AAT9125
30V N-Channel Power MOSFET

PWMSwitch™

General Description

The AAT9125 30V N-Channel Power MOSFET is a member of AnalogicTech's TrenchDMOS™ product family. Using the ultra-high density proprietary TrenchDMOS technology, this product demonstrates high power handling and small size.

Features

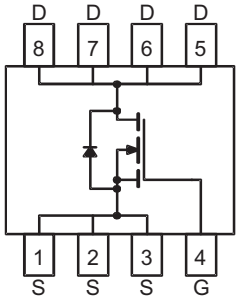
- $V_{DS(MAX)}$ = 30V
- $I_{D(MAX)}$ = 12.5A @ 25°C
- Low $R_{DS(ON)}$:
  - 9 mΩ @V_{GS} = 10V
  - 14 mΩ @ V_{GS} = 4.5V

Applications

- DC-DC converters for mobile CPUs
- Battery-powered portable equipment
- High power density switch-mode supplies
- Point-of-use Power Supplies

SOP8 Package

Top View



Preliminary Information

Absolute Maximum Ratings (T_A=25°C unless otherwise noted)

Symbol	Description		Value	Units
V_{DS}	Drain-Source Voltage		30	V
V_{GS}	Gate-Source Voltage		±20	
I_D	Continuous Drain Current @ T_J=150°C [1]	T_A = 25°C	±12.5	A
		T_A = 70°C	±10	
I_{DM}	Pulsed Drain Current		±52	
I_S	Continuous Source Current (Source-Drain Diode) [1]		2.25	
P_D	Maximum Power Dissipation [1]	T_A = 25°C	2.5	W
		T_A = 70°C	1.6	
T_J, T_{STG}	Operating Junction and Storage Temperature Range		-55 to 150	°C

Thermal Characteristics

Symbol	Description	Value	Units
$R_{\theta JA}$	Typical Junction-to-Ambient [1]	50	°C/W
$R_{\theta JC}$	Typical Junction-to-Case	25	°C/W

Note 1: Mounted on 1" x 1" FR4 Copper Board, 10 sec pulse width

Electrical Characteristics (T_J=25°C unless otherwise noted)

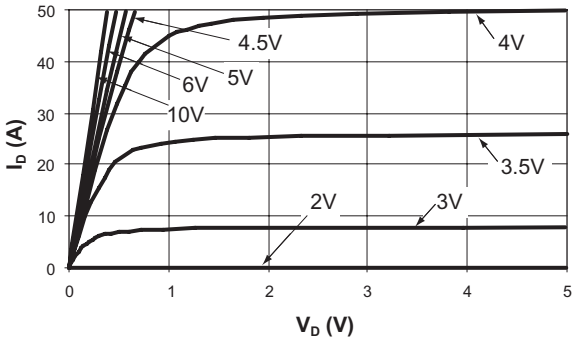
Symbol	Description	Conditions	Min	Typ	Max	Units
DC Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250µA	30			V
$R_{DS(ON)}$	Drain-Source ON-Resistance [2]	V_{GS}=10V, I_D=12A		7.5	9	mΩ
		V_{GS}=4.5V, I_D=10A		11.5	14	
$I_{D(ON)}$	On-State Drain Current [2]	V_{GS}=10V ,V_{DS}=5V (Pulsed)	52			A
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS}, I_D=250µA	1.0			V
I_{GSS}	Gate-Body Leakage Current	V_{GS}=±20V, V_{DS}=0V			±100	nA
I_{DSS}	Drain Source Leakage Current	V_{GS}=0V,V_{DS}=30V			1	µA
		V_{GS}=0V,V_{DS}=30V, T_J=55°C			5	
g_{fs}	Forward Transconductance [2]	V_{DS}=15V, I_D=12.5A		30		S
Dynamic Characteristics [3]						
Q_G	Total Gate Charge	V_{DS}=15V, I_D=12.5A, V_{GS}=5V		31	50	nC
Q_{GT}	Total Gate Charge	V_{DS}=15V, I_D=12.5A, V_{GS}=10V		60	100	nC
Q_{GS}	Gate-Source Charge	V_{DS}=15V, I_D=12.5A, V_{GS}=10V		10		nC
Q_{GD}	Gate-Drain Charge	V_{DS}=15V, I_D=12.5A, V_{GS}=10V		9		nC
$t_{D(ON)}$	Turn-ON Delay	V_{DD}=15V, V_{GS}=10V, R_D=1.2Ω, R_G=6Ω		20	35	ns
t_R	Turn-ON Rise Time	V_{DD}=15V, V_{GS}=10V, R_D=1.2Ω, R_G=6Ω		14	30	ns
$t_{D(OFF)}$	Turn-OFF Delay	V_{DD}=15V, V_{GS}=10V, R_D=1.2Ω, R_G=6Ω		100	160	ns
t_F	Turn-OFF Fall Time	V_{DD}=15V, V_{GS}=10V, R_D=1.2Ω, R_G=6Ω		38	80	ns
Source-Drain Diode Characteristics						
V_{SD}	Source-Drain Forward Voltage [2]	V_{GS}=0, I_S=2.25A			1.1	V
I_S	Continuous Diode Current	T_A=25ºC			2.25	A

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

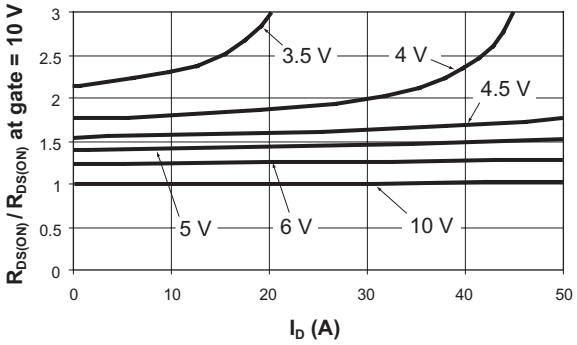
Typical Characteristics

(T_J = 25ºC unless otherwise noted)

