

General Description

The AAT9121 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.

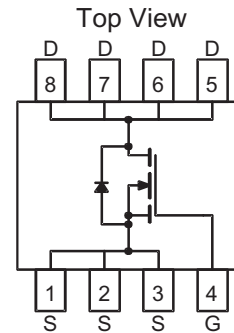
Features

- $V_{DS(MAX)} = 30V$
- $I_{D(MAX)} = 8A @ 25^{\circ}C$
- Low Gate Charge
- Low $R_{DS(ON)}$:
 - $24 m\Omega @ V_{GS} = 10V$
 - $35 m\Omega @ V_{GS} = 4.5V$

Applications

- DC-DC converters for mobile CPUs
- Battery-powered portable equipment
- High power density DC - DC supplies
- Power supplies

SOP-8 Package



Absolute Maximum Ratings ($T_A=25^{\circ}C$ 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 @ $T_J=150^{\circ}C$ ¹	$T_A = 25^{\circ}C$	± 8.0	A
		$T_A = 70^{\circ}C$	± 6.4	
I_{DM}	Pulsed Drain Current	± 24		
I_S	Continuous Source Current (Source-Drain Diode) ¹	2.25		
P_D	Maximum Power Dissipation ¹	$T_A = 25^{\circ}C$	2.5	W
		$T_A = 70^{\circ}C$	1.6	
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 ¹	50	$^{\circ}C/W$
$R_{\theta JC}$	Typical Junction-to-Case	28	$^{\circ}C/W$

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 =8A		16	24	mΩ
		V _{GS} =4.5V, I _D =6.6A		28	35	
I _{D(ON)}	On-State Drain Current ²	V _{GS} =10V, V _{DS} =5V (Pulsed)	24			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 =8A		15		S
Dynamic Characteristics ³						
Q _G	Total Gate Charge	V _{DS} =15V, I _D =8A, V _{GS} =5V		10.5	16	nC
Q _{GT}	Total Gate Charge	V _{DS} =15V, I _D =8A, V _{GS} =10V		20.5	28	nC
Q _{GS}	Gate-Source Charge	V _{DS} =15V, I _D =8A, V _{GS} =10V		3.8		nC
Q _{GD}	Gate-Drain Charge	V _{DS} =15V, I _D =8A, V _{GS} =10V		2.9		nC
t _{D(ON)}	Turn-ON Delay	V _{DD} =15V, V _{GS} =10V, R _D =1.8Ω, R _G =6Ω		9	15	ns
t _R	Turn-ON Rise Time	V _{DD} =15V, V _{GS} =10V, R _D =1.8Ω, R _G =6Ω		12	20	ns
t _{D(OFF)}	Turn-OFF Delay	V _{DD} =15V, V _{GS} =10V, R _D =1.8Ω, R _G =6Ω		38	55	ns
t _F	Turn-OFF Fall Time	V _{DD} =15V, V _{GS} =10V, R _D =1.8Ω, R _G =6Ω		19	28	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 ²	T _A =25°C			2.25	A

