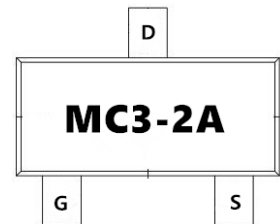
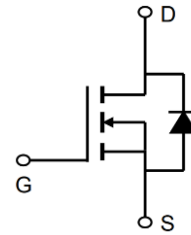


## 300V N-Channel Enhancement Mode MOSFET

### Description

The AP2N30MI is silicon N-channel Enhanced VDMOSFETs, is obtained by the self-aligned planar Technology which reduce the conduction loss, improve switching performance and enhance the avalanche energy. The transistor can be used in various power switching circuit for system miniaturization and higher efficiency.



### General Features

$V_{DS} = 300V, I_D = 2A$

$R_{DS(ON)} < 4.0\Omega @ V_{GS} = 10V$

### Application

Uninterruptible Power Supply (UPS)

Power Factor Correction (PFC)



### Package Marking and Ordering Information

| Product ID | Pack      | Marking | Qty(PCS) |
|------------|-----------|---------|----------|
| AP2N30MI   | SOT-23-3L | MC3-2A  | 3000     |

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

| Parameter  | Symbol         | Value           | Unit         |
|--|----------------|-----------------|--------------|
| Drain-Source Voltage                             | $V_{DSS}$      | 300             | V            |
| Continuous Drain Current                         | $I_D$          | 2               | A            |
| Pulsed Drain Current                             | $I_{DM}$       | 12              | A            |
| Gate-Source Voltage                              | $V_{GSS}$      | $\pm 20$        | V            |
| Single Pulse Avalanche Energy                    | $E_{AS}$       | 30              | mJ           |
| Avalanche Current                                | $I_{AR}$       | 1.9             | A            |
| Repetitive Avalanche Energy                      | $E_{AR}$       | 0.9             | mJ           |
| Power Dissipation ( $T_C = 25^\circ C$ )         | $P_D$          | 35.2            | W            |
| Operating Junction and Storage Temperature Range | $T_J, T_{stg}$ | $-55 \sim +150$ | $^\circ C$   |
| Thermal Resistance, Junction-to-Case             | $R_{thJC}$     | 3.55            | $^\circ C/W$ |
| Thermal Resistance, Junction-to-Ambient          | $R_{thJA}$     | 60              |              |

## 300V N-Channel Enhancement Mode MOSFET

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

| Symbol   | Parameter                             | Test Conditions  | Min. | Typ. | Max.      | Unit     |
|----------|---------------------------------------|--|------|------|-----------|----------|
| V(BR)DSS | Drain-Source Breakdown Voltage        | $V_{GS} = 0V, I_D = 250\mu A$                            | 300  | --   | --        | V        |
| VGS(th)  | Gate-Source Threshold Voltage         | $V_{DS} = V_{GS}, I_D = 250\mu A$                        | 2.0  | --   | 4.0       | V        |
| RDS(on)  | Drain-Source On-Resistance<br>(Note3) | $V_{GS} = 10V, I_D = 1.5A$                               | --   | 3.0  | 4.0       | $\Omega$ |
| IDSS     | Zero Gate Voltage Drain Current       | $V_{DS} = 300V, V_{GS} = 0V, T_J = 25^\circ\text{C}$     | --   | --   | 1         | $\mu A$  |
|          |                                       | $V_{DS} = 240V, V_{GS} = 0V, T_J = 125^\circ\text{C}$    | --   | --   | 100       |          |
| IGSS     | Gate-Source Leakage                   | $V_{GS} = \pm 25V$                                       | --   | --   | $\pm 100$ | nA       |
| Ciss     | Input Capacitance                     | $V_{GS} = 0V,$<br>$V_{DS} = 25V, f =$<br>$1.0\text{MHz}$ | --   | 138  | --        | pF       |
| Coss     | Output Capacitance                    |  | --   | 30   | --        |          |
| Crss     | Reverse Transfer Capacitance          |  | --   | 5    | --        |          |
| Qg       | Total Gate Charge                     | $V_{DD} = 240V, I_D = 3.0A, V_{GS} =$<br>$10V$           | --   | 4.4  | --        | nC       |
| Qgs      | Gate-Source Charge                    |  | --   | 0.7  | --        |          |
| Qgd      | Gate-Drain Charge                     |  | --   | 2    | --        |          |
| td(on)   | Turn-on Delay Time                    | $V_{DD} = 150V, I_D = 3.0A, R_G =$<br>$25\ \Omega$       | --   | 18   | --        | ns       |
| tr       | Turn-on Rise Time                     |  | --   | 55   | --        |          |
| td(off)  | Turn-off Delay Time                   |  | --   | 60   | --        |          |
| tr       | Turn-off Fall Time                    |  | --   | 55   | --        |          |
| Is       | Continuous Body Diode Current         | $T_C = 25^\circ\text{C}$                                 | --   | --   | 3         | A        |
| ISM      | Pulsed Diode Forward Current          |  | --   | --   | 12        |          |
| trr      | Reverse Recovery Time                 | $V_{GS} = 0V, I_S = 3A, di_F/dt$<br>$= 100A/\mu s$       | --   | 250  | --        | ns       |
| Qrr      | Reverse Recovery Charge               |  | --   | 1.8  | --        | $\mu C$  |
| VSD      | Body Diode Voltage                    | $T_J = 25^\circ\text{C}, I_{SD} = 3A, V_{GS} = 0V$       | --   | --   | 1.4       | V        |

