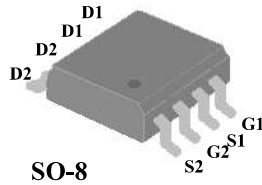


# AP3020

## N-Channel Power MOSFET

- ▼ Lower Gate Charge
- ▼ Simple Drive Requirement
- ▼ Fast Switching Characteristic
- ▼ RoHS Compliant & Halogen-Free

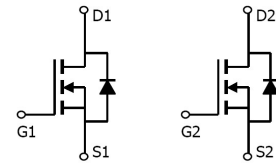


$BV_{DSS}$	30V
$R_{DS(ON)}$	14.5m $\Omega$
$I_D$	11.8A

### Description

AP3020 series are from Advanced Power innovated design and silicon process technology to achieve the lowest possible on-resistance and fast switching performance. It provides the designer with an extreme efficient device for use in a wide range of power applications.

The SO-8 package is widely preferred for all commercial-industrial surface mount applications using infrared reflow technique and suited for voltage conversion or switch applications.



### Absolute Maximum Ratings@ $T_j=25^\circ\text{C}$ (unless otherwise specified)

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	30	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$I_D@T_A=25^\circ\text{C}$	Drain Current, $V_{GS} @ 10V^3$	11.8	A
$I_D@T_A=70^\circ\text{C}$	Drain Current, $V_{GS} @ 10V^3$	9.4	A
$I_{DM}$	Pulsed Drain Current <sup>1</sup>	40	A
$P_D@T_A=25^\circ\text{C}$	Total Power Dissipation	2.5	W
$T_{STG}$	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
$T_J$	Operating Junction Temperature Range	-55 to 150	$^\circ\text{C}$

### Thermal Data

Symbol	Parameter	Value	Unit
Rthj-a	Maximum Thermal Resistance, Junction-ambient <sup>3</sup>	50	$^\circ\text{C}/\text{W}$

## N-Channel Power MOSFET

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

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250uA	30	-	-	V
R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance <sup>2</sup>	V <sub>GS</sub> =10V, I <sub>D</sub> =11A		12	14.5	Ω
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =7A	-	13.8	18	mΩ
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250uA	1	-	3	V
g <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> =10V, I <sub>D</sub> =11A	-	22	-	S
I <sub>DSS</sub>	Drain-Source Leakage Current	V <sub>DS</sub> =30V, V <sub>GS</sub> =0V	-	-	10	uA
I <sub>GSS</sub>	Gate-Source Leakage	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	-	-	±100	nA
Q <sub>g</sub>	Total Gate Charge	I <sub>D</sub> =11A	-	10.5	16.8	nC
Q <sub>gs</sub>	Gate-Source Charge	V <sub>DS</sub> =15V	-	2.5	-	nC
Q <sub>gd</sub>	Gate-Drain ("Miller") Charge	V <sub>GS</sub> =4.5V	-	6	-	nC
t <sub>d(on)</sub>	Turn-on Delay Time	V <sub>DS</sub> =15V	-	7	-	ns
t <sub>r</sub>	Rise Time	I <sub>D</sub> =1A	-	6	-	ns
t <sub>d(off)</sub>	Turn-off Delay Time	R <sub>G</sub> =3.3Ω, V <sub>GS</sub> =10V	-	23	-	ns
t <sub>f</sub>	Fall Time	R <sub>D</sub> =15Ω	-	5	-	ns
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> =0V	-	790	1280	pF
C <sub>oss</sub>	Output Capacitance	V <sub>DS</sub> =25V	-	125	-	pF
C <sub>rss</sub>	Reverse Transfer Capacitance	f=1.0MHz	-	105	-	pF
R <sub>g</sub>	Gate Resistance	f=1.0MHz	-	2.1	-	Ω

## Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V <sub>SD</sub>	Forward On Voltage <sup>2</sup>	I <sub>S</sub> =2.1A, V <sub>GS</sub> =0V	-	-	1.2	V
t <sub>rr</sub>	Reverse Recovery Time	I <sub>S</sub> =11A, V <sub>GS</sub> =0V,	-	22	-	ns
Q <sub>rr</sub>	Reverse Recovery Charge	dI/dt=100A/μs	-	14	-	nC

## Notes:

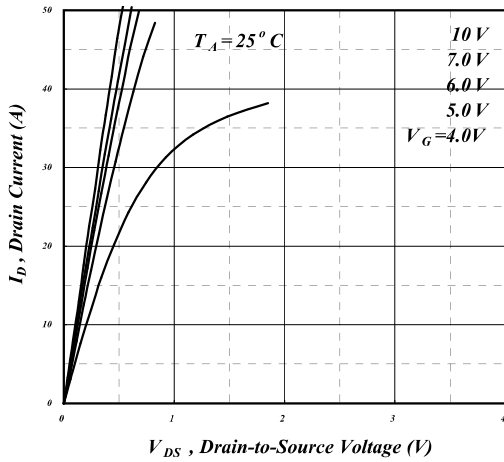
- 1.Pulse width limited by Max. junction temperature.
- 2.Pulse test
- 3.Surface mounted on 1 in<sup>2</sup> copper pad of FR4 board, t ≤10sec ; 125 °C/W when mounted on Min. copper pad.

THIS PRODUCT IS SENSITIVE TO ELECTROSTATIC DISCHARGE, PLEASE HANDLE WITH CAUTION.

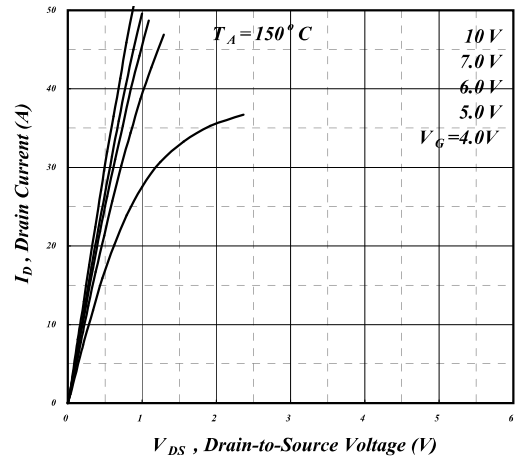
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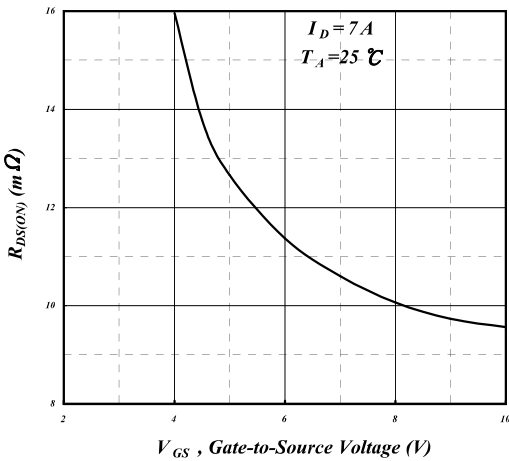
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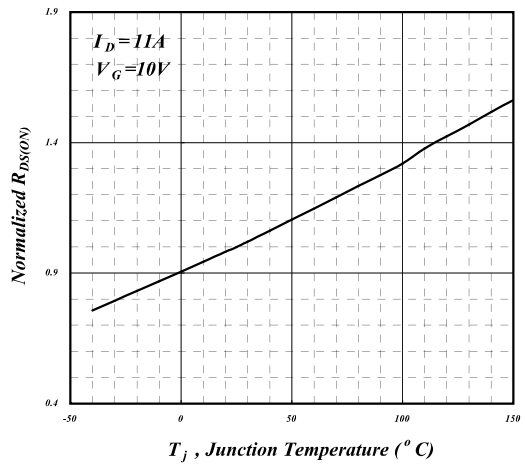
**Fig 1. Typical Output Characteristics**



