



AAT7103

25V N-Channel Power MOSFET

General Description

The AAT7103 25V N-Channel Power MOSFET is a member of AnalogicTech™'s TrenchDMOS™ product family. Using the ultra-high density proprietary TrenchDMOS technology, the product demonstrates high power handling and small size.

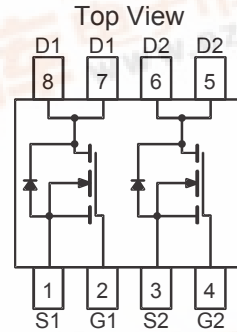
Features

- $V_{DS(MAX)} = 25V$
- $I_{D(MAX)}^{(1)} = 6.8 A @ 25^{\circ}C$
- LOW $R_{DS(ON)}$:
 - $26 m\Omega @ V_{GS} = 4.5V$
 - $41 m\Omega @ V_{GS} = 2.5V$

Applications

- Battery Packs
- Cellular & Cordless Telephones
- PDAs, Camcorders, and Cell Phones

Dual SOP-8 Package



Absolute Maximum Ratings ($T_A=25^{\circ}C$ unless otherwise noted)

Symbol	Description	Value	Units
V_{DS}	Drain-Source Voltage	25	V
V_{GS}	Gate-Source Voltage	± 12	
I_D	Continuous Drain Current @ $T_J=150^{\circ}C$ ¹	$T_A = 25^{\circ}C$	± 6.8
		$T_A = 70^{\circ}C$	± 5.4
I_{DM}	Pulsed Drain Current ³	± 24	A
I_S	Continuous Source Current (Source-Drain Diode) ¹	1.8	W
P_D	Maximum Power Dissipation ¹	$T_A = 25^{\circ}C$	
		$T_A = 70^{\circ}C$	1.25
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, one FET on ²	100	$^{\circ}C/W$
$R_{\theta JA2}$	Maximum Junction-to-Ambient Figure, $t < 10$ sec. ¹	62.5	$^{\circ}C/W$
$R_{\theta JF}$	Typical Junction-to-Foot, one FET on ¹	35	$^{\circ}C/W$

Preliminary Information



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	25			V
R _{DS(ON)}	Drain-Source ON-Resistance ³	V _{GS} =4.5V, I _D =6.8A		19	26	mΩ
		V _{GS} =2.5V, I _D =5.4A		28	41	
I _{D(ON)}	On-State Drain Current ³	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 _{DSS}	Drain Source Leakage Current	V _{GS} =0V, V _{DS} =25V			1	μA
		V _{GS} =0V, V _{DS} =20V, T _J =70°C			5	
g _{fs}	Forward Transconductance ³	V _{DS} =5V, I _D =6.8A		20		S
Dynamic Characteristics ⁴						
Q _G	Total Gate Charge	V _{DS} =15V, R _D =2.2Ω, V _{GS} =4.5V		13	19	nC
Q _{GS}	Gate-Source Charge	V _{DS} =15V, R _D =2.2Ω, V _{GS} =4.5V		1.9		
Q _{GD}	Gate-Drain Charge	V _{DS} =15V, R _D =2.2Ω, V _{GS} =4.5V		2.9		
t _{D(ON)}	Turn-ON Delay	V _{DD} =15V, V _{GS} =10V, R _D =2.2Ω, RG=6Ω		15		ns
t _R	Turn-ON Rise Time	V _{DD} =15V, V _{GS} =10V, R _D =2.2Ω, RG=6Ω		18		
t _{D(OFF)}	Turn-OFF Delay	V _{DD} =15V, V _{GS} =10V, R _D =2.2Ω, RG=6Ω		36		
t _F	Turn-OFF Fall Time	V _{DD} =15V, V _{GS} =10V, R _D =2.2Ω, RG=6Ω		27		
Source-Drain Diode Characteristics						
V _{SD}	Source-Drain Forward Voltage ³	V _{GS} =0, I _S =6.8A			1.5	V
I _S	Continuous Diode Current ¹				1.8	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 many 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, $R_{\theta FA}$ is determined by PCB design. Actual maximum continuous current is limited by the application's design.

Note 2: Steady state thermal response while mounted on a 1" x 1" PCB with maximum copper area is provided for comparison with other devices. This test condition approximates many battery pack applications.

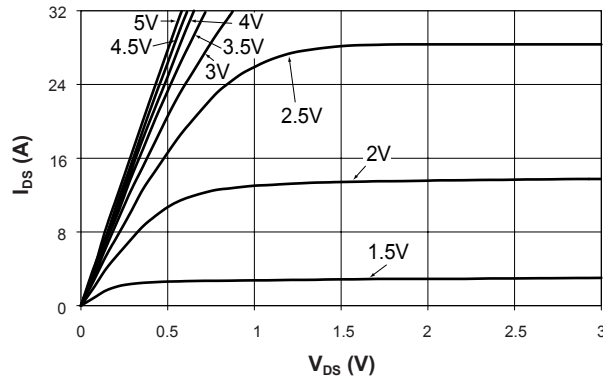
Note 3: Pulsed measurement 300 μs, single pulse.

Note 4: Guaranteed by design. Not subject to production testing.

