ADDtek
www.addmtek.com

A703

2 CHANNELS 150mA HIGH VOLTAGE ADJUSTABLE CURRENT REGULATOR

DESCRIPTION

A703 is a high voltage, adjustable constant current driver for LED applications. Two regulated current ports are designed to provide uniform and pure DC constant current sinks for driving LEDs within a large range V_F variations.

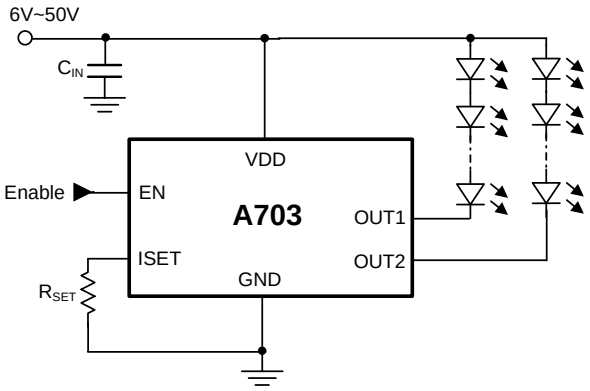
A703 provides 2-channel constant current ports to match LEDs with equal current. Users may adjust the output current from 20mA to 150mA through an external resistor, R_{SET}, which gives users flexibility in controlling the light intensity of LEDs. It also could adjust LED brightness from 0% to 100% via enable pin (EN) with Pulse Width Modulation signal.

The thermal protection function protects IC from over temperature (150°C). Also, the thermal pad enhances the package power dissipation capability.

FEATURES

- **2 constant-current output channels.**
- **Output current adjustable through external resistor.**
- **Constant output current range: 20mA~150mA.**
- **Wide supply voltage range: 6V~50V.**
- **75V output sustaining voltage.**
- **Lead free and Green package available.**

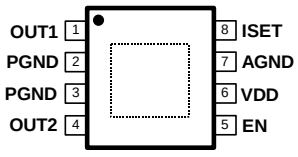
TYPICAL APPLICATION CIRCUIT



APPLICATIONS

- Automotive interior lighting
- Channel letter
- LED backlight driver for photo-frame, portable DVD, LCD Monitor, and LCD TV.
- Indoors lighting.

PACKAGE PIN OUT



SOP-EP-8L
(Top View)

ORDER INFORMATION

T_A (°C)	E	SOP-EP
		8 pin
-40 ~ 85		A703EFT (Lead Free)
		A703EGT (Green)

Note:

Part Number: **A 7 0 3** □ □ □

Package Type. E: SOP-EP-8L

Packing. T: Tape & Reel

Package Process. F: Lead Free; G: Green

ABSOLUTE MAXIMUM RATINGS (Note)	
Supply Voltage, V_{DD}	6V to 50V
Output Current, I_{OUTn}	180mA
Sustaining Voltage, V_{DS}	-0.4V to 75V
Maximum Operating Junction Temperature, T_J	125°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.

RECOMMENDED OPERATING CONDITIONS

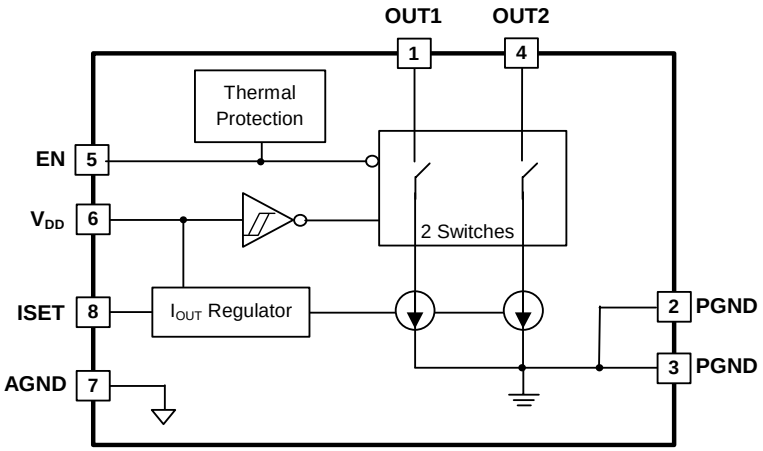
Parameter	Symbol	Min	Typ	Max	Unit
Supply Voltage	V_{DD}	6		50	V
Output Sink Current	I_{OUT}			150	mA
Operating free-air temperature range	T_A	-20		+85	°C

