# N-Ch 100V Fast Switching MOSFETs

## ❖ GENERAL DESCRIPTION

The AM6011 is the high cell density trenched N-ch MOSFETs, which provide excellent RDSON and gate charge for most of the Synchronous Rectification for AC/DC Quick Charger.

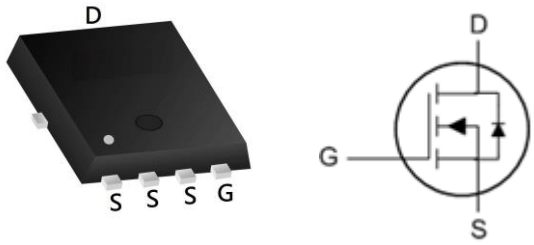
## ❖ FEATURES

- 100% EAS Guaranteed
- Low $R_{DS(ON)}$
- Low Gate Charge
- RoHs and Halogen-Free Compliant

**Product Summery**

| BVDSS | RDSON | ID |
|---|---|---|
| 100V | 11.5mΩ | 34A |

**PRPAK5X6 Pin configuration**



## ❖ ORDER INFORMATION

| Order Information | Top Marking |
|---|---|
| AM6011 XXX X<br>Package Type<br>P8C: PRPAK-8L (5*6)<br>Packing<br>Blank : Bag<br>A : Taping | AM6 0 1 1 → Part number<br>Y Y W W X → ID code:internal<br>WW: 01~52<br>Year: 11=2011<br>12=2012<br>⋮<br>19=2019 |

## ❖ Absolute Maximum Ratings

| Symbol | Parameter | Rating | Units |
|---|---|---|---|
| $V_{DS}$ | Drain-Source Voltage | 100 | V |
| $V_{GS}$ | Gate-Source Voltage | ±20 | V |
| $I_D$@$T_C$=25°C | Continuous Drain Current[1] | 34 | A |
| $I_D$@$T_C$=100°C | Continuous Drain Current[1] | 31 | A |
| $I_{DM}$ | Pulsed Drain Current[2] | 120 | A |
| EAS | Single Pulse Avalanche Energy[3] | 33 | mJ |
| $I_{AS}$ | Avalanche Current | 15 | A |
| $P_D$@$T_C$=25°C | Total Power Dissipation[4] | 56.5 | W |
| $T_{STG}$ | Storage Temperature Range | -55 to 150 | °C |
| $T_J$ | Operating Junction Temperature Range | -55 to 150 | °C |

## ❖ Thermal Data

| Symbol | Parameter | Typ. | Max. | Unit |
|---|---|---|---|---|
| $R_{\theta JA}$ | Thermal Resistance Junction-Ambient [1] | --- | 50 | °C/W |
| $R_{\theta JC}$ | Thermal Resistance Junction-Case[1] | --- | 2.2 | °C/W |

## ❖ ELECTRICAL CHARACTERISTICS

(TJ=25 ℃, unless otherwise noted)

