

Features

Switching Regulator

- Efficiency up to 96%, no need for heatsinks
- Pin-out compatible with LM78XX linears
- Low profile (L*W*H=11.6*8.5*10.4mm)
- Wide input range (5V - 42V)
- Short circuit protection, thermal shutdown
- Low ripple and noise
- IEC/EN60950 certified

Description

The R-78Cxx-1.0 series switching regulators are ideally suited to replace 1 Amp 78xx linear regulators and are pin compatible. Efficiencies of up to 96% means that very little energy is wasted as heat and the high input voltage is a useful feature.

Selection Guide

Part Number	Input Voltage Range [VDC]	Output Voltage [VDC]	Output Current [A]	Efficiency	
				@ min Vin [%]	@ max. Vin [%]
R-78C1.8-1.0	5 - 42	1.8	1.0	80	71
R-78C3.3-1.0	7 - 42	3.3	1.0	89	79
R-78C5.0-1.0	8 - 42	5	1.0	93	85
R-78C9.0-1.0	12 - 42	9	1.0	95	90
R-78C12-1.0	15 - 42	12	1.0	96	92
R-78C15-1.0	18 - 42	15	1.0	96	94

Model Numbering

R-78C -1.0
Output Voltage Output Current

Specifications (measured at Ta= 25°C, minimum load, otherwise specified)

BASIC CHARACTERISTICS

Parameter	Condition		Min.	Typ.	Max.
Input Voltage Range			Vout +3V		42VDC
Output Voltage Range			1.8VDC		15VDC
Minimum Load ⁽¹⁾			0%		
Quiescent Current				1mA	
Internal Operating Frequency			280kHz	350kHz	420kHz
Output Ripple and Noise ⁽²⁾	20MHz BW	Vin= 24VDC Vout=1.8-15 full load		75mVp-p 30mVp-p	120mVp-p
Max. Capacitive Load	with normal start-up time, no external components with <1 second start-up time + diode protection circuit				470µF 6800µF

Notes:

Note1: No load operation will not damage these devices, however they may not meet all specifications
A minimum load of 10mA is required

Note2: Measurements are made with a 10µF MLCC across output. (low ESR)

REGULATIONS

Parameter	Condition	Value
Output Voltage Accuracy	full load	±2% typ. / ±3% max.
Line Voltage Regulation	max. Vin, full load	±0.2% typ.
Load Voltage Regulation	max. Vin. and 10% to 100% load	±0.4% typ.
Transient Response	100% <-> 50% load 100% <-> 10% load	±75mV max. ±200mV max.

RECOM
DC/DC Converter

R-78C-1.0

1.0 Amp
SIP3
Single Output



IEC60950-1 certified
EN60950-1 certified
EN55032 compliant

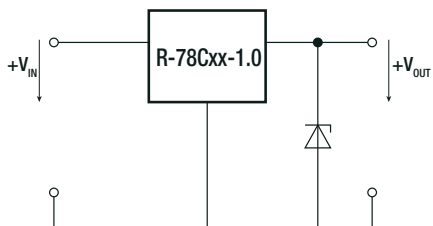
Specifications (measured at Ta= 25°C, minimum load, otherwise specified)

PROTECTIONS

Parameter	Condition	Value
Short Circuit Protection (SCP)		continuous, automatic recovery
Short Circuit Input Current	nom. Vin = 24VDC	65mA typ.

External Zener Diode Calculation for Output Over Voltage Protection

Minimum Zener Breakdown Voltage (VZmin) ≥ VOUTnom + 3% Accuracy

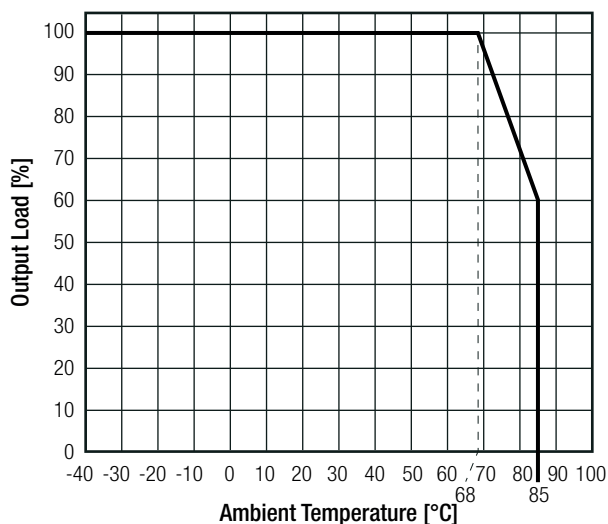


R-78C Vout	Zener Voltage, Vz (VZmin)	Recommended Zener Diode
1.8V (1.85V max.)	2.0V (1.90V)	MMSZ679T1G
3.3V (3.4V max.)	3.6V (3.42V)	MMSZ4685T1G
5V (5.15V max.)	5.6V (5.32V)	MMSZ4690T1G
9V (9.27V max.)	10V (9.50V)	MMSZ4697T1G
12V (12.36V max.)	13V (12.35V) 14V (13.30V)	MMSZ4700T1G / MMSZ4701T1G
15V (15.45V max.)	17V (16.15V)	MMSZ4704T1G

ENVIRONMENTAL

Parameter	Condition	Value
Operating Temperature Range	with derating (see graph)	-40°C to +85°C
Max. Case Temperature		+100°C
Temperature Coefficient		0.015%/°C
Case Thermal Impedance		70°C/W max.
Operating Altitude		2000m
Operating Humidity	non condensing	5% - 95% max., RH
Pollution Degree		PD2
MTBF	MIL-HDBK 217F	+25°C +68°C 8600 x 10 ³ hours 3880 x 10 ³ hours

Derating Graph



SAFETY AND CERTIFICATIONS

Certificate Type (Safety)	Report / File Number	Standard
Information Technology Equipment, General Requirements for Safety	1603123	IEC60950-1:2005, 2nd Edition + AM 2:2013 EN60950-1:2006 + AM2:2013
RoHS 2+		RoHS 2011/65/EU + AM2015/863
EAC	RU-AT.49.09571	TP TC 004/2011

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