

# APG250N01

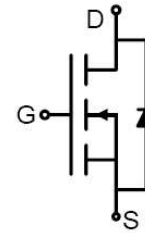
## N-Channel Enhancement Mosfet

# AIIPOWER

## DATA SHEET

### Feature

- 100V,40A  
 $R_{DS(ON)} < 25m\Omega @ V_{GS}=10V$  (TYP:18m $\Omega$ )  
 $R_{DS(ON)} < 38m\Omega @ V_{GS}=4.5V$  (TYP:25m $\Omega$ )
- Split Gate Trench Technology
- Lead free product is acquired
- Excellent  $R_{DS(ON)}$  and Low Gate Charge



Schematic Diagram

### Application

- PWM applications
- Load Switch
- Power management



Marking and pin Assignment

### Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity (PCS)
G250N01	APG250N01	TO-220	-	-	1000

### ABSOLUTE MAXIMUM RATINGS ( $T_a=25^{\circ}C$ 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 ( $T_a=25^{\circ}C$ )	$I_D$	40	A
Continuous Drain Current ( $T_a=100^{\circ}C$ )	$I_D$	25	A
Pulsed Drain Current <sup>(1)</sup>	$I_{DM}$	160	A
Single Pulsed Avalanche Energy <sup>(2)</sup>	$E_{AS}$	16	mJ
Power Dissipation	$P_D$	45	W
Thermal Resistance from Junction to Case	$R_{\theta JC}$	2.5	$^{\circ}C/W$
Junction Temperature	$T_J$	150	$^{\circ}C$
Storage Temperature	$T_{STG}$	-55~ +150	$^{\circ}C$

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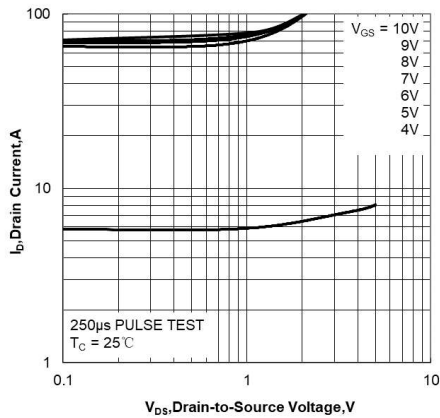
### MOSFET ELECTRICAL CHARACTERISTICS ( $T_a=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Type	Max	Unit
<b>Static Characteristics</b>						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	100	-	-	V
Zero gate voltage drain current	$I_{DSS}$	$V_{DS} = 100V, V_{GS} = 0V$	-	-	1	$\mu A$
Gate-body leakage current	$I_{GSS}$	$V_{GS} = \pm 20V, V_{DS} = 0V$	-	-	$\pm 100$	nA
Gate threshold voltage <sup>(3)</sup>	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	1.2	1.8	2.8	V
Drain-source on-resistance <sup>(3)</sup>	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 15A$	-	18	25	$m\Omega$
		$V_{GS} = 4.5V, I_D = 10A$	-	25	38	$m\Omega$
Forward Threshold Voltage	$g_{fs}$	$V_{DS} = 10V, I_D = 20A$	-	22	-	S
Gate Resistance	$R_g$	$V_{DS} = V_{GS} = 0V, f = 1MHz$	-	1.62	-	$\Omega$
<b>Dynamic characteristics</b>						
Input Capacitance	$C_{iss}$	$V_{DS} = 50V, V_{GS} = 0V, f = 1MHz$	-	822	-	pF
Output Capacitance	$C_{oss}$		-	310	-	
Reverse Transfer Capacitance	$C_{rss}$		-	23.5	-	
<b>Switching characteristics</b>						
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 50V, I_D = 20A,$ $V_{GS} = 10V, R_G = 3\Omega$	-	15	-	ns
Turn-on rise time	$t_r$		-	3.2	-	
Turn-off delay time	$t_{d(off)}$		-	30	-	
Turn-off fall time	$t_f$		-	7.6	-	
Total Gate Charge	$Q_g$	$V_{DS} = 50V, I_D = 20A,$ $V_{GS} = 10V$	-	22.7	-	nC
Gate-Source Charge	$Q_{gs}$		-	6.2	-	
Gate-Drain Charge	$Q_{gd}$		-	5.3	-	
Reverse Recovery Charge	$Q_{rr}$	$I_F = 20A, di/dt = 100A/\mu s$	-	59	-	nC
Reverse Recovery Time	$T_{rr}$	$I_F = 20A, di/dt = 100A/\mu s$	-	45	-	ns
<b>Source-Drain Diode characteristics</b>						
Diode Forward voltage <sup>(3)</sup>	$V_{DS}$	$V_{GS} = 0V, I_S = 10A$	-	-	1.2	V
Diode Forward current <sup>(4)</sup>	$I_S$		-	-	40	A

