CUI INC
a bel group

SERIES: PRC40 | DESCRIPTION: DC-DC CONVERTER

FEATURES

- up to 40W continuous power
- single and dual regulated outputs
- 4:1 input range, 9~36 Vdc and 18~75 Vdc input voltage options
- certified to EN/IEC 62368-1
- wide operating temperature range (-40 ~ +105°C)
- short circuit, over current, over temperature, and over voltage protection
- remote ON/OFF, output voltage trim



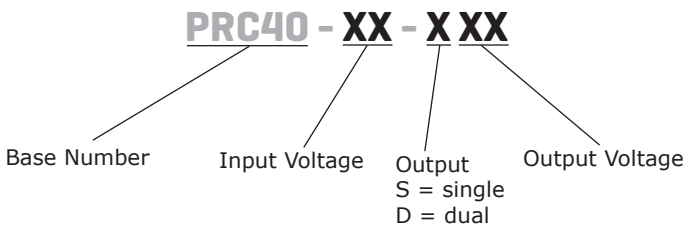
RoHS CE UKCA

MODEL

MODEL	input voltage		output voltage	output current[1]	output power	ripple & noise[2]	efficiency[3]
	typ (Vdc)	range (Vdc)	(Vdc)	max (mA)	max (W)	max (mVp-p)	typ (%)
PRC40-24-S3	24	9 ~ 36	3.3	10,000	33	100	89
PRC40-24-S5	24	9 ~ 36	5	8,000	40	100	90
PRC40-24-S12	24	9 ~ 36	12	3,333	40	125	92
PRC40-24-S15	24	9 ~ 36	15	2,666	40	125	92
PRC40-24-D12	24	9 ~ 36	±12	±1,666	40	125	90
PRC40-24-D15	24	9 ~ 36	±15	±1,333	40	125	90
PRC40-24-D24	24	9 ~ 36	±24	±833	40	200	91
PRC40-48-S3	48	18 ~ 75	3.3	10,000	33	100	89
PRC40-48-S5	48	18 ~ 75	5	8,000	40	100	90
PRC40-48-S12	48	18 ~ 75	12	3,333	40	125	92
PRC40-48-S15	48	18 ~ 75	15	2,666	40	125	92
PRC40-48-D12	48	18 ~ 75	±12	±1,666	40	125	90
PRC40-48-D15	48	18 ~ 75	±15	±1,333	40	125	90
PRC40-48-D24	48	18 ~ 75	±24	±833	40	200	90

Notes:
1. At full load.
2. Measured with 20MHz bandwidth and 1µF ceramic capacitor.
3. The efficiency is test by nominal input and full load at 25°C.

PART NUMBER KEY



INPUT

parameter	conditions/description	min	typ	max	units
operating input voltage	24 Vdc input 48 Vdc input	9 18	24 48	36 75	Vdc Vdc
surge voltage	24 Vdc input 48 Vdc input			50 100	Vdc Vdc
input undervoltage lockout	0% ~ 100% load 24 Vdc input 48 Vdc input		 8 16		 Vdc Vdc
no load input current	at nominal input voltage			15	mA
input filter	Pi filter				
start-up time	at nominal input, full load			40	ms
start-up voltage	0% ~ 100% load 24 Vdc input 48 Vdc input			 9 18	 Vdc Vdc
remote ON/OFF	module on: CTRL pin open or pulled high (3~12 Vdc) module off: CTRL pin pulled low to GND (0~1.2 Vdc)				

OUTPUT

parameter	conditions/description	min	typ	max	units
maximum capacitive load	3.3 Vdc output 5 Vdc output 12 Vdc output 15 Vdc output ±12 Vdc output ±15 Vdc output ±24 Vdc output			26,600 20,000 3,900 2,600 ±2,600 ±1,600 ±650	µF µF µF µF µF µF µF
voltage accuracy	at full load, nominal input		±1		%
voltage adjustability			±10		%
line regulation	low line to high line at full load single output dual output		 ±0.2 ±0.5		 % %
load regulation	0% ~ 100% load single output dual output		±0.5 ±1		 % %
cross regulation	25% ~ 100%, dual output models		±5		%
operating frequency	at full load, nominal input	220	250	285	kHz
transient recovery time	75% to 100% load step change		500		µs
temperature coefficient		-0.05		±0.05	%/°C

