

# APG042N01D

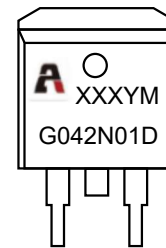
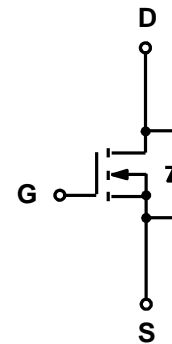
## N-Channel Shielding-Gate Mosfet

### Feature

- 100V,145A  
 $R_{DS(ON)} < 4.2m\Omega @ V_{GS}=10V$  TYP:3.7
- Advanced Trench Power MOSFET
- Provide Excellent  $R_{DS(ON)}$  And Low Gate Charge

### Application

- DC/DC Converter
- Load Switch for Portable Devices
- Battery Switch
- Rectifier



**TO-263**

### Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity (PCS)
G042N01D	APG042N01D	TO-263		-	800

### ABSOLUTE MAXIMUM RATINGS ( $T_J=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DS}$	100	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current ( $T_C = 25^\circ\text{C}$ )	$I_D$	145	A
Continuous Drain Current ( $T_C = 100^\circ\text{C}$ )	$I_D$	105	A
Pulsed Drain Current <sup>(1)</sup>	$I_{DM}$	380	A
Single Pulsed Avalanche Energy <sup>(2)</sup>	$E_{AS}$	660	mJ
Power Dissipation	$P_D$	215	W
Thermal Resistance from Junction to Case	$R_{\theta JC}$	0.44	$^\circ\text{C}/\text{W}$
Junction Temperature	$T_J$	150	$^\circ\text{C}$
Storage Temperature	$T_{STG}$	-55~ +150	$^\circ\text{C}$

**MOSFET ELECTRICAL CHARACTERISTICS(T<sub>J</sub>=25°C unless otherwise noted)**

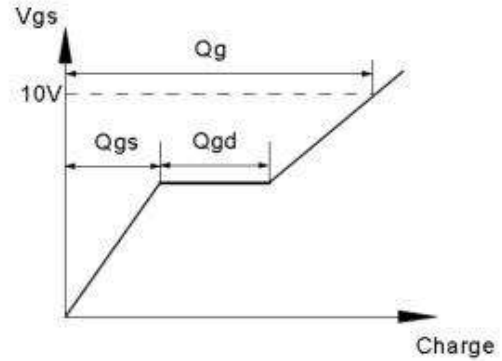
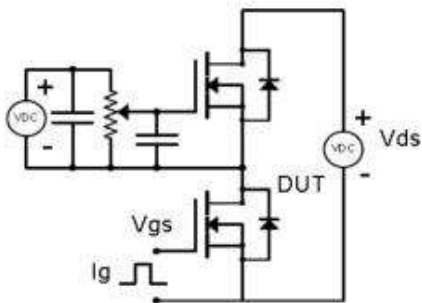
Parameter	Symbol	Test Condition	Min	Type	Max	Unit
<b>Static Characteristics</b>						
Drain-source breakdown voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> = 0V, I <sub>D</sub> =250μA	100	-	-	V
Zero gate voltage drain current	I <sub>DSS</sub>	V <sub>DS</sub> =100V, V <sub>GS</sub> = 0V	-	-	1	μA
Gate-body leakage current	I <sub>GSS</sub>	V <sub>GS</sub> =±20V, V <sub>DS</sub> = 0V	-	-	±100	nA
Gate threshold voltage <sup>(3)</sup>	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	2	3	4	V
Drain-source on-resistance <sup>(3)</sup>	R <sub>DS(on)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =70A	-	3.7	4.2	mΩ
Forward tranconductance <sup>(3)</sup>	g <sub>FS</sub>	V <sub>DS</sub> =10V, I <sub>D</sub> =70A	-	122	-	S
<b>Dynamic characteristics</b>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =50V, V <sub>GS</sub> =0V, f =1MHz	-	5678	-	pF
Output Capacitance	C <sub>oss</sub>		-	673	-	
Reverse Transfer Capacitance	C <sub>rss</sub>		-	27	-	
<b>Switching characteristics</b>						
Turn-on delay time	t <sub>d(on)</sub>	V <sub>DD</sub> =50V, I <sub>D</sub> =70A, V <sub>GS</sub> =10V, R <sub>G</sub> =25Ω	-	25	-	ns
Turn-on rise time	t <sub>r</sub>		-	33	-	
Turn-off delay time	t <sub>d(off)</sub>		-	37	-	
Turn-off fall time	t <sub>f</sub>		-	18	-	
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =50V, I <sub>D</sub> =70A, V <sub>GS</sub> =10V	-	82	-	nC
Gate-Source Charge	Q <sub>gs</sub>		-	22	-	
Gate-Drain Charge	Q <sub>gd</sub>		-	20	-	
<b>Source-Drain Diode characteristics</b>						
Diode Forward voltage <sup>(3)</sup>	V <sub>DS</sub>	V <sub>GS</sub> =0V, I <sub>S</sub> =140A	-	-	1.2	V
Diode Forward current <sup>(4)</sup>	I <sub>S</sub>		-	-	140	A
Reverse recovery time	T <sub>rr</sub>	I <sub>S</sub> =70A, V <sub>GS</sub> =0V, dI <sub>F</sub> /dt=100A/us		71		ns
Reverse recovery charge	Q <sub>rr</sub>	I <sub>S</sub> =70A, V <sub>GS</sub> =0V, dI <sub>F</sub> /dt=100A/us		144		nC

