



AAT7361

20V P-Channel Power MOSFET

General Description

The AAT7361 is a low threshold dual MOSFET designed for the battery, cell phone, and PDA markets. Using AnalogicTech™'s ultra high density MOSFET process and space saving small outline J-lead package, performance superior to that normally found in a larger footprint has been squeezed into the footprint of a TSOP6 package.

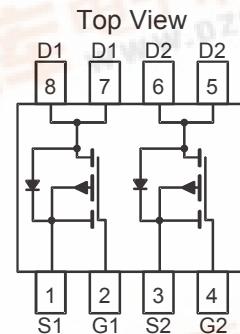
Applications

- Battery Packs
- Cellular & Cordless Telephones
- Battery-powered portable equipment

Features

- $V_{DS(MAX)} = -20V$
- $I_{D(MAX)}^1 = -3.0A @ 25^\circ C$
- Low $R_{DS(ON)}$:
 - $100\ m\Omega @ V_{GS} = -4.5V$
 - $175\ m\Omega @ V_{GS} = -2.5V$

Dual TSOPJW-8 Package



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

Symbol	Description	Value	Units
V_{DS}	Drain-Source Voltage	-20	V
V_{GS}	Gate-Source Voltage	± 12	
I_D	Continuous Drain Current @ $T_J=150^\circ C$ ¹	± 3.0	A
		± 2.4	
I_{DM}	Pulsed Drain Current ²	± 9	A
I_S	Continuous Source Current (Source-Drain Diode) ¹	-1.0	
P_D	Maximum Power Dissipation ¹	1.4	W
		0.9	
T_J, T_{STG}	Operating Junction and Storage Temperature Range	-55 to 150	°C

Thermal Characteristics

Symbol	Description	Typ	Max	Units
$R_{\theta JA}$	Junction-to-Ambient steady state, one FET on ¹	124	155	°C/W
$R_{\theta JA2}$	Junction-to-Ambient t<5 seconds ¹	74	90	°C/W
$R_{\theta JF}$	Junction-to-Foot ¹	66	80	°C/W

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

Symbol	Description	Conditions	Min	Typ	Max	Units
DC Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0\text{V}$, $I_D=-250\mu\text{A}$	-20			V
$R_{DS(\text{ON})}$	Drain-Source ON-Resistance ²	$V_{GS}=-4.5\text{V}$, $I_D=-3.0\text{A}$		80	100	$\text{m}\Omega$
		$V_{GS}=-2.5\text{V}$, $I_D=-2.3\text{A}$		140	175	
$I_{D(\text{ON})}$	On-State Drain Current ²	$V_{GS}=-4.5\text{V}$, $V_{DS}=-5\text{V}$ (Pulsed)	-9			A
$V_{GS(\text{th})}$	Gate Threshold Voltage	$V_{GS}=V_{DS}$, $I_D=-250\mu\text{A}$	-0.6			V
I_{GSS}	Gate-Body Leakage Current	$V_{GS}=\pm 12\text{V}$, $V_{DS}=0\text{V}$			± 100	nA
I_{DSS}	Drain Source Leakage Current	$V_{GS}=0\text{V}$, $V_{DS}=-20\text{V}$			-1	μA
		$V_{GS}=0\text{V}$, $V_{DS}=-16\text{V}$, $T_J=70^\circ\text{C}$ ³			-5	
g_{fs}	Forward Transconductance ²	$V_{DS}=-5\text{V}$, $I_D=-3.0\text{A}$		5		S
Dynamic Characteristics ³						
Q_G	Total Gate Charge	$V_{DS}=-10\text{V}$, $R_D=3.3\Omega$, $V_{GS}=-4.5\text{V}$		6		nC
Q_{GS}	Gate-Source Charge	$V_{DS}=-10\text{V}$, $R_D=3.3\Omega$, $V_{GS}=-4.5\text{V}$		1.3		
Q_{GD}	Gate-Drain Charge	$V_{DS}=-10\text{V}$, $R_D=3.3\Omega$, $V_{GS}=-4.5\text{V}$		1.7		
$t_{D(\text{ON})}$	Turn-ON Delay	$V_{DS}=-10\text{V}$, $R_D=3.3\Omega$, $V_{GS}=-4.5\text{V}$, $R_G=6\Omega$		7		ns
t_R	Turn-ON Rise Time	$V_{DS}=-10\text{V}$, $R_D=3.3\Omega$, $V_{GS}=-4.5\text{V}$, $R_G=6\Omega$		13		
$t_{D(\text{OFF})}$	Turn-OFF Delay	$V_{DS}=-10\text{V}$, $R_D=3.3\Omega$, $V_{GS}=-4.5\text{V}$, $R_G=6\Omega$		15		
t_F	Turn-OFF Fall Time	$V_{DS}=-10\text{V}$, $R_D=3.3\Omega$, $V_{GS}=-4.5\text{V}$, $R_G=6\Omega$		20		
Source-Drain Diode Characteristics						
V_{SD}	Source-Drain Forward Voltage ²	$V_{GS}=0$, $I_S=-3.0\text{A}$			-1.3	V
I_S	Continuous Diode Current ¹				-1.0	A

