_72xx			160	VDC
Operating input voltage ranges	• 50QBTW4_24xx	9	18	36	VDC
	• 50QBTW4_48xx	9	28	75	VDC
	• 50QBTW12_72xx	14	54	154	VDC
Under voltage lockout - Start-up voltage -	• 50QBTW4_24xx			9	VDC
	• 50QBTW4_48xx			9	VDC
	• 50QBTW12_72xx			14	VDC
Under voltage lockout - Shutdown voltage -	• 50QBTW4_24xx		7		VDC
	• 50QBTW4_48xx		7		VDC
	• 50QBTW12_72xx		12		VDC
Input current	See model selection guide Standby mode (OFF, UVLO) 5mA				
Enable function input	<u>Positive logic</u>			Open or 8 ~ 20 VDC	
	• ON			Short or 0 ~ 1.2 VDC	
	<u>Negative logic</u>			Short or 0 ~ 1.2 VDC	
	• OFF			Open or 8 ~ 20 VDC	

Isolation specifications

Item	Test condition	Min	Typ	Max	Units
Isolation voltage	Tested for 1 minute	2250			VDC
	Additional option for 50QBTW12_7205S3:	3000			VDC
Isolation resistance	500VDC, 70% RH	100			MΩ
Isolation capacitance			1500		pF

Output specifications

Item	Test condition	Min	Typ	Max	Units
Output voltage accuracy	V _{NOM} 50% Load			±1.5	%
Line regulation	Low line to high line			±0.3	%
Load regulation	10% to 100% load			±0.5	%
Minimum load	• Single output	0			%
	• Dual output	10			%
Ripple&Noise	20MHz Bandwidth and with 1uF MLCC. Output Capacitor each output		1.5		%
Temperature drift				±0.04	%/°C
Transient recovery time	25% load step change		800		μs
Transient peak deviation	ΔIo/Δt=2.5A/us		±2		%Vo
Start-up time	When use enable function		20		msec
Trimming output voltage	V _{NOM} 10% Load			±10%	VDC
Over voltage protection	V _{NOM} 10% Load		120		%
Output power protection	V _{NOM}		120		%

Example:

50QBTW12_7205S2.25
50= 50Watt; QB= Quarter Brick; TW= series; W12= ultra wide input (12:1) 14-154Vin; 5Vout; S= single output; 2.25=2250VDC

Note:

1. Min. load shouldn't be less than 5%, otherwise ripple maybe increase dramatically. Operation under minimum load will not damage the converter, however, they may not meet all specification listed.
2. All specifications are measured at TA=25°C, humidity<75%, nominal input voltage and rated output load unless otherwise specified.
3. It is recommended to protect the input by fuses or other protection devices.
4. In this datasheet, all the test methods of indications are based on corporate standards.
5. All characteristics are for listed model, non-standard models may perform differently, please contact our technical person for more detail.
6. Specifications subject to change without prior notice.

