

DC/DC Converter

30 Watt

30 LPB 024 M12 □ □ □

$V_{I\text{ nom}} = 24\text{ V}$

$V_{O\text{ nom}} = 12\text{ V}$ $I_{O\text{ nom}} = 2.5\text{ A}$

SYMBOL	PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
INPUT						
V_{IN}	Input voltage range	Continuously	16.8		30	V
$V_{IN\text{ Dyn}}$	Input voltage range dynamic	$V_{IN} = 14.4\text{ V} \dots 16.8\text{ V}$ for $t \leq 0.1\text{ s}$ $V_{IN} = 30\text{ V} \dots 33.6\text{ V}$ for $t \leq 1\text{ s}$	14.4		33.6	V
$V_{IN\text{ min}}$	Converter shutdown				14.0	V
$V_{IN\text{ max}}$	Converter shutdown		36			V
I_E	Input current	no load Nominal load Nominal load	$V_{IN} = 33.6\text{ V}, I_{OUT} = 0\text{ A}$ $V_{IN} = 24.0\text{ V}, I_{OUT} = 2.5\text{ A}$ $V_{IN} = 14.4\text{ V}, I_{OUT} = 2.5\text{ A}$	1.5	30	mA A A
	Input current integral	$V_{IN} = 33.6\text{ V}$			10	A ² s
$I_{IN\text{ max}}$	Switch on current at $V_{IN} \geq V_{IN\text{ min}}$	$I_{OUT} = 2.5\text{ A}$ $\Delta t \leq 100\text{ ms}$			5	A
	Input Fuse		10 A Picofuse			
C_{IN}	Converter input capacitance				10	μF
	External Line Inductance				10	μH
	Reverse input protection	parallel diode + input fuse	1.5KE36A			

OUTPUT: Power Unit

$P_{OUT\text{ Nom}}$	Output power	$14.4\text{ V} \leq V_{IN} \leq 33.6\text{ V}$		30		W
$V_{OUT\text{ Nom}}$	Output voltage adjustment, factory set	$16.8\text{ V} \leq V_{IN} \leq 30.0\text{ V}$	11.9	12.0	12.1	V
ΔV_{OUT}	Load regulation static	$14.4\text{ V} \leq V_{IN} \leq 33.6\text{ V}$ $0\text{ A} \leq I_{OUT} \leq 2.5\text{ A}$ $T_A = -40^\circ\text{C} \dots +70^\circ\text{C}$	$\leq 2.5\% V_{OUT\text{ nom}}$			V
$\Delta V_{O\text{ dyn}}$	Load regulation dynamic	$14.4\text{ V} \leq V_{IN} \leq 33.6\text{ V}$ Pulse load: 20 - 80 - 20 % x I_{OUT}			200	mV
t_{dyn}	Response time	$14.4\text{ V} \leq V_{IN} \leq 50.4\text{ V}$ Pulse load: 20 - 80 - 20 % x I_{OUT}		1	2	ms
$V_{O\text{ rms}}$	Ripple	$14.4\text{ V} \leq V_{IN} \leq 33.6\text{ V}$ Nominal load BW 300 kHz		100	150	mV
$V_{O\text{ pp}}$	Noise	$14.4\text{ V} \leq V_{IN} \leq 33.6\text{ V}$ Nominal load BW 20 MHz			200	mV
t_{on}	Turn on time V_o	$14.4\text{ V} \leq V_{IN} \leq 33.6\text{ V}, 0\text{ A} \leq I_{OUT} \leq 2.5\text{ A}$ resistive load			100	ms
t_h	Hold Up Time	$14.4\text{ V} \leq V_{IN} \leq 33.6\text{ V}$ $0\text{ A} \leq I_{OUT} \leq 2.5\text{ A}$	-	-	-	ms
	Overvoltage Protection	$14.4\text{ V} \leq V_{IN} \leq 33.6\text{ V}$ $0\text{ A} \leq I_{OUT} \leq 2.5\text{ A}$	Transil diode 1.5KE15A			V
I_{OUT}	Output current	$14.4\text{ V} \leq V_{IN} \leq 33.6\text{ V}$		2.5		A
	Output current limitation	$14.4\text{ V} \leq V_{IN} \leq 33.6\text{ V}$	2.6			A
I_{AK}	Output short circuit current	short circuit between + V_o and - V_o $14.4\text{ V} \leq V_{IN} \leq 33.6\text{ V}$			3.5	A
C_o	Converter Capacitance			2		mF

OUTPUT: Signals

Signal			-	
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GENERAL SPECIFICATIONS

f	Switching frequency	$V_{IN} = 24\text{ V}, I_{OUT} = 2.5\text{ A}$		135		kHz
η	Efficiency	$P_{OUT} \geq 0.7 \times P_{OUT\text{ Nom}}$		87		%
	MTBF (SN 29500)	$V_{IN} = 24\text{ V}, I_{OUT} = 2.5\text{ A}, T_A = +40^\circ\text{C}$		500 000		h
	No load, short circuit proof		Continuously			

SYMBOL	PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
SAFETY / DIMENSIONS						
	Creepage, Clearance PCB, FR4, V0	Input – Output Input – Case Output – Case	2.0 1.0 1.0			mm mm mm
	Converter Dielectric Strength Test each unit ramp function 2 s – 3 s – 2 s	Input – Output Input – Case Output – Case			2100 1500 500	V V V
	Connector	Input: + V _{IN} und – V _{IN} Output: + V _{OUT} und – V _{OUT} PE		Solder Pins 1.0 mm ² 1.5 mm ²		
	Protection Class, Protection degree			I, IP 20		
	Dimensions <i>see drawing</i>	w x h x d PCB mounting		80 x 21.5 x 70		mm
	Assembling	PCB mounting		4 x M2.5		
	Weight			125		g

ENVIRONMENTAL CONDITIONS						
T _A	Operating Range	Continuously EN 50155 class Tx	- 40 - 40		+ 70 + 85	°C °C
T _{Sto}	Storage Range		- 40		+ 70	°C
	Cooling		convection			
	Humidity	EN 50155, IEC 60571	75% averaged year, 95% 30 days			
	Vibration / Shock Valid only for wall mounting	IEC 61373, IEC 68-2-27, BN 411002 Cat. I 3 shocks each Axis	50 m / s ² , 30 ms			

EMC						
	Emission	Line conducted and radiated	EN 50121 - 3 - 2: 2004			
	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, perf. criteria - A -			
		HF – Current Injection EN 61000 - 4 - 6	10 V _{eff} , R _i = 150 Ω performance criteria - A -			

STANDARDS						
Applied Standards:	EN 50155: 2004	BN 411 002	EN 50124 - 1: 1996	EN 50121 - 3 - 2: 2004	IEC 60571	
	SN 29500	prEN 50121 - 1	prEN 50125 - 1	EN 60068 - 2 - 6, 2...27	EN 61000 - 4 - 2...6	
	IEC 571	IEC 61373: 1999	EN 60721 - 3 - 5	EN 61373 : 1999	EN 60529	

Technical specifications valid for: - 40° C ≤ T_A ≤ + 70° C, 16.8 V ≤ V_{IN} ≤ 30 V, unless otherwise noted.