

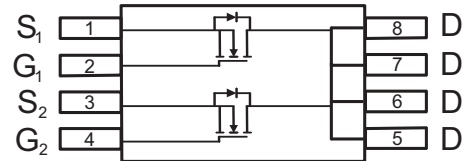
### General Description

Analogic Tech™'s AAT7204 is a dual 2.5V rated N channel MOSFET designed for use in battery packs, cellular phones and battery powered portable equipment. Utilizing Analogic Tech's proprietary ultra high density TrenchDMOS™ process, the AAT7204 achieves performance normally found in products that are rated to block only 20V in one that blocks 25V. Featuring a small footprint and low profile of <1.2mm, the TSSOP8 package is ideal for use in battery and load management applications where height and size are critical.

### Features

- $V_{DS(MAX)} = 25V$
- $I_{D(MAX)} = 6.0A^1 @ 25^\circ C$
- Low  $R_{DS(ON)}$ :
  - $26 m\Omega @ V_{GS} = 4.5V$
  - $40 m\Omega @ V_{GS} = 2.5V$
- Optimized for battery protection

### TSSOP8 Package



### Applications

- Li Ion Battery Packs
- Cellular and Cordless Telephones
- Battery-powered portable equipment

### Absolute Maximum Ratings (T<sub>A</sub>=25°C unless otherwise noted)

Symbol	Description	10 sec	DC	Units	
V <sub>DS</sub>	Drain-Source Voltage	25		V	
V <sub>GS</sub>	Gate-Source Voltage	±12			
I <sub>D</sub>	Continuous Drain Current @ T <sub>J</sub> =150°C <sup>1</sup>	T <sub>A</sub> = 25°C	6.0	5.1	A
		T <sub>A</sub> = 70°C	4.8	4.1	
I <sub>DM</sub>	Pulsed Drain Current (10µs pulse width)	±30			
I <sub>S</sub>	Continuous Source Current (Source-Drain Diode) <sup>1</sup>	1.7	1.3		
I <sub>SM</sub>	Pulsed Source Current (Source-Drain Diode) <sup>3</sup>	±30			
P <sub>D</sub>	Maximum Power Dissipation <sup>1</sup>	T <sub>A</sub> = 25°C	1.5	1.1	W
		T <sub>A</sub> = 70°C	1.0	0.7	
T <sub>J</sub> , T <sub>STG</sub>	Operating Junction and Storage Temperature Range	-55 to 150		°C	

### Thermal Characteristics

Symbol	Description	Value	Units
R <sub>θJA</sub>	Typical Junction-to-Ambient <sup>2</sup>	88	°C/W
R <sub>θJA2</sub>	Maximum Junction-to-Ambient, one MOSFET on, t < 10s <sup>1</sup>	80	°C/W
R <sub>θJF</sub>	Typical Junction-to-Foot <sup>1</sup>	40	°C/W

### Electrical Characteristics (T<sub>J</sub>=25°C unless otherwise noted)

Symbol	Description	Conditions	Min	Typ	Max	Units
<b>DC Characteristics</b>						
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	25			V
R <sub>DS(ON)</sub>	Drain-Source ON-Resistance <sup>3</sup>	V <sub>GS</sub> =4.5V, I <sub>D</sub> =6.0A		21	26	mΩ
		V <sub>GS</sub> =2.5V, I <sub>D</sub> =4.8A		32	40	
I <sub>D(ON)</sub>	On-State Drain Current	V <sub>GS</sub> =4.5V, V <sub>DS</sub> =5V (10μs pulse width)	30			A
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250μA	0.6			V
I <sub>GSS</sub>	Gate-Body Leakage Current	V <sub>GS</sub> =±12V, V <sub>DS</sub> =0V			±100	nA
I <sub>DSS</sub>	Drain Source Leakage Current	V <sub>GS</sub> =0V, V <sub>DS</sub> =25V			1	μA
		V <sub>GS</sub> =0V, V <sub>DS</sub> =20V, T <sub>J</sub> =70°C <sup>4</sup>			5	
g <sub>fs</sub>	Forward Transconductance <sup>3</sup>	V <sub>DS</sub> =5V, I <sub>D</sub> =6.0A		19		S
<b>Dynamic Characteristics <sup>4</sup></b>						
Q <sub>G</sub>	Total Gate Charge	V <sub>DS</sub> =15V, R <sub>D</sub> =3.0Ω, V <sub>GS</sub> =4.5V		16	23	nC
Q <sub>GS</sub>	Gate-Source Charge	V <sub>DS</sub> =15V, R <sub>D</sub> =3.0Ω, V <sub>GS</sub> =4.5V		2.7		
Q <sub>GD</sub>	Gate-Drain Charge	V <sub>DS</sub> =15V, R <sub>D</sub> =3.0Ω, V <sub>GS</sub> =4.5V		3.2		
t <sub>D(ON)</sub>	Turn-ON Delay	V <sub>DD</sub> =15V, V <sub>GS</sub> =4.5V, R <sub>D</sub> =3.0Ω, R <sub>G</sub> =6Ω		10		ns
t <sub>R</sub>	Turn-ON Rise Time	V <sub>DD</sub> =15V, V <sub>GS</sub> =4.5V, R <sub>D</sub> =3.0Ω, R <sub>G</sub> =6Ω		14		
t <sub>D(OFF)</sub>	Turn-OFF Delay	V <sub>DD</sub> =15V, V <sub>GS</sub> =4.5V, R <sub>D</sub> =3.0Ω, R <sub>G</sub> =6Ω		31		
t <sub>F</sub>	Turn-OFF Fall Time	V <sub>DD</sub> =15V, V <sub>GS</sub> =4.5V, R <sub>D</sub> =3.0Ω, R <sub>G</sub> =6Ω		17		
<b>Source-Drain Diode Characteristics</b>						
V <sub>SD</sub>	Source-Drain Forward Voltage <sup>3</sup>	V <sub>GS</sub> =0, I <sub>S</sub> =6.0A			1.2	V
I <sub>S</sub>	Continuous Diode Current <sup>1</sup>				1.7	A

