

DC/DC Converter

250 W

250 DDB 036 M24 □ □ □

$V_{I\text{ nom}} = 36\text{ V}$ $V_{O\text{ nom}} = 24\text{ V}$ $I_o = 10.5\text{ A}$

SYMBOL	PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNITS
INPUT						
V_I	Input voltage range	Continuously	25.2		45.0	V
	Input voltage range: dynamic	$V_I = 21.6\text{ V} \dots 25.2\text{ V}$ for $t \leq 0.1\text{ s}$ $V_I = 45.0\text{ V} \dots 50.4\text{ V}$ for $t \leq 1\text{ s}$	21.6		50.4	V
$V_{I\text{ min}}$	Converter shutdown				21.3	V
$V_{I\text{ max}}$	Converter shutdown		45.5		54.5	V
V_{Enable}	Enable Function Reference: $-V_I$	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	$21.6\text{ V} \leq V_I \leq 50.4\text{ V}$, Enable = high			18	mA
I_I	Input current	No load $V_I = 50.4\text{ V}$, $I_o = 0\text{ A}$ Nominal load $V_I = 36.0\text{ V}$, $I_o = 10.5\text{ A}$ Nominal load $V_I = 21.6\text{ V}$, $I_o = 10.5\text{ A}$		8	25	mA A A
	Input current integral	$V_I = 50.4\text{ V}$			15	A ² s
$I_{I\text{ max}}$	Max. input switch on current $V_I \geq V_{I\text{ min}}$, ($V_{\text{Enable}} \rightarrow \leq 0.8\text{ V}$)	$I_o = 10.5\text{ A}$ $\Delta t \leq 100\text{ ms}$	on request			
	Input fuse		30 A			
C_I	Converter input capacity		180			μF
	External line inductance		15			μH
	Reverse input protection	Parallel diode + fuse	1.5KE47A			

OUTPUT: Power unit

$P_{O\text{ nom}}$	Output power	$21.6\text{ V} \leq V_I \leq 50.4\text{ V}$		250		W
$V_{O\text{ nom}}$	Output voltage adjustment, factory set	$25.2\text{ V} \leq V_I \leq 45.0\text{ V}$	23.9	24.0	24.2	V
ΔV_O	Regulation	$21.6\text{ V} \leq V_I \leq 50.4\text{ V}$ $0\text{ A} \leq I_o \leq 10.5\text{ A}$ $T_A = -40^\circ\text{C} \dots +70^\circ\text{C}$ $T_A = -40^\circ\text{C} \dots +85^\circ\text{C}$	$\leq 2.5\% V_{O\text{ nom}}$ $\leq 3\% V_{O\text{ nom}}$			V V
$\Delta V_{O\text{ dyn}}$	Load regulation dynamic	$21.6\text{ V} \leq V_I \leq 50.4\text{ V}$ Load: 20 - 80 - 20 % x $I_{O\text{ nom}}$			500	mV
t_{dyn}	Response time	$21.6\text{ V} \leq V_I \leq 50.4\text{ V}$ Load: 20 - 80 - 20 % x $I_{O\text{ nom}}$		1	2	ms
$V_{O\text{ rms}}$	Ripple	$21.6\text{ V} \leq V_I \leq 50.4\text{ V}$ Nom. load BW 300 kHz		100	250	mV
$V_{O\text{ pp}}$	Noise	$21.6\text{ V} \leq V_I \leq 50.4\text{ V}$ Nom. load BW 20 MHz			350	mV
t_{on}	Turn on time V_O	$21.6\text{ V} \leq V_I \leq 50.4\text{ V}$, $0\text{ A} \leq I_o \leq 10.5\text{ A}$ Resistive load			200	ms
t_h	Option: Hold up time	$21.6\text{ V} \leq V_I \leq 45.0\text{ V}$ $0\text{ A} \leq I_o \leq 10.5\text{ A}$ Class S1 @ EN 50155	10			ms
	Overvoltage shutdown V_O	$21.6\text{ V} \leq V_I \leq 50.4\text{ V}$ $0\text{ A} \leq I_o \leq 10.5\text{ A}$	Converter off: $V_O \leq 32.4\text{ V}$			V
I_o	Output current	$21.6\text{ V} \leq V_I \leq 50.4\text{ V}$		10.5		A
	Output current limitation of I_o	$21.6\text{ V} \leq V_I \leq 50.4\text{ V}$	11			A
	Output short circuit current	Short circuit between + V_O and - V_O $21.6\text{ V} \leq V_I \leq 50.4\text{ V}$			15	A
C_o	Output capacity			14		mF

OUTPUT: Signals

PF	Power Fail Open Collector Transistor $V_{\text{CEmax}} \leq 70\text{ V}$, $I_{\text{CEmax}} \leq -20\text{ mA}^*$ Reference: $-V_O$	Transistor on: PF= low, $V_O < V_{O\text{ min}}$ Transistor off: PF= high, $V_O \geq V_{O\text{ min}}$ Signal defined for $V_O \geq 0.6 \times V_{O\text{ nom}}$	$V_O < 0.95 \times V_{O\text{ nom}} \pm 2\%$ $V_O \geq 0.95 \times V_{O\text{ nom}} \pm 2\%$		V V
	Signals	Input: Output:	LED yellow LED yellow		