PROTECTIONS

parameter	conditions/description	min	typ	max	units
over voltage protection	zener diode clamp	112		160	%
over current protection			175		%
short circuit protection	continuous, auto recovery				
over temperature protection			115		°C

SAFETY AND COMPLIANCE

parameter	conditions/description	min	typ	max	units
isolation voltage	input to output, for 1 minute	1,600			Vdc
isolation resistance		1,000			MΩ
isolation capacitance			1,500		pF
safety approvals	certified to 62368-1: EN, BS EN				

SAFETY AND COMPLIANCE (CONTINUED)

parameter	conditions/description	min	typ	max	units
EMI	EN 55032 Class A, Class B (external circuit required, see Figure 3)				
ESD	EN 61000-4-2, Air ± 8kV, Contact ± 6kV, perf. Criteria A				
fast transient[4]	EN 61000-4-4, ±2kV, perf. Criteria A				
surge[4]	EN 61000-4-5, ±2kV, perf. Criteria A				
conducted immunity	EN 61000-4-6, 10 Vrms, perf. Criteria A				
magnetic field immunity	EN 61000-4-8, 10 A/m, perf. Criteria A				
MTBF	as per MIL-HDBK-217F, 25°C		779,000		hours
RoHS	yes				

Notes: 4. External 680µF/100V capacitor required.

ENVIRONMENTAL

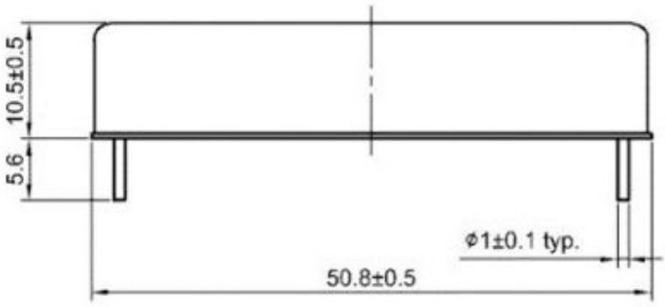
parameter	conditions/description	min	typ	max	units
operating temperature	see derating curve	-40		105	°C
storage temperature		-55		125	°C
humidity	non-condensing	5		95	%
max. case temperature				110	°C

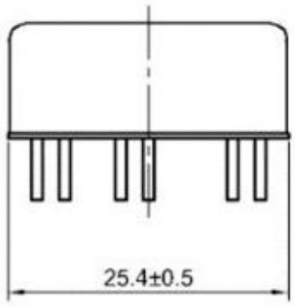
MECHANICAL

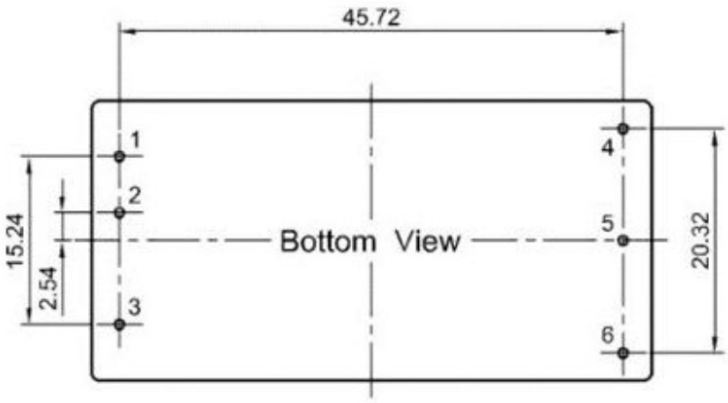
parameter	conditions/description	min	typ	max	units
dimensions	50.80 x 25.40 x 10.50				mm
weight			37.6		g
case material	metal case				
potting material	silicone (UL94V-0)				

