

Features

- 700V Power MOSFET
- PWM operation with frequency jittering for low EMI
- Self-biased supply – saves transformer auxiliary winding and associated bias supply components
- Standby power < 50 mW at 265 VAC
- Fully integrated auto-restart for short circuit and open loop protection
- Lowest component count switcher solution
- Accurate hysteretic thermal shutdown protection – automatic recovery improves field reliability

Application

- Auxiliary power supply for consumer and home equipments
- Chargers or adapters for cell phones, PDAs, digital cameras, MP3 or portable audio players, and shavers
- LED Lights Driver

Description

GMC8364 integrate a 700 V power MOSFET, oscillator, simple ON/OFF control scheme, a high-voltage switched current source, frequency jittering, cycle-by-cycle current limit and thermal shutdown circuitry onto a monolithic IC. The startup and operating power are derived directly from the D (DRAIN) pin, eliminating the need for a bias winding and associated circuitry. Unlike conventional PWM

(Pulse Width Modulator) controllers, a simple ON/OFF control regulates the output voltage. The controller consists of an oscillator, feedback (sense and logic) circuit, 5.3 V regulators, VDD pin Under

Voltage Lockout circuit, over-temperature protection, frequency jittering, current limit circuit, and leading edge blanking integrated with a 700 V power MOSFET.

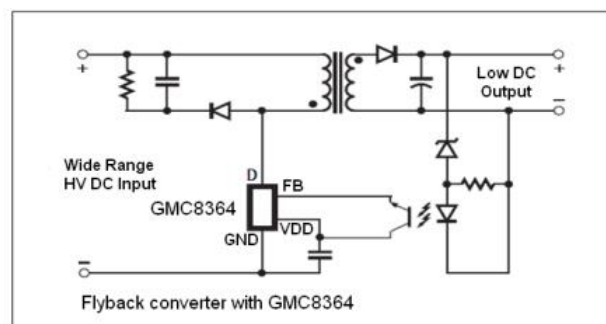


Figure 1. Typical Application with GMC8364

Output Power Table				
Production	230VAC $\pm$ 15%		85V-265V	
	Adapter (1)	Open Frame (2)	Adapter (1)	Open Frame (2)
GMC8364	5.5 W	9.0W	5.0W	6.0W

Table 1. Output Power Table

1. Typical continuous power in non ventilated enclosed adapter measured at 50 ° C ambient.
2. Maximum practical continuous power in an open frame design at 50 ° C ambient, with adequate heat sinking.

CONTENT

1	Block diagram.....	3
2	Pin settings.....	3
2.1	Connection diagram.....	3
2.2	Pin description.....	4
3	Electrical data.....	4
3.1	Maximum ratings.....	4
3.2	Electrical characteristics.....	5
4	Typical Application circuit.....	7