**Notes:**

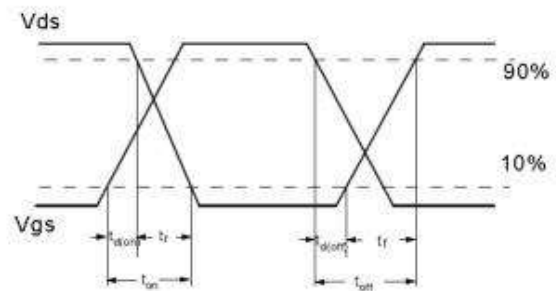
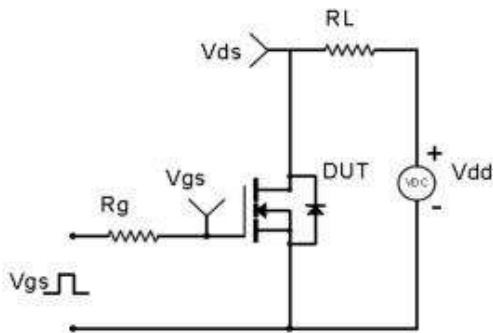
1. Repetitive Rating: pulse width limited by maximum junction temperature
2. EAS Condition: T<sub>J</sub>=25°C, V<sub>DD</sub>=50V, R<sub>G</sub>=20 Ω, L=0.5mH
3. Pulse Test: pulse width≤300μs, duty cycle≤2%
4. Surface Mounted on FR4 Board, t≤10 sec

**Test Circuit & Waveform**

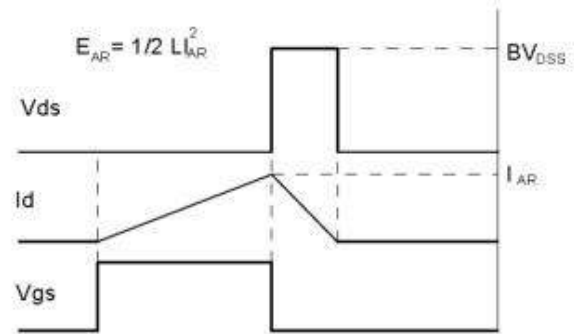
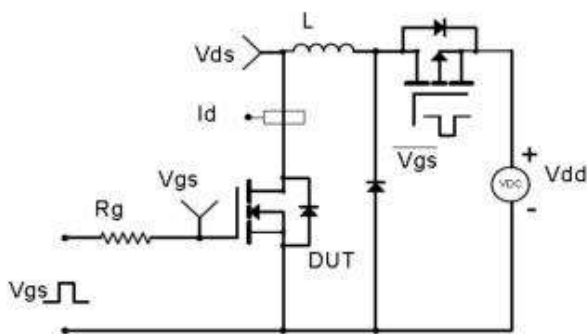
Gate Charge Test Circuit & Waveform



