



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. Each switch's current limit is factory programmed at 1A. Additional protection is provided with undervoltage lockout; the switches are turned off when the input voltage drops below a preset level. The quiescent supply current is typically 20 μ A. 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 8 pin TSSOP or SOP packages, specified over -40 to 85°C.

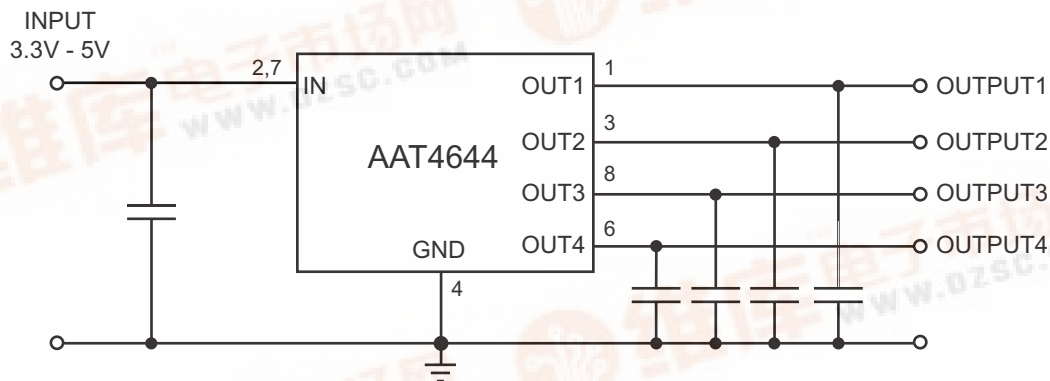
Features

- 500mA per channel steady state
- 4 X 1A current limit trip point
- Over-temp protection
- Fast transient response:
 - 1 μ s (typ) response to short circuit
- 100m Ω typical $R_{DS(ON)}$
- Undervoltage Lockout
- Temp range -40 to 85°C
- 8 pin TSSOP or SOP packages

Applications

- USB ports
- Peripheral ports
- Desktop PCs

Typical Application



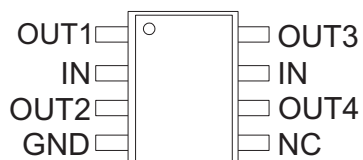
Preliminary Information

Pin Descriptions

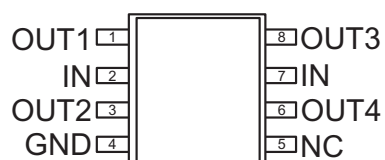
Pin #	Symbol	Function
1	OUT1	Channel 1 output
2, 7	IN	These pins are the input supply to the circuit
3	OUT2	Channel 2 output
4	GND	Ground connection
5	NC	Not internally connected
6	OUT4	Channel 4 output
8	OUT3	Channel 3 output

Pin Configuration

SO-8
(Top View)



TSSOP-8
(Top View)



Absolute Maximum Ratings (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 ¹ —HBM	4000	V
T _{LEAD}	Maximum Soldering Temperature (at Leads)	300	°C

Note: 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.

Note 1: Human body model is a 100pF capacitor discharged through a 1.5kΩ resistor into each pin.

Thermal Characteristics

Symbol	Description	Value	Units
Θ _{JA}	Maximum Thermal Resistance	100	°C/W
P _D	Maximum Power Dissipation	1.25	W

Note 2: Mounted on a demo board.