GENERAL SPECIFICATIONS

f	Switching frequency	$V_I = 36\text{ V}$, $I_o = 10.5\text{ A}$		60		kHz
η	Efficiency	$P_o \geq 0.7 \times P_{O\text{ nom}}$	86	88		%
	MTBF (SN 29500)	$V_I = 36\text{ V}$, $I_o = 10.5\text{ A}$, $T_A = +40^\circ\text{C}$		400 000		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 distances PD2 PCB FR4, V0, TG = + 140°C	Input – output Input – case Output – case	6.0 4.0 2.0			mm mm mm
	Converter dielectric strength test every unit ramp function 2 s - 3 s - 2 s	Input – output Input – case Output – case			2100 1500 750	VDC VDC VDC
	Connectors	Input, Output, SE: 5 pins Required female plug Enable Signal, Power Fail each 2 pins Required female plug	Combicon PC 6-16/5-G1F-10,16 Combicon PC 6/5-STF-10,16 Combicon MC1,5/2-GF-3,81 Combicon MC 1,5/2-STF-3,81			
	Protection class, protection system		I, IP 20			
	Dimensions with mounting plate <i>see drawing</i>	w x h x d Chassis mounting or Din rail mounting TS35	210 x 160 x 81.5			mm
	Assembling	Chassis mounting with screws or Din rail mounting TS35	4 x M5			
	Weight			2.4		kg

ENVIROMENTAL CONDITIONS

T _A	Operating temperature range T _A	Continuously EN 50155 Class Tx for 10 min.	- 40 - 40		+ 70 + 85	°C °C
T _{Storage}	Storage Temperature		- 40		+ 85	°C
	Cooling		free air convection			
	Humidity	EN 50155, IEC 60571	75% averaged year, 95% 30 days			
	Vibration / Shock valid only for chassis mounting	IEC 61373, IEC 68-2-27, BN 411002 Cat. I 3 Shocks per axis	50 m / s ² , 30 ms			

EMC

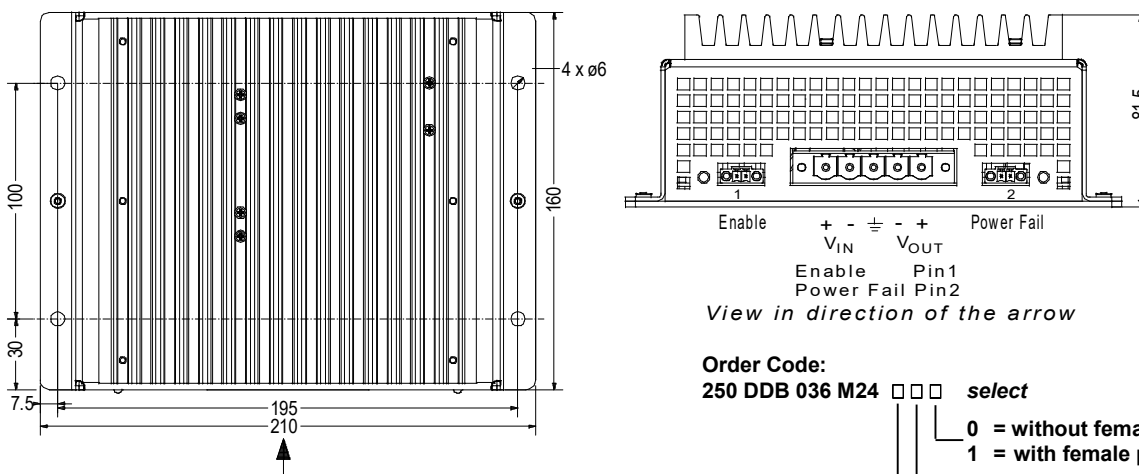
	Emission	Line conducted and radiated	EN 50121 - 3 - 2: 2006		
	Immunity	ESD EN 61000 - 4 - 2	6 kV / 8 kV Performance criteria - B -		
		High frequency field EN 61000 - 4 - 3	20 V / m 80 MHz ... 1 GHz Performance criteria - A -		
		Burst EN 61000 - 4 - 4	Level 3 asym., sym. Performance criteria - A -		
		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	3 V _{rms} , R _i = 150 Ω Performance criteria - A -		

STANDARDS

	Applied standards:	EN 50155: 2006	BN 411 002	EN 50124 - 1: 1996	EN 50121 - 3 - 2: 2006	IEC 60571
		SN 29500	EN 50121 - 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 61373 : 1999	EN 60529

Technical specifications valid for: - 40° C ≤ T_A ≤ + 70° C, 25.2 V ≤ V_i ≤ 45.0 V, unless otherwise noted.

Dimensions (in mm) and Pin Assignment



Keep free space over and under the unit: ≥ 100 mm.

Attention: Take care to a close thermal connection between mounting plate and case.