

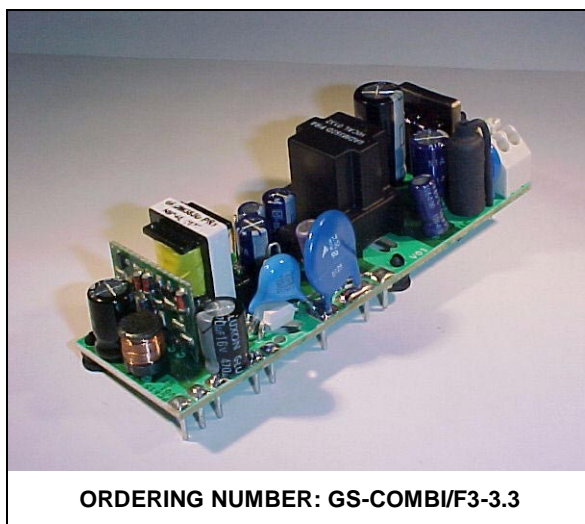
## POWER MANAGEMENT MODULE FOR ISDN NT1

REV. 01

Type	V <sub>i</sub>	V <sub>o</sub>	I <sub>o</sub>
COMBI/F3	195 to 253 V <sub>ac</sub> and 28 to 115 V <sub>dc</sub>	out 1:3.3V	100 mA
		out 2:40V	120 mA

### FEATURE

- Uko INTERFACE (DC) and MAINS (AC) inputs to enable NPM (Normal Power Mode) and RPM (Restricted Power Mode) CONDITIONS
- INPUT FILTER TO MEET EMI requirements
- PEAK INPUT OVERVOLTAGE WITHSTANDING
- AC INPUT PROTECTION FUSE
- INPUTS TO OUTPUTS INSULATION
- 2 INSULATED OUTPUTS:
  - V<sub>o1</sub>=3.3 V for NT1 logics
  - V<sub>o2</sub>=40 V for "S" interface
- AUXILIARY LOGIC OUTPUT TTL-COMPATIBLE for LED & NPM/RPM MODE indication, share the same ground of V<sub>o1</sub>
- AUXILIARY LOGIC OUTPUT TTL-COMPATIBLE for LED & NPM/RPM MODE indication, share the same ground of V<sub>o2</sub>
- INTERNAL RELAY FUNCTION FOR V<sub>o2</sub> POLARITY REVERSE
- "S" INTERFACE OUTPUT CHARACTERISTICS:
  - Peak output of 220 mA for 150 ms
  - Typical output power 4,5 W
  - Output filtering to meet ETSI requirements
  - Hold up time: 20 ms with 4,5 W output power
  - Continuous short circuit protection
  - Peak overvoltage withstand: 1KV for 10/700 us transversal
- U-INTERFACE ACCORDING TO ETR080
- S-INTERFACE ACCORDING TO ETS 300 012
- MTBF: 300 Kh, according to MIL HDBK 217-F
- Operating Temperature: -10 to +70°C



ORDERING NUMBER: GS-COMBI/F3-3.3

### DESCRIPTION

The NT1 Power Management Module COMBI/F3 is a comprehensive solution for ISDN-NT1 (Network Termination Basic Access NTBA) equipment, combining both AC-DC and DC-DC functions.

The GS-COMBI/F3 provide the NTBA with all necessary supply voltages as well as control signals to operate in the different operating modes, typically the Normal Power Mode (NPM) and Restricted Power Mode (RPM).

Connected to the main, Input 1 (2 poles AC connector) is the AC input power to the COMBI/F3, source of the whole necessary power in normal operating mode, namely in NPM. Input 2 is the DC power source when in RPM, therefore to connect to the U-INTERFACE.

The device supply 3.3V (out 1) for logics and 40V (out 2) for the S interface both in Normal Power Mode (NPM) and in Restricted Power Mode (RPM).

RPM mode is the emergency condition that occurs if the mains (AC) input is not available. An internal "relay function" is available to reverse the 40 V output polarity. A third auxiliary output can be used for LEDs driving and RPM/NPM mode acknowledge (Logic output), referred to 3.3 V output and a fourth auxiliary output can be used for LEDs driving and RPM/NPM

mode acknowledge (Logic output), referred to 40 V.

The logics outputs become high (+3.3V) when in NPM condition.

The converter offers short-circuit protection on both outputs: particularly, short-circuit on 40V output doesn't affect the +3.3V output.

6000 V<sub>RMS</sub> insulation voltage for 60 seconds (reinforced insulation) is provided among input 1 and all outputs. Same reinforced insulation is also provided between Input 1 and Input 2.