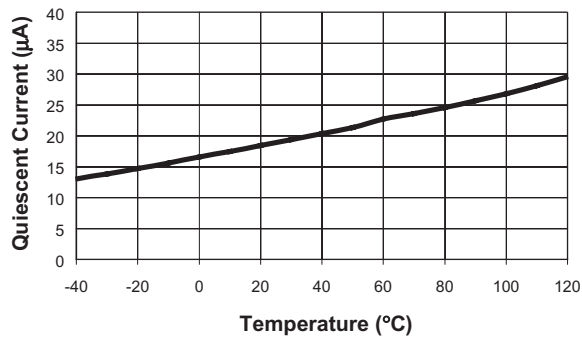
Electrical Characteristics (V_{IN} = 5V, T_A = -40 to 85°C unless otherwise noted. Typical values are at T_A=25°C; **bold** values designate full temperature range)

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}	Undervoltage Lockout	Rising edge		1.75		V
V _{UVLO(hys)}	Undervoltage 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 -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

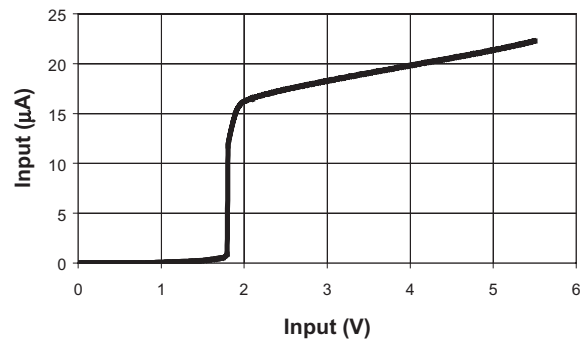
Typical Characteristics

($T_A = 25^\circ\text{C}$ unless otherwise noted)