1 Block diagram

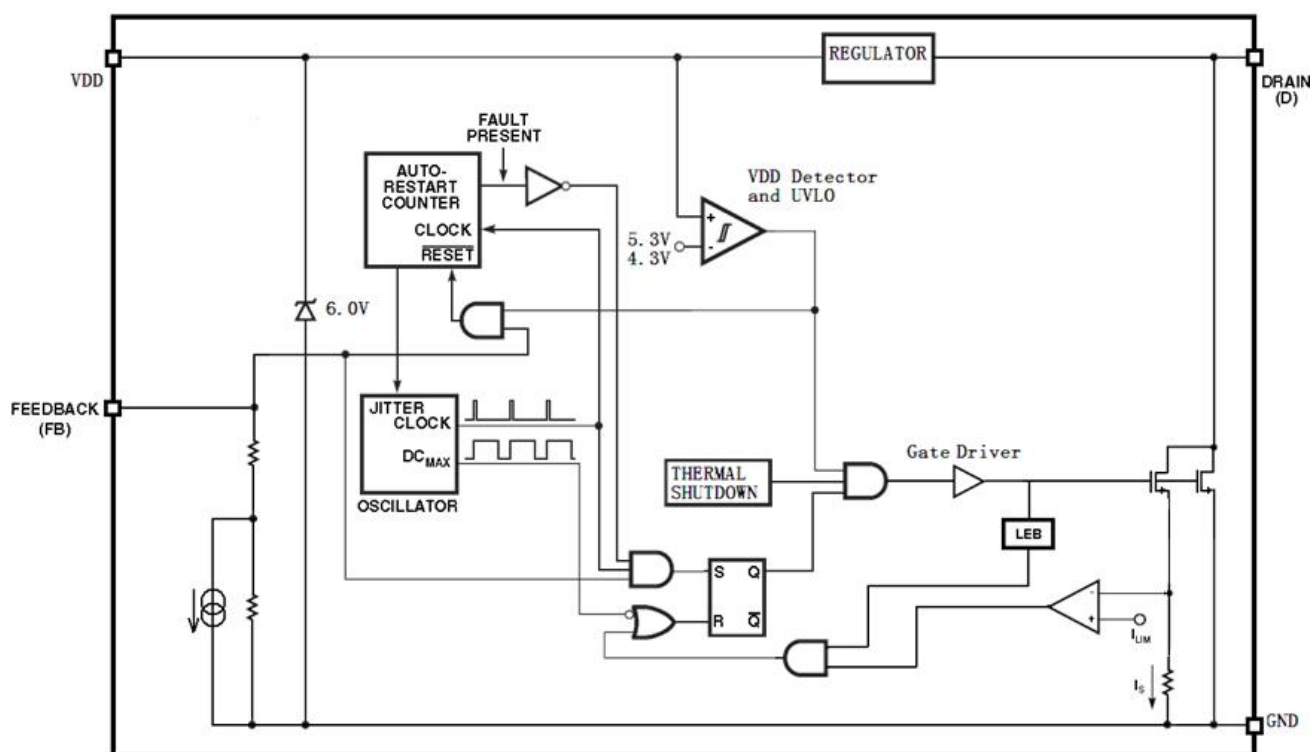


Figure 2. GMC8364 Block diagram

2 Pin settings

2.1 Connection diagram

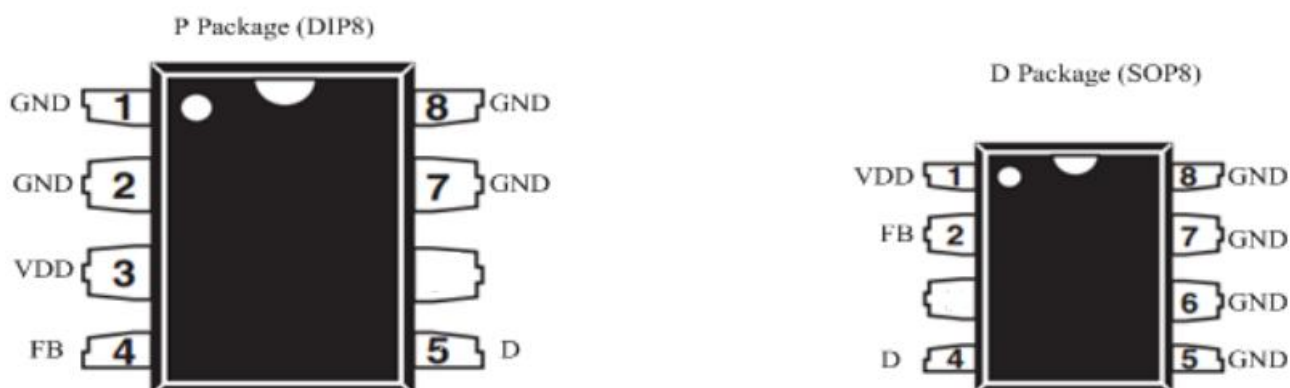


Figure 3. Connection diagram (top view)

2.2 Pin description

Name	Function
GND	This pin is the power MOSFET source connection. It is also the ground reference for the VDD and FEEDBACK pins.
VDD	Connection point for a 0.1 μ F external bypass capacitor for the internally generated 5.3 V supply. If an external bias winding is used, the current into the VDD pin must not exceed 1mA.
FB(Feedback)	During normal operation, switching of the power MOSFET is controlled by this pin. MOSFET switching is disabled when a current greater than 49 μ A is delivered into this pin.
D(Drain)	Power MOSFET drains connection. Provides internal operating current for both startup and steady-state operation.

