AAT7357
20V P-Channel Power MOSFET

General Description

The AAT7357 is a low threshold dual P-channel MOSFET designed for the battery, cell phone, and PDA markets. Using AnalogicTech's ultra-high-density MOSFET process and space-saving, small-outline, J-lead package, performance superior to that normally found in a TSSOP-8 footprint has been squeezed into the footprint of a TSOPJW-8 package.

Features

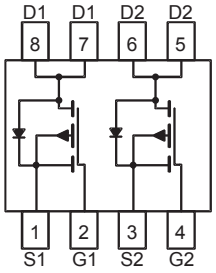
- Drain-Source Voltage (max): -20V
- Contiunous Drain Current[1] (max) = -5A @ 25°C
- Low On-Resistance:
  - 39mΩ @ V_{GS} = -4.5V
  - 63mΩ @ V_{GS} = -2.5V

Applications

- Battery Packs
- Battery-Powered Portable Equipment
- Cellular and Cordless Telephones

Dual TSOPJW-8 Package

Top View



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	±5	A
		T_A = 70°C	±4	
I_{DM}	Pulsed Drain Current[2]		±12	
I_S	Continuous Source Current (Source-Drain Diode)[1]		-1.3	
P_D	Maximum Power Dissipation[1]	T_A = 25°C	1.6	W
		T_A = 70°C	1.0	
T_J	Operating Junction Temperature Range		-55 to 150	°C
T_{STG}	Storage Temperature Range		-55 to 150	°C

Thermal Characteristics[1]

Symbol	Description	Typ	Max	Units
$R_{\theta JA}$	Junction-to-Ambient Steady State, One FET On	115	140	°C/W
$R_{\theta JA2}$	Junction-to-Ambient t<5 Seconds	64	78	°C/W
$R_{\theta JF}$	Junction-to-Foot	60	72	°C/W

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.
2. Pulse test: Pulse Width = 300µs.

Electrical Characteristics

T_J = 25°C, unless otherwise noted.

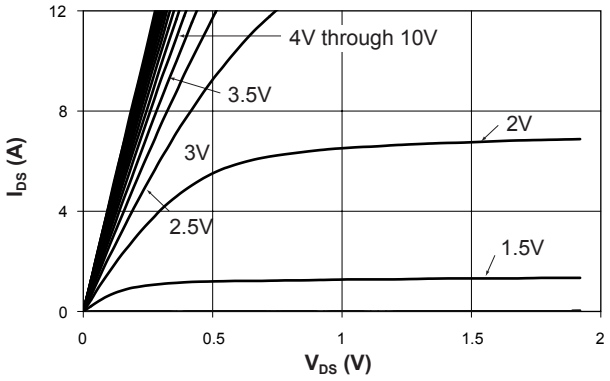
Symbol	Description	Conditions	Min	Typ	Max	Units
DC Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS} = 0V, I_D = -250µA	-20			V
$R_{DS(ON)}$	Drain-Source On-Resistance[1]	V_{GS} = -4.5V, I_D = -5A		30	39	mΩ
		V_{GS} = -2.5V, I_D = -4A		49	63	
$I_{D(ON)}$	On-State Drain Current[1]	V_{GS} = -4.5V, V_{DS} = -5V (pulsed)	-12			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[2]			-5	
g_{fs}	Forward Transconductance[1]	V_{DS} = -5V, I_D = -5A		12		S
Dynamic Characteristics[2]						
Q_G	Total Gate Charge	V_{DS} = -10V, R_D = 2.0Ω, V_{GS} = -4.5V		14		nC
Q_{GS}	Gate-Source Charge	V_{DS} = -10V, R_D = 2.0Ω, V_{GS} = -4.5V		3.5		
Q_{GD}	Gate-Drain Charge	V_{DS} = -10V, R_D = 2.0Ω, V_{GS} = -4.5V		5.6		
$t_{D(ON)}$	Turn-On Delay	V_{DS} = -10V, R_D = 2.0Ω, V_{GS} = -4.5V, R_G = 6Ω		12		ns
t_R	Turn-On Rise Time	V_{DS} = -10V, R_D = 2.0Ω, V_{GS} = -4.5V, R_G = 6Ω		20		
$t_{D(OFF)}$	Turn-Off Delay	V_{DS} = -10V, R_D = 2.0Ω, V_{GS} = -4.5V, R_G = 6Ω		33		
t_F	Turn-Off Fall Time	V_{DS} = -10V, R_D = 2.0Ω, V_{GS} = -4.5V, R_G = 6Ω		40		
Source-Drain Diode Characteristics						
V_{SD}	Source-Drain Forward Voltage[1]	V_{GS} = 0, I_S = -5A			-1.2	V
I_S	Continuous Diode Current[3]				-1.3	A

1. Pulse test: Pulse Width = 300µs.
2. Guaranteed by design. Not subject to production testing.
3. 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.