#### Notes

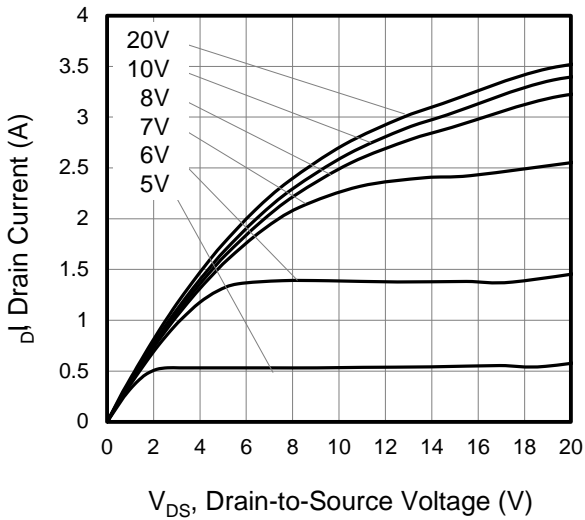
1. Repetitive Rating: Pulse width limited by maximum junction temperature
2.  $I_{AS} = 1.9A, V_{DD} = 50V, R_G = 25\ \Omega, \text{Starting } T_J = 25^\circ\text{C}$
3. Pulse Test: Pulse width  $\leq 300\mu s, \text{Duty Cycle } \leq 1\%$

### Typical Characteristics $T_J = 25^\circ\text{C}$ , unless otherwise noted

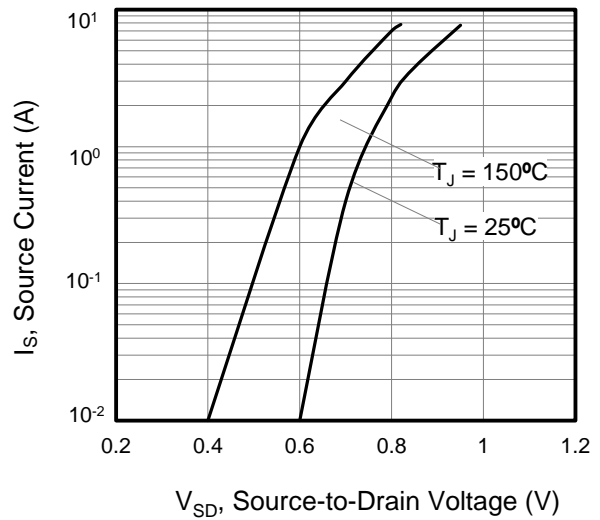
**300V N-Channel Enhancement Mode MOSFET**

