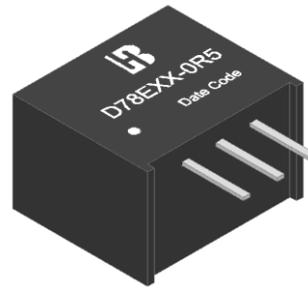


Features

- 4.75~32VDC wide input range
- Pin-out compatible with LM78xx linear regulators
- High Efficiency up to 96%
- Output Short Circuit Protection:
Hiccup & Auto Recovery
- Over Temperature Protection
- Lead Free Design, RoHS Compliant
- Meet Safety Standard / Approval: IEC / EN60950-1



Description

The D78xx-0R5 Series are non-isolated DC/DC converters suited to replace 0.5 Amp LM78xx linear regulators. Designed with highly efficiency, allow the operating temperature range of these units to be -40°C to +85°C in a 11.6×7.5×10.2mm non-conducted black plastic case. Further features include wide 4.75~32VDC input voltage range, short-circuits protection and over temperature protection.

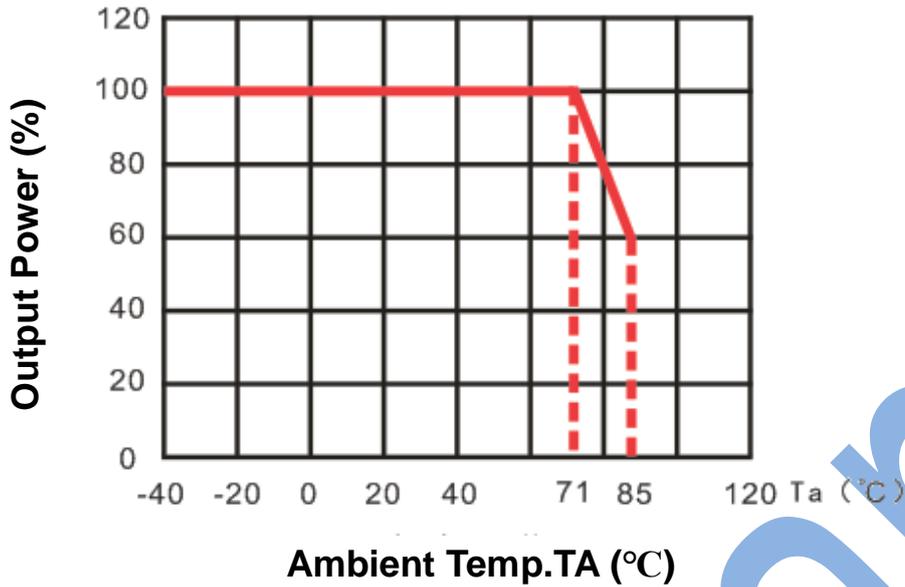
Technical Specification All specifications are typical at nominal input, full load and 25°C unless otherwise stated.

Model Number	Input Voltage Range	Output Voltage	Output Current (mA)		Eff. ⁽²⁾ (%)		Capacitive Load, max. ⁽³⁾ (uF)
		(V)	Min. Load ⁽¹⁾	Full. Load	Vin_min	Vin_max	
D78E03-0R5	4.75-28V Nominal:24	3.3V	0	500	90	80	1000
D78E05-0R5	6.5-32V Nominal:24	5.0V	0	500	93	84	1000
D78E6R5-0R5	9.0-32V Nominal:24	6.5V	0	500	93	85	820
D78E09-0R5	12-32V Nominal:24	9.0V	0	500	94	90	680
D78E12-0R5	15-32V Nominal:24	12V	0	500	95	92	330
D78E15-0R5	18-32V Nominal:24	15V	0	500	96	93	330