Note 1: Based on thermal dissipation from junction to ambient while mounted on a 1" x 1" PCB with optimized layout. A 10 second pulse on a 1" x 1" PCB approximates testing a device mounted on a large multi-layer PCB as in many applications. R<sub>θJF</sub> + R<sub>θFA</sub> = R<sub>θJA</sub> where the foot thermal reference is defined as the normal solder mounting surface of the device's leads. R<sub>θJF</sub> is guaranteed by design; however, R<sub>θFA</sub> is determined by PCB design. Actual maximum continuous current is limited by the application's design.

Note 2: Steady state thermal response while mounted on a 1" x 1" PCB with maximum copper area is provided for comparison with other devices. This test condition approximates many battery pack applications.

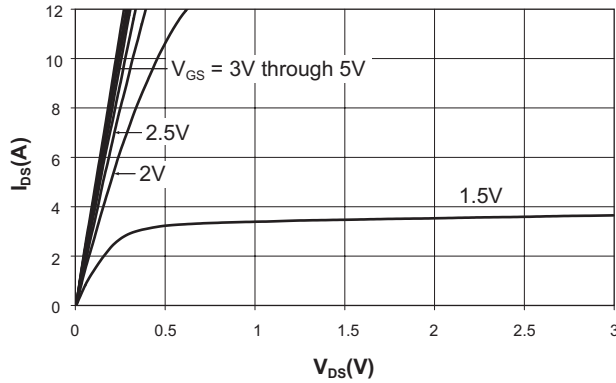
Note 3: Pulsed measurement 300 μs, single pulse.

Note 4: Guaranteed by design. Not subject to production testing.

