

Power Management IC Design

Training Programme
by
Dream Catcher Consulting Sdn Bhd

20-Dec-2013
Dream Catcher, Krystal Point, Penang

303-4-5 & 303-4-6 Block B, Krystal Point Jln Sultan Azlan Shah 11900 Sg Nibong Penang, Malaysia

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Synopsis

Portable devices have become more and more common in our daily lives. How to efficiently manage the power of these devices has become a very important topic in recent years. In this course, power management circuits design will be introduced, including the voltage reference circuit, the linear regulator, and the switching regulator.

Voltage reference circuits are usually used to produce an output voltage that is independent of its supply voltage and the temperature variations. Most of them are designed with low voltage and low power to decrease the total power consumption nowadays, for a longer battery life of portable devices. In this course, the low power bandgap reference structure will be discussed.

Linear regulators are generally used to provide a regulated voltage for different sub-systems. The main challenge of these regulators is how to minimize the dropout voltage between the input and the output voltage to achieve the maximum efficiency. Here, the structure and implementation of low-dropout regulator (LDO) will be presented.

Switching regulators are commonly used in many complex systems to ensure high efficiency. Basics of three converters are described in this course, including the buck converter, the boost converter, and the buck-boost converter. Moreover, there are two kinds of control, the pulse-width modulation (PWM) and the pulse frequency modulation (PFM). In this course, fully-integrated converters and light-load efficiency improvement of converters will also be discussed.

What You Will Learn

- Voltage reference circuits
- Linear regulators
- Switching regulators

Who Should Attend

Engineers and academia who are new to design and development of power management IC design and those who wish to learn the principles and operations of power management IC.

Prerequisite

Knowledge of basic operations of semiconductor devices and analog IC design.

Course Methodology

This course is presented classroom style.

Course Duration

1 day, 9am - 5pm

Course Structure

Introduction of Power Management IC

Voltage Reference Circuits

- Supply-independent biasing
- Temperature-independent references
- Low-power differential CMOS Bandgap references
- Curvature compensated Bandgap
- Sub-1-V Bandgap

Linear Regulator

- Concept of linear regulator
- Structure of low-dropout regulator (LDO)
- LDO specifications
- LDO circuit Implementation
- Output-capacitor-free LDOs

Switching Regulator

- Concept of switching regulator
- Buck, Boost & Buck-Boost converters
- PWM/PFM control
- Light-load efficiency improvement converters
- Fully integration converters

Course Instructor(s)

Prof Dr Robert Chen-Hao Chang

Robert Chen-Hao Chang received the B.S. and M.S. degrees in electrical engineering from National Taiwan University, Taipei, Taiwan, in 1987 and 1989, respectively, and the Ph.D. degree in electrical engineering from University of Southern California (USC), Los Angeles, in 1995.

In 1996, he joined the faculty of the Department of Electrical Engineering, National Chung Hsing University (NCHU), Taichung, Taiwan, where he is currently a Distinguished Professor. He served as the Director of Center for Research and Development of Engineering Technology of the College of Engineering from 2005 to 2006, and Chairman of the Electrical Engineering Department from 2006 to 2008. Since March 2011, he has become the Deputy Director General of the National Chip Implementation Center in Hsinchu, Taiwan. He has published more than 100 technical journal and conference papers. His research interests include low-power circuits and systems design, baseband circuits design, and mixed-signal IC design.

Dr. Chang was a recipient of the National Science Council Research Award in 1997 and 1998, the Distinguished Teaching Award from NCHU in 2004, and the Outstanding Research Project Award from NCHU in 2006 and 2011. He is a Fellow of IET. He is an Associate Editor for the IEEE Transactions on VLSI Systems.

Administrative Details

Programme Logistics

Duration : 1 day, 9am - 5pm
 Date : 20-Dec-2013
 Venue : Dream Catcher, Krystal Point, Penang

Morning break, lunch and tea break will be provided throughout the course duration. Course Manual and Certificate of Attendance will be provided.

Your Investment

Type	Condition	Price per Pax
Regular Fee	-	RM 1150
Early Bird Discount	for registration before 22-Nov-2013. N/A for SBL KHAS, PERLA and 1MALAYSIA	RM 1045
Group Discount	For every 3 pax registered, receive 1 complimentary seat	RM 1150

course fee is 100% claimable from PSMB (SBL scheme) in accordance to PSMB guidelines

3 Easy Steps to Register



phone +604 640 7111 / 7112



fax registration form to +604 640 7110



email registration form to register@dreamcatcher.asia

Method of Payment

Crossed cheque / bank draft made in favour of DREAM CATCHER CONSULTING SDN BHD. Registration form together with payment to be couriered to :

Dream Catcher Consulting Sdn Bhd
 303-4-5 & 303-4-6
 Block B, Krystal Point
 Jln Sultan Azlan Shah
 11900 Sg Nibong
 Penang, Malaysia

Payment must be received no later than 10 working days before the course commences. An undertaking may be accepted in cases where payment is delayed. However all payments must be made before the course commences.

Closing registration date is 6-Dec-2013.

Refund & Cancellation

Fees will only be refunded in full for cancellation received in writing more than 10 working days prior to the commencement date. Substitute attendee(s) will be accepted at no extra charge.

Disclaimer

Dream Catcher Consulting Sdn Bhd reserves the right to change the instructors, date and to vary/cancel the programme should unavoidable circumstances arise. All effort will be taken to inform participants of the changes. Upon sending the registration form, you are deemed to have read and accepted the terms.

Enquiries

call us at +604 640 7111 / 7112 or email us at enquiry@dreamcatcher.asia

Registration Form

Course Title	Power Management IC Design
Course Date	20-Dec-2013
Location	Dream Catcher, Krystal Point, Penang

(Emails are required to ensure notification of any changes reach the participant)

No	Name	Job Title	IC No (for HRDF claim)	Email	Fee (RM)
1					
2					
3					
4					
5					
Total Amount					

(if space is insufficient, please use another form)

Submitted by:

Company Name: _____
 Company Address: _____
 Contact Person: _____ Designation: _____
 Dept: _____ Phone: _____
 Email: _____

Please complete this form with an authorised signature below and fax to fax registration form to +604 640 7110 or email to email registration form to register@dreamcatcher.asia. Call us at phone +604 640 7111 / 7112 for any enquiry.

Authorised Signature: _____

** Please print full name (authorised signature) if you submit via email*

Name: _____ Designation: _____
 Dept: _____ Date: _____

This registration is invalid without a signature. Payment must be made no later than 10 working days before the course commences. An undertaking may be accepted in cases where payment is delayed, However all payment must be made before the course commences. Participants who registered but did not attend will be invoiced accordingly. Fees will only be refunded in full for cancellation received in writing more than 10 working days prior to the commencement date. Substitute attendee(s) will be accepted at no extra charge.

*Please send payment with this form to
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Enclosed cheque/bank draft no _____ made in favour of DREAM CATCHER CONSULTING SDN BHD