

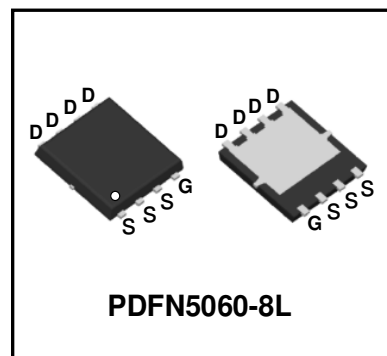
## 30V N-Channel Enhancement Mode Power MOSFET

## Description

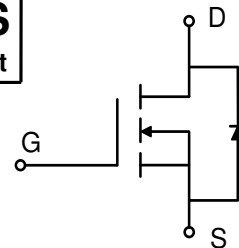
WMB023N03LG2 uses Wayon's 2<sup>nd</sup> generation power trench MOSFET technology that has been especially tailored to minimize the on-state resistance and yet maintain superior switching performance. This device is well suited for high efficiency fast switching applications.

## Features

- $V_{DS} = 30V$ ,  $I_D = 83A$ (Silicon Limited)  
 $R_{DS(on)} < 2.3m\Omega$  @  $V_{GS} = 10V$   
 $R_{DS(on)} < 3.6m\Omega$  @  $V_{GS} = 4.5V$
- Low  $R_{DS(on)}$
- Low Gate Charge
- 100% EAS Guaranteed
- RoHS and Halogen-Free Compliant



**RoHS**  
compliant



## Applications

- Power Management in Switches
- DC/DC Converter

## Absolute Maximum Ratings

| Parameter                                               |                     | Symbol                                 | Value      | Unit       |
|---------------------------------------------------------|---------------------|----------------------------------------|------------|------------|
| Drain-Source Voltage                                    |                     | $V_{DS}$                               | 30         | V          |
| Gate-Source Voltage                                     |                     | $V_{GS}$                               | $\pm 20$   | V          |
| Continuous Drain Current <sup>1</sup> (Silicon Limited) | $T_C = 25^\circ C$  | $I_D$                                  | 83         | A          |
|                                                         | $T_C = 100^\circ C$ |                                        | 65         |            |
| Pulsed Drain Current <sup>2</sup>                       |                     | $I_{DM}$                               | 248        | A          |
| Single Pulse Avalanche Energy <sup>3</sup>              |                     | <b>EAS</b>                             | 80         | mJ         |
| Avalanche Current                                       |                     | $I_{AS}$                               | 40         | A          |
| Total Power Dissipation <sup>4</sup>                    | $T_C = 25^\circ C$  | <b>P<sub>D</sub></b>                   | 49         | W          |
| Operating Junction and Storage Temperature Range        |                     | <b>T<sub>J</sub> , T<sub>STG</sub></b> | -55 to 150 | $^\circ C$ |

## Thermal Characteristics

| Parameter                                                | Symbol                 | Value | Unit         |
|----------------------------------------------------------|------------------------|-------|--------------|
| Thermal Resistance from Junction-to-Ambient <sup>1</sup> | <b>R<sub>θJA</sub></b> | 50.1  | $^\circ C/W$ |
| Thermal Resistance from Junction-to-Case <sup>1</sup>    | <b>R<sub>θJC</sub></b> | 2.5   | $^\circ C/W$ |

