General Description

The AAT8307 is a low threshold P Channel MOSFET designed for the battery, cell phone, and PDA markets. Using AnalogicTech™'s proprietary ultra-high density Trench technology, and space saving small outline J-lead package, performance superior to that normally found in a larger footprint has been squeezed into the area of a TSOP6 package.

Features

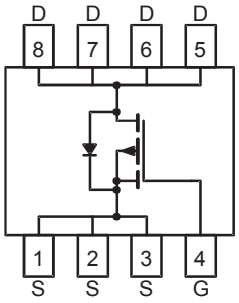
- $V_{DS(MAX)}$ = -20V
- $I_{D(MAX)}$ [1] = -6.0A @ 25°C
- Low $R_{DS(ON)}$:
  - 35 mΩ @ V_{GS} = -4.5V
  - 60 mΩ @ V_{GS} = -2.5V

Applications

- Battery Packs
- Cellular & Cordless Telephones
- Battery-powered portable equipment
- Load Switches

TSOPJW-8 Package

Top View



Preliminary Information

Absolute Maximum Ratings (T_A=25°C unless otherwise noted)

Symbol	Description		Value	Units
V_{DS}	Drain-Source Voltage		-20	V
V_{GS}	Gate-Source Voltage		±12	
I_D	Continuous Drain Current @ T_J=150°C [1]	T_A = 25°C	±6.0	A
		T_A = 70°C	±4.8	
I_{DM}	Pulsed Drain Current [2]		±32	
I_S	Continuous Source Current (Source-Drain Diode) [1]		-1.9	
P_D	Maximum Power Dissipation [1]	T_A = 25°C	2.1	W
		T_A = 70°C	1.3	
T_J, T_{STG}	Operating Junction and Storage Temperature Range		-55 to 150	°C

Thermal Characteristics

Symbol	Description	Typ	Max	Units
$R_{\theta JA}$	Junction-to-Ambient steady state [1]	90	110	°C/W
$R_{\theta JA2}$	Junction-to-Ambient t<5 seconds [1]	48	59	°C/W
$R_{\theta JF}$	Junction-to-Foot [1]	31	37	°C/W

Electrical Characteristics (T_J=25°C unless otherwise noted)

Symbol	Description	Conditions	Min	Typ	Max	Units
DC Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=-250µA	-20			V
$R_{DS(ON)}$	Drain-Source ON-Resistance [2]	V_{GS}=-4.5V, I_D=-6.0A		27	35	mΩ
		V_{GS}=-2.5V, I_D=-4.6A		46	60	
$I_{D(ON)}$	On-State Drain Current [2]	V_{GS}=-4.5V, V_{DS}=-5V (Pulsed)	-32			A
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS}, I_D=-250µA	-0.6			V
I_{GSS}	Gate-Body Leakage Current	V_{GS}=±12V, V_{DS}=0V			±100	nA
I_{DSS}	Drain Source Leakage Current	V_{GS}=0V, V_{DS}=-20V			-1	µA
		V_{GS}=0V, V_{DS}=-16V, T_J=70°C [3]			-5	
g_{fs}	Forward Transconductance [2]	V_{DS}=-5V, I_D=-6.0A		12		S
Dynamic Characteristics [3]						
Q_G	Total Gate Charge	V_{DS}=-15V, R_D=2.5Ω, V_{GS}=-4.5V		14		nC
Q_{GS}	Gate-Source Charge	V_{DS}=-15V, R_D=2.5Ω, V_{GS}=-4.5V		2.3		
Q_{GD}	Gate-Drain Charge	V_{DS}=-15V, R_D=2.5Ω, V_{GS}=-4.5V		5.5		
$t_{D(ON)}$	Turn-ON Delay	V_{DD}=-15V, V_{GS}=-4.5V, R_D=2.5Ω, R_G=6Ω		10		ns
t_R	Turn-ON Rise Time	V_{DD}=-15V, V_{GS}=-4.5V, R_D=2.5Ω, R_G=6Ω		37		
$t_{D(OFF)}$	Turn-OFF Delay	V_{DD}=-15V, V_{GS}=-4.5V, R_D=2.5Ω, R_G=6Ω		36		
t_F	Turn-OFF Fall Time	V_{DD}=-15V, V_{GS}=-4.5V, R_D=2.5Ω, R_G=6Ω		52		
Source-Drain Diode Characteristics						
V_{SD}	Source-Drain Forward Voltage [2]	V_{GS}=0, I_S=-6.0A			-1.2	V
I_S	Continuous Diode Current [1]				-1.9	A

