



## Description

### JMG N-channel Advanced Mode Power MOSFET

#### Features

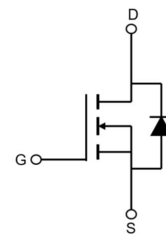
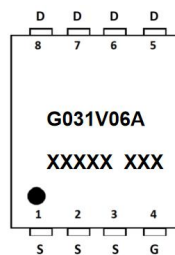
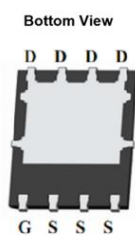
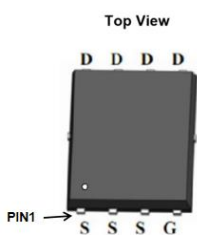
- 60V,160A  
 $R_{DS(ON)} < 3m\Omega @ V_{GS} = 10V$
- Advanced Split Gate Trench Technology
- Excellent  $R_{DS(ON)}$  and Low Gate Charge
- Lead Free

#### Application

- Load Switch
- PWM Application
- Power Management



*100% UIS TESTED!*  
*100% ΔVds TESTED!*



PDFN5x6-8L

Marking and pin Assignment

Schematic Diagram

## Package Marking and Ordering Information

Device Marking	Device	Outline	Package	Reel Size	Reel (pcs)	Per Carton (pcs)
G031V06A	JMGG031V06A	TAPING	PDFN5x6-8L	13"	5000	50000

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

Symbol	Parameter	Max.	Units
$V_{DSS}$	Drain-Source Voltage	60	V
$V_{GSS}$	Gate-Source Voltage	$\pm 25$	V
$I_D$	Continuous Drain Current	$T_C = 25^\circ C$	160
		$T_C = 100^\circ C$	104
$I_{DM}$	Pulsed Drain Current <sup>note1</sup>	640	A
$E_{AS}$	Single Pulsed Avalanche Energy <sup>note2</sup>	196	mJ
$P_D$	Power Dissipation	$T_C = 25^\circ C$	125
$R_{\theta JC}$	Thermal Resistance, Junction to Case	1	$^\circ C/W$
$T_J, T_{STG}$	Operating and Storage Temperature Range	-55 to +150	$^\circ C$



## Electrical Characteristics (T<sub>J</sub>=25°C unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
<b>Off Characteristics</b>						
V <sub>(BR)DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	60	-	-	V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =60V, V <sub>GS</sub> =0V,	-	-	1.0	μA
I <sub>GSS</sub>	Gate to Body Leakage Current	V <sub>DS</sub> =0V, V <sub>GS</sub> = ±25V	-	-	±100	nA
<b>On Characteristics</b>						
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	2	3	4	V
R <sub>DS(on)</sub>	Static Drain-Source on-Resistance <small>note3</small>	V <sub>GS</sub> =10V, I <sub>D</sub> =30A	-	2.3	3.0	mΩ
<b>Dynamic Characteristics</b>						
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, f=1.0MHz	-	3383	-	pF
C <sub>oss</sub>	Output Capacitance		-	1940	-	pF
C <sub>rss</sub>	Reverse Transfer Capacitance		-	14	-	pF
Q <sub>g</sub>	Total Gate Charge	V <sub>DD</sub> =30V, I <sub>D</sub> =40A, V <sub>GS</sub> =10V	-	46	-	nC
Q <sub>gs</sub>	Gate-Source Charge		-	17	-	nC
Q <sub>gd</sub>	Gate-Drain("Miller") Charge		-	10	-	nC
<b>Switching Characteristics</b>						
t <sub>d(on)</sub>	Turn-on Delay Time	V <sub>DD</sub> =30V, I <sub>D</sub> =40A, R <sub>GEN</sub> =2.7Ω, V <sub>GS</sub> =10V	-	19	-	ns
t <sub>r</sub>	Turn-on Rise Time		-	105	-	ns
t <sub>d(off)</sub>	Turn-off Delay Time		-	35	-	ns
t <sub>f</sub>	Turn-off Fall Time		-	107	-	ns
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
I <sub>S</sub>	Maximum Continuous Drain to Source Diode Forward Current		-	-	160	A
I <sub>SM</sub>	Maximum Pulsed Drain to Source Diode Forward Current		-	-	640	A
V <sub>SD</sub>	Drain to Source Diode Forward Voltage	V <sub>GS</sub> =0V, I <sub>S</sub> =30A	-	-	1.2	V
t <sub>rr</sub>	Body Diode Reverse Recovery Time	V <sub>DS</sub> =60V, I <sub>F</sub> =40A, di/dt=300A/μs	-	50	-	ns
Q <sub>rr</sub>	Body Diode Reverse Recovery Charge		-	115	-	nC

