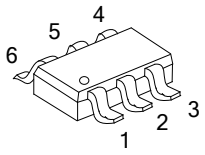
HIGH PERFORMANCE CURRENT MODE PWM CONTROLLER WITH PEAK LOAD



SOT-26

■ DESCRIPTION

UTC **UC3883** is a highly integrated current mode PWM control IC optimized for high performance, low standby power and cost effective offline flyback converter applications.

PWM switching frequency at normal operation is internally fixed and is trimmed to tight range. At no load or light load condition, the IC operates in extended 'burst mode' to minimize switching loss. Lower standby power and higher conversion efficiency is thus achieved.

V_{CC} low startup current and low operating current contribute to a reliable power on startup and low standby design with UTC **UC3883**.

UTC **UC3883** offers complete protection coverage with auto-recovery including Cycle-by-Cycle current limiting (OCP), over load protection (OLP), over temperature protection (OTP) and V_{CC} under voltage lockout (UVLO). It also provides the over voltage protection (OVP) protections with latched shut down. Excellent EMI performance is achieved with UTC proprietary frequency shuffling technique.

The tone energy at below 20KHZ is minimized in the design and audio noise is eliminated during operation.

■ FEATURES

* Power on Soft Start Reducing MOSFET V_{DS} Stress
* Frequency shuffling for EMI
* Extended Burst Mode Control For Improved Efficiency and Minimum Standby Power Design
* Ultra Low Operating Current at Light Load (typical 0.6mA)
* Audio Noise Free Operation
* Normal 65KHz Switching Frequency
* Frequency Triple for peak load (180KHz)
* Adjustable Overload Protection (OLP) delay time
* Comprehensive Protection Coverage

  V_{CC} Under Voltage Lockout with Hysteresis (UVLO)

  Cycle-by-cycle over current threshold setting for constant output power limiting over universal input voltage range

  Overload Protection (OLP) with autorecovery

  External (if NTC resistor is connected at CT/RT pin) or internal (if capacitor is connected at CT/RT pin) Over Temperature Protection (OTP) with autorecovery.

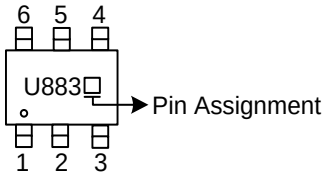
  V_{CC} Over Voltage Protection (OVP) with latch shut down

■ ORDERING INFORMATION

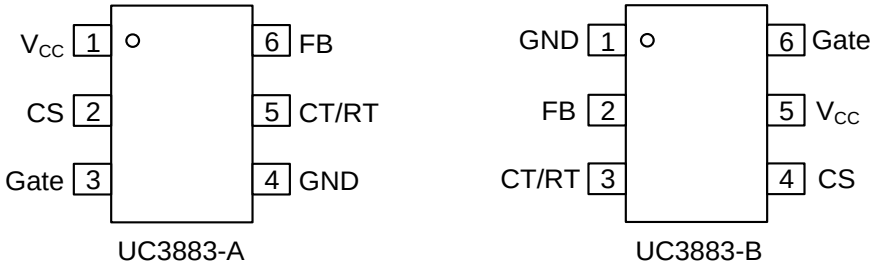
Ordering Number		Package	Packing
Lead Free	Halogen Free		
UC3883L-AG6-A-R	UC3883G-AG6-A-R	SOT-26	Tape Reel
UC3883L-AG6-B-R	UC3883G-AG6-B-R	SOT-26	Tape Reel

UC3883G-AG6-A-R (1)Packing Type (2)Pin Assignment (3)Green Package (4)Package Type	(1) R: Tape Reel (2) X: refer to PIN CONFIGURATION (3) G: Halogen Free and Lead Free, L: Lead Free (4) AG6: SOT-26