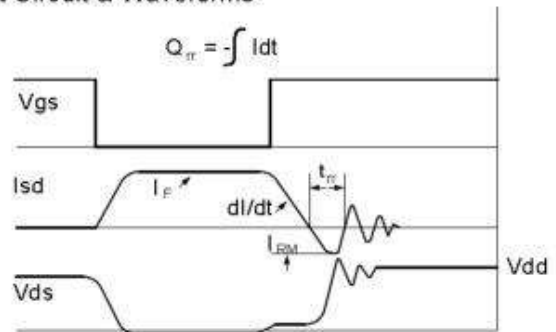
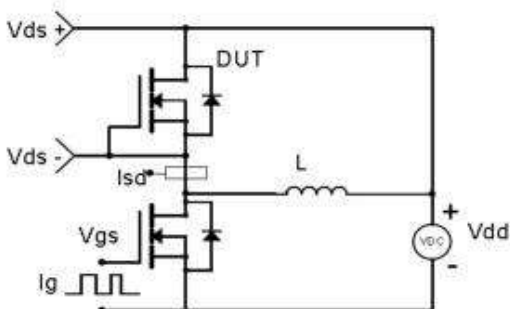
Resistive Switching Test Circuit & Waveforms



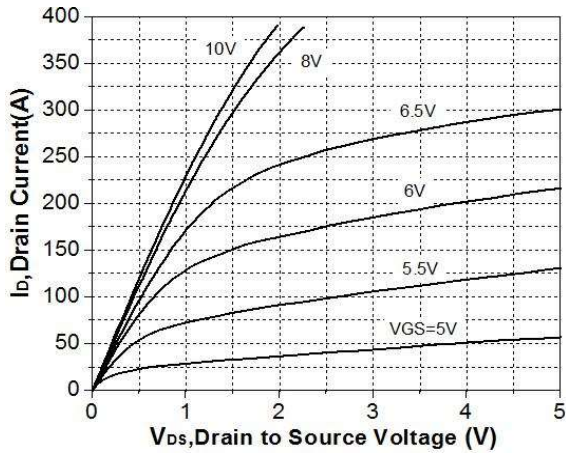
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



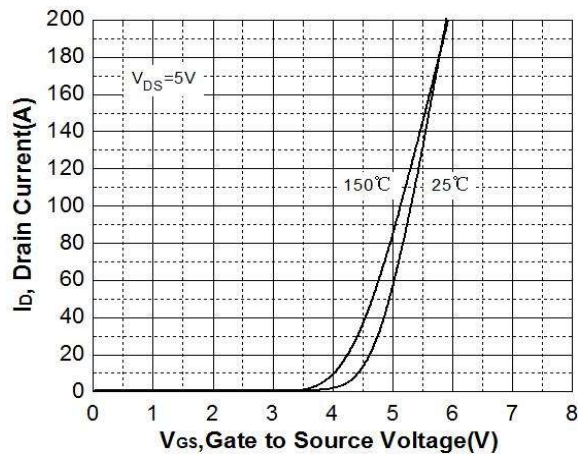
Diode Recovery Test Circuit & Waveforms



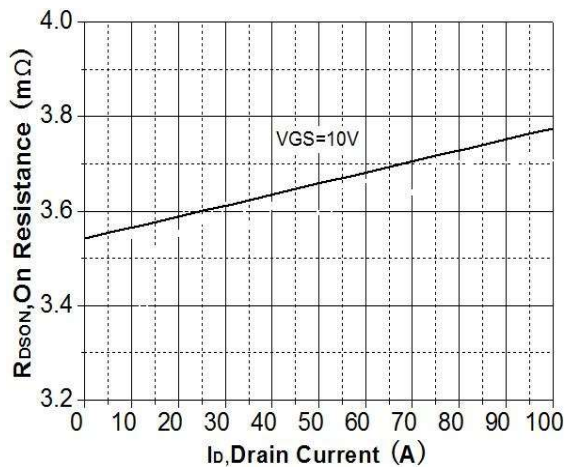
**Typical Electronic and Thermal Characteristics**