Notes:1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

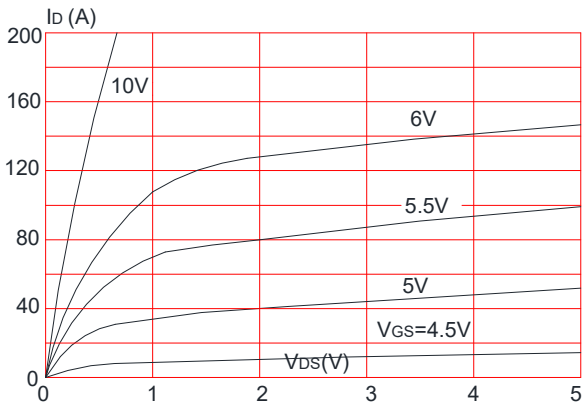
2. EAS condition: Starting T<sub>J</sub>=25°C, V<sub>DD</sub>=30V, V<sub>G</sub>=10V, R<sub>G</sub>=25Ω, L=0.5mH, I<sub>AS</sub>=28A

3. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%

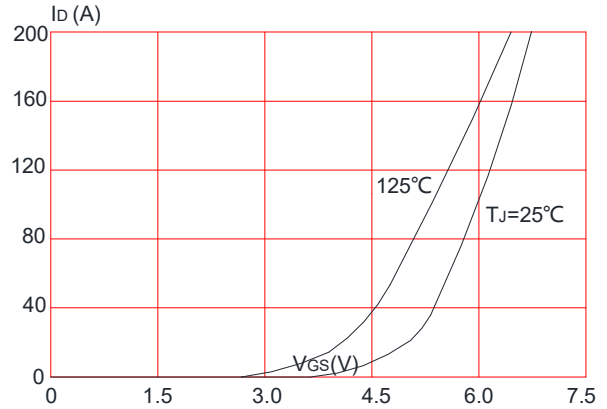


## Typical Performance Characteristics

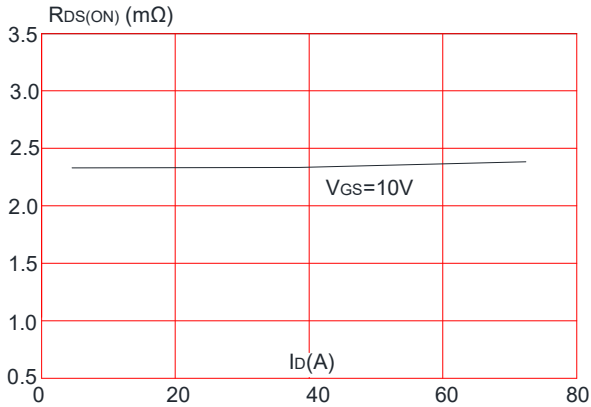
**Figure 1: Output Characteristics**



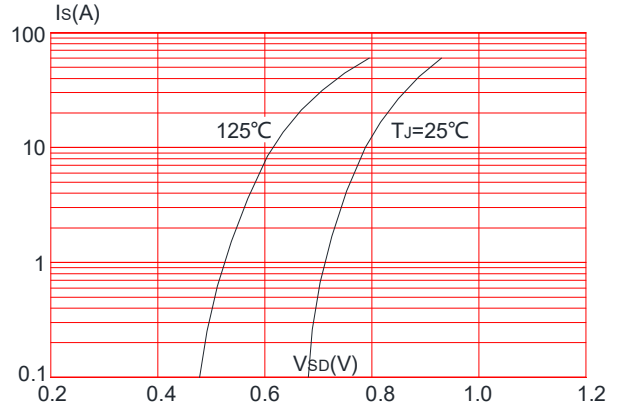
**Figure 2: Typical Transfer Characteristics**



