

■ FEATURES

- Industrial standard SIP-4 package
- Operating temperature range -40°C ~ +105°C
- Low no load input current
- Continuous short circuit protection
- Isolation voltage 1500VDC
- Efficiency up to 88%
- 3 years warranty

■ APPLICATIONS

- Automation equipment
- Power supplies
- Industrial PC
- Data communications
- Distributed power system

■ DESCRIPTION

MU-N series is a unregulated 1 Watt DC/DC converter in standard SIP-4 plastic package, with $\pm 10\%$ input voltage range. It features isolated voltage of 1500VDC, extremely low no load current, wide working temperature range from -40~ +105°C, and suits all kinds of systems like industrial control, automation field, and so on.

■ MODEL ENCODING

MU	S	-	05	05	N
Series Name	Output Quantity		Input Voltage	Output Voltage	New Series
	S : Single		3.3 : 2.97~3.63V	03.3 : 3.3V	
			05 : 4.5~5.5V	05 : 5V	
			12 : 10.8~13.2V	09 : 9V	
			24 : 21.6~26.4V	12 : 12V	
				15 : 15V	
				24 : 24V	

■ MODEL SELECTION TABLE(1W OUTPUT POWER)

MODEL NUMBER	INPUT				OUTPUT		EFF. (%)	CAPACITOR LOAD (Max.)
	VOLTAGE (VDC)		CURRENT (mA)		VOLTAGE (VDC)	CURRENT (mA)		
	NOMINAL	RANGE	NO LOAD	FULL LOAD				
MUS-3.303.3N	3.3	2.97-3.63	10	379	3.3	300	80	470uF
MUS-3.305N	3.3	2.97-3.63	10	357	5	200	85	470uF
MUS-0503.3N	5	4.5~5.5	6	247	3.3	300	81	470uF
MUS-0505N	5	4.5~5.5	6	235	5	200	85	470uF
MUS-0509N	5	4.5~5.5	7	230	9	111	87	220uF
MUS-0512N	5	4.5~5.5	9	235	12	84	85	220uF
MUS-0515N	5	4.5~5.5	12	233	15	67	86	220uF
MUS-0524N	5	4.5~5.5	20	235	24	42	85	100uF
MUS-1203.3N	12	10.8-13.2	6	102	3.3	300	82	470uF
MUS-1205N	12	10.8-13.2	6	96	5	200	87	470uF
MUS-1209N	12	10.8-13.2	6	96	9	111	87	220uF
MUS-1212N	12	10.8-13.2	6	96	12	84	87	220uF
MUS-1215N	12	10.8-13.2	6	95	15	67	88	220uF
MUS-1224N	12	10.8-13.2	10	96	24	42	87	100uF
MUS-2403.3N	24	21.6-26.4	5	51	3.3	300	82	470uF
MUS-2405N	24	21.6-26.4	5	49	5	200	85	470uF
MUS-2409N	24	21.6-26.4	5	48	9	111	86	220uF
MUS-2412N	24	21.6-26.4	5	49	12	84	85	220uF
MUS-2415N	24	21.6-26.4	5	49	15	67	85	220uF
MUS-2424N	24	21.6-26.4	6	49	24	42	85	100uF

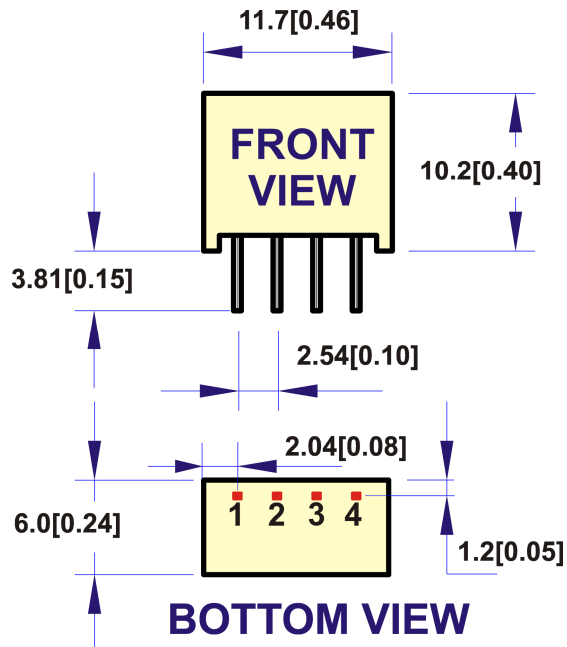
Note: Efficiency and input current are measured at nominal input voltage and full load.

