# AS20N06S-Q1

N-Channel Enhancement Mode Power MOSFET

## Product Summary

| $V_{(BR)DSS}$ | $R_{DS(on)MAX}$ | $I_D$ |
|---|---|---|
| 60V | 43mΩ@10V | 20A |
| | 47mΩ@4.5V | |

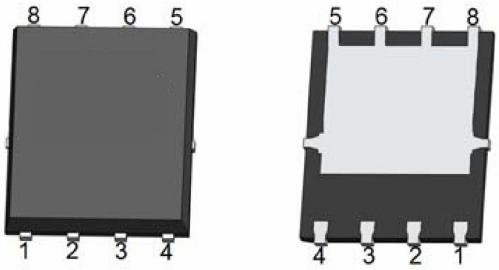
## Feature

- Trench Power MV MOSFET technology
- High density cell design for Low $R_{DS(on)}$
- Suffix "-Q1" for AEC-Q101

## Application

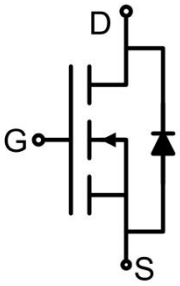
- DC/DC Converters
- Power management functions
- Backlighting

## Package

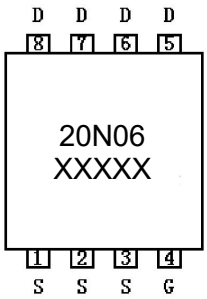



**DFN5*6-8L**

## Circuit diagram




## Marking



# AS20N06S-Q1

N-Channel Enhancement Mode Power MOSFET

## Absolute maximum ratings ($T_A$=25℃ unless otherwise noted)

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Drain-Source Voltage | $V_{DS}$ | 60 | V |
| Gate-Source Voltage | $V_{GS}$ | ±20 | V |
| Continuous Drain Current ($T_C$=25℃) | $I_D$ | 20 | A |
| Continuous Drain Current ($T_C$=100℃) | $I_D$ (100℃) | 12.5 | |
| Pulsed Drain Current[1] | $I_{DM}$ | 60 | A |
| Power Dissipation ($T_C$=25℃) | $P_D$ | 21 | W |
| Thermal Resistance,Junction-to-Case[2] | $R_{\theta JC}$ | 5.9 | ℃/W |
| Single pulse avalanche energy | $E_{AS}$ | 20 | mJ |
| Junction Temperature | $T_J$ | 150 | ℃ |
| Storage Temperature | $T_{STG}$ | -55 ~ +150 | ℃ |

## Electrical characteristics ($T_J$=25 °C, unless otherwise noted)

| Parameter | Symbol | Test Condition | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| **Static Characteristics** | | | | | | |
| Drain-source breakdown voltage | $V_{(BR)DSS}$ | $V_{GS}$= 0V, $I_D$ =250μA | 60 | | | V |
| Zero gate voltage drain current | $I_{DSS}$ | $V_{DS}$ =60V,$V_{GS}$ = 0V | | | 1 | μA |
| Gate-body leakage current | $I_{GSS}$ | $V_{GS}$ =±20V, $V_{DS}$ = 0V | | | ±100 | nA |
| Gate threshold voltage | $V_{GS(th)}$ | $V_{DS}$ =$V_{GS}$, $I_D$ =250μA | 1.0 | 1.5 | 2.5 | V |
| Drain-source on-resistance | $R_{DS(on)}$ | $V_{GS}$ =10V, $I_D$ =20A | | 34 | 43 | mΩ |
| | | $V_{GS}$ =4.5V, $I_D$ =10A | | 36 | 47 | |
| **Dynamic characteristics[3]** | | | | | | |
| Input Capacitance | $C_{iss}$ | $V_{DS}$ =30V,$V_{GS}$ =0V,f =1MHz | | 1018 | | pF |
| Output Capacitance | $C_{oss}$ | | | 70 | | |
| Reverse Transfer Capacitance | $C_{rss}$ | | | 62 | | |
| Total Gate Charge | $Q_g$ | $V_{DS}$ =30V,$V_{GS}$ =10V,$I_D$ =10A | | 26 | | nC |
| Gate-Source Charge | $Q_{gs}$ | | | 5.4 | | |
| Gate-Drain Charge | $Q_{gd}$ | | | 6.5 | | |
| Turn-on delay time | $t_{d(on)}$ | $V_{DD}$=30V,$V_{GS}$=10V, $I_D$ =2A $R_L$=1Ω,$R_{GEN}$=3Ω | | 10 | | nS |
| Turn-on rise time | $t_r$ | | | 20 | | |
| Turn-off delay time | $t_{d(off)}$ | | | 29 | | |
| Turn-off fall time | $t_f$ | | | 22 | | |
| **Source-Drain Diode characteristics** | | | | | | |
| Diode Forward Current | $I_S$ | | | | 20 | A |
| Diode Forward voltage | $V_{SD}$ | $V_{GS}$ =0V, $I_S$=10A | | | 1.2 | V |
| Reverse Recovery Time | $t_{rr}$ | $I_F$ = 20A, di/dt = 500A/μs | | 23 | | nS |
| Reverse Recovery Charge | $Q_{rr}$ | | | 11.7 | | nC |

Notes:

1) Pulse Test: Pulse Width < 300μs, Duty Cycle ≤2%.