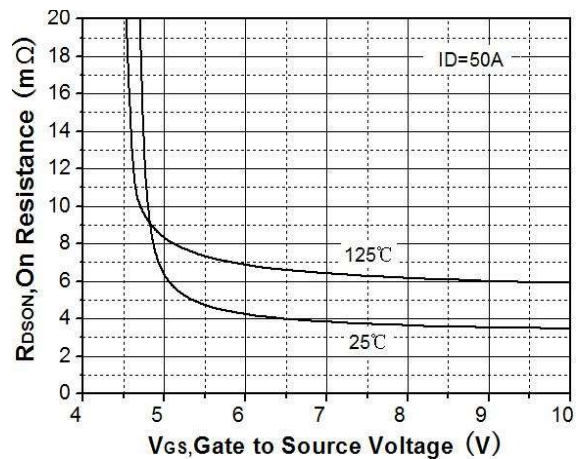
**Figure 1. On-Region Characteristics**



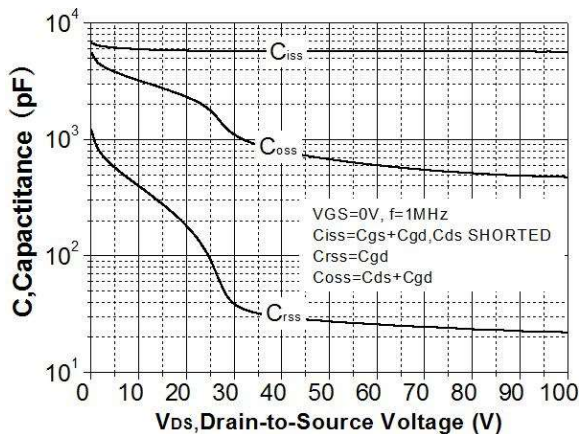
**Figure 2. Transfer Characteristics**



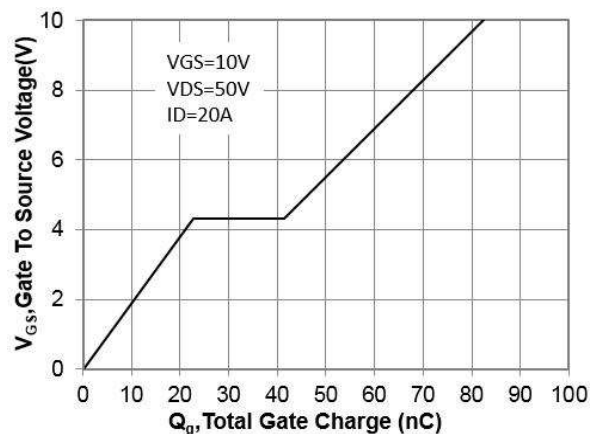
**Figure 3. On-Resistance Variation vs Drain Current**