Note 1: Based on thermal dissipation from junction to ambient while mounted on a 1" x 1" PCB with optimized layout. A 5 second pulse on a 1" x 1" PCB approximates testing a device mounted on a large multi-layer PCB as in most applications. $R_{\theta,\text{JF}} + R_{\theta,\text{FA}} = R_{\theta,\text{JA}}$ where the foot thermal reference is defined as the normal solder mounting surface of the device's leads. $R_{\theta,\text{JF}}$ is guaranteed by design, however $R_{\theta,\text{CA}}$ is determined by the PCB design. Actual maximum continuous current is limited by the application's design.

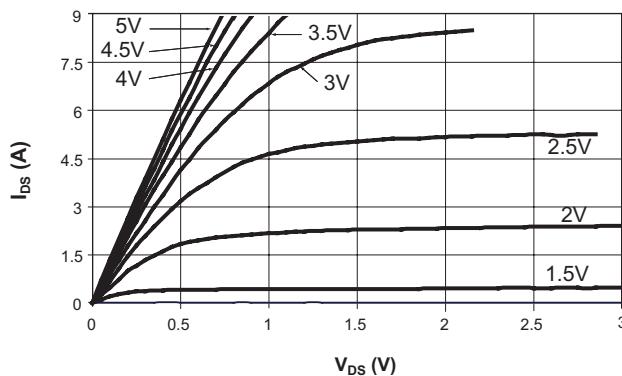
Note 2: Pulse test: Pulse Width = 300 μs

