

General Description

The AAT8107 low threshold 20V, P-channel MOSFET is a member of AnalogicTech's TrenchDMOS product family. Using an ultra-high density proprietary TrenchDMOS technology, the AAT8107 is designed for use as a load switch in battery-powered applications and protection in battery packs.

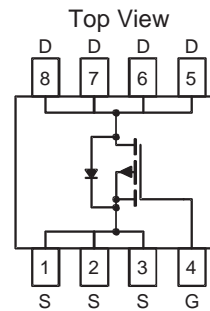
Features

- $V_{DS(MAX)} = -20V$
- $I_{D(MAX)}^1 = -6.5A @ 25^{\circ}C$
- Low $R_{DS(ON)}$:
 - $35m\Omega @ V_{GS} = -4.5V$
 - $60m\Omega @ V_{GS} = -2.5V$

Applications

- Battery Packs
- Battery-Powered Portable Equipment

SOP-8L Package



Absolute Maximum Ratings

$T_A = 25^{\circ}C$, 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 @ $T_J = 150^{\circ}C^1$	$T_A = 25^{\circ}C$	A
		$T_A = 70^{\circ}C$	
I_{DM}	Pulsed Drain Current ²	± 32	
I_S	Continuous Source Current (Source-Drain Diode) ¹	-1.7	
P_D	Maximum Power Dissipation ¹	$T_A = 25^{\circ}C$	W
		$T_A = 70^{\circ}C$	
T_J, T_{STG}	Operating Junction and Storage Temperature Range	-55 to 150	$^{\circ}C$

Thermal Characteristics

Symbol	Description	Value	Units
$R_{\theta JA}$	Typical Junction-to-Ambient Steady State ¹	80	$^{\circ}C/W$
$R_{\theta JA2}$	Maximum Junction-to-Ambient $t < 10$ Seconds ¹	50	
$R_{\theta JF}$	Typical Junction-to-Foot ¹	27	

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 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 = 300 μs .

Electrical Characteristics

$T_J = 25^\circ\text{C}$, unless otherwise noted.

Symbol	Description	Conditions	Min	Typ	Max	Units
DC Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = -250\mu A$	-20			V
$R_{DS(ON)}$	Drain-Source On-Resistance ¹	$V_{GS} = -4.5V, I_D = -6.5A$		27	35	m Ω
		$V_{GS} = -2.5V, I_D = -5.0A$		46	60	
$I_{D(ON)}$	On-State Drain Current ¹	$V_{GS} = -4.5V, V_{DS} = 5V$ (Pulsed)	-32			A
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}, I_D = -250\mu A$	-0.6			V
I_{GSS}	Gate-Body Leakage Current	$V_{GS} = \pm 12V, V_{DS} = 0V$			± 100	nA
I_{DSS}	Drain Source Leakage Current	$V_{GS} = 0V, V_{DS} = -20V$			-1	μA
		$V_{GS} = 0V, V_{DS} = -16V, T_J = 70^\circ\text{C}$			-5	
g_{fs}	Forward Transconductance ¹	$V_{DS} = -5V, I_D = -6.5A$		12		S
Dynamic Characteristics²						
Q_G	Total Gate Charge	$V_{DS} = -15V, R_D = 2.3\Omega, V_{GS} = -4.5V$		13.6		nC
Q_{GS}	Gate-Source Charge	$V_{DS} = -15V, R_D = 2.3\Omega, V_{GS} = -4.5V$		2.3		
Q_{GD}	Gate-Drain Charge	$V_{DS} = -15V, R_D = 2.3\Omega, V_{GS} = -4.5V$		5.5		
$t_{D(ON)}$	Turn-On Delay	$V_{DS} = -15V, R_D = 2.3\Omega, V_{GS} = -4.5V, R_G = 6\Omega$		10		ns
t_R	Turn-On Rise Time	$V_{DS} = -15V, R_D = 2.3\Omega, V_{GS} = -4.5V, R_G = 6\Omega$		35		
$t_{D(OFF)}$	Turn-Off Delay	$V_{DS} = -15V, R_D = 2.3\Omega, V_{GS} = -4.5V, R_G = 6\Omega$		38		
t_F	Turn-Off Fall Time	$V_{DS} = -15V, R_D = 2.3\Omega, V_{GS} = -4.5V, R_G = 6\Omega$		50		
Source-Drain Diode Characteristics						
V_{SD}	Source-Drain Forward Voltage ¹	$V_{GS} = 0, I_S = -6.5A$			-1.5	V
I_S	Continuous Diode Current ³				-1.7	A

1. Pulse test: Pulse Width = 300 μs .

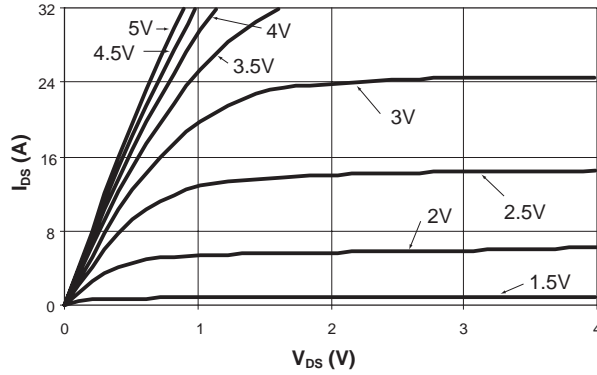
2. Guaranteed by design. Not subject to production testing.