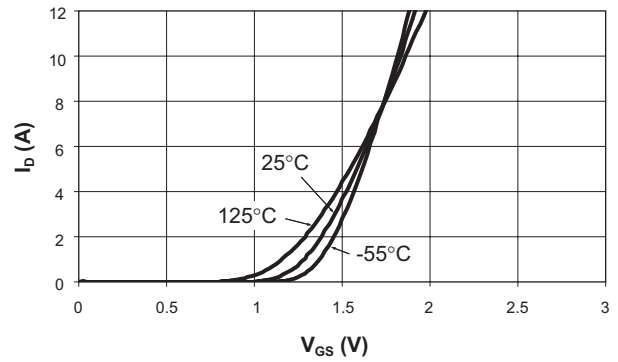
### Typical Characteristics

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

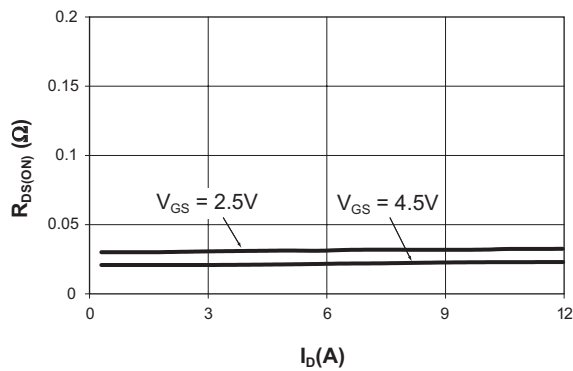
#### Output Characteristics



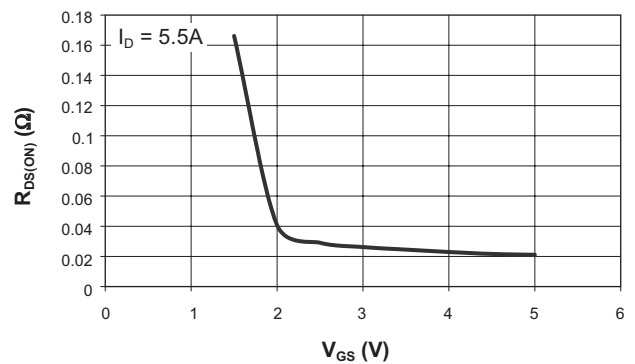
#### Transfer Characteristics



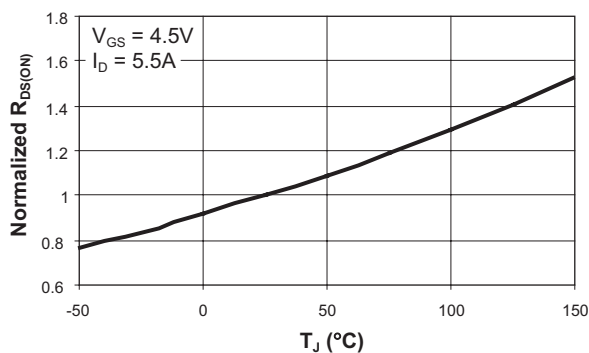
#### On-Resistance vs. Drain Current



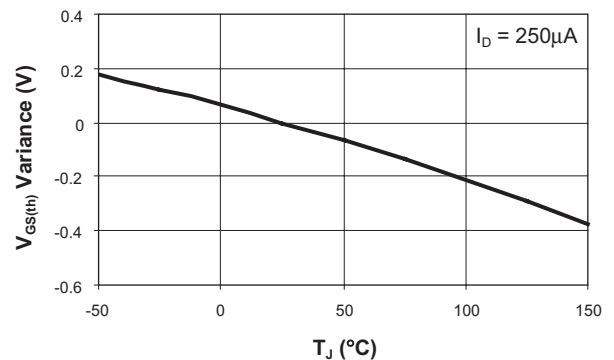
#### On-Resistance vs. Gate to Source Voltage



#### On-Resistance vs Junction Temperature



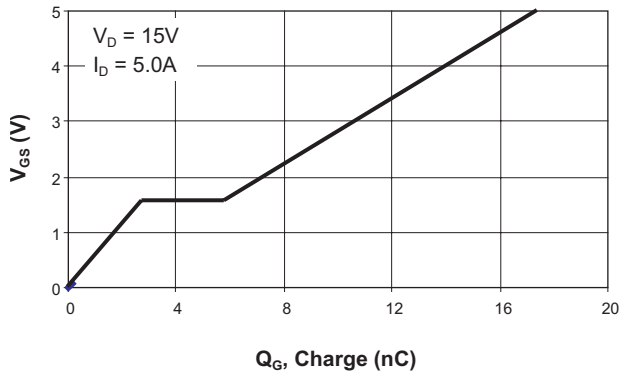
#### Threshold Voltage



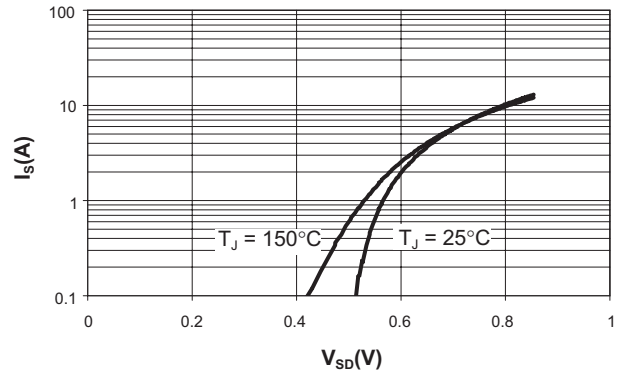
### Typical Characteristics

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

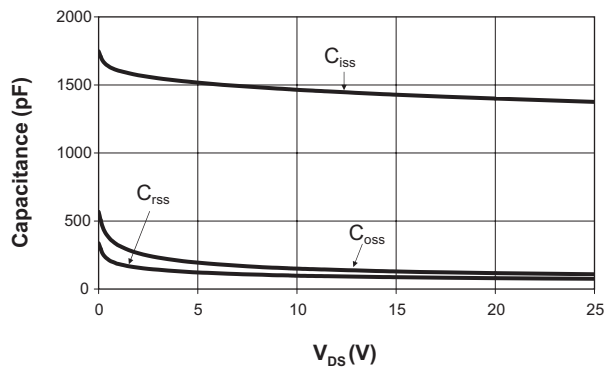
**Gate Charge**



**Source-Drain Diode Forward Voltage**



**Capacitance**



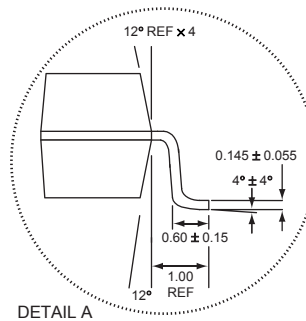
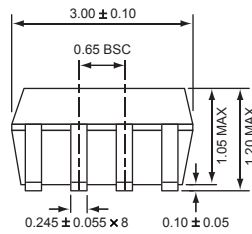
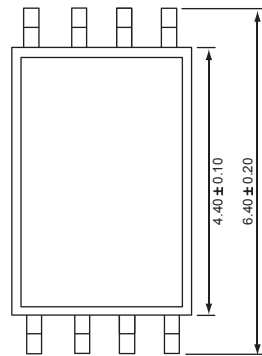
### Ordering Information

Package	Marking	Part Number (Tape and Reel)
TSSOP-8	7204	<b>AAT7204IHS-T1</b>

Note: Sample stock is generally held on all part numbers listed in **BOLD**.

### Package Information

#### TSSOP-8



All dimensions in millimeters.

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