



### FEATURES

- ◆RoHS compliant
- ◆Efficiency up to 80%
- ◆Miniature SIP Package Style
- ◆Wide temperature performance at full 0.5 Watt load,-40°C to 85 °C
- ◆UL 94V-0 package material
- ◆No heat sink required
- ◆Industry standard pin out
- ◆Power sharing on output
- ◆1KVDC isolation
- ◆Continuous Short Circuit Protection
- ◆Internal SMD construction
- ◆No external components required

### MODEL SELECTION

QB<sup>①</sup>05<sup>②</sup>05<sup>③</sup>X<sup>④</sup>LM<sup>⑤</sup>

- ① Product Series
- ② Input Voltage
- ③ Output Voltage
- ④ Fixed Input
- ⑤ Package Style

### APPLICATIONS

The QB\_XLM Series are specially designed for applications where a group of polar power supplies are isolated from the input power supply in a distributed power supply system on a circuit board.

These products apply to:

- 1) Where the voltage of the input power supply is fixed (voltage variation  $\leq \pm 10\%$ );
- 2) Where isolation is necessary between input and output (isolation voltage  $\leq 1000\text{VDC}$ );
- 3) Where the regulation of the output voltage and the output ripple noise are not demanding.

Such as: purely digital circuits, ordinary low frequency analog circuits, and IGBT power device driving circuits.



### SELECTION GUIDE

Order code*	Input		Output			Efficiency (% Typ)	Switching Frequency (KHz Typ)
	Voltage(VDC)		Voltage (VDC)	Current			
	Nominal	Range		Max	Min		
QB0503XLM	5	4.5-5.5	5	50	5	79	83
QB0505XLM	5	4.5-5.5	5	100	10	70	82
QB0509XLM-	5	4.5-5.5	9	56	6	75	83
QB0512XLM	5	4.5-5.5	12	42	4	79	83
QB0515XLM	5	4.5-5.5	15	33	3	80	80
QB0524XLM	5	4.5-5.5	24	21	2	78	84
QB1205XLM	12	10.8-13	5	100	10	72	84
QB1209XLM	12	10.8-13	9	56	6	75	81
QB1212XLM	12	10.8-13	12	42	4	77	82
QB1215XLM	12	10.8-13	15	33	3	79	83
QB1224XLM	12	10.8-13	24	21	2	81	84
QB2405XLM	24	21.6-26	5	100	10	70	82
QB2409XLM	24	21.6-26	9	56	6	73	83
QB2412XLM	24	21.6-26	12	42	4	75	83
QB2415XLM	24	21.6-26	15	33	3	78	80
QB2424XLM	24	21.6-26	24	21	2	77	84

\* add Suffix "P" for Continuous Short Circuit Protection, e.g. B0505XLM-W5P

### ISOLATION SPECIFICATIONS

Parameter	Test conditions	Min.	Typ.	Max.	Units
Isolation test voltage	Flash tested for 1 minute and 1mA max	1000			VDC
Isolation resistance	Test at Viso=500VDC	1000			MΩ

### OUTPUT SPECIFICATIONS

Parameter	Test conditions	Min.	Typ.	Max	Unit
Output power		0.05		0.5	W
Line regulation	For Vin change of 1%			1.2	%
Load regulation	10% to 100% full load(5V output)		10	15	
	10% to 100% full load(9V output)		8.3	10	
	10% to 100% full load(12V output)		6.8	10	
	10% to 100% full load(15V output)		6.3	10	
10% to 100% full load(24V output)		5	10		
Output voltage		See tolerance envelope graph			
Temperature drift	100% full load		0.03		%/°C
Output Ripple&Noise*	20MHz Bandwidth(B-XLM-W5)		75	100	MV P-P
Switching frequency	100% load, nominal input(5V,12V)		100		Khz
	100% load, nominal input(24V)		500		

\* Test ripple and noise by "parallel cable" method. See detailed operation instructions at Testing of Power Converter section, application notes.