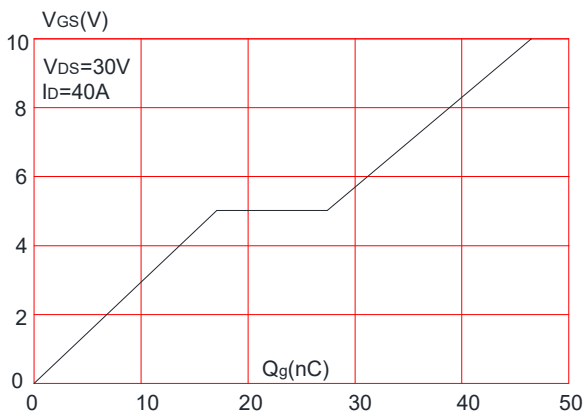
**Figure 3: On-resistance vs. Drain Current**



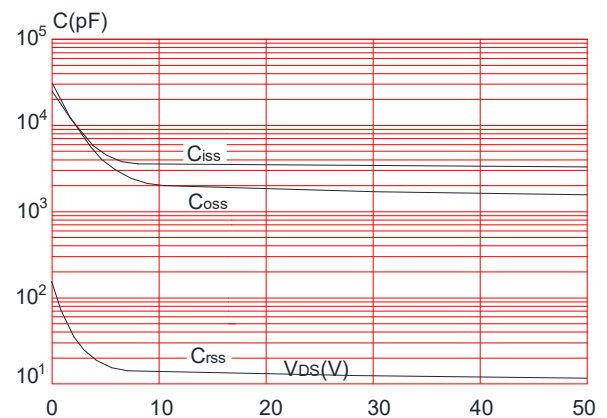
**Figure 4: Body Diode Characteristics**



**Figure 5: Gate Charge Characteristics**

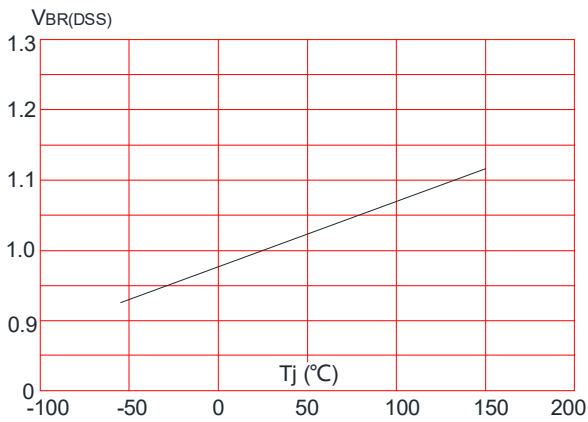


**Figure 6: Capacitance Characteristics**

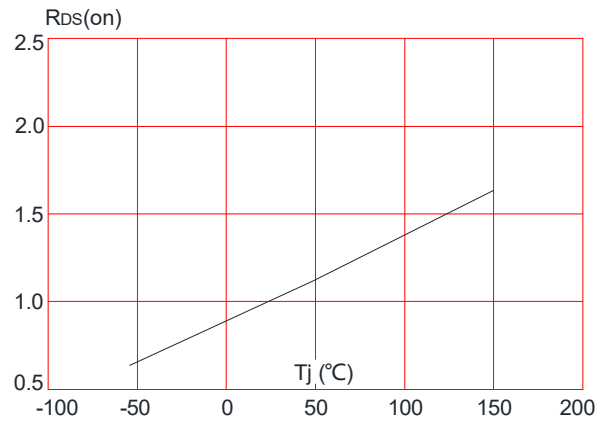




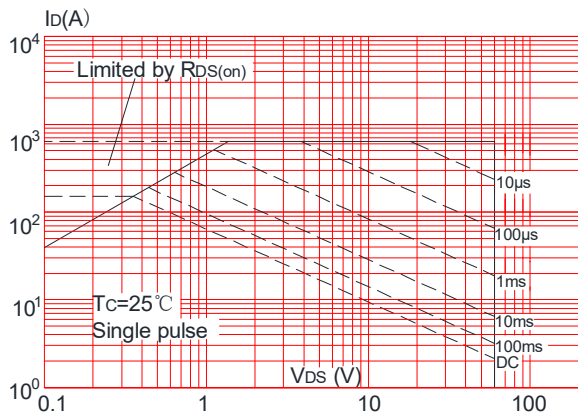
**Figure 7: Normalized Breakdown Voltage vs. Junction Temperature**