Table 2. Pin description

3 Electrical data

3.1 Maximum ratings

Symbol	Parameter	Value	Unit
VDRAIN	Drain-to-source (ground) voltage	700	V
IDRAIN Peak DRAIN Current	GMC8364	400(750mA) ₍₁₎	mA
VDD	VDD Voltage	-0.3 to 7	V
FB	Feedback Voltage	-0.3 to 7	V
TJ	Operating junction temperature	-40 to 150	° C
TSTG	Storage temperature	-65 to 150	° C

Table 3. Absolute maximum ratings

1. The higher peak DRAIN current is allowed while the DRAIN voltage is simultaneously less than 400 V.

3.2 Electrical characteristics

Parameter	Symbol	Conditions		Min	Typ	Max	Units
CONTROL FUNCTIONS							
Output Frequency	f _{OSC}	T _J = 25 ° C	Average	124	132	140	KHz
			Peak-Peak Jitter		9		
Maximum Duty Cycle	DC _{MAX}	S2 Open		60			%
FEEDBACK Pin Turnoff Threshold Current	I _{FB}	T _J = 25 ° C		30	49	68	μA
FEEDBACK Pin Voltage at Turnoff Threshold	V _{FB}	T _J = 0 ° C to 125 ° C		1.55	1.65	1.75	V
DRAIN Supply Current	I _{S1}	V _{FB} ≥2 V See Note A (MOSFET Not Switching)			200	250	μA
	I _{S2}	FEEDBACK Open See Note B (MOSFET Switching)			250	300	μA
VDD Pin Charge Current	I _{CH1}	VDD = 0 V, T _J = 25 ° C		-4.5	-3.2	-1.5	mA
	I _{CH2}	VDD= 4 V, T _J = 25 ° C		-3.0	-2.0	-1.1	mA
VDD Pin Voltage	V _{DD}			4.9	5.3	5.5	V
VDD Pin Voltage Hysteresis	V _{DDH}			0.8	1.0	1.2	V
VDD Pin Supply Current	I _{VDDSC}	See Note C		68			μA
CIRCUIT PROTECTION							
Current Limit	I _{LIMIT}	di/dt = 50 mA/us T _J = 25 ° C	GMC8364	240	270	300	mA
Leading Edge Blanking Time	t _{LEB}	T _J = 25 ° C See Note D	GMC8364	300	375		ns
Current Limit Delay	t _{LTD}				125		ns
Thermal Shutdown Temperature	T _{SD}			135	142	150	° C
Thermal Shutdown Hysteresis	T _{SHD}	See Note E			75		° C
OUTPUT							
ON-State Resistance	R _{DS(ON)}	GMC8364 ID =20mA	T _J = 25 ° C		30	36	Ω
			T _J = 100 ° C		38	45	
OFF-State Drain Leakage Current	I _{DSS}	V _{BP} = 6 V, V _{FB} ≥2 V, V _{DS} = 560 V,T _J = 125 ° C		GMC8364		80	μA

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Breakdown Voltage	B _{VDSS}	V _{BP} = 6.0 V, V _{FB} ≥ 2 V, See Note F, T _J = 25 ° C	700			V
DRAIN Supply Voltage			50			V
Output Enable Delay	t _{EN}	See Figure 6			10	μs
Auto-Restart ON-Time	t _{ARO}	T _J = 25 ° C See Note G		20		ms
Auto-Restart Cycle	t _{AR}			800		ms

NOTES:

- A. Total current consumption is the sum of I_{S1} and I_{DSS} when FEEDBACK pin voltage is ≥ 2 V (MOSFET not switching) and the sum of I_{S2} and I_{DSS} when FEEDBACK pin is shorted to SOURCE (MOSFET switching).
- B. Since the output MOSFET is switching, it is difficult to isolate the switching current from the supply current at the DRAIN. An alternative is to measure the VDD pin current at 6 V.
- C. This current is only intended to supply an optional opt-coupler connected between the VDD and FEEDBACK pins and not any other external circuitry.
- D. This parameter is guaranteed by design.
- E. This parameter is derived from characterization.
- F. Breakdown voltage may be checked against minimum B_{VDSS} specification by ramping the DRAIN pin voltage up to but not exceeding minimum B_{VDSS}.
- G. Auto-restart on time has the same temperature characteristics as the oscillator (inversely proportional to frequency).

