

## Dual N-Channel Enhancement Mode MOSFET

### Description

WM02DN560QC uses advanced power trench technology that has been especially tailored to minimize the on-state resistance. This device is suitable for un-directional or bidirectional load switch, facilitated by its common-drain configuration.

$V_{(BR)DSS}(V)$	$I_D(A)$	$R_{DS(on)TYP}(m\Omega)$
20	56	4.2 @ $V_{GS}=4.5V$
		4.5 @ $V_{GS}=3.9V$
		4.9 @ $V_{GS}=3.1V$
		5.2 @ $V_{GS}=2.5V$

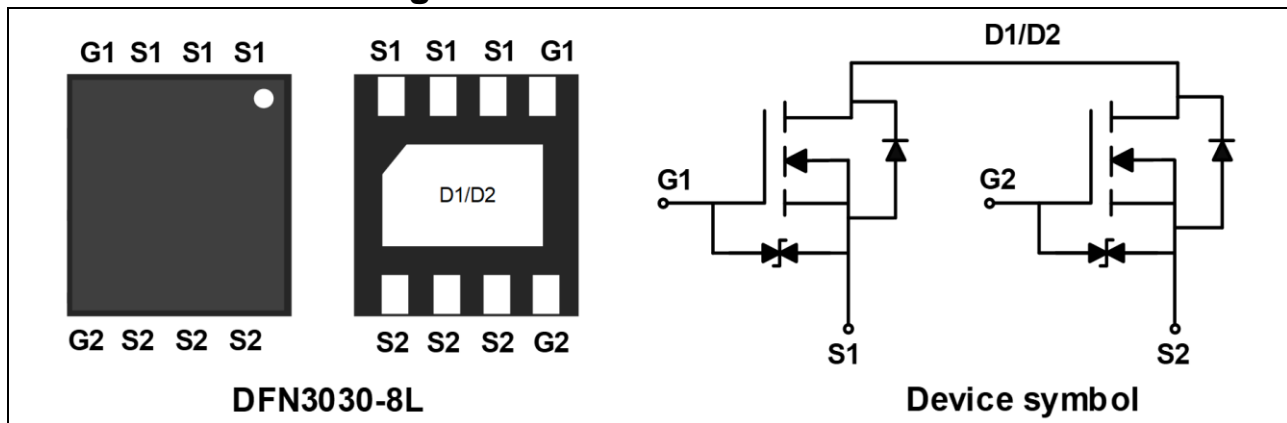
### Features

- Super high dense cell for low  $R_{DS(ON)}$
- RoHS Compliant & Halogen-Free
- ESD protected: Class 2

### Applications

- Battery protection
- Load switch

### Schematic & PIN Configuration



### Absolute Maximum Rating ( $T_A=25^\circ C$ , unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DS}$	20	V
Gate-Source Voltage	$V_{GS}$	$\pm 12$	V
Continuous Drain Current	$I_D$	$T_C=25^\circ C$	56
		$T_C=100^\circ C$	35.6
		$T_A=25^\circ C$	20
		$T_A=70^\circ C$	15.8
Pulsed Drain Current <sup>1</sup>	$I_{DM}$	100	A
Single Pulse Avalanche Energy <sup>2</sup>	$E_{AS}$	80	mJ
Total Power Dissipation	$P_D$	$T_C=25^\circ C$	31
		$T_A=25^\circ C$	3.6
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 to 150	$^\circ C$

### Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance from Junction-to-Ambient <sup>3</sup>	$R_{\theta JA}$	35	$^\circ C/W$
Thermal Resistance from Junction-to-Case	$R_{\theta JC}$	4	$^\circ C/W$