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

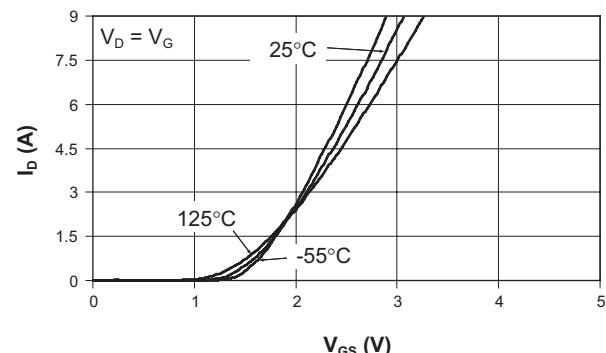
Typical Characteristics

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

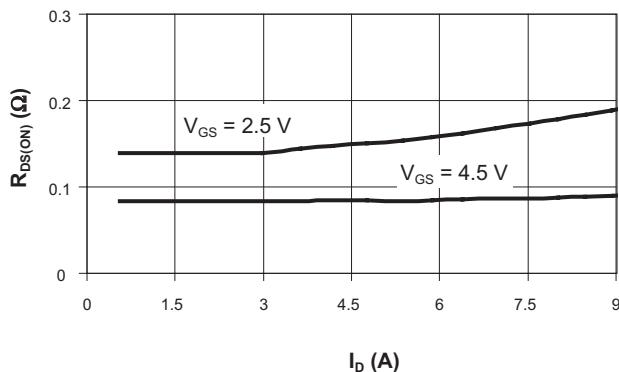
Output Characteristics



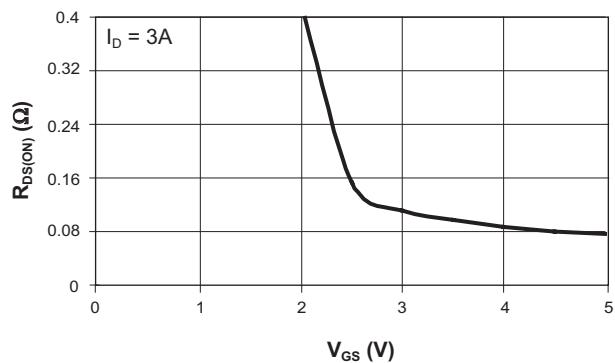
Transfer Characteristics



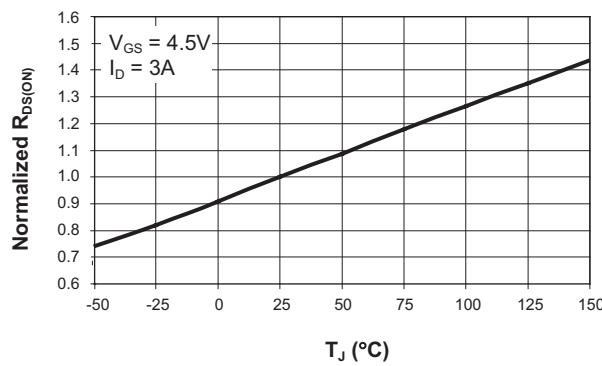
On-Resistance vs. Drain Current



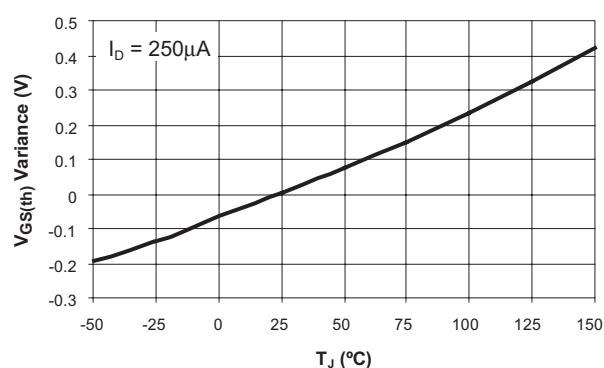
On-Resistance vs. Gate to Source Voltage