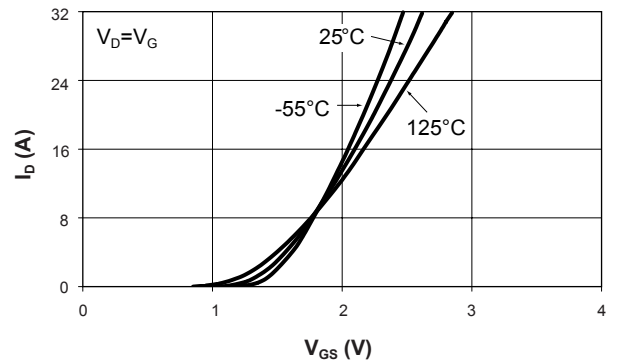
Typical Characteristics

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

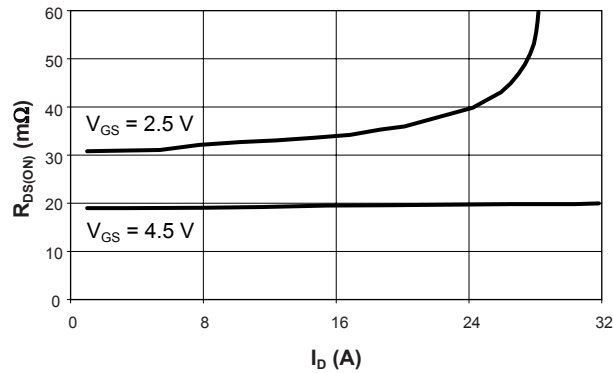
Output Characteristics



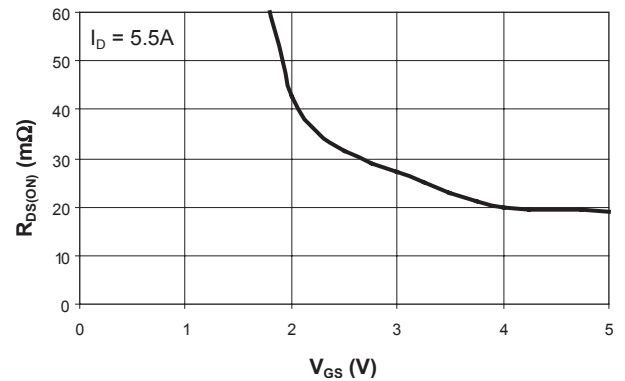
Transfer Characteristics



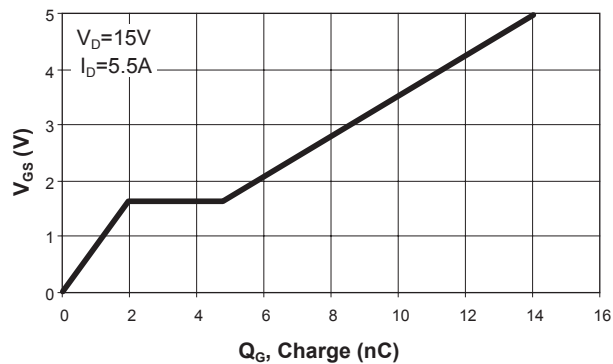
On-Resistance vs. Drain Current



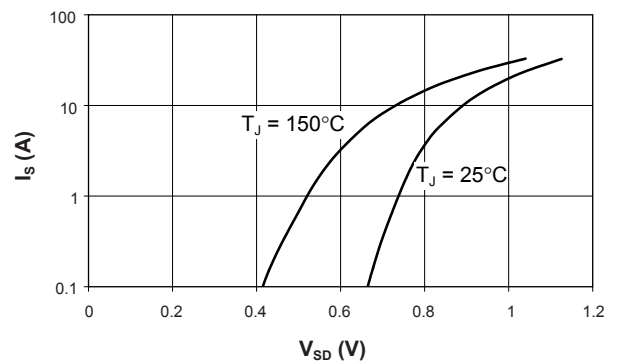
On-Resistance vs. Gate to Source Voltage



Gate Charge



Source-Drain Diode Forward Voltage

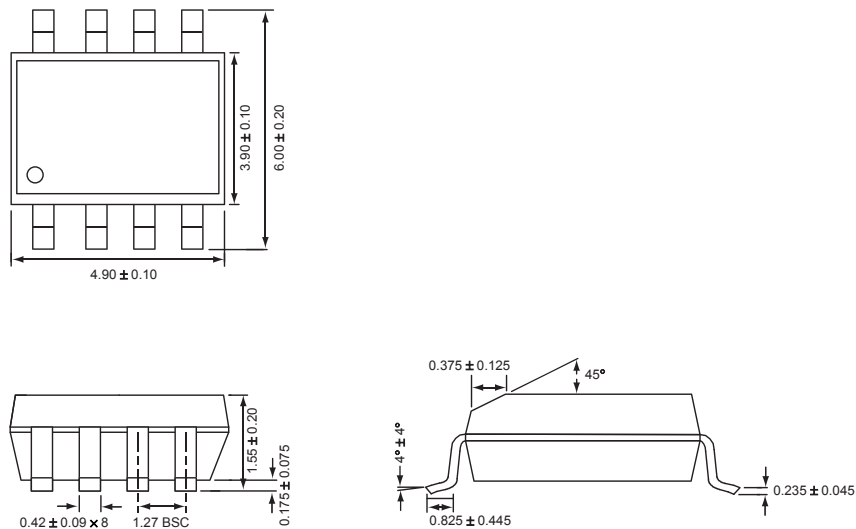


Ordering Information

Package	Marking	Part Number (Tape and Reel)
SOP-8	7103	AAT7103IAS-T1

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

Package Information



All dimensions in millimeters.

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