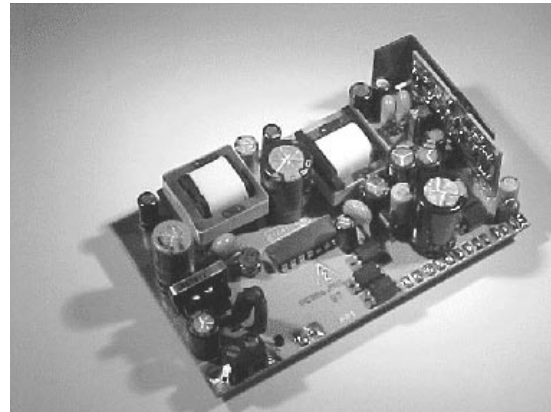


## Power Management Module for *ISDN NT1+*

Rev. 01

Type	Vi	Vo	Po
NT1+/INF2	180<Vi1<264Vrms	+/-40V	4.5W
		+5V	720mW
		-22V	900mW
	40<Vi2<120 Vdc	-50V	100mW
		-130V	700mW

### PRODUCT VIEW



### FEATURES

- COMBINED AC+DC CONVERTER FOR ISDN NT1+ APPLICATION
- U<sub>o</sub> INTERFACE (DC) AND MAIN (AC) INPUTS TO ENABLE NPM (Normal Power Mode) AND RPM (Restricted Power Mode) CONDITIONS
- INPUT FILTER TO MEET EMC REQUIREMENTS
- 5 INSULATED MAIN OUTPUTS
- PEAK INPUT OVERVOLTAGE WITHSTANDING
- INPUT FUSE ON AC MAIN INPUT
- INPUTS TO OUTPUTS INSULATION
- AUXILIARY LOGIC OUTPUT TTL-COMPATIBLE FOR NPM/RPM MODE INDICATION (EM SIGNAL & GREEN LED). 3mA OUTPUT SOURCE CURRENT
- AUXILIARY LOGIC OUTPUT TTL-COMPATIBLE FOR U-INTERFACE DETECTION (RED LED). 3mA OUTPUT SOURCE CURRENT

### ORDERING NUMBER: GS-NT1+/INF2

- INTERNAL RELAY FUNCTION FOR Vo1 POLARITY REVERSE
- ANALOG OUTPUTS EMERGENCY CONDITION PROGRAMMABLE VIA EXTERNAL COMMAND, TTL COMPATIBLE, 1mA SINK CURRENT
- U-INTERFACE ACCORDING TO ETR 080 WITH EXTERNAL CAPACITOR  $\leq 2.2 \mu\text{F}$
- S-INTERFACE ACCORDING TO ETS 300 012
- SAFETY COMPLIANCE ACCORDING TO EN60950
- MECHANICAL DIMENSIONS (LxWxH): 96x58x26.6

### DESCRIPTION

The NT1+/INF2 Power Management Module is a comprehensive solution for ISDN-NT1 "Plus" (Network Termination Basic Access type Plus) equipment, combining both AC-DC and DC-DC functions. This version is suitable for Infineon ISDN U/S chip set.

The NT1+ Power Management Module (NT1+ PMM) provide the NT1+ equipment with all necessary supply voltages as well as control signals to operate in the different operating modes, typically the Normal Power Mode (NPM) and the Restricted Power Mode (RPM).

Connected to the main, Input 1 is the AC input power to the NT1+ PMM, 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.

When the main is available (230 Vac in this version) NT1+ PMM operate in Normal Power Mode, therefore it supply +40V (output 1) to the S-Interface being the output power 4.5 W. Output 2 delivers 5V (up to 720mW) for the logics and output 3 delivers -22V (up to 900 mW). Out voltage 4 is -50V with 100 mW output power. Last, output 5 delivers -130V and the output power can reach peaks of 700 mW.

When the main is missing, the module remains active but only in Restricted Power Mode (RPM). The only power source in RPM is the Input 2, the U-Interface (Vi2). Therefore in RPM the following condition apply to outputs 1 and 2: output 1 reverses the voltage (it becomes -40V) and the maximum power Pout is reduced to 420 mW.

P2max is reduced to 450 mW typically, however the output power available at outputs 2,3,4,5 mainly depend on input power available from the "U Interface" Vi2, therefore subject of variation as per local application and regulation.

In RPM it is also possible to set a different "emergency condition" setting HIGH the auxiliary input 3 (analog emergency input, Vin3). In this case Pout1 is reduced to 25mW, voltage level being -40V.

The following tables give you details of the various parameters in the 3 different operating modes, namely NPM, RPM with Vi3 LOW, RPM with Vi3 HIGH.

