

# AP060N07

## N-Channel Power MOSFET

### Product Summary

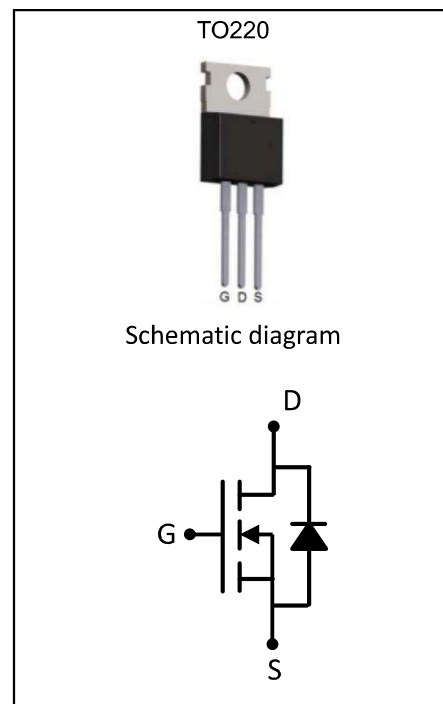
$V_{(BR)DSS}$	$R_{DS(on)}$	$I_D$
70V	5.9mΩ@10V	90A

### Feature

- TrenchFET Power MOSFET
- Fast Switching
- Exceptional on-resistance and maximum DC current capability

### Application

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



### Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
AP060N07	AP060N07	TO-220-3L		-	-

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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DS}$	70	V
Gate-Source Voltage	$V_{GS}$	+20/-12	V
Continuous Drain Current	$I_D$	90	A
Pulsed Drain Current	$I_{DM}$	350	A
Single Pulse Avalanche Current	EAS	150	mJ
Power Dissipation	$P_D$	120	W
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	3	$^{\circ}\text{C}/\text{W}$
Junction Temperature	$T_J$	150	$^{\circ}\text{C}$
Storage Temperature	$T_{STG}$	-55~ +150	$^{\circ}\text{C}$

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

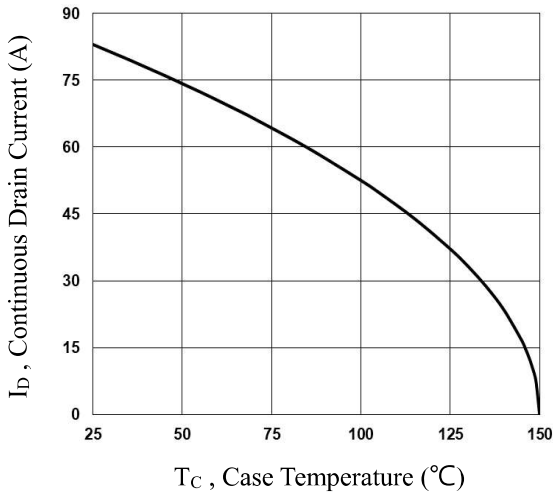
Parameter	Symbol	Test Condition	Min	Type	Max	Unit
<b>Static Characteristics</b>						
Drain-source breakdown voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> = 0V, I <sub>D</sub> = -250μA	70	72		V
Zero gate voltage drain current	I <sub>DSS</sub>	V <sub>DS</sub> = 65V, V <sub>GS</sub> = 0V			1	μA
Gate-body leakage current	I <sub>GSS</sub>	V <sub>GS</sub> = +20V, V <sub>DS</sub> = 0V			±100	nA
Gate threshold voltage <sup>(1)</sup>	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250μA	2	2.8	4	V
Drain-source on-resistance <sup>(1)</sup>	R <sub>DS(on)</sub>	V <sub>GS</sub> = 10V, I <sub>D</sub> = 40A		5.9	7	mΩ
Forward transconductance <sup>(1)</sup>	g <sub>FS</sub>	V <sub>DS</sub> = 10V, I <sub>D</sub> = 3A		10		S
<b>Dynamic characteristics<sup>(2)</sup></b>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> = 30V, V <sub>GS</sub> = 0V, f = 1MHz		1910		pF
Output Capacitance	C <sub>oss</sub>			520		
Reverse Transfer Capacitance	C <sub>rss</sub>			30		
<b>Switching characteristics<sup>(2)</sup></b>						
Turn-on delay time	t <sub>d(on)</sub>	V <sub>DD</sub> = 30V, I <sub>D</sub> = 1A, R <sub>L</sub> = 6Ω V <sub>GS</sub> = 10V, R <sub>G</sub> = 1Ω		10.2	20	ns
Turn-on rise time	t <sub>r</sub>			16	32	
Turn-off delay time	t <sub>d(off)</sub>			42	84	
Turn-off fall time	t <sub>f</sub>			38	76	
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> = 30V, I <sub>D</sub> = 10A, V <sub>GS</sub> = 10V		34.7	70	nC
Gate-Source Charge	Q <sub>gs</sub>			4.9		
Gate-Drain Charge	Q <sub>gd</sub>			11		
<b>Source-Drain Diode characteristics</b>						
Diode Forward voltage <sup>(1)</sup>	V <sub>DS</sub>	V <sub>GS</sub> = 0V, I <sub>S</sub> = 1A			1	V

