AMC7135

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350mA ADVANCED CURRENT REGULATOR

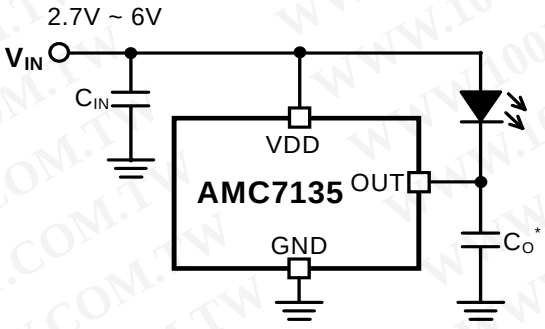
DESCRIPTION

The AMC7135 is a low dropout current regulator rated for 350mA constant sink current. The low quiescent current and low dropout voltage are achieved by advanced Bi-CMOS process.

FEATURES

- **350mA constant sink current.**
- **Output short / open circuit protection.**
- **Low dropout voltage.**
- **Low quiescent current**
- **Supply voltage range 2.7V ~ 6V**
- **2KV HBM ESD protection**
- **Advanced Bi-CMOS process.**
- **SOT-89 and TO-252 package**

TYPICAL APPLICATION CIRCUIT

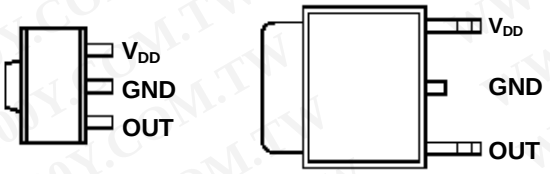


* C_O is strongly recommended.

APPLICATIONS

- Power LED driver
- Cap Lamp
- Refrigerator Lighting

PACKAGE PIN OUT



SOT-89 **TO-252**

(Top View)

ORDER INFORMATION

I_{OUT}	PK	SOT-89	SJ	TO-252
		3-pin		3-pin
340-380mA	**AMC7135PKF**		**AMC7135SJF**	
300-340mA	**AMC7135PKFA**		**AMC7135SJFA**	

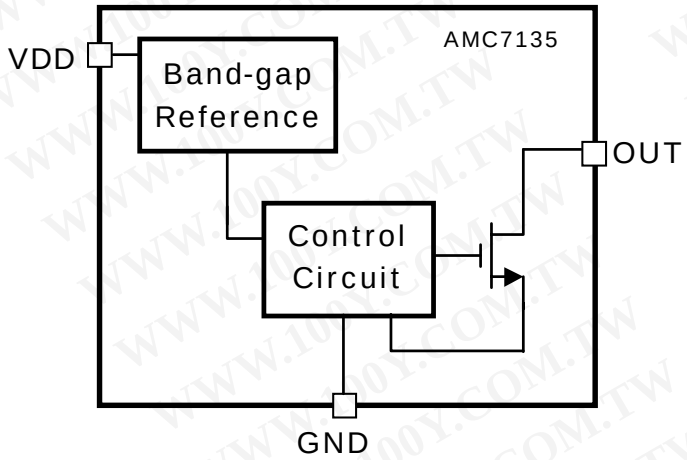
Note: 1. All surface-mount packages are available in Tape & Reel. Append the letter "T" to part number (i.e. AMC7135PKFAT).
2. The letter "F" is marked for Lead Free process.
3. The letter "A" is marked for current ranking.

ABSOLUTE MAXIMUM RATINGS (Note)

Input Voltage, V_{DD}	-0.3V to 7V
Output Voltage, V_{OUT}	-0.3V to 7V
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.

BLOCK DIAGRAM



PIN DESCRIPTION

Pin Name	Pin Function
V_{DD}	Power supply.
OUT	Output pins. Connected to load.
GND	Ground.

RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	Min	Typ	Max	Unit
Supply Voltage	V_{DD}	2.7		6	V
Output Sink Current	I_{OUT}			400	mA
Operating Free-air Temperature Range	T_A	-40		+85	℃

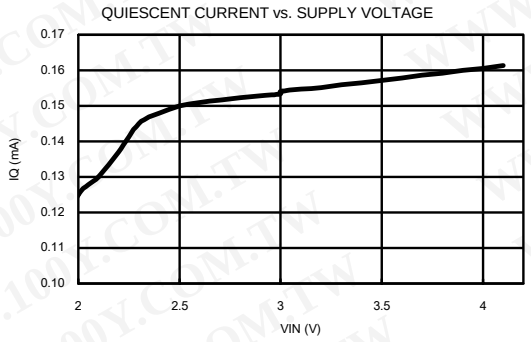
DC ELECTRICAL CHARACTERISTICS

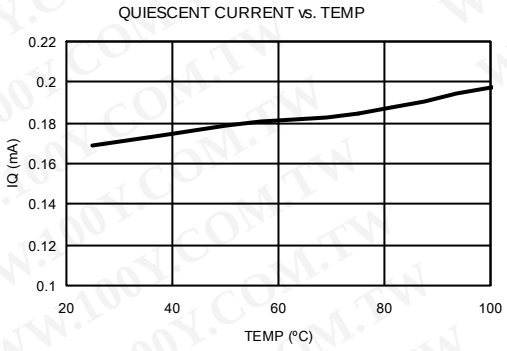
V_{DD}=3.7V, T_A=25°C, No Load, (Unless otherwise noted)

