# AC25N60S-Q1

N-Channel Enhancement Mode Power MOSFET

## Product Summary

| $V_{(BR)DSS}$ | $R_{DS(on)MAX}$ | $I_D$ |
|---|---|---|
| 60V | 14mΩ@10V | 25A |
| | 19mΩ@4.5V | |

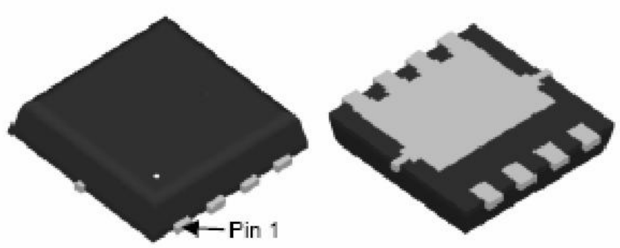
## Feature

- High density cell design for ultra low Rdson
- Fully characterized avalanche voltage and current
- Good stability and uniformity with high $E_{AS}$
- Excellent package for good heat dissipation
- Special process technology for high ESD capability
- Suffix "-Q1" for AEC-Q101

## Application

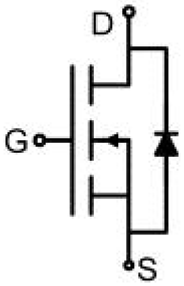
- Power switching application
- Hard switched and high frequency circuits
- Uninterruptible power supply

## Package

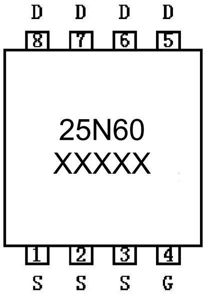


DFN3.3X3.3-8L

## Circuit diagram



## Marking



## Absolute maximum ratings (Tc=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 | $I_D$ | 25 | A |
| Continuous Drain Current($T_C$ =100℃ ) | $I_D$ (100 ℃) | 17.7 | A |
| Pulsed Drain Current | $I_{DM}$ | 100 | A |
| Power Dissipation | $P_D$ | 35 | W |
| Single pulse avalanche energy$^{4)}$ | $E_{AS}$ | 150 | mJ |
| Thermal Resistance,Junction-to-Case$^{1)}$ | $R_{\theta JC}$ | 3.6 | ℃/W |
| Junction Temperature | $T_J$ | 150 | ℃ |
| Storage Temperature | $T_{STG}$ | -55 ~ +150 | ℃ |

## Electrical characteristics ($T_C$=25℃ 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$^{2)}$ | $V_{GS(th)}$ | $V_{DS}$ =$V_{GS}$, $I_D$ =250μA | 1.0 | 1.6 | 2.5 | V |
| Drain-source on-resistance$^{2)}$ | $R_{DS(on)}$ | $V_{GS}$ =10V, $I_D$ =20A | | 12 | 14 | mΩ |
| | | $V_{GS}$ =4.5V, $I_D$ =20A | | 16 | 19 | |
| **Dynamic characteristics$^{3)}$** | | | | | | |
| Input Capacitance | $C_{iss}$ | $V_{DS}$ =30V,$V_{GS}$ =0V,f =1MHz | | 1630 | | pF |
| Output Capacitance | $C_{oss}$ | | | 113 | | |
| Reverse Transfer Capacitance | $C_{rss}$ | | | 97 | | |
| Total Gate Charge | $Q_g$ | $V_{DS}$ =30V,$V_{GS}$ =10V,<br>$I_D$ =20A | | 39 | | nC |
| Gate-Source Charge | $Q_{gs}$ | | | 7 | | |
| Gate-Drain Charge | $Q_{gd}$ | | | 8.5 | | |
| Turn-on delay time | $t_{d(on)}$ | $V_{DD}$=30V,$V_{GS}$=10V,<br>$R_L$=6.7Ω,$R_G$=3Ω | | 7.4 | | nS |
| Turn-on rise time | $t_r$ | | | 5.1 | | |
| Turn-off delay time | $t_{d(off)}$ | | | 28.2 | | |
| Turn-off fall time | $t_f$ | | | 5.5 | | |
| **Source-Drain Diode characteristics** | | | | | | |
| Diode Forward Current$^{1)}$ | $I_S$ | | | | 25 | A |
| Diode Forward voltage$^{2)}$ | $V_{SD}$ | $V_{GS}$ =0V, $I_S$=20A | | | 1.2 | V |
| Reverse Recovery Time | $t_{rr}$ | $T_J$ = 25°C, $I_F$ = 20A<br>di/dt = 100A/μs $^{2)}$ | | 28 | | nS |
| Reverse Recovery Charge | $Q_{rr}$ | | | 40 | | nC |