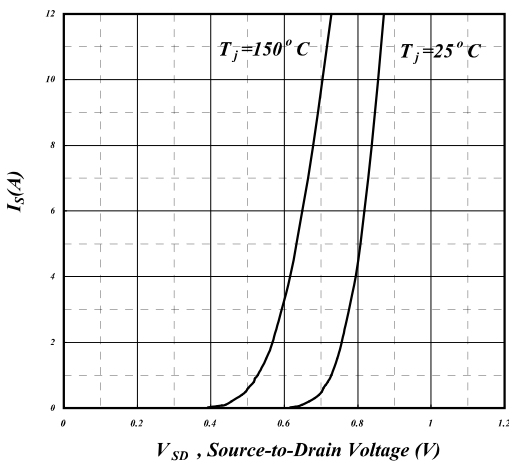
**Fig 2. Typical Output Characteristics**



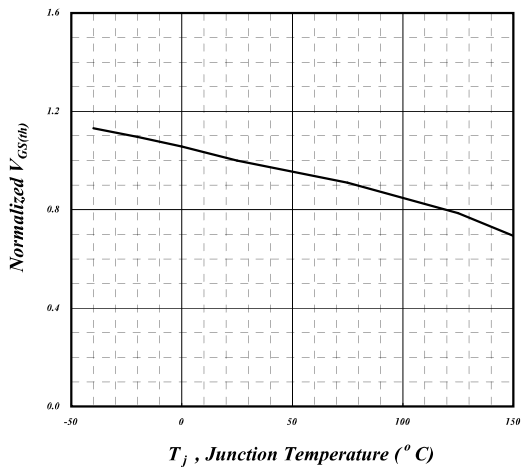
**Fig 3. On-Resistance v.s. Gate Voltage**



