ANALOGIC TECH™

# AAT8308
## 20V P-Channel Power MOSFET

## General Description

The AAT8308 is a low threshold P Channel MOSFET designed for the battery, cell phone, and PDA markets. Using AnalogicTech™'s proprietary ultra-high density Trench technology, and space saving small outline J-lead package, performance superior to that normally found in a larger footprint has been squeezed into the area of a TSOP6 package.

## Features

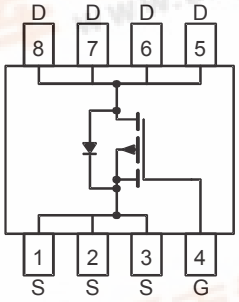
- $V_{DS(MAX)}$ = -20V
- $I_{D(MAX)}$ [1] = -4.5A @ 25°C
- Low $R_{DS(ON)}$:
  - 60 mΩ @ $V_{GS}$ = -4.5V
  - 110 mΩ @ $V_{GS}$ = -2.5V

## Applications

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

## TSOPJW-8 Package

Top View




Advanced Information

## Absolute Maximum Ratings ($T_A$=25°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°C [1] | $T_A$ = 25°C | ±4.5 | A |
| | | $T_A$ = 70°C | ±3.6 | |
| $I_{DM}$ | Pulsed Drain Current [2] | | ±24 | |
| $I_S$ | Continuous Source Current (Source-Drain Diode) [1] | | -1.3 | |
| $P_D$ | Maximum Power Dissipation [1] | $T_A$ = 25°C | 2.0 | W |
| | | $T_A$ = 70°C | 1.3 | |
| $T_J$, $T_{STG}$ | 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 [1] | 92 | 112 | °C/W |
| $R_{\theta JA2}$ | Junction-to-Ambient t<5 seconds [1] | 50 | 62 | °C/W |
| $R_{\theta JF}$ | Junction-to-Foot [1] | 33 | 40 | °C/W |

## 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 | -20 | | | V |
| $R_{DS(ON)}$ | Drain-Source ON-Resistance [2] | $V_{GS}$=-4.5V, $I_D$=-4.5A | | 48 | 60 | mΩ |
| | | $V_{GS}$=-2.5V, $I_D$=-3.3A | | 85 | 110 | |
| $I_{D(ON)}$ | On-State Drain Current [2] | $V_{GS}$=-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, $V_{DS}$=-20V | | | -1 | µA |
| | | $V_{GS}$=0V, $V_{DS}$=-16V, $T_J$=70°C [3] | | | -5 | |
| $g_{fs}$ | Forward Transconductance [2] | $V_{DS}$=-5V, $I_D$=-4.5A | | 7 | | S |
| **Dynamic Characteristics** [3] | | | | | | |
| $Q_G$ | Total Gate Charge | $V_{DS}$=-10V, $R_D$=2.2Ω, $V_{GS}$=-4.5V | | 7.1 | | nC |
| $Q_{GS}$ | Gate-Source Charge | $V_{DS}$=-10V, $R_D$=2.2Ω, $V_{GS}$=-4.5V | | 1.8 | | |
| $Q_{GD}$ | Gate-Drain Charge | $V_{DS}$=-10V, $R_D$=2.2Ω, $V_{GS}$=-4.5V | | 2.9 | | |
| $t_{D(ON)}$ | Turn-ON Delay | $V_{DS}$=-10V, $V_{GS}$=-4.5V, $R_D$=2.2Ω, $R_G$=6Ω | | TBD | | ns |
| $t_R$ | Turn-ON Rise Time | $V_{DS}$=-10V, $V_{GS}$=-4.5V, $R_D$=2.2Ω, $R_G$=6Ω | | TBD | | |
| $t_{D(OFF)}$ | Turn-OFF Delay | $V_{DS}$=-10V, $V_{GS}$=-4.5V, $R_D$=2.2Ω, $R_G$=6Ω | | TBD | | |
| $t_F$ | Turn-OFF Fall Time | $V_{DS}$=-10V, $V_{GS}$=-4.5V, $R_D$=2.2Ω, $R_G$=6Ω | | TBD | | |
| **Source-Drain Diode Characteristics** | | | | | | |
| $V_{SD}$ | Source-Drain Forward Voltage [2] | $V_{GS}$=0, $I_S$=-4.5A | | | -1.3 | V |
| $I_S$ | Continuous Diode Current [1] | | | | -1.3 | 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. $R_{\theta JF}$ + $R_{\theta FA}$ = $R_{\theta JA}$ 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 $R_{\theta CA}$ 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

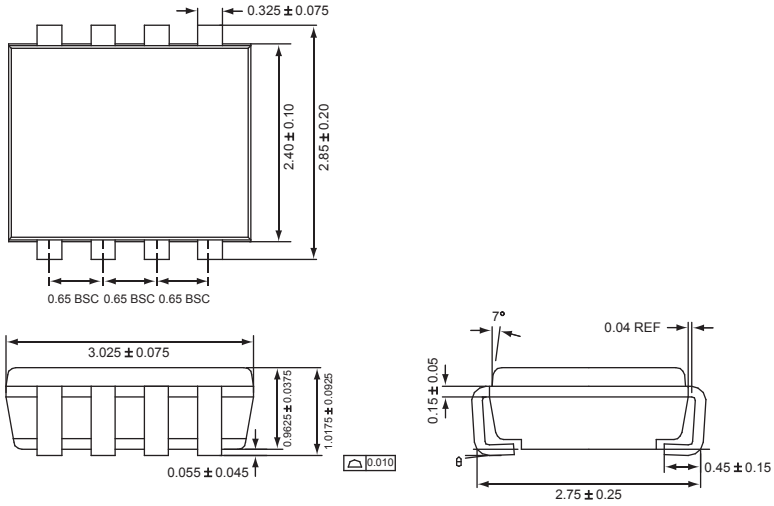
Note 3: Guaranteed by design. Not subject to production testing.

## Ordering Information

| Package | Marking | Part Number (Tape and Reel) |
|---|---|---|
| TSOPJW-8 | | AAT8308ITS-T1 |

## Package Information

**TSOPJW-8**




All dimensions in millimeters.

**Advanced Analogic Technologies, Inc.**
**830 E. Arques Avenue, Sunnyvale, CA 94085**
**Phone (408) 737-4600**
**Fax (408) 737-4611**