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

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
<b>Static Characteristics</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	20	-	-	V
Zero Gate Voltage Drain Current	$T_J=25^\circ\text{C}$	$I_{DSS}$ $V_{DS} = 20V, V_{GS} = 0V$	-	-	1	$\mu A$
	$T_J=100^\circ\text{C}$		-	-	100	
Gate-body Leakage Current	$I_{GSS}$	$V_{DS} = 0V, V_{GS} = \pm 8V$	-	-	$\pm 10$	$\mu A$
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	0.45	0.65	1.0	V
Drain-Source on-Resistance <sup>4</sup>	$R_{DS(on)}$	$V_{GS} = 4.5V, I_D = 3A$	3.4	4.2	5.4	m $\Omega$
		$V_{GS} = 3.9V, I_D = 3A$	3.6	4.5	5.8	
		$V_{GS} = 3.1V, I_D = 3A$	3.8	4.9	6.2	
		$V_{GS} = 2.5V, I_D = 3A$	4	5.2	6.5	
<b>Dynamic Characteristics<sup>5</sup></b>						
Input Capacitance	$C_{iss}$	$V_{DS} = 10V, V_{GS} = 0V,$ $f = 1\text{MHz}$	-	2370	-	pF
Output Capacitance	$C_{oss}$		-	305	-	
Reverse Transfer Capacitance	$C_{rss}$		-	280	-	
Gate Resistance	$R_g$	$f = 1\text{MHz}$	-	1.3	-	$\Omega$
<b>Switching Characteristics<sup>5</sup></b>						
Total Gate Charge	$Q_g$	$V_{GS} = 4.5V, V_{DS} = 10V,$ $I_D = 3A$	-	27.8	-	nC
Gate-Source Charge	$Q_{gs}$		-	4.1	-	
Gate-Drain Charge	$Q_{gd}$		-	7.9	-	
Turn-on Delay Time	$t_{d(on)}$	$V_{GS} = 4.5V, V_{DD} = 10V,$ $R_G = 3\Omega, I_D = 3A$	-	8.3	-	ns
Rise Time	$t_r$		-	14	-	
Turn-off Delay Time	$t_{d(off)}$		-	28.8	-	
Fall Time	$t_f$		-	15.2	-	
<b>Drain-Source Diode Characteristics</b>						
Diode Forward Voltage <sup>4</sup>	$V_{SD}$	$I_S = 3A, V_{GS} = 0V$	-	-	1.2	V
Continuous Source Current	$T_C=25^\circ\text{C}$	$I_S$	-	-	56	A

**Notes:**

1. Repetitive rating, pulse width limited by junction temperature  $T_{J(MAX)}=150^\circ\text{C}$ .
2. The test condition is  $V_{DD}=25V, V_{GS}=10V, L=0.4\text{mH}, I_{AS}=20A$ .
3. The data tested by surface mounted on a 1 inch2 FR-4 board with 2OZ copper, The value in any given application depends on the user's specific board design.
4. The data tested by pulsed , pulse width  $\leq 300\mu s$  , duty cycle  $\leq 2\%$ .
5. This value is guaranteed by design hence it is not included in the production test.

