

A GROUND BREAKING SOLUTION FOR OPERATION OVER 225°C/437°F (case)

The DC-DC Converter manufactured by C-MAC MicroTechnology is the first of a family of high temperature hybrid modules specifically developed using CISSOID SOI (Silicon On Insulator) active devices. This leading edge product is designed for continuous operation up to 225°C/437°F and limited duration at 250°C/482°F. The implemented architecture is a voltage-mode 'Buck converter' that uses duty-ratio modulation at a constant frequency. Adaptive gate drive techniques ensure that maximum efficiency is achieved.

Can be packaged for oil & gas, industrial and aerospace applications.

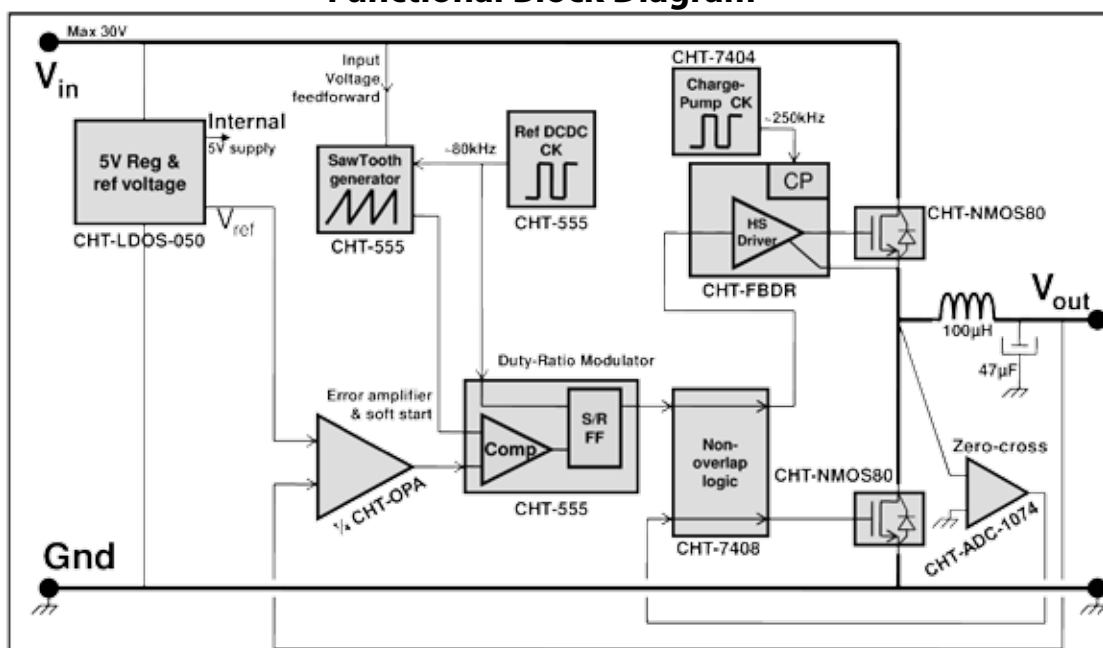
Key features:

- » Output voltage options from +2.5V to +25V
- » Load current from 10mA to 1A
- » Input voltage up to 30V
- » Up to 85% efficient
- » Fully characterised up to +225°C/437°F
- » Operational up to +250°C/482°F