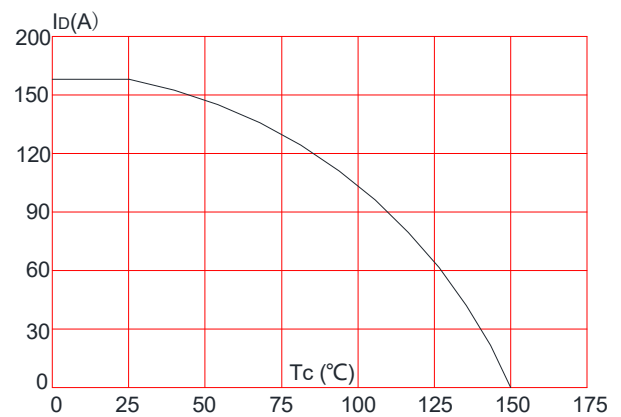
**Figure 8: Normalized on Resistance vs. Junction Temperature**



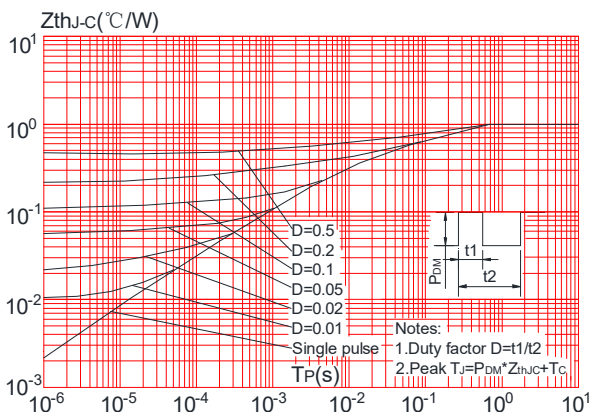
**Figure 9: Maximum Safe Operating Area**



