



Applications

- Telecommunications
- Data communications
- Wireless communications
- Servers

Benefits

- High efficiency – no heat sink required
- Higher current capability at elevated temperatures than many competitors' 25A and 30A quarter bricks
- Extremely small footprint: 0.896" x 2.30" (2.06 in²), 38% smaller than conventional quarter bricks

Description

The new High Temperature **20A SemiQ™ Family** of dc-dc converters provides a high efficiency single output in a size that is only 60% of industry-standard quarter-bricks. Specifically designed for operation in systems that have limited airflow and increased ambient temperatures, the **SQE48T20033** eighth-brick converters utilize the same pinout and functionality of the industry-standard quarter-bricks.

The **20A SQE48T Series** converters of the **SemiQ™ Family** provide thermal performance in high temperature environments that exceeds many competitors' 25A and 30A quarter-bricks. This is accomplished through the use of patent pending circuits, packaging, and processing techniques to achieve ultra-high efficiency, excellent thermal management and a low body profile.

Low body profile and the preclusion of heat sinks minimize airflow shadowing, thus enhancing cooling for downstream devices. The use of 100% automation for assembly, coupled with advanced electronic circuits and thermal design, results in a product with extremely high reliability.

Operating from a 36-75V input, the **20A SQE48T Series** converters provides a standard output voltage 3.3V. The outputs can be trimmed from -20% to +10% of the nominal output voltage, thus providing outstanding design flexibility.

With standard pinout and trim equations, the **SQE48T Series** converters are perfect drop-in replacements for competing quarter-brick designs. Inclusion of this converter in new designs can result in significant board space and cost savings. The designer can expect reliability improvement over other available converters because of the **SQE48T Series'** optimized thermal efficiency.

Features

- RoHS lead-free solder and lead-solder-exempted products are available
- Delivers 20A with no derating up to 70 °C
- Industry-standard quarter-brick pinout
- On-board input differential LC-filter
- Start-up into pre-biased load
- No minimum load required
- Weight: 0.72 oz [20.6 g]
- Meets Basic Insulation requirements of EN60950
- Withstands 100 V input transient for 100 ms
- Fixed-frequency operation
- Fully protected
- Remote output sense
- Positive or negative logic ON/OFF option
- Output voltage trim range: +10%/-20% with Industry Standard trim equations
- High reliability: MTBF approx. 15.75 million hours, calculated per Telcordia TR-332, Method I Case 1
- UL 60950 recognized in US and Canada and TUV certified per IEC/EN 60950
- Designed to meet Class B conducted emissions per FCC and EN 55022 when used with external filter
- All materials meet UL94, V-0 flammability rating

Electrical Specifications

Conditions: $T_A=25\text{ }^\circ\text{C}$, Airflow = 300 LFM (1.5 m/s), $V_{in} = 48\text{ VDC}$, unless otherwise specified.

Parameter	Notes	Min	Typ	Max	Units
Absolute Maximum Ratings					
Input Voltage	Continuous	0		80	VDC
Operating Ambient Temperature		-40		85	$^\circ\text{C}$
Storage Temperature		-55		125	$^\circ\text{C}$
Input Characteristics					
Operating Input Voltage Range		36	48	75	VDC
Input Under Voltage Lockout	Non-latching				
Turn-on Threshold		33	34	35	VDC
Turn-off Threshold		31	32	33	VDC
Input Voltage Transient	100 ms			100	VDC
Isolation Characteristics					
I/O Isolation		2000			VDC
Isolation Capacitance			160		pF
Isolation Resistance		10			M Ω
Feature Characteristics					
Switching Frequency			480		kHz
Output Voltage Trim Range ¹	Industry-std. equations	-20		+10	%
Remote Sense Compensation ¹	Percent of $V_{OUT(NOM)}$			+10	%
Output Over-Voltage Protection	Non-latching	117	122	127	%
Over-Temperature Shutdown (PCB)	Non-latching		125		$^\circ\text{C}$
Auto-Restart Period	Applies to all protection features		200		ms
Turn-On Time			4		ms
ON/OFF Control (Positive Logic)					
Converter Off (logic low)		-20		0.8	VDC
Converter On (logic high)		2.4		20	VDC
ON/OFF Control (Negative Logic)					
Converter Off (logic high)		2.4		20	VDC
Converter On (logic low)		-20		0.8	VDC

Additional Notes:

1. V_{out} can be increased up to 10% via the sense leads or up to 10% via the trim function. However, the total output voltage trim from all sources should not exceed 10% of $V_{OUT(NOM)}$, in order to insure specified operation of overvoltage protection circuitry.