**Electrical Characteristics**  $T_c = 25^\circ\text{C}$ , unless otherwise noted

| Parameter                               |                      | Symbol               | Test Conditions                                                                           | Min. | Typ. | Max. | Unit |
|-----------------------------------------|----------------------|----------------------|-------------------------------------------------------------------------------------------|------|------|------|------|
| Static Characteristics                  |                      |                      |                                                                                           |      |      |      |      |
| Drain-Source Breakdown Voltage          |                      | V <sub>(BR)DSS</sub> | V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA                                              | 30   | -    | -    | V    |
| Gate-body Leakage Current               |                      | I <sub>GSS</sub>     | V <sub>DS</sub> = 0V, V <sub>GS</sub> = ±20V                                              | -    | -    | ±100 | nA   |
| Zero Gate Voltage Drain Current         | T <sub>J</sub> =25°C | I <sub>DSS</sub>     | V <sub>DS</sub> = 30V, V <sub>GS</sub> = 0V                                               | -    | -    | 1    | μA   |
|                                         | T <sub>J</sub> =55°C |                      |                                                                                           | -    | -    | 5    |      |
| Gate-Threshold Voltage                  |                      | V <sub>GS(th)</sub>  | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA                                | 1.2  | 1.7  | 2.2  | V    |
| Drain-Source On-Resistance <sup>2</sup> |                      | R <sub>DS(on)</sub>  | V <sub>GS</sub> = 10V, I <sub>D</sub> = 20A                                               | -    | 1.8  | 2.3  | mΩ   |
|                                         |                      |                      | V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 20A                                              | -    | 2.7  | 3.6  |      |
| Forward Transconductance <sup>2</sup>   |                      | g <sub>fs</sub>      | V <sub>DS</sub> = 5V, I <sub>D</sub> = 20A                                                | -    | 90   | -    | S    |
| Dynamic Characteristics                 |                      |                      |                                                                                           |      |      |      |      |
| Input Capacitance                       |                      | C <sub>iss</sub>     | V <sub>DS</sub> = 15V, V <sub>GS</sub> = 0V, f = 1MHz                                     | -    | 2670 | -    | pF   |
| Output Capacitance                      |                      | C <sub>oss</sub>     |                                                                                           | -    | 1480 | -    |      |
| Reverse Transfer Capacitance            |                      | C <sub>rss</sub>     |                                                                                           | -    | 158  | -    |      |
| Switching Characteristics               |                      |                      |                                                                                           |      |      |      |      |
| Gate Resistance                         |                      | R <sub>G</sub>       | V <sub>DS</sub> = 0V, V <sub>GS</sub> =0V, f = 1MHz                                       | -    | 0.8  | -    | Ω    |
| Total Gate Charge(4.5V)                 |                      | Q <sub>g</sub>       | V <sub>GS</sub> = 10V, V <sub>DS</sub> = 15V, I <sub>D</sub> = 20A                        | -    | 25   | -    | nC   |
| Gate-Source Charge                      |                      | Q <sub>gs</sub>      |                                                                                           | -    | 14   | -    |      |
| Gate-Drain Charge                       |                      | Q <sub>gd</sub>      |                                                                                           | -    | 16.5 | -    |      |
| Turn-on Delay Time                      |                      | t <sub>d(on)</sub>   | V <sub>GS</sub> = 10V, V <sub>DS</sub> = 15V, R <sub>G</sub> = 3.3Ω, I <sub>D</sub> = 20A | -    | 14.8 | -    | nS   |
| Rise Time                               |                      | t <sub>r</sub>       |                                                                                           | -    | 8    | -    |      |
| Turn-off Delay Time                     |                      | t <sub>d(off)</sub>  |                                                                                           | -    | 41.5 | -    |      |
| Fall Time                               |                      | t <sub>f</sub>       |                                                                                           | -    | 13   | -    |      |
| Drain-Source Body Diode Characteristics |                      |                      |                                                                                           |      |      |      |      |
| Diode Forward Voltage <sup>2</sup>      |                      | V <sub>SD</sub>      | I <sub>S</sub> = 1A, V <sub>GS</sub> = 0V                                                 | -    | -    | 1.0  | V    |
| Continuous Source Current <sup>1</sup>  |                      | I <sub>S</sub>       | V <sub>G</sub> = V <sub>D</sub> = 0V , Force Current                                      | -    | -    | 83   | A    |

Notes:

1. The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 20Z copper.
2. The data tested by pulsed, pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$
3. The EAS data shows Max. rating. The test condition is  $V_{DD} = 25V, V_{GS} = 10V, L = 0.1mH, I_{AS} = 40A$
4. The power dissipation is limited by  $150^\circ\text{C}$  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.