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{DSS}$ | Drain-Source Breakdown Voltage | $V_{GS}$=0V , $I_D$=250uA | 100 | --- | --- | V |
| $R_{DS(ON)}$ | Static Drain-Source On-Resistance[2] | $V_{GS}$=10V , $I_D$=20A | --- | 8 | 11.5 | mΩ |
| | Static Drain-Source On-Resistance[2] | $V_{GS}$=4.5V , $I_D$=10A | --- | 11.6 | 15 | |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{GS}$=$V_{DS}$ , $I_D$ =250uA | 1.2 | --- | 2.4 | V |
| $I_{DSS}$ | Drain-Source Leakage Current | $V_{DS}$=80V , $V_{GS}$=0V , $T_J$=25℃ | --- | --- | 1 | uA |
| | | $V_{DS}$=80V , $V_{GS}$=0V , $T_J$=55℃ | --- | --- | 5 | |
| $I_{GSS}$ | Gate-Source Leakage Current | $V_{GS}$=±20V , $V_{DS}$=0V | --- | --- | ±100 | nA |
| Qg | Total Gate Charge (10V) | $V_{DS}$=50V , $V_{GS}$=10V , $I_D$=20A | --- | 43 | --- | nC |
| Qg | Total Gate Charge (4.5V) | | | 18.5 | | |
| Qgs | Gate-Source Charge | | --- | 8.5 | --- | |
| Qgd | Gate-Drain Charge | | --- | 10.3 | --- | |
| Td(on) | Turn-On Delay Time | $V_{DD}$=50V , $V_{GS}$=10V , $R_G$=3.3Ω, $I_D$=20A | --- | 10 | --- | ns |
| Tr | Rise Time | | --- | 7 | --- | |
| Td(off) | Turn-Off Delay Time | | --- | 50 | --- | |
| Tf | Fall Time | | --- | 11 | --- | |
| Ciss | Input Capacitance | $V_{DS}$=50V , $V_{GS}$=0V , f=1MHz | --- | 3150 | --- | pF |
| Coss | Output Capacitance | | --- | 695 | --- | |
| Crss | Reverse Transfer Capacitance | | --- | 25 | --- | |

## ❖ Diode Characteristics

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $I_S$ | Continuous Source Current[1,5] | $V_G$=$V_D$=0V , Force Current | --- | --- | 34 | A |
| $V_{SD}$ | Diode Forward Voltage[2] | $V_{GS}$=0V , $I_S$=1A , $T_J$=25℃ | --- | --- | 1.2 | V |
| $t_{rr}$ | Reverse Recovery Time | IF=20A , di/dt=100A/μs , TJ=25℃ | --- | 45 | --- | nS |
| $Q_{rr}$ | Reverse Recovery Charge | | --- | 165 | --- | nC |

Note :
1.The data tested by surface mounted on a 1 inch$^2$ FR-4 board with 2OZ copper.
2.The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%
3.The EAS data shows Max. rating . The test condition is $V_{DD}$=25V,$V_{GS}$=10V,L=0.3mH,$I_{AS}$=15A
4.The power dissipation is limited by 150℃ junction temperature
5.The data is theoretically the same as $I_D$ and $I_{DM}$ , in real applications , should be limited by total power dissipation.

