

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.

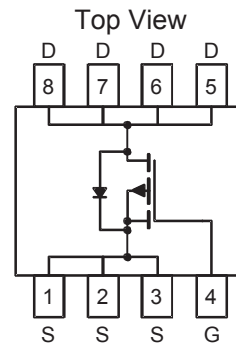
Features

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

Applications

- Battery Packs
- Battery-powered portable equipment

SOP-8L Package



Preliminary Information

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	

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 =-6.5A		27	35	mΩ
		V _{GS} =-2.5V, I _D =-5.0A		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			-5	
g _{fs}	Forward Transconductance ²	V _{DS} =-5V, I _D =-6.5A		12		S
Dynamic Characteristics ³						
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 ²	V _{GS} =0, I _S =-6.5A			-1.5	V
I _S	Continuous Diode Current ¹				-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 most applications. R_{θJF} + R_{θFA} = R_{θJA} where the foot thermal reference is defined as the normal solder mounting surface of the device's leads. R_{θJF} is guaranteed by design, however R_{θCA} is determined by the PCB design. Actual maximum continuous current is limited by the application's design.

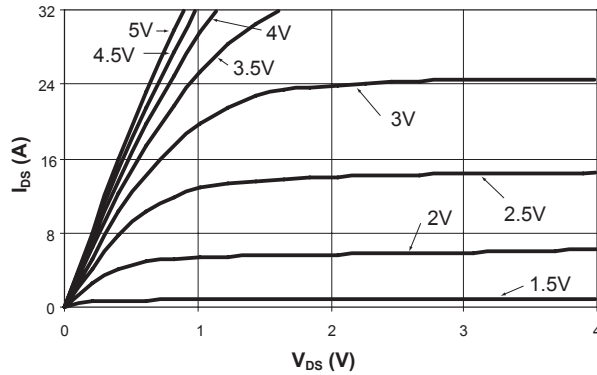
Note 2: Pulse test: Pulse Width = 300 μs

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

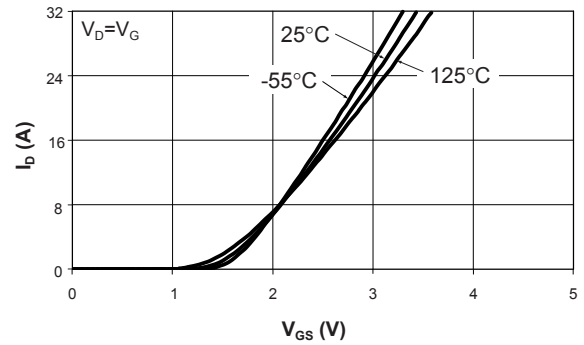
Typical Characteristics

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

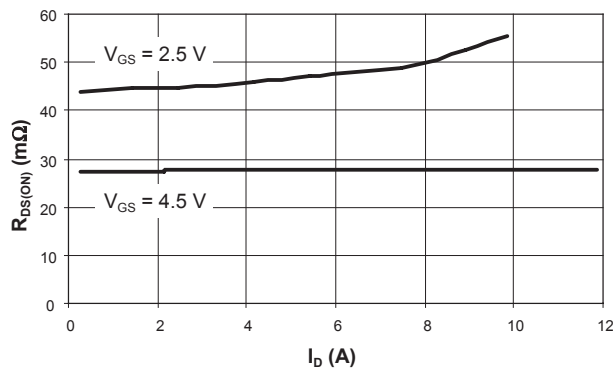
Output Characteristics



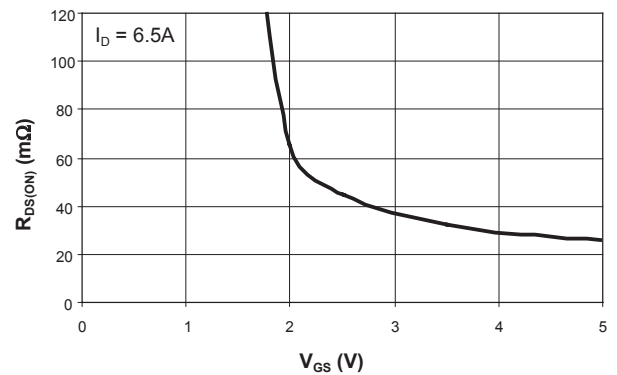
Transfer Characteristics



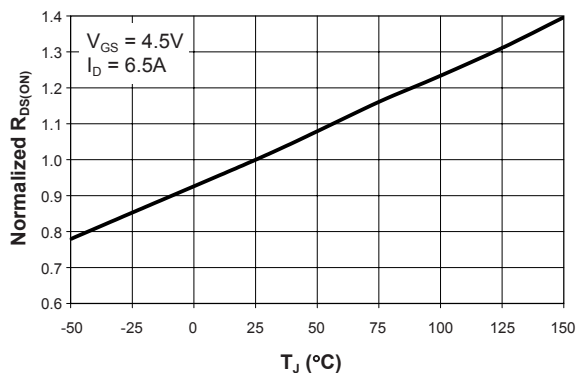
On-Resistance vs. Drain Current



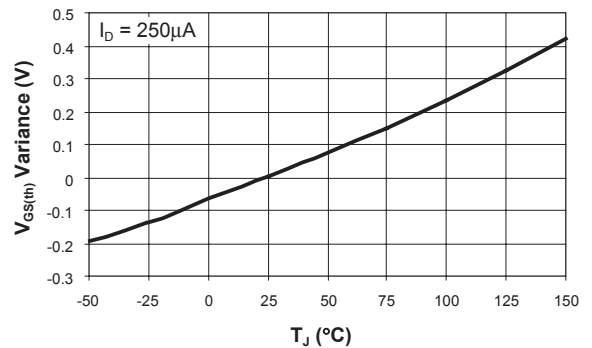
On-Resistance vs. Gate to Source Voltage



