GENERAL DESCRIPTION

The CM8502 is a low cost switching regulator designed to provide a desired output voltage or termination voltage for various applications by converting voltage supplies ranging from 2.0V to 4.0V. The CM8502 can be implemented to produce regulated output voltages in two different modes. In the default mode, when the VIN/2 pin is open, the output voltage is 50% of the VCCQ. The CM8502 can also be used to produce various user-defined voltages by forcing a voltage on the VIN/2 pin. In this case, the output voltage follows the VIN/2 pin input voltage. The switching regulator is capable of sourcing or sinking up to 2A of current while regulating an output V_{TT} voltage to within 3% or less.

The CM8502 provides low profile 16-pin PSOP and PTSSOP packages that are pin-to-pin compatible to the previous CM8500.

FEATURES

- Patent Filed #6,452,366
- 16 pin PTSSOP and 16 pin PSOP power packages
- Source and sink up to 2A, no heat sink required
- Integrated Power MOSFETs
- Output voltage can be programmed by external resistors
- Separate voltages for VCCQ and PVDD
- V OUT of ±3% or less at 2A
- Minimum external components
- Shutdown for standby or suspend mode operation
- Thermal shutdown protection
- Soft start

24 Hours Technical Support---WebSIM

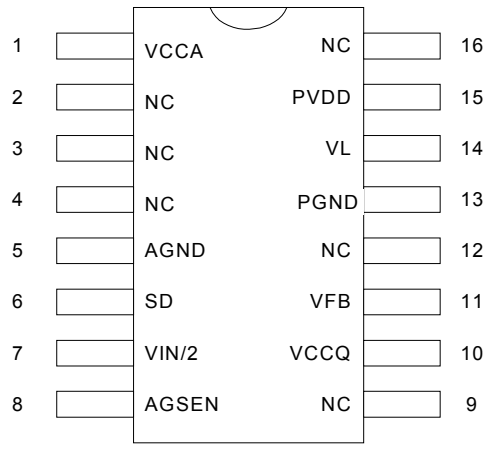
Champion provides customers an online circuit simulation tool called WebSIM. You could simply logon our website at www.champion-micro.com for details.

APPLICATIONS

- Mother Board
- PCI/AGP Graphics
- Game/ Play Station
- Set Top Box
- IPC
- SCSI-III Bus terminator
- Buck Converter