Input Specifications			
Input voltage	D78E03-0R5	24V nominal input	4.75~28V
	D78E05-0R5	24V nominal input	6.5~32V
	D78E6R5-0R5	24V nominal input	9~32V
	D78E09-0R5	24V nominal input	12~32V
	D78E12-0R5	24V nominal input	15~32V
	D78E15-0R5	24V nominal input	18~32V
Input filter			Capacitor type
Environmental Specifications			
Operating ambient temperature			-40°C to +85°C (with derating)
Maximum case temperature			+105°C
Storage temperature range			-50°C to +125°C
Relative humidity			95% RH max.
Temperature coefficient			±0.03% / °C max.
Output Specifications			
Output current			0.5A max.
Voltage accuracy	0 -100% load and 24Vin		±1% typ.
			±3% max.
Minimum load			0mA
Line regulation	Full load		±0.5% max.
Load Regulation	10 -100% load		±0.75% max.
Ripple and Noise (20MHz Bandwidth)			50mVp-p max.
Capacitive load			See table
Short Circuit Protection(SCP)			Hiccup, automatic recovery
Over Temperature Protection(OTP)	The IC Thermal Shutdown Temperature		150°C typ
General Specifications			
Efficiency			See table
Switching frequency (Fixed)	Pulse width modulation (PWM)		480kHz
Reliability, calculated MTBF			10 × 10 ⁵ Hrs
Physical Specifications			
Case material			Plastic (UL94 V-0)
Dimensions			0.46 × 0.295 × 0.4 Inch
			(11.6 × 7.5 × 10.2 mm)
Weight			1.6g (0.057oz) typ.

Attention: Please don't use it in overload condition.