2) $R_{\theta JA}$ is the sum of the junction-to-case and case-to-ambient thermal resistance, where the case thermal reference is defined as the solder mounting surface of the drain pins. $R_{\theta JC}$ is guaranteed by design, while $R_{\theta JA}$ is determined by the board design. The maximum rating presented here is based on mounting on a 1 in 2 pad of 2oz copper.

3) Guaranteed by design, not subject to production testing.

## Typical Characteristics

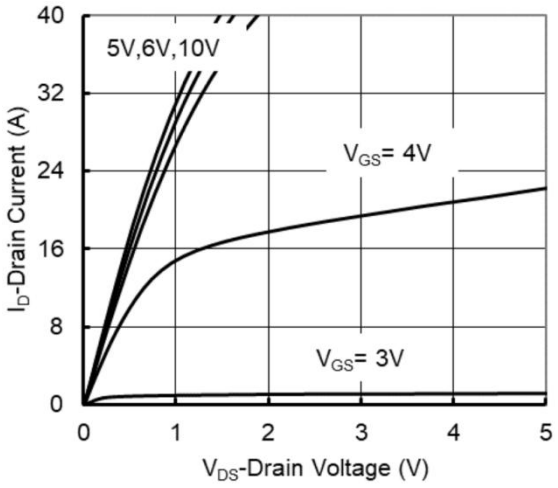



**Figure 1. Output Characteristics**

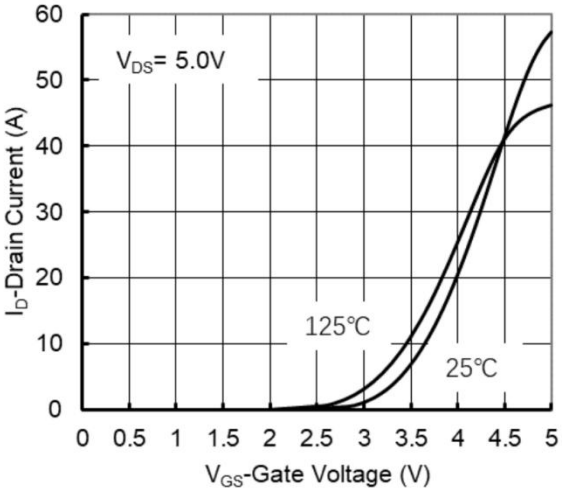



**Figure 2. Transfer Characteristics**

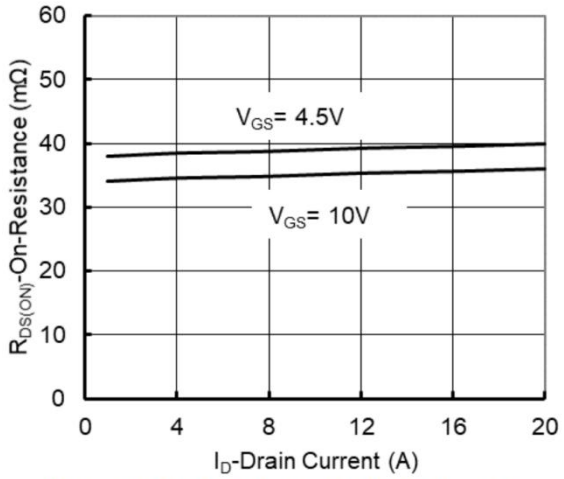



**Figure 3. On-Resistance vs. Drain Current and Gate Voltage**

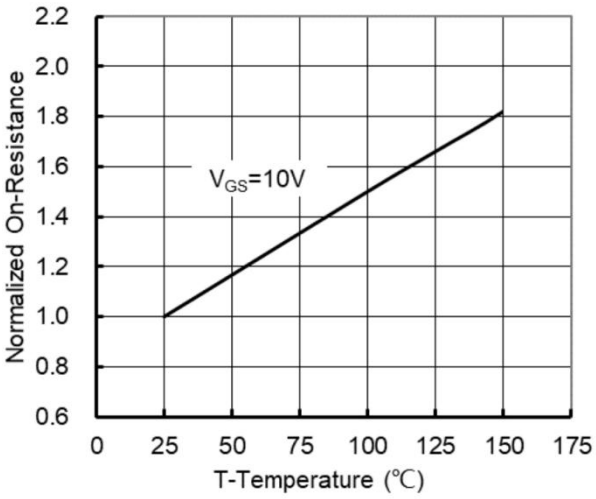



