

## Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	$I_D$
30V	1.9mΩ@10V	100A
	3mΩ@4.5V	



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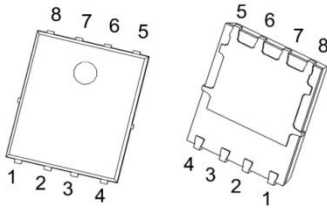
## Feature

- Fast Switching
- Low Gate Charge and Rds on
- 100% Single Pulse avalanche energy Test

## Applications

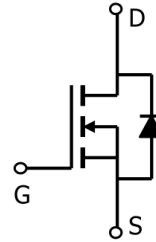
- DC-DC Converter
- Ideal for high-frequency switching and synchronous rectification

## Package

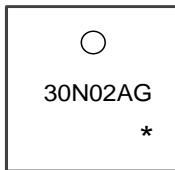


PDFN5X6-8L

## Circuit diagram



## Marking



30N02AG =Device Code  
\* =Month Code

## Order Information

Device	Package	Unite/Tape
SP30N02AGNK	PDFN5 × 6-8L	5000

**Absolute maximum ratings (Ta=25°C, unless otherwise noted)**

Parameter	Symbol	Rating	Units
Drain-Source Voltage	V <sub>DS</sub>	30	V
Gate-Source Voltage	V <sub>GS</sub>	±20	V
Continuous Drain Current <sup>1</sup> (T <sub>C</sub> =25°C)	I <sub>D</sub>	100	A
Pulsed Drain Current <sup>2</sup>	I <sub>DM</sub>	400	A
Single Pulse Avalanche Energy <sup>3</sup>	E <sub>AS</sub>	405	mJ
Total Power Dissipation <sup>4</sup> (T <sub>C</sub> =25°C)	P <sub>D</sub>	85	W
Thermal Resistance Junction-Case <sup>1</sup>	R <sub>θJC</sub>	1.47	°C/W
Storage Temperature Range	T <sub>STG</sub>	-55 to 150	°C
Operating Junction Temperature Range	T <sub>J</sub>	-55 to 150	°C

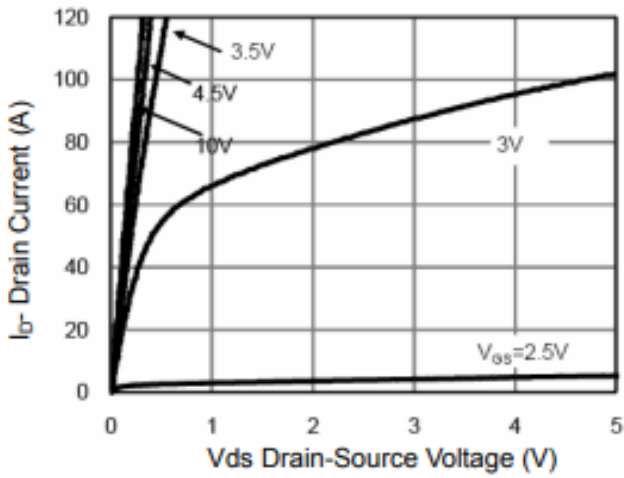
**Electrical characteristics (Ta=25°C, unless otherwise noted)**

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
<b>Static Characteristics</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V , I <sub>D</sub> =250uA	30	---	---	V
Drain-Source Leakage Current	I <sub>DSS</sub>	V <sub>DS</sub> =24V , V <sub>GS</sub> =0V , T <sub>J</sub> =25°C	---	---	1	uA
Gate-Source Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =±20V , V <sub>DS</sub> =0V	---	---	±100	nA
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250uA	1	1.8	2.5	V
Static Drain-Source On-Resistance <sup>2</sup>	R <sub>DS(ON)</sub>	V <sub>GS</sub> =10V , I <sub>D</sub> =20A	---	1.9	2.5	mΩ
		V <sub>GS</sub> =4.5V , I <sub>D</sub> =20A	---	3.0	4.5	
<b>Dynamic characteristics</b>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =15V , V <sub>GS</sub> =0V , f=1MHz	---	2190	---	pF
Output Capacitance	C <sub>oss</sub>		---	770	---	
Reverse Transfer Capacitance	C <sub>rss</sub>		---	16	---	
<b>Switching Characteristics</b>						
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =15V , V <sub>GS</sub> =10V , I <sub>D</sub> =20A	---	36	---	nC
Gate-Source Charge	Q <sub>gs</sub>		---	6.5	---	
Gate-Drain Charge	Q <sub>gd</sub>		---	5.5	---	
Turn-On Delay Time	T <sub>d(on)</sub>	V <sub>DD</sub> =15V , V <sub>GS</sub> =10V , R <sub>G</sub> =1.6Ω, I <sub>D</sub> =20A	---	7	---	ns
Rise Time	T <sub>r</sub>		---	4.5	---	
Turn-Off Delay Time	T <sub>d(off)</sub>		---	34	---	
Fall Time	T <sub>f</sub>		---	8	---	
<b>Diode Characteristics</b>						
Diode Forward Voltage <sup>2</sup>	V <sub>SD</sub>	V <sub>GS</sub> =0V , I <sub>S</sub> =20A , T <sub>J</sub> =25°C	---	---	1.2	V