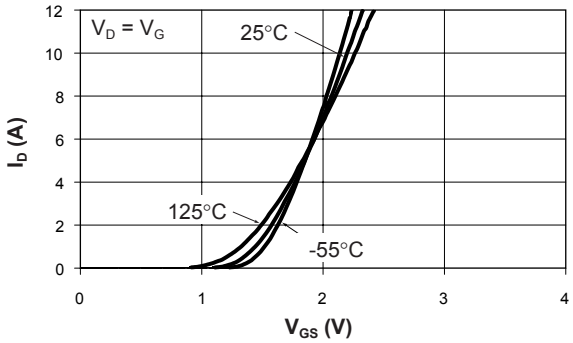
Typical Characteristics

T_J = 25ºC, unless otherwise noted.

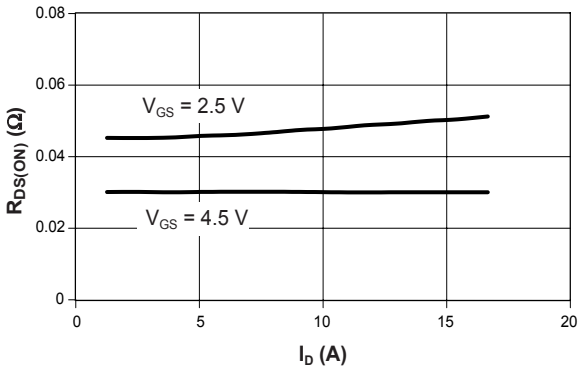
Output Characteristics



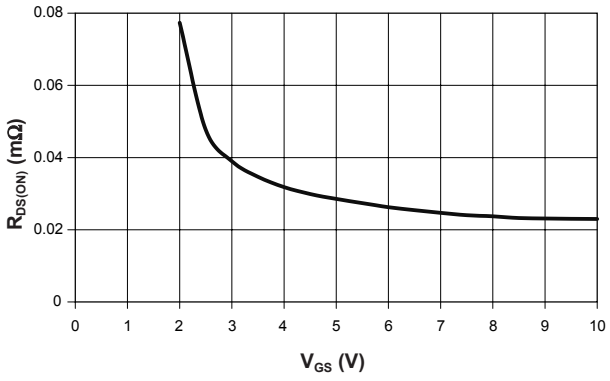
Transfer Characteristics



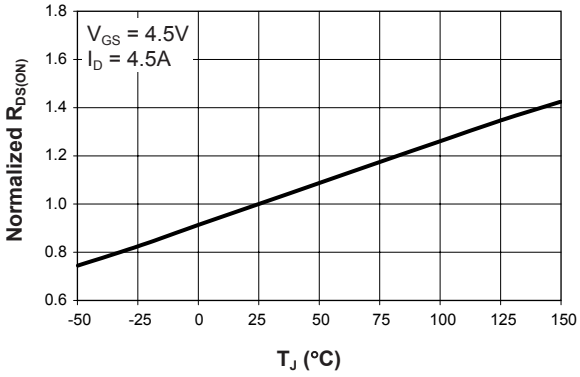
On-Resistance vs. Drain Current



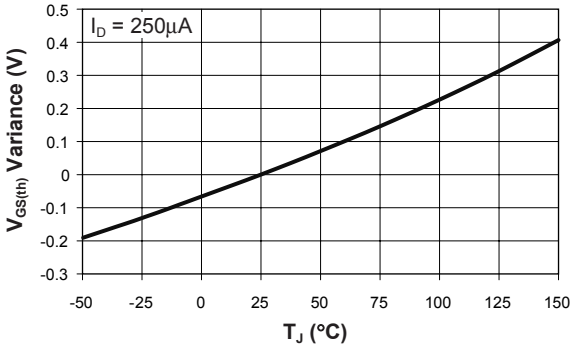
On-Resistance vs. Gate to Source Voltage



