

## 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.

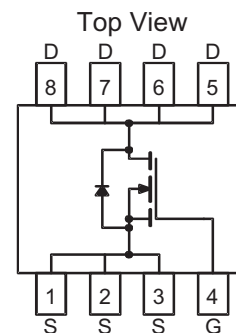
## Features

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

## Applications

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

## SOP8 Package



## 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	$\pm 20$	
$I_D$	Continuous Drain Current @ $T_J = 150^{\circ}C$ <sup>1</sup>	$T_A = 25^{\circ}C$	A
		$T_A = 70^{\circ}C$	
$I_{DM}$	Pulsed Drain Current	$\pm 52$	
$I_S$	Continuous Source Current (Source-Drain Diode) <sup>1</sup>	2.25	W
$P_D$	Maximum Power Dissipation <sup>1</sup>	$T_A = 25^{\circ}C$	
		$T_A = 70^{\circ}C$	
$T_J, T_{STG}$	Operating Junction and Storage Temperature Range	-55 to 150	$^{\circ}C$

## Thermal Characteristics

Symbol	Description	Value	Units
$R_{\theta JA}$	Typical Junction-to-Ambient <sup>1</sup>	50	$^{\circ}C/W$
$R_{\theta JC}$	Typical Junction-to-Case	25	$^{\circ}C/W$

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

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

Symbol	Description	Conditions	Min	Typ	Max	Units
<b>DC Characteristics</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	30			V
$R_{DS(ON)}$	Drain-Source ON-Resistance <sup>2</sup>	$V_{GS}=10V, I_D=12A$		7.5	9	m $\Omega$
		$V_{GS}=4.5V, I_D=10A$		11.5	14	
$I_{D(ON)}$	On-State Drain Current <sup>2</sup>	$V_{GS}=10V, V_{DS}=5V$ (Pulsed)	52			A
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	1.0			V
$I_{GSS}$	Gate-Body Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$			$\pm 100$	nA
$I_{DSS}$	Drain Source Leakage Current	$V_{GS}=0V, V_{DS}=30V$			1	$\mu A$
		$V_{GS}=0V, V_{DS}=30V, T_J=55^\circ\text{C}$			5	
$g_{fs}$	Forward Transconductance <sup>2</sup>	$V_{DS}=15V, I_D=12.5A$		30		S
<b>Dynamic Characteristics <sup>3</sup></b>						
$Q_G$	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	$V_{DD}=15V, V_{GS}=10V, R_D=1.2\Omega, R_G=6\Omega$		20	35	ns
$t_R$	Turn-ON Rise Time	$V_{DD}=15V, V_{GS}=10V, R_D=1.2\Omega, R_G=6\Omega$		14	30	ns
$t_{D(OFF)}$	Turn-OFF Delay	$V_{DD}=15V, V_{GS}=10V, R_D=1.2\Omega, R_G=6\Omega$		100	160	ns
$t_F$	Turn-OFF Fall Time	$V_{DD}=15V, V_{GS}=10V, R_D=1.2\Omega, R_G=6\Omega$		38	80	ns
<b>Source-Drain Diode Characteristics</b>						
$V_{SD}$	Source-Drain Forward Voltage <sup>2</sup>	$V_{GS}=0, I_S=2.25A$			1.1	V
$I_S$	Continuous Diode Current	$T_A=25^\circ\text{C}$			2.25	A

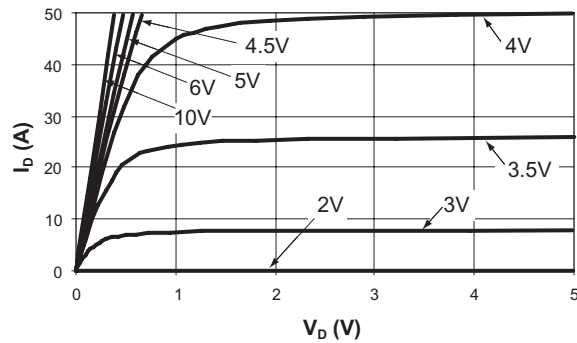
Note 2: Pulse test: Pulse Width = 300 $\mu$ s