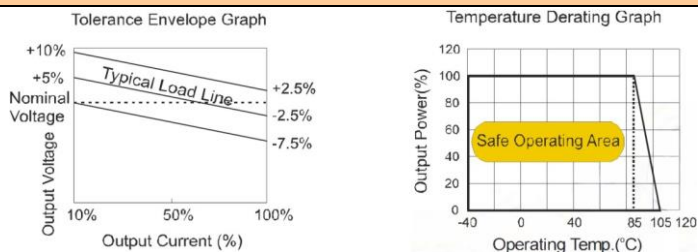
### COMMON SPECIFICATIONS

Parameter	Conditions	Min.	Typ.	Max.	Units
Storage humidity range				95	%
Operating temperature		-40		85	°C
Storage temperature		-55		125	
Lead temperature	1.5mm from case for 10 seconds		300		
Temp.rise at full load			15	25	
Cooling		Free air convection			
Case material		Plastic(UL94-V0)			
Short circuit protection*		Continuous			
MTBF		3500		1	s
Weight			2.1		g

\*Supply voltage must be discontinued at the end of short circuit duration.

### TYPICAL CHARACTERISTICS

Temperature Derating Graph



### OUTLINE DIMENSIONS & PIN CONNECTIONS

SIZE Graph

Dimensions: 16.50 (0.65) x 7.50 (0.29) x 4.10 (0.16) mm. Pin spacing: 0.50 (0.020) mm. Pin length: 6.00 (0.24) mm. Pin diameter: 0.90 (0.035) mm. Pin positions: 1, 2, 4, 5, 6.

**RECOMMENDED FOOTPRINT**  
Top view,grid:2.54mm(0.1inch)  
diameter:1.00mm(0.039inch)  
Single

FOOTPRINT DETAILS	
Pin	Single
1	VIN
2	GND
4	0V
5	NC
6	+Vo

N C - Not available for electrical connection.

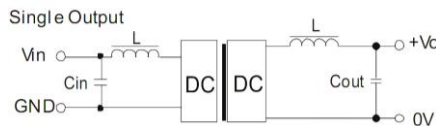
**Requirement on output load**  
To ensure this module can operate efficiently and reliably, a minimum load is specified for this kind of DC/DC converter in addition to a maximum load (namely full load). During operation, make sure the specified range of input voltage is not exceeded, the minimum output load is not less than 10% of the full load, and that this product should **never be operated under no load!**

### Overload Protection

Under normal operating conditions, the output circuit of these products has no protection against overload. The simplest method is to connect a self-recovery fuse in series at the input end or add a circuit breaker to the circuit.

### Recommended testing and application circuit

If you want to further decrease the input/output ripple, an "LC" filtering network may be connected to the input and output ends of the DC/DC converter, see (Figure 1).



(Figure 1)

It should also be noted that the inductance and the frequency of the "LC" filtering network should be staggered with the DC/DC frequency to avoid mutual interference. However, the capacitance of the output filter capacitor must be proper. If the capacitance is too big, a startup problem might arise. For every channel of output, provided the safe and reliable operation is ensured, the greatest capacitance of its filter capacitor sees (Table 1).

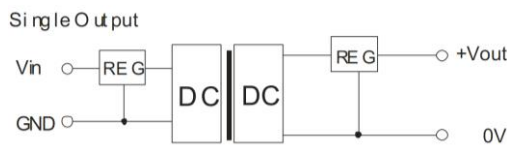
EXTERNAL CAPACITOR TABLE (TABLE 1)

Vin (VDC)	Cin (μF)	Single Vout (VDC)	Cout (μF)
5	47	5	10
12	2.2	9	4.7
24	1.0	12	2.2
--	--	15	1

It's not recommend to connect any external capacitor in the application field with less than 0.5 watt output.

### Output Voltage Regulation and Over-voltage Protection Circuit

The simplest device for output voltage regulation, over-voltage and over-current protection is a linear voltage regulator with overheat protection that is connected to the input or output end in series (Figure 2).



(Figure 2)

When the environment temperature is higher than 71°C, the product output power should be less than 60% of the rated power.

No parallel connection or plug and play.

### RoHS COMPLIANT INFORMATION

This series is compatible with RoHS soldering systems with a peak wave solder temperature of 300° C for 10 seconds. The pin termination finish on the SIP package type is Tin Plate, Hot Dipped over Matte Tin with Nickel Preplate. The DIP types are Matte Tin over Nickel Preplate. Both types in this series are backward compatible with Sn/Pb soldering systems.

### REACH COMPLIANT INFORMATION

This series has proven that this product does not contain harmful chemicals, it also has harmful chemical substances through the registration, inspection and approval.