Availability of the input AC main is also acknowledged by a specific auxiliary output (out 6, "EM signal"), a TTL-compatible signal set HIGH (to logic level "1") when the main is available and LOW when the AC main is missing.

The presence of the "U" is optionally acknowledged by an other auxiliary output (out 7, RED LED) that is HIGH only when Vin2 > 40V.

The NT1+ PMM provides double insulation (3000 Vrms) between the inputs (1 and 2), and among the input 1 and all the outputs. Basic insulation exists among Out1 and all other outputs. The other outputs (including the 2 auxiliary outputs) and the input 3, share the same common ground.

Double insulation (2000 Vrms) is provided among Input 2 (DC "U") and all outputs.

The NT1+ Power Management Module operate in the range -10 to +70 °C, storage temperatures in the range -40 to +85 °C are allowed.

**ELECTRICAL CHARACTERISTICS** when in **NPM** ( $T_{amb}=25^{\circ}\text{C}$ , unless otherwise specified.)**NPM Standard Condition:  $V_{in1} = 180$  to  $264$  Vrms  $V_{in2} = 40$  to  $120$  Vdc**

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
Vi1	AC Input Voltage 1		180		264	Vrms
Vi2	DC Input Voltage 2	any polarity	40		120	Vdc
fi	Vi1 Input Frequency	Vi1 = 230 Vrms	43		56	Hz
Vi1st	Start up Input 1 voltage	Output parameters as per NPM Standard Condition			175	Vrms
Pi1	Input 1 Apparent Power	NPM Standard Condition			15	VA
Vi2nd	Start up Input 2 voltage	Output parameters as per Std. Condition			40	Vdc
Vo1	Output Voltage 1	Standard condition	34	40	42	V
Vo2	Output Voltage 2	Standard condition	4.75	5	5.25	V
Vo3	Output Voltage 3	Standard condition	-21	-22	-25	V
Vo4	Output Voltage 4	Standard condition	-48	-50	-65	V
Vo5	Output Voltage 5	Standard condition	-125	-130	-165	V
Vo6	Auxiliary Output 6 (EM)	Standard condition	3.75	5	5.25	V
Vo7	Auxiliary Output 7 (red LED)	Standard condition	3.75	5	5.25	V
Vor1,3,4,5	Output Ripple voltage 1,3,4,5	Standard condition BW: 0-20 MHz			100	mVrms
Vor2	Output Ripple voltage 2	Standard condition BW: 0-20 MHz			30	mVrms
Po1	Output Power 1	Std. condition according to ETS300 012, E5.1.5, E5.1.6, E5.1.7 (n=4)			4.5	W
Po2	Output Power 2	Standard condition			720	mW
Po3	Output Power 3	Standard condition			900	mW
Po4	Output Power 4	Standard condition			100	mW
Po5	Output Power 5	During 1 s, 40% of the time during the ring period at the analog interface. The output is current limited at 2.5 mA +/- 0.2 mA, with 100uF capacitor			700	mW
Vi1th	NPM => RPM mode Vi1 threshold	Output parameters as per Standard Condition			160	Vrms
Ttr	Transition time	transition NPM => RPM and vice versa according to ETS300 012, E5.1.3 (n=4)			5	ms
Vi1pk	Input 1 Transient overvoltage	t = 10/700 us as per 1TR9 Dec. 96	2000			V
Vi1pk	Input 1 Transient overvoltage	common mode test according to ETS300 047-5p5.6	2500			V
Vi1pk	Input 1 Transient overvoltage	impulse transfer from main according to ETS300 047-5p5.7.1	2500			V
Vo1pk	Output 1 Transient overvoltage	t = 1,2/50 us	500			V
Vis	Insulation Voltage	Input 1 to outputs and input 1 to input 2, t=60s reinforced insulation as per EN60950	3000			V
Vist	Insulation Voltage	Input 1 to outputs t=10/700 us (pulse)	4000			V
th	Hold-up time	Vin = 180 Vrms Standard Condition	20			ms
MTBF	Mean Time Before Failure	Ground Fixed, MIL-HDBK-217E	1			Mh
Top	Oper. Ambient Temperature		-10		+70	°C

