

General Description

The AAT4644 is a four-channel resettable fuse. It utilizes independent current-limited and thermally-protected P-channel MOSFETs to protect against short circuits. Current limit is factory programmed at 1A. Additional protection is provided with under-voltage lockout. The switches are turned off when the input voltage drops below a preset level. The quiescent supply current is typically 20µA. The AAT4644 is a flexible solution, allowing system designers to gang outputs together for lower $R_{DS(ON)}$ and higher current limit.

The AAT4644 is available in a Pb-free, 8-pin TSSOP or SOP package and is specified over the -40°C to +85°C temperature range.

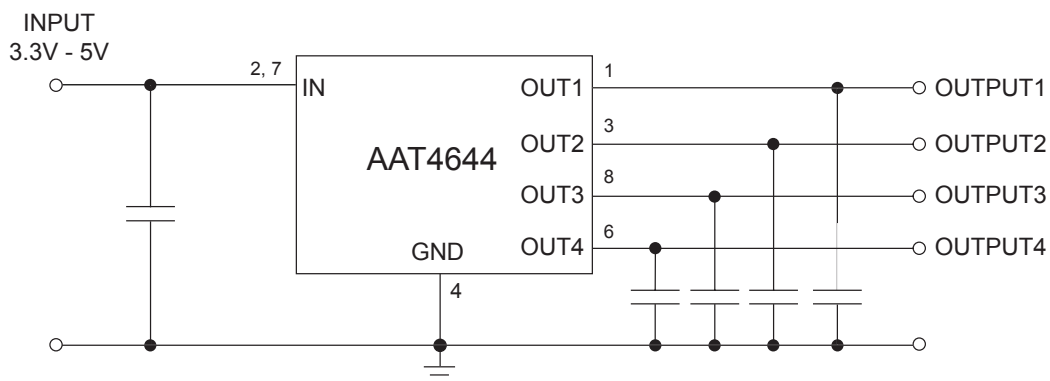
Features

- 500mA per Channel Steady State
- 4 x 1A Current Limit Trip Point
- Over-Temperature Protection
- Fast Transient Response:
 - 1µs (Typ) Response to Short Circuit
- 100mΩ Typical $R_{DS(ON)}$
- Under-Voltage Lockout
- Temperature Range: -40°C to +85°C
- 8-Pin TSSOP or SOP Package

Applications

- Desktop PCs
- Peripheral Ports
- USB Ports

Typical Application

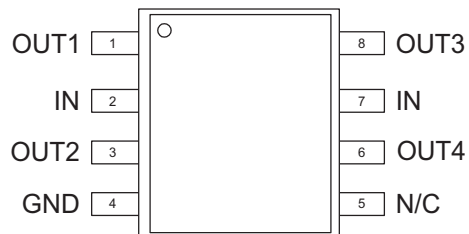


Pin Descriptions

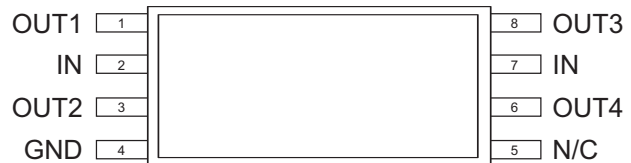
Pin #	Symbol	Function
1	OUT1	Channel 1 output.
2, 7	IN	These pins are the input supply to the circuit.
3	OUT2	Channel 2 output.
4	GND	Ground connection.
5	N/C	Not internally connected.
6	OUT4	Channel 4 output.
8	OUT3	Channel 3 output.

Pin Configuration

SOP-8
(Top View)



TSSOP-8
(Top View)



Absolute Maximum Ratings¹

$T_A = 25^\circ\text{C}$, unless otherwise noted.