Notes:

1) Surface Mounted on FR4 Board, t ≤ 10 sec.
2) Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
3) Guaranteed by design, not subject to production.
4) EAS condition : Tj=25℃,VDD=30V,VG=10V,L=0.5mH,Rg=25Ω.

## Typical Characteristics

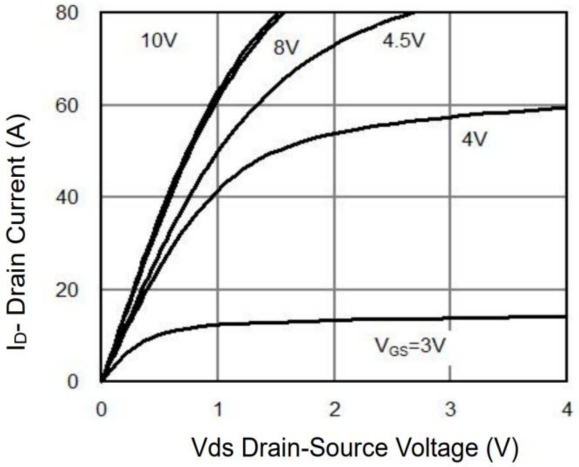


**Figure 1 Output Characteristics**

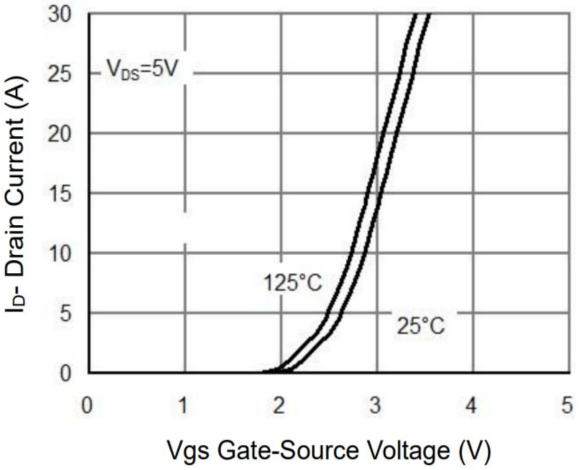


**Figure 2 Transfer Characteristics**

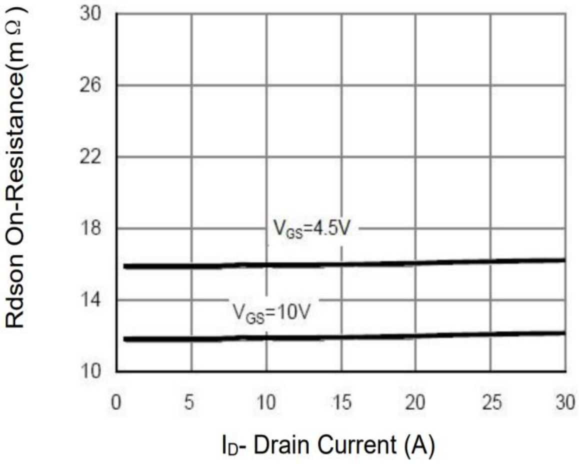