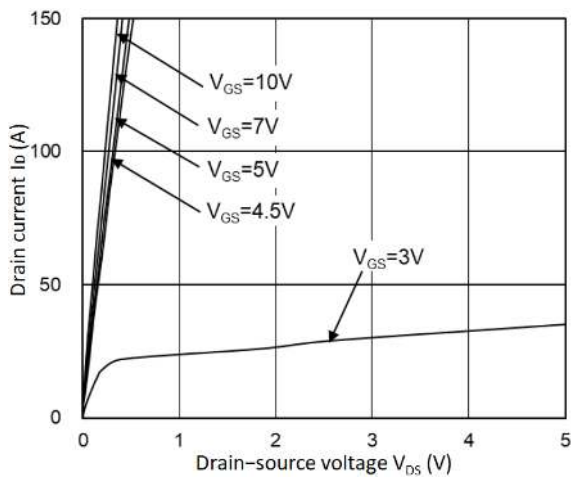


Figure 1. Output Characteristics

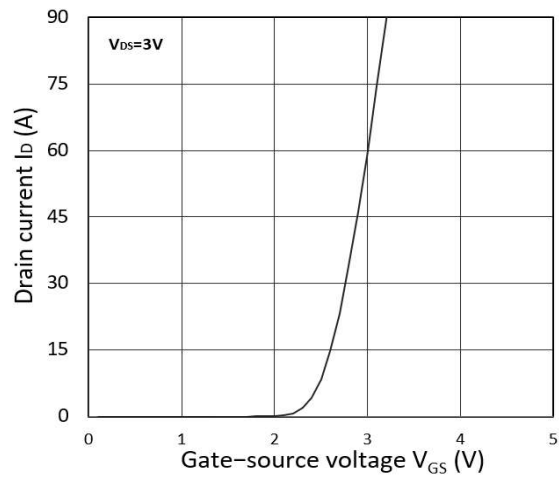


Figure 2. Transfer Characteristics

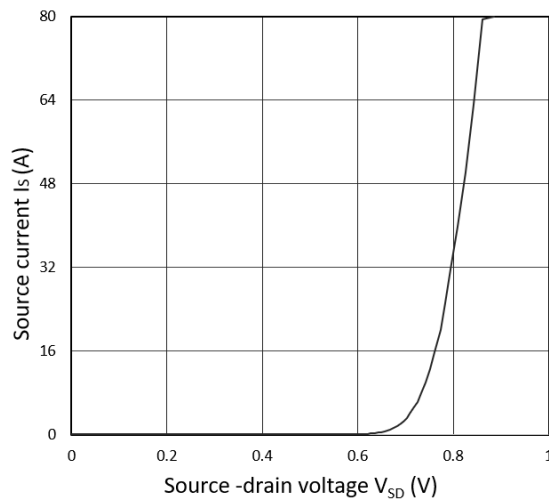


Figure 3. Forward Characteristics of Reverse

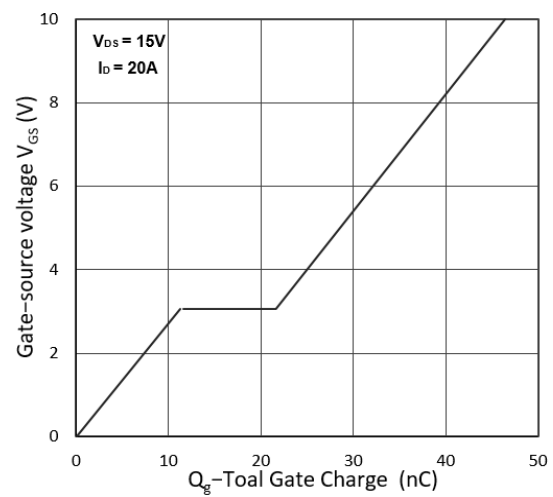
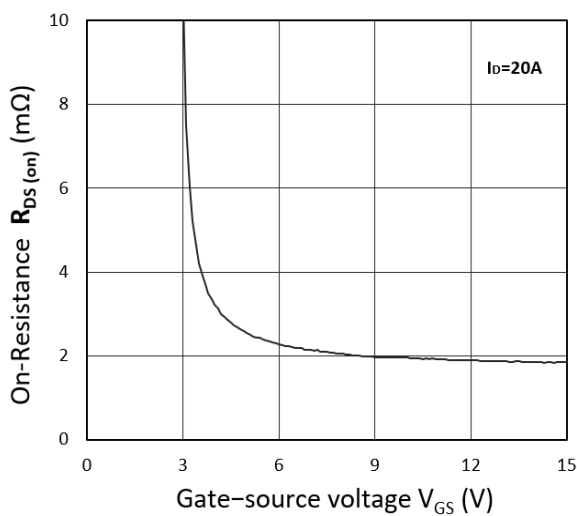
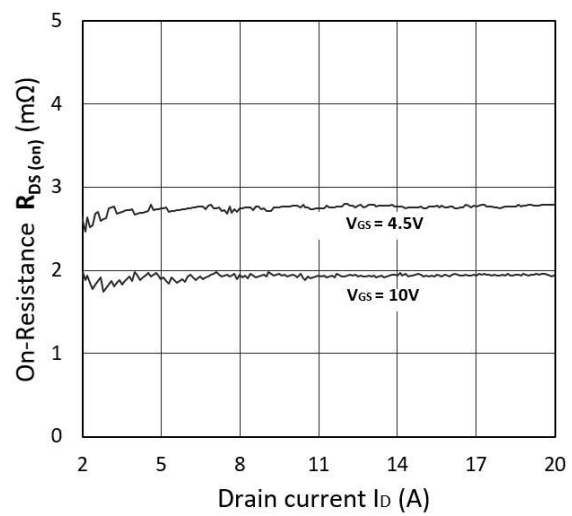


