

ELECTRICAL CHARACTERISTICS The ● denotes the specifications which apply over the full operating temperature range, otherwise specifications are at $T_J = 25^\circ\text{C}$. $V_{PWR} = V_{IN_SNS} = 12\text{V}$, $V_{DD33} = V_{DDIO}$, V_{DD33} , V_{DD25} , REFP and REFM pins floating, unless otherwise indicated. $C_{VDD33} = 100\text{nF}$, $C_{VDD25} = 100\text{nF}$, $C_{VIN_SNS_CAP} = 10\text{nF}$ and $C_{REF} = 100\text{nF}$. (Note 2)

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS	
Power Supply Characteristics							
V_{PWR}	V_{PWR} Supply Input Operating Range	V_{DD33} Floating	●	4.5	15	V	
I_{PWR}	V_{PWR} Supply Current	$4.5\text{V} \leq V_{PWR} \leq 15\text{V}$, V_{DD33} Floating	●	6.7	9	mA	
I_{VDD33}	V_{DD33} Supply Current	$3.13\text{V} \leq V_{DD33} \leq 3.47\text{V}$, $V_{PWR} = V_{DD33}$	●	6.7	9	mA	
V_{UVLO_VDD33}	V_{DD33} Undervoltage Lockout	V_{DD33} Ramping Up, $V_{PWR} = V_{DD33}$	●	2.25	2.55	2.8	V
	V_{DD33} Undervoltage Lockout Hysteresis			120		mV	
V_{DD33}	Supply Input Operating Range	$V_{PWR} = V_{DD33}$	●	3.13	3.47	V	
	Regulator Output Voltage	$4.5\text{V} \leq V_{PWR} \leq 15\text{V}$	●	3.13	3.26	3.47	V
	Regulator Output Short-Circuit Current	$V_{PWR} = 4.5\text{V}$, $V_{DD33} = 0\text{V}$	✗	75	90	140	mA
V_{DD25}	Regulator Output Voltage	$3.13\text{V} \leq V_{DD33} \leq 3.47\text{V}$	●	2.35	2.5	2.6	V
	Regulator Output Short-Circuit Current	$V_{PWR} = V_{DD33} = 3.47\text{V}$, $V_{DD25} = 0\text{V}$	✗	30	55	80	mA
t_{INIT}	Initialization Time	Time from V_{IN} applied until the TON_DELAY Timer Starts		30		ms	
V_{DDIO}	V_{DDIO} Input Operating Range		●	1.62	3.6	V	
R_{IN}	V_{DDIO} Input Resistance	$0 \leq V_{VDDIO} \leq 3.6\text{V}$	●	53	68.8	86	k Ω
Voltage Reference Characteristics							
V_{REF}	Output Voltage (Note 3)	$V_{REF} = V_{REFP} - V_{REFM}$, $0 < I_{REFP} < 100\mu\text{A}$	●	1.216	1.228	1.240	V
	Temperature Coefficient			3		ppm/ $^\circ\text{C}$	
	Hysteresis	(Note 4)		100		ppm	
ADC Characteristics							
V_{IN_ADC}	Voltage Sense Input Range	Differential Voltage: $V_{IN_ADC} = (V_{SENSEp_n} - V_{SENSEM_n})$	●	0	6	V	
		Single-Ended Voltage: V_{SENSEm_n}	●	-0.1	0.1	V	
	Current Sense Input Range	Single-Ended Voltage: I_{SENSEp_n} , I_{SENSEM_n}	●	-0.1	6	V	
		Differential Current Sense Voltage: $V_{IN_ADC} = (I_{SENSEp_n} - I_{SENSEM_n})$ Mfr_config_imon_sel = 0 Mfr_config_imon_sel = 1	● ●	-170 -0.1	170 6	mV V	
N_{ADC}	Voltage Sense Resolution	$0\text{V} \leq V_{IN_ADC} \leq 6\text{V}$, READ_VOUT		122		$\mu\text{V}/\text{LSB}$	
	Current Sense Resolution with IOUT_CAL_GAIN = 1 Ω	$0\text{mV} \leq V_{IN_ADC} < 16\text{mV}$ (Note 5)		15.625		$\mu\text{A}/\text{LSB}$	
		$16\text{mV} \leq V_{IN_ADC} < 32\text{mV}$		31.25		$\mu\text{A}/\text{LSB}$	
		$32\text{mV} \leq V_{IN_ADC} < 63.9\text{mV}$		62.5		$\mu\text{A}/\text{LSB}$	
		$63.9\text{mV} \leq V_{IN_ADC} < 127.9\text{mV}$		125		$\mu\text{A}/\text{LSB}$	
$TUE_ADC_VOLT_SNS$	Total Unadjusted Error (Note 3)	Voltage Sense Inputs $V_{IN_ADC} \geq 1\text{V}$	●		± 0.25	% of Reading	
		Voltage Sense Inputs $0 \leq V_{IN_ADC} \leq 1\text{V}$	●		± 2.5	mV	