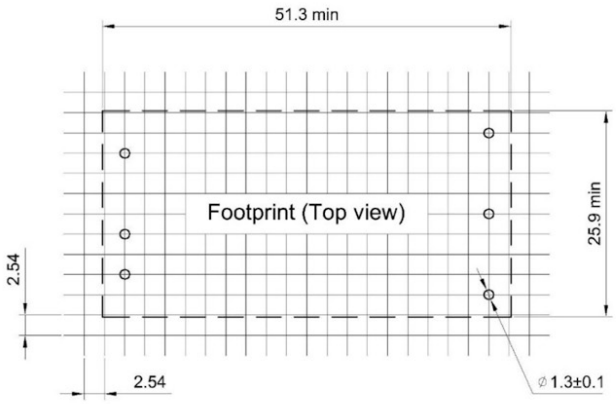
MECHANICAL DRAWING

units: inch [mm]
general tolerance: ±0.35mm





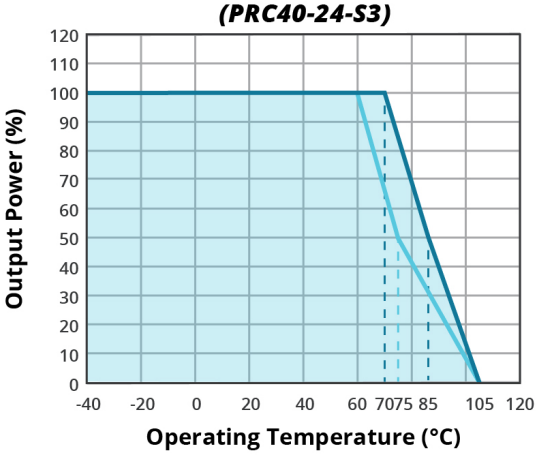




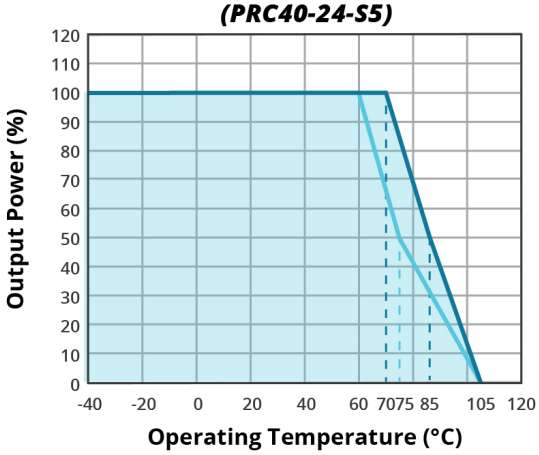
Pin Out		
PIN	Single outputs	Dual outputs
1	+Vin	+Vin
2	-Vin	-Vin
3	CTRL	CTRL
4	+Vout	+Vout
5	-Vout	0V
6	Trim	-Vout

DERATING CURVES

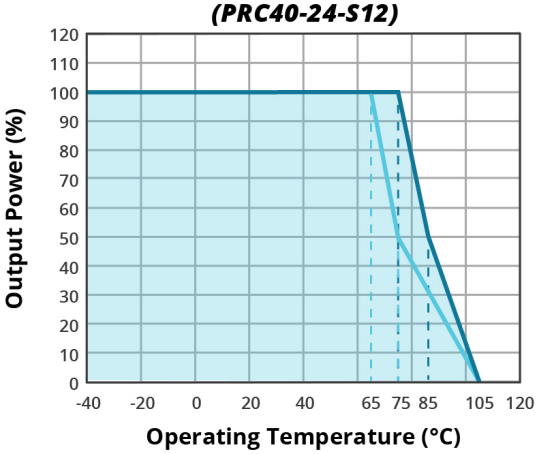
TEMPERATURE DERATING CURVE (PRC40-24-S3)



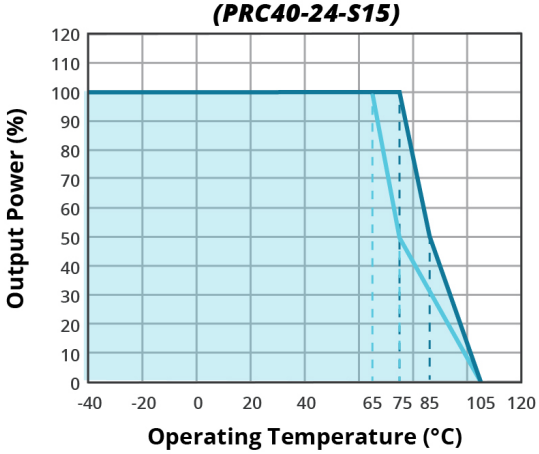
TEMPERATURE DERATING CURVE (PRC40-24-S5)