Note 1: Based on thermal dissipation from junction to ambient while mounted on a 1" x 1" PCB with optimized layout. A 5 second pulse on a 1" x 1" PCB approximates testing a device mounted on a large multi-layer PCB as in most applications. $R_{\theta JF}$ + $R_{\theta FA}$ = $R_{\theta JA}$ where the foot thermal reference is defined as the normal solder mounting surface of the device's leads. $R_{\theta JF}$ is guaranteed by design, however $R_{\theta CA}$ is determined by the PCB design. Actual maximum continuous current is limited by the application's design.

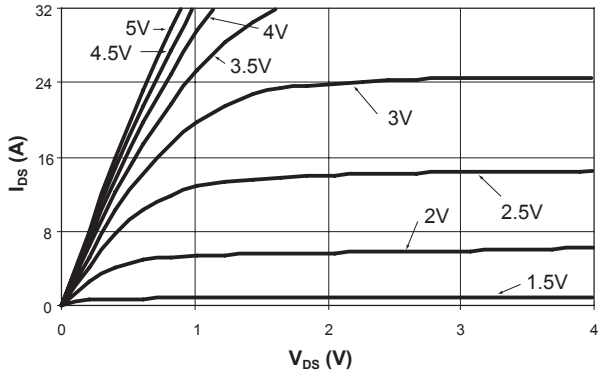
Note 2: Pulse test: Pulse Width = 300 µs

Note 3: Guaranteed by design. Not subject to production testing.

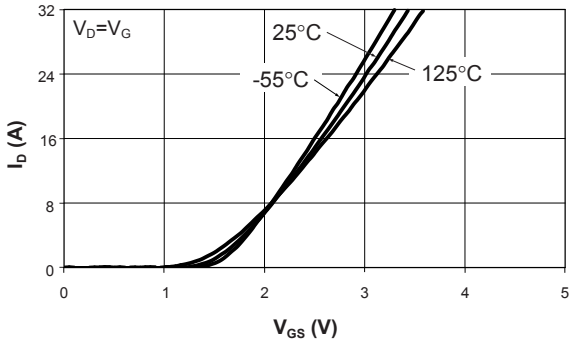
Typical Characteristics

(T_J = 25ºC unless otherwise noted)

