AAT4644
4-Channel Current Limited Load Switch

SmartSwitch™

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.

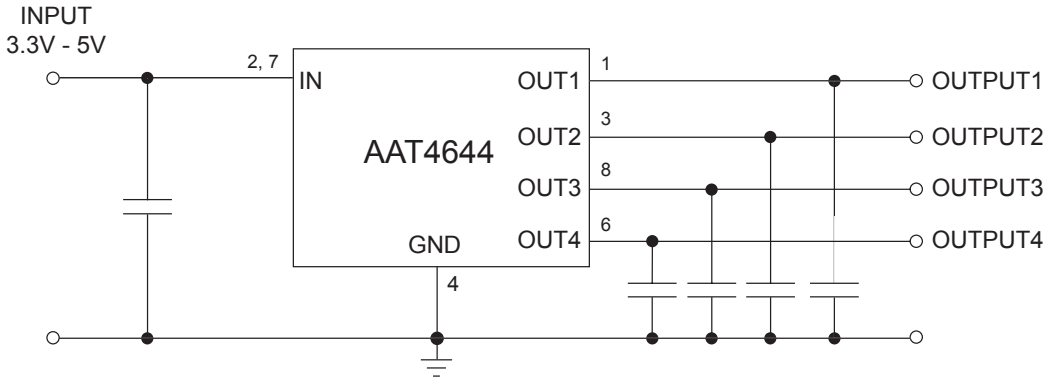
Features

- 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

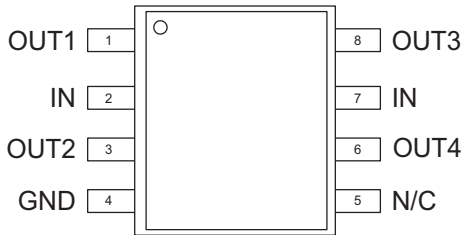


Pin Descriptions

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 Ratings[1]

T_A = 25°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	°C
V_{ESD}	ESD Rating[2]—HBM	4000	V
T_{LEAD}	Maximum Soldering Temperature (at Leads)	300	°C

Thermal Characteristics[3]

Symbol	Description	Value	Units
Θ_{JA}	Maximum Thermal Resistance	100	°C/W
P_D	Maximum Power Dissipation	1.25	W

Electrical Characteristics

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

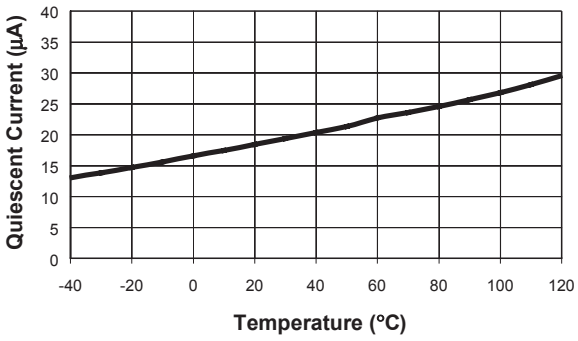
Symbol	Description	Conditions	Min	Typ	Max	Units
V_{IN}	Operation Voltage		**2.7**		**5.5**	V
I_Q	Quiescent Current	V_{IN} = 5V, I_{OUT} = 0		20	**40**	µA
V_{UVLO}	Under-Voltage Lockout	Rising Edge		1.75		V
$V_{UVLO(HYS)}$	Under-Voltage Lockout Hysteresis			0.3		V
$R_{DS(ON)}$	On Resistance	V_{IN} = 5.0V, T_A = 25°C		100	125	mΩ
I_{LIM}	Current Limit	Each Output OUT < IN to 1V	**0.6**	1.0	**1.5**	A
t_{RESP}	Current Loop Response	V_{IN} = 5V		1		µs
T_{SD}	Over-Temperature Threshold			125		°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 1.5kΩ resistor into each pin.
3. Mounted on a demo board.

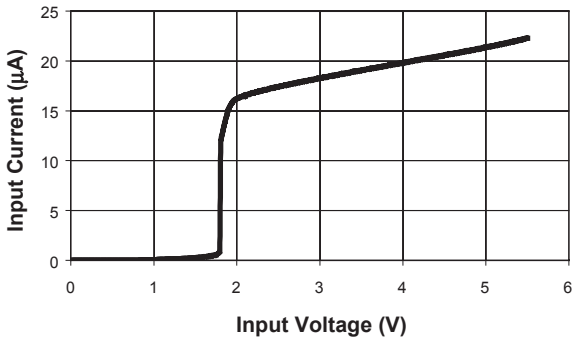
Typical Characteristics

T_A = 25°C, unless otherwise noted.