**Notes:**

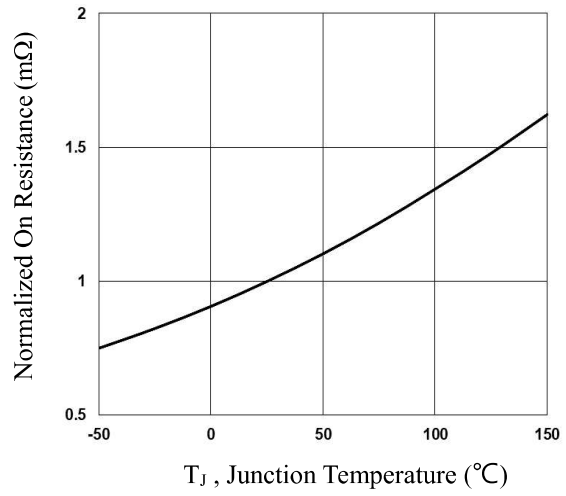
1. Pulse test; pulse width ≤ 300μs, duty cycle ≤ 2%.
2. Guaranteed by design, not subject to production testing.

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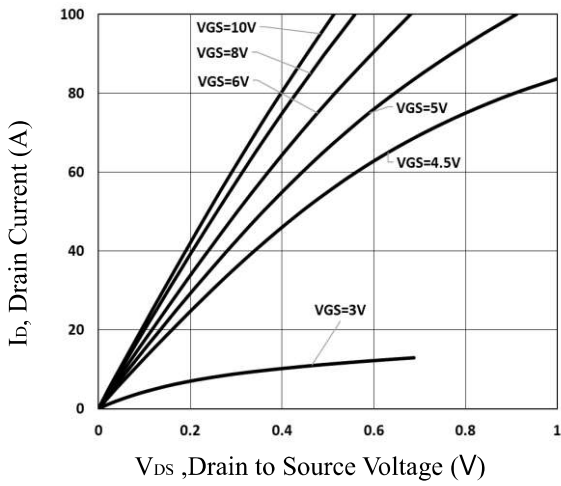
**Typical Electrical and Thermal Characteristics**



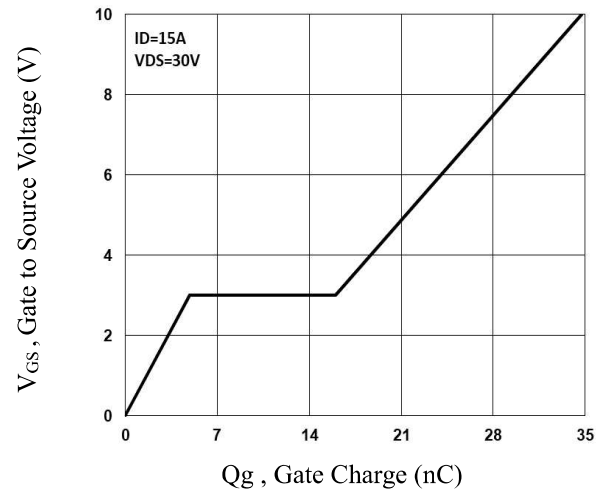
**Fig.1 Continuous Drain Current vs. T<sub>C</sub>**