3000 V<sub>RMS</sub> / 1 min. reinforced insulation is provided between Input 2 and 40 V output.

When in NPM mode (AC main supply), the module max. power consumption is <15 VA (apparent power).

Input 2 undervoltage lockout offers high impedance in order to have 10μA max input current when V<sub>i2</sub> is <18 Volts.

The design of the module has been conducted using the following reference standards:

EN 60950, VDE0878 part 1 class B (EMC), EN55022 class B (emission), EN50 082-1 (immunity) ITU-T I.430, ETS 300 012 and ETR 080 and ETS300 047 (ISDN BASIC ACCESS, Safety and Protection); anyway, please note that no certification processes have been carried out on the module itself.

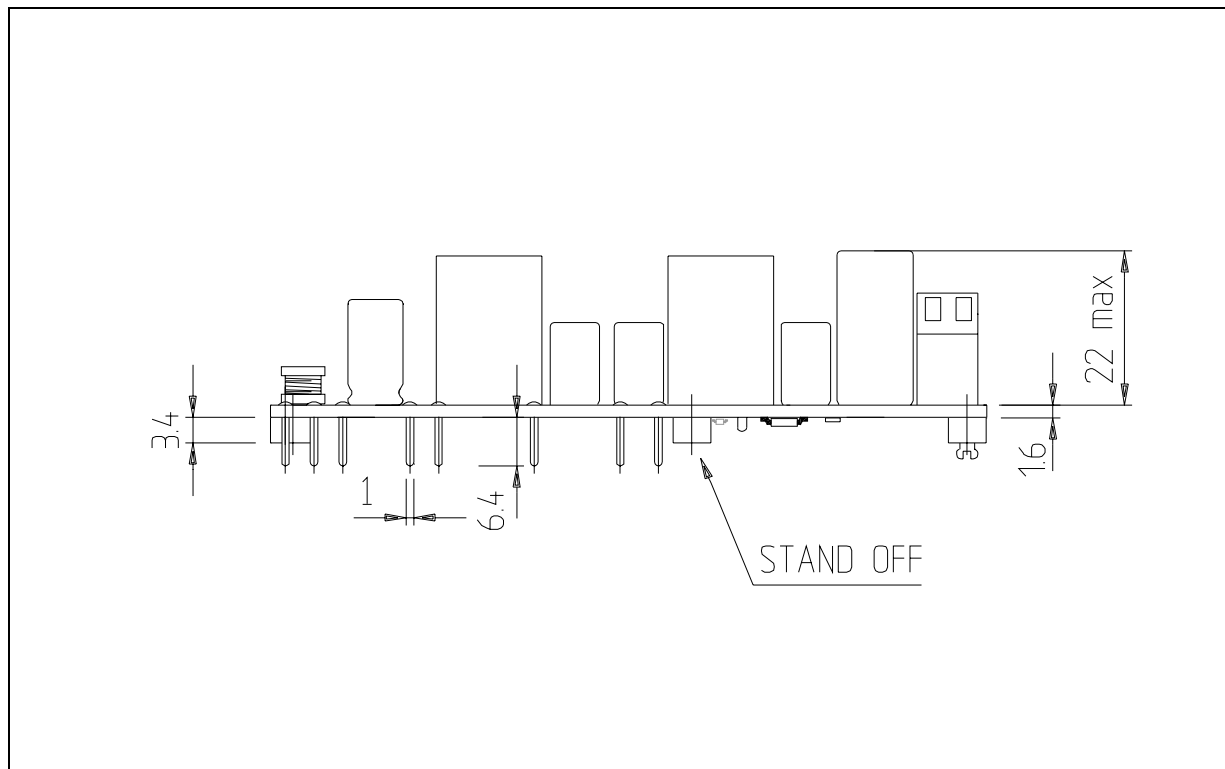
**ELECTRICAL CHARACTERISTICS** when in **NPM** ( $T_{amb}=25^{\circ}\text{C}$ , unless otherwise specified.)**NPM Standard Condoton:**  $V_{in1}=195$  to  $253\text{ V}_{rms}$  $V_{in2}=28$  to  $115\text{ V}_d$ 