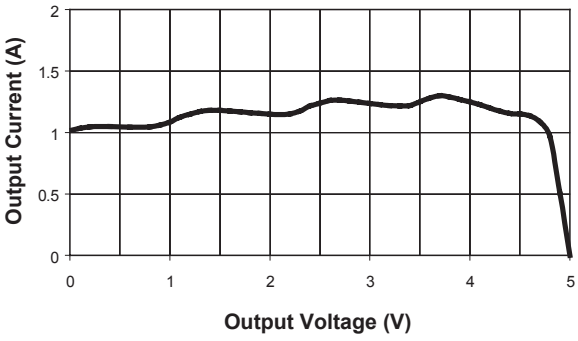
Quiescent Current vs. Temperature



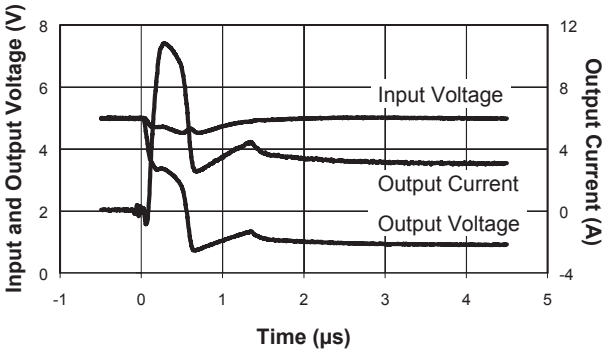
Quiescent Current



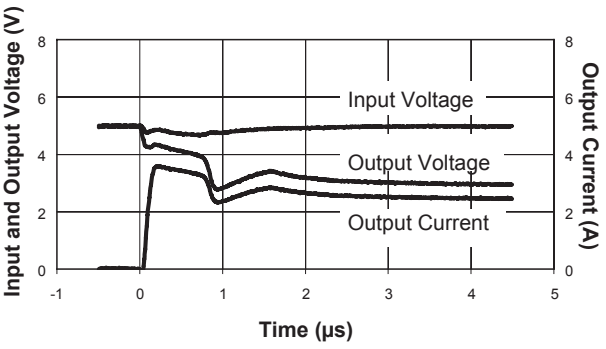
Current Limit



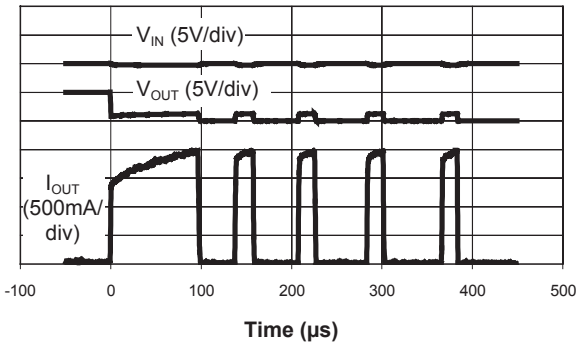
Short Circuit Through 0.3Ω



Short Circuit Through 0.6Ω



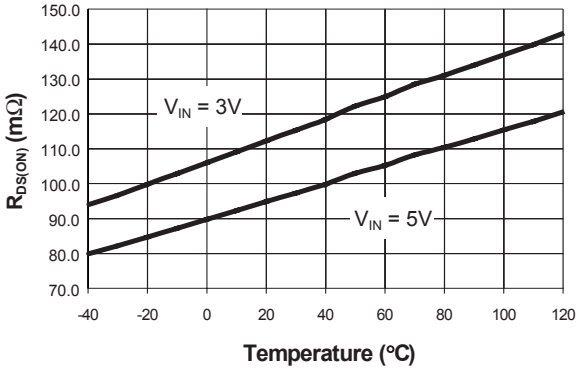
Thermal Shutdown Response
(0.3Ω Load)