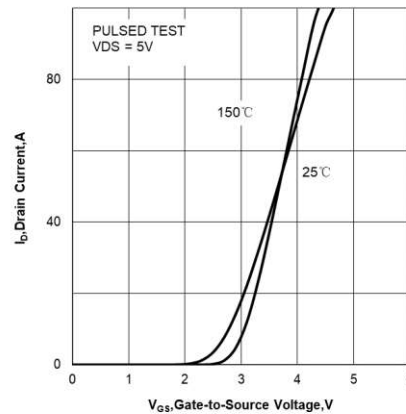
#### Notes:

1. Repetitive Rating: pulse width limited by maximum junction temperature
2. EAS Condition:  $T_J = 25^\circ\text{C}, V_{DD} = 50V, R_G = 25\Omega, L = 0.5\text{Mh}$
3. Pulse Test: pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$
4. Surface Mounted on FR4 Board,  $t \leq 10\text{ sec}$

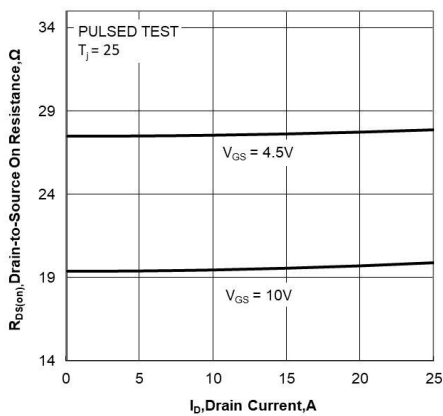
**Typical Performance Characteristics**



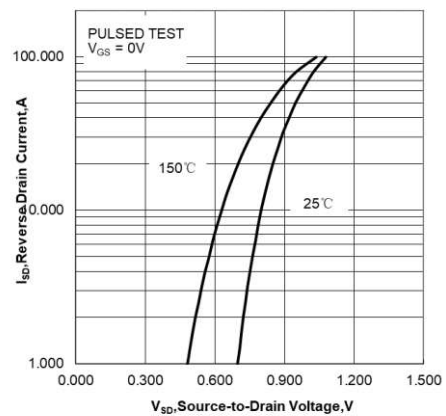
**Figure 1. Output Characteristics**



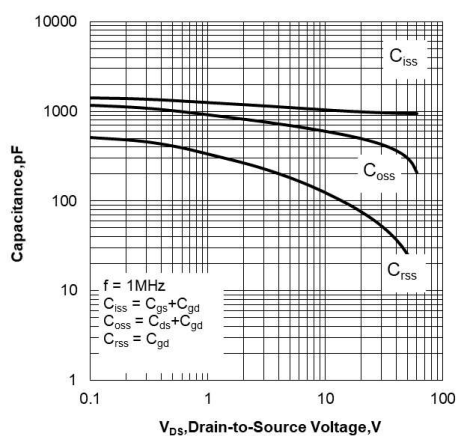
**Figure 2. Transfer Characteristics**



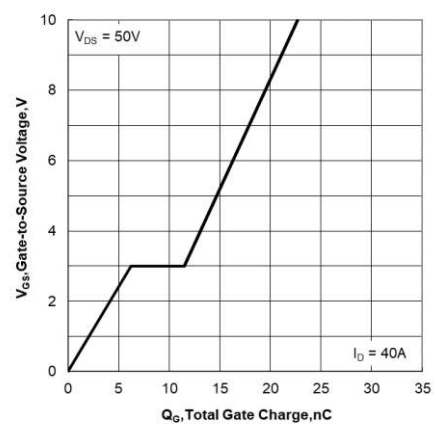
**Figure 3. Drain-to-Source On Resistance vs Drain Current**



**Figure 4. Body Diode Forward Voltage vs Source Current and Temperature**



**Figure 5. Capacitance Characteristics**



**Figure 6. Gate Charge Characteristics**

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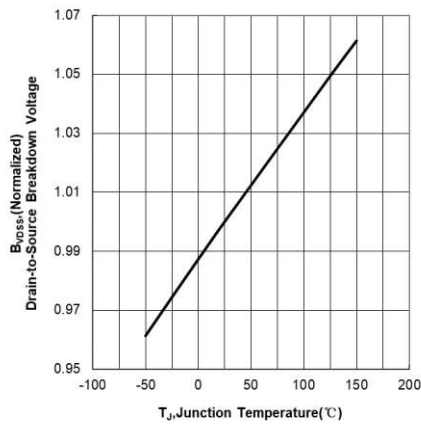