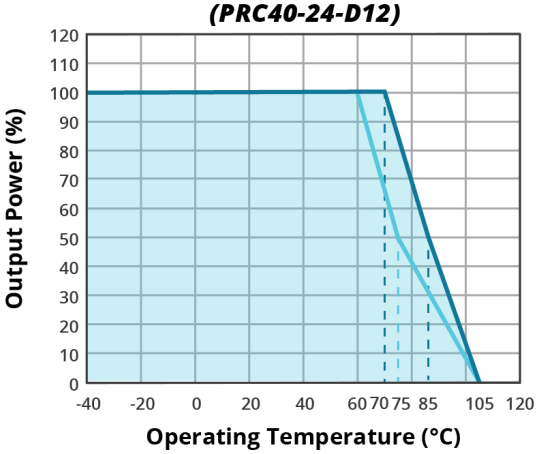
TEMPERATURE DERATING CURVE (PRC40-24-S12)



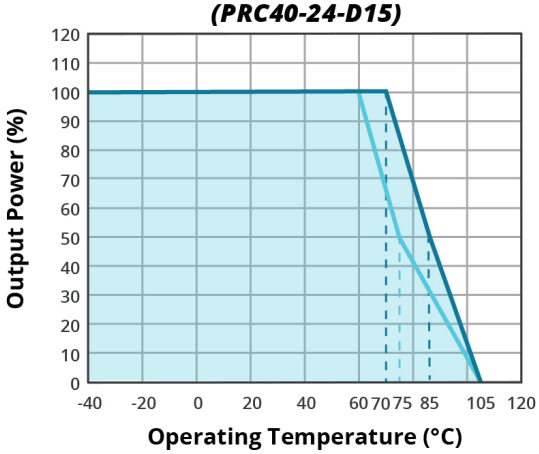
TEMPERATURE DERATING CURVE (PRC40-24-S15)



TEMPERATURE DERATING CURVE (PRC40-24-D12)

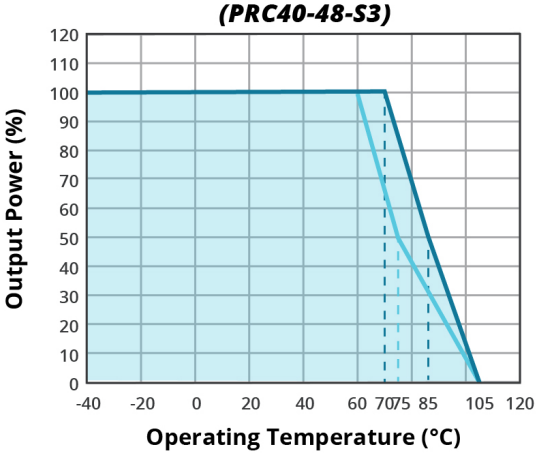


TEMPERATURE DERATING CURVE (PRC40-24-D15)

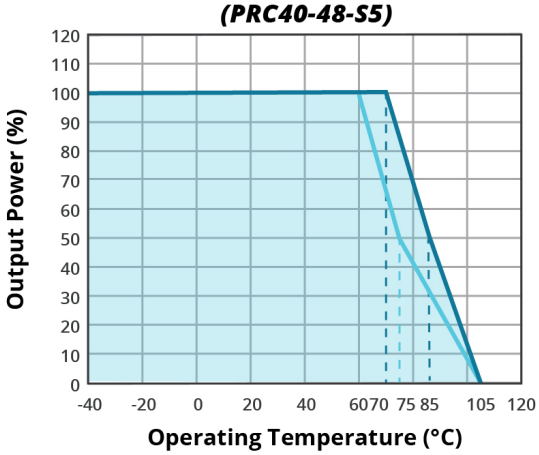


DERATING CURVES (CONTINUED)

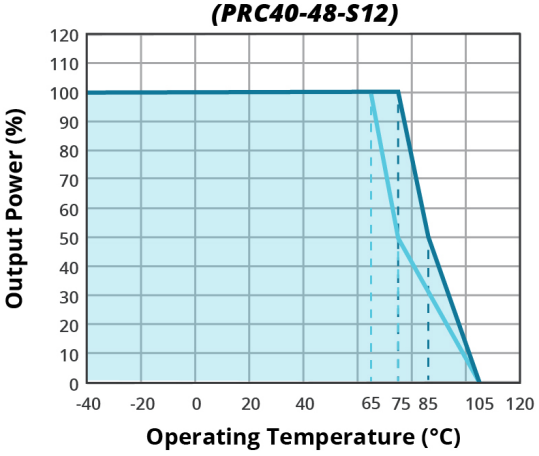
TEMPERATURE DERATING CURVE (PRC40-48-S3)



