

## Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	$I_D$
30V	6mΩ@10V	35A
	9.4mΩ@4.5V	



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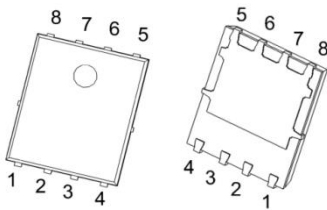
## Feature

- Fast Switching
- Low Gate Charge and R<sub>ds(on)</sub>
- Low Reverse transfer capacitances
- 100% Single Pulse avalanche energy Test

## Applications

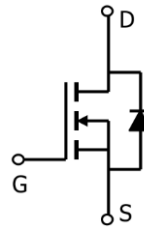
- Power switching application
- Isolated DC/DC Converters in Telecom and Industrial

## Package

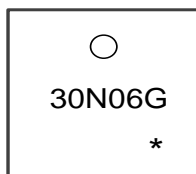


PDFNWB5X6-8L

## Circuit diagram



## Marking



30N06G =Device Code  
\* =Month Code

## Order Information

Device	Package	Unite/Tape
SP30N06GNK	PDFN5 × 6-8L	5000

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

Parameter	Symbol	Rating	Units
Drain-Source Voltage	$V_{DS}$	30	V
Gate-Source Voltage	$V_{GS}$	±20	V
Continuous Drain Current, VGS @ 10V <sup>1</sup>	$I_{D@TC=25^{\circ}C}$	35	A
Pulsed Drain Current <sup>2</sup>	$I_{DM}$	140	A
Single Pulse Avalanche Energy <sup>3</sup>	$E_{AS}$	39.2	mJ
Avalanche Current	$I_{AS}$	28	A
Total Power Dissipation <sup>4</sup>	$P_D@TC=25^{\circ}C$	28	W
Thermal Resistance Junction-Case <sup>1</sup>	$R_{\theta JC}$	4.5	°C/W
Storage Temperature Range	$T_{STG}$	-55 to 150	°C
Operating Junction Temperature Range	$T_J$	-55 to 150	°C

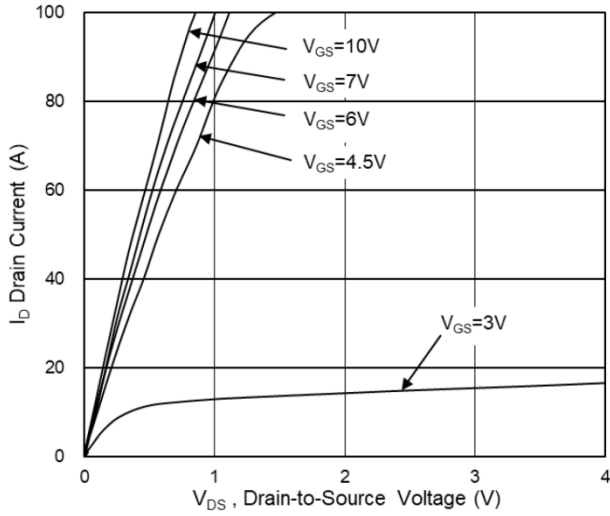
**Electrical characteristics (Ta=25°C, unless otherwise noted)**

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
<b>Static Characteristics</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	VGS=0V, ID=250uA	30	---	---	V
Drain-Source Leakage Current	$I_{DSS}$	VDS=30V, VGS=0V, TJ=25°C	---	---	1	uA
Drain-Source Leakage Current	$I_{DSS}$	VDS=30V, VGS=0V, TJ=55°C	---	---	5	uA
Gate-Source Leakage Current	$I_{GSS}$	VGS=±20V, VDS=0V	---	---	±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	VGS=VDS, ID=250uA	1.2	1.7	2.2	V
Static Drain-Source On-Resistance <sup>2</sup>	$R_{DS(on)}$	VGS=10V, ID=12A	---	6	8	mΩ
		VGS=4.5V, ID=12A	---	9.4	11	
Gate Resistance	$R_g$	VDS=0V, VGS=0V, f=1MHz	0.8	1.7	2.6	Ω
<b>Dynamic Characteristics</b>						
Forward Transconductance	$g_{fs}$	VDS=5V, ID=12A	---	55	---	S
Total Gate Charge (4.5V)	$Q_g$	VDS=15V, VGS=10V, ID=12A	---	7.1	---	nC
Gate-Source Charge	$Q_{gs}$		---	2.2	---	
Gate-Drain Charge	$Q_{gd}$		---	3.1	---	
Input Capacitance	$C_{iss}$		VDS=15V, VGS=0V, f=1MHz	---	693	
Output Capacitance	$C_{oss}$	---		332	---	
Reverse Transfer Capacitance	$C_{rss}$	---		34	---	
<b>Switching Characteristics</b>						
Turn-On Delay Time	$T_{d(on)}$	VDD=15V, VGS=10V, RG=3Ω, ID=12A	---	7	---	ns
Rise Time	$T_r$		---	18.8	---	
Turn-Off Delay Time	$T_{d(off)}$		---	19.5	---	
Fall Time	$T_f$		---	3.4	---	
<b>Source-Drain Diode Characteristics</b>						
Continuous Source Current <sup>1,5</sup>	$I_S$	VG=VD=0V, Force Current	---	---	12	A
Diode Forward Voltage <sup>2</sup>	$V_{SD}$	VGS=0V, IS=1A, TJ=25°C	---	---	1	V