PIN DESCRIPTION

Pin Number	Pin Name	Pin Function
1, 4	OUT1, OUT2	Constant Current Output pins. Sink current is decided by the current on R_{SET} connected to I_{SET}. $I_{OUTn} = 180 \times I_{SET}$.
2, 3	PGND	Power Ground pin for current sink.
5	EN	Enable Control pin. High enables the chip.
6	VDD	Power Supply pin.
7	AGND	Analog Ground pin for control logic. Must be connected to PGND on PCB.
8	I_{SET}	Output current set input. Connect a resistor between I_{SET} pin and AGND pin to set the LED bias current following $I_{SET} = 1.2V/R_{SET}$. **Don't leave this pin open as shutdown control.**
Exposed Pad	Heat Pad (PGND)	Heat pad. Connect to power ground. Must be soldered to PGND on PCB.

Note: The thermal pad is suggested connect to GND on PCB. And thermal conductivity will be improved, if a copper foil on PCB is soldered with thermal pad.

BLOCK DIAGRAM



THERMAL DATA

Thermal Resistance from Junction to Thermal Pad, θ_{JC}	15 °C/W
Thermal Resistance from Junction to Ambient, θ_{JA}	86 °C/W

Junction Temperature Calculation: $T_J = T_A + (P_D \times \theta_{JA})$.
The θ_{JA} numbers are guidelines for the thermal performance of the device/pc-board 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-Ambient thermal resistance of the package, and other heat dissipating materials.

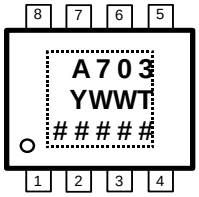
ELECTRICAL CHARACTERISTICS

V_{DD}=12V, T_A=25°C. (Unless otherwise noted)

Parameter		Symbol	Conditions	Min	Typ	Max	Unit
Sustaining Voltage		V_{DS}	OUT1、OUT 2			75	V
Output Current		I_{OUTn}	DC Test Circuit	20		150	mA
Enable Input Voltage “H” level		V_{IH}	Should not higher than V_{DD}.	2		12	V
Enable Input Voltage “L” level		V_{IL}		GND		0.8	V
Enable Input Hysteresis					200		mV
Output Leakage Current		$I_{LEAKAGE}$	V_{DS}=60V			0.5	uA
Output Current		I_{OUTn}	V_{DS}=0.6V, R_{SET}=2.4 KΩ	83.7	90	96.3	mA
			V_{DS}=0.6V, R_{SET}=3.6 KΩ	55.8	60	64.2	
Regulation of Output Current vs. Sustaining Voltage		%/△V_{DS}	V_{DS} =0.5V ~ 3.0V			±1	%
Regulation of Output Current vs. Supply Voltage		%/△V_{DD}	V_{DD} = 6V ~ 40V			±1	%
Pull-up Resistor, EN		R_{IN} (up)		0.5	1	1.5	MΩ
Thermal Protection Temperature		T_X	When T_J approaches T_X and OUT is shut off		150		° C
Thermal Protection Temperature Hysteresis					25		
Supply Current	“ON”	$I_{DD(ON)}$	R_{SET}=2.4 KΩ; EN = “High”		4	7	mA
	“OFF”	$I_{DD(OFF)}$	EN= “Low”		40	70	uA