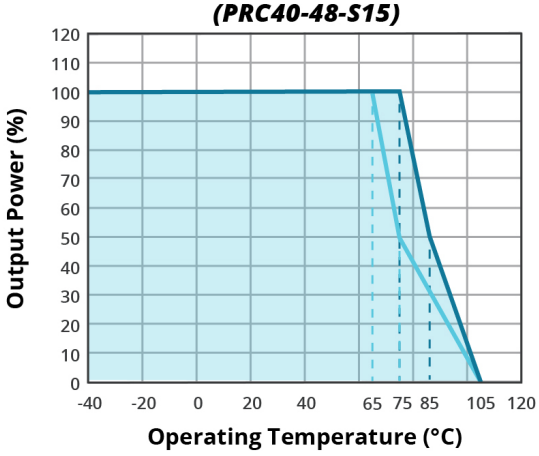
TEMPERATURE DERATING CURVE (PRC40-48-S5)



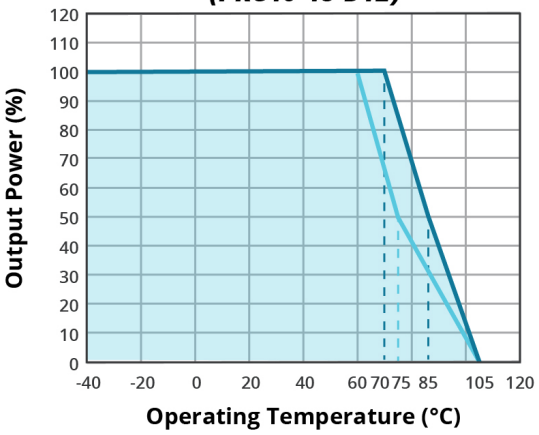
TEMPERATURE DERATING CURVE (PRC40-48-S12)



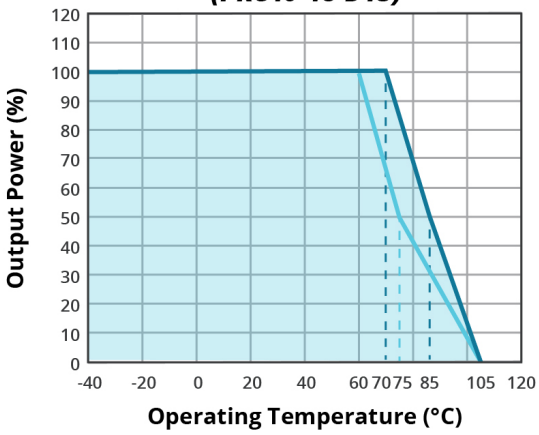
TEMPERATURE DERATING CURVE (PRC40-48-S15)



TEMPERATURE DERATING CURVE (PRC40-48-D12)



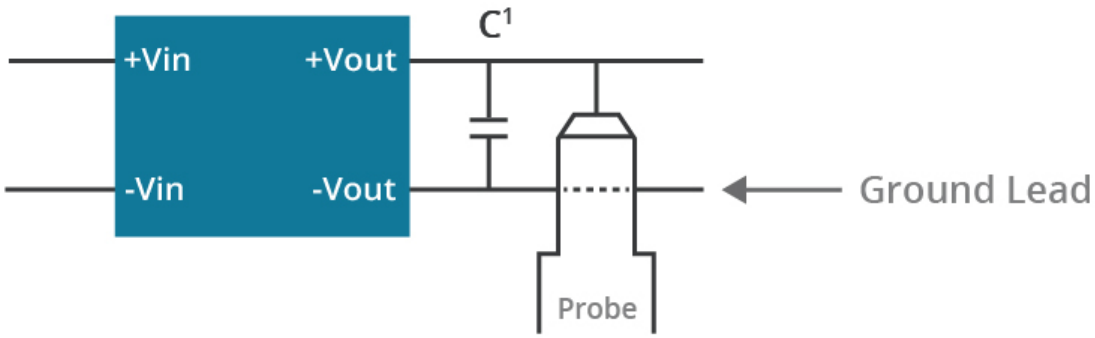
TEMPERATURE DERATING CURVE (PRC40-48-D15)



Note: The derating curve was measured at nominal Vin in chamber with nature convection.
The derating curve was measured with nominal line. Mounted test board 90 x 80 mm and each power pin with 43 x 40 mm, 2oz double layer.

RIPPLE AND NOISE MEASURE METHOD

Figure 1



Note: 1. Measured with 20MHz bandwidth and 1μF ceramic capacitor.