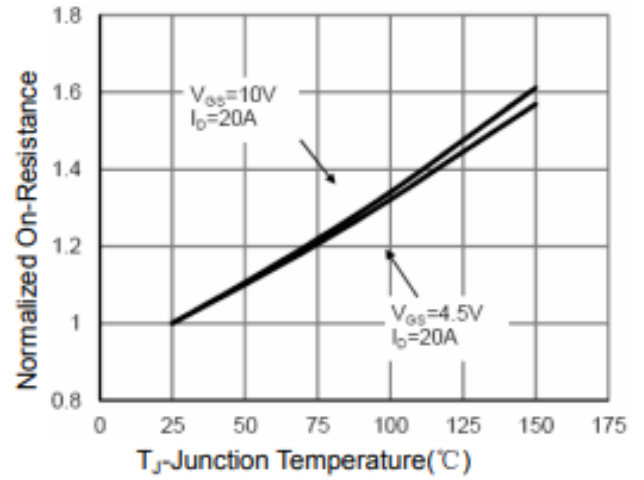
**Note :**

- The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2OZ copper.
- The data tested by pulsed , pulse width ≅ 300us , duty cycle ≅ 2%
- The EAS data shows Max. rating . The test condition is V<sub>DD</sub>=15V, V<sub>GS</sub>=10V, L=0.5mH, R<sub>G</sub>=25Ω