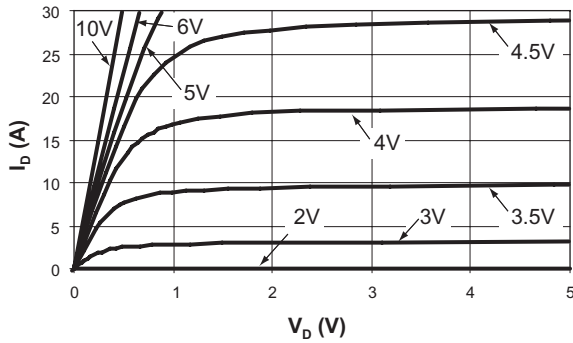
Note 2: Pulse test: Pulse Width = 300μs

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

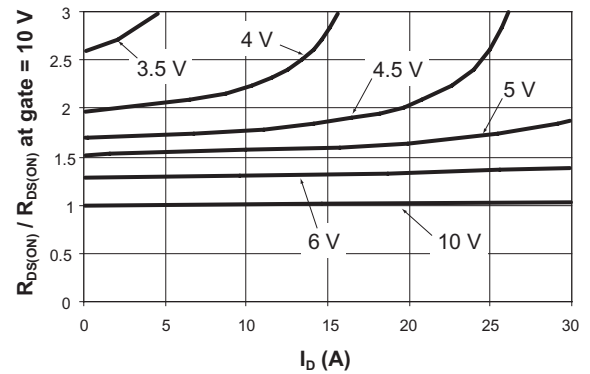
Typical Characteristics

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

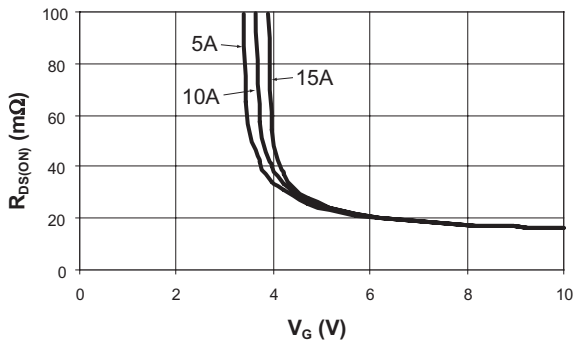
Forward Characteristics



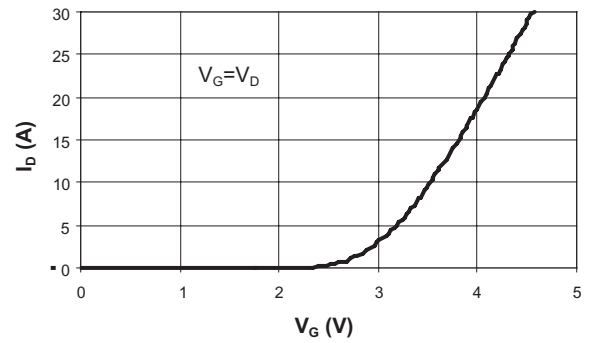
Normalized $R_{DS(ON)}$



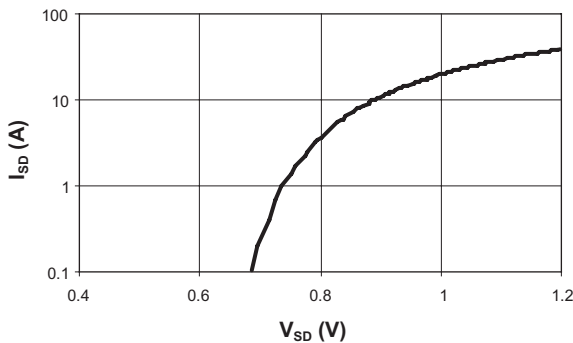
$R_{DS(ON)}$ vs. V_G



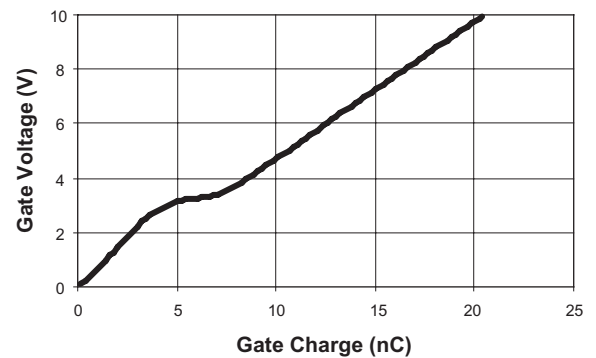
Transfer



Source to Drain Voltage



Gate Charge Characteristics

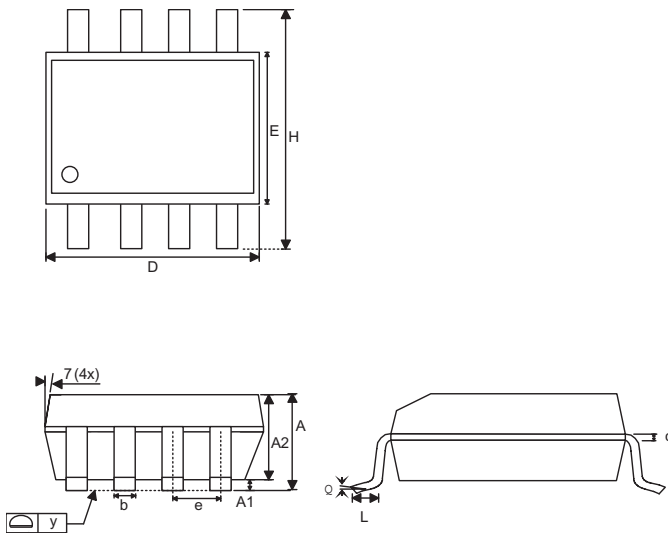


Ordering Information

Package	Marking	Part Number	
		Bulk	Tape and Reel
SOP-8		AAT9121IAS-B1	AAT9121IAS-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.