

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.

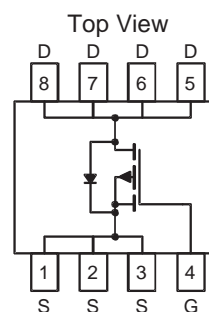
Features

- $V_{DS(MAX)} = -20V$
- $I_{D(MAX)}^1 = -6.5A @ 25^{\circ}C$
- 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 @ $T_J = 150^{\circ}C^1$	$T_A = 25^{\circ}C$ ± 6.5 $T_A = 70^{\circ}C$ ± 5.2	A
I_{DM}	Pulsed Drain Current ²	± 32	
I_S	Continuous Source Current (Source-Drain Diode) ¹	-1.7	
P_D	Maximum Power Dissipation ¹	$T_A = 25^{\circ}C$ 2.5 $T_A = 70^{\circ}C$ 1.6	W
T_J, T_{STG}	Operating Junction and Storage Temperature Range	-55 to 150	

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 = -250μA	-20			V
R _{DS(ON)}	Drain-Source On-Resistance ¹	V _{GS} = -4.5V, I _D = -6.5A		27	35	mΩ
		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 = -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			-5	
g _{fs}	Forward Transconductance ¹	V _{DS} = -5V, I _D = -6.5A		12		S
Dynamic Characteristics ²						
Q _G	Total Gate Charge	V _{DS} = -15V, R _D = 2.3Ω, V _{GS} = -4.5V		13.6		nC
Q _{GS}	Gate-Source Charge	V _{DS} = -15V, R _D = 2.3Ω, V _{GS} = -4.5V		2.3		
Q _{GD}	Gate-Drain Charge	V _{DS} = -15V, R _D = 2.3Ω, V _{GS} = -4.5V		5.5		
t _{D(ON)}	Turn-On Delay	V _{DS} = -15V, R _D = 2.3Ω, V _{GS} = -4.5V, R _G = 6Ω		10		ns
t _R	Turn-On Rise Time	V _{DS} = -15V, R _D = 2.3Ω, V _{GS} = -4.5V, R _G = 6Ω		35		
t _{D(OFF)}	Turn-Off Delay	V _{DS} = -15V, R _D = 2.3Ω, V _{GS} = -4.5V, R _G = 6Ω		38		
t _F	Turn-Off Fall Time	V _{DS} = -15V, R _D = 2.3Ω, V _{GS} = -4.5V, R _G = 6Ω		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 μ s.

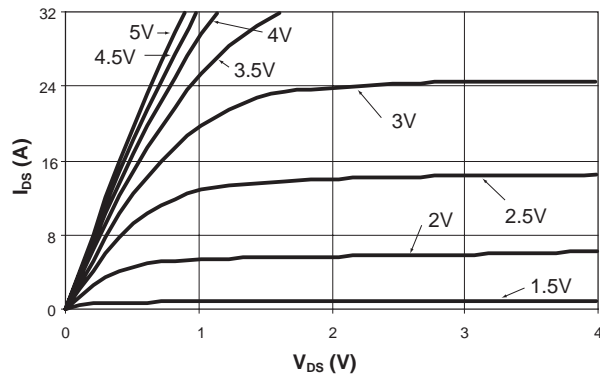
2. Guaranteed by design. Not subject to production testing.

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.