**Figure 3 Rdson- Drain Current**

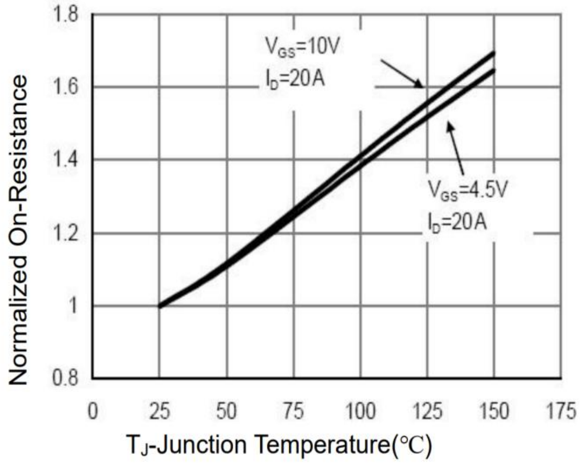


**Figure 4 Rdson-Junction Temperature**

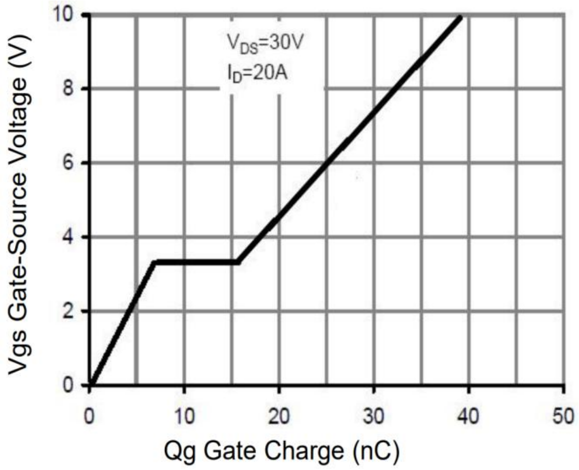


**Figure 5 Gate Charge**

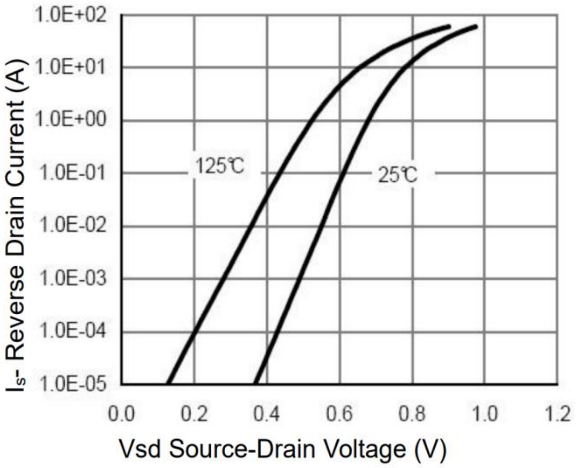


**Figure 6 Source- Drain Diode Forward**

## Typical Characteristics

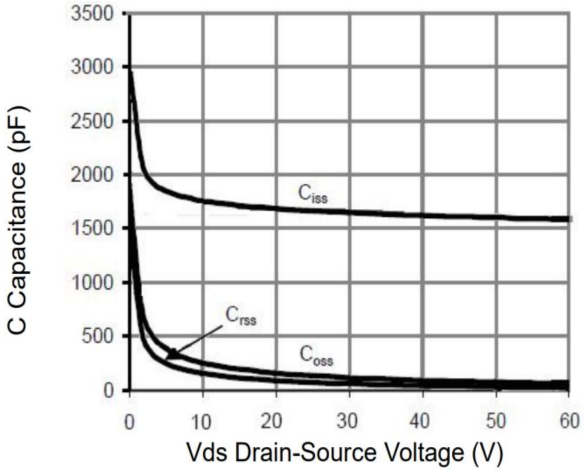


**Figure 7 Capacitance vs Vds**

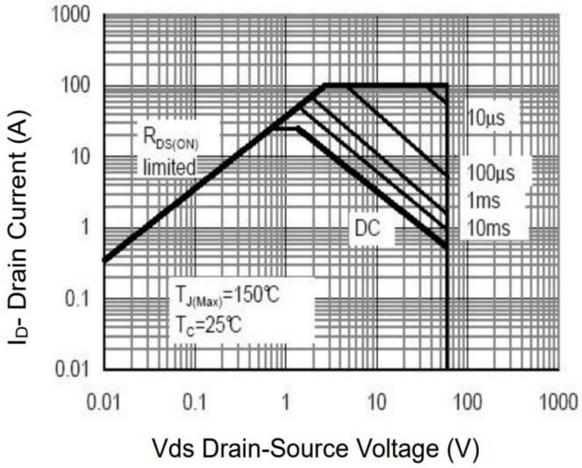


**Figure 8 Safe Operation Area**

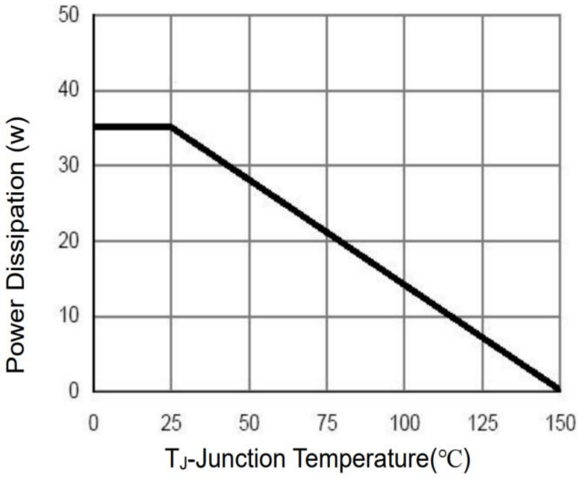


