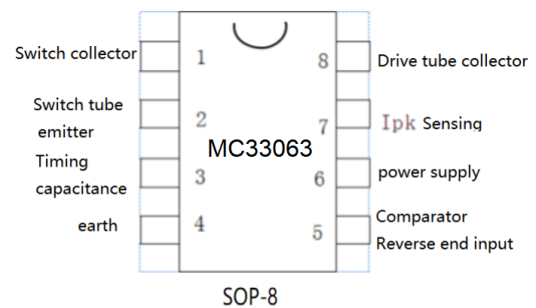## Summary

MC33063ADR is a single-chip DC-DC converter integrated circuit with a reference voltage source for temperature compensation (1.25V), comparator, oscillator, driver and high current output switch tube which can effectively limit the current and control the working cycle. With a few external components, the DC-DC converter with boost, buck and voltage reversal can be formed.

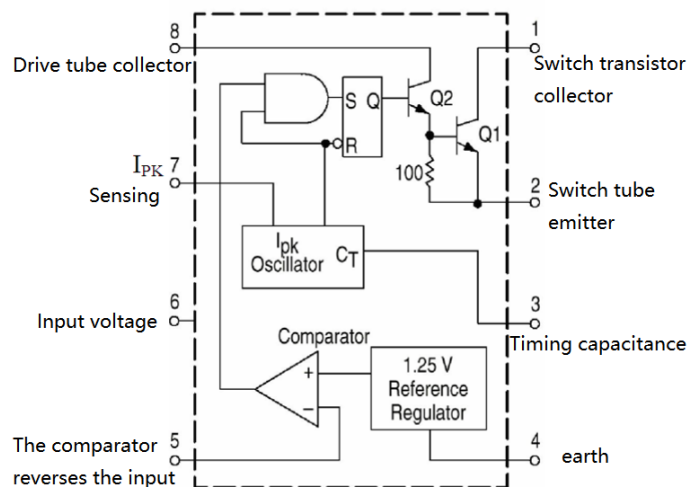The circuit is packaged in SOP8.

Main features

- The working voltage range is 3.0V-32V
- The static current is small
- Pin layout
- It has output current limit function and output current protection function
- The limit current of the output switch is 1.2A
- Adjustable output voltage
- The working frequency can reach 100kHz
- Internal reference voltage accuracy 2%

Pin arrangement

SOP-8

Functional block diagram

Function description of outlet

Balloon	Function	Symbol	Balloon	Function	Symbol
1	Switch collector	SC	5	Comparator reverse input	FB
2	Switch emitter	SE	6	input voltage	VCC
3	Timing capacitor	CT	7	check measure	Ipk
4	land	GND	8	Driving tube collector	DC

Limit value

Parameter name	Symbol	numerical value		Company
		minimum	maximum	
supply voltage	Vcc		32	V
Comparator input voltage range	VIR	- 0.3	30	V
Output collector voltage	Vc(switch)		32	V
Output tube emitter voltage (vpin1 = 32V)	VE(switch)		32	V
Voltage between collector and emitter of output tube	VCE(switch)		32	V
Driving tube collector voltage	Vc(driver)		32	V
Driving tube collector current	Ic(driver)		100	mA
Output current	ISW		1.2	A
power waste	PD		1.25	W
Working environment temperature	TA	0	+70	℃
Storage temperature	Tstg	- 65	+150	℃

Electrical characteristics (VCC = 5.0V; TA = 0℃ ~ 70 ℃, unless otherwise specified)