EMI RECOMMENDED CIRCUIT

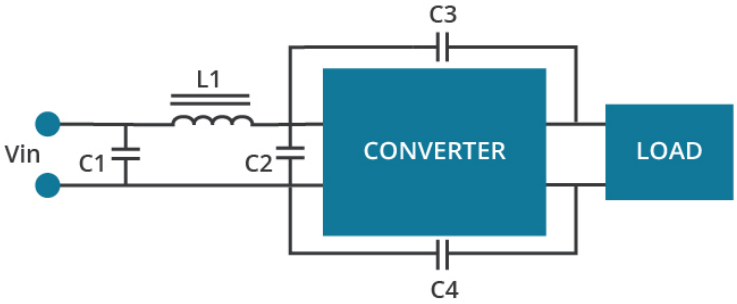
Figure 2

EN55032 CLASS A



Figure 3

Single output
EN55032 CLASS B



Dual output
EN55032 CLASS B

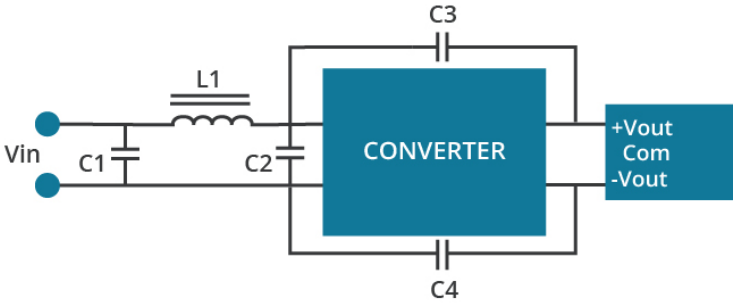


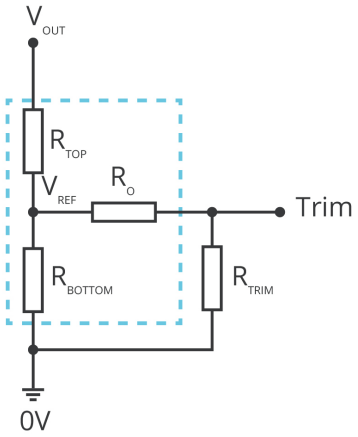
Table 2

Vin	C1	L1	C2	C3	C4
24V	10μF	1.5μH	10μF	2200pF	2200pF
48V	10μF	3.3μH	4.7μF	2200pF	2200pF

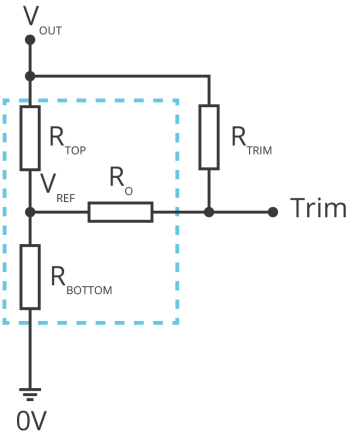
APPLICATION NOTES

Figure 4

Trim up



Trim down



$$R_{TRIM} = \frac{a \cdot R_{BOTTOM}}{R_{BOTTOM} - a} - R_O \qquad a = \frac{V_{REF}}{V_{OUT} - V_{REF}} \cdot R_{TOP}$$

Formula for Trim up

$$R_{TRIM} = \frac{a \cdot R_{TOP}}{R_{TOP} - a} - R_O \qquad a = \frac{V_{OUT} - V_{REF}}{V_{REF}} \cdot R_{BOTTOM}$$

Formula for Trim down

Table 3

V_{NOM}	R_{TOP}	R_{BOTTOM}	R_O	V_{REF}
(Vdc)	(kΩ)	(kΩ)	(kΩ)	(V)
3.3	8.5	5.1	27	1.24
5	15.47	5.1	33	1.24
12	12.62	3.3	22	2.50
15	15.1	3	22	2.50

Note: Value for R_{TOP}, R_{BOTTOM}, R_O, and V_{REF} refer to Table 3 (fixed internal values).
R_{TRIM}: Trim resistance
a: User-defined parameter, no actual meanings
V_{NOM}: Nominal output voltage
V_{OUT}: Target output voltage

REVISION HISTORY

rev.	description	date
1.0	initial release	06/15/2023

The revision history provided is for informational purposes only and is believed to be accurate.

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CUI offers a two (2) year limited warranty. Complete warranty information is listed on our website.

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