Symbol	Description	Value	Units
V_{IN}	IN to GND	-0.3 to 6	V
V_{OUT}	OUT to GND	-0.3 to 6	V
I_{OUT}	Output Current	Internally Limited	A
T_J	Operating Junction Temperature Range	-40 to 85	$^\circ\text{C}$
V_{ESD}	ESD Rating ² —HBM	4000	V
T_{LEAD}	Maximum Soldering Temperature (at Leads)	300	$^\circ\text{C}$

Thermal Characteristics³

Symbol	Description	Value	Units
Θ_{JA}	Maximum Thermal Resistance	100	$^\circ\text{C}/\text{W}$
P_D	Maximum Power Dissipation	1.25	W

Electrical Characteristics

$V_{IN} = 5\text{V}$, $T_A = -40^\circ\text{C}$ to $+85^\circ\text{C}$, unless otherwise noted. Typical values are at $T_A = 25^\circ\text{C}$; **bold** values designate full temperature range.

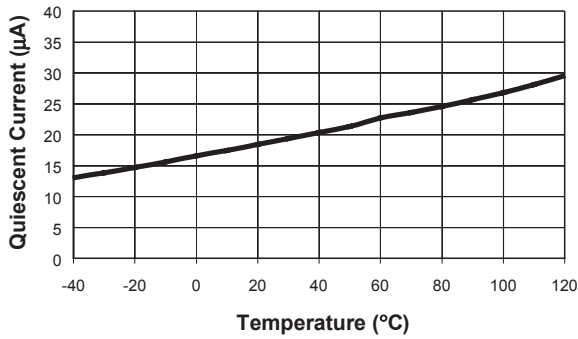
Symbol	Description	Conditions	Min	Typ	Max	Units
V_{IN}	Operation Voltage		2.7		5.5	V
I_Q	Quiescent Current	$V_{IN} = 5\text{V}$, $I_{OUT} = 0$		20	40	μA
V_{UVLO}	Under-Voltage Lockout	Rising Edge		1.75		V
$V_{UVLO(HYS)}$	Under-Voltage Lockout Hysteresis			0.3		V
$R_{DS(ON)}$	On Resistance	$V_{IN} = 5.0\text{V}$, $T_A = 25^\circ\text{C}$		100	125	$\text{m}\Omega$
I_{LIM}	Current Limit	Each Output $OUT < IN$ to 1V	0.6	1.0	1.5	A
t_{RESP}	Current Loop Response	$V_{IN} = 5\text{V}$		1		μs
T_{SD}	Over-Temperature Threshold			125		$^\circ\text{C}$

1. Stresses above those listed in Absolute Maximum Ratings may cause permanent damage to the device. Functional operation at conditions other than the operating conditions specified is not implied. Only one Absolute Maximum Rating should be applied at any one time.
2. Human body model is a 100pF capacitor discharged through a 1.5k Ω resistor into each pin.
3. Mounted on a demo board.

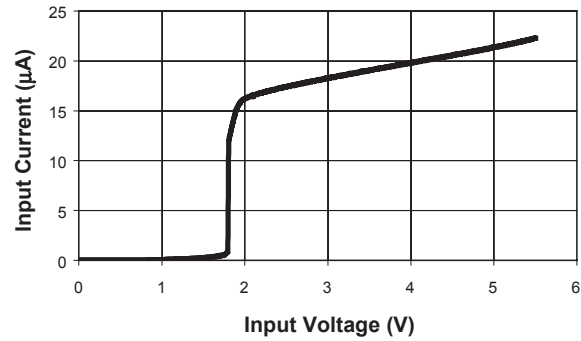
Typical Characteristics

$T_A = 25^\circ\text{C}$, unless otherwise noted.