■ MARKING



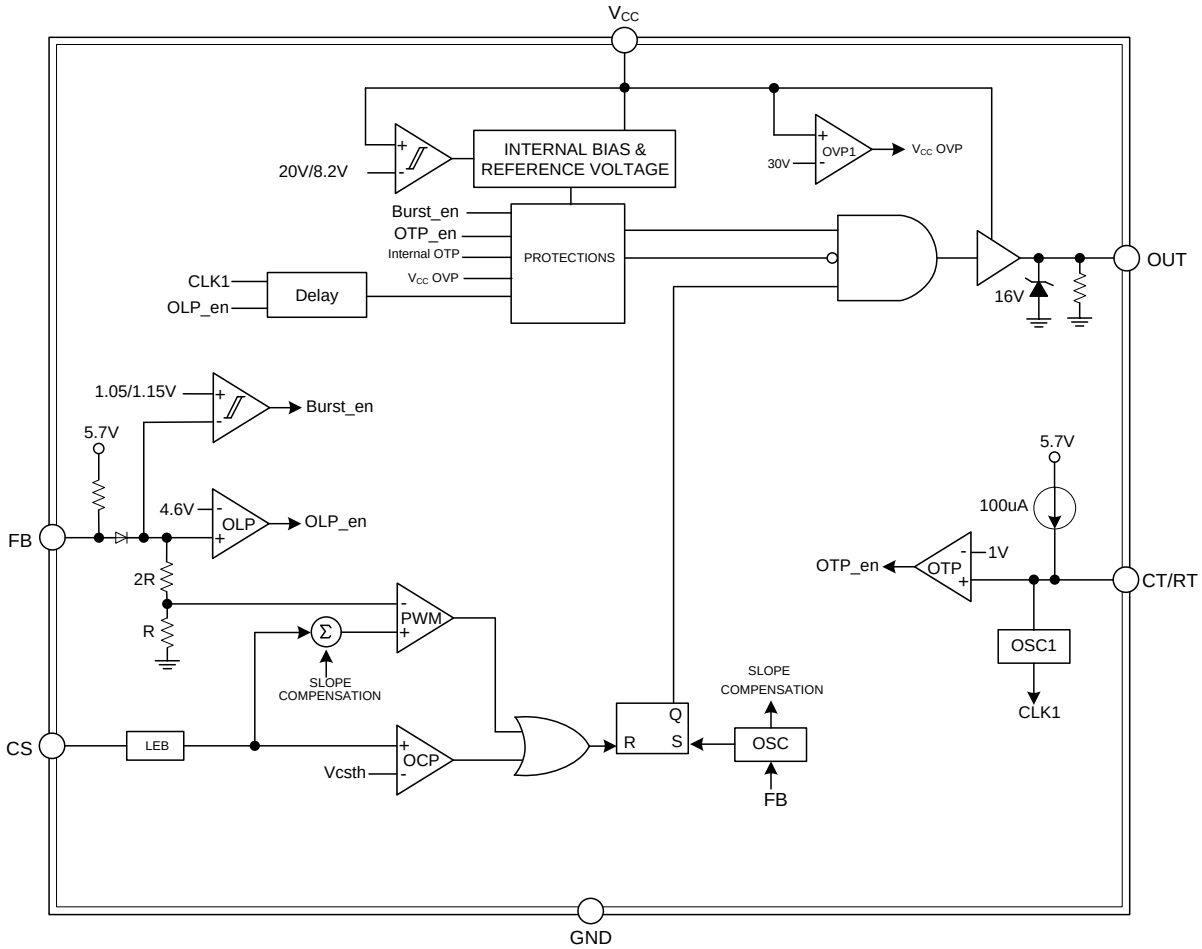
■ PIN CONFIGURATION



■ PIN DESCRIPTION

PIN NO.		PIN NAME	DESCRIPTION
UC3883A	UC3883B		
1	5	V_{CC}	Power Supply
2	4	CS	Current sense input
3	6	Gate	Totem-pole gate driver output for power MOSFET
4	1	GND	Ground
5	3	CT/RT	Dual functions pin. Connecting a NTC resistor to ground for over temperature control. Connecting a capacitor to ground sets OLP delay time
6	2	FB	Feedback input pin. The PWM duty cycle is determined by voltage level into this pin and the current-sense signal at Pin 4.