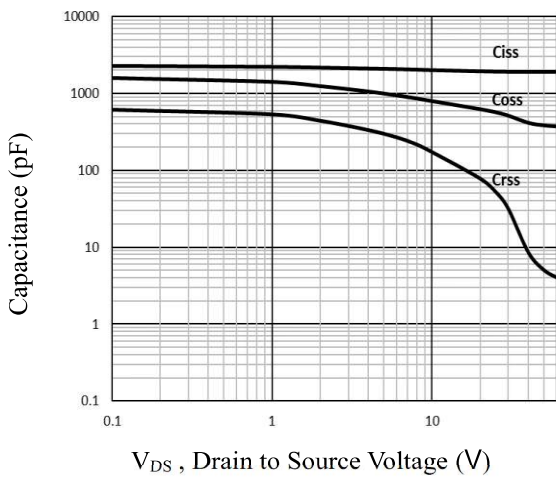
**Fig.2 Normalized RDSON vs. T<sub>J</sub>**



**Fig.3 Typical Output Characteristics**

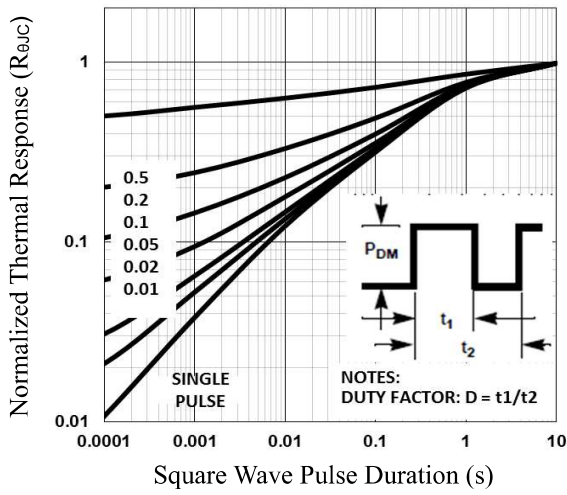


**Fig.4 Gate Charge Characteristics**

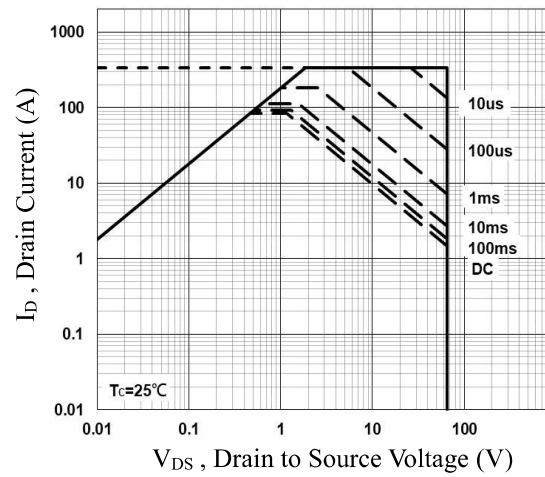


**Fig.5 Capacitance Characteristics**

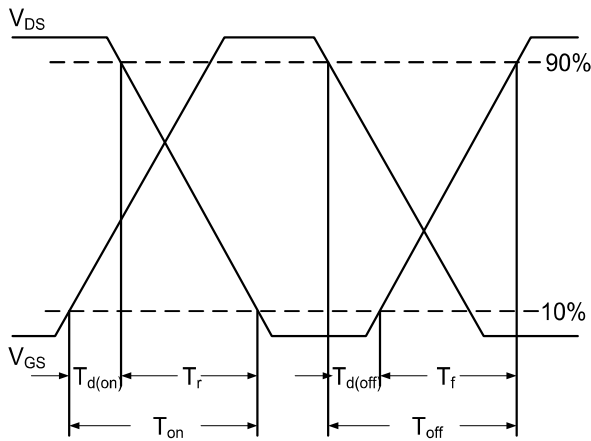
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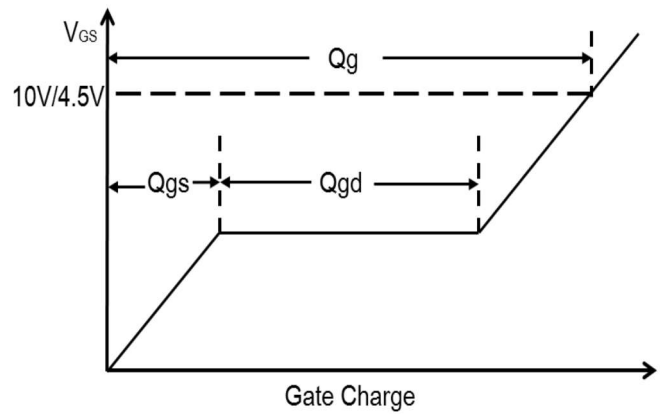
**Fig.6 Normalized Transient Impedance**



