DC/DC Converter

K78_JT-500R3-LB Series

MORNSUN®

Wide input voltage, non-isolated & regulated single output

3 years Warranty

CE Report EN 62368-1

UKCA Report BS EN 62368-1

RoHS

FEATURES

- Economical open frame power supply
- High efficiency up to 95%
- No-load input current as low as 0.2mA
- Operating ambient temperature range: -40℃ to +85℃
- Output short-circuit protection

K78_JT-500R3-LB series are high efficiency switching regulators. The converters feature high efficiency, low loss and short-circuit protection in a compact SMD package. These products are widely used in applications such as industrial control, instrumentation and electric power.

Selection Guide

Certification	Part No.	Input Voltage (VDC)*	Output		Full Load Efficiency (%) Typ.	Capacitive Load(μF)
		Nominal (Range)	Voltage (VDC)	Current (mA) Max.	Vin Min. / Vin Max.	Max.
EN/BS EN	K7803JT-500R3-LB	24 (4.75-36)	3.3	500	85/76	680
	K7805JT-500R3-LB	24 (6.5-36)	5	500	90/81	680
	K78X6JT-500R3-LB	24 (8-36)	6.5	500	91/83	680
	K7809JT-500R3-LB	24 (12-36)	9	500	93/87	680
	K7812JT-500R3-LB	24 (15-36)	12	500	94/88	680
	K7815JT-500R3-LB	24 (19-36)	15	500	95/90	680

Note: *For input voltage exceeding 30 VDC, an input electrolytic capacitor of 22uF/50V is required to prevent the module from being damaged by voltage spikes.

Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
No-load Input Current		--	0.2	1.5	mA
Reverse Polarity at Input		Avoid / Not protected			
Input Filter		Capacitance filter			

Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Voltage Accuracy	Full load, input voltage range	3.3 VDC output	--	±2	±4	%
		Others	--	±2	±3	
Linear Regulation	Full load, input voltage range		--	±0.3	±0.5	
Load Regulation	Nominal input voltage, 10% -100% load		--	±0.6	±1.0	
Ripple & Noise*	20MHz bandwidth, nominal input voltage	3.3 VDC output, 30% -100% load	--	50	100	mVp-p
		Others, 20% -100% load	--	50	100	
Temperature Coefficient	Full load		--	±0.02	--	%/℃
Transient Response Deviation	Nominal input voltage, 25% load step change		--	±50	±250	mV
Transient Recovery Time			--	0.2	1	ms

Short-circuit Protection	Input voltage range	Continuous, self-recovery

Notes: * 1. The "parallel cable" method is used for Ripple and Noise test, please refer to DC-DC Converter Application Notes for specific information;
2. With light loads at or below 30%, Ripple & Noise for 3.3V output parts increase to 200mVp-p max, and a load below 20% for 5V/6.5V/9V/12V/15V output parts levels increase to 250mVp-p max.

General Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Operating Temperature	See Fig. 1	-40	--	+85	℃
Storage Temperature		-55	--	+125	
Storage Humidity	Non-condensing	5	--	95	%RH
Reflow Soldering Temperature		Peak temp.≤245℃, maximum duration time≤60s over 217℃. For actual application, please refer to IPC/JEDEC J-STD-020D.1.			
Switching Frequency	Full load, nominal input	--	700	--	kHz
MTBF	MIL-HDBK-217F@25℃	2000	--	--	k hours
Moisture Sensitivity Level (MSL)*	IPC/JEDEC J-STD-020D.1	Level 1			

Note: * For actual application, please refer to IPC/JEDEC J-STD-020D.1.

Mechanical Specifications

Dimensions	12 x 12 x 4.5mm
Weight	0.75g (Typ.)
Cooling Method	Free air convection

Electromagnetic Compatibility (EMC)

Emissions	CE	CISPR32/EN55032	CLASS B (see Fig. 4-② for recommended circuit)	
	RE	CISPR32/EN55032	CLASS B (see Fig. 4-② for recommended circuit)	
Immunity	ESD	IEC/EN 61000-4-2	Contact ±4kV	perf. Criteria B
	RS	IEC/EN 61000-4-3	10V/m	perf. Criteria B
	EFT	IEC/EN 61000-4-4	100kHz ±1kV (see Fig. 4-① for recommended circuit)	perf. Criteria B
	Surge	IEC/EN 61000-4-5	line to line ±1kV (see Fig. 4-① for recommended circuit)	perf. Criteria B
	CS	IEC/EN 61000-4-6	3Vr.m.s	perf. Criteria B