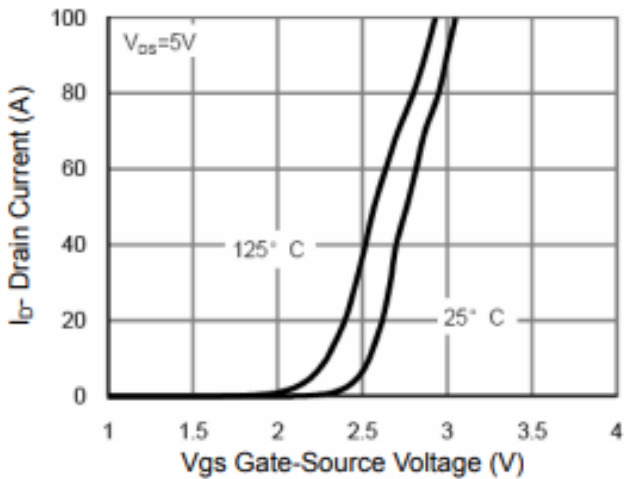
**Typical Characteristics**



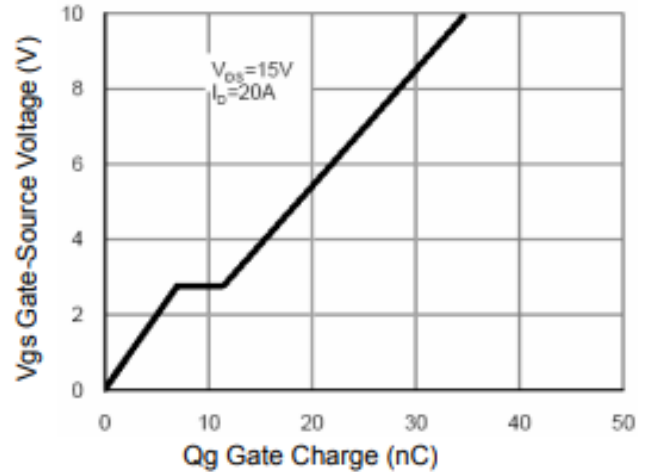
**Figure 1 Output Characteristics**



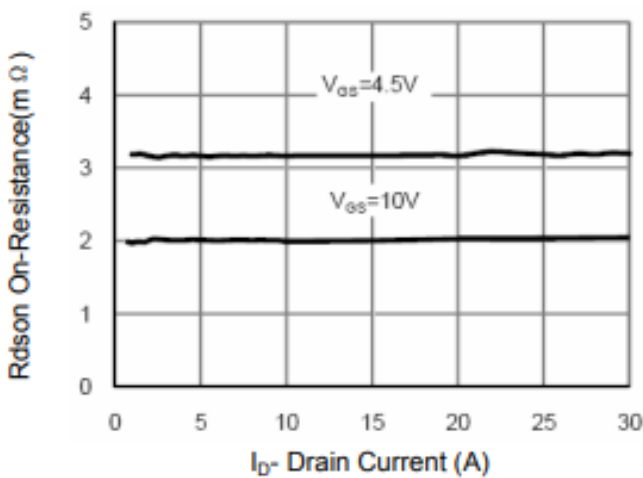
**Figure 4  $R_{dson}$ -Junction Temperature**



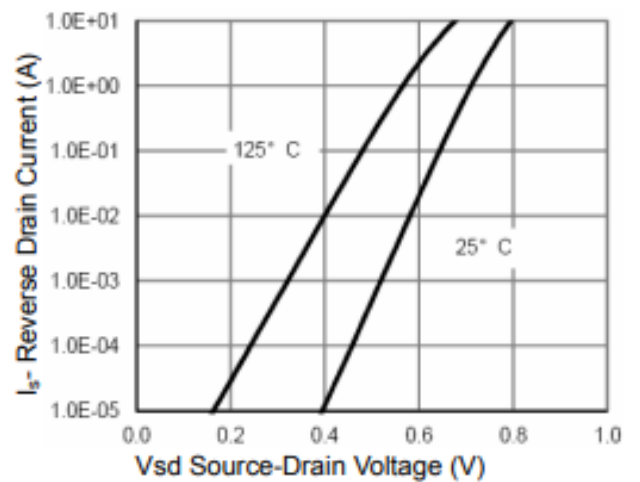
**Figure 2 Transfer Characteristics**



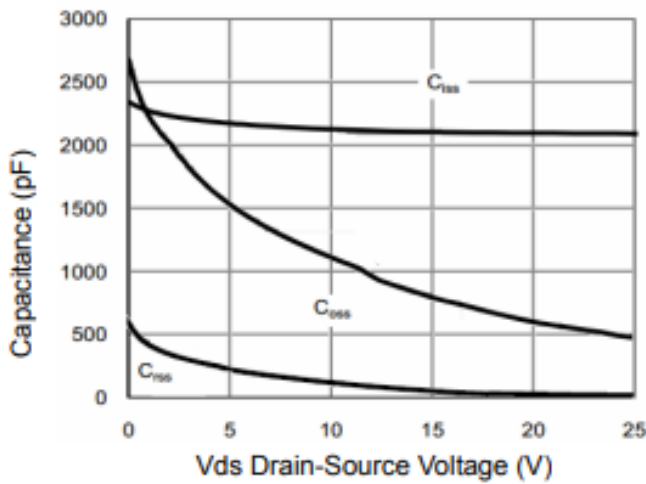
**Figure 5 Gate Charge**



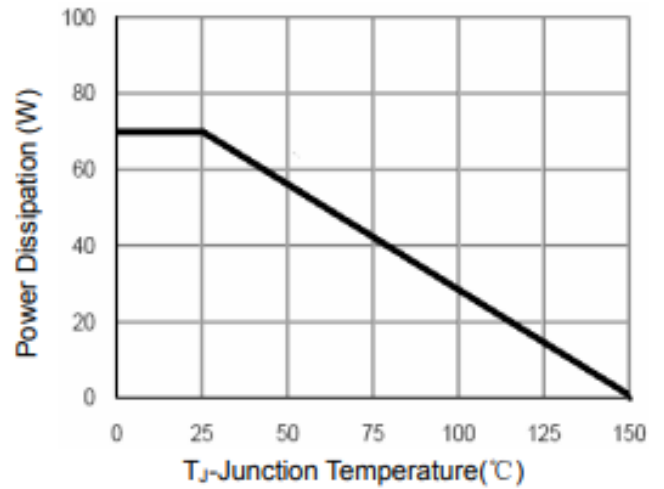
**Figure 3  $R_{dson}$ - Drain Current**