**Figure 9 Power De-rating**

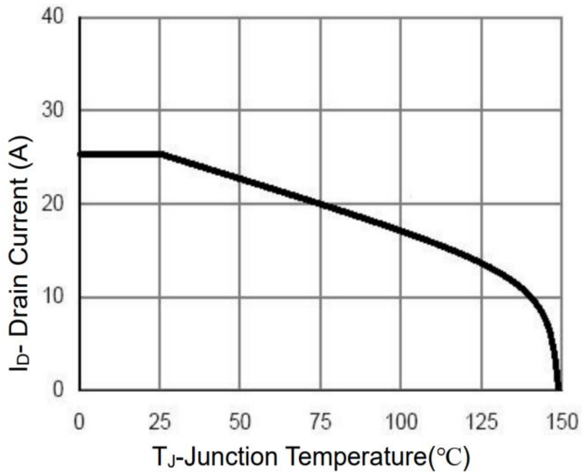


**Figure 10 Current De-rating**

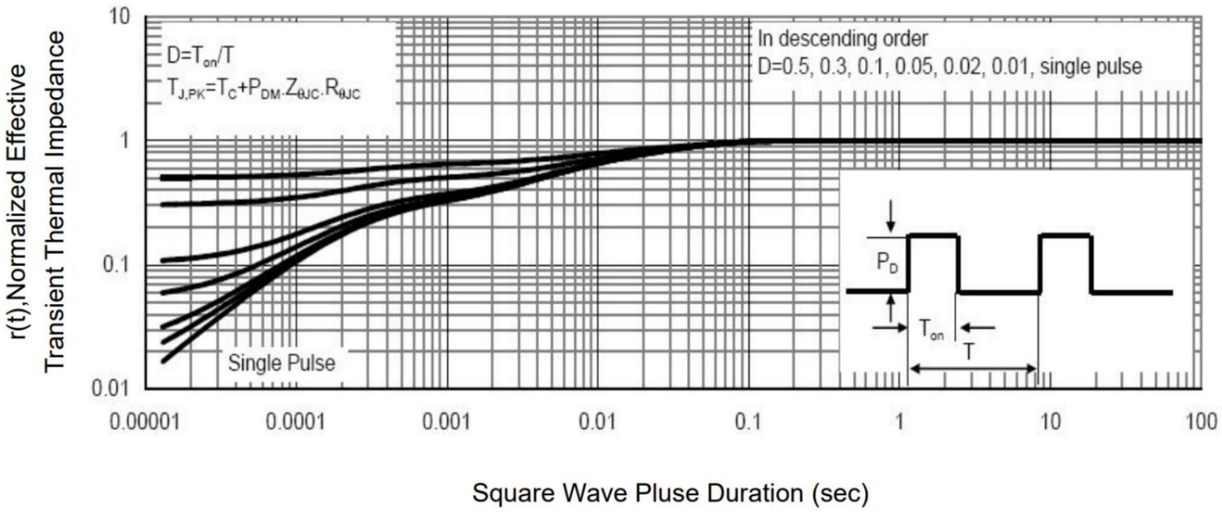
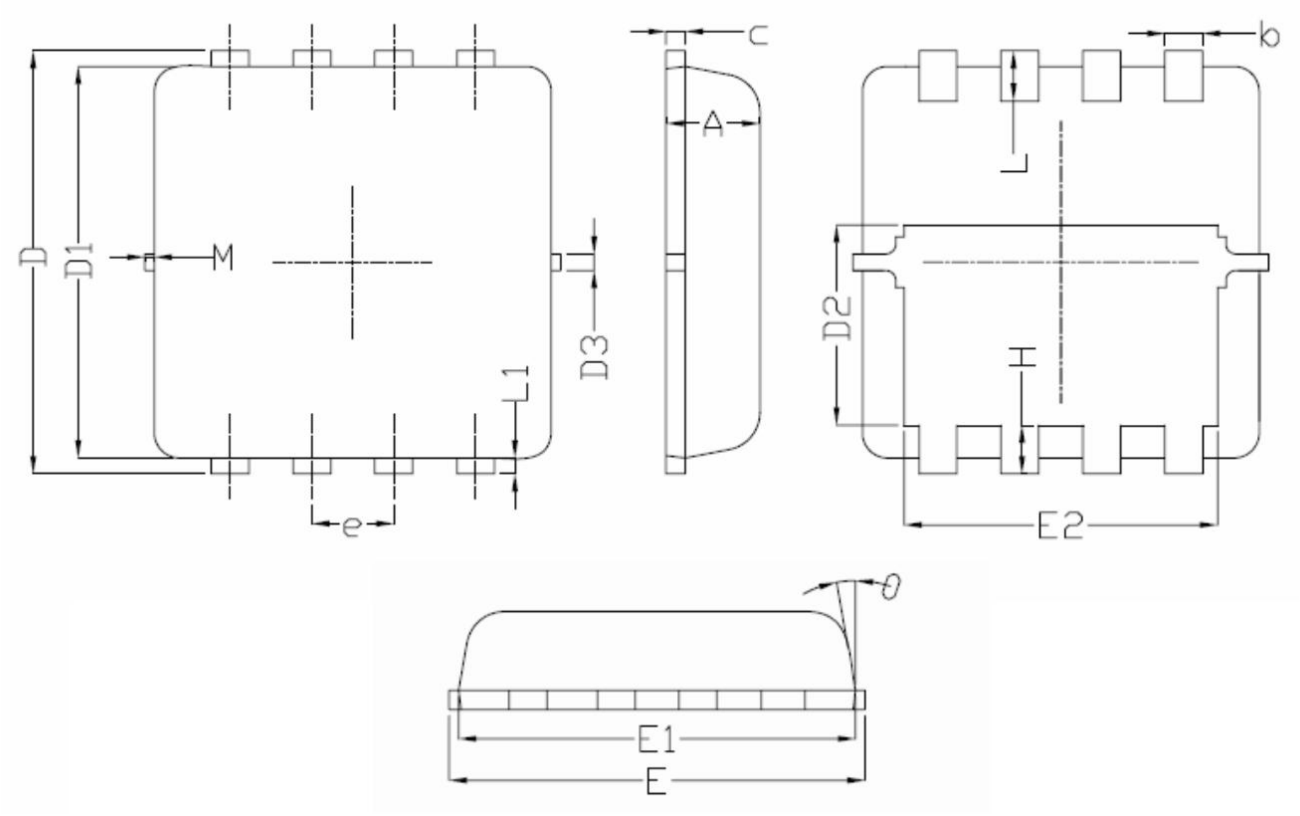


**Figure 11 Normalized Maximum Transient Thermal Impedance**

## DFN3.3X3.3-8L Package Information



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|---|---|---|---|---|
| | Min. | Max. | Min. | Max. |
| A | 0.700 | 0.900 | 0.028 | 0.035 |
| b | 0.240 | 0.350 | 0.009 | 0.014 |
| c | 0.100 | 0.250 | 0.004 | 0.010 |
| D | 3.200 | 3.450 | 0.126 | 0.136 |
| D1 | 3.000 | 3.200 | 0.118 | 0.126 |
| D2 | 1.350 | 1.680 | 0.053 | 0.066 |
| D3 | 0.130 BSC | | 0.005 BSC | |
| E | 3.200 | 3.400 | 0.126 | 0.134 |
| E1 | 3.000 | 3.250 | 0.118 | 0.128 |
| E2 | 2.390 | 2.600 | 0.094 | 0.102 |
| e | 0.650 BSC | | 0.026 BSC | |
| H | 0.300 | 0.500 | 0.012 | 0.020 |
| L | 0.300 | 0.500 | 0.012 | 0.020 |
| L1 | 0.150 BSC | | 0.006 BSC | |
| M | 0.000 | 0.150 | 0.000 | 0.006 |
| θ | 0° | 12° | 0° | 12° |