Characteristic conditions	Symbol	Specification value			Company
		minimum	typical	maximum	
Oscillator part					
Oscillation frequency (vpin5 = 0V, CT = 1.0nf, Ta = 25 ℃)	fosc	24	33	42	KHz
Charging current (VCC = 5.0V ~ 32V, Ta = 25℃)	Ichg	24	33	42	uA
Discharge current (VCC = 5.0V ~ 32V, Ta = 25℃)	Idischg	140	200	260	uA
Ratio of discharge to charging current (vpin7 = VCC, Ta = 25 ℃)	Idischg/Ichg	5.2	6.2	7.5	--
Current limiter (ichta = 25℃)	V_{PK}	250	300	350	mV
Output part:					
Saturation pressure drop (ISW = 1.0A, pin1,8 connection)	V_{CE}(sat)	--	1.0	1.3	V
Saturation pressure drop (ISW = 1.0A, rpin8 = 82 to VCC)	V_{CE}(sat)	--	0.45	0.7	V
DC amplification factor (ISW = 1a, VCE = 5V, Ta =25 ℃)	hfe	50	120	--	--
Collector leakage current (VCE = 30V)	I_c(off)	--	0.01	100	uA
Characteristic conditions	Symbol	Specification value			Company

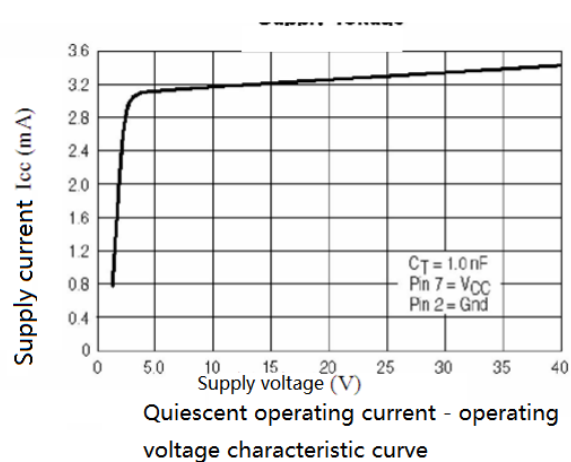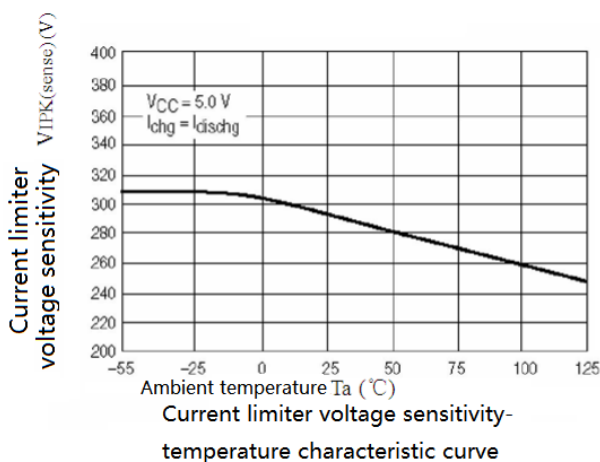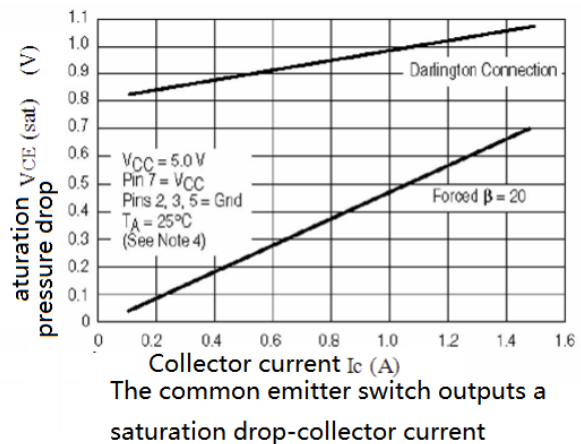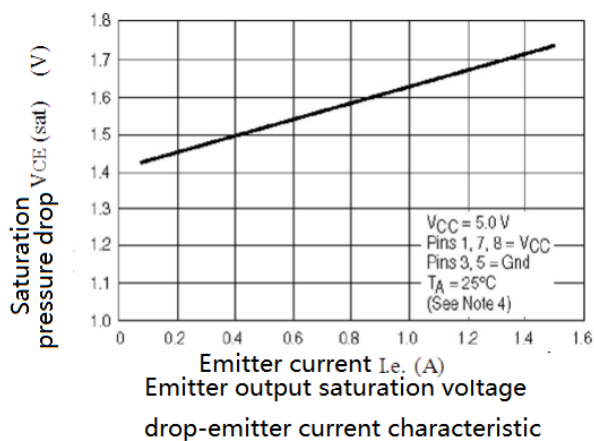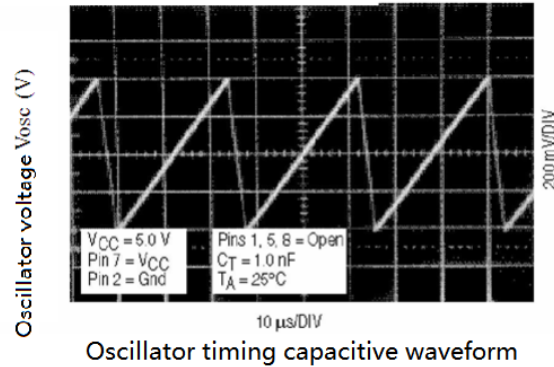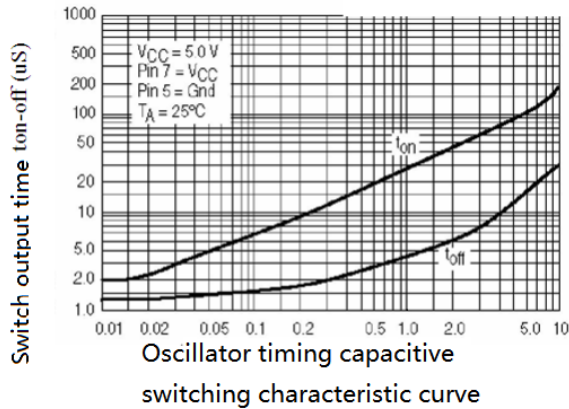|		minimum	typical	maximum	
Comparator part:					
Threshold voltage (TA = 25°C) (TA = 0 ~ 70°C)	Vth	1.23 1.21	1.25 --	1.27 1.29	V
Input bias current (VIN = 0V)	I IB	--	- 40	- 400	nA
Threshold voltage linear adjustment rate (VCC = 3.0 ~ 30V)	Regline	--	1.4	5.0	mV
Overall part:					
Power supply current (VCC = 5.0V ~ 30V, CT =1.0nf, vpin7 = VCC, vpin5 > Vth, vpin2 = GND, others are suspended)	ICC	----	2.5	4.0	mA