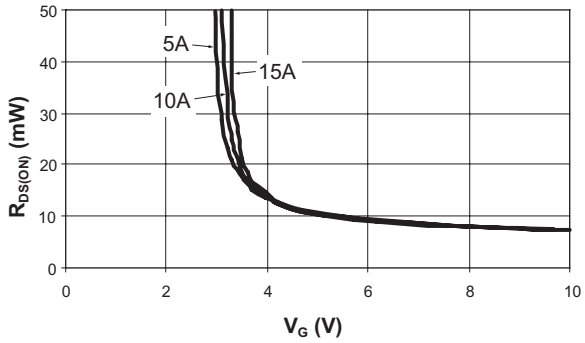
Forward Characteristics



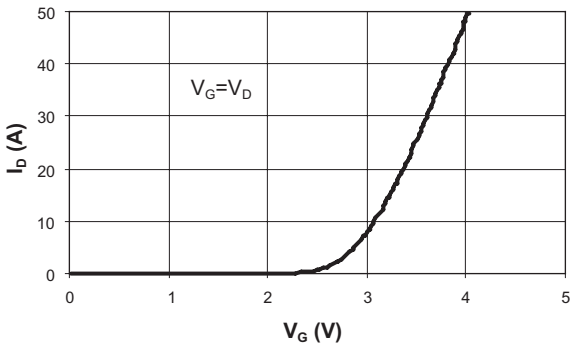
Normalized $R_{DS(ON)}$



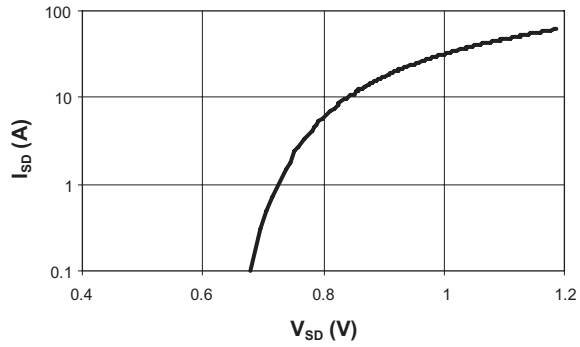
$R_{DS(ON)}$ vs. V_G



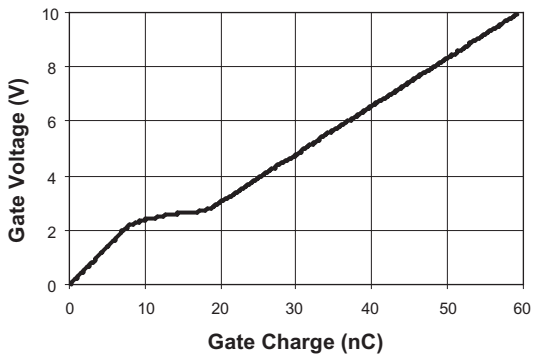
Transfer



Source to Drain Voltage



Gate Charge Characteristics

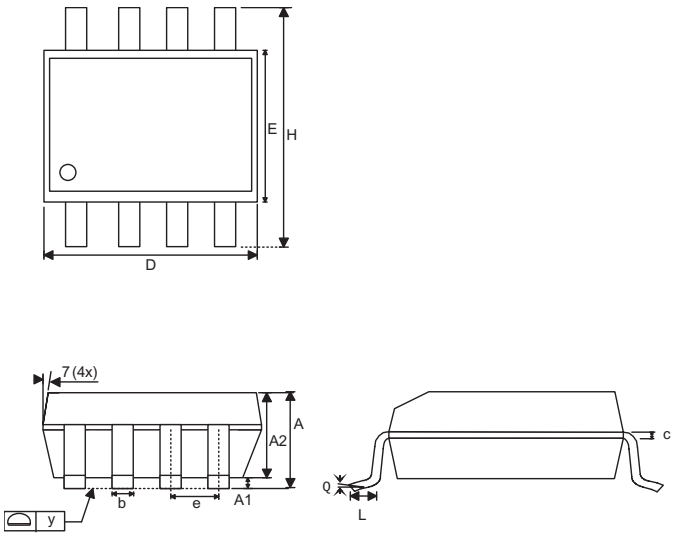


Ordering Information

Package	Marking	Part Number	
		Bulk	Tape and Reel
SOP-8		AAT9125IAS-B1	AAT9125IAS-T1

Package Information

SOP-8



Dim	Millimeters		Inches	
	Min	Max	Min	Max
A	1.35	1.75	0.053	0.069
A1	0.10	0.25	0.004	0.010
A2	1.45		0.057	
B	0.33	0.51	0.013	0.020
C	0.19	0.25	0.007	0.010
D	4.80	5.00	0.189	0.197
E	3.80	4.00	0.150	0.157
e	1.27		0.050	
H	5.80	6.20	0.228	0.244
L	0.40	1.27	0.016	0.050
Y	0.00	0.10	0.000	0.004
θ1	0°	8°	0°	8°

Note:
1. PACKAGE BODY SIZES EXCLUDE MOLD FLASH PROTRUSIONS OR GATE BURRS.
2. TOLERANCE 0.1000mm (4mil) UNLESS OTHERWISE SPECIFIED
3. COPLANARITY: 0.1000mm
4. DIMENSION L IS MEASURED IN GAGE PLANE.
5. CONTROLLING DIMENSION IS MILLIMETER; CONVERTED INCH DIMENSIONS ARE NOT NECESSARILY EXACT.

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