## ❖ TYPICAL CHARACTERISTICS

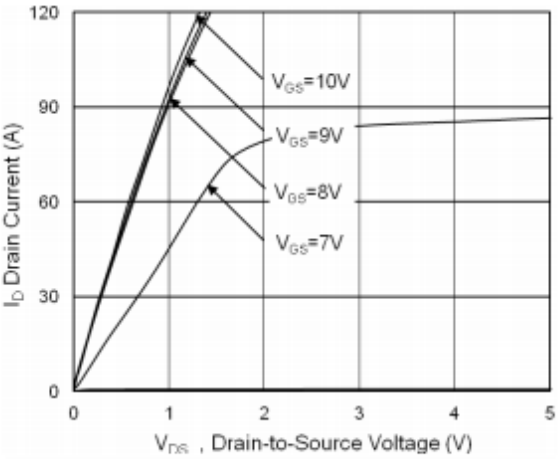



**Fig.1 Typical Output Characteristics**

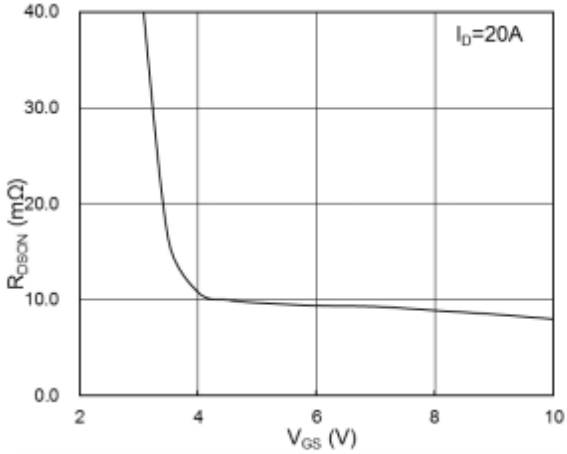



**Fig.2 On-Resistance vs. G-S Voltage**

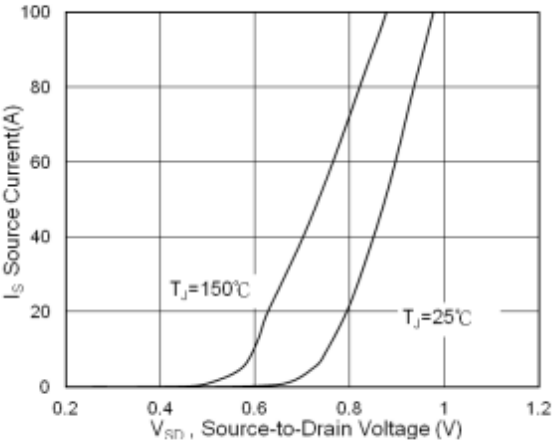



**Fig.3 Source Drain Forward Characteristics**

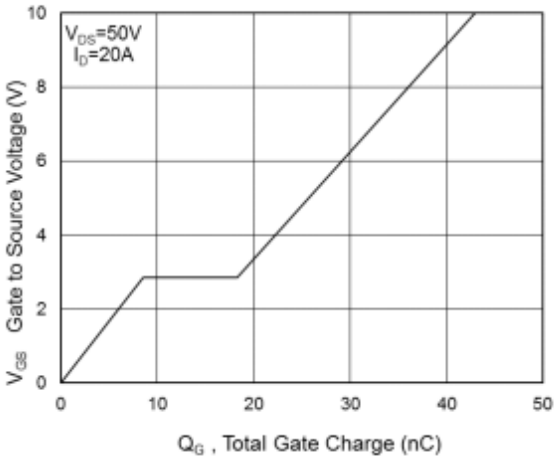



**Fig.4 Gate-Charge Characteristics**

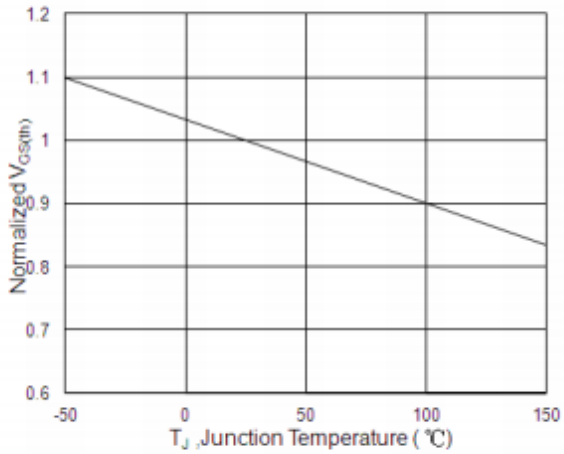



**Fig.5 Normalized $V_{GS(th)}$ vs. $T_J$**

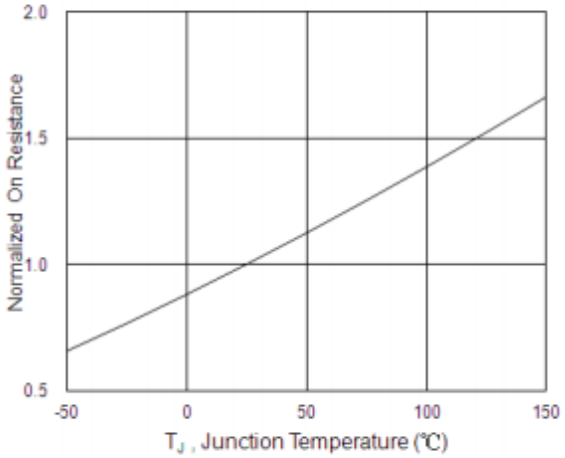



**Fig.6 Normalized $R_{DSON}$ vs. $T_J$**

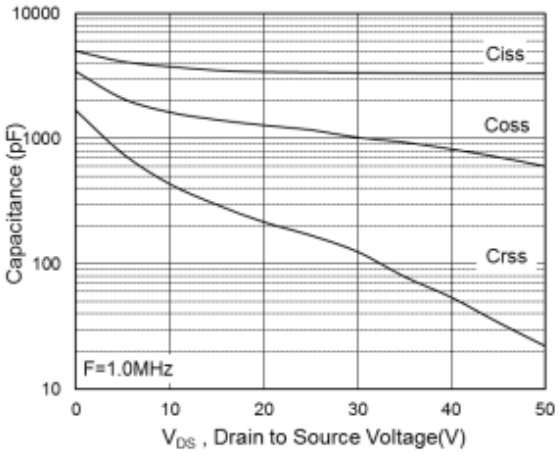



Fig.7 Capacitance