Typical Characteristics  $T_J = 25^\circ\text{C}$ , unless otherwise noted

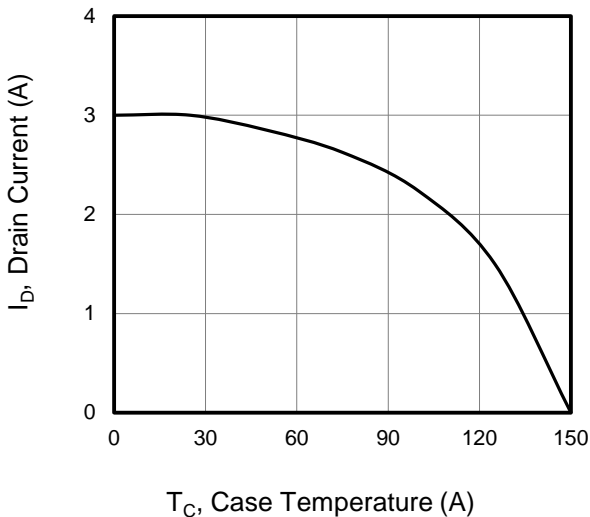
**Figure 1. Output Characteristics ( $T_J = 25^\circ\text{C}$ )**



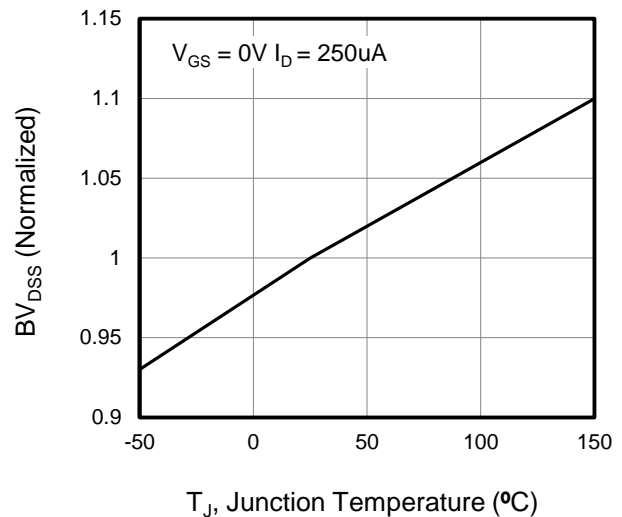
**Figure 2. Body Diode Forward Voltage**



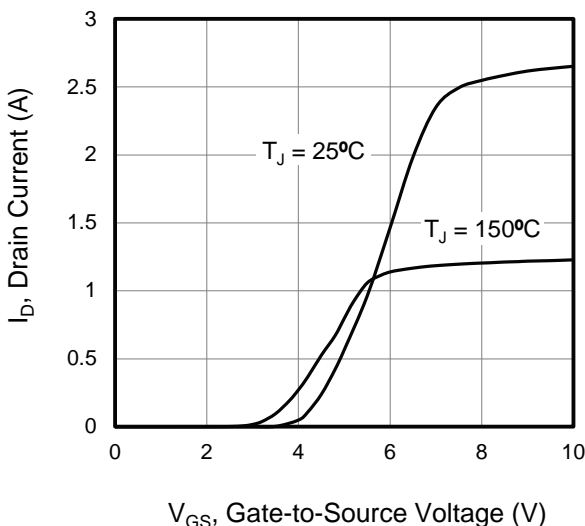
**Figure 3. Drain Current vs. Temperature**



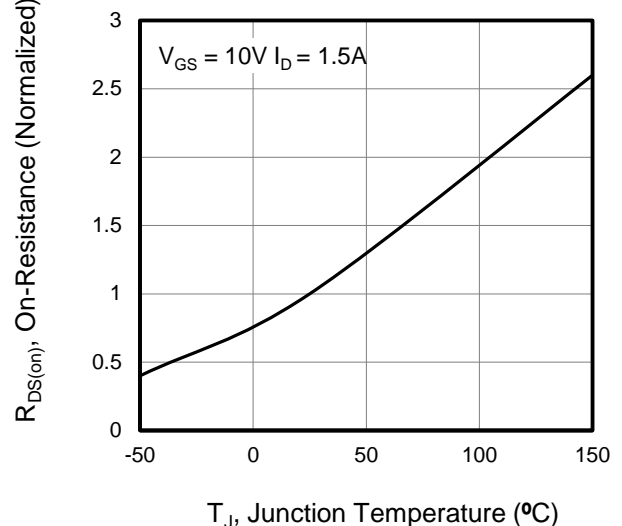
**Figure 4.  $BV_{DSS}$  Variation vs. Temperature**