Application circuit diagram

Mc33063 as reverse DC-DC converter

As shown in Fig. 3, the voltage ripple and noise can be further reduced after the LC filter is added. The characteristics are shown in the table below

Parameter	Test conditions	Result
Linear adjustment rate	VIN=4.5~6.0V,Io=100mA	3.0mV=0.012%
Load adjustment rate	VIN=5.0V,Io=10~100mA	0.022V=+0.09%
Output ripple	VIN=5.0V,Io=100mA	500mVpp
Circuit limiting current	VIN=5.0V,RL=0.1	910mA
efficiency	VIN=5.0V,Io=100mA	64.5%
Output ripple	VIN=5.0V,Io=100mA	70mVpp

Characte ristic curve

Oscillator timing capacitive

switching characteristic curve

Oscillator timing capacitive waveform

Emitter output saturation voltage

drop-emitter current characteristic

The common emitter switch outputs a

saturation drop-collector current

Current limiter voltage sensitivity-

temperature characteristic curve

Quiescent operating current - operating

voltage characteristic curve

PACKAGE OUTLINE DIMENSIONS

SOP-8

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270(BSC)		0.050(BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

Ordering information

Order code	Package	Baseqty	Deliverymode
UMW MC33063ADR	SOP-8	2500	Tape and reel