**ELECTRICAL CHARACTERISTICS** when in **RPM** (Tamb=25°C, unless otherwise specified.)

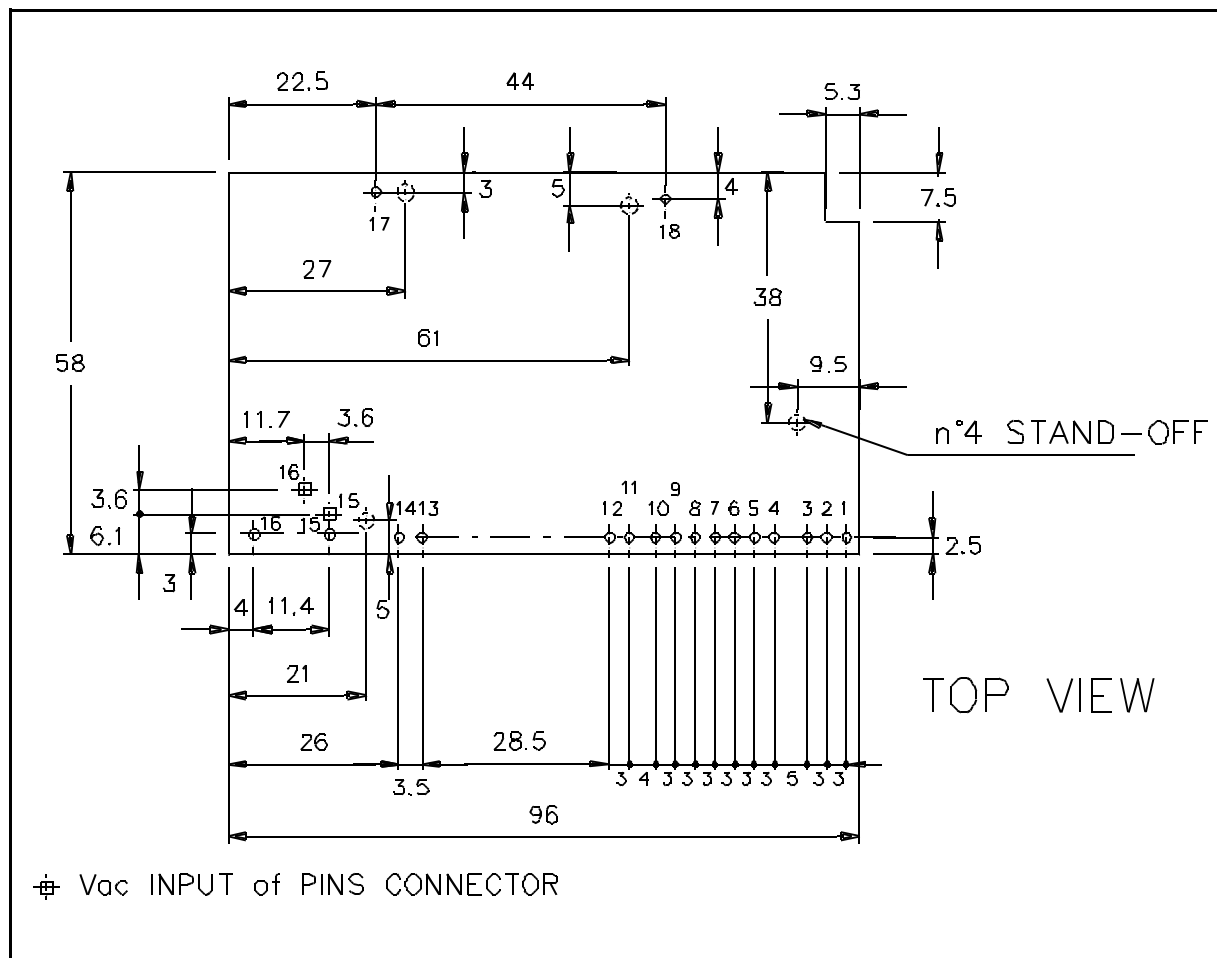
**RPM Standard Condition: Vin1 < 100 Vrms Vin2 = 40 to 120 Vdc Vin3 = LOW**