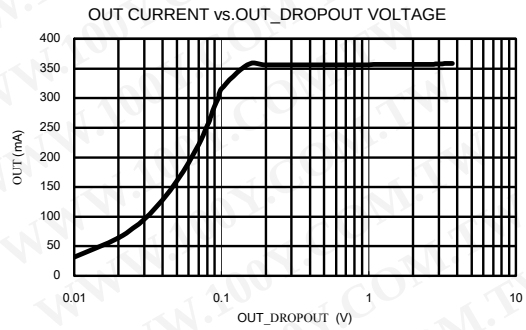
Parameter	Symbol	Condition	Min	Typ	Max	Unit	Apply Pin
Output Sink Current	I_{SINK}	V_{OUT}=0.2V	340	360	380	mA	OUT
		V_{OUT}=0.2V, Rank A	300	320	340	mA	
Load Regulation		V_{OUT}=0.2V to 3V			3	mA/V	
Line Regulation		V_{DD}= 3V to 6V, V_{OUT}=0.2V			3	mA/V	
Output Dropout Voltage	V_{OUTL}			120		mV	
Supply Current Consumption	I_{DD}			200		uA	VDD

Note 1: Output dropout voltage: 90% x I_{OUT} @ V_{OUT}=200mV

TYPICAL OPERATION CHRACTERISTICS



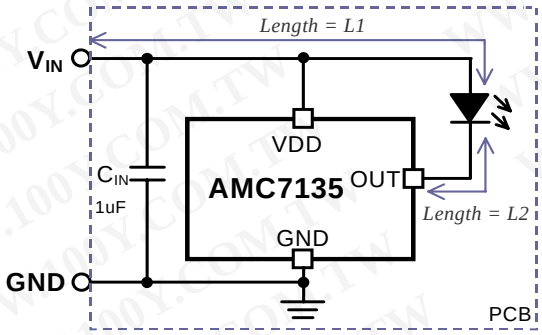




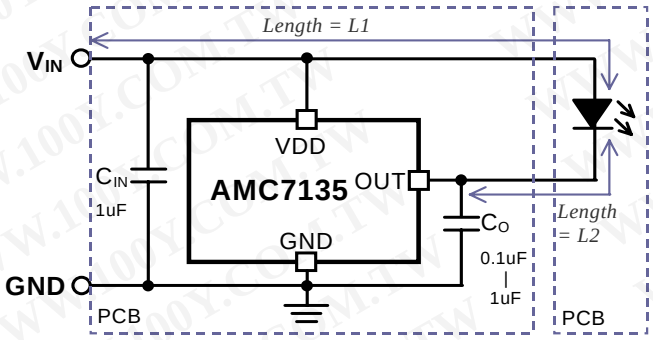
APPLICATION INFORMATION

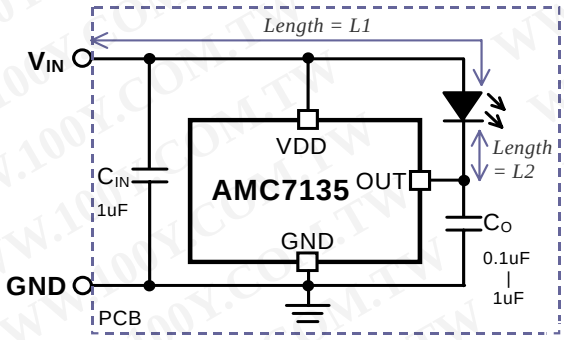
Output Capacitor C_O and PCB layout:

The output capacitor C_O may be removed under certain condition. Please refer to the following figure. If LED and AMC7135 is located in the same PCB, and the length of the routing path L1<10cm & L2<3cm, the output capacitor C_O can be neglected.



If LED and AMC7135 is located in separate PCBs, or the length of the routing path L1>10cm or L2>3cm, the output capacitor C_O should be added. Typically, capacitance of 0.1uF ~ 1uF is recommended and 1uF is needed when L2 is much longer than 3cm.





The Maximum Power Dissipation on Regulator:

$$P_{D(MAX)} = V_{OUT(MAX)} \times I_{OUT(NOM)} + V_{IN(MAX)} \times I_Q$$

$V_{OUT(MAX)}$ = the maximum voltage on output pin;
$I_{OUT(NOM)}$ = the nominal output current;
I_Q = the quiescent current the regulator consumes at $I_{OUT(MAX)}$;
$V_{IN(MAX)}$ = the maximum input voltage.

Thermal Consideration:

The maximum junction temperature ratings of AMC7135 should not be exceeded under continuous normal load conditions. When power consumption is over about 700mW (SOT-89 package, at T_A=70°C) or 1000mW (TO-252 package, at T_A=70°C), additional heat sink is required to control the junction temperature below 120°C.