**Figure 5. Transfer Characteristics**

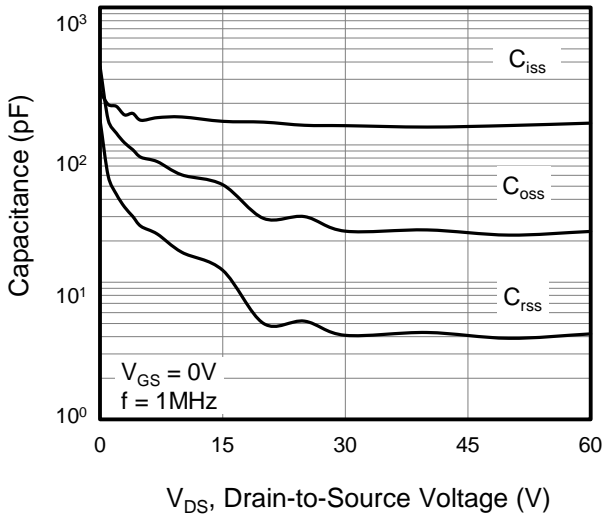


**Figure 6. On-Resistance vs. Temperature**

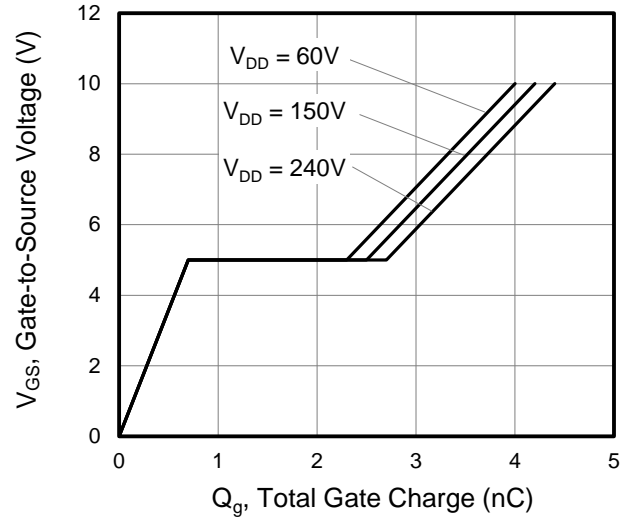


**300V N-Channel Enhancement Mode MOSFET**

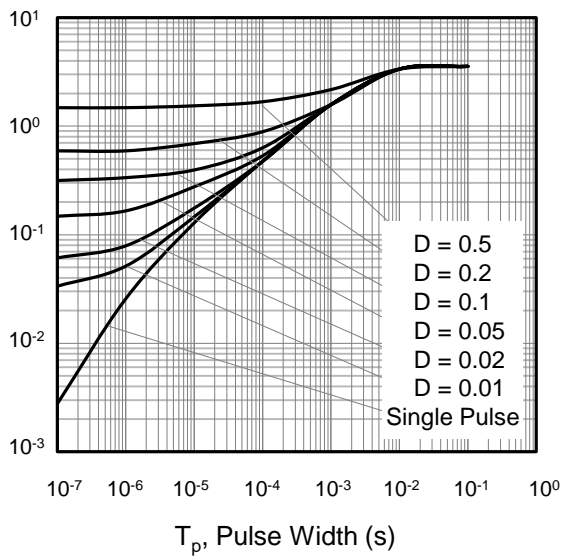
**Figure 7. Capacitance**



**Figure 8. Gate Charge**

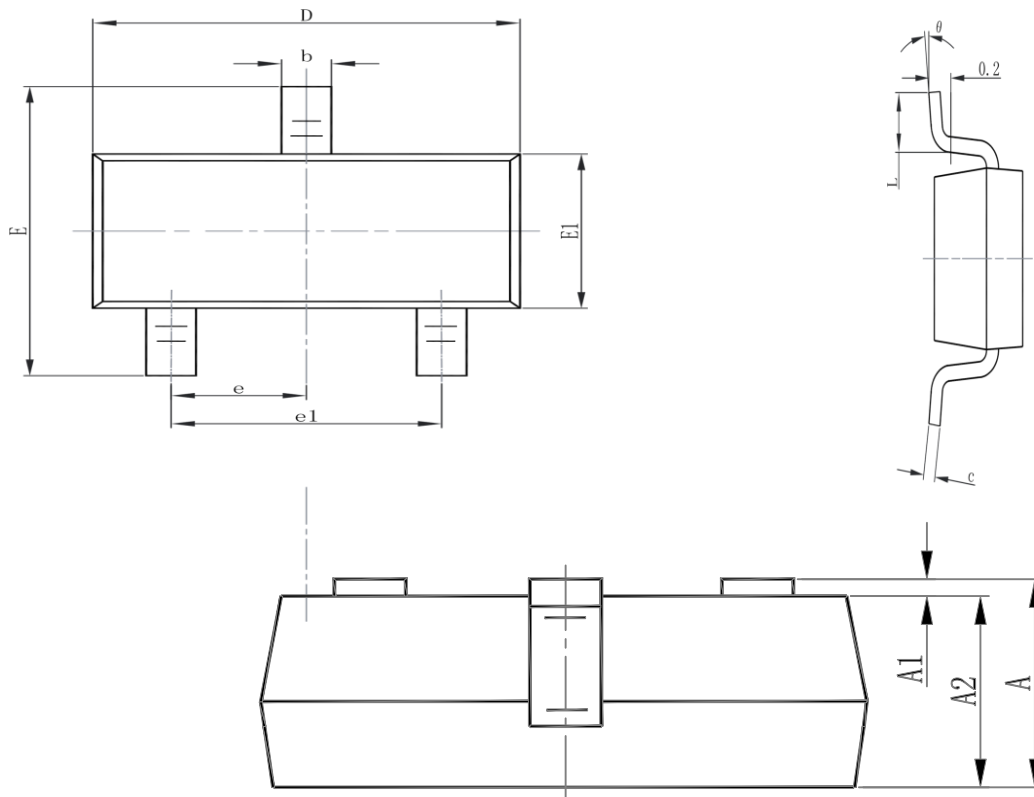


**Figure 9. Transient Thermal Impedance**



## 300V N-Channel Enhancement Mode MOSFET

### Package Mechanical Data-SOT23-3



| Symbol | Dimensions In Millimeters |       | Dimensions In Inches |       |
|--------|---------------------------|-------|----------------------|-------|
|        | Min.                      | Max.  | Min.                 | Max.  |
| A      | 1.050                     | 1.250 | 0.041                | 0.049 |
| A1     | 0.000                     | 0.100 | 0.000                | 0.004 |
| A2     | 1.050                     | 1.150 | 0.041                | 0.045 |
| b      | 0.300                     | 0.500 | 0.012                | 0.020 |
| c      | 0.100                     | 0.200 | 0.004                | 0.008 |
| D      | 2.820                     | 3.020 | 0.111                | 0.119 |
| E1     | 1.500                     | 1.700 | 0.059                | 0.067 |
| E      | 2.650                     | 2.950 | 0.104                | 0.116 |
| e      | 0.950(BSC)                |       | 0.037(BSC)           |       |
| e1     | 1.800                     | 2.000 | 0.071                | 0.079 |
| L      | 0.300                     | 0.600 | 0.012                | 0.024 |
| θ      | 0°                        | 8°    | 0°                   | 8°    |

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## 300V N-Channel Enhancement Mode MOSFET

| Edition | Date      | Change          |
|---------|-----------|-----------------|
| Rve1.0  | 2019/9/29 | Initial release |