On-Resistance vs. Junction Temperature



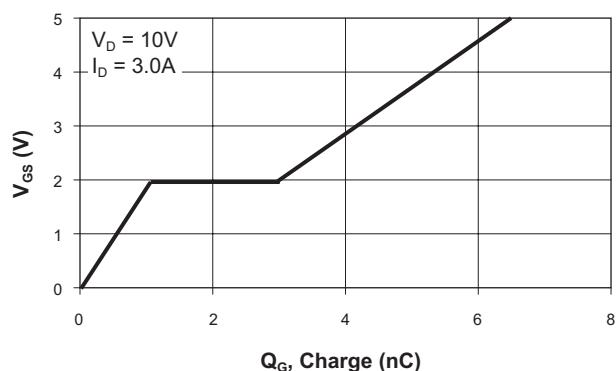
Threshold Voltage



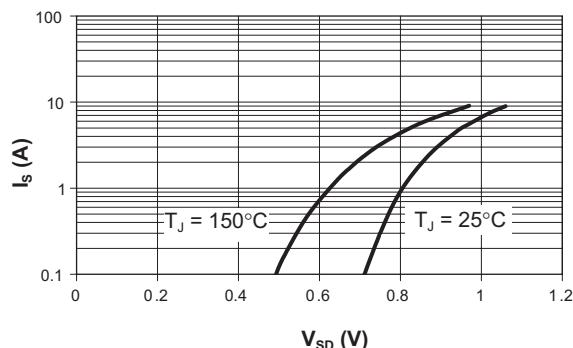
Typical Characteristics

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

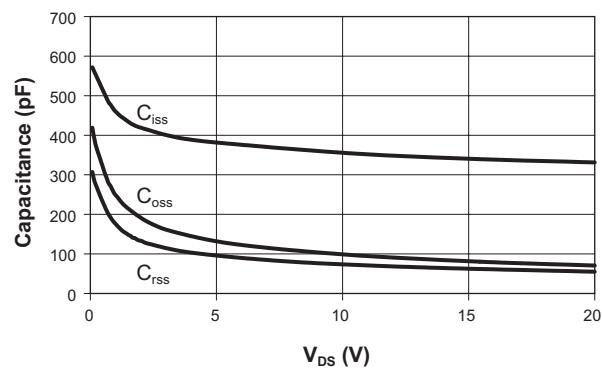
Gate Charge



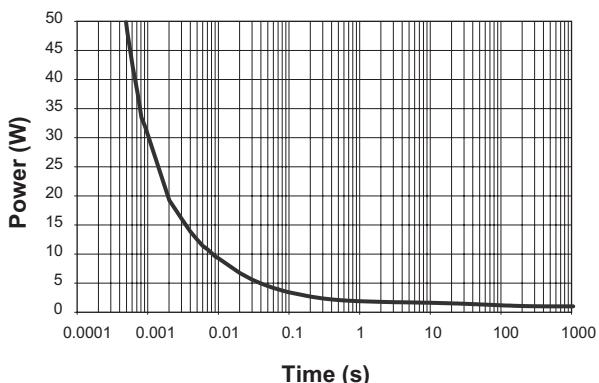
Source-Drain Diode Forward Voltage



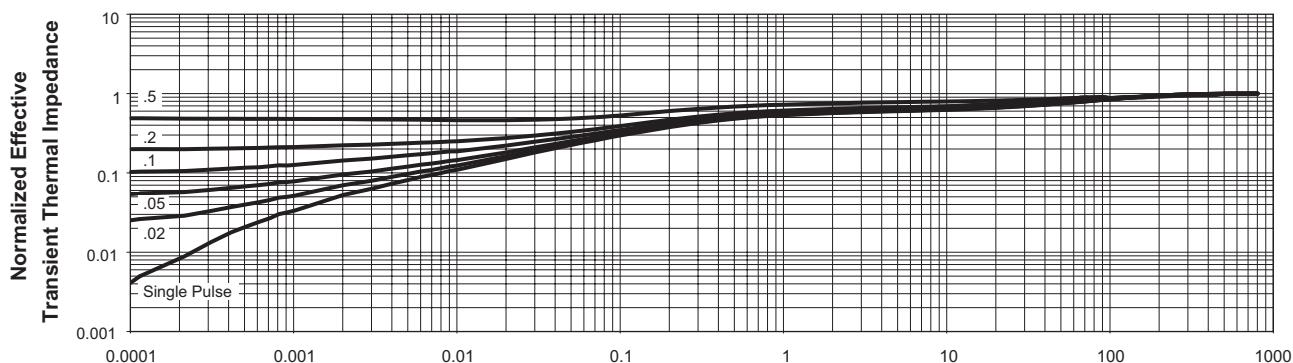
Capacitance



Single Pulse Power, Junction To Ambient



Transient Thermal Response, Junction to Ambient



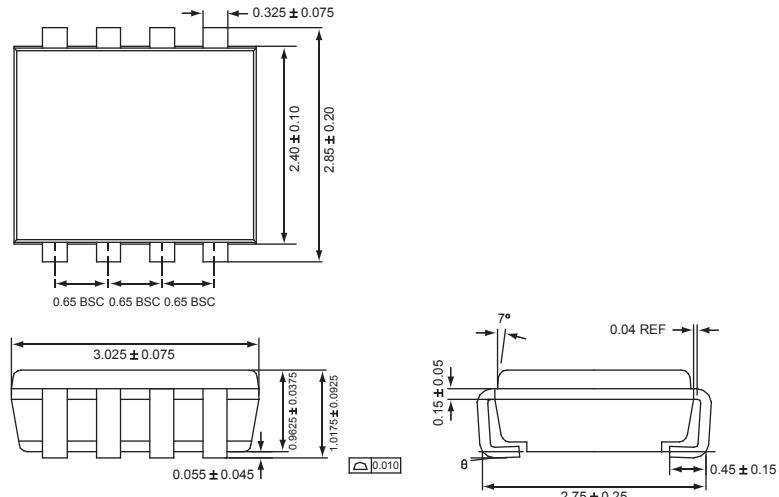
Ordering Information

Package	Marking ¹	Part Number (Tape and Reel)
TSOPJW-8	JYXYY	AAT7361ITS-T1

Note 1: XYY = assembly and date code.

Package Information

TSOPJW-8



All dimensions in millimeters.



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