DC/DC Converter 20 W

20 SCB 110 T24 P00 Art. No. 1430 - 09

$V_{I\,nom}$ = 24 V_{DC} ... 110 V_{DC} $V_{O1,2,3}$ = + 24.0 V_{DC} $I_{O1,2,3\,nom}$ = 0.28 A

SYMBOL	PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNITS
INPUT						
V_I	Input voltage range	Continuously	16.8		137.5	V_{DC}
$V_{I\,dyn}$	Input voltage range dynamic	V_I = 14.4 V … 16.8 V for t ≤ 0.1 s V_I = 137.5 V … 154.0 V for t ≤ 1.0 s	14.4		 154	V_{DC} V_{DC}
$V_{I\,min}$	Converter shutdown		12.0		14.2	V_{DC}
$V_{I\,min}$	Converter On		15.5		16.8	V_{DC}
$V_{I\,max}$	Converter shutdown		154		160	V_{DC}
V_{INH}	INH Function Reference potential: - V_I	Converter On: INH = low V_{INH} ≤ 0.8 V, I ≤ 1.5 mA Converter Off: INH = high V_{INH} ≥ 3.0 V, I ≤ - 50 µA*	0 3.0		0.8 20	V_{DC} V_{DC}
	Stand by current	14.4 V ≤ V_I ≤ 154 V, INH = high		10	18	mA
I_I	Input current No load	V_I = 154 V, $I_{O1,2,3}$ = 0 A			25	mA
	No load	V_I = 14.4 V, $I_{O1,2,3}$ = 0 A		50		mA
	Nominal load	V_I = 24 V, $I_{O1,2,3}$ = 0.28 A		0.94		A
	Nominal load	V_I = 110 V, $I_{O1,2,3}$ = 0.28 A		0.22		A
	Nominal load	V_I = 14.4 V, $I_{O1,2,3}$ = 0.28 A		1.6	1.7	A
$I_{I\,max}$	Max. input switch on current V_I ≥ $V_{I\,min}$, V_{INH} → ≤ 0.8 V	$I_{O1,2,3}$ = 0.28 A Δ t ≤ 200 ms			2.0	A
FF11	Input fuse	Quick Acting Fuse		10		A
C_I	Converter input capacitance				10	µF
Cd	Damping Unit			100 ± 20%		µF
	External line inductance				50	µH
	Reverse input protection	(Rev. Diode) MOS Power Transistor				
OUTPUT: Power Unit						
$P_{O\,nom}$	Output power	14.4 V ≤ V_I ≤ 154 V		20		W
$V_{O1,2,3\,n}$	Output voltage adjustment, factory set	$I_{O1,2,3}$ = 0.28 A	+23.8	+24.0	+24.2	V_{DC}
Δ V_O	Load regulation V_{O1}, V_{O2}, V_{O3}	0 A ≤ $I_{O1,2,3}$ ≤ 0.28 A T_A = - 40°C … + 85°C		± 2.5 % $V_{O\,nom}$		V_{DC}
$\Delta V_{Oi\,dyn.}$	Load regulation dynamic $V_{O1,2,3}$	Pulse load: 20 - 80 - 20 % x $I_{O1,2,3}$		± 100	± 150	mV
t_{dyn}	Response time	Pulse load: 20 – 80 - 20 % x $I_{O2\,nom}$		1	2	ms
$V_{O1,2,3rms}$	Ripple	Nominal load BW 300 kHz		100	250	mV_{rms}
$V_{O1,2,3pp}$	Noise	Nominal load BW 20 MHz			350	mV_{pp}
t_{On}	Turn on time Vo	1.) V_I ≥ $V_{I\,min}$, V_{INH} → ≤ 0.8 V 2.) V_{INH} ≤ 0,8 V, V_I → ≥ $V_{I\,min}$	25		200	ms
t_{off}	Hold up time	$V_{O1,2,3\,min}$ = 22.8 V 0A ≤ $I_{O1,2,3}$ ≤ 0.28 A	0			ms
	Overvoltage shutdown V_O	0 A ≤ $I_{O1,2,3}$ ≤ 0.1 A		Converter switch off: $V_{O1,2,3}$ ≤ 31 V		
$I_{O1,2,3}$	Output current			1.0		A
	Output short circuit current $I_{O1,2,3}$	Short circuit between +$V_{O1,2,3}$/–$V_{O1,2,3}$			1.8	A
$C_{O1,2,3}$	Output capacity converter	Output each output stage		0.540		mF
OUTPUT: Signals						
LUEFUW	LUEFUW, X2: Pin 2 Open Collector Transistor $V_{CE\,max}$ ≤ 10 V, $I_{CE\,max}$ ≤ - 5 mA* Reference potential: M (X2: Pin 1) Signal defined for V_O ≥ 0.6 x $V_{Oi\,nom}$	$I_{O1,2,3}$ good: LUEFUW= low, I_{Oi} > $I_{Oi\,min}$ and I_{Oi} < $I_{Oi\,max}$ $I_{O1,2,3}$ fail: LUEFUW= high, I_{Oi} < $I_{Oi\,min}$ and I_{Oi} ≥ $I_{Oi\,max}$		$I_{Oi\,min}$ < 0.13 ± 2 % $I_{Oi\,max}$ ≥ 0.30 ± 2 %		A A
LED	-					
BAT	Buffer Battery	Acc. IEC: type R14 (ANSI: type C)				
GENERAL SPECIFICATIONS						
f	Switching frequency	V_I = 110 V, $I_{O1,2,3}$ = $I_{Oi,nom}$	110	120	130	kHz
η	Efficiency	16.8 V ≤ V_I ≤ 137.5 V, P_O ≥ 0.7 x $P_{O\,nom}$	83	85	89	%
	MTBF (SN 29500)	V_I = 110 V, $I_{O1,2,3}$ = $I_{Oi,nom}$, T_A = + 40°C		500 000		h
	No load, short circuit proof			Continuously		

Outputs +24V to Input are not galvanical isolated to each other.