3. Based on thermal dissipation from junction to ambient while mounted on a 1" x 1" PCB with optimized layout. A 10-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.

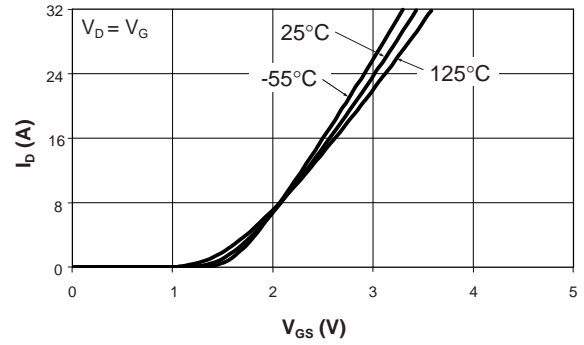
Typical Characteristics

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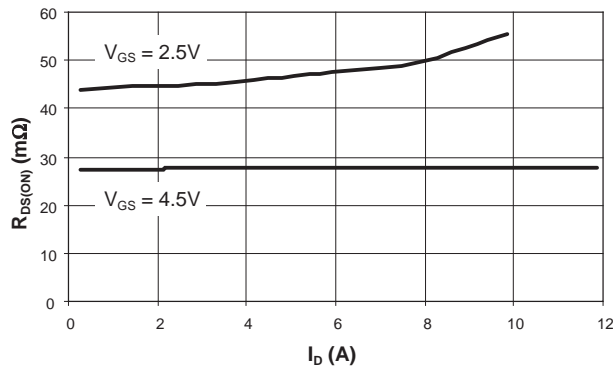
Output Characteristics



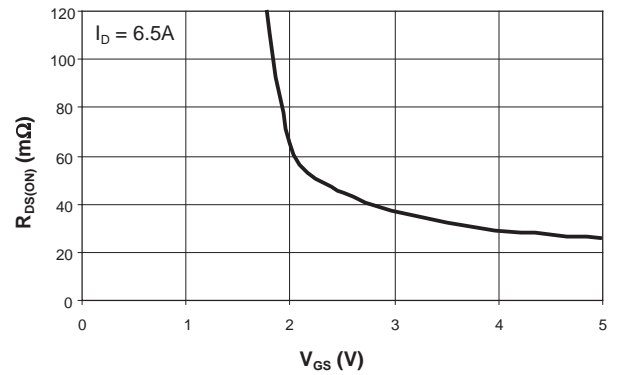
Transfer Characteristics



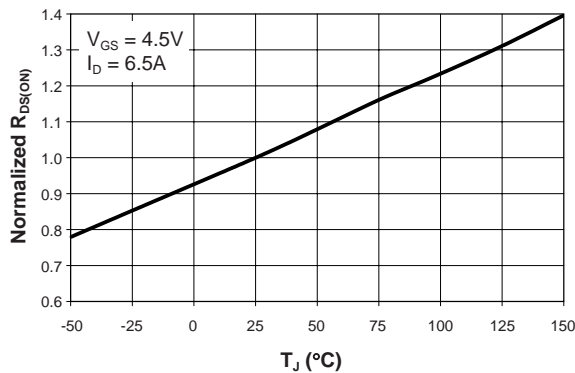
On-Resistance vs. Drain Current



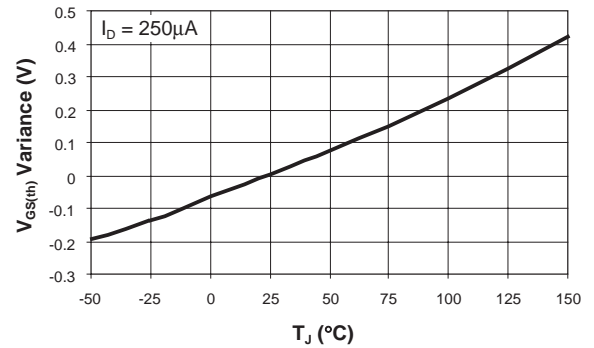
On-Resistance vs. Gate-to-Source Voltage