**Figure 4. On-Resistance vs. Junction Temperature**

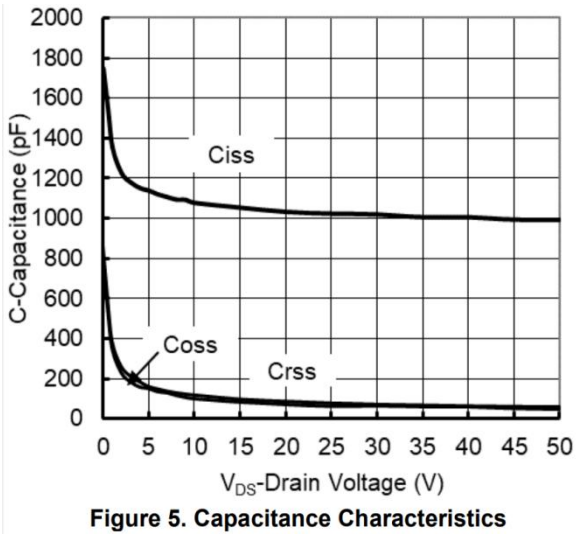



**Figure 5. Capacitance Characteristics**

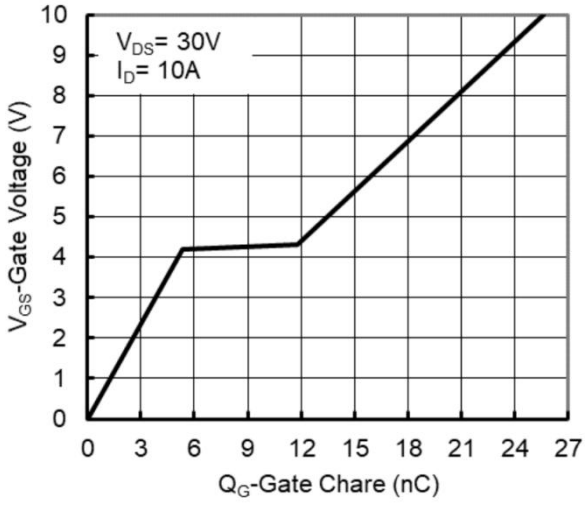



**Figure 6. Gate Charge**

## Typical Characteristics

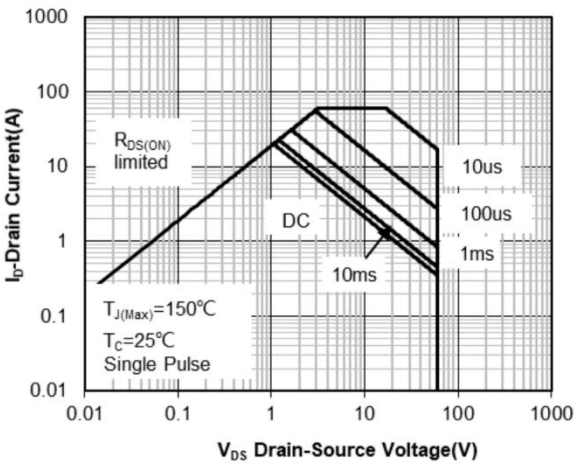



Figure 7. Safe Operation Area

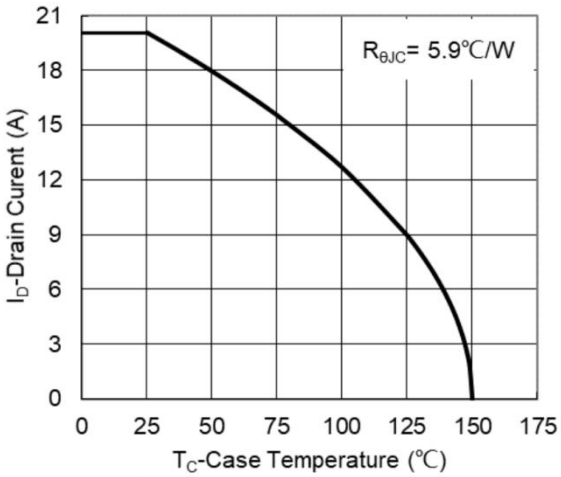



Figure 8. Maximum Continuous Drain Current vs Case Temperature

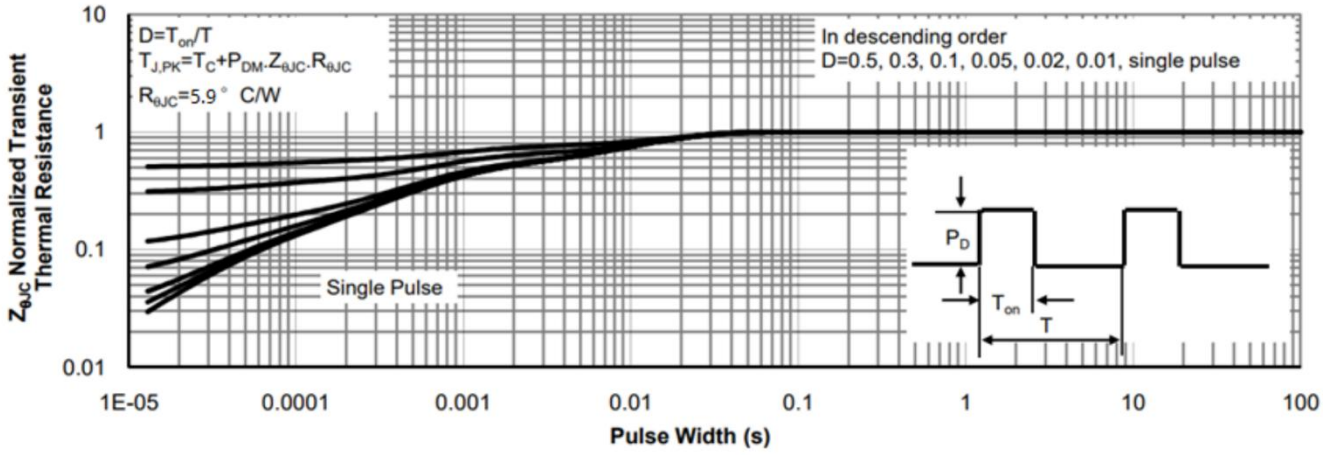
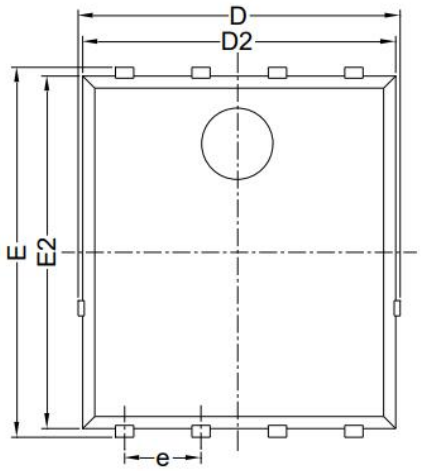
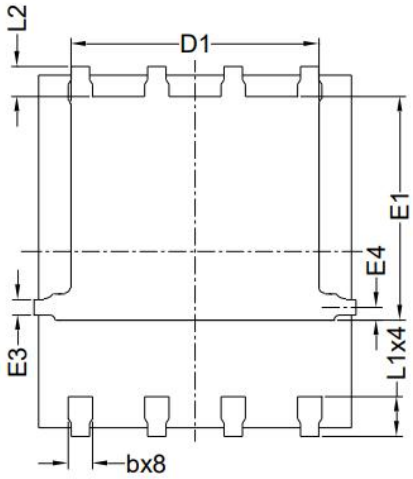



Figure 9. Normalized Maximum Transient Thermal Impedance

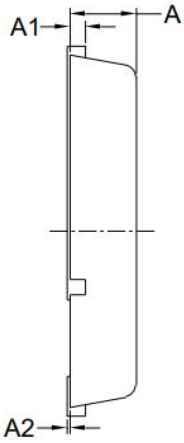
## DFN5*6-8L Package Information




Top View
正面视图




Bottom View
背面视图




Side View
侧面视图

| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|---|---|---|---|---|
| | Min. | Max. | Min. | Max. |
| A | 1.000 | 1.200 | 0.039 | 0.047 |
| A1 | 0.254 BSC | | 0.010 BSC | |
| A2 | - | 0.100 | - | 0.004 |
| D | 5.150 | 5.550 | 0.203 | 0.219 |
| D1 | 3.920 | 4.320 | 0.154 | 0.170 |
| D2 | 5.000 | 5.400 | 0.197 | 0.213 |
| E | 5.950 | 6.350 | 0.234 | 0.250 |
| E1 | 3.520 | 3.920 | 0.139 | 0.154 |
| E2 | 5.660 | 6.060 | 0.223 | 0.239 |
| E3 | 0.254 REF | | 0.010 REF | |
| E4 | 0.210 REF | | 0.008 REF | |
| L1 | 0.560 | 0.760 | 0.022 | 0.030 |
| L2 | 0.500 BSC | | 0.020 BSC | |
| b | 0.310 | 0.510 | 0.012 | 0.020 |
| e | 1.270 BSC | | 0.050 BSC | |