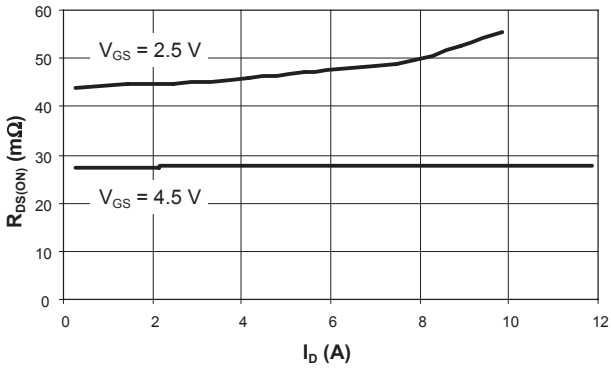
Output Characteristics



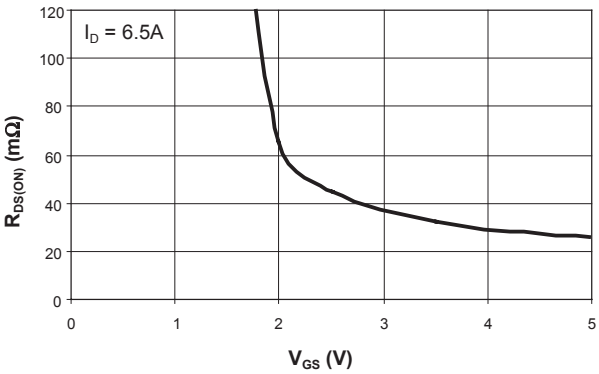
Transfer Characteristics



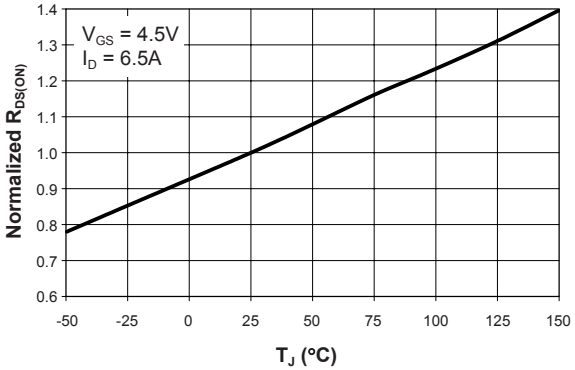
On-Resistance vs. Drain Current



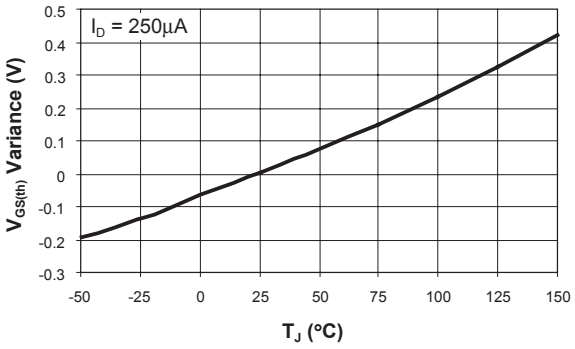
On-Resistance vs. Gate to Source Voltage



On-Resistance vs. Junction Temperature



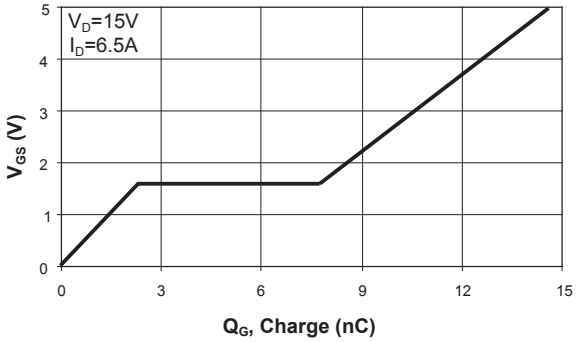
Threshold Voltage



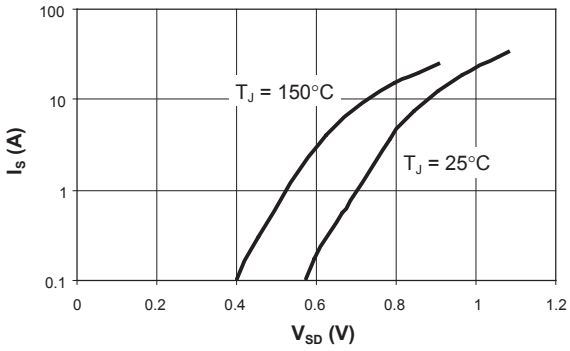
Typical Characteristics

(T_J = 25ºC unless otherwise noted)