Other input to output voltages may be available. Please contact factory.

SPECIFICATION

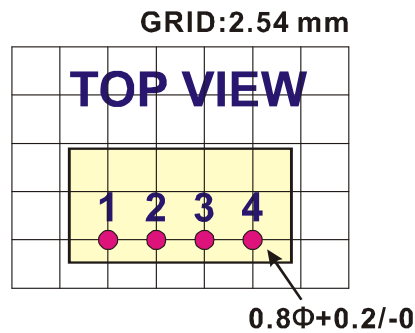
INPUT	Voltage Range	3.3 : 2.97~3.63V ; 5 : 4.5~5.5V ; 12 : 10.8~13.2V ; 24 : 21.6~26.4V		
	Surge Voltage(100ms max.)	3.3Vin models : 9Vdc ; 5Vin models : 9Vdc ; 12Vin models : 18Vdc ; 24Vin models : 30Vdc		
	Filter	Internal capacitor		
	Protection	Fuse recommended (see page 6)		
OUTPUT	Voltage Accuracy	±3% max.		
	Rated Power	1W		
	Ripple & Noise ¹	75mVp-p max.		
	Line Regulation ²	±1.2% (other output) , (for 1% input variation) ±1.5% (3.3Vdc output) , (for 1% input variation)		
	Load Regulation ³	8% (other output) 12% (3.3Vdc output)		
	Switching Frequency	200KHz min.		
	Minimum Load	10% of full load		
PROTECTION	Short Circuit	Continuous , automatic recovery		
ENVIRONMENT	Cooling	Free-air convection		
	Working Temperature	-40~ +105°C (refer to “Derating Curve”)		
	Case Temperature	+115°C max.		
	Working Humidity	5% ~ 95% RH non-condensing		
	Storage Temp., Humidity	-55 ~ +125°C, 10 ~ 95% RH non-condensing		
	Temperature Coefficient	±0.05% / °C		
	Soldering Temperature	1.5mm from case of 3~5 sec./265°C(max.)		
	Vibration	10~500Hz, 2G 10min./1cycle, period for 60 min. each along X, Y, Z axes		
SAFETY & EMC	Isolation Voltage ⁴	I/P-O/P : 1500VDC		
	Isolation Resistance	I/P-O/P : 1000M Ohms / 500VDC / 25°C / 70% RH		
	Isolation Capacitance	50pF typ.		
	EMC Emission	Parameter	Standard	Test Level / Note
		Conducted	EN55032(CISPR32)	N/A
		Radiated	EN55032(CISPR32)	Class B
	EMC Immunity	Parameter	Standard	Test Level / Note
		ESD	BS IEC 61000-4-2	Air 8KV
		Radiated Susceptibility	BS IEC 61000-4-3	3V/m
		EFT/Burst	BS IEC 61000-4-4	0.5KV/5KHz
		Surge	BS IEC 61000-4-5	0.5KV/Line-Line
		Conducted	BS IEC 61000-4-6	3Vrms
		Magnetic field immunity	BS IEC 61000-4-8	1A/m
OTHERS		MTBF ⁵	>4,000,000Hours	
	Weight	1.3g typ.		
	Dimension(L*W*H)	11.7mm*6.0mm*10.2mm		
	Case Material	Non-conductive plastic		
NOTE	¹ Ripple & noise are measured at 20MHz with 1uF ceramic capacitor connect to the output pins.			
	² High line to low line at rated load.			
	³ Load regulation is for output load current change from 10% to 100%.			
	⁴ 1500VDC for 1 minute.			
	⁵ MIL-HDBK-217F @25 °C, Ground Benign.			
*All specifications are measured at Ta=25°C, humidity < 75%, nominal input voltage, and rated output load unless otherwise specified.				