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
Vi1	AC Input Voltage 1				100	Vrms
Vi2	DC Input Voltage 2	any polarity	40		120	Vdc
Vi2nd	Start up Input 2 voltage	Output parameters as per Std. Condition			48	Vdc
Vo1	Output Voltage 1	Standard condition	-34	-40	-42	V
Vo2	Output Voltage 2	Standard condition	4.75	5	5.25	V
Vo3	Output Voltage 3	Standard condition	-21	-22	-25	V
Vo4	Output Voltage 4	Standard condition	-48	-50	-65	V
Vo5	Output Voltage 5	Standard condition	-125	-130	-165	V
Vo6	Auxiliary Output 6 (EM)	Standard condition	3.75	5	5.25	V
Vo7	Auxiliary Output 7 (red LED)	Standard condition	3.75	5	5.25	V
Vor1,3,4,5	Output Ripple voltage 1,3,4,5	Standard condition BW: 0-20 MHz			100	mVrms
Vor2	Output Ripple voltage 2	Standard condition BW: 0-20 MHz			30	mVrms
Po1	Output Power 1	Std condition according to ETS300 012, E5.1.1, E5.1.4.1, E5.1.4.2, E5.1.5.3 (n=4)			420	mW
Po2	Output Power 2	Standard condition		450		mW
Po3	Output Power 3	Standard condition		tbd		mW
Po4	Output Power 4	Standard condition		tbd		mW
Po5	Output Power 5	Standard condition		tbd		mW
Vi1st	RPM => NPM mode Vi1 threshold	Output parameters as per Standard Condition			175	Vrms
Ttr	Transition time	transition NPM => RPM and vice versa according to ETS300 012, E5.1.3 (n=4)			5	ms
Vi1pk	Input 1 Transient overvoltage	t = 10/700 us as per 1TR9 Dec. 96	2000			V
Vi1pk	Input 1 Transient overvoltage	common mode test according to ETS300 047-5p5.6	2500			V
Vi1pk	Input 1 Transient overvoltage	impulse transfer from main according to ETS300 047-5p5.7.1	2500			V
Vo1pk	Output 1 Transient overvoltage	t = 1,2/50 us	500			V
Vis	Insulation Voltage	Input 1 to outputs and input 1 to input 2, t=60s reinforced insulation as per EN60950	3000			V
Vist	Insulation Voltage	Input 1 to outputs t=10/700 us (pulse)	4000			V
th	Hold-up time	Vin = 180 Vrms Standard Condition	20			ms
MTBF	Mean Time Before Failure	Ground Fixed, MIL-HDBK-217E	1			Mhours
Top	Oper. Ambient Temperature		-10		+70	°C
Tstg	Storage Temperature Range		-40		+85	°C

**ELECTRICAL CHARACTERISTICS** when in **RPM** ( $T_{amb}=25^{\circ}\text{C}$ , unless otherwise specified.)**RPM Standard Condition:  $V_{in1} < 100 \text{ Vrms}$   $V_{in2} = 40 \text{ to } 120 \text{ Vdc}$   $V_{in3} = \text{HIGH}$** 

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
Vi1	AC Input Voltage 1		0		100	Vrms
Vi2	DC Input Voltage 2	any polarity	40		120	Vdc
Vi2nd	Start up Input 2 voltage	Output parameters as per Std. Condition			40	Vdc
Vo1	Output Voltage 1	Standard condition	-34	-40	-42	V
Vo2	Output Voltage 2	Standard condition	4.75	5	5.25	V
Vo3	Output Voltage 3	Standard condition	-21	-22	-25	V
Vo4	Output Voltage 4	Standard condition	-48	-50	-65	V
Vo5	Output Voltage 5	Standard condition	-125	-130	-165	V
Vo6	Auxiliary Output 6 (EM)	Standard condition	0		1.25	V
Vo7	Auxiliary Output 7 (red LED)	Standard condition	3.75	5	5.25	V
Vor1,3,4,5	Output Ripple voltage 1,3,4,5	Standard condition BW: 0-20 MHz			100	mVrms
Vor2	Output Ripple voltage 2	Standard condition BW: 0-20 MHz			30	mVrms
Po1	Output Power 1	Standard condition			25	mW
Po2	Output Power 2	Standard condition		450		mW
Po3	Output Power 3	Standard condition		tbd		mW
Po4	Output Power 4	Standard condition		tbd		mW
Po5	Output Power 5	Standard condition		tbd		mW
Vi1st	RPM => NPM mode Vi1 threshold	Output parameters as per Standard Condition			175	Vrms
Ttr	Transition time	transition NPM => RPM and vice versa according to ETS300 012, E5.1.3 (n=4)			5	ms
Vi1pk	Input 1 Transient overvoltage	t = 10/700 us as per 1TR9 Dec. 96	2000			V
Vi1pk	Input 1 Transient overvoltage	common mode test according to ETS300 047-5p5.6	2500			V
Vi1pk	Input 1 Transient overvoltage	impulse transfer from main according to ETS300 047-5p5.7.1	2500			V
Vo1pk	Output 1 Transient overvoltage	t = 1,2/50 us	500			V
Vis	Insulation Voltage	Input 1 to outputs and input 1 to input 2, t=60s reinforced insulation as per EN60950	3000			V
Vist	Insulation Voltage	Input 1 to outputs t=10/700 us (pulse)	4000			V
th	Hold-up time	$V_{in} = 180 \text{ Vrms}$ Standard Condition	20			ms
MTBF	Mean Time Before Failure	Ground Fixed, MIL-HDBK-217E	1			Mhours
Top	Oper. Ambient Temperature		-10		+70	$^{\circ}\text{C}$
Tstg	Storage Temperature Range		-40		+85	$^{\circ}\text{C}$