**Fig.7 Maximum Safe Operation Area**



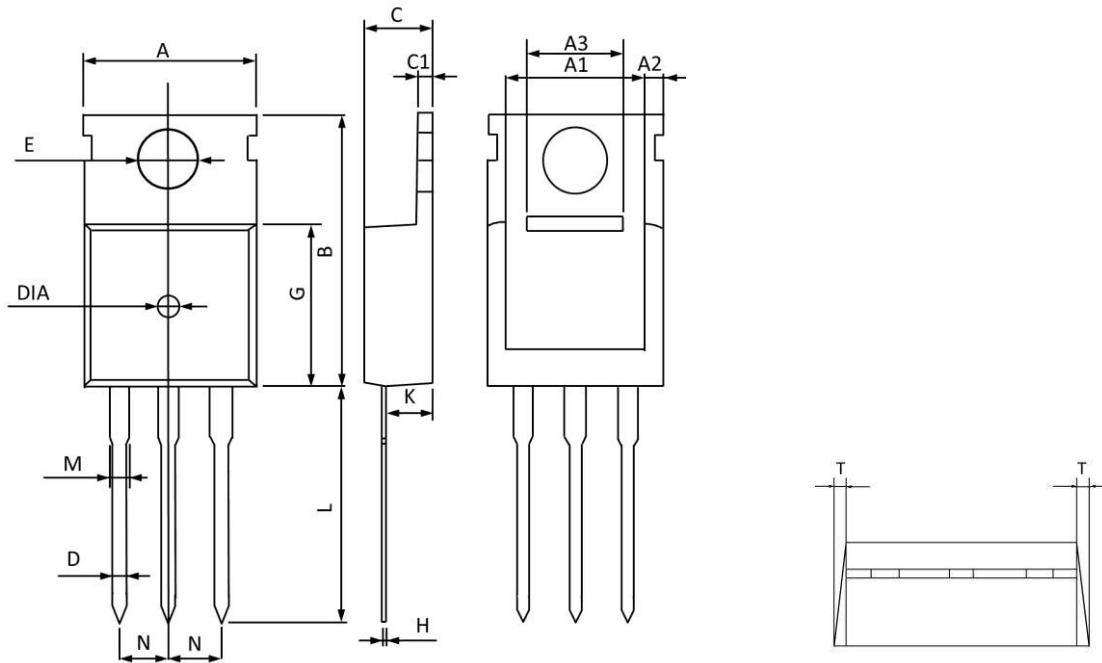
**Fig.8 Switching Time Waveform**



**Fig.9 Gate Charge Waveform**

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**TO220 PACKAGE INFORMATION**



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MAX	MIN	MAX	MIN
A	10.300	9.700	0.406	0.382
A1	8.840	8.440	0.348	0.332
A2	1.250	1.050	0.049	0.041
A3	5.300	5.100	0.209	0.201
B	16.200	15.400	0.638	0.606
C	4.680	4.280	0.184	0.169
C1	1.500	1.100	0.059	0.043
D	1.000	0.600	0.039	0.024
E	3.800	3.400	0.150	0.134
G	9.300	8.700	0.366	0.343
H	0.600	0.400	0.024	0.016
K	2.700	2.100	0.106	0.083
L	13.600	12.800	0.535	0.504
M	1.500	1.100	0.059	0.043
N	2.590	2.490	0.102	0.098
T	W0.35		W0.014	
DIA	Φ1.5 TYP.	deep0.2 TYP.	Φ0.059 TYP.	deep0.008 TYP.