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
$V_{i1}$	Input Voltage 1		195		253	$V_{RMS}$
$V_{i2}$	Input Voltage 2	any polarity	28		115	$V_{dc}$
$f_i$	$V_{i1}$ Input Frequency	$V_{i1} = 230\text{ V}_{RMS}$	43		56	Hz
$V_{i1st}$	Start up Input 1 voltage	Output parameters as per NPM Standard Conditions			185	$V_{RMS}$
$V_{i2st}$	Start up Input 2 voltage	Output parameters as per Standard Conditions			28	$V_{dc}$
$V_{o1}$	Output Voltage 1	Standard conditions	3.1	3.3	3.5	V
$V_{o2}$	Output Voltage 2	Standard conditions	36	40	42	V
$V_{o3}$	Output Voltage 3 LED "U"	Standard conditions, $I_{o3}=0.9$ to $3\text{ mA}$	3.0	3.3	3.5	V
$V_{o4}$	Output Voltage 4	Standard conditions, $I_{o4}=1$ to $2\text{ mA}$	2.0	3.0	3.5	V
$V_{or1}$	Output Ripple voltage 1	Standard conditions BW: 0-20 MHz			20	$mV_{rms}$
$V_{o2}$	Output Ripple voltage 2	Standard conditions BW: 0-20 MHz			100	$mV_{rms}$
$I_{o1}$	Output Current 1	Standard conditions	3		100	mA
$I_{o2}$	Output Current 2	Standard conditions	0		120	mA
$I_{oc2}$	Output Overcurrent 2	$t=150\text{ms}$ , $V_{o1}=34$ to $42\text{ V}$	180	220	260	mA
$I_{o2sc}$	Output 2 short circuit current	Continuous short circuit	100	150	200	mA
$V_{i1th}$	NPM => RPM mode $V_{i1}$ threshold	Output parameters as per Standard Conditions			160	$V_{rms}$
$T_{tr}$	Transition time	transition NPM => RPM and vice versa			5	ms
$V_{i1pk}$	Input 1 Transient overvoltage	$t = 8/20\text{ us}$ transversal	2			kV
$V_{i2pk}$	Input 2 Transient overvoltage	$t = 10/700\text{ us}$ transversal	500			V
$V_{o2pk}$	Output 1 Transient overvoltage	$t = 10/700\text{ us}$ transversal	1000			V
$P_{i1r}$	Input 1 Real Power	NPM standard conditions			9	W
$P_{i1}$	Input 1 Apparent Power	NPM standard conditions			15	VA
$V_{ist}$	Insulation Voltage, pulse	Inputs to $V_{o2}$ output $t = 10/700\text{ us}$ (pulse)	10			kV
th	Hold-up time	$V_{in} = 195\text{ V}_{RMS}$ $P_{out} 1:0$ to $340\text{ mW}$ $P_{out} 2:4.5\text{ W}$	20			ms

**ELECTRICAL CHARACTERISTICS** when in **RPM** ( $T_{amb}=25^{\circ}\text{C}$ , unless otherwise specified.)**RPM Standard Condition:**  $V_{in1} < 100 V_{rms}$  $V_{in2} = 28 \text{ to } 115 V_{dc}$ 

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
$V_1$	Input Voltage 1		0		100	$V_{rms}$
$V_{i2}$	Input Voltage 2	any polarity	28		115	$V_{dc}$
$V_{i2st}$	Start Up Input 2 Voltage				28	$V_{dc}$
$V_{o1}$	Output Voltage 1	RPM Standard Conditions	3.1	3.3	3.5	V
$V_{o2}$	Output Voltage 2	RPM Standard Conditions	36	40	42	V
$V_{o3, 4}$	Output Voltage 3, 4	RPM Standard conditions, out 3, 4 load = 50 kOhm			0.5	V
$V_{or1}$	Output Ripple Voltage 1	RPM Standard Conditions BW:0-20 Mhz			20	$mV_{rms}$
$V_{or2}$	Output Ripple Voltage 2	RPM Standard Conditions BW:0-20 Mhz			100	$mV_{rms}$
$I_{o1}$	Output Current 1	RPM Standard Conditions	3		100	mA
$I_{o2}$	Output Current 2	RPM Standard Conditions	0		12.5	mA
$I_{o2sc}$	Output 2 short circuit current	Continuous short circuit	9		13.5	mA
$V_{i1th}$	RPM => NPM mode $V_{i1}$ threshold				185	$V_{RMS}$
$T_{rt}$	Transition time	transition NPM => RPM and vice versa			5	ms
$V_{i1pk}$	Input 1 Transient overvoltage	$t = 8/20 \mu s$ transversal	2.0			Kv
$V_{i2pk}$	Input 2 Transient overvoltage	$t = 10/700 \mu s$ transversal	500			V
$V_{o2pk}$	Out 2 Transient overvoltage	$t = 10/700 \mu s$ transversal	1000			V
$V_{ist}$	Insulation Voltage, pulse	Inputs to $V_{o2}$ output $t = 10/700 \mu s$ (pulse)	10			kV



**Figure 2. NT1 Power Management Module SIDE VIEW** (dimensions in mm)

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