The junction temperature is:

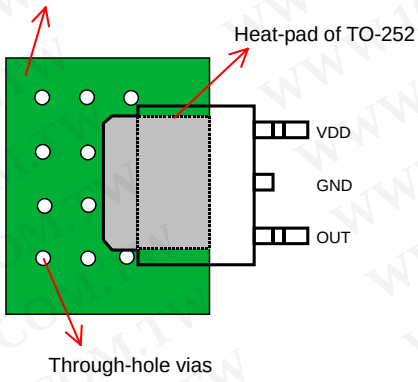
$$T_J = P_D (\theta_{JT} + \theta_{CS} + \theta_{SA}) + T_A$$

P_D .: Dissipated power.
θ_{JT}: Thermal resistance from the junction to the mounting tab of the package.
For SOT-89 package, θ_{JT} = 35.0 °C /W. For TO-252 package, θ_{JT} = 7.0 °C /W.
θ_{CS}: Thermal resistance through the interface between the IC and the surface on which it is mounted.
(typically, θ_{CS} < 1.0°C /W)
θ_{SA}: Thermal resistance from the mounting surface to ambient (thermal resistance of the heat sink).

If PC Board copper is going to be used as a heat sink, below table can be used to determine the appropriate size of copper foil required. For multi-layered PCB, these layers can also be used as a heat sink. They can be connected with several through-hole vias.

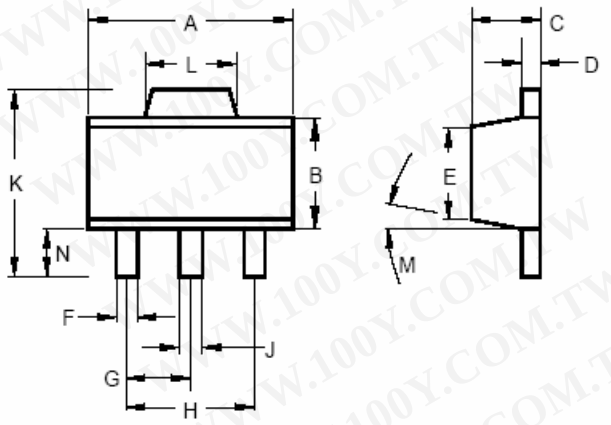
PCB θ_{SA} (°C /W)	59	45	38	33	27	24	21
PCB heat sink size (mm^2)	500	1000	1500	2000	3000	4000	5000

Recommended figure of PCB area used as a heat sink.



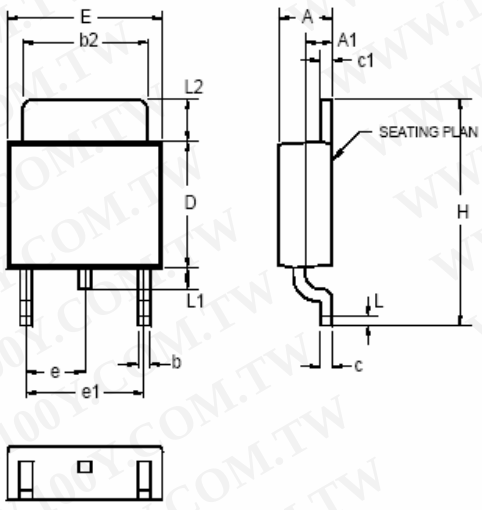
PACKAGE

3-Pin Surface Mount SOT-89



	INCHES			MILLIMETERS		
	MIN	TYP	MAX	MIN	TYP	MAX
A	0.173	-	0.181	4.39	-	4.59
B	0.090	-	0.102	2.28	-	2.59
C	0.055	-	0.063	1.39	-	1.60
D	0.015	-	0.017	0.38	-	0.43
E	0.084	-	0.090	2.13	-	2.28
F	0.016	-	0.019	0.33	-	0.48
G	0.059 BSC			1.49 BSC		
H	0.118 BSC			2.99 BSC		
J	0.018	-	0.022	0.45	-	0.55
K	0.155	-	0.167	3.94	-	4.24
L	0.067	-	0.072	1.70	-	1.82
M	0°	-	8°	0°	-	8°
N	0.035	-	0.047	0.89	-	1.19

3-Pin Surface Mount TO-252 (SJ)



	INCHES			MILLIMETERS		
	MIN	TYP	MAX	MIN	TYP	MAX
A	0.086	-	0.094	2.18	-	2.39
A1	0.040	-	0.050	1.02	-	1.27
b	-	0.024	-	-	0.61	-
b2	0.205	-	0.215	5.21	-	5.46
c	0.018	-	0.023	0.46	-	0.58
c1	0.018	-	0.023	0.46	-	0.58
D	0.210	-	0.220	5.33	-	5.59
E	0.250	-	0.265	6.35	-	6.73
e	0.090 BSC			2.29 BSC		
e1	0.180 BSC			4.58 BSC		
H	0.370	-	0.410	9.40	-	10.41
L	0.020	-	-	0.51	-	-
L1	0.025	-	0.040	0.64	-	1.02
L2	0.060	-	0.080	1.52	-	2.03

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