On-Resistance vs. Junction Temperature



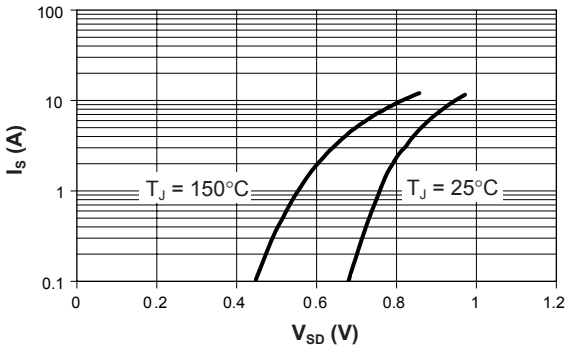
Threshold Voltage



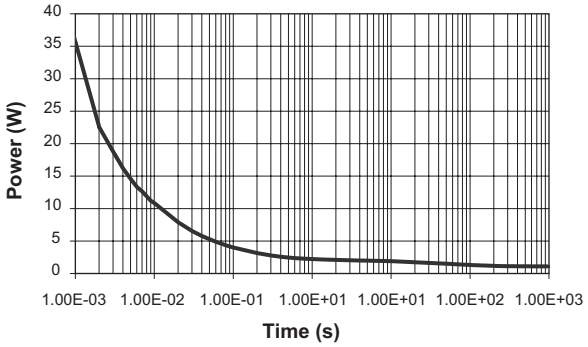
Typical Characteristics

T_J = 25ºC, unless otherwise noted.

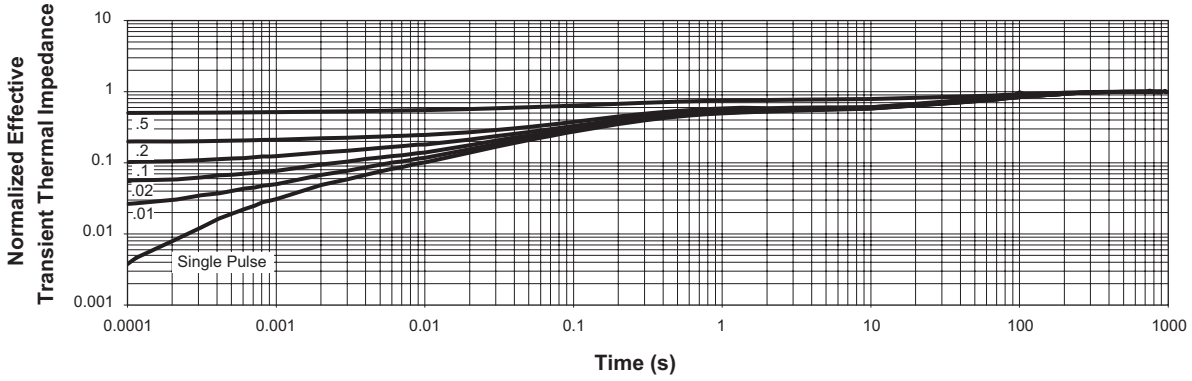
Source-Drain Diode Forward Voltage



Single Pulse Power, Junction to Ambient



Transient Thermal Response, Junction to Ambient

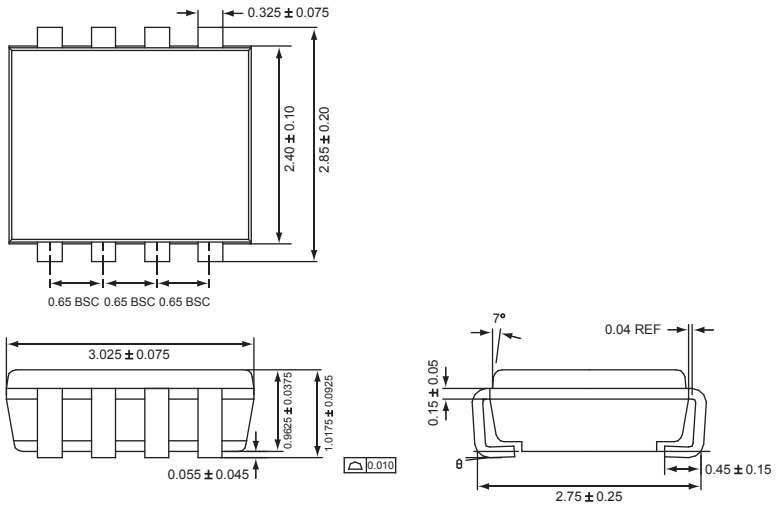


Ordering Information

Package	Marking[1]	Part Number (Tape and Reel)[2]
TSOPJW-8	NBXYY	**AAT7357ITS-T1**

Package Information

TSOPJW-8



All dimensions in millimeters.

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

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