50QBTW12_2.25 Series

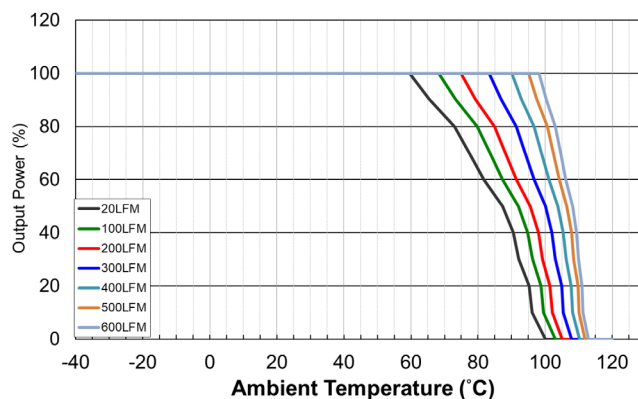
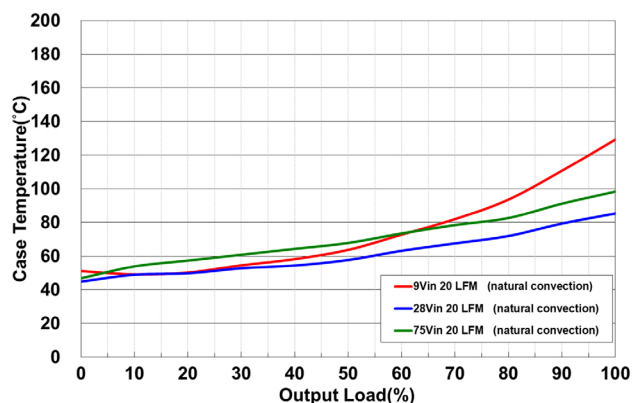
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Part Number	Input Voltage [VDC] Nominal	Input Voltage [VDC] Range	Output Voltage [VDC]	Output Current [A, Typ.]	Output Power [W, Typ.]	Efficiency [%, Typ.]
50QBTW4_2405S2.25	18	9-36	5	10	100	91
50QBTW4_2412S2.25	18	9-36	12	4.2	100	90
50QBTW4_2415S2.25	18	9-36	15	3.3	100	90
50QBTW4_2424S2.25	18	9-36	24	2.1	100	90
50QBTW4_2412D2.25	18	9-36	±12	2.1	100	90
50QBTW4_2415D2.25	18	9-36	±15	1.7	100	90
50QBTW4_2424D2.25	18	9-36	±24	1	100	90
50QBTW4_4805S2.25	28	9-75	5	10	50	90
50QBTW4_4812S2.25	28	9-75	12	4.2	50	89
50QBTW4_4815S2.25	28	9-75	15	3.3	50	89
50QBTW4_4824S2.25	28	9-75	24	2.1	50	89
50QBTW4_4812D2.25	28	9-75	±12	2.1	50	89
50QBTW4_4815D2.25	28	9-75	±15	1.7	50	89
50QBTW4_4824D2.25	28	9-75	±24	1	50	89
50QBTW12_7205S2.25	54	14-154	5	10	50	90
50QBTW12_7212S2.25	54	14-154	12	4.2	50	89
50QBTW12_7215S2.25	54	14-154	15	3.3	50	89
50QBTW12_7224S2.25	54	14-154	24	2.1	50	89
50QBTW12_7212D2.25	54	14-154	±12	2.1	50	89
50QBTW12_7215D2.25	54	14-154	±15	1.7	50	89
50QBTW12_7224D2.25	54	14-154	±24	1	50	89

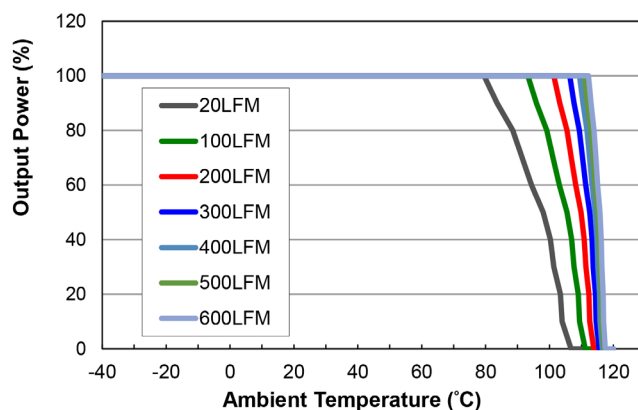
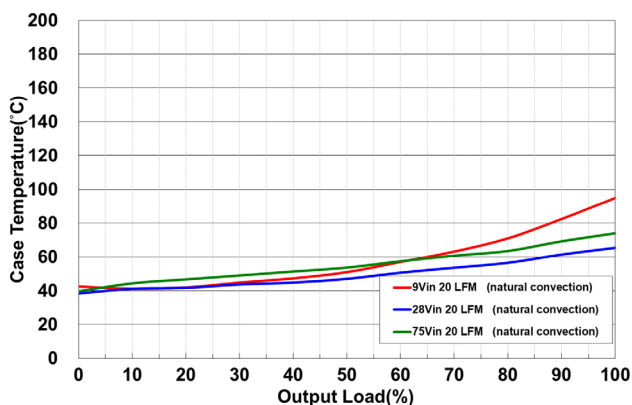
For 3KV Isolation: e.g. 50QBTW12_7224D3

Typical characteristics

Derating curves - without additional heatsink



Derating curves - with additional heatsink
(Heat Sink dimension: 50mm x 37mm x 15.4mm with 10 fins of 0.8mm thickness)