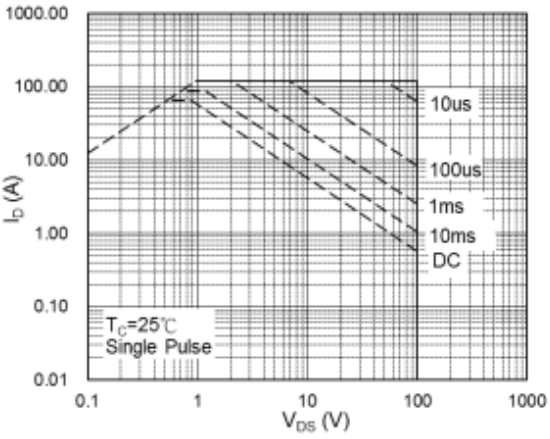



Fig.8 Safe Operating Area

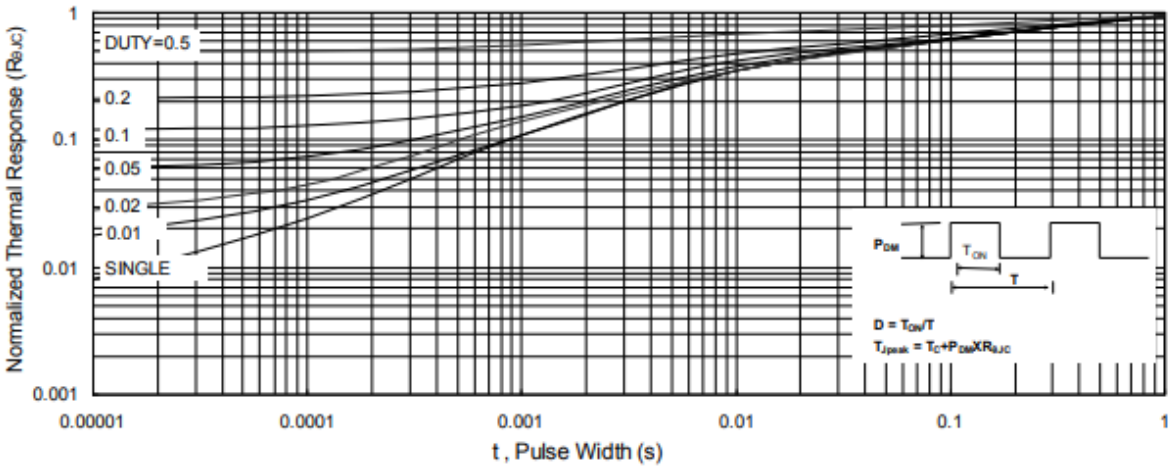



Fig.9 Normalized Maximum Transient Thermal Impedance

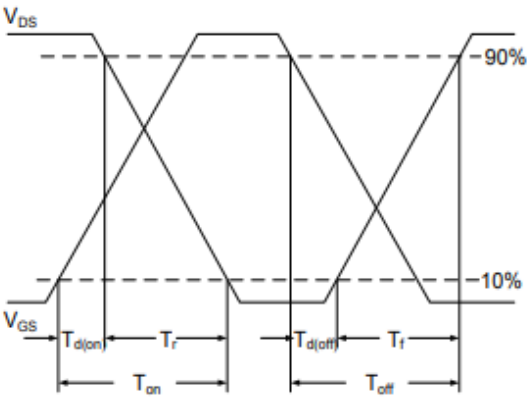



Fig.10 Switching Time Waveform

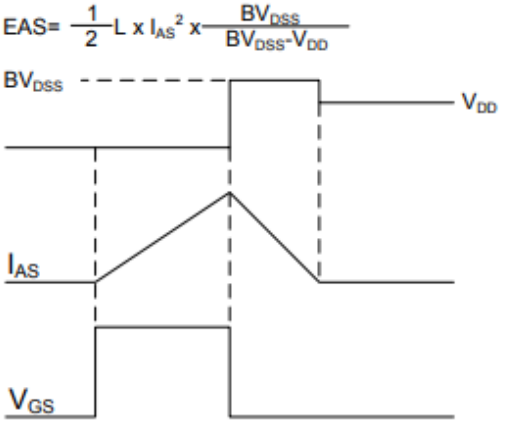
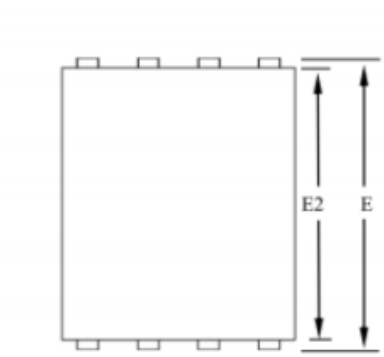


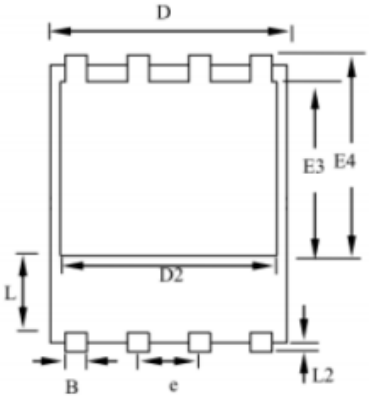

Fig.11 Unclamped Inductive Switching Waveform

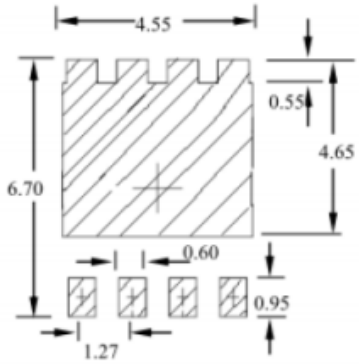
## ❖ PACKAGE OUTLINES

**PRPAK5X6 Package Outline Dimensions**








LAND PATTERN RECOMMENDATION


| SYMBOLS | MILLIMETERS | | | INCHES | | |
|---|---|---|---|---|---|---|
| | MIN | NOM | MAX | MIN | NOM | MAX |
| A | 0.80 | -- | 1.20 | 0.031 | -- | 0.047 |
| B | 0.30 | -- | 0.51 | 0.012 | -- | 0.020 |
| C | 0.15 | -- | 0.35 | 0.006 | -- | 0.014 |
| D | 4.80 | -- | 5.30 | 0.189 | -- | 0.209 |
| D2 | 3.61 | -- | 4.35 | 0.142 | -- | 0.171 |
| E | 5.90 | -- | 6.35 | 0.232 | -- | 0.250 |
| E2 | 5.42 | -- | 5.90 | 0.213 | -- | 0.232 |
| E3 | 3.23 | -- | 3.90 | 0.127 | -- | 0.154 |
| E4 | 3.69 | -- | 4.55 | 0.145 | | 0.179 |
| L | 0.61 | -- | 1.80 | 0.024 | -- | 0.071 |
| L2 | 0.05 | -- | 0.36 | 0.002 | -- | 0.014 |
| e | -- | 1.27 | -- | -- | 0.050 | -- |