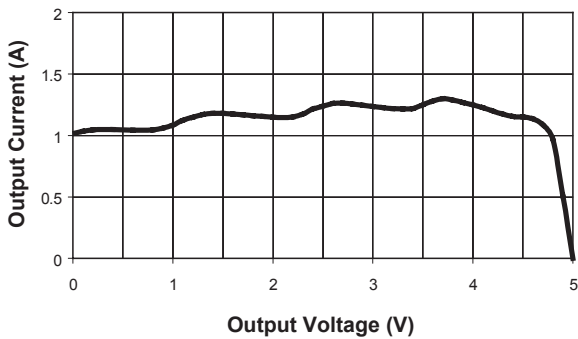
Quiescent Current vs. Temperature



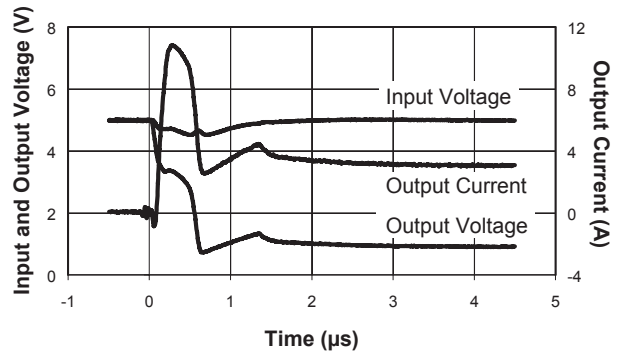
Quiescent Current



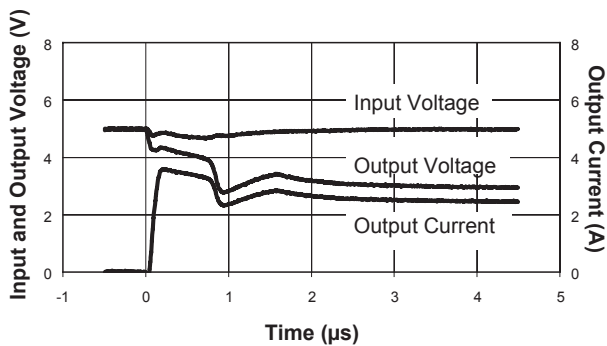
Current Limit



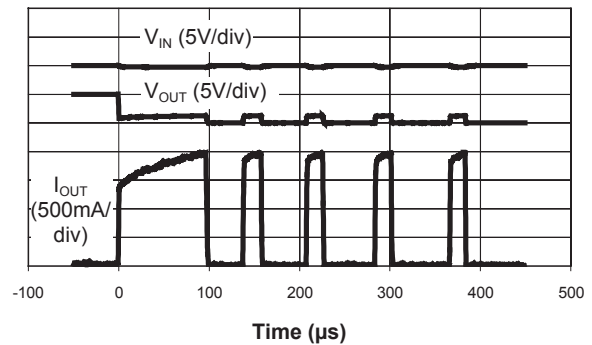
Short Circuit Through 0.3Ω



Short Circuit Through 0.6Ω



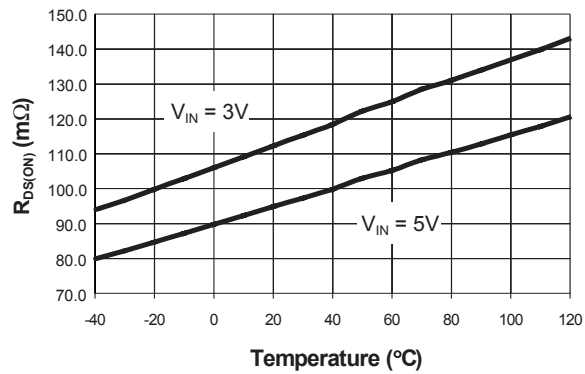
Thermal Shutdown Response
(0.3Ω Load)



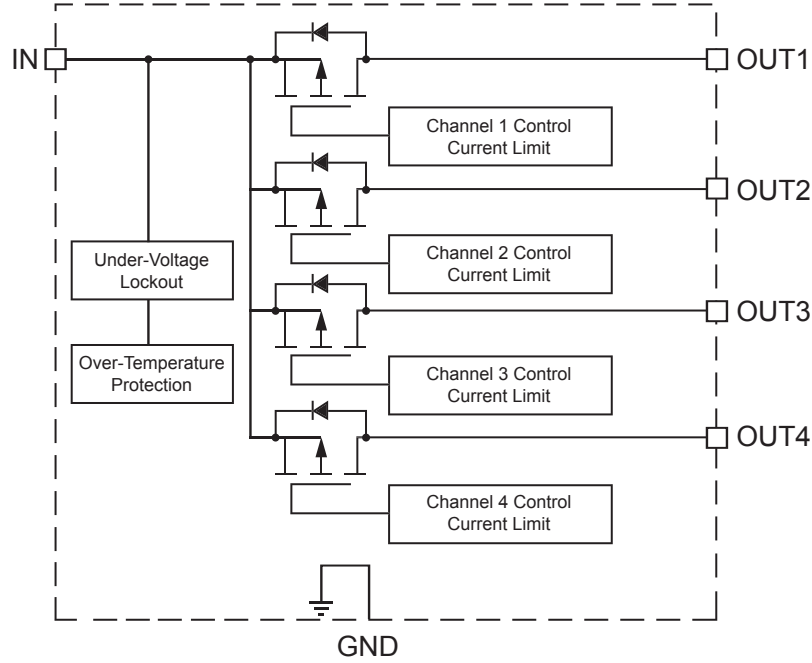
Typical Characteristics

$T_A = 25^\circ\text{C}$, unless otherwise noted.