Typical Characteristic Curves

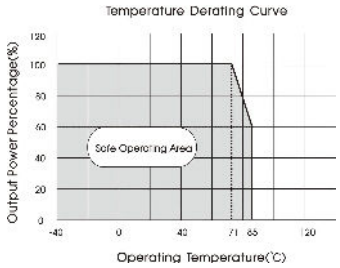
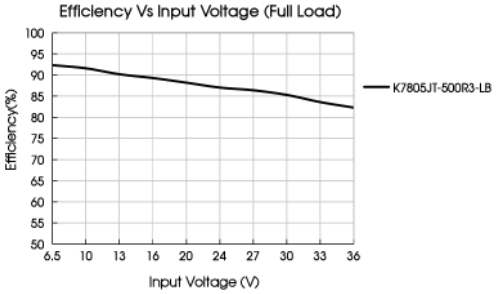
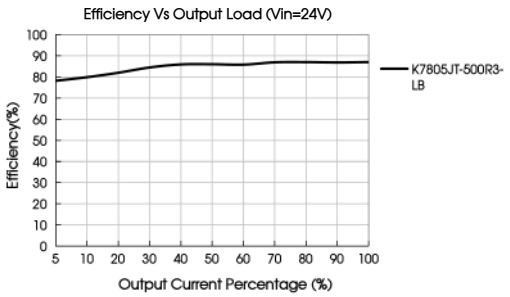
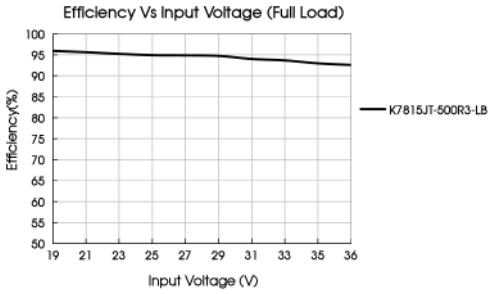
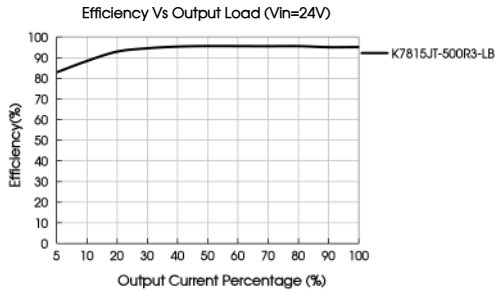


Fig. 1









Design Reference

1. Typical application

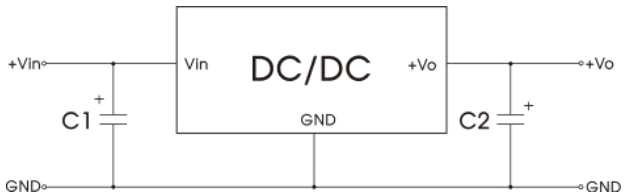


Fig. 2 Typical application circuit

Table 1

Part No.	C1 (ceramic capacitor)	C2 (ceramic capacitor)
K7803JT-500R3-LB	10μF/50V	22μF/10V
K7805JT-500R3-LB		22μF/10V
K78X6JT-500R3-LB		22μF/16V
K7809JT-500R3-LB		22μF/16V
K7812JT-500R3-LB		22μF/25V
K7815JT-500R3-LB		22μF/25V

Notes:
1. The required C1 and C2 capacitors must be connected as close as possible to the terminals of the module;
2. Refer to Table 1 for C1 and C2 capacitor values. For certain applications, increased values and/or tantalum or low ESR electrolytic capacitors may also be used instead;
3. Converter cannot be used for hot swap and with output in parallel;
4. To further reduce the output ripple and noise, we suggested the use of a "LC" filter at the output terminals, with an inductor value (L) of 10μH-47μH, see Fig. 3