**Figure 4. On-Resistance Vs Gate to Source Voltage**

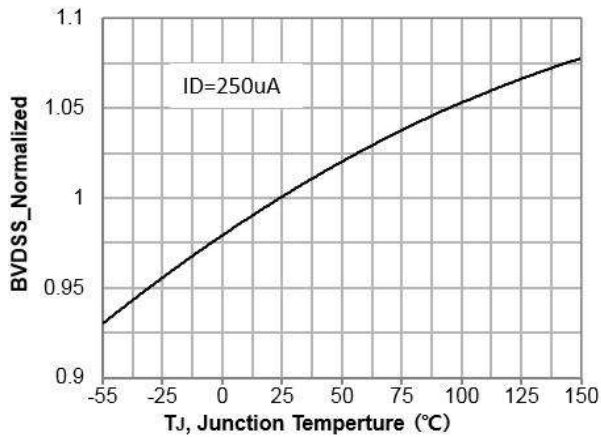


**Figure 5. Capacitance Characteristics**

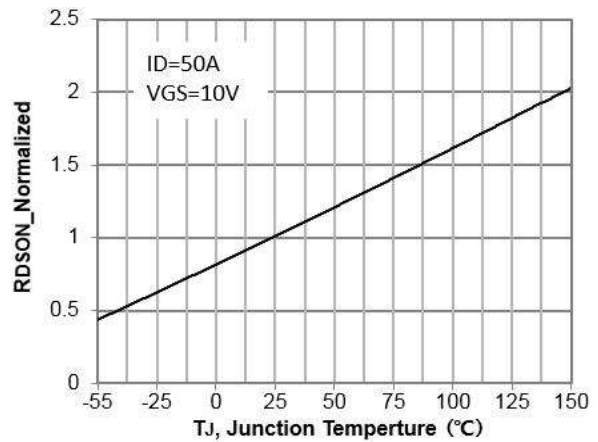


**Figure 6. Gate Charge Characteristics**

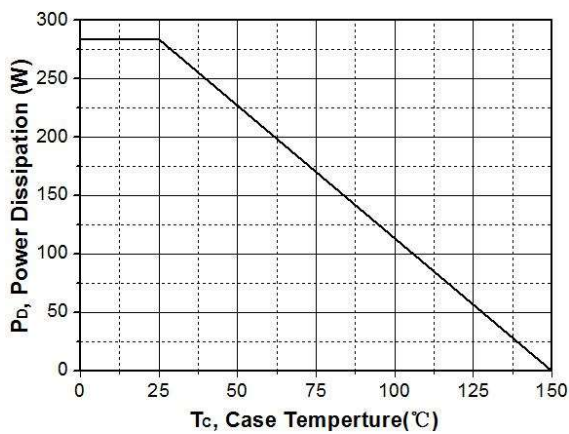
**Typical Electronic and Thermal Characteristics**



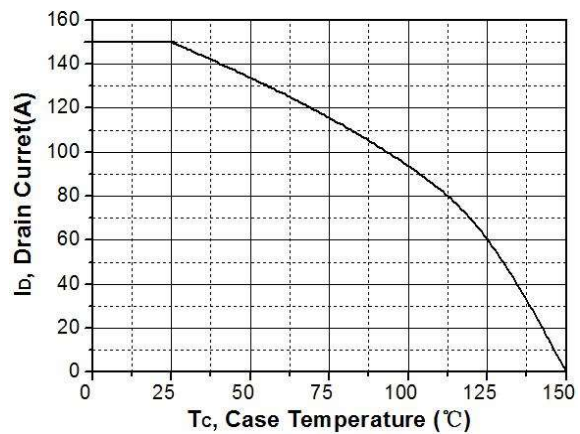
**Figure 7. Breakdown Voltage Variation vs Temperature**



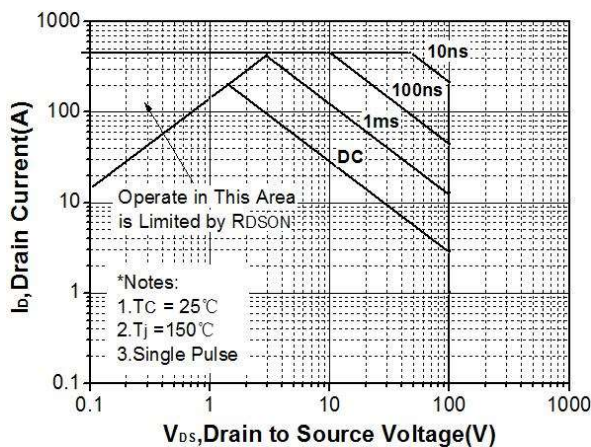
**Figure 8. On-Resistance Variation vs Temperature**