On-Resistance vs. Junction Temperature



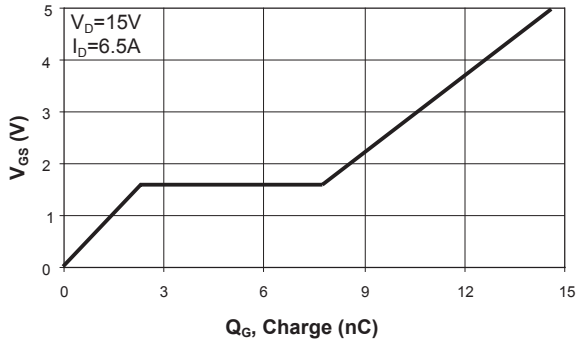
Threshold Voltage



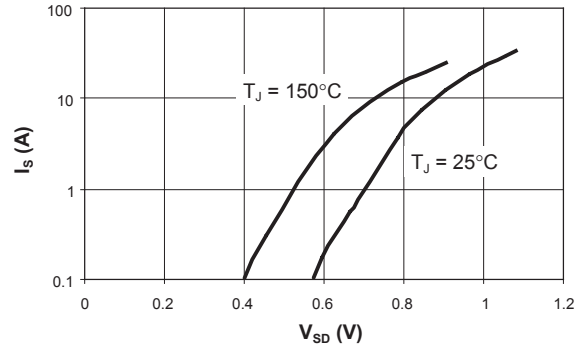
Typical Characteristics

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

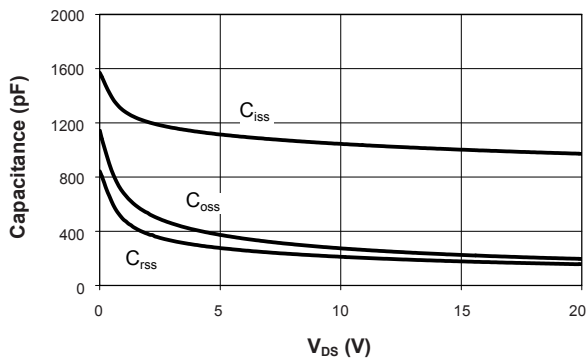
Gate Charge



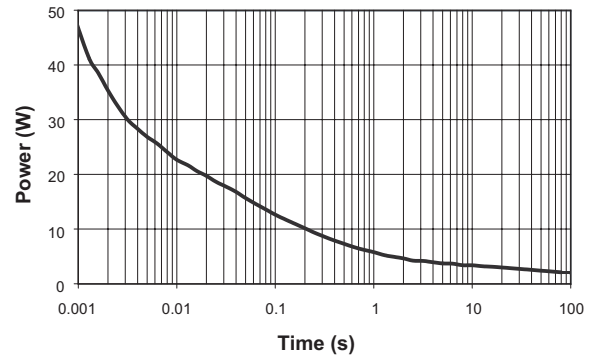
Source-Drain Diode Forward Voltage



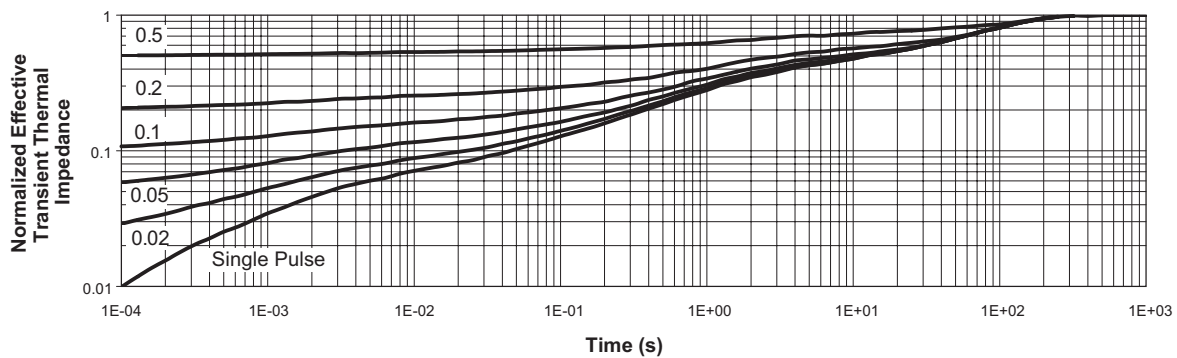
Capacitance



Single Pulse Power, Junction to Ambient



Transient Thermal Response, Junction to Ambient



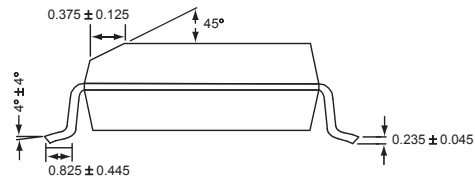
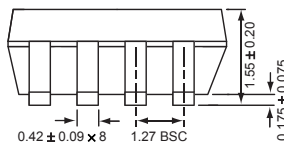
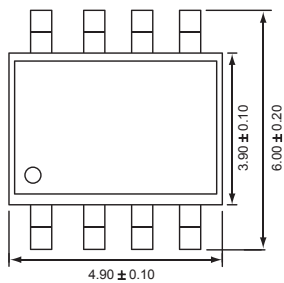
Ordering Information

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

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

Package Information

SOP-8



All dimensions in millimeters.

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