PIN CONFIGURATION

PSOP-16 (PS16)/PTSSOP-16 (PT16)
Top View



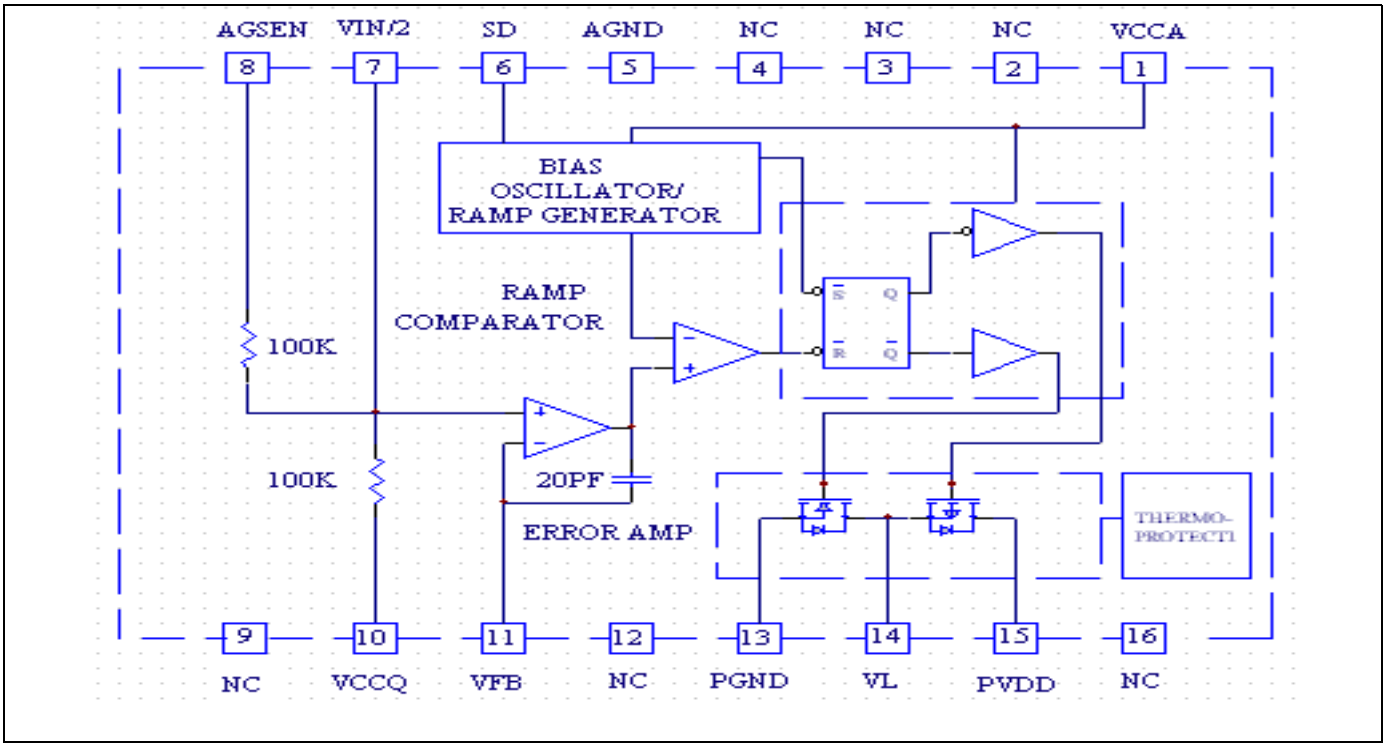
PIN DESCRIPTION

Pin No.	Symbol	Description	Operating Rating			
			Min.	Typ.	Max.	Unit
1	VCCA	Voltage supply for internal circuits	2	2.5	4	V
2,3,4,9,12,16	NC	No Connection				
5	AGND	Ground for internal reference voltage divider				
6	SD	Shutdown active high. CMOS input level	0.75 x VCCA		VCCA + 0.3V	V
7	VIN/2	Input for external reference voltage		VCCQ/2		V
8	AGSEN	Ground for remote sensing				
10	VCCQ	Voltage reference for external voltage divider		2.5		V
11	VFB	Feedback node for the V_{TT}		VCCQ/2		V
13	PGND	Ground for output power transistors				
14	VL	Output voltage/inductor connection (IDD1+IDD2, Output RMS current)	2			A
15	PVDD	Voltage supply for output power transistors	2	2.5	4	V

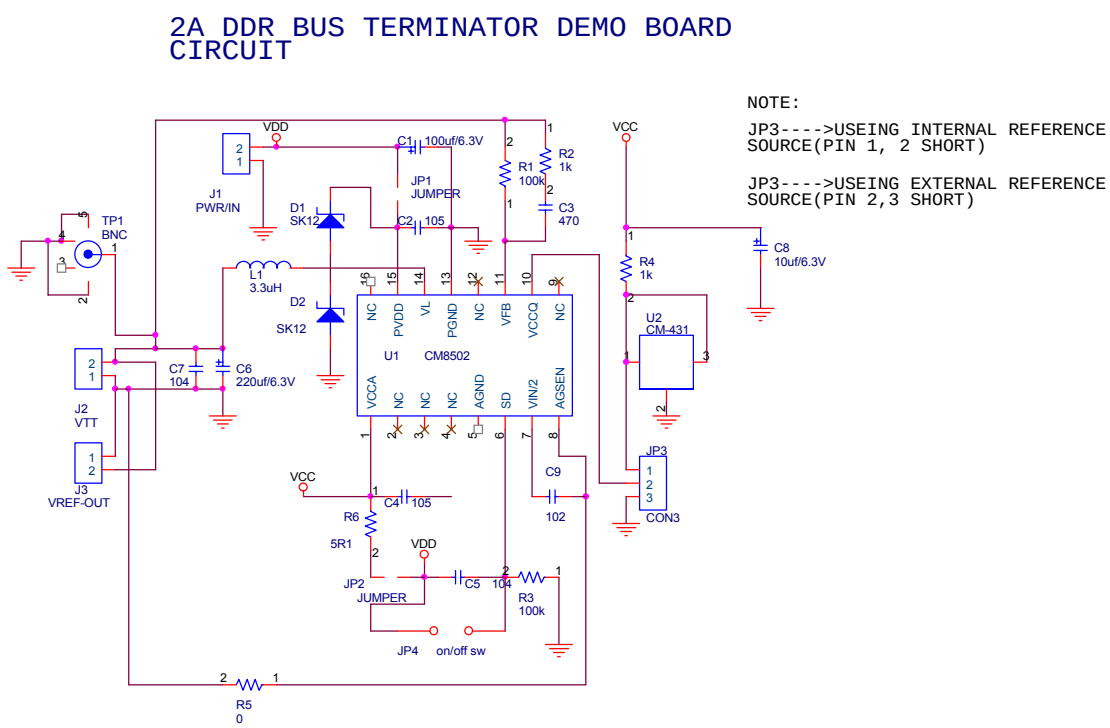
ORDERING INFORMATION

Part Number	Temperature Range	Package
CM8502IT	-40℃ to 85℃	16-Pin PTSSOP (PT16)
CM8502IS	-40℃ to 85℃	16-Pin PSOP (PS16)

BLOCK DIAGRAM



APPLICATION CIRCUITS



16-Pin Schematic

ABSOLUTE MAXIMUM RATINGS

Absolute maximum ratings are those values beyond which the device could be permanently damaged.