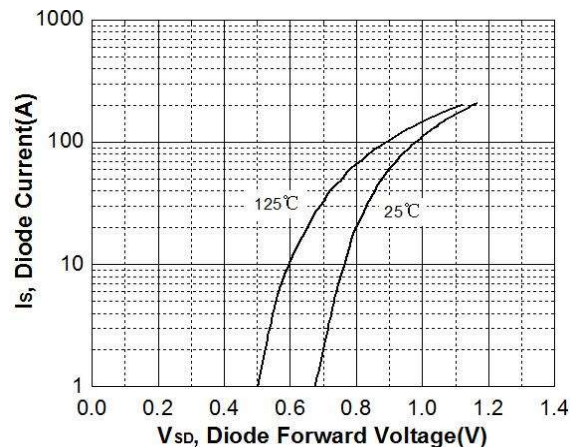
**Figure 9. Power Dissipation**



**Figure 10. Drain Current Derating**

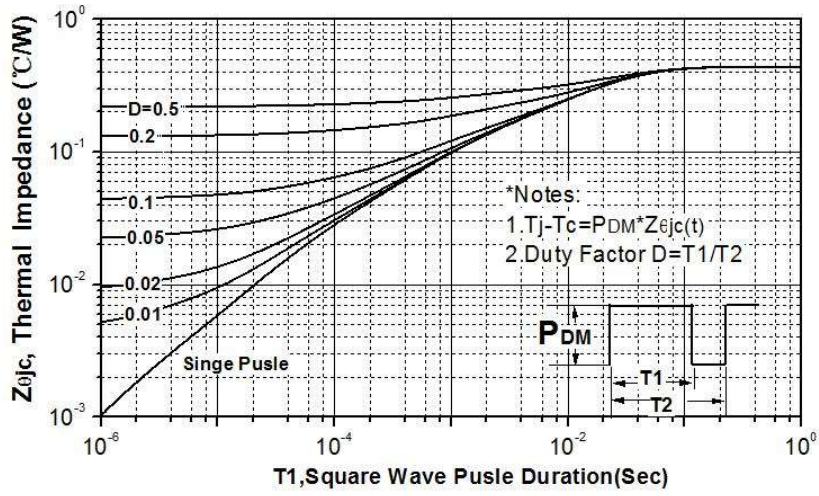


**Figure 11. Maximum Safe Operating Area**

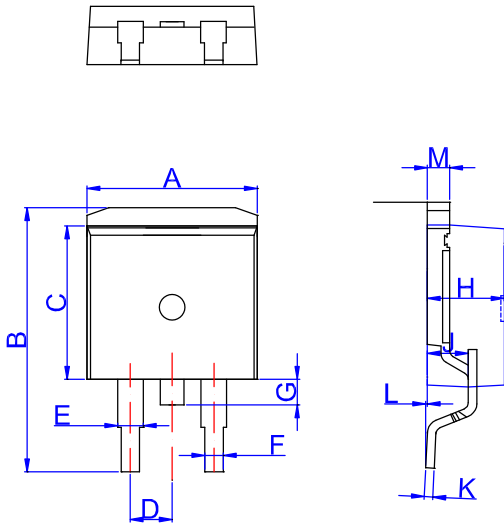


**Figure 12. Body-diode Forward Characteristics**

Typical Electronic and Thermal Characteristics



**TO-263 Package Information**



TO-263

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	9.90		10.20	0.390		0.402
B	14.70		15.80	0.579		0.622
C	9.4		9.6	0.37		0.378
D		2.54			0.100	
E	1.20		1.40	0.047		0.055
F	0.75		0.85	0.029		0.033
G			1.75			0.069
H	4.40		4.70	0.173		0.185
J	2.30		2.70	0.091		0.106
K	0.38		0.55	0.015		0.022
L	0	0.10	0.25	0	0.004	0.010
M	1.25		1.35	0.049		0.053

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## Revision History

Revision	Release	Remark
V1.0	2023/08/10	Initial Release

## Disclaimer

The information given in this document describes the independent performance of the product, but similar performance is not guaranteed under other working conditions, and cannot be guaranteed when installed with other products or equipment. To achieve the required performance of the product in actual scenarios, the customer should conduct a complete application test to assess the functionality of the product.

Allpower assumes no responsibility for equipment failures result from using products at values that exceed the ratings, operating conditions, or other parameters listed in the product specifications.

The product described in this specification is not applicable for aerospace or other applications which requires high reliability. Customers using or selling these products for use in medical, life-saving, or life-sustaining applications do so at their own risk and agree to fully indemnify.

Due to product or technical improvements, the information described or contained herein may be changed without prior notice.