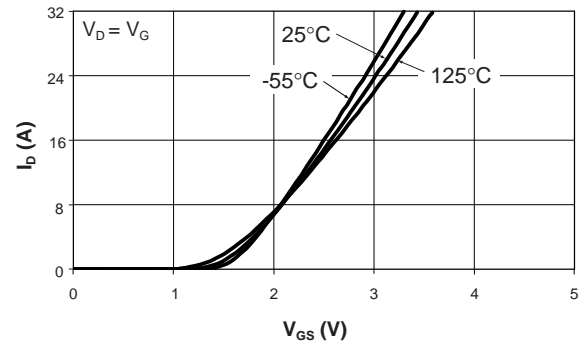
Typical Characteristics

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

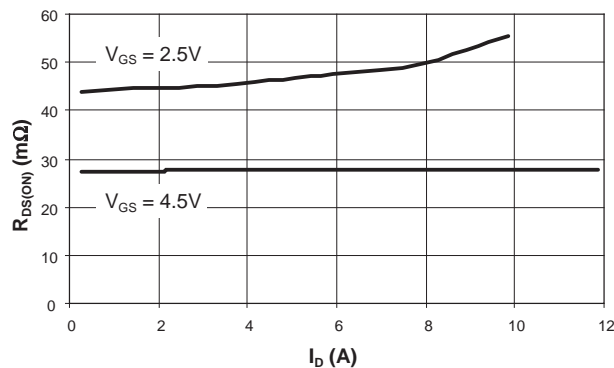
Output Characteristics



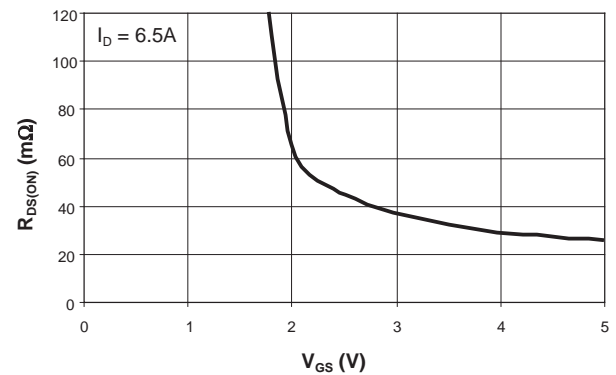
Transfer Characteristics



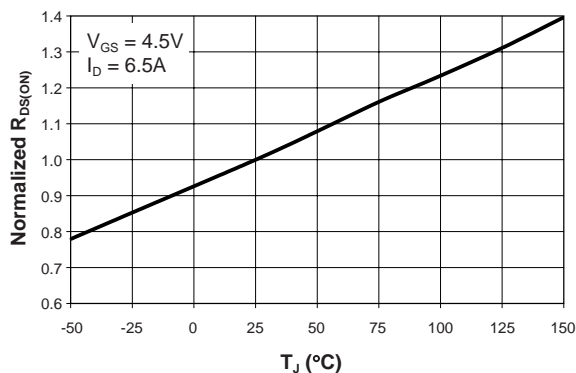
On-Resistance vs. Drain Current



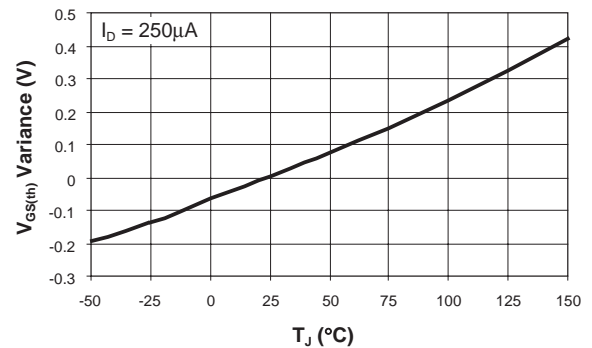
On-Resistance vs. Gate-to-Source Voltage