MECHANICAL SPECIFICATION

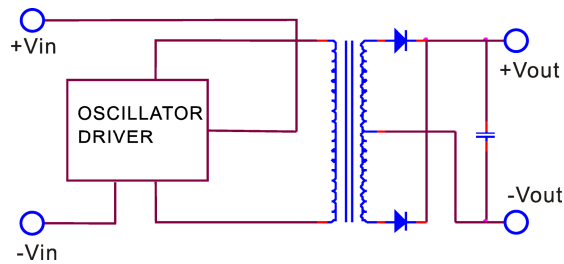


PIN CONNECTION	
PIN	SINGLE
1	-Vin
2	+Vin
3	-Vout
4	+Vout

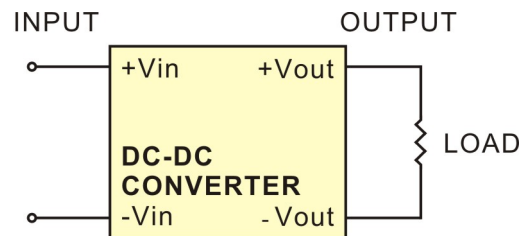
All dimensions are in mm[Inches]
Pin size is 0.50x0.30mm[0.02"x0.01"]
Pin tolerance .XX= ± 0.05 mm
Tolerance .x = ± 0.5 mm
.xx= ± 0.25 mm