**Fig 4. Normalized On-Resistance v.s. Junction Temperature**

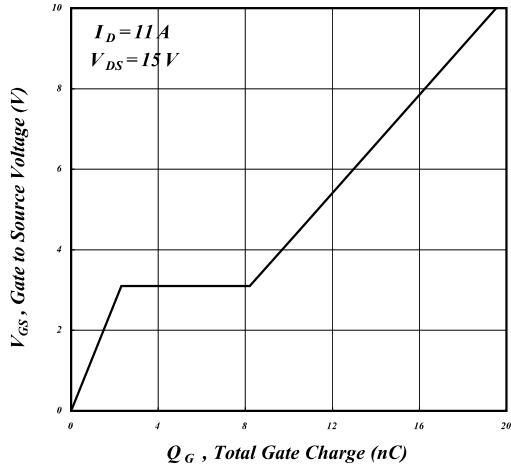


**Fig 5. Forward Characteristic of Reverse Diode**

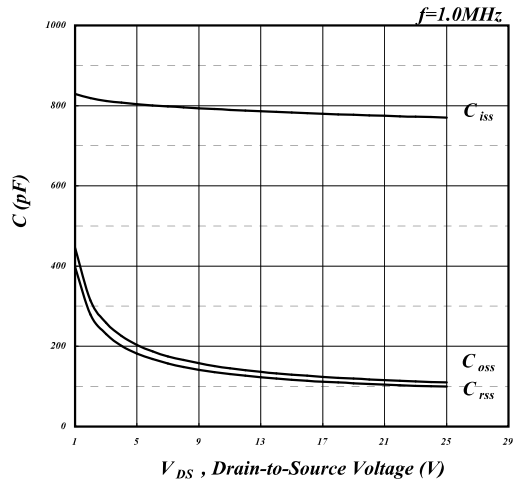


**Fig 6. Gate Threshold Voltage v.s. Junction Temperature**

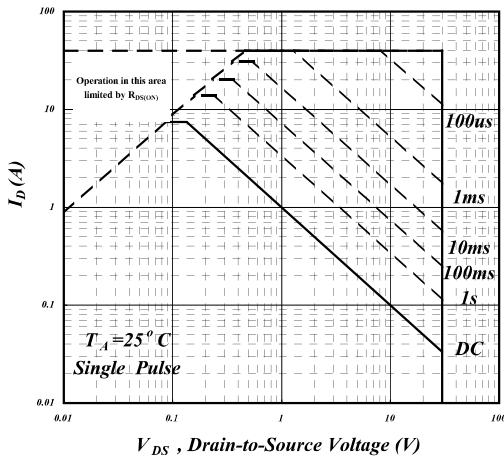
**AP3020**  
**N-Channel Power MOSFET**



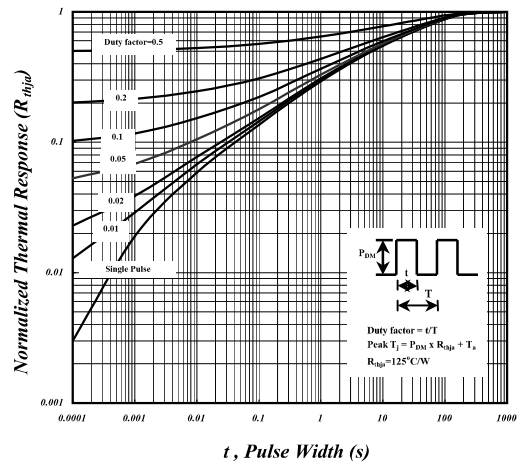
**Fig 7. Gate Charge Characteristics**



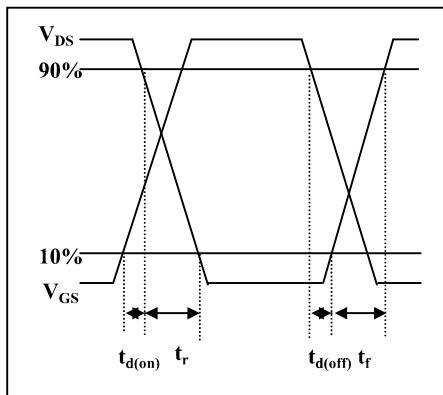
**Fig 8. Typical Capacitance Characteristics**



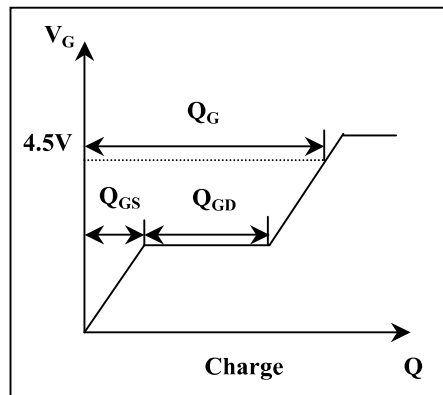
**Fig 9. Maximum Safe Operating Area**



**Fig 10. Effective Transient Thermal Impedance**



**Fig 11. Switching Time Waveform**

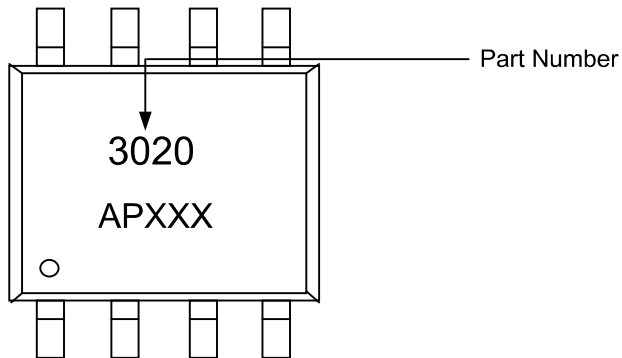


**Fig 12. Gate Charge Waveform**

# AP3020

## N-Channel Power MOSFET

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