

60 SBB 024 M12 □ □ □

$V_{I\text{ nom}} = 24\text{ V}$ $V_{O\text{ nom}} = 12\text{ V}$ $I_{O\text{ nom}} = 5.0\text{ A}$
 $V_{I\text{ nom}} = 36\text{ V}$

SYMBOL	PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNITS
INPUT						
V_I	Input voltage range	Continuously	16.8		45.0	V_{DC}
	Input voltage range dynamic	$V_I = 14.4\text{ V} \dots 16.8\text{ V}$ for $t \leq 0.1\text{ s}$ $V_I = 45.0\text{ V} \dots 50.4\text{ V}$ for $t \leq 1\text{ s}$	14.4		50.4	V_{DC}
$V_{I\text{ min}}$	Converter shutdown				14.2	V_{DC}
$V_{I\text{ max}}$	Converter shutdown		52		53	V_{DC}
V_{Enable}	Enable Function, PIN d22 Reference potential: $-V_I$	Converter on: Enable = low $V_{\text{Enable}} \leq 0.8\text{ V}$, $I \leq 1.5\text{ mA}$ Converter off: Enable = high $V_{\text{Enable}} \geq 3.0\text{ V}$, $I \leq -50\text{ }\mu\text{A}^*$	0		0.8	V
	Stand by current	Enable = high			18	mA
I_I	Input current	no load $V_I = 50.4\text{ V}$, $I_O = 0\text{ A}$ Nominal load $V_I = 36\text{ V}$, $I_O = 5.0\text{ A}$ Nominal load $V_I = 24\text{ V}$, $I_O = 5.0\text{ A}$ Nominal load $V_I = 14.4\text{ V}$, $I_O = 5.0\text{ A}$		2.0 2.9	130	mA A A A
	Input current integral	$V_I = 50.4\text{ V}$			10	A^2s
$I_{I\text{ max}}$	Max. input switch on current $V_I \geq V_{I\text{ min}}$, $V_{\text{Enable}} \rightarrow \geq 0.8\text{ V}$	$I_O = 5.0\text{ A}$ $\Delta t \leq 100\text{ ms}$			11	A
	Input fuse		10 A Pico Fuse			
C_I	Converter input capacitance				100	μF
	External line inductance				25	μH
	Reverse input protection	Parallel diode + fuse	1.5KE62A			

OUTPUT: power unit

$14.4\text{ V} \leq V_I \leq 50.4\text{ V}$

$P_{O\text{ Nom}}$	Output power			60		W
$V_{O\text{ Nom}}$	Output voltage adjustment, factory set		+ 11.95	+ 12.0	+ 12.1	V
ΔV_O	Load regulation	$0\text{ A} \leq I_O \leq 4.0\text{ A}$ $T_A = -40^\circ\text{C} \dots +70^\circ\text{C}$ $T_A = -40^\circ\text{C} \dots +85^\circ\text{C}$	$\pm 2.5\% V_{O\text{ nom}}$ $\pm 3.0\% V_{O\text{ nom}}$			
$\Delta V_{O\text{ dyn.}}$	Load regulation dynamic	Puls load: $20 - 80 - 20\% \times I_{O\text{ nom}}$			± 250	mV
t_{dyn}	Response time	Puls load: $20 - 80 - 20\% \times I_{O\text{ nom}}$		1	2	ms
$V_{O\text{ rms}}$	Ripple	Nominal load BW 300 kHz		100	150	mV
$V_{O\text{ pp}}$	Noise	Nominal load BW 20 MHz			300	mV
T_{On}	Turn on time V_O	$0\text{ A} \leq I_O \leq 5.0\text{ A}$ Resistive load 1.) $V_I \geq V_{I\text{ min}}$, $V_{\text{Enable}} \rightarrow \leq 0.8\text{ V}$ 2.) $V_{\text{Enable}} \leq 0.8\text{ V}$, $V_I \rightarrow \geq V_{I\text{ min}}$	25		200	ms
t_h	Option: Hold up time Recharge time $t \leq 5\text{ sec}$ @ $I_O \geq 1\text{ A}$	$0\text{ A} \leq I_O \leq 5.0\text{ A}$ Class S2 @ EN 50155	10			ms
	Overvoltage shutdown output voltage	$0\text{ A} \leq I_O \leq 5.0\text{ A}$	Converter off: $V_O \leq 15.5\text{ V}$			
I_O	Output current			5.0		A
	Output current limitation		5.1			A
	Output short circuit current	Short circuit between $+V_O$ and $-V_O$			6.2	A
	Sense lines	Max. voltage drop compensation			0.5	V
C_O	Output capacity converter	Output stage		8		mF