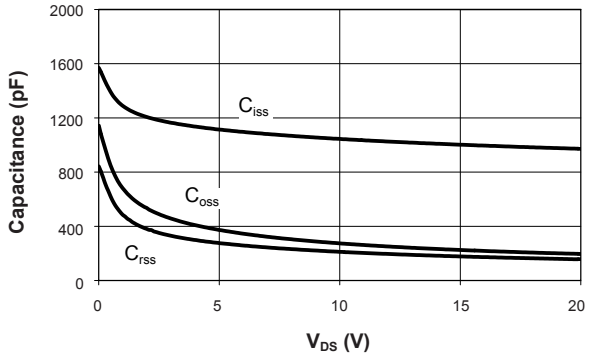
Gate Charge



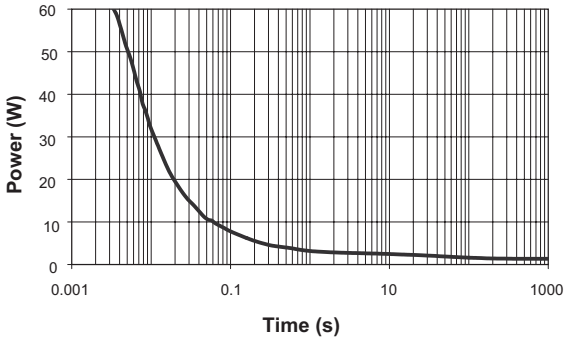
Source-Drain Diode Forward Voltage



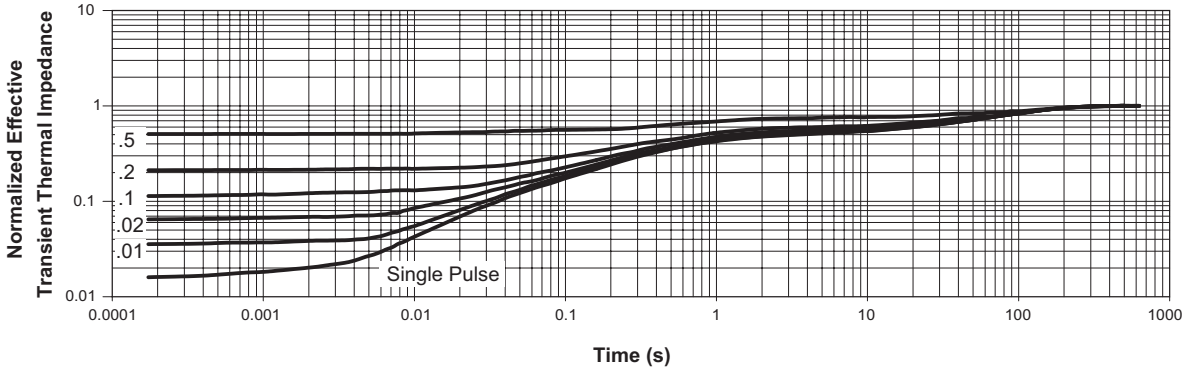
Capacitance



Single Pulse Power, Junction to Ambient



Transient Thermal Response, Junction to Ambient



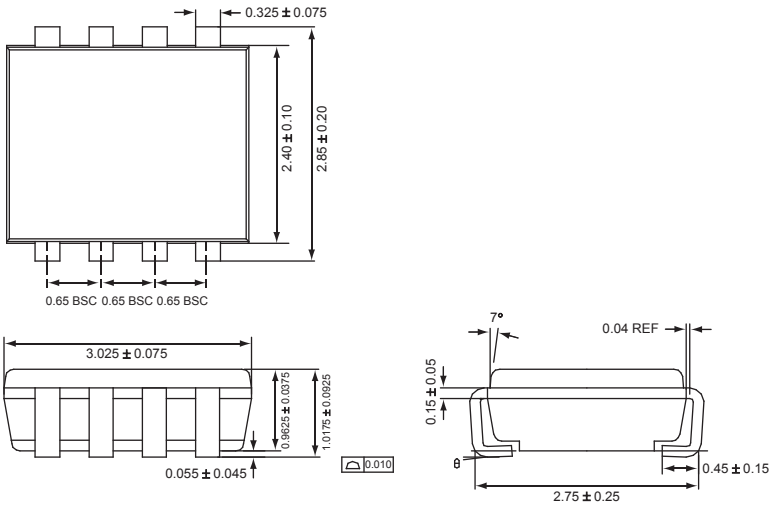
Ordering Information

Package	Marking[1]	Part Number (Tape and Reel)
TSOPJW-8	ICXYY	**AAT8307ITS-T1**

Note: Sample stock is generally held on all part numbers listed in **BOLD**.
Note 1: XYY = assembly and date code.

Package Information

TSOPJW-8



All dimensions in millimeters.

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, and advise customers 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.

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