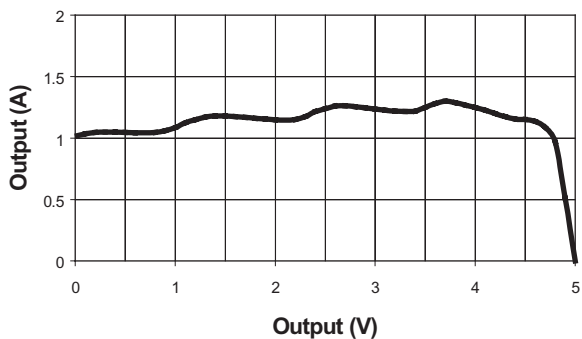
Quiescent Current vs. Temperature



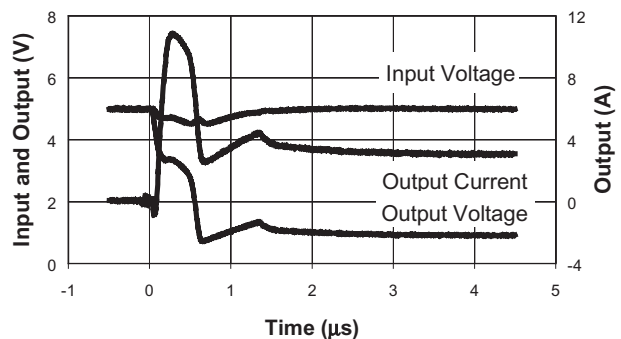
Quiescent Current



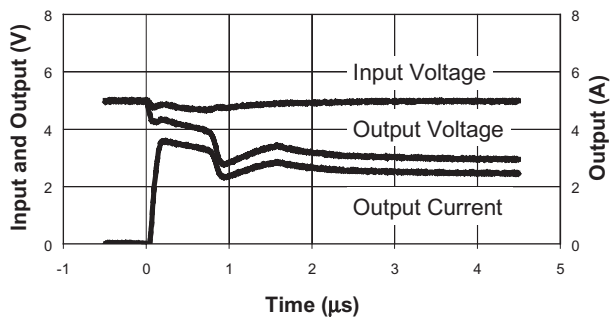
Current Limit



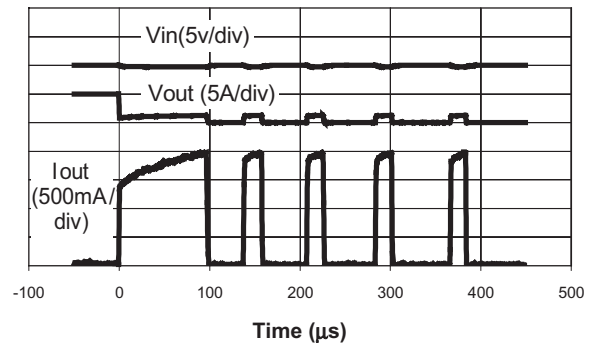
Short Circuit Through 0.3 Ohm



Short Circuit Through 0.6 Ohm

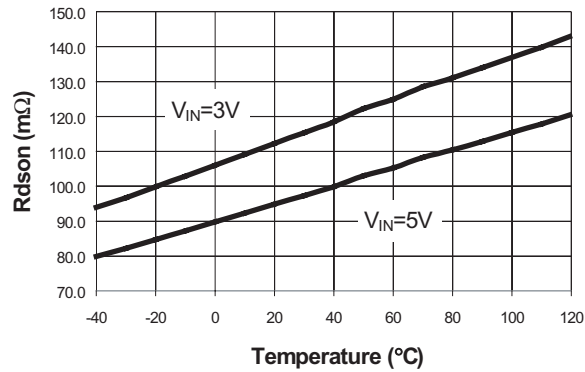


Thermal Shutdown Response 0.3 Ω Load

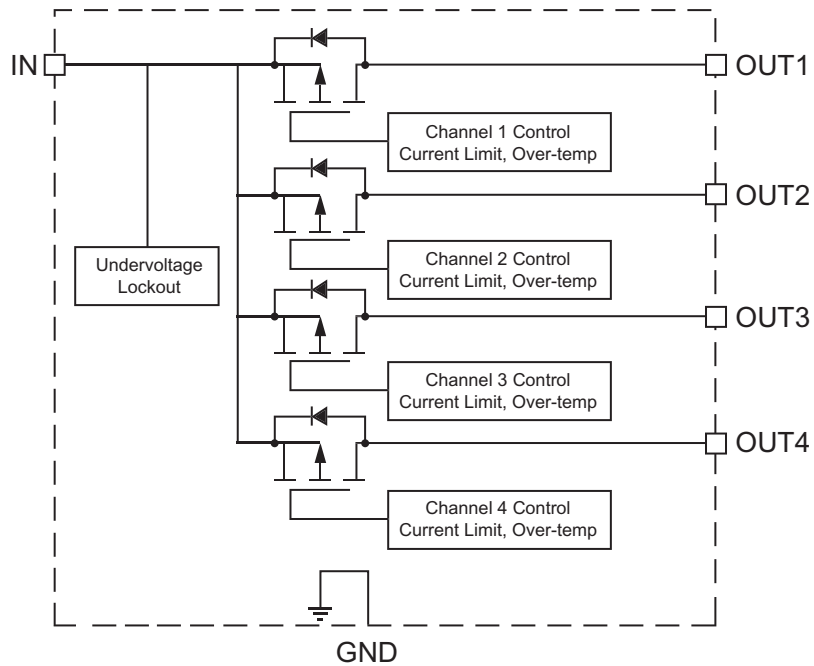


($T_A = 25^\circ\text{C}$ unless otherwise noted)