PVDD/VCCA/VCCQ .....-0.3V to 4.0V
Voltage on Any Other Pin …….. GND – 0.3V to VCC + 0.3V
Output RMS Current, Source or Sink .....……..…..2A

Junction Temperature ..…… ……150°C
Storage Temperature ……..…… -65°C to 125°C
Lead Temperature (Soldering, 5 sec)…….. 300°C
Thermal Resistance (θ_{JA})….. …….. .40°C/W

OPERATING CONDITIONS

Temperature Range ..... -40°C to 85°C
P_{VDD} Operating Range .....2.0V to 4.0V

ELECTRICAL CHARACTERISTICS **(Unless otherwise stated, these specifications apply T_A=25°C; VCCA=+3.3V and PVDD=+3.3V)** maximum ratings are stress ratings only and functional device operation is not implied. (Note 1)

Symbol	Parameter	Test Conditions		CM8502 Min.	CM8502 Typ.	CM8502 Max.	Unit
SWITCHING REGULATOR							
VL	Output Voltage, SSTL_2	IOUT = 0, Note 2	VCCQ = 2.3V	1.12	1.15	1.18	V
			VCCQ = 2.5V	1.22	1.25	1.28	V
			VCCQ = 2.7V	1.32	1.35	1.38	V
		IOUT = ±2A, Note 2 Note 3	VCCQ = 2.3V	1.09	1.15	1.21	V
			VCCQ = 2.5V	1.19	1.25	1.31	V
			VCCQ = 2.7V	1.28	1.35	1.42	V
V_{IN}/2	Internal Resistor Divider	IOUT = 0 Note 2	VCCQ = 2.3V	1.139	1.15	1.162	V
			VCCQ = 2.5V	1.238	1.25	1.263	V
			VCCQ = 2.7V	1.337	1.35	1.364	V
Z_{IN}	V_{IN}/2 Reference Pin Input Impedance	Note 2	VCCQ = 0		50		KΩ
fsw	Switching Frequency	CM8502			1.2		MHz
$I_{OUT(RMS)}$	Maximum Output RMS Current	CM8502				2.0	A
$I_{OUT(PEAK)}$	Maximum Output Peak Current	CM8502				4.0	A
MOSFETs							
$RDS_{(ON)}$	Drain to Source on-State Resistance	PVDD=5V			250		mΩ
SUPPLY							
I_Q	Quiescent Current	IOUT = 0, no load	Icc + Idd			10	mA
I_{VCCA}	Quiescent Current	VFB = 1.4V LC unconnected			220		µA
I_{PVDD}		VFB = 1.4V LC unconnected			500		µA

Note 1: Limits are guaranteed by 100% testing, sampling, or correlation with worst case test conditions

Note 2: VCCA, PVDD = 3.3V ±10%, VIN/2=open for CM8502

Note 3: Guaranteed by design, not 100% test

FUNCTIONAL DESCRIPTION

The CM8502 is a switching regulator that is capable of sinking and sourcing 2A of current without an external heat sink. CM8502 uses a standard surface mount PTSSOP and PSOP package with bottom metal exposed and the heat can be piped through the bottom of the device and onto the PCB.

The CM8502 integrates power MOSFETs that are capable of source and sink 2A of current while maintaining excellent voltage regulation. The output voltage can be regulated within 3% or less by using the external feedback. Separate voltage supply inputs have been added to fit applications with various power supplies for the databus and power buses.

OUPUTS

The output voltage pins (VL) are tied to the databus, address, or clock lines via an external inductor. Output voltage is determined by the VCCQ or VIN/2 inputs for CM8502.

INPUTS

The input voltage pins (VCCQ & VIN/2 of CM8502) determine the output voltages (VL). At CM8502, when the VIN/2 pin is open, the output voltage is 50% of the VCCQ input. If a specific voltage is forced at the VIN/2 pin, the output voltage follows the voltage at the VIN/2 pin.
VCCQ is suggested to connect to VCCQ of memory module for better tracking with memory VCCQ.