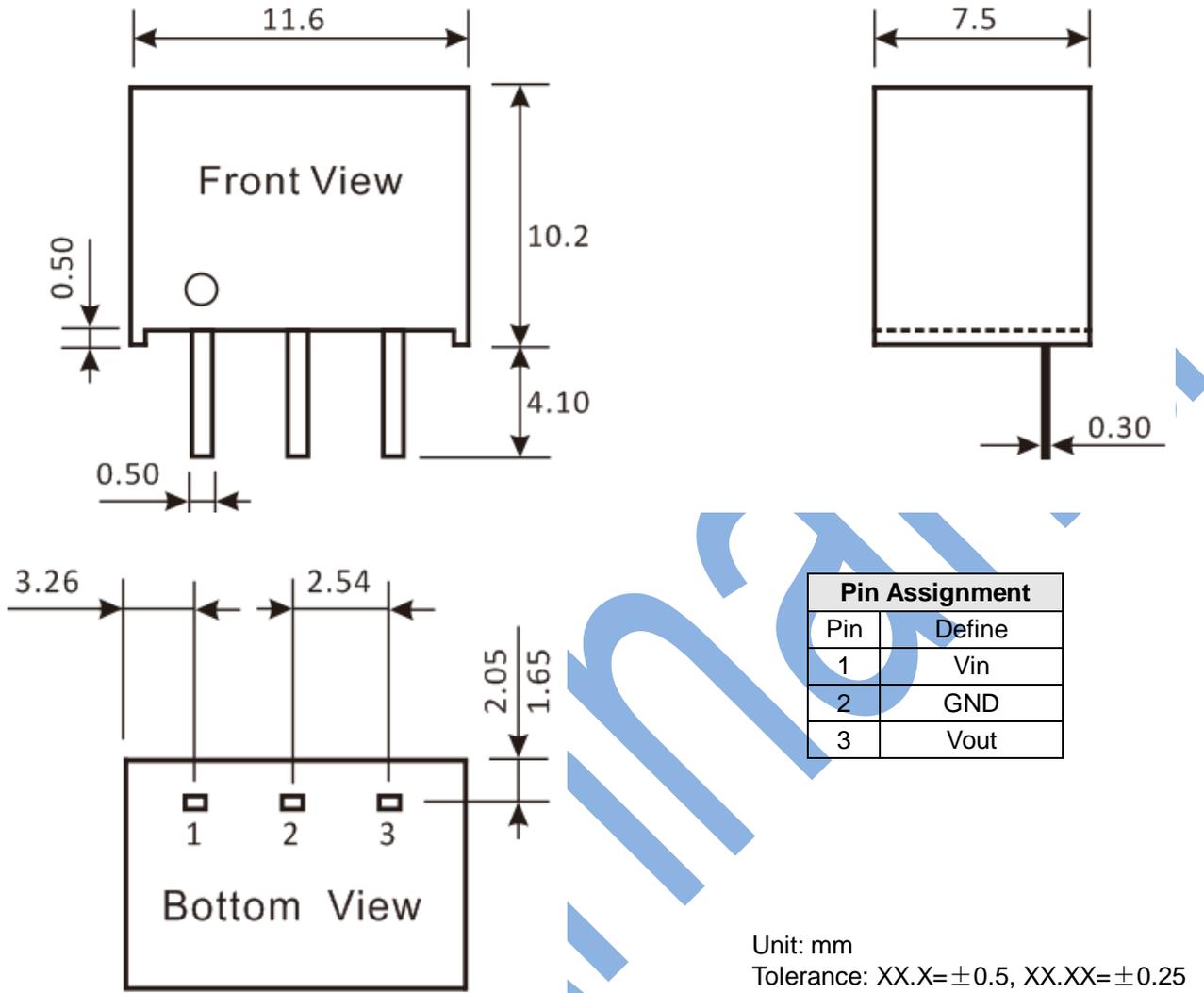
Power Derating Curve



Note

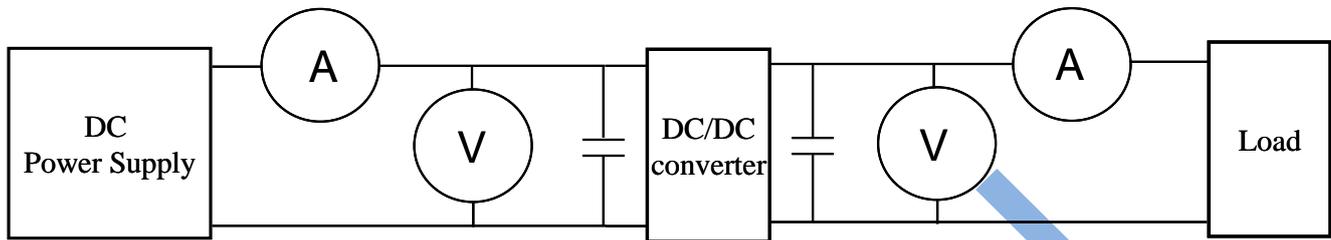
1. Io below this value will not damage these converters, however, they may not meet all listed specifications.
2. Typical value, tested at nominal input and full load.
3. Specifications subject to change without notice.
4. This power module is not internally fused. The input line fuse must always be used.
5. When the input voltage is higher than 30V or In case of long input lines or hot plug-in requirements, 33uF high frequency and low resistance electrolytic capacitor must be attached to the input during test or operation.
6. In the process of testing or using, it is necessary to ensure that the "GND" pin of the product is well connected to the GND of the power supply, otherwise the product will be damaged.

Mechanical Dimensions



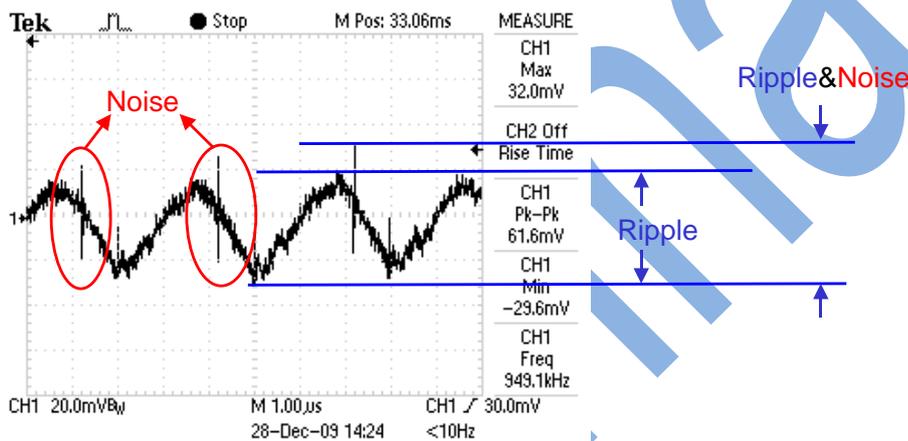
Test Configurations

All specifications are typical at nominal input, full load and 25°C unless otherwise stated.