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATING

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V_{CC}	-0.3 ~ 36	V
Input Voltage to OUT Pin	V_{OUT}	-0.3 ~ V_{CC}+0.3	V
FB, CS, DEM		-0.3 ~ 6	V
Power Dissipation @ T_A=+25°C	P_D	400	mW
Junction Temperature	T_J	+150	°C
Operating Ambient Temperature	T_{OPR}	-40 ~ +125	°C
Storage Temperature Range	T_{STG}	-65 ~ +150	°C

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

■ RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V_{CC}	9 ~ 28	V
Start up Resistor		0.86 ~ 4.4	MΩ
V_{CC} Capacitor		2.2 ~ 4.7	μF

■ THERMAL DATA

PARAMETER	SYMBOL	RATING	UNIT
Junction to Ambient	θ_{JA}	250	°C/W

■ ELECTRICAL CHARACTERISTICS (V_{CC}=15V, T_A=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
SUPPLY VOLTAGE						
V_{CC} (ON)	$V_{CC(ON)}$	For UC3883A	18	20	22	V
		For UC3883B	13.8	15.3	16.8	V
V_{CC} (OFF)	$V_{CC(MIN)}$		7.2	8.2	9.2	V
Startup Current	I_{STR}	V_{CC}<$V_{CC(ON)}$-0.5V		1.5	5	μA
Operating Current	I_{OP}	V_{FB}=3V		0.85		mA
		V_{FB}=Burst Level		0.5		mA
V_{CC} OVP Threshold	$V_{CC(OVP)}$		28	30	32	V
OSCILLATOR & SWITCHING FREQUENCY						
Switching Frequency	$F_{(SW)}$		60	65	70	KHz
Temperature Stability	F_{DT}	Guaranteed by Design			10	%
Voltage Stability	F_{DV}				10	%
Green Mode Frequency	$F_{(SW\_GR)}$		20			KHz
Frequency Spreading Range	Δ OSC		+9		-9	%
Max.Duty Cycle	DC_{MAX}	V_{FB}=3.9V	70	77	85	%
VOLTAGE FEEDBACK						
Open Loop Voltage	V_{FB_Open}		5.00	5.40	5.80	V
OLP Level	V_{FB_OLP}			4.60		V
OLP De-Bounce Time	T_{D_OLP}	V_{FB}>5V	60	100	160	mS
Burst-Mode Enter FB Voltage	V_{FB-IN}			1.05		V
Burst-Mode Quit FB Voltage	V_{FB-OUT}			1.15		V
FB Pin Short Current	I_{FB_SHORT}			130		μA

■ ELECTRICAL CHARACTERISTICS (Cont.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Current Sensing						
Current Limiting Threshold Voltage	V_{CS_MAX}	Read cs pin in testmode		0.88		V
Current Limiting Threshold Voltage with 0% Duty	V_{CS_L}	Read cs pin in testmode		0.43		V
Lead Edge Blanking Time	T_{LEB}	Guaranteed by Design		350		ns
SDSP(Secondary Diode Short Protection) CS pin Level	V_{SCP}	Guaranteed by Design		1.32		V
CS DCOVP Level	V_{CS_DCOVP}	Guaranteed by Design		0.44		V
Soft Start Time		Guaranteed by Design		10		mS
GATE DRIVE OUTPUT						
Output Low Level	V_{OL}	V_{CC}=15V, I_{OUT}=-20mA			1	V
Output High Level	V_{OH}	V_{CC}=15V, I_{OUT}=20mA	9			V
Rising Time	t_R	10% to 90% of V_{OUT}, C_L=1nF		200		nS
Falling Time	t_F	90% to 10% of V_{OUT}, C_L=1nF		60		nS
Out Clamping	V_{clamp}	V_{CC}=20V		15		V
CT/RT Detection						
OLP De-bounce time	T_{d_OLP}	C_T=100nF		1		S
	$T_{d\_OLP\_inner}$	No capacitor connected to CT/RT		12		
OTP Threshold Level	V_{OTP}		0.92	0.98	1.04	V
Output current of CT/RT pin	I_{RT}		94	100	106	μA
OTP De-Bounce Time	T_{OTP}	Guaranteed by Design			7	Times
THERMAL SHUT DOWN						
OTP Threshold				150		°C

