

FEATURES

- ▶ Industrial Standard SMD Package
- ▶ I/O Isolation 4000VAC with Reinforced Insulation, rated for 250Vrms Working Voltage
- ▶ Low Leakage Current < 2μA
- ▶ Operating Ambient Temp. Range -40°C to 95°C
- ▶ Short Circuit Protection
- ▶ Medical EMC Standard meets 4th Edition of EMI EN55011 and EMS EN60601-1-2
- ▶ Medical Safety meets 2xMOPP per 3rd Edition of IEC/EN 60601-1 & ANSI/AAMI ES60601-1 with CE Marking


NEW

PRODUCT OVERVIEW

The MINMAX MSCU01M series is a new range of medical approved 1W isolated dc-dc converter within enclosed SMD-14 package which specifically design for medical applications. There are 15 models available for input voltage of 5, 12, 24VDC and 5, 12, 15, ±12, ±15VDC output. The I/O isolation is specified for 4000VAC with reinforced insulation, which rated for 250Vrms working voltage. Further features include short circuit protection, low leakage current 2μA max. and operating ambient temp. range by -40°C to 95°C without derating. MSCU01M series conform to 4th edition medical EMC standard, medical safety approval meets 2xMOPP (Means Of Patient Protection) per 3rd edition of IEC/EN 60601-1 & ANSI/AAMI ES60601-1.

The MSCU01M series offer a economical solution for demanding application in medical instrument requesting a certified supplementary and reinforced insulation system to comply with latest medical safety approval for 2xMOPP requirement.

Model Selection Guide

Model Number	Input Voltage (Range) VDC	Output Voltage VDC	Output Current		Input Current		Max. capacitive Load μF	Efficiency (typ.)	
			Max.	Min.	@Max. Load	@No Load		@Max. Load	
			mA	mA	mA(typ.)	mA(typ.)		%	
MSCU01-05S05M	5 (4.5 ~ 5.5)	5	200	4	263	50	220	76	
MSCU01-05S12M		12	84	1.68	252			80	
MSCU01-05S15M		15	68	1.36	246			83	
MSCU01-05D12M		±12	±42	±0.84	252			100#	80
MSCU01-05D15M		±15	±33	±0.66	236				84
MSCU01-12S05M	12 (10.8 ~ 13.2)	5	200	4	110	35	220	76	
MSCU01-12S12M		12	84	1.68	106			79	
MSCU01-12S15M		15	68	1.36	106			80	
MSCU01-12D12M		±12	±42	±0.84	106			100#	79
MSCU01-12D15M		±15	±33	±0.66	103				80
MSCU01-24S05M	24 (21.6 ~ 26.4)	5	200	4	55	20	220	76	
MSCU01-24S12M		12	84	1.68	53			80	
MSCU01-24S15M		15	68	1.36	53			80	
MSCU01-24D12M		±12	±42	±0.84	53			100#	80
MSCU01-24D15M		±15	±33	±0.66	52				80

For each output

Input Specifications

Parameter	Model	Min.	Typ.	Max.	Unit
Input Voltage Range	5V Input Models	4.5	5	5.5	VDC
	12V Input Models	10.8	12	13.2	
	24V Input Models	21.6	24	26.4	
Input Surge Voltage (1 sec. max.)	5V Input Models	-0.7	---	9	VDC
	12V Input Models	-0.7	---	18	
	24V Input Models	-0.7	---	30	
Input Filter	All Models	Internal Capacitor			

Output Specifications

Parameter	Conditions	Min.	Typ.	Max.	Unit
Output Voltage Setting Accuracy		---	±1.0	±3.0	%Vnom.
Output Voltage Balance	Dual Output, Balanced Loads	---	±0.1	±1.0	%
Line Regulation	For Vin Change of 1%	---	±1.2	±1.5	%
Load Regulation	Io=10% to 100%	---	---	±10	%
Ripple & Noise	0-20 MHz Bandwidth	---	---	100	mV p-p
Temperature Coefficient		---	±0.01	±0.02	%/°C
Short Circuit Protection	Continuous, Automatic Recovery				

Isolation, Safety Standards

Parameter	Conditions	Min.	Typ.	Max.	Unit
I/O Isolation Voltage	60 Seconds Reinforced insulation, rated for 250Vrms working voltage	4000	---	---	VACrms
Leakage Current	240VAC, 60Hz	---	---	2	µA
I/O Isolation Resistance	500 VDC	10	---	---	GΩ
I/O Isolation Capacitance	100KHz, 1V	---	20	---	pF
Safety Standards	ANSI/AAMI ES60601-1, CAN/CSA-C22.2 No. 60601-1 IEC/EN 60601-1 3 rd Edition 2xMOPP				
Safety Approvals	ANSI/AAMI ES60601-1 2xMOPP recognition (UL certificate), IEC/EN 60601-1 3 rd Edition (CB-report)				

General Specifications

Parameter	Conditions	Min.	Typ.	Max.	Unit
Switching Frequency		---	55	---	kHz
MTBF (calculated)	MIL-HDBK-217F@25°C, Ground Benign	4,771,507	---	---	Hours
Moisture Sensitivity Level (MSL)	IPC/JEDEC J-STD-020D.1	Level 2			

Environmental Specifications

Parameter	Conditions	Min.	Max.	Unit
Operating Ambient Temperature Range (See Power Derating Curve)	Natural Convection	-40	+95	°C
Case Temperature		---	+105	°C
Storage Temperature Range		-50	+125	°C
Humidity (non condensing)		---	95	% rel. H
Cooling	Natural Convection			
Lead-free Reflow Solder Process	IPC/JEDEC J-STD-020D.1			

EMC Specifications

Parameter	Standards & Level		Performance
EMI	Conduction	EN55011, FCC part 15	Class A ₍₅₎
	EN60601-1-2 4 th		
EMS	ESD	EN61000-4-2 Air ± 15kV, Contact ± 8kV	A
	Radiated immunity	EN61000-4-3 10V/m	A
	Fast transient ⁽⁶⁾	EN61000-4-4 ±2kV	A
	Surge ⁽⁶⁾	EN61000-4-5 ±1kV	A
	Conducted immunity	EN61000-4-6 10Vrms	A
	PFMF	EN61000-4-8 30A/m	A

Order Code Table	
Standard	For water-washable process
MSCU01-05S05M	MSCU01-05S05M-W
MSCU01-05S12M	MSCU01-05S12M-W
MSCU01-05S15M	MSCU01-05S15M-W
MSCU01-05D12M	MSCU01-05D12M-W
MSCU01-05D15M	MSCU01-05D15M-W
MSCU01-12S05M	MSCU01-12S05M-W
MSCU01-12S12M	MSCU01-12S12M-W
MSCU01-12S15M	MSCU01-12S15M-W
MSCU01-12D12M	MSCU01-12D12M-W
MSCU01-12D15M	MSCU01-12D15M-W
MSCU01-24S05M	MSCU01-24S05M-W
MSCU01-24S12M	MSCU01-24S12M-W
MSCU01-24S15M	MSCU01-24S15M-W
MSCU01-24D12M	MSCU01-24D12M-W
MSCU01-24D15M	MSCU01-24D15M-W