Figure 4. Gate Charge Characteristics

Figure 5.  $R_{DS(on)}$  vs.  $V_{GS}$ Figure 6.  $R_{DS(on)}$  vs.  $I_D$

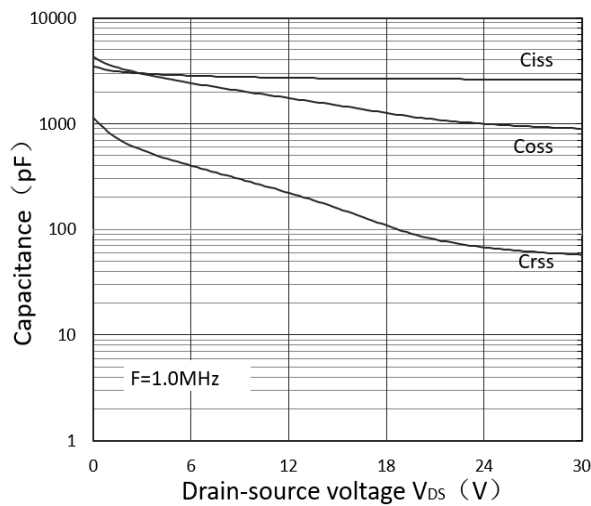


Figure 7. Capacitance Characteristics

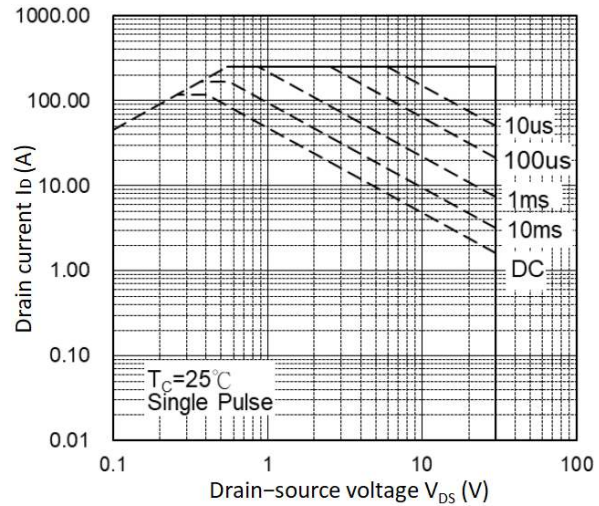


Figure 8. Safe Operating Area

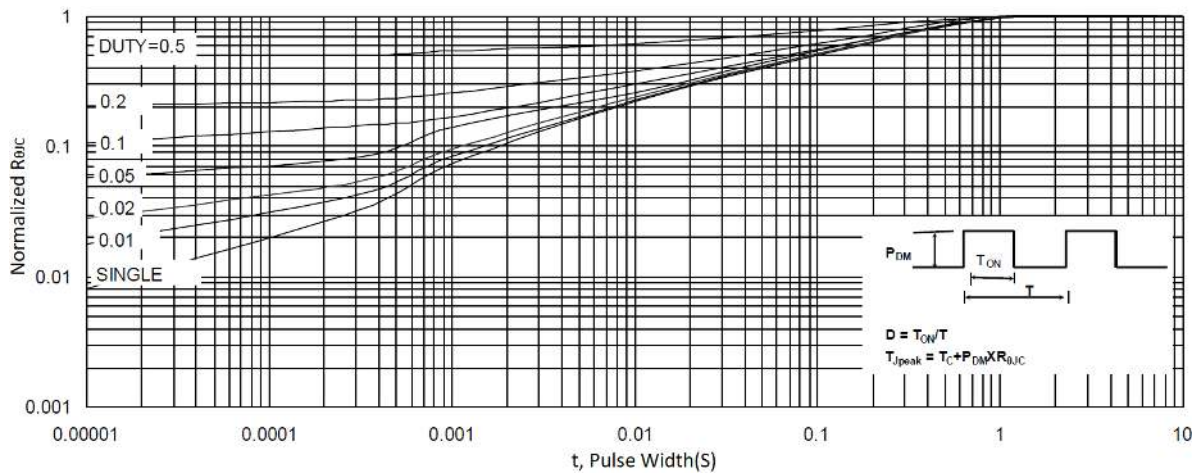


Figure 9. Normalized Maximum Transient Thermal Impedance

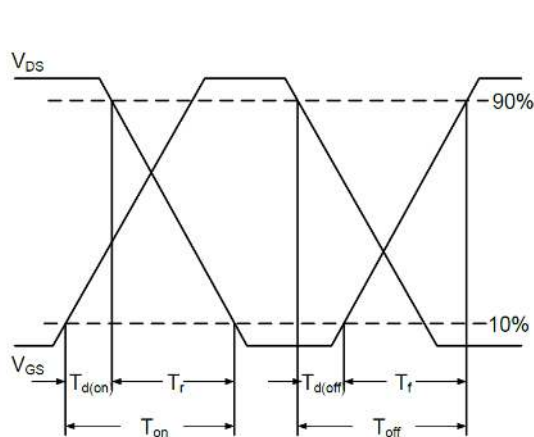
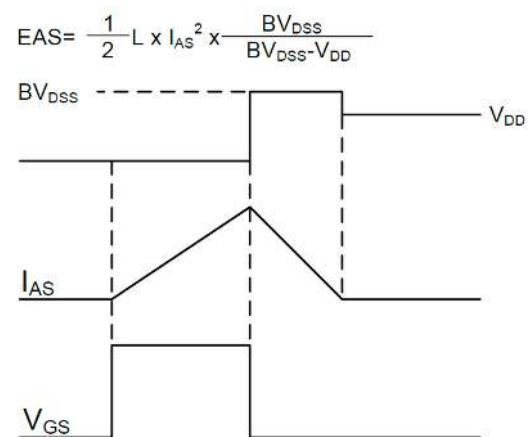
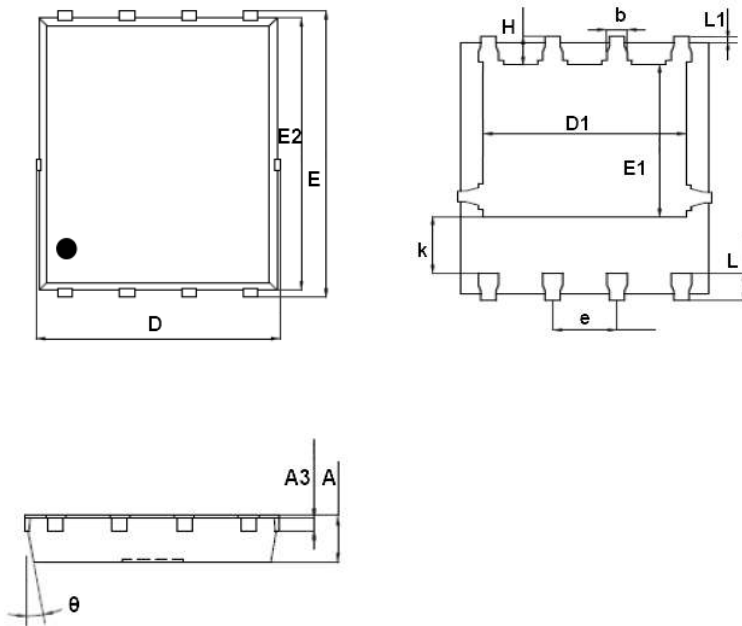


Figure 10. Switching Time Waveform

Figure 11. Unclamped Inductive Switching  
Waveform

## Mechanical Dimensions for PDFN5060-8L

## COMMON DIMENSIONS

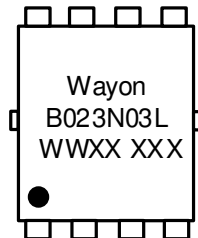


| SYMBOL   | MM      |      |
|----------|---------|------|
|          | MIN     | MAX  |
| A        | 0.90    | 1.20 |
| A3       | 0.15    | 0.35 |
| D        | 4.80    | 5.40 |
| E        | 5.90    | 6.35 |
| D1       | 3.61    | 4.31 |
| E1       | 3.30    | 3.92 |
| E2       | 5.65    | 6.06 |
| k        | 1.10    | -    |
| b        | 0.30    | 0.51 |
| e        | 1.27BSC |      |
| L        | 0.38    | 0.71 |
| L1       | 0.05    | 0.36 |
| H        | 0.38    | 0.61 |
| $\theta$ | 0°      | 12°  |

## Ordering Information

| Part         | Package     | Marking  | Packing method |
|--------------|-------------|----------|----------------|
| WMB023N03LG2 | PDFN5060-8L | B023N03L | Tape and Reel  |

## Marking Information



B023N03L = Device code

WWXX XXX= Date code

## Contact Information

No.1001, Shiwan(7) Road, Pudong District, Shanghai, P.R.China.201207

Tel: 86-21-50310888 Fax: 86-21-50757680 Email: market@way-on.com

WAYON website: <http://www.way-on.com>

For additional information, please contact your local Sales Representative.

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