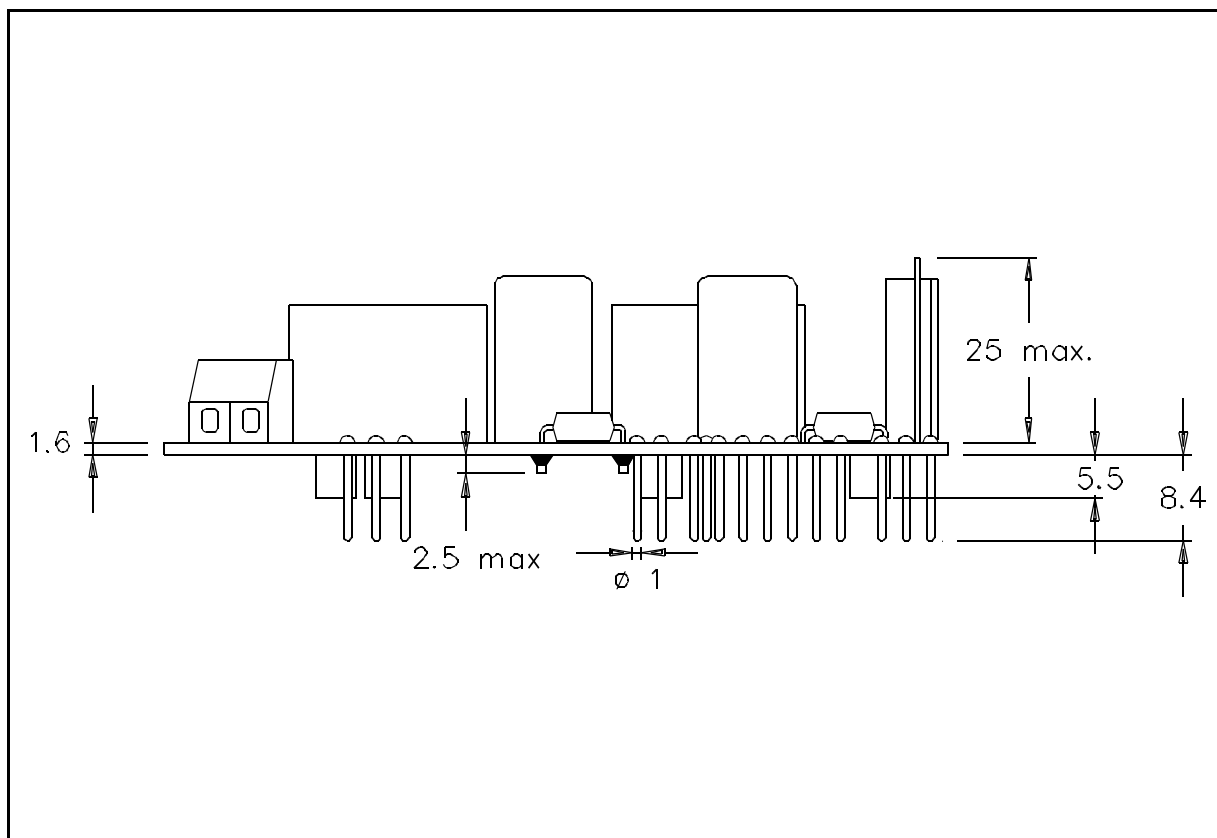
**NT1+ Power Management Module TOP VIEW** (dimensions in mm)



**PIN CONFIGURATION**

**Input 1 (230 Vac) applies to the Vac INPUT CONNECTOR**

Pin No	Signal	Pin No	Signal
1	Output 1 return	10	Output 7 (RED LED)
2	Output 1 (+/- 40 V)	11	N.C.
3	PS Signal	12	GND, Common return for output 2,3,4,5,6,7, Input 3
4	Output 3 (-22 V)	13	Vi2 Input Voltage 2, Vdc (any polarity)
5	Output 6 (EM, Green LED)	14	Vi2 Input Voltage 2, Vdc (any polarity)
6	Output 2 (+5 V)	15	Vi1 Input Voltage 1, VAC
7	Vin 3, Analog Emergency Input 3	16	Vi1 Input Voltage 1, VAC
8	Output 4 (-50 V)	17	N.C.
9	Output 5 (-130 V)	18	N.C.

**NT1+ Power Management Module SIDE VIEW (dimensions in mm)**

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