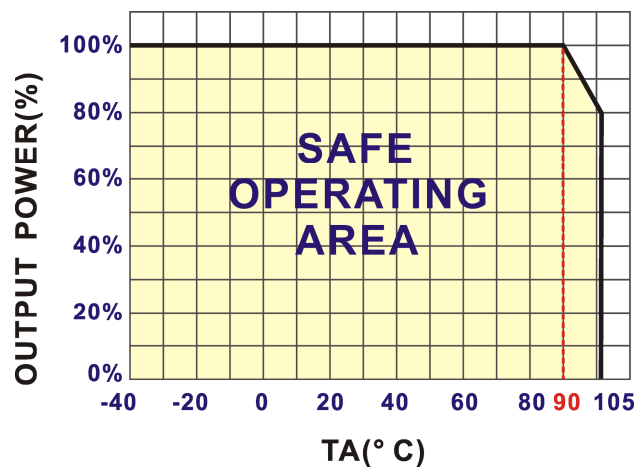
■ SIMPLIFIED SCHEMATIC



■ TYPICAL APPLICATIONS



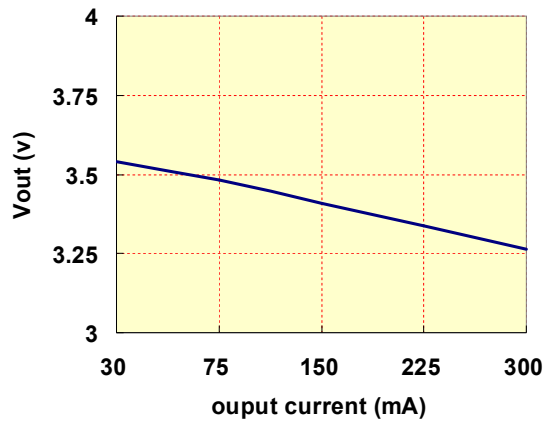
■ DERATING CURVE



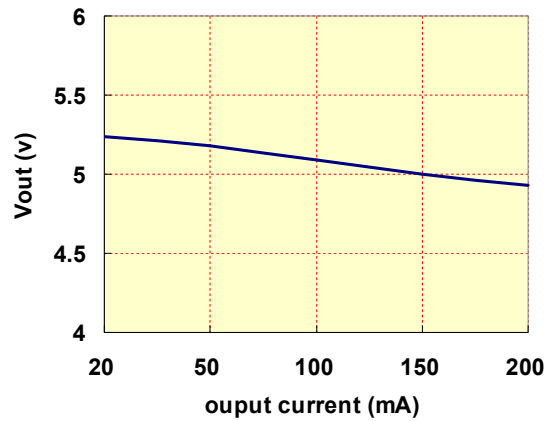
TYPICAL PERFORMANCE CURVES

Specifications typical at $T_A=25^\circ\text{C}$, nominal input voltage, rated output current unless otherwise specified.

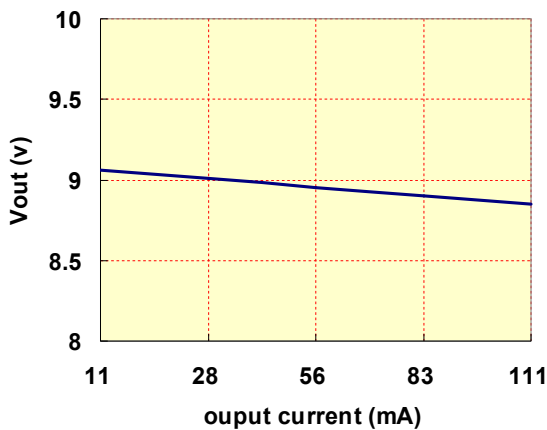
VOUT VS LOAD(3.3Vout Models)



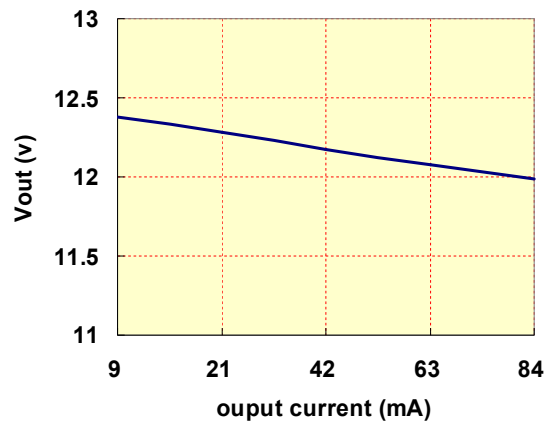
VOUT VS LOAD(5Vout Models)



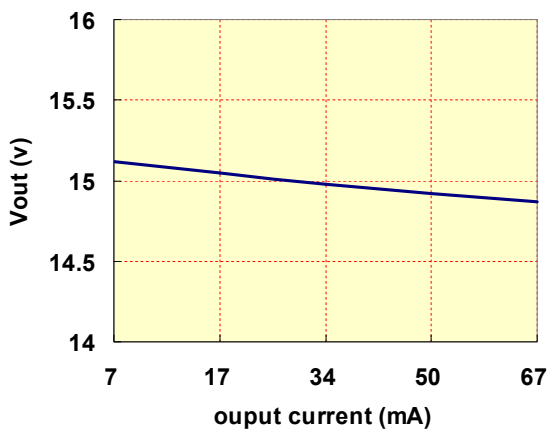
VOUT VS LOAD(9Vout Models)



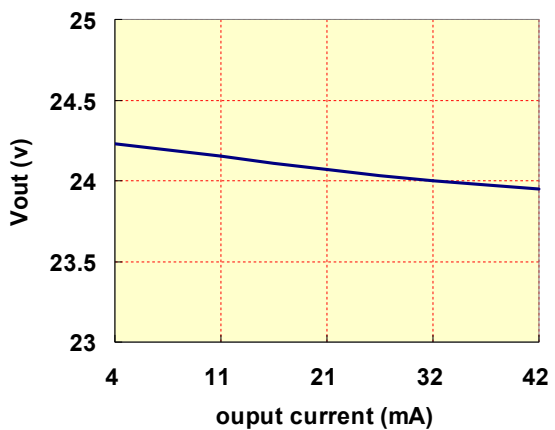
VOUT VS LOAD(12Vout Models)



