AMC7169

500mA LED PROTECTOR

DESCRIPTION

The AMC7169 is a two terminal LED protector with low dropout voltage rated for 500mA bypass current. Low operation current at monitoring mode and high bypass current capability at triggered mode. Build-in reverse diode for bypass reversed supply voltage.

The AMC7169 is designed for parallel connection with power LED. It bypasses LED driving current when LED at open circuit condition. It also bypasses LED driving current at reverse connected driving current to LED.

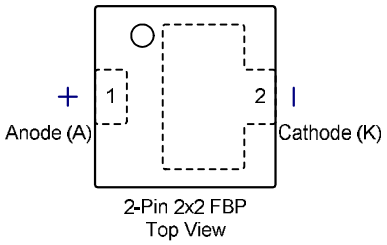
FEATURES

- **5V Protection Trigger Voltage**
- **500mA Bypass Current Capability**
- **1V Bypass Dropout Voltage**
- **500mA Reverse Current Capability**
- **8KV HBM ESD Protection**
- **2-Lead 2mm x 2mm FBP Package**

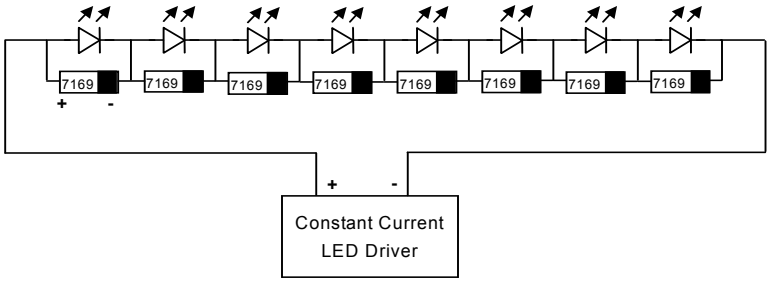
APPLICATIONS

- LED Lighting
- LED backlight for LCD TV/ Monitor
- High Power LED Protection

PACKAGE PIN OUT



TYPICAL APPLICATION



ORDER INFORMATION

W	**FBP-2mmx2mm**
	2 pins
	AMC7169WFT

Note: FBP-2x2 package is available in Tape & Reel. Append the letter "T" to part number (i.e. AMC7169WFT).

ABSOLUTE MAXIMUM RATINGS (Note)	
Input Sustaining Voltage	40V
Maximum Operating Junction Temperature, T_J	150°C
Operating Temperature, T_{opr}	-40°C to 85°C
Storage Temperature Range	-55°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.

PIN DESCRIPTION

Pin Number	Pin Name	Pin Function
1 (+)	Anode (A)	Connected to LED's anode.
2 (−)	Cathode (K)	Connected to LED's cathode and use this pin to enhance the power dissipation ability.

THERMAL DATA	
Thermal Resistance from Junction to Ambient, θ_{JA}	100°C/W

Junction Temperature Calculation: $T_J = T_A + (P_D \times \theta_{JA})$.

The θ_{JA} numbers are guidelines for performance of the device/PCB system.

Connect the ground pin to ground using a large pad or ground plane for better heat dissipation. All of the above assume no ambient airflow.

Maximum Power Calculation:

$$P_{D(MAX)} = \frac{T_{J(MAX)} - T_{A(MAX)}}{\theta_{JA}}$$

T_J (°C): Maximum recommended junction temperature.

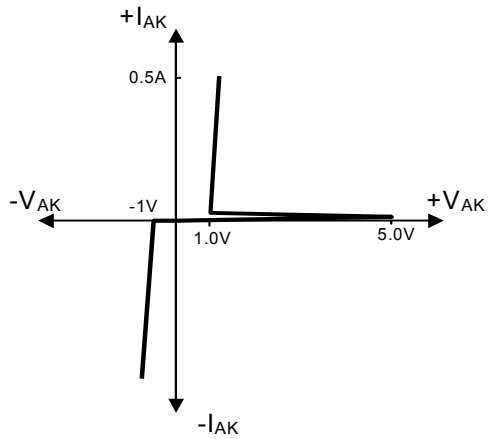
T_A (°C): Ambient temperature of the application.

θ_{JA} (°C/W): Junction-to-temperature thermal resistance of the package, and other heat dissipating materials.

RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	Min.	Typ.	Max.	Units
Bypass Current (with Adequate Heat Sinking)	I_{BP}			500	mA
Reverse Current	I_R			500	mA
Operating Ambient Temperature Range	T_A	-40		85	°C
Operating Junction Temperature	T_J			125	°C

I-V CURVE



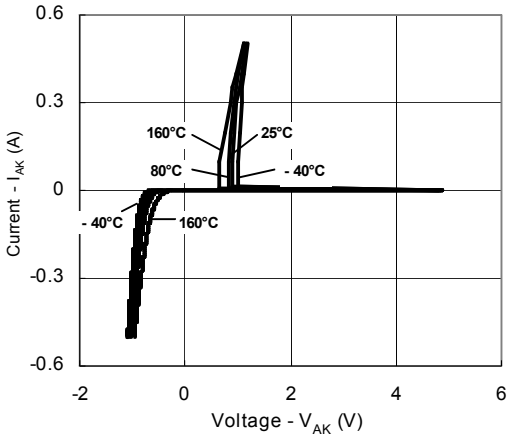
ELECTRICAL CHARACTERISTICS

Unless otherwise specified, T_A=25°C, and are for DC characteristics only. (Low duty cycle pulse testing techniques are used which maintains junction and case temperatures equal to the ambient temperature.)

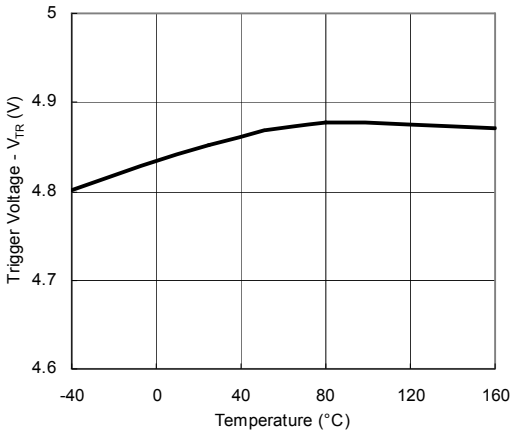
Parameter	Symbol	Conditions	Min	Typ	Max	Units
Trigger Voltage	V_{TR}		4.65	4.9	5.15	V
Drop-out Voltage	V_{DO}	I_{AK} =350mA		1	1.35	V
Reverse Drop-out Voltage	V_{RDO}	I_R = 350mA		1.1	1.35	V
Monitoring Current	I_{MAC}	V_{AK} = 3.5V		100	150	uA
Break-over Current	I_{BAC}				20	mA
Trigger Delay Time	t_D	I_{AK}=350mA		100		nS