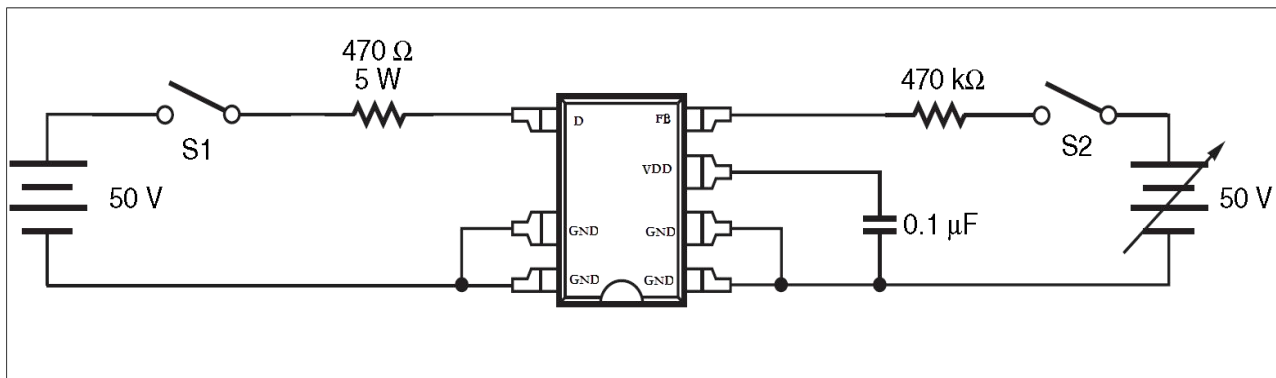


Figure 4. GMC8364 General Test Circuit

4 Typical Application circuit

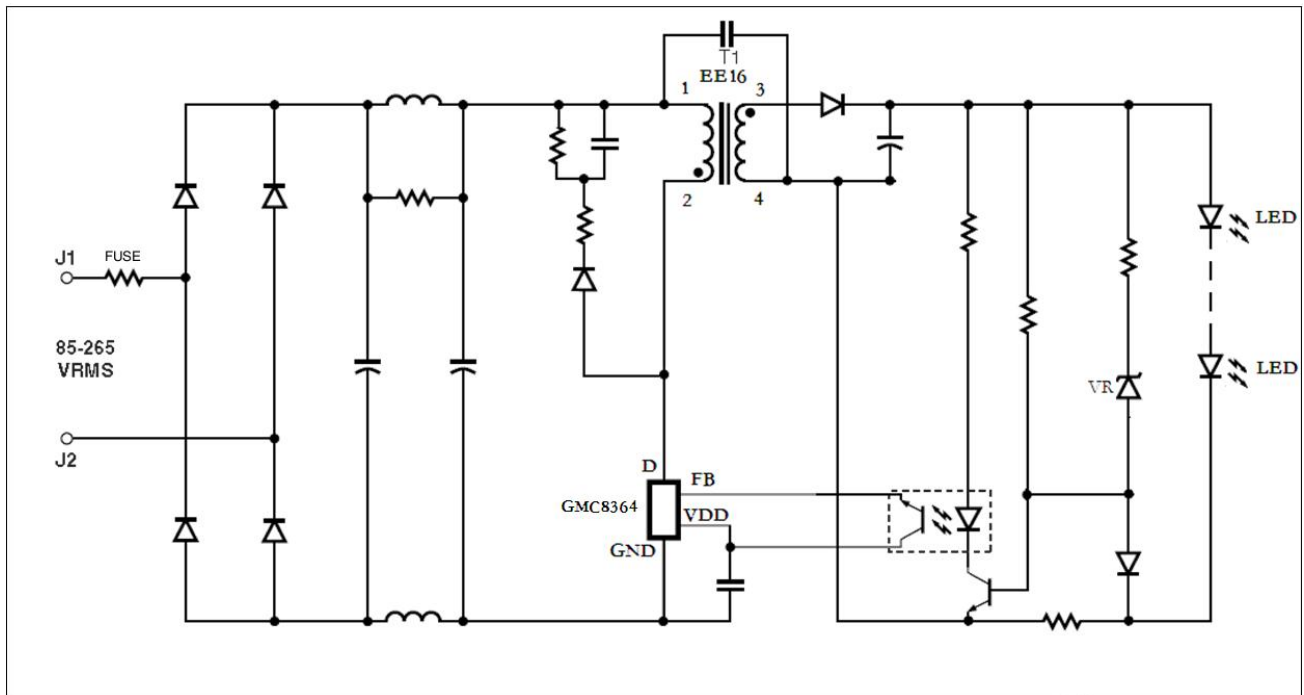


Figure 6. 3.0W~5.0 W Universal Input CV/CC LED Driver Using GMC8364.