■ TYPICAL APPLICATION CIRCUIT

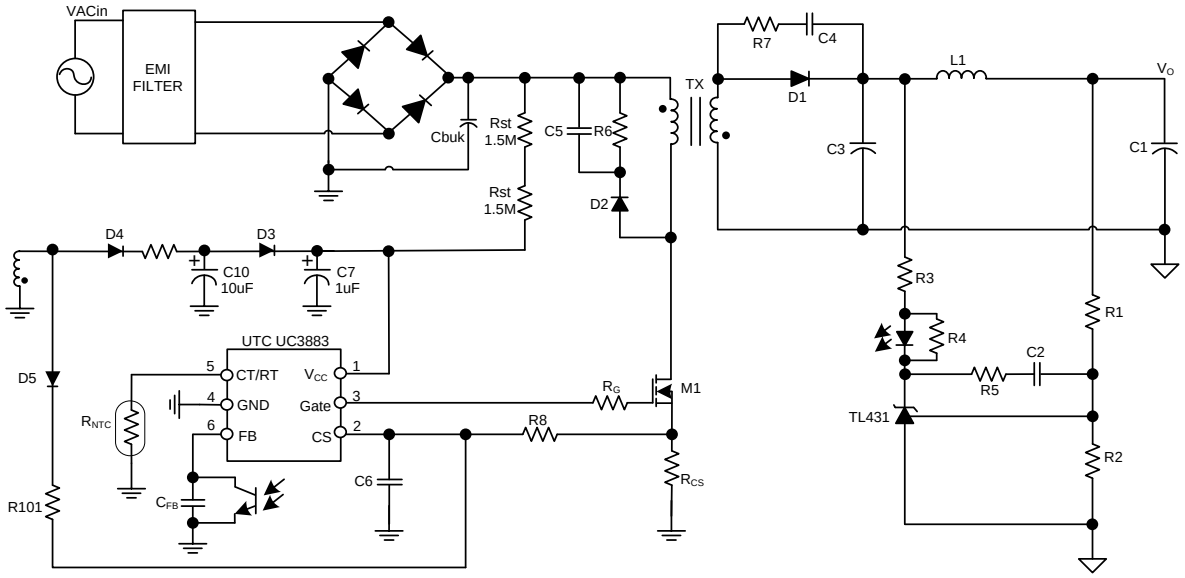


Fig.1 Application Circuit for ADJ-OTP

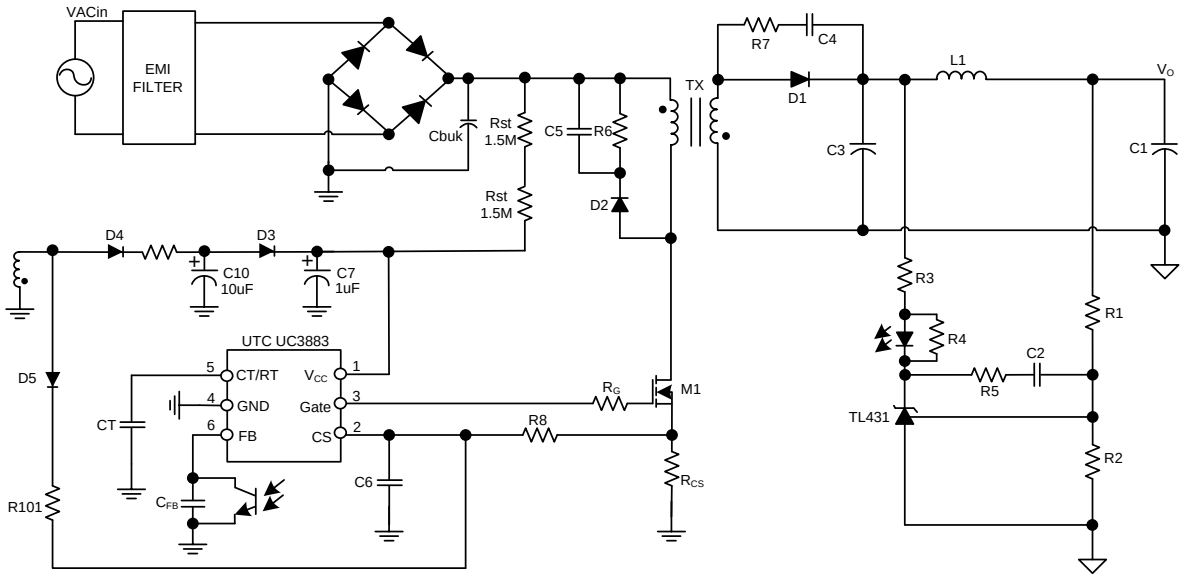


Fig.2 Application Circuit for ADJ-OLP-Debounce time(0~10s)