**Figure 10: Maximum Continuous Drain Current vs. Case Temperature**



**Figure 11: Maximum Effective Transient Thermal Impedance, Junction-to-Case**



## Test Circuit



Figure1:Gate Charge Test Circuit & Waveform

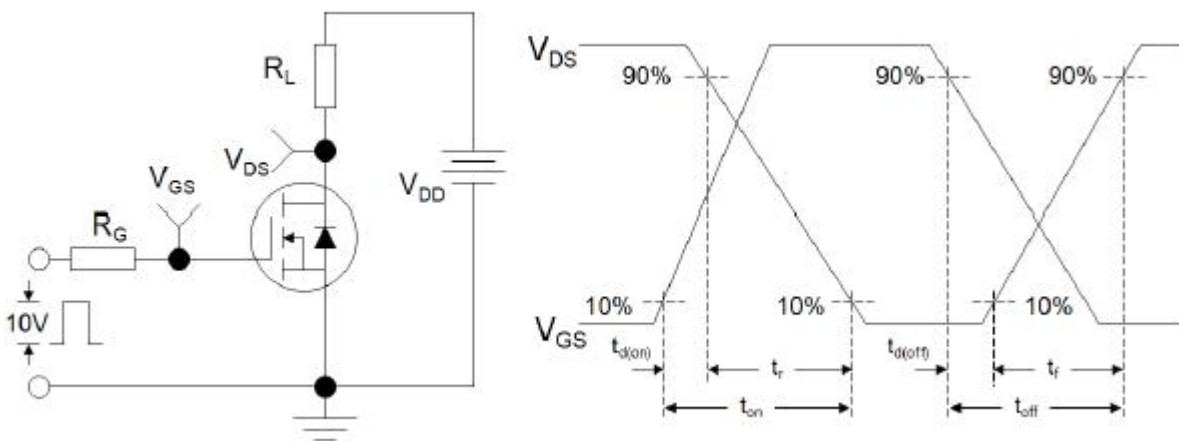


Figure 2: Resistive Switching Test Circuit & Waveforms

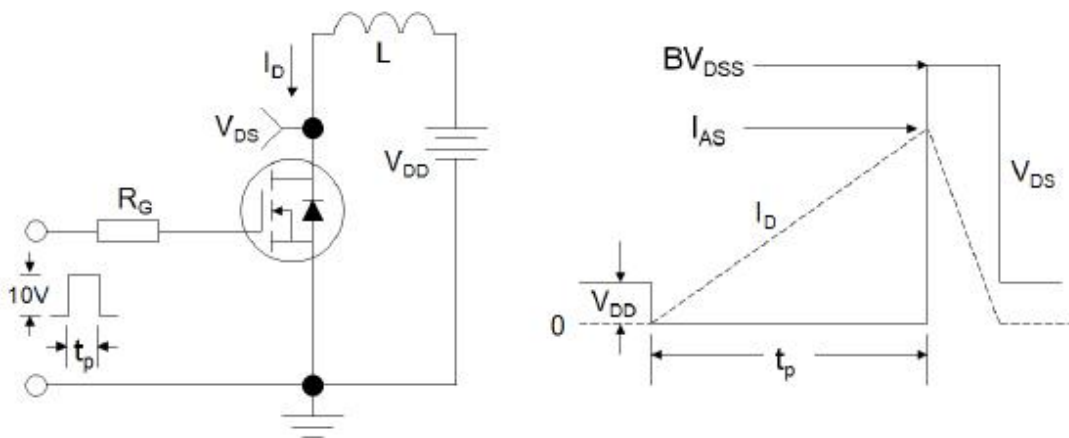
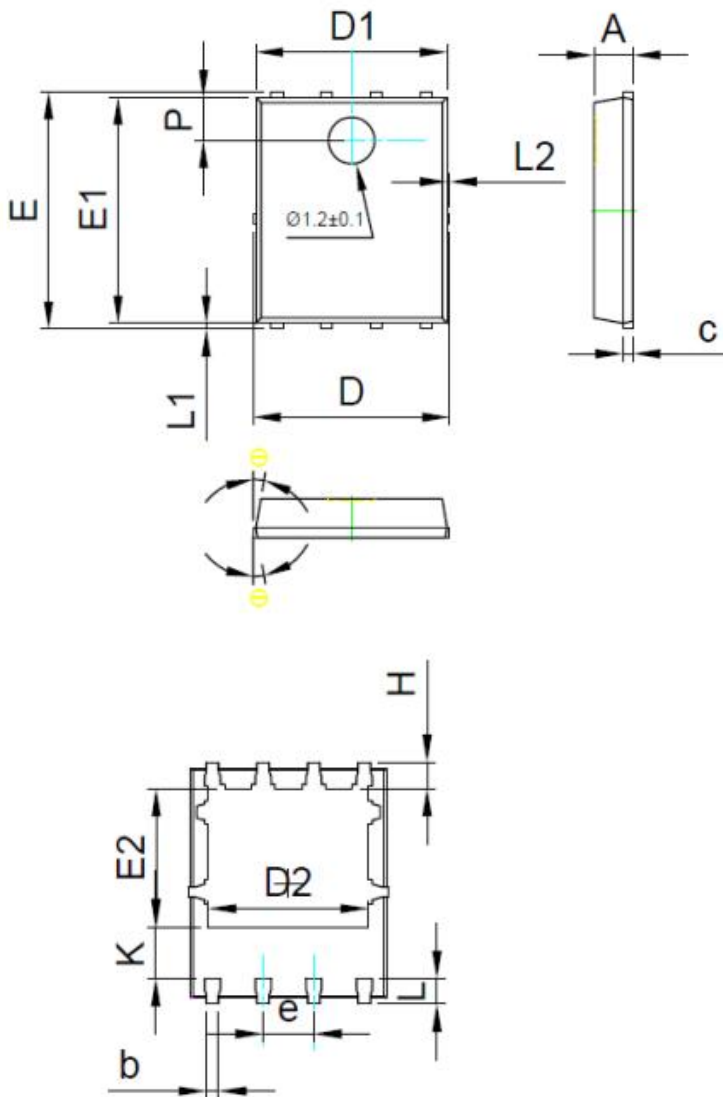


Figure 3:Unclamped Inductive Switching Test Circuit & Waveforms



## Package Mechanical Data-PDFN5x6-8L




SYMBOL	MIN	NOM	MAX
A	0.90	1.00	1.10
b	0.35	0.40	0.45
c	0.21	0.25	0.34
D	-	-	5.10
D1	4.85	4.90	4.95
D2	3.96	4.01	4.06
e	1.27 BSC		
E	5.95	6.00	6.05
E1	5.70	5.75	5.80
E2	3.425	3.475	3.525
H	0.60	0.65	0.70
K	1.29	-	-
L	0.60	0.65	0.70
L1	0.05	0.15	0.25
L2	-	-	0.12
⊙	8°	10°	12°
P	1.05	1.10	1.15

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