ADD MICROTECH CORP.
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AMC7160

POWER LED DRIVER CONTROLLER

DESCRIPTION

AMC7160 is a PWM power LED driver control IC. The driving current from few milliamps up to more than 2A that depend on external power MOSFET select. It allows high brightness power LED operating at high efficiency for 85~265V AC power source. Up to 300KHz precision operation frequency that controlled by external Resistor and capacitor. Current sense resistor decides the maximum output current to single LED or a LED string.

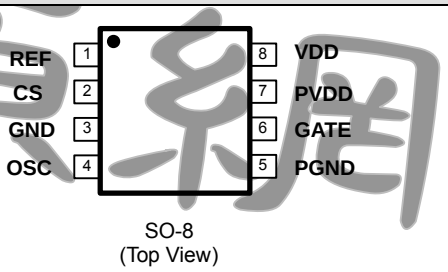
FEATURES

- **> 90% Efficiency.**
- **Controller for Constant Current Power LED Driver**
- **Application From a Few mA to >2A LED Driving Current**
- **LED String From One to Hundred Diodes.**
- **Precision Operation Frequency.**
- **SO-8 Package.**

APPLICATIONS

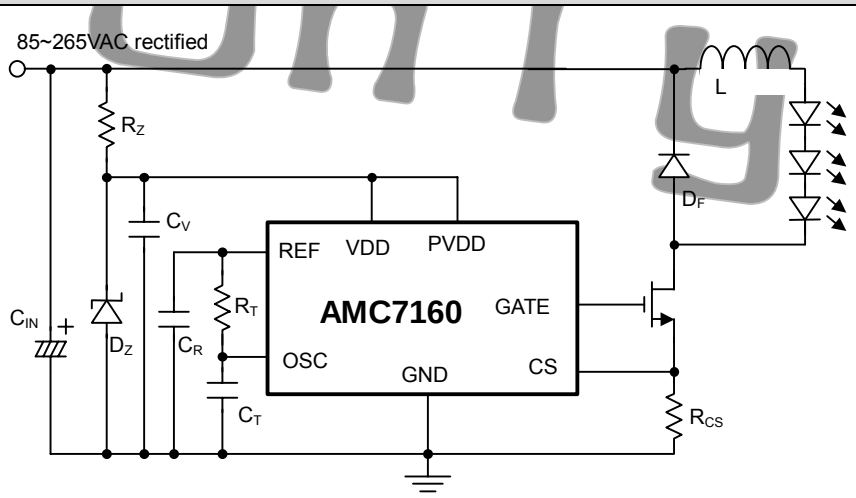
- AC/DC LED driver
- Lighting

PACKAGE PIN OUT



SO-8
(Top View)

TYPICAL APPLICATION



ORDER INFORMATION

DM	SO
	8-pin
AMC7160DMF (Lead Free)	

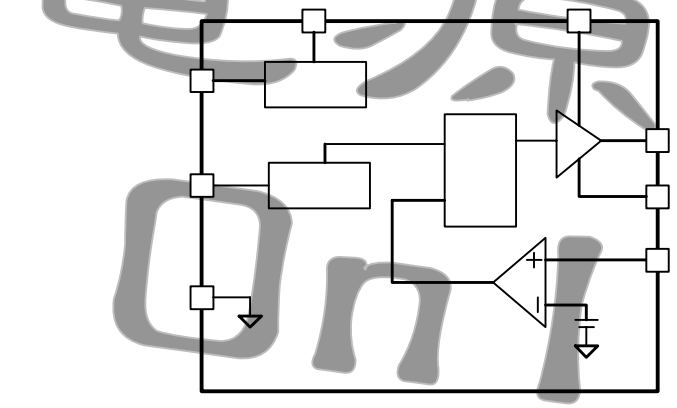
Note: 1. All surface-mount packages are available in Tape & Reel. Append the letter "T" to part number (i.e. AMC7160DMFT).
2. The letter "F" is marked for Lead Free process.