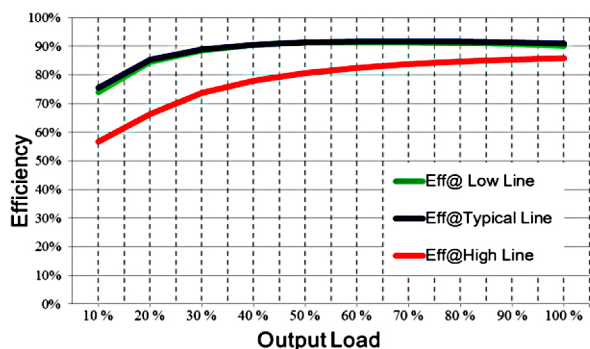


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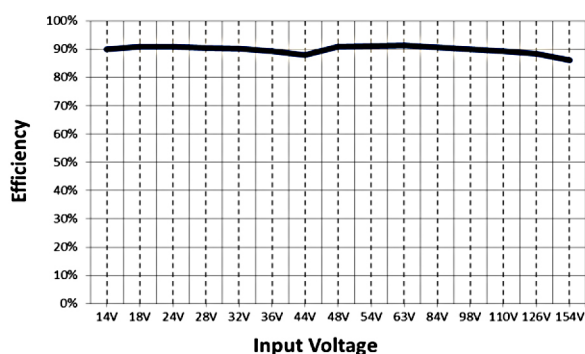
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Efficiency

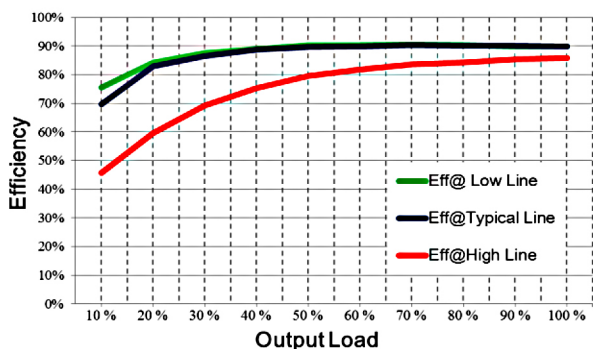
Efficiency vs. output power
50QBTW12_7205S2.25



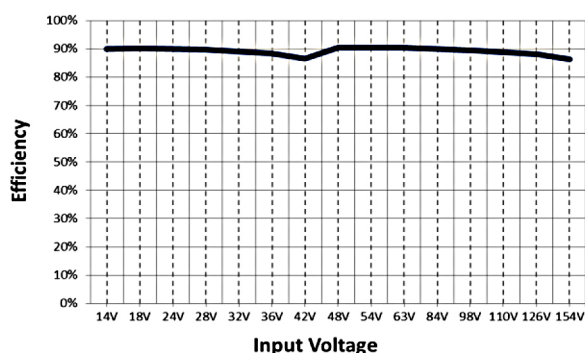
Efficiency vs. input voltage
50QBTW12_7205S2.25



Efficiency vs. output power
50QBTW12_7224S2.25



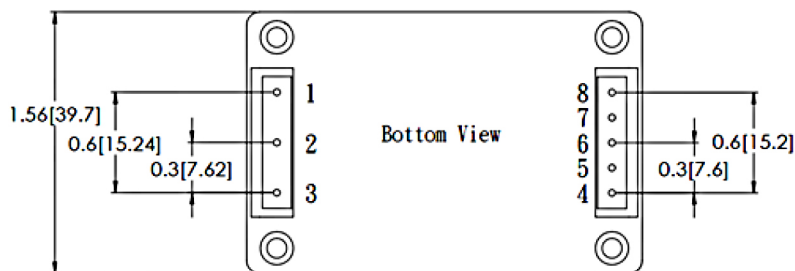
Efficiency vs. input voltage
50QBTW12_7224S2.25



Mechanical dimensions

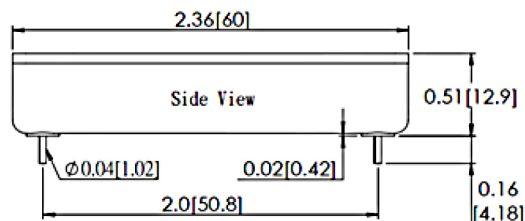
Pin connections for 50QBTW12_48xx and 50QBTW12_72xx:

Pin	Single	Dual
1	-Vin	-Vin
2	Enable	Enable
3	+Vin	+Vin
4	+Vout	+Vout
5	NA	NA
6	Trim	Common
7	NA	NA
8	-Vout	-Vout



Pin connections for 50QBTW12_24xx:

Pin	Single	Dual
1	-Vin	-Vin
2	Enable	Enable
3	+Vin	+Vin
4	+Vout	+Vout
5	+Sense	NA
6	Trim	Common
7	-Sense	NA
8	-Vout	-Vout



Note:
 All pins are 0.040" (1.02mm)
 Pins Material: Copper Alloy
 Pins Plating: Gold
 All dimensions in inches [mm]
 Tolerances: .XX±0.02 [.X±0.5mm]