On-Resistance vs. Junction Temperature



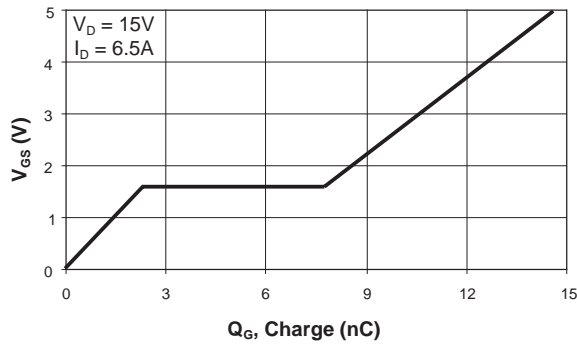
Threshold Voltage



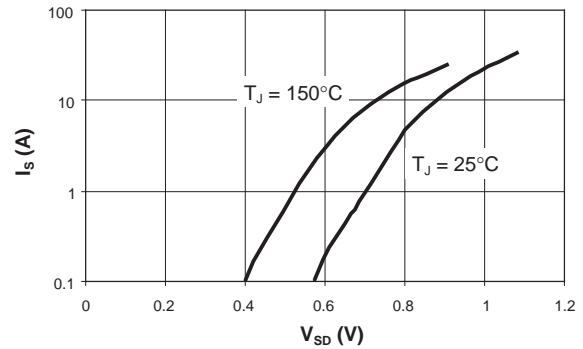
Typical Characteristics

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

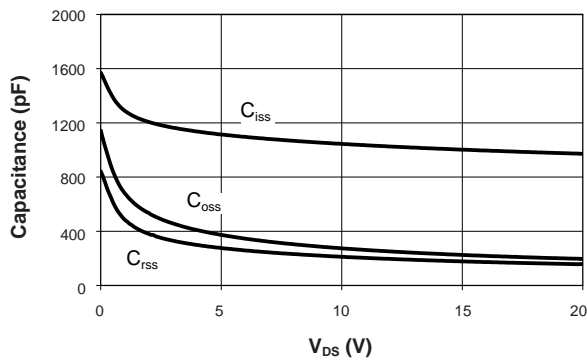
Gate Charge



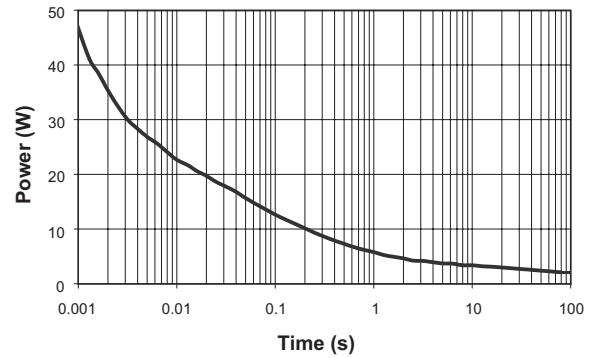
Source-Drain Diode Forward Voltage



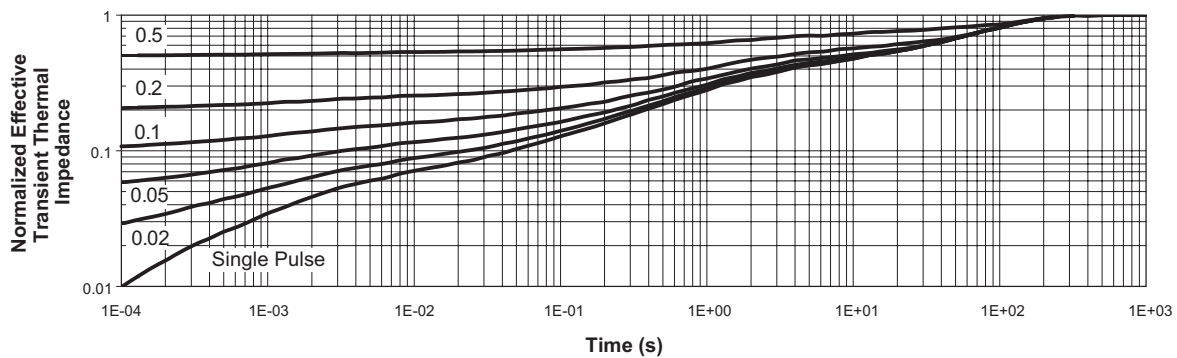
Capacitance



Single Pulse Power, Junction to Ambient



Transient Thermal Response, Junction to Ambient

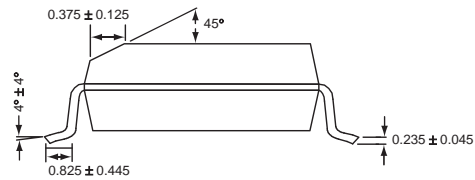
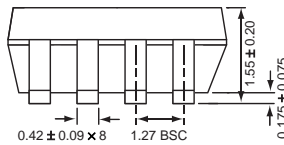
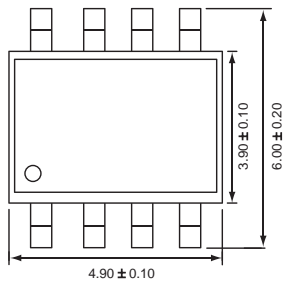


Ordering Information

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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