R_{ds(on)} vs. Temperature



Block Diagram

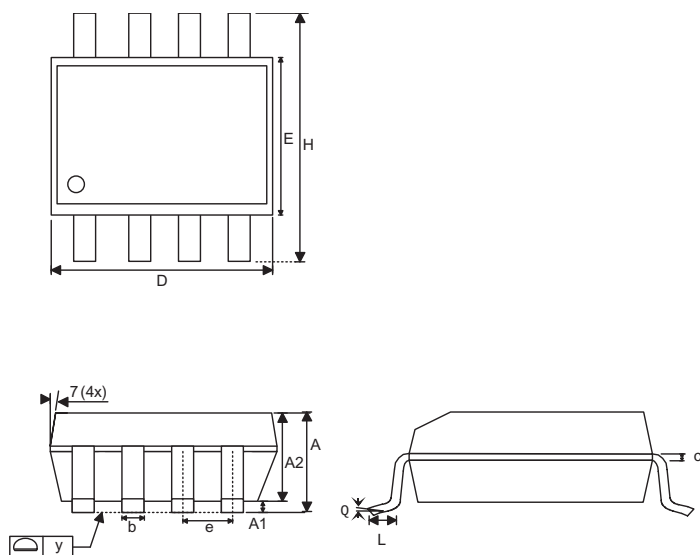


Ordering Information

Package	Marking	Part Number	
		Bulk	Tape and Reel
SOP8		AAT4644IAS-B1	AAT4644IAS-T1
TSSOP8		AAT4644IHS-B1	AAT4644IHS-T1

Package Information

SOP-8

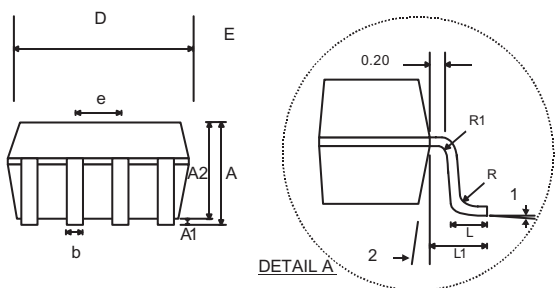
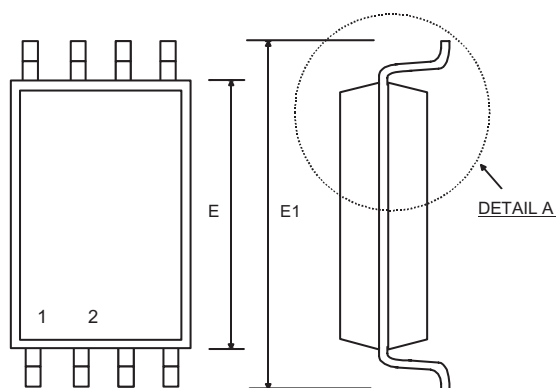


Dim	Millimeters		Inches	
	Min	Max	Min	Max
A	1.35	1.75	0.053	0.069
A1	0.10	0.25	0.004	0.010
A2	1.45		0.057	
B	0.33	0.51	0.013	0.020
C	0.19	0.25	0.007	0.010
D	4.80	5.00	0.189	0.197
E	3.80	4.00	0.150	0.157
e	1.27		0.050	
H	5.80	6.20	0.228	0.244
L	0.40	1.27	0.016	0.050
Y	0.00	0.10	0.000	0.004
θ1	0°	8°	0°	8°

Note:

1. PACKAGE BODY SIZES EXCLUDE MOLD FLASH PROTRUSIONS OR GATE BURRS.
2. TOLERANCE 0.1000mm (4mil) UNLESS OTHERWISE SPECIFIED
3. COPLANARITY: 0.1000mm
4. DIMENSION L IS MEASURED IN GAGE PLANE.
5. CONTROLLING DIMENSION IS MILLIMETER; CONVERTED INCH DIMENSIONS ARE NOT NECESSARILY EXACT.

TSSOP-8



Dim	Millimeters		Inches	
	Min	Max	Min	Max
A	1.05	1.20	0.041	0.047
A1	0.05	0.15	0.002	0.006
A2	-	1.05	-	0.041
b	0.25	0.30	0.010	0.012
c	0.127		0.005	
D-8	2.90	3.10	0.114	0.122
D-28	9.60	9.80	0.378	0.386
E	4.30	4.50	0.170	0.177
E1	6.20	6.60	0.244	0.260
e	0.65 BSC		0.025 BSC	
L	0.50	0.70	0.20	0.028
L1	1.0		0.039	
R	0.09	-	0.004	-
R1	0.09	-	0.004	-
θ1	0°	8°	0°	8°
θ2	12°			

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