

General Description

The AAT7157 low threshold 20V, dual P-Channel MOSFET is a member of AnalogicTech™'s TrenchDMOS[™] product family. Using an ultra-high density proprietary TrenchDMOS technology the AAT7157 is designed for use as a load switch in battery powered applications and protection in battery packs.

Features

Dual SOP-8L Package

 $\begin{array}{l} {\sf V}_{{\sf DS}({\sf MAX})} = -20{\sf V} \\ {\sf I}_{{\sf D}({\sf MAX})}{}^1 = -5.8{\sf A} @~25^\circ{\sf C} \\ {\sf Low} ~{\sf R}_{{\sf DS}({\sf ON})}{}^{:} \\ \bullet ~~36~{\sf m}\Omega @~{\sf V}_{{\sf GS}} = -4.5{\sf V} \\ \bullet ~~62~{\sf m}\Omega @~{\sf V}_{{\sf GS}} = -2.5{\sf V} \end{array}$

Applications

- **Battery Packs**
- Battery-powered portable equipment •

D1 8	Top D1 7	View	D2 5
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1 51	2 G1	3 S2	4 G2

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	v	
Ι _D	Continuous Drain Current @ T _J =150°C ¹	T _A = 25°C	±5.8		
		T _A = 70°C	±4.6	А	
I _{DM}	Pulsed Drain Current ²		±24	A	
Is	Continuous Source Current (Source-Drain Diode) 1		-1.5		
P _D	Maximum Power Dissipation ¹	T _A = 25°C	2.0	W	
		T _A = 70°C	1.25	vv	
T _J , T _{STG}	Operating Junction and Storage Temperature Range		-55 to 150	°C	

Thermal Characteristics

Symbol	Description	Value	Units
R _{0JA}	Typical Junction-to-Ambient steady state ¹ 100		
R _{0JA2}	Maximum Junction-to-Ambient t<10 seconds 1	62.5	°C/W
R _{θJF}	Typical Junction-to-Foot 1 35		



Symbol	Description	Conditions	Min	Тур	Max	Units	
DC Charac	DC Characteristics					1	
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 =-5.8A		29	36	mΩ	
		V _{GS} =-2.5V, I _D =-4.4A		49	62		
I _{D(ON)}	On-State Drain Current ²	V _{GS} =-4.5V, V _{DS} =5V (Pulsed)	-24			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	Drain Source Leakage Current	V _{GS} =0V, V _{DS} =-20V			-1	μA	
I _{DSS}		V _{GS} =0V, V _{DS} =-16V, T _J =70°C ³			-5		
9 _{fs}	Forward Transconductance ²	V _{DS} =-5V, I _D =-5.8A		12		S	
Dynamic C	haracteristics ³	•					
Q_{G}	Total Gate Charge	V _{DS} =-15V, R _D =2.6Ω, V _{GS} =-4.5V		14			
Q_{GS}	Gate-Source Charge	V _{DS} =-15V, R _D =2.6Ω, V _{GS} =-4.5V		2.3		nC	
Q_{GD}	Gate-Drain Charge	V _{DS} =-15V, R _D =2.6Ω, V _{GS} =-4.5V		5.5]	
t _{D(ON)}	Turn-ON Delay	V_{DS} =-15V, R_{D} =2.6 Ω , V_{GS} =-4.5V, R_{G} =6 Ω		10			
t _R	Turn-ON Rise Time	V_{DS} =-15V, R_{D} =2.6 Ω , V_{GS} =-4.5V, R_{G} =6 Ω		37		ns	
t _{D(OFF)}	Turn-OFF Delay	V_{DS} =-15V, R_{D} =2.6 Ω , V_{GS} =-4.5V, R_{G} =6 Ω		36			
t _F	Turn-OFF Fall Time	V_{DS} =-15V, R_{D} =2.6 Ω , V_{GS} =-4.5V, R_{G} =6 Ω		52]	
Source-Drain Diode Characteristics							
V_{SD}	Source-Drain Forward Voltage ²	V _{GS} =0, I _S =-5.8A			-1.5	V	
۱ _s	Continuous Diode Current ¹				-1.5	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. $R_{\theta JF} + R_{\theta FA} = R_{\theta JA}$ 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.

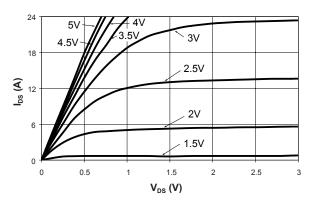
Note 2: Pulse test: Pulse Width = 300 µs

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



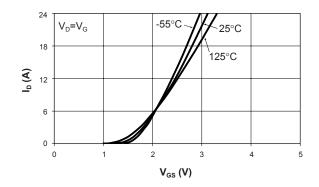
Typical Characteristics

 $(T_{\rm J} = 25^{\circ}C \text{ unless otherwise noted})$

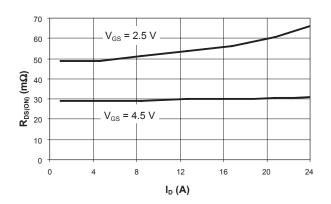


Output Characteristics

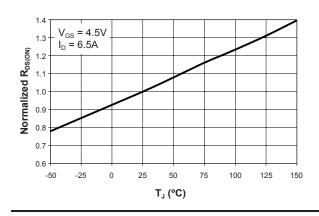
Transfer Characteristics



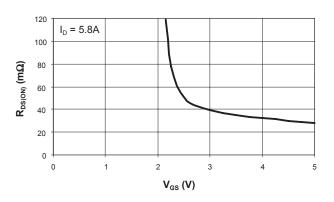
On-Resistance vs. Drain Current



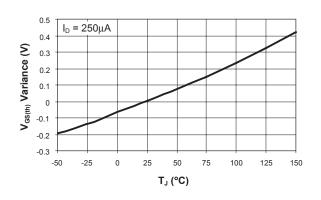
On-Resistance vs. Junction Temperature



On-Resistance vs. Gate to Source Voltage



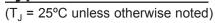
Threshold Voltage



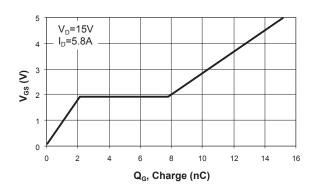


AAT7157 20V P-Channel Power MOSFET

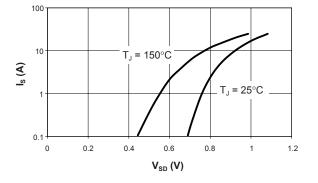
Typical Characteristics



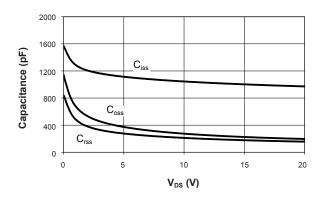
Gate Charge



Source-Drain Diode Forward Voltage



Capacitance





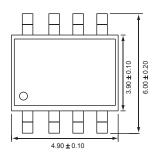
Ordering Information

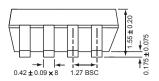
Package	Marking	Part Number (Tape and Reel)
SOP-8	7157	AAT7157IAS-T1

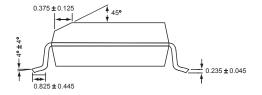
Note: Sample stock is generally held on all part numbers listed in BOLD.

Package Information









All dimensions in millimeters.



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