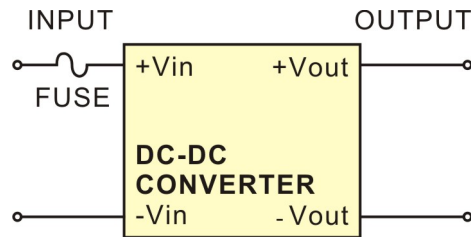
VOUT VS LOAD(15Vout Models)



VOUT VS LOAD(24Vout Models)



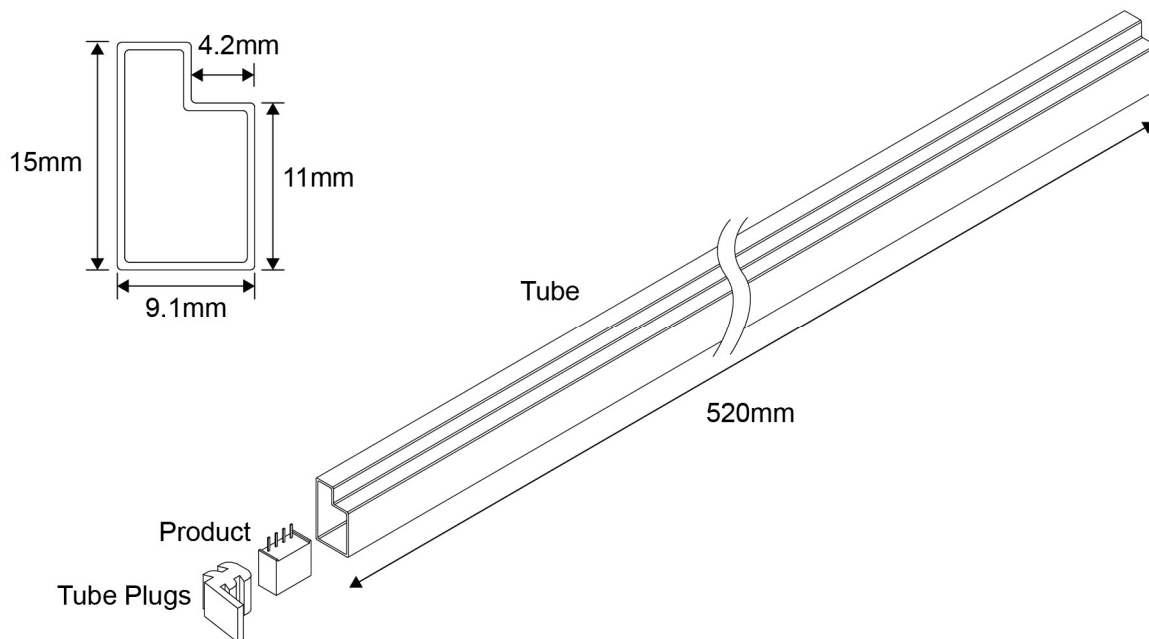
■ INPUT FUSE SELECTION GUIDE



MODEL NUMBER	INPUT VOLTAGE(VDC)	FUSE
MUS-3.3XXN	2.97~3.63V	1000mA Slow-Blow Type
MUS-05XXN	4.5~5.5V	500mA Slow-Blow Type
MUS-12XXN	10.8~13.2V	300mA Slow-Blow Type
MUS-24XXN	21.6~26.4V	150mA Slow-Blow Type

Note: Certain applications may require the installation of external fuse in front of the input.

■ PACKAGING INFORMATION



Packaging Quantity: 42 pcs converter per tube