Package option

Functional Block Diagram



PROVISIONAL
DATASHEET

ABSOLUTE MAXIMUM RATINGS

Supply voltage to GND -0.5 to +35.0V.
ESD rating 1kV

OPERATING CONDITIONS

Supply voltage to GND +7V to +30V

ELECTRICAL CHARACTERISTICS

The measurements have been made for an output voltage $V_{out}=+5V$

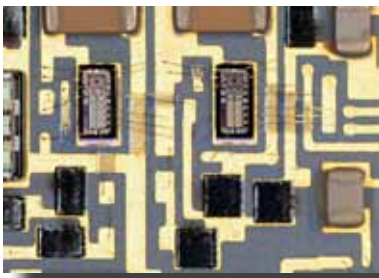
C-MAC
semiconductor die
assembly



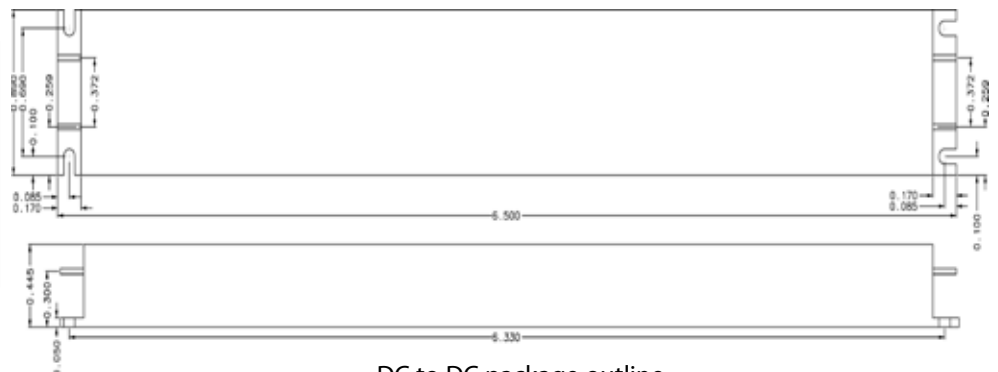
Parameter	Condition	Min	Typ	Max	Units
Supply voltage V_{in}		7 ¹		30	V
DC-DC Converter Output voltage ² V_{out}	$I_{load}=10mA$ to 1A	2.5	5	25	V
DC Line Regulation $\Delta V_{out}/\Delta V_{in}$			-1		mV/V
DC Load Regulation $\Delta V_{out}/\Delta I_{load}$			+5		mV/A
AC Load Regulation $\delta V_{out}/\delta I_{load}$	$V_{in}=9V$; $V_{out}=5V$; $I_{load}=10mA$ to 1A; $T_{amb}=200^{\circ}C$				
	10Hz		-60		dB
	100Hz		-40		dB
	1kHz		-26		dB
Output drift with Temperature $\Delta V_{out}/\Delta T$			+0.25		mV/K
Load current I_{load}		10m		1	A
Output ripple V_r	At worst case: $V_{in}=30V$				
	25 °C			30	mVpk
	100 °C			33	
	150 °C			60	
	175 °C			80	
	200 °C			110	
	225 °C			145	
Switching frequency		50	90	100	kHz
Efficiency P_{out}/P_{in}				85	%
Load capacitance C_L	Typical value at $T_{amb}=25^{\circ}C$		47		μF
Inductor L (25 °C)	Typical value at $T_{amb}=25^{\circ}C$		100		μH
Transient load response	$V_{out}=5V$; $T_{ambient}=200^{\circ}C$ Load current slew-rate=1mA/ μs $V_{in}=8V$ and $I_{load}=100mA \rightarrow 1A$ $V_{in}=8V$ and $I_{load}=1A \rightarrow 100mA$ $V_{in}=15V$ and $I_{load}=100mA \rightarrow 1A$ $V_{in}=15V$ and $I_{load}=1A \rightarrow 100mA$ $V_{in}=30V$ and $I_{load}=100mA \rightarrow 1A$ $V_{in}=30V$ and $I_{load}=1A \rightarrow 100mA$		ΔV_{out} [%]	Recovery Time [μs]	
			-6	600	
			+8	750	
			-7	750	
			+7	750	
			-7	500	
			+7	500	
Intrinsic current consumption		10		25	mA

¹ The minimum dropout voltage is 2V

² The nominal output voltage is preset by an internal resistive divider



C-MAC high temperature
chip and wire technology



For further information contact:

**Mike Woolsey, Business Development Manager, Energy,
C-MAC MicroTechnology**

South Denes, Great Yarmouth,
Norfolk, NR30 3PX, United Kingdom

Tel: +44 (0) 1493 743 143

Email: michaelwoolsey@cmac.com