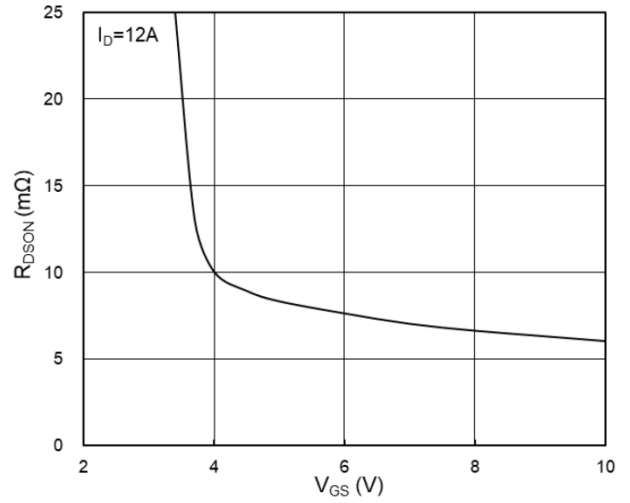
Note :

- The data tested by surface mounted on a 1 inch2 FR-4 board with 20Z copper.
- The data tested by pulsed , pulse width  $\leq 300\mu s$  , duty cycle  $\leq 2\%$
- The EAS data shows Max. rating . The test condition is VDD=25V,VGS=10V,L=0.1mH,IAS=28A
- The power dissipation is limited by 150°C junction temperature
- The data is theoretically the same as ID and IDM , in real applications , should be limited by total power dissipation.

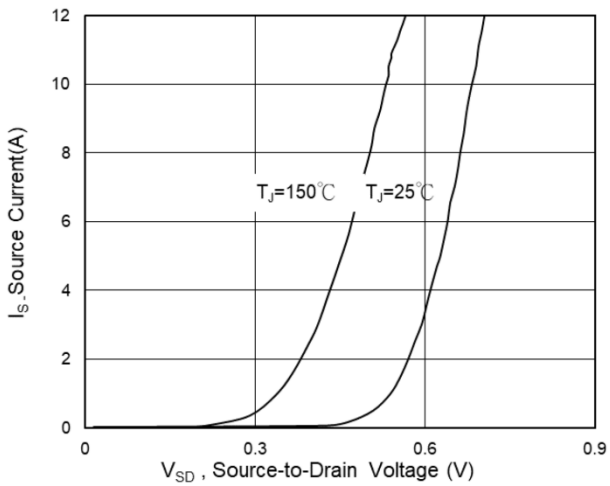
**Typical Characteristics**



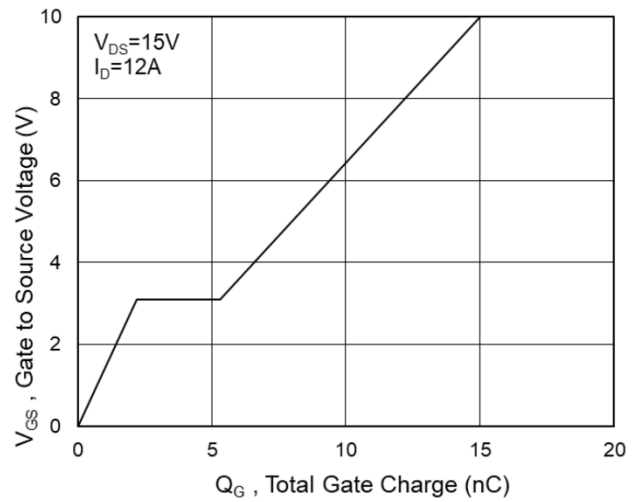
**Typical Output Characteristics**



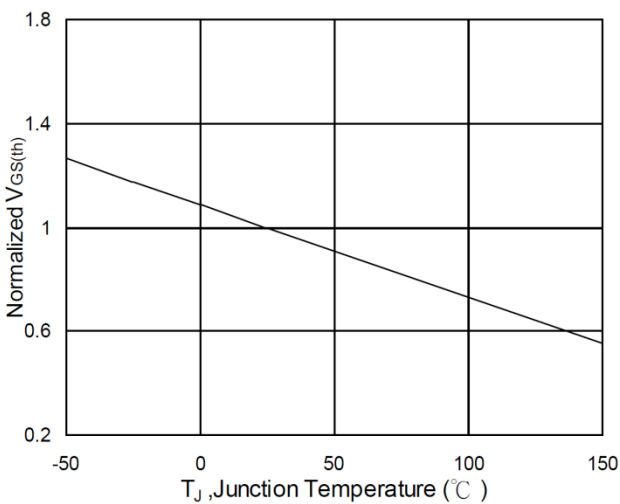
**On-Resistance vs G-S Voltage**



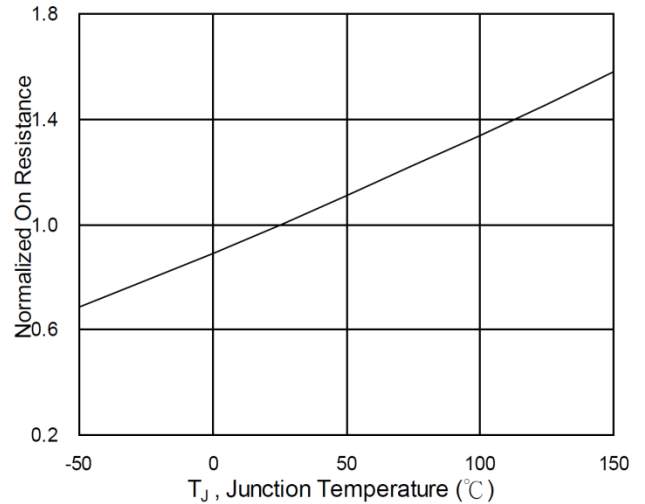
**Source Drain Forward Characteristics**