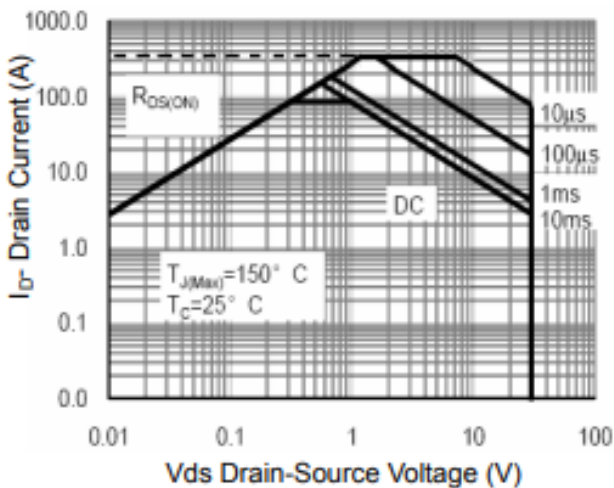
**Figure 6 Source- Drain Diode Forward**



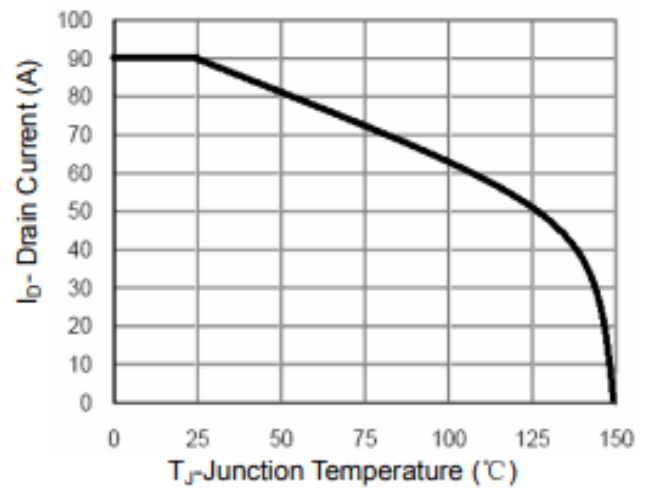
**Figure 7 Capacitance vs Vds**



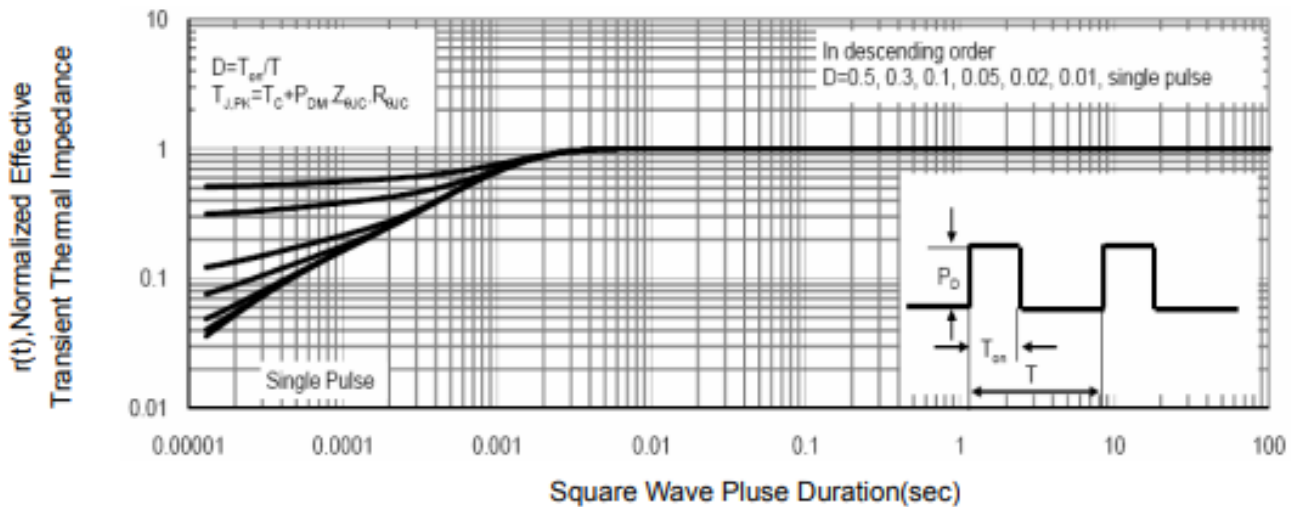
**Figure 9 Power De-rating**



**Figure 8 Safe Operation Area**



**Figure 10 Current De-rating**



**Figure 11 Normalized Maximum Transient Thermal Impedance**

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