PACKAGE

Top Marking



Y : Year Code

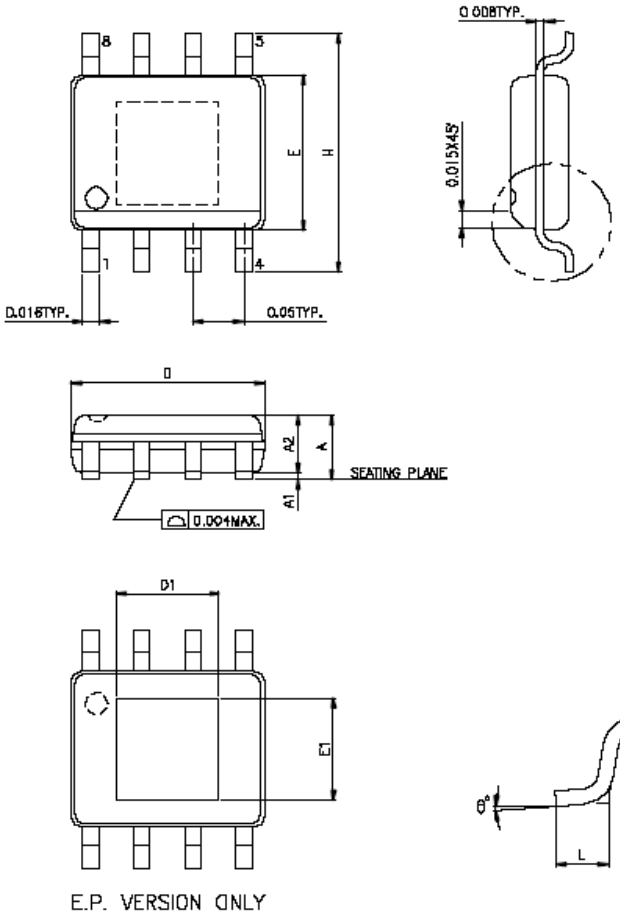
WW : Week Code

T : Trace Code

: Lot Number (LF: A703EFT)

#####_ : Lot Number (GP: A703EGT)

SOP-EP 8-Pin



SYMBOLS	MIN.	MAX.
A	0.053	0.069
A1	0.002	0.006
A2	-	0.059
D	0.189	0.196
E	0.150	0.157
H	0.228	0.244
L	0.016	0.050
θ°	0	8

UNIT: INCH

THERMALLY ENHANCED DIMENSIONS

PAD SIZE	E1	D1
90X90E	0.081 REF	0.081 REF
95X13E	0.086 REF	0.117 REF

UNIT: INCH

NOTES:

1. JEDEC OUTLINE. N/A
2. DIMENSIONS “D” DOES NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS. MOLD FLASH, PROTRUSIONS AND GATE BURRS SHALL NOT EXCEED 15mm (.005in) PER SIDE.
3. DIMENSIONS “E” DOES NOT INCLUDE INTER-LEAD FLASH, OR PROTRUSIONS. INTER-LEAD FLASH AND PROTRUSIONS SHALL NOT EXCEED .25mm (.010in) PER SIDE.

IMPORTANT NOTICE

ADDtek reserves the right to make changes to its products or to discontinue any integrated circuit product or service without notice, and advises its customers to obtain the latest version of relevant information to verify, before placing orders, that the information being relied on is current.

A few applications using integrated circuit products may involve potential risks of death, personal injury, or severe property or environmental damage. ADDtek integrated circuit products are not designed, intended, authorized, or warranted to be suitable for use in life-support applications, devices or systems or other critical applications. Use of ADDtek products in such applications is understood to be fully at the risk of the customer. In order to minimize risks associated with the customer's applications, the customer should provide adequate design and operating safeguards.

ADDtek assumes to no liability to customer product design or application support. ADDtek warrants the performance of its products to the specifications applicable at the time of sale.

ADDtek Corp.
9F, No. 20, Sec. 3, Bade Rd., Taipei, Taiwan, 105
TEL: 2-25700299
FAX: 2-25700196