### Typical Characteristics

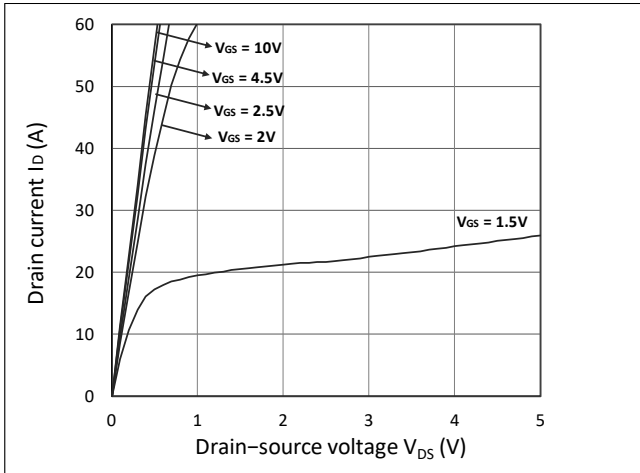


Figure 1. Output Characteristics

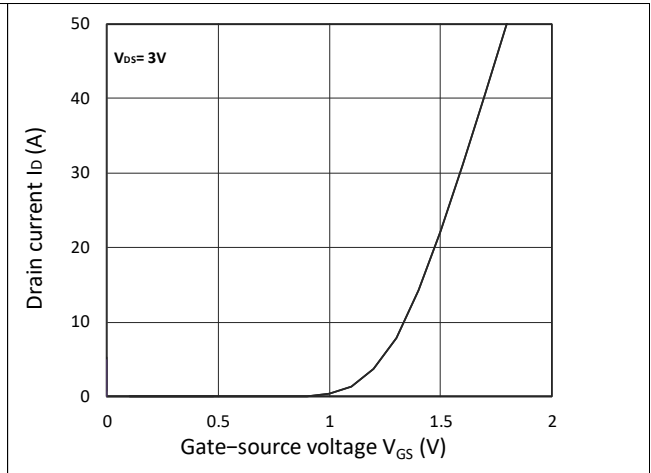


Figure 2. Transfer Characteristics

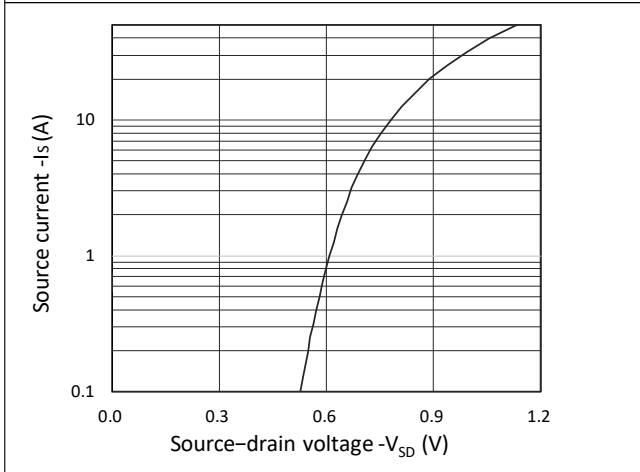


Figure 3. Forward Characteristics of Reverse

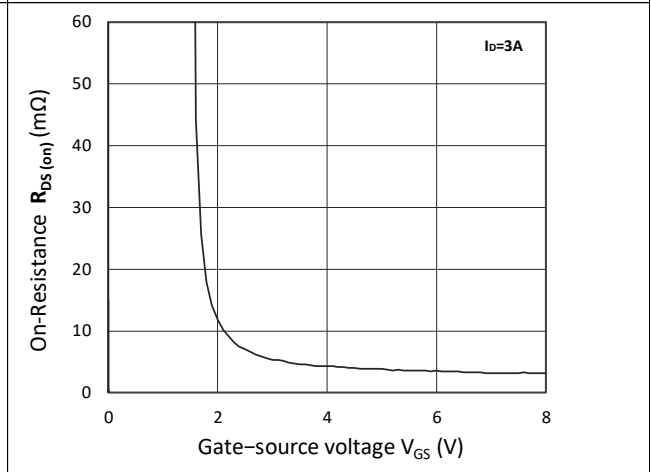


Figure 4.  $R_{DS(ON)}$  vs.  $V_{GS}$