POWER DISSIPATION TABLE

Package	θ_{JA} (^{O}C /W)	Derating factor (mW/^{O}C) $T_A \geqq 25^{O}C$	$T_A \leqq 25^{O}C$ Power rating (mW)	$T_A=70^{O}C$ Power rating (mW)
SO-8	165	6	757	487

Note :
Junction Temperature Calculation: $T_J = T_A + (P_D \times \theta_{JA})$.
P_D: Power Dissipation, T_A: Ambient temperature, θ_{JA}: Thermal Resistance-Junction to Ambient
The θ_{JA} numbers are guidelines for the thermal performance of the device/PC-board system.
All of the above assume no ambient airflow.

BLOCK DIAGRAM



PIN DESCRIPTION

Pin Number	Pin Name	Pin Function
6	GATE	Driver output pin, Connect to power MOSFET gate.
2	CS	Current senses pin. Threshold voltage 450mV.
4	OSC	Oscillator timing pin, Connect to REF via timing resistor and connect to ground via timing capacitor.
1	REF	5V reference voltage.
8	VDD	Input supply Voltage 9V ~ 20V
7	PVDD	Supply voltage for output stage.
3	GND	Ground
5	PGND	Ground for output stage.

ABSOLUTE MAXIMUM RATINGS

Input Voltage, VDD, PVDD	-0.3V to 20V
Output Voltage, GATE	-0.3V to 20V
Maximum Junction Temperature , T_J	150°C
Storage Temperature Range	-40°C to 150°C
Lead Temperature (soldering, 10 seconds)	260°C

Note:
Exceeding these ratings could cause damage to the device. All voltages are with respect to Ground.
Currents are positive into, negative out of the specified terminal.

RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	Min	Typ	Max	Unit
Supply Voltage	VCC	9		20	V
Operating free-air temperature range	Ta	-40		85	℃

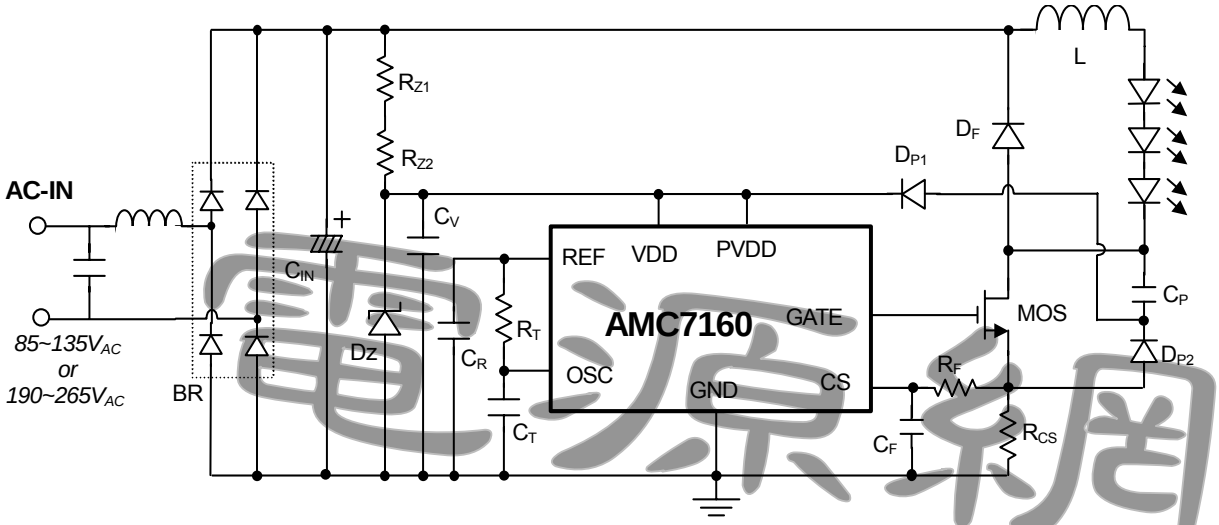
ELECTRICAL CHARACTERISTICS

VCC=15V, Ta=25°C. (Unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Supply Current	I_{DD}	VCC=9~20V		4	6	mA
VDD Under Voltage Lockout			7.8	8.4	9.0	V
REF Reference Voltage	V_{REF}	I_O=1mA	4.9	5.0	5.1	V
REF Output Short Circuit Current	I_{RS}		-30	-80	-180	mA
Current Sense Threshold Voltage	V_{CS}	VCC- V_{CS}	405	450	495	mV
Current Sense Input Bias Current	I_{CSB}			-.01	-2	uA
Delay from Current Sense to Output	T_{CSO}			120	250	nS
GATE Output Rise Time		C_L=500pF		20	40	nS
GATE Output Fall Time		C_L=500pF		15	30	nS
Oscillator Frequency	f_{OSC}	R=16K, C=1nF	92	100	108	KHz
Maximum Output Duty Cycle			94	96		%
OSC Discharge Current		OSC=2V	7.5	8.5	9.5	mA