OUTPUT: Signals

PF	Power Fail, PIN z20 Open Collector Transistor $U_{CE\text{ max}} \leq 70\text{ V}$, $I_{CE\text{ max}} \leq -20\text{ mA}^*$ Reference potential: - Sense	Transistor on: PF= low, $V_O < V_{O\text{ min}}$ Transistor off: PF= high, $V_O \geq V_{O\text{ min}}$	$V_O < 0.95 \times V_{O\text{ nom}} \pm 2\%$ $V_O \geq 0.95 \times V_{O\text{ nom}} \pm 2\%$	V V
	Signals	Signal defined for $V_O \geq 0.6 \times V_{O\text{ nom}}$ $V_O > 11.4\text{ V} \pm 2\%$	LED yellow On	

GENERAL SPECIFICATIONS

f	Switching frequency	$V_I = 24\text{ V}$, $I_O = 5.0\text{ A}$		75		kHz
η	Efficiency	$P_O \geq 0.7 \times P_{O\text{ Nom}}$	86	88		%
	MTBF (SN 29500)	$V_I = 24\text{ V}$, $I_O = 5.0\text{ A}$, $T_A = +40^\circ\text{C}$		500'000		h
	No load, short circuit proof		Continuously			

* - Sign: sink current

SYMBOL	PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNITS
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SAFETY / DIMENSIONS

	Creepage, Clearance for PD2 and OV2 PCB FR4, V0, TG = + 140°C	Input – output Input – case Output – case	2.0 2.0 1.0			mm mm mm
	Converter dielectric strength test every unit for 1 minute	Input – output Input – case Output – case			2'100 2'100 750	V _{DC} V _{DC} V _{DC}
	Connectors DIN 41612	H15, Pin 24 leading				
	Pin assignment			See table		
	Protection class, protection system			I, IP 20		
	Dimensions incl. front panel <i>see figure</i>	Plug - in unit incl. front panel Wall mounting, Din rail mounting TS35	45.3 x 128.4 x 160 (9 T / 3 U) 217 x 104 x 60			mm mm
	Weight	Plug - in unit incl. front panel Wall mounting, Din rail mounting TS35		0.75 1.2		kg kg

ENVIROMENTAL CONDITIONS

T _A	Operating temperature range	EN 50155 Class: Tx	- 40		+ 85	°C
T _{Storage}	Storage temperature range		- 50		+ 100	°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 / s ² , 30 ms			

EMC

	Emission	Line conducted and radiated	EN 50121 - 3 - 2: 2001		
	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 (Option: 12 Ω) Performance criteria - B -		
		HF – Current injection EN 61000 - 4 - 6	3 V _{eff} (Option: 10 V _{eff}), R _i = 150 Ω Performance criteria - A -		

STANDARDS

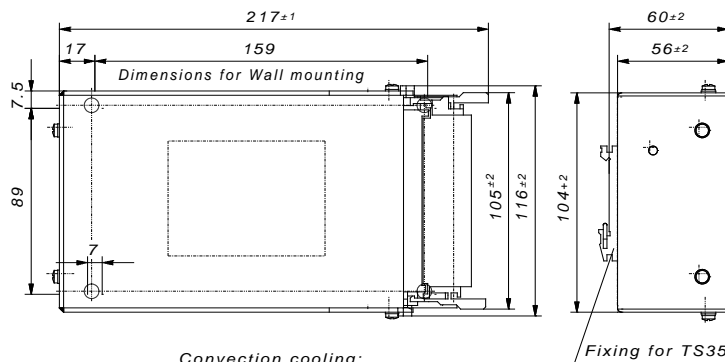
Applied Standards:	EN 50155: 2000	BN 411 002	EN 50124 - 1: 1996	EN 50121 - 3 - 2: 2001	IEC 60571
	SN 29 500	prEN 50 121 - 1	prEN 50125 - 1	EN 60068 - 2 - 6, 2...27	EN 61000 - 4 - 2...6
	IEC 571	IEC 61373	EN 60721 - 3 - 5	EN 61373	EN 60529

Technical specifications valid for: - 40° C ≤ T_A ≤ + 85° C, 16.8 V ≤ V_I ≤ 50.4 V, unless otherwise noted.

H15 – Pin Assignment

Pin	
z 4	+ V _o
d 6	+ V _o
z 8	- V _o
d 10	- V _o
z 12	n. c.
d 14	n. c.
z 16	+ Sense
d 18	- Sense
z 20	Power Fail
d 22	Enable
z 24	PE
d 26	+ V _I
z 28	+ V _I
d 30	- V _I
z 32	- V _I

Dimensions Wall mounting or Din rail mounting (in mm)



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- x = individual customised front panel
- 0 = without Hold up time
- 1 = Hold up time (10 ms)
- E = Plug - in unit
- W = Wall mounting
- H = Din rail mounting TS35