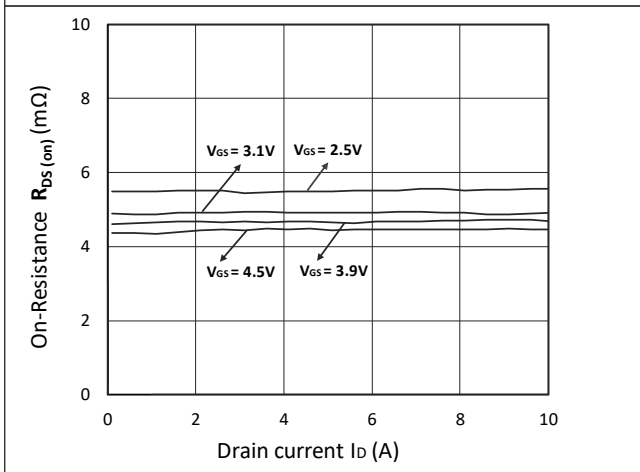


Figure 5.  $R_{DS(ON)}$  vs.  $I_D$

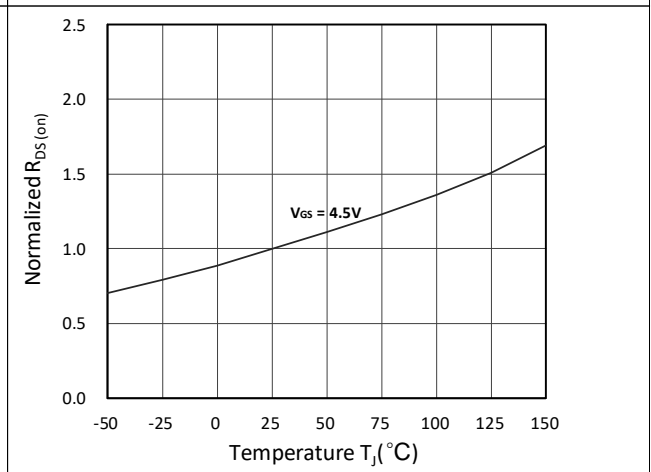


Figure 6. Capacitance Characteristics

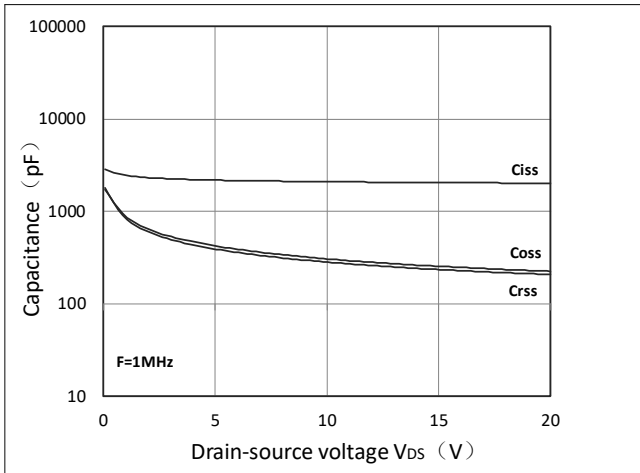


Figure 7. Capacitance Characteristics

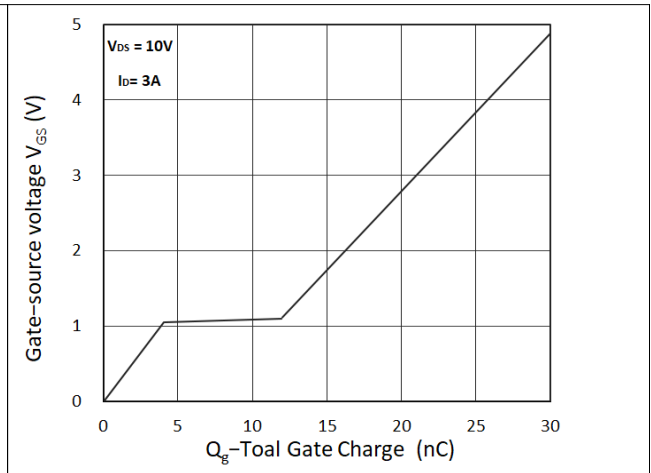
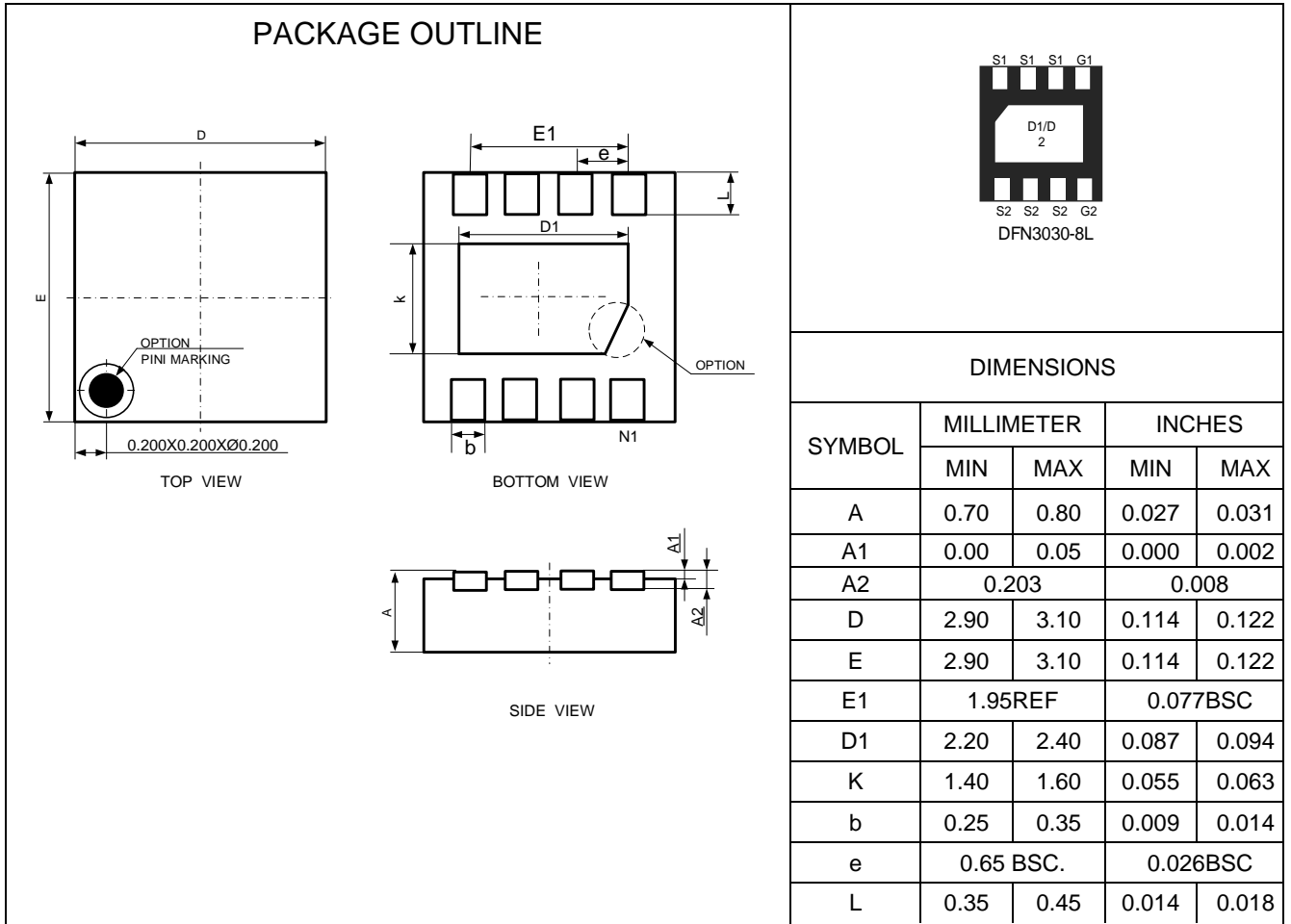