Figure 7. Normalized Breakdown Voltage vs Junction Temperature

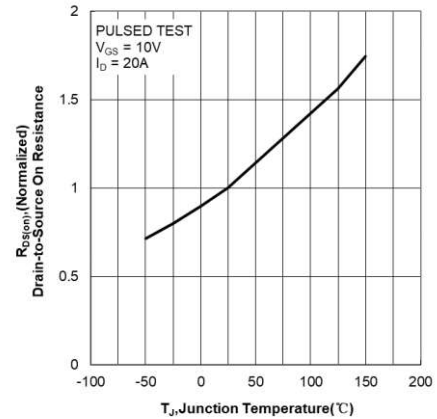


Figure 8. Normalized On Resistance vs Junction Temperature

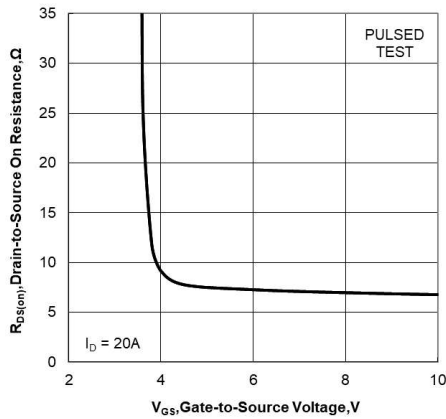


Figure 9. Drain-to-Source On Resistance vs Gate Voltage and Drain Current

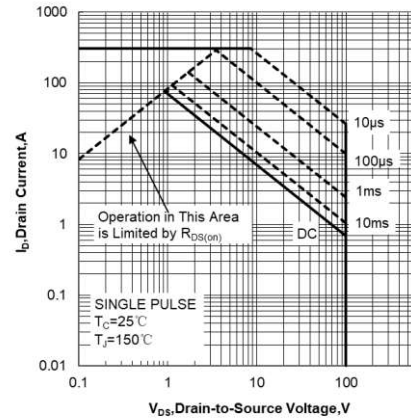


Figure 10. Maximum Safe Operating Area

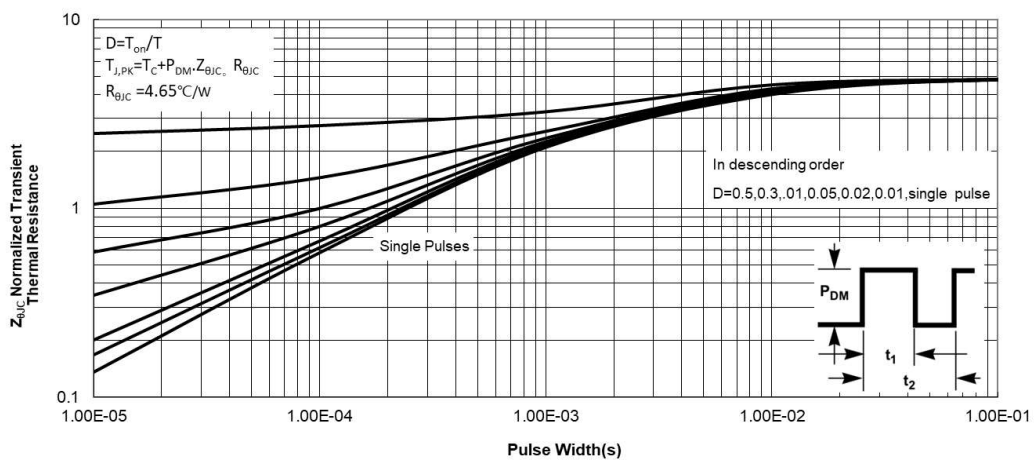
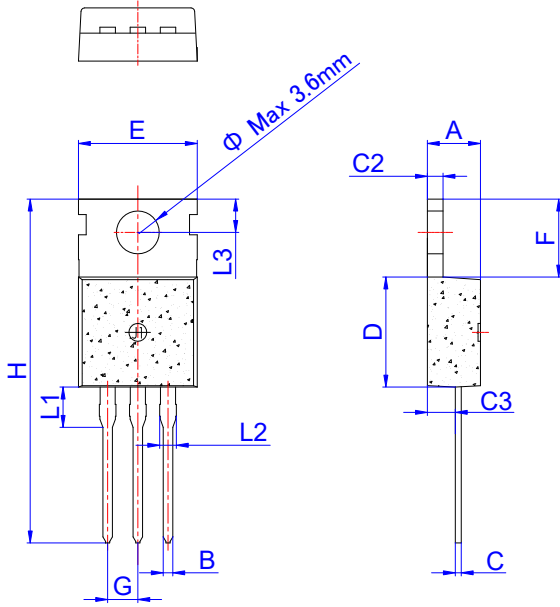


Figure 11. Maximum Effective Transient Thermal Impedance, Junction-to-Case

**TO-220 Package Information**



TO-220

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.40		4.60	0.173		0.181
B	0.70		0.90	0.028		0.035
C	0.45		0.60	0.018		0.024
C2	1.23		1.32	0.048		0.052
C3	2.20		2.60	0.087		0.102
D	8.90		9.90	0.350		0.390
E	9.90		10.3	0.390		0.406
F	6.30		6.90	0.248		0.272
G		2.54			0.1	
H	28.0		29.8	1.102		1.173
L1		3.39			0.133	
L2	1.14		1.70	0.045		0.067
L3	2.65		2.95	0.104		0.116
Φ		3.6			0.142	