APPLICATION INFORMATION

In order to reach best performance, following application circuit was suggested. Some components value is adjusted at different AC supply voltage range. Also the inductor valune higly depends on the LED numbers and LED driving current.

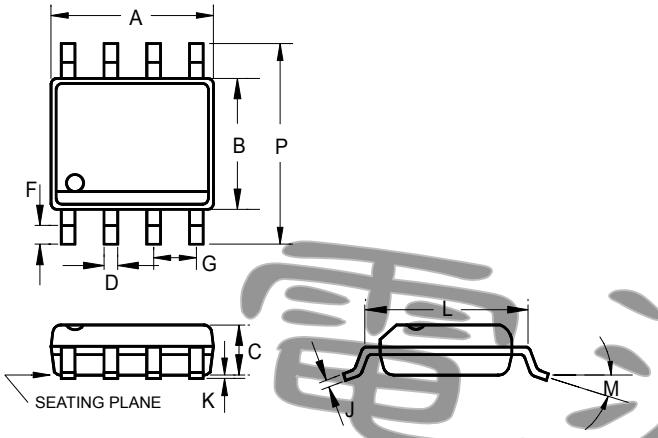


Bill of Material

C.R. No.	Q'TY	Description		
IC	1	AMC7160		
BR	1	Mini Surface Mount Bridge Rectifier (0.8A)		
C_{IN}	1	E.C Cap：10uF / 450V / -40℃ ~ 105℃		
R_{Z1}、R_{Z2}	2	560 KΩ/ 0.25W		
D_Z	1	V_Z = 20V / 0.5W (1N5250B)		
C_V	1	E.C Cap：10uF / 50V / -40℃ ~ 105℃		
C_R	1	100 nF/ 50V		
R_T	1	47 KΩ / 0.125W		
C_T	1	680 pF/ 50V		
R_F	1	390 Ω/ 0.125W		
C_F	1	1 nF/ 50V		
D_F	1	Super Fast Rectifiers (Reverse Voltage=400V, Forward Current=1.0A)		
C_P	1	AC-IN = 85 ~135 VAC	1500 pF / 500V	
		AC-IN = 190 ~265 VAC	560 pF / 1KV	
D_{P1}、D_{P2}	2	1N4148		
L	1	＞ 2 mH / 400mA	3 ~ 5 LEDs	2 mH
			6 ~ 8 LEDs	3 mH
			9 ~ 11 LEDs	4 mH
			12 ~ 14 LEDs	5 mH
			15 ~ 17 LEDs	6 mH
Power MOSFET	1	Power NMOS (IRF840/TO-220) / Need Heat-Sink (Thermal Resistance＜6℃/W)		
R_{CS}	1	AC-IN = 85 ~135 VAC	1.1 Ω / 0.25W	I_{LED} = 350 mA
		AC-IN = 190 ~265 VAC	1.2 Ω / 0.25W	

PACKAGE

8-Pin Plastic S.O.I.C.



	INCHES			MILLIMETERS		
	MIN	TYP	MAX	MIN	TYP	MAX
A	0.183	-	0.202	4.65	-	5.13
B	0.144	-	0.163	3.66	-	4.14
C	0.068	-	0.074	1.35	-	1.88
D	0.010	-	0.020	0.25	-	0.51
F	0.015	-	0.035	0.38	-	0.89
G	0.050 BSC			1.27 BSC		
J	0.007	-	0.010	0.19	-	0.25
K	0.005	-	0.010	0.13	-	0.25
L	0.189	-	0.205	4.80	-	5.21
M	-	-	8°	-	-	8°
P	0.228	-	0.244	5.79	-	6.20