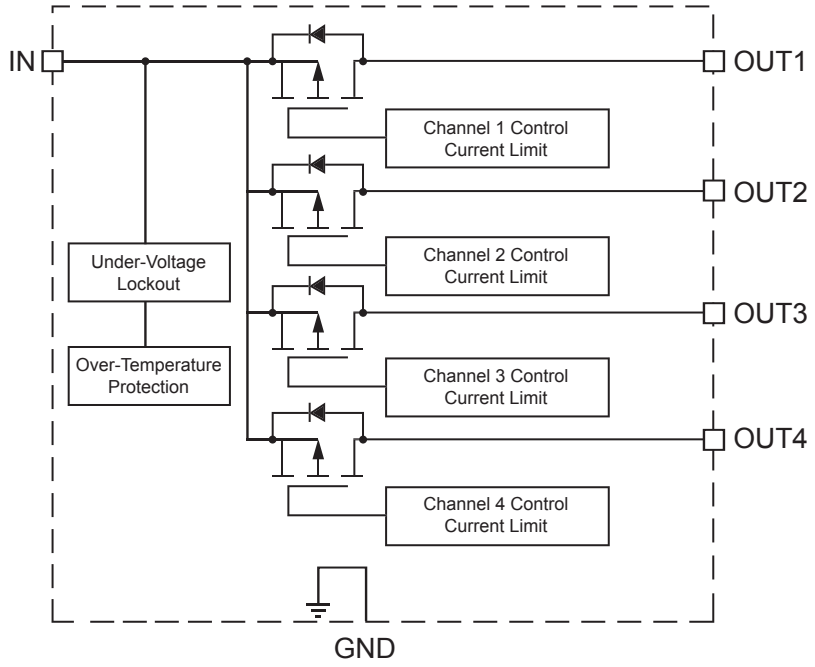
Typical Characteristics

T_A = 25°C, unless otherwise noted.

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



Functional Block Diagram



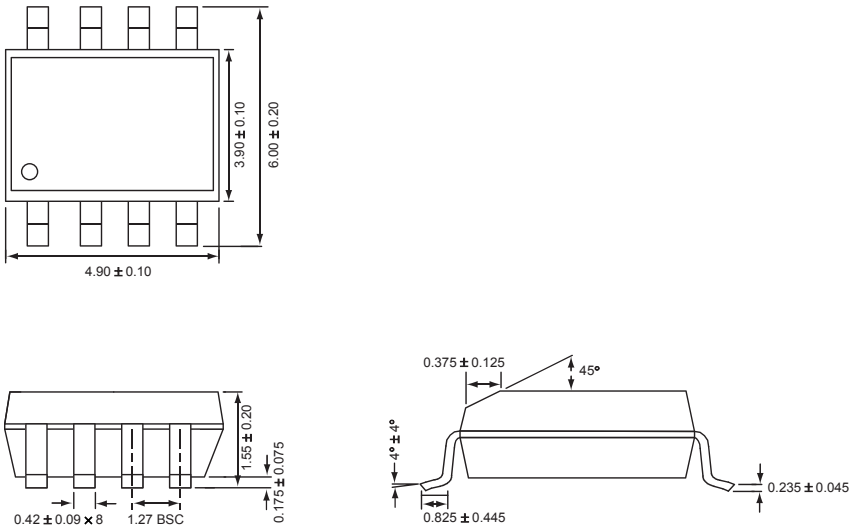
Ordering Information

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

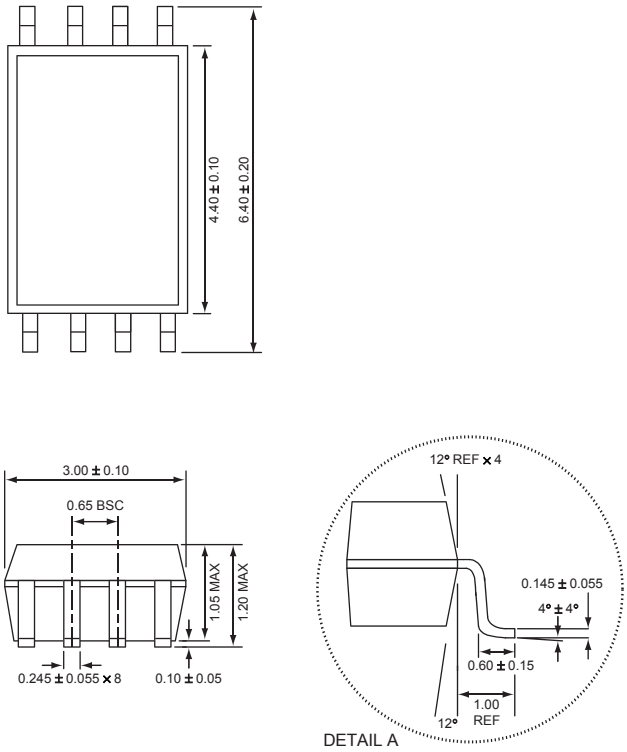
SOP-8



All dimensions in millimeters.

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

TSSOP-8



All dimensions in millimeters.

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