CHARACTERISTIC CURVES

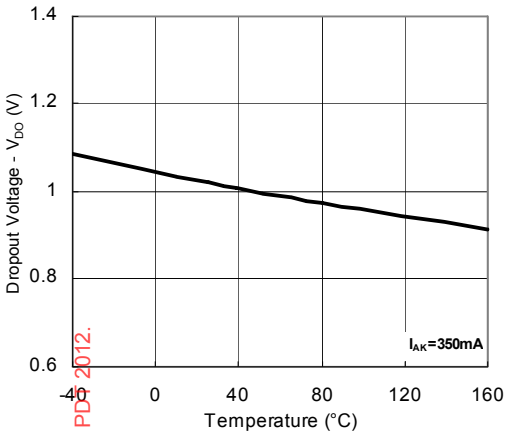
I-V Curves vs. Temperature



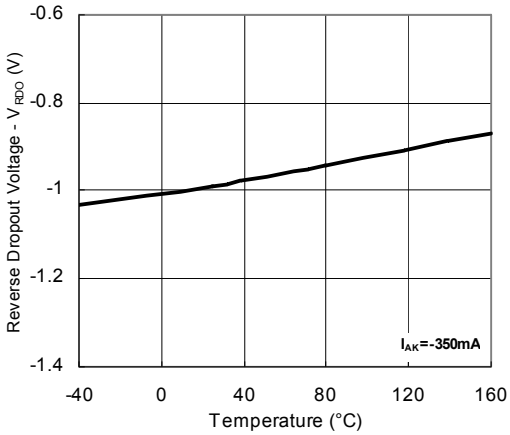
Trigger Voltage vs. Temperature



Dropout Voltage vs. Temperature



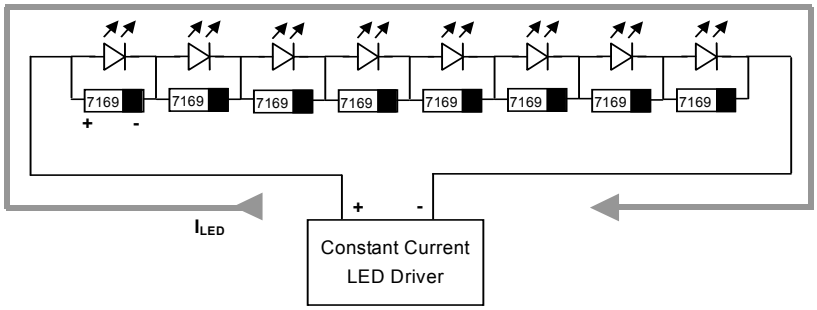
Reverse Dropout vs. Temperature



APPLICATION INFORMATION

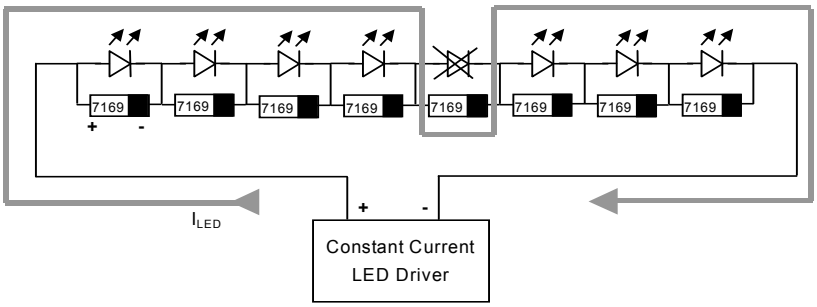
Monitoring Mode:

The forward voltage drop (V_F) of all LEDs should be less than 4V, which is lower than AMC7169 trigger voltage 5.0V. All AMC7169 at monitoring mode would only sink ~uA current from the system.



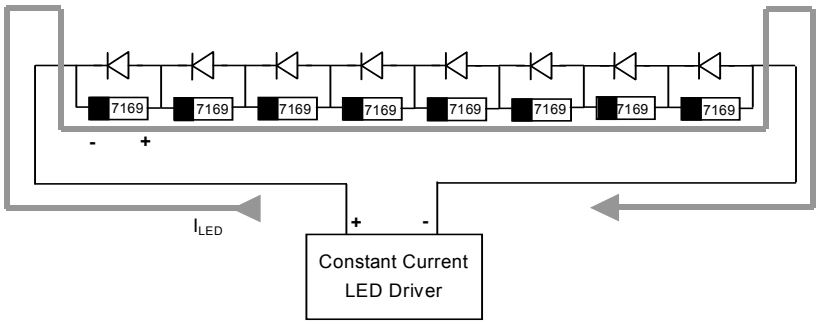
Triggered Mode:

Any LED may become open circuit because of LED damage or wiring problem. When it happens, the voltage drop across adjacent AMC7169 starts to increase, and then AMC7169 will be trigged when the voltage drop reaches 5V. The dropout voltage on AMC7169 will be around 1V and the LED current I_{LED} will be bypassed to next LED. All LEDs will work well except the abnormal LED bypassed.



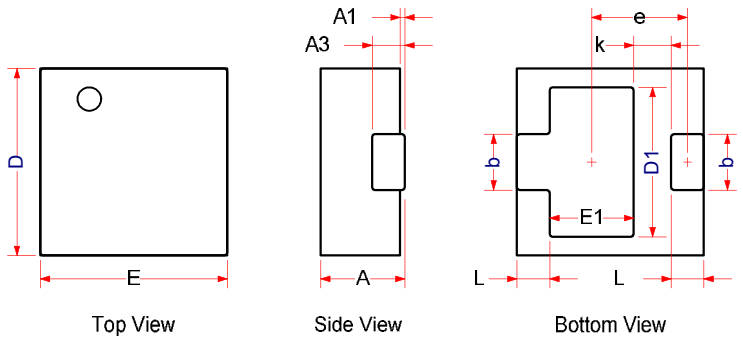
Reverse Mode:

When the LED string was reversed connected to the driver, the AMC7169 build-in reverse protection diode was turned-on to bypass the current. Such that the reverse voltage on LEDs was reduced to prevent LED damage.



PACKAGE

2x2 FBP



SYMBOLS	MIN.	NOM.	MAX.
A	0.800	0.850	0.900
A1	0.000	-	0.050
A3	-	0.203	-
b	0.550	0.600	0.650
D	1.924	2.000	2.076
D1	1.580	1.680	1.780
E	1.924	2.000	2.076
E1	0.820	0.920	1.020
e	-	1.045	-
k	0.200	-	-
L	0.254	0.330	0.406

UNIT: MILLIMETERS