On-Resistance vs. Junction Temperature



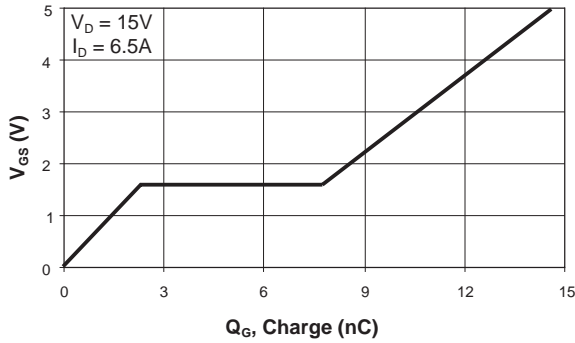
Threshold Voltage



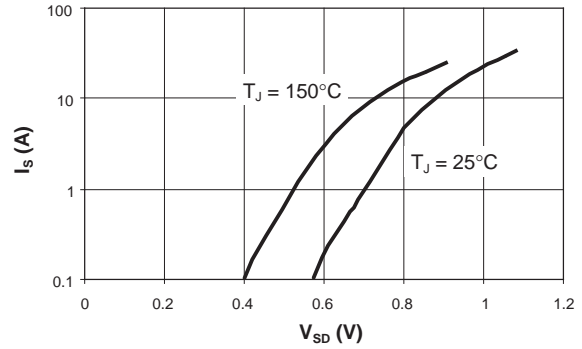
Typical Characteristics

$T_J = 25^\circ\text{C}$, unless otherwise noted.

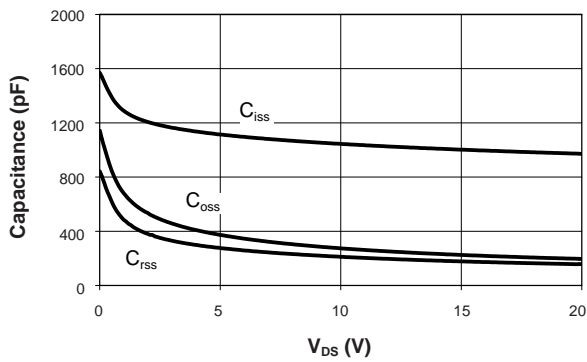
Gate Charge



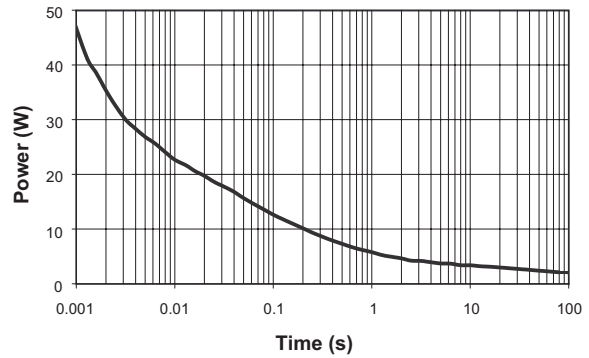
Source-Drain Diode Forward Voltage



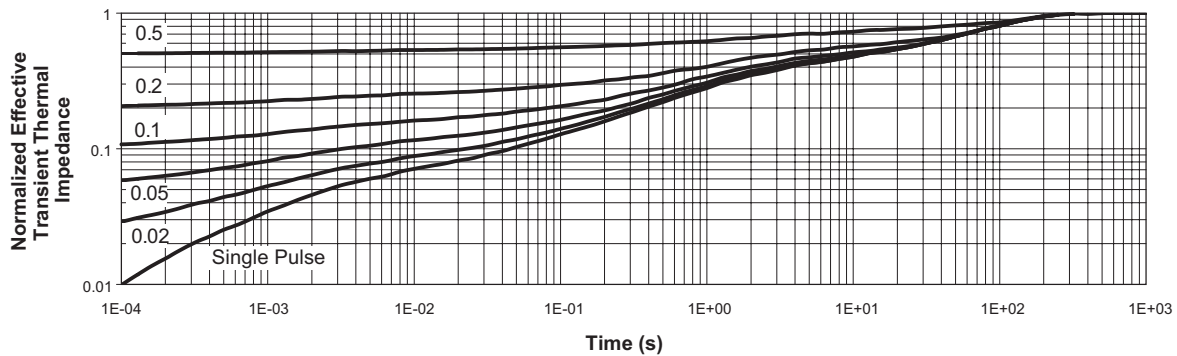
Capacitance



Single Pulse Power, Junction to Ambient



Transient Thermal Response, Junction to Ambient

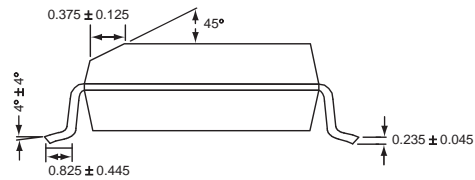
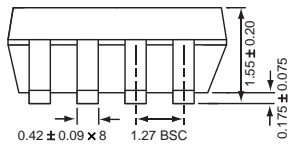
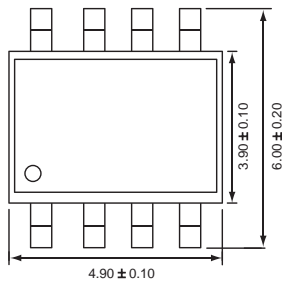


Ordering Information

Package	Marking	Part Number (Tape and Reel) ¹
SOP-8	8107	AAT8107IAS-T1

Package Information

SOP-8



All dimensions in millimeters.

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

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