OTHER SUPPLY VOLTAGES

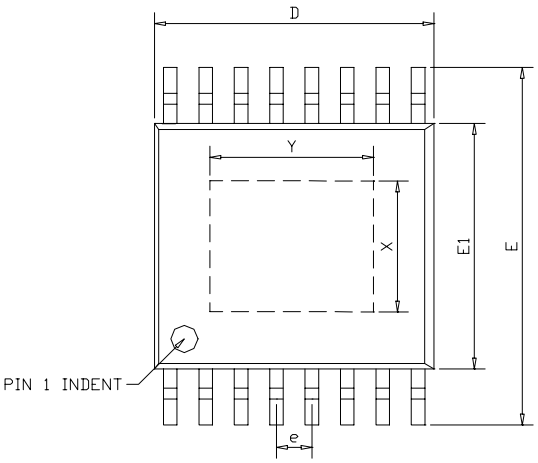
Several inputs are provided for the supply voltages: PVDD and VCCA
The PVDD provide the power supply to the power MOSFETs. VCCA provide the voltage supply to the logic section and internal error amplifiers of CM8502.

FEEDBACK

The VFB pin is an input that can be used for closed loop compensation. This input is derived from the voltage output. AGSEN pin is a contact node of internal resistor divider for remote sense (CM8502).

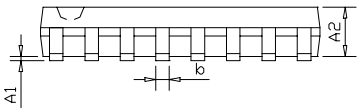
PACKAGE DIMENSION

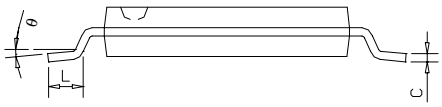
16-PIN PTSSOP (PT16)



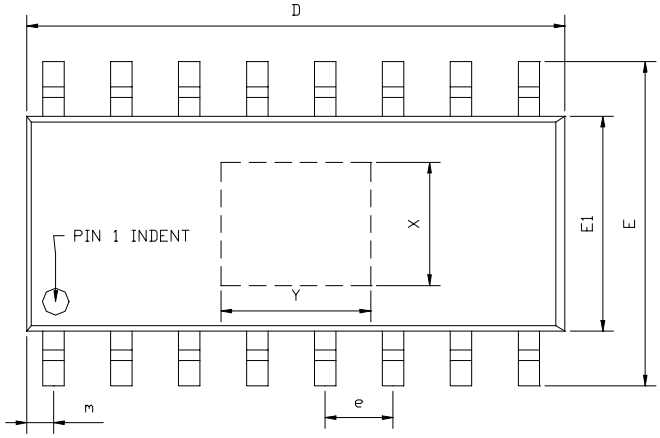
SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCHS		
	MIN	NOM	MAX	MIN	NOM	MAX
A1	0.05	---	0.15	0.002	---	0.006
A2	0.84	---	0.94	0.033	---	0.037
b	0.20	---	0.30	0.008	---	0.012
C	0.10	---	0.20	0.004	---	0.008
D	4.88	---	5.13	0.192	---	0.202
E	6.25	---	6.55	0.246	---	0.258
E1	4.29	---	4.50	0.169	---	0.177
e	---	0.65	---	---	0.026	---
L	0.51	---	0.71	0.020	---	0.028
θ	0°	---	8°	0°	---	8°

EXPOSED PAD DIMENSION : (mm)
PAD SIZE: X=2.4; Y=3.0



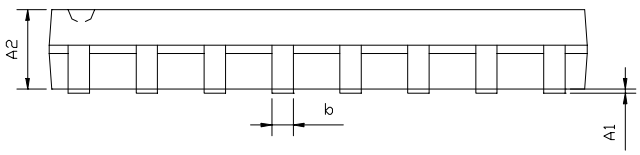


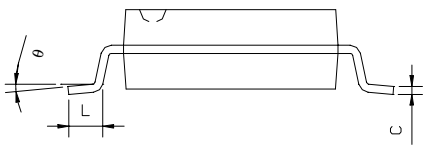
16-PIN PSOP (PS16)



SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCHS		
	MIN	NOM	MAX	MIN	NOM	MAX
A1	0.05	---	0.15	0.002	---	0.006
A2	1.40	---	1.55	0.055	---	0.061
b	0.30	---	0.51	0.012	---	0.020
C	0.15	---	0.26	0.006	---	0.010
D	9.80	---	10.06	0.386	---	0.396
E	5.79	---	6.20	0.228	---	0.244
E1	3.76	---	4.01	0.148	---	0.158
e	---	1.27	---	---	0.050	---
L	0.38	---	0.69	0.015	---	0.035
m	0.43	---	0.69	0.017	---	0.027
θ	0°	---	8°	0°	---	8°

EXPOSED PAD DIMENSION : (mm)
PAD SIZE: X=2.3 ; Y=2.8





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