* - Sign: sink current

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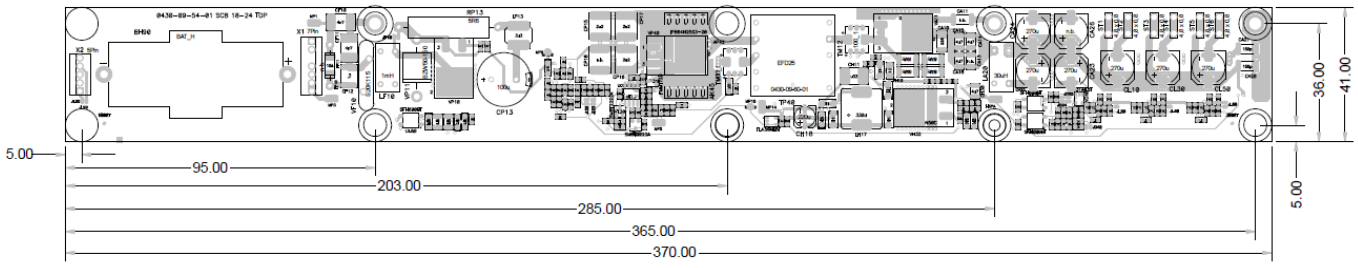
SYMBOL	PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNITS
SAFETY / DIMENSIONS						
	Creepage, Clearance PD2, OV 2 PCB: FR4, V0, TG = +140°C	Input/output +24V – output signals Input/output +24V – case Output signals – case	2.0 2.0 2.0			mm mm mm
	Converter dielectric strength test Type test: every unit Unit test: ramp function 2 s – 3 s – 2 s	Input/output +24V – output signals Input/output +24V – case Output signals – case			2100 2100 750	V_{DC} V_{DC} V_{DC}
	Connectors Molex	Input X1: 171856-1007 (22-28-0070) Out X2: 171856-1005 (22-28-0050)	7 Pin 5 Pin			
	Pin assignment		*see table*			
	Protection class, protection system		I, IP 20			
	Dimensions w x h x d *see figure*	unit PCB	370 x 30 x 41 370 x 41			mm mm
	Weight	Unit without battery		0.155		kg
ENVIROMENTAL CONDITIONS						
T_A	Operating temperature range	Continuously EN 50155 Class Tx for 10 min. + 85°C	- 40 - 40		+ 70 + 85	°C °C
$T_{Storage}$	Storage temperature range		- 55		+ 85	°C
	Cooling		Free air convection			
	Humidity	EN 50155, IEC 60571	75% averaged year, 95% 30 days			
	Vibration / shock	IEC 61373, IEC 68-2-27, BN 411002 Cat. I 3 shocks per axes	50 m / s² , 30 ms			
EMC						
	Emission	Line conducted and radiated	EN 50121 - 3 - 2: 2016			
	Immunity	ESD EN 61000 - 4 - 2	6 kV / 8 kV Performance criteria - B -			
		High frequency field EN 61000 - 4 - 3	20 V / m 80 MHz ... 1 GHz Performance criteria - A -			
		Burst EN 61000 - 4 - 4	Level 3 asym., sym. Performance criteria - A -			
		Surge EN 61000 - 4 - 5	2 kV asym. / 1 kV sym. R_i = 42 Ω Performance criteria - B -			
		HF – Current injection EN 61000 - 4 - 6	10 V_{eff} , R_i = 150 Ω Performance criteria - A -			

STANDARDS

	Applied Standards:	EN 50155: 2016	BN 411 002	EN 50124 - 1: 2006	EN 50121 - 3 - 2: 2016	IEC 60571
		SN 29 500	EN 50 121 - 1	EN 50125 - 1	EN 60068 - 2 - 6, 2…27	EN 61000 - 4 - 2…6
		IEC 571	IEC 61373 :1999	EN 60721 - 3 - 5	EN 60529	

Technical specifications valid for: - 40° C ≤ T_A ≤ + 85° C, 16.8 V ≤ V_I ≤ 137.5 V, unless otherwise noted.

Mechanical Drawing: Dimensions



PIN Assigment

INPUT

X1: Pin 1 → +V_{IN}
Pin 2 → +V_{IN}
Pin 3 → n.c.
Pin 4 → INH
Pin 5 → n.c.
Pin 6 → - V_{IN}
Pin 7 → - V_{IN}

OUTPUT Signals

X2: Pin 1 → M (GND)
Pin 2 → LUEFUW (Power Good or Fail)
Pin 3 → P5 (+5V_{DC})
Pin 4 → MBatt (Minus battery)
Pin 5 → PBatt (Plus battery 3.6 V_{DC})

OUTPUT +24V_{DC}

ST1: $V_{Out\,1}$ = +24V_{DC}
ST2: $V_{Out\,1}$ = 0V
ST3: $V_{Out\,2}$ = +24V_{DC}
ST4: $V_{Out\,2}$ = 0V
ST5: $V_{Out\,3}$ = +24V_{DC}
ST6: $V_{Out\,3}$ = 0V