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

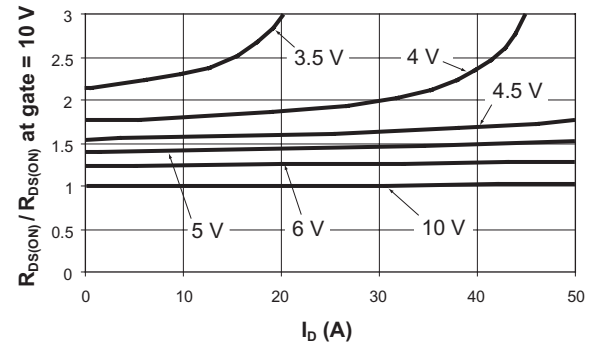
## Typical Characteristics

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

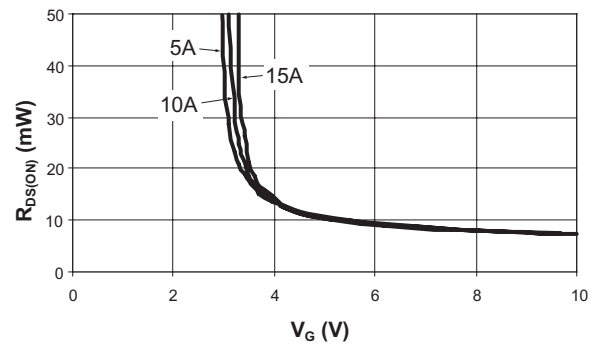
**Forward Characteristics**



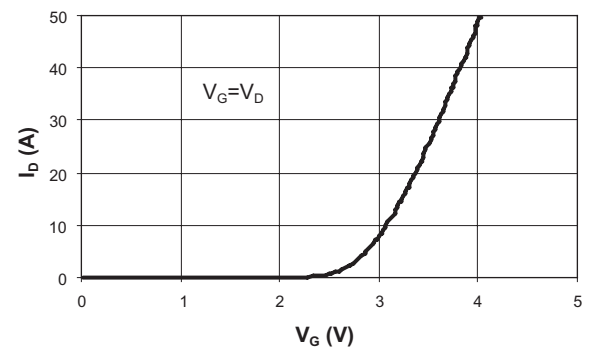
**Normalized  $R_{DS(ON)}$**



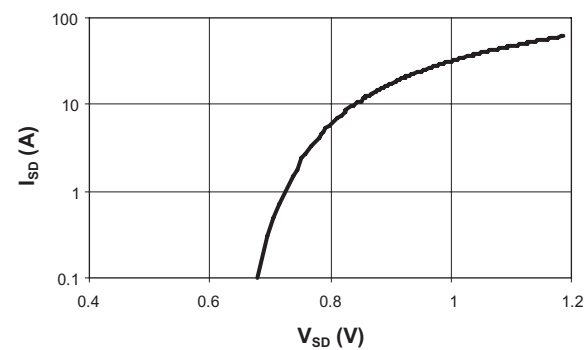
**$R_{DS(ON)}$  vs.  $V_G$**



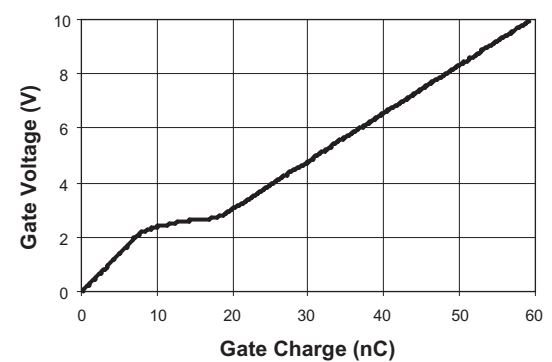
**Transfer**



**Source to Drain Voltage**



**Gate Charge Characteristics**

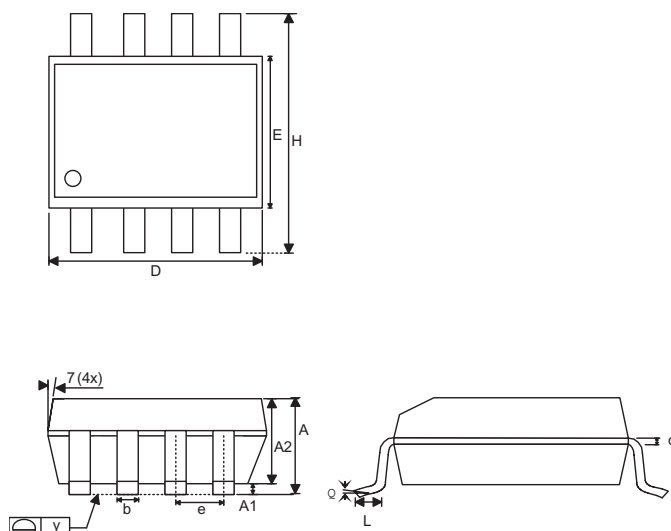


### Ordering Information

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