Figure 8. Gate Charge Characteristics

### Outline Drawing –DFN3030-8L



### Marking Codes

Part Number	WM02DN560QC
Marking Code	<div style="display: flex; align-items: center;"> <div style="border: 1px solid black; padding: 5px; margin-right: 10px;"> <p style="font-size: 8px;">Q56N02C WWXX XXX</p> </div> <p style="font-size: 10px;">Q56N02C = Device code WWXX XXX= Date code</p> </div>

### Package Information

Qty: 3k/Reel

### 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](mailto:market@way-on.com)  
 WAYON website: <http://www.way-on.com>  
 For additional information, please contact your local Sales Representative.

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## Product Specification Statement

1. The product specification aims to provide users with a reference regarding various product parameters, performance, and usage. It presents certain aspects of the product's performance in graphical form and is intended solely for users to select product and make product comparisons, enabling users to better understand and evaluate the characteristics and advantages of the product. It does not constitute any commitment, warranty, or guarantee.
2. The product parameters described in the product specification are numerical values, characteristics, and functions obtained through actual testing or theoretical calculations of the product in an independent or ideal state. Due to the complexity of product applications and variations in test conditions and equipment, there may be slight fluctuations in parameter test values. WAYON shall not guarantee that the actual performance of the product when installed in the customer's system or equipment will be entirely consistent with the product specification, especially concerning dynamic parameters. It is recommended that users consult with professionals for product selection and system design. Users should also thoroughly validate and assess whether the actual parameters and performance when installed in their respective systems or equipment meet their requirements or expectations. Additionally, users should exercise caution in verifying product compatibility issues, and WAYON assumes no responsibility for the application of the product.
3. WAYON strives to provide accurate and up-to-date information to the best of our ability. However, due to technical, human, or other reasons, WAYON cannot guarantee that the information provided in the product specification is entirely accurate and error-free. WAYON shall not be held responsible for any losses or damages resulting from the use or reliance on any information in these product specifications. WAYON reserves the right to revise or update the product specification and the products at any time without prior notice, and the user's continued use of the product specification is considered an acceptance of these revisions and updates. Prior to purchasing and using the product, users should verify the above information with WAYON to ensure that the product specification is the most current, effective, and complete. If users are particularly concerned about product parameters, please consult WAYON in detail or request relevant product test reports. Any data not explicitly mentioned in the product specification shall be subject to separate agreement.
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