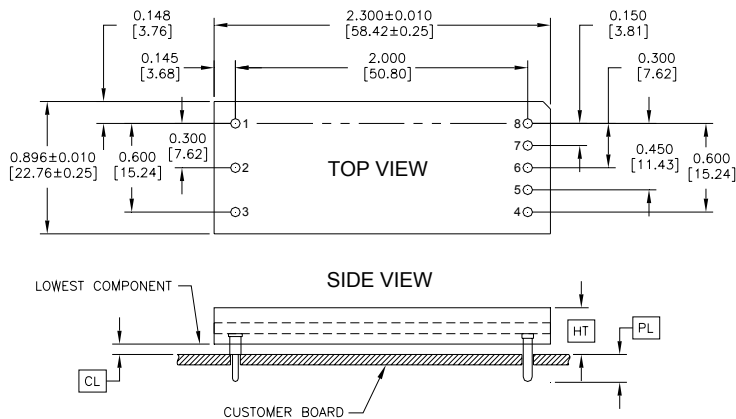
Electrical Specifications (continued)

Conditions: $T_A=25\text{ }^\circ\text{C}$, Airflow = 300 LFM (1.5 m/s), $V_{in} = 48\text{ VDC}$, unless otherwise specified.

Parameter	Notes	Min	Typ	Max	Units
Input Characteristics					
Maximum Input Current	20 ADC, 3.3 VDC Out @ 36 VDC In			2	ADC
Input Stand-by Current	$V_{in} = 48\text{ V}$, converter disabled		2		mADC
Input No Load Current (0 load on the output)	$V_{in} = 48\text{ V}$, converter enabled		38		mADC
Input Reflected-Ripple Current	20 MHz bandwidth		6		$\text{mA}_{\text{PK-PK}}$
Input Voltage Ripple Rejection	120 Hz		75		dB
Output Characteristics					
Output Voltage Set Point (no load)		3.275	3.300	3.325	VDC
Output Regulation					
Over Line			± 2	± 5	mV
Over Load			± 2	± 5	mV
Output Voltage Range	Over line, load and temperature ²	3.250		3.350	VDC
Output Ripple and Noise - 25 MHz bandwidth	Full load + 10 μF tantalum + 1 μF ceramic		35	70	$\text{mV}_{\text{PK-PK}}$
External Load Capacitance	Plus full load (resistive)			20,000	μF
Output Current Range		0		20	ADC
Current Limit Inception	Non-latching	21	25	29	ADC
Peak Short-Circuit Current	Non-latching. Short=10m Ω .		25		A
RMS Short-Circuit Current	Non-latching. Short=10m Ω .		4	8	Arms
Dynamic Response					
Load Change 10A-15A-10A, $di/dt = 0.1\text{A}/\mu\text{s}$	$C_o = 1\text{ }\mu\text{F}$ ceramic		20		mV
	$di/dt = 5\text{A}/\mu\text{s}$ $C_o = 470\text{ }\mu\text{F}$ POS + 1 μF ceramic		110		mV
Settling Time to 1%			15		μs
Efficiency					
100% Load			92		%
50% Load			92		%

Additional Notes: 2. -40°C to 85°C .

Physical Information



SQE48T Pinout (Through-hole)

Pad/Pin Connections	
Pad/Pin #	Function
1	Vin (+)
2	ON/OFF
3	Vin (-)
4	Vout (-)
5	SENSE(-)
6	TRIM
7	SENSE(+)
8	Vout (+)

SQE48T Platform Notes

- All dimensions are in inches [mm]
- Pins 1-3 and 5-7 are $\varnothing 0.040$ " [1.02] with $\varnothing 0.078$ " [1.98] shoulder
- Pins 4 and 8 are $\varnothing 0.062$ " [1.57] without shoulder
- Pin Material & Finish: Brass Alloy 360 ½ Hard with Matte Tin/Lead over Nickel or Copper Alloy CDA 145 with Matte Tin over Nickel (RoHS Option)
- Converter Weight: 0.72 oz [20.6 g]

Height Option	HT (Max. Height)	CL (Min. Clearance)	Pin Option	PL Pin Length
	+0.000 [+0.00] -0.038 [- 0.97]	+0.016 [+0.41] -0.000 [- 0.00]		
G	0.407 [10.34]	0.035 [0.89]	A	0.188 [4.77]
			B	0.145 [3.68]

Converter Part Numbering Ordering Information

Product Series	Input Voltage	Mounting Scheme	Rated Load Current	Output Voltage	ON/OFF Logic	Maximum Height [HT]	Pin Length [PL]	Special Features	Environmental
SQE	48	T	20	033	-	N	G	B	0
One-Eighth Brick Format	36-75 V	T \Rightarrow Through-hole	20A	033 \Rightarrow 3.3V	N \Rightarrow Negative P \Rightarrow Positive	<u>Through hole</u> G \Rightarrow 0.407"	<u>Through hole</u> A \Rightarrow 0.188" B \Rightarrow 0.145"	0 \Rightarrow STD	No Suffix \Rightarrow RoHS lead solder exemption compliant G \Rightarrow RoHS compliant for all six substances

The example above describes P/N SQE48T20033-NGB0G: 36-75V input, through-hole mounting, 20A @ 3.3V output, negative ON/OFF logic, a maximum height of 0.407", and a through the board pin length of 0.145", and RoHS compliant. Please consult factory regarding availability of a specific (including RoHS compliant) version.

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