$R_{DS(ON)}$ vs. Temperature



Functional Block Diagram



Ordering Information

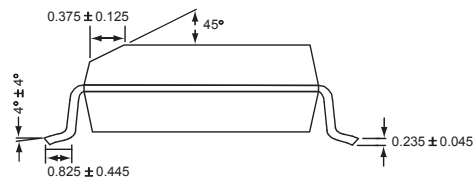
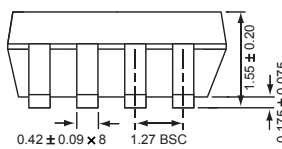
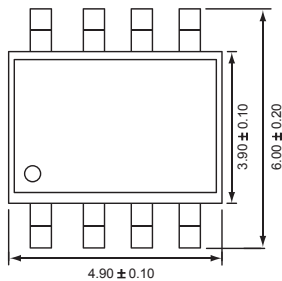
Package	Marking	Part Number (Tape and Reel) ¹
SOP-8	4644	AAT4644IAS-T1
TSSOP-8	4644	AAT4644IHS-T1



All AnalogicTech products are offered in Pb-free packaging. The term “Pb-free” means semiconductor products that are in compliance with current RoHS standards, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. For more information, please visit our website at <http://www.analogictech.com/pbfree>.

Package Information

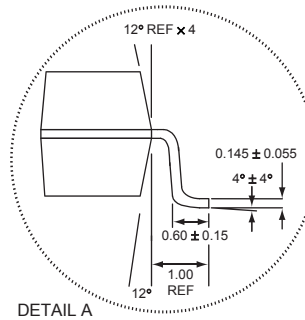
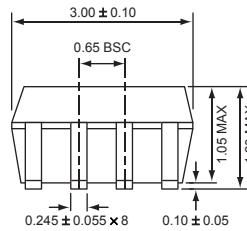
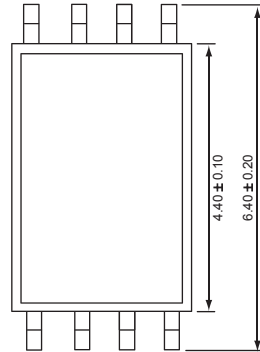
SOP-8



All dimensions in millimeters.

1. Sample stock is generally held on part numbers listed in **BOLD**.

TSSOP-8



All dimensions in millimeters.

© Advanced Analogic Technologies, Inc.

AnalogicTech cannot assume responsibility for use of any circuitry other than circuitry entirely embodied in an AnalogicTech product. No circuit patent licenses, copyrights, mask work rights, or other intellectual property rights are implied. AnalogicTech reserves the right to make changes to their products or specifications or to discontinue any product or service without notice. Customers are advised to obtain the latest version of relevant information to verify, before placing orders, that information being relied on is current and complete. All products are sold subject to the terms and conditions of sale supplied at the time of order acknowledgement, including those pertaining to warranty, patent infringement, and limitation of liability. AnalogicTech warrants performance of its semiconductor products to the specifications applicable at the time of sale in accordance with AnalogicTech's standard warranty. Testing and other quality control techniques are utilized to the extent AnalogicTech deems necessary to support this warranty. Specific testing of all parameters of each device is not necessarily performed.

AnalogicTech and the AnalogicTech logo are trademarks of Advanced Analogic Technologies Incorporated. All other brand and product names appearing in this document are registered trademarks or trademarks of their respective holders.

Advanced Analogic Technologies, Inc.
 830 E. Arques Avenue, Sunnyvale, CA 94085
 Phone (408) 737-4600
 Fax (408) 737-4611