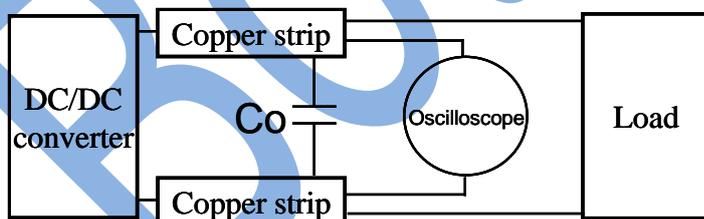


- ◎DC Power Supply: It offers a wide voltage and current range precisely.
- ◎Current meter (A): Accuracy → 200μA ~ 200mA 4 ranges $\pm(0.2\% \text{ rdg} + 2 \text{ digits})$
2000mA ~ 20A 2 ranges $\pm(0.3\% \text{ rdg} + 2 \text{ digits})$.
- ◎Voltage meter (V): Accuracy → $\pm(0.03\% \text{ rdg} + 4 \text{ digits})$.
- ◎Load: At full load.
- ◎Wires: The resistance of the wires must be small.

1. Ripple and Noise: as shown below. The bandwidth is 0-20MHz.

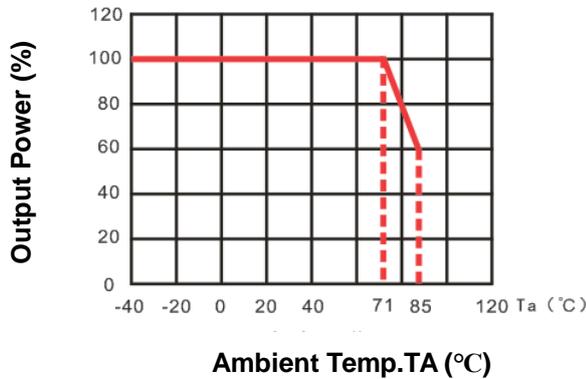


Output Ripple&Noise measurement test circuit: as shown below.

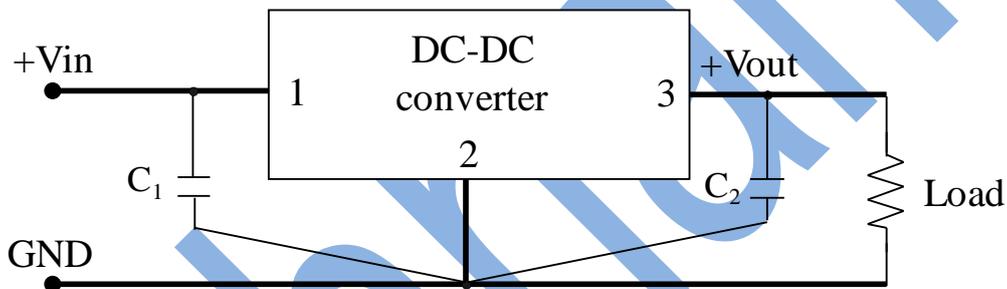


Co: usually 1uF MLCC and 10uF tantalum capacitor.

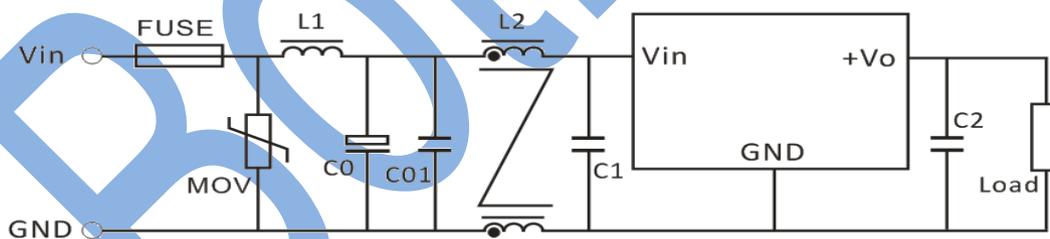
2. **Temperature derating curve:** The DC-DC converter will operate over a wider temperature range if less power is drawn from the output and the device is already running. The temperature derating curve shows the operating power-temperature range. As shown below.



3. **Application circuit:** as shown below. C1=10uF/50V MLCC, C2 =22uF/25V MLCC.



4. EMC Filter Suggestion according to EN55032 CLASSB:



MOV	L1	C0	C01	L2	C1	C2
20D470K	300uH	470uF/50V	4.7uF/50V MLCC	5mH	10uF/50V MLCC	22uF/25V MLCC