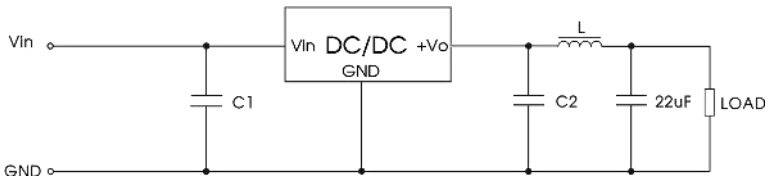


Fig. 3 External "LC" output filter circuit diagram

2. EMC Compliance circuit

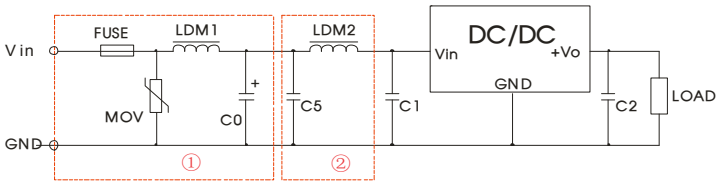


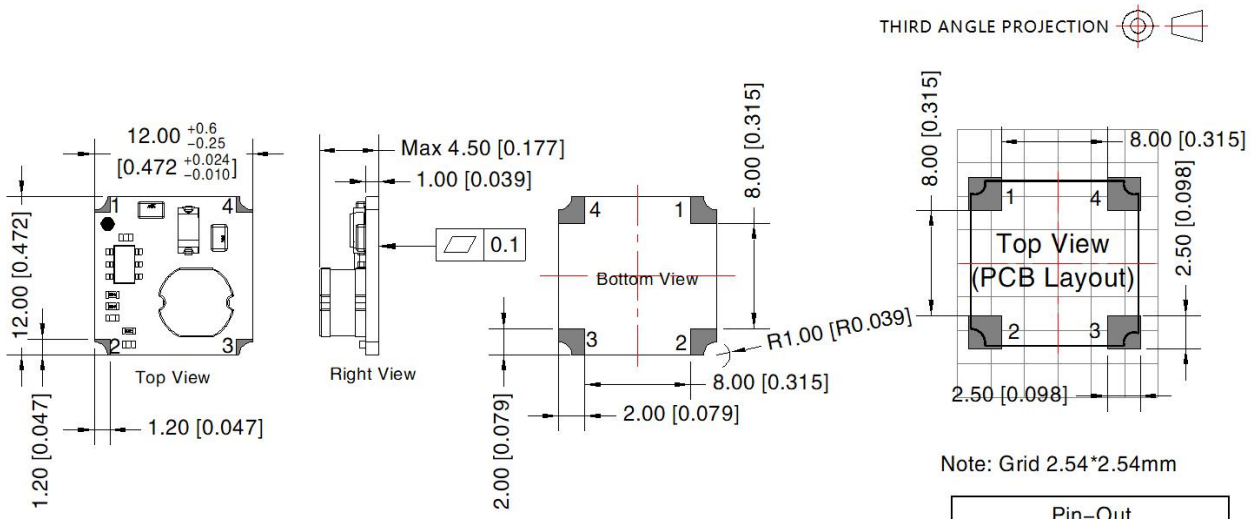
Fig.4 Recommended compliance circuit

FUSE	MOV	LDM1	C0	C1/C2	C5	LDM2
Selecting based on the actual input current in application	S20K30	82μH	680μF /50V	Refer to table 1	4.7μF /50V	22μH

Note: For EMC tests we use Part ① in Fig. 4 for immunity and part ② for emissions test. Selecting based on needs.

3. For additional information please refer to DC-DC converter application notes on www.mornsun-power.com

Dimensions and Recommended Layout

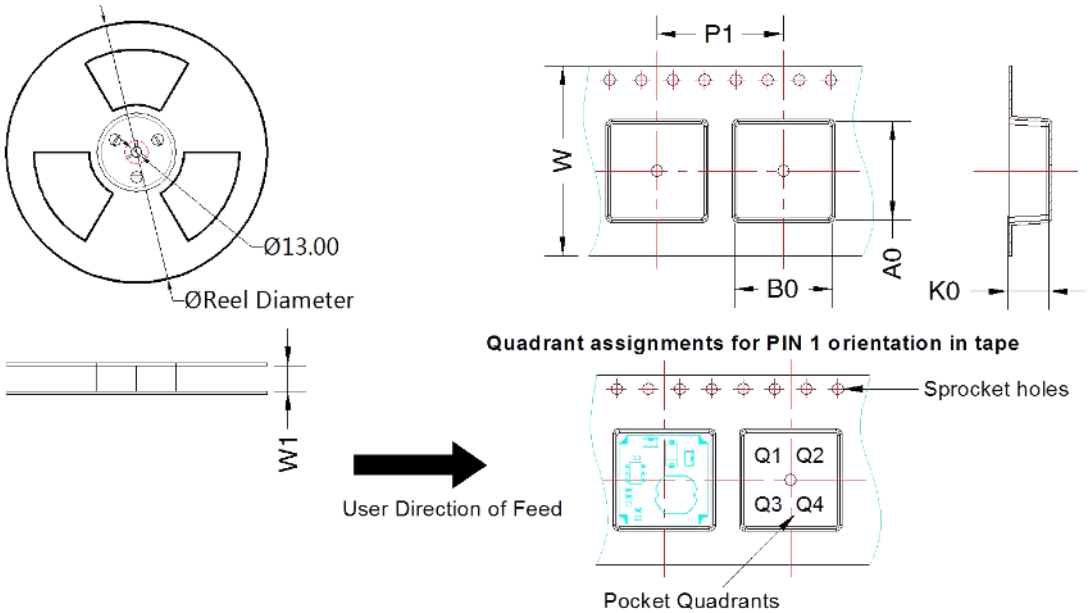


Note: Grid 2.54*2.54mm

Pin-Out	
Pin	Mark
1	+Vin
2	NC
3	+Vo
4	GND

Note:
Unit: mm[inch]
General tolerances: ±0.25[±0.010]
The layout of the device is for reference only, please refer to the actual product

Tape and Reel Info



Device	Package Type	Pin	MPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
K78_JT-500R3-LB	SMD	4	700	330.0	24.4	12.47	12.47	5.1	16	24.0	Q1

Notes:

1. For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number: 58210140;
2. The maximum capacitive load offered were tested at nominal input voltage and full load;
3. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta=25℃, humidity<75%RH with nominal input voltage and rated output load;
4. All index testing methods in this datatable are based on our company corporate standards;
5. We can provide product customization service, please contact our technicians directly for specific information;
6. Products are related to laws and regulations: see "Features" and "EMC";
7. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.

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