PIN FUNCTIONS

PIN NAME	PIN NUMBER	PIN TYPE	DESCRIPTION
V _{SENSE0}	32*	In	DC/DC Converter Differential (+) Output Voltage-0 Sensing Pin
V _{SENSE0}	33*	In	DC/DC Converter Differential (-) Output Voltage-0 Sensing Pin
V _{OUT_EN0}	41	Out	DC/DC Converter Enable-0 Pin.
V _{OUT_EN1}	40	Out	DC/DC Converter Enable-1 Pin.
AUXFAULTB	42	Out	Auxiliary Fault Output Pin. Can Be Configured to Pull Low When OV/UV Detected
DNC	3	Do Not Connect	Do Not Connect to this Pin
V _{IN_SNS}	4	In	V _{IN} SENSE Input. This Voltage Is Compared Against the V _{IN} On and Off Voltage Thresholds In Order to Determine When to Enable and Disable, Respectively, the Downstream DC/DC Converters
V _{DD33}	6	In/Out	If Shorted to V _{PWR} , It Serves as 3.13 to 3.47V Supply Input Pin. Otherwise It Is a 3.3V Internally Regulated Voltage Output (Use 0.1 μ F Decoupling Capacitor to GND). If using the internal regulator to provide V _{DD33} , do not connect to V _{DD33} pins of any other devices
V _{DD33}	7	In	Input for internal 2.5V Sub-Regulator. Short this Pin to Pin 6. If using the internal regulator to provide VDD33, do not connect to V _{DD33} pins of any other devices
V _{DD25}	8	In/Out	2.5V Internally Regulated Voltage Output. Bypass to GND with a 0.1 μ F Capacitor. Do not connect to V _{DD25} pins of any other devices
V _{DD25}	9	In	2.5V Supply Voltage Input. Short this Pin to Pin 8. Do not connect to V _{DD25} pins of any other devices
T _{SENSE0}	10*	In/Out	External Temperature Current Output and Voltage Input for Channel 0. Maximum allowed capacitance is 1 μ F
T _{SENSE1}	11*	In/Out	External Temperature Current Output and Voltage Input for Channel 1. Maximum allowed capacitance is 1 μ F
PWRGD	12	Out	Power-Good Open Drain Output. Indicates When Selected Outputs Are Power Good. Can be Used as System Power-On Reset
SHARE_CLK	13	In/Out	Bidirectional Clock Sharing Pin. Connect a 5.49k Ω Pull-Up Resistor to V _{DD33} . Connect to all other SHARE_CLK pins in the system
PG0	14	In/Out	Configurable Open-Drain Output and Digital Input for Channel 0. Connect a 10k Ω Pull-Up Resistor to V _{DDIO} .
PG1	15	In/Out	Configurable Open-Drain Output and Digital Input for Channel 1. Connect a 10k Ω Pull-Up Resistor to V _{DDIO}
WDI/RESETB	16	In	Watchdog Timer Interrupt and Chip Reset Input. Connect a 10k Ω Pull-Up Resistor to V _{DD33} . Rising Edge Resets Watchdog Counter. Holding this Pin Low for More than t _{RESETB} Resets the Chip
FAULTB0	17	In/Out	Open-Drain Output and Digital Input. Active Low Bidirectional Fault Indicator-0. Connect a 10k Ω Pull-Up Resistor to V _{DDIO}
FAULTB1	18	In/Out	Open-Drain Output and Digital Input. Active Low Bidirectional Fault Indicator-1. Connect a 10k Ω Pull-Up Resistor to V _{DDIO}
WP	19	In	Digital Input. Write-Protect Input Pin, Active High
SDA	20	In/Out	PMBus Bidirectional Serial Data Pin
SCL	21	In	PMBus Serial Clock Input Pin (400kHz Maximum)
ALERTB	22	Out	Open-Drain Output. Generates an Interrupt Request in a Fault/Warning Situation
CONTROL0	23	In	Control Pin 0 Input
CONTROL1	24	In	Control Pin 1 Input
V _{DDIO}	25	In	Sets the Input Threshold of all Digital inputs, except SHARE_CLK, ASEL[1:0], VOUT_EN[1:0] and AUX_FAULTB, to approximately 45% of V _{DDIO} . Connect to a supply voltage between 1.5V and 3.6V. Connect all of the LTC2972 pins pull-up resistors to this pin except WDI/RESETB, SHARE_CLK and VOUT_EN[1:0]. Connect these pins pull-up resistors to V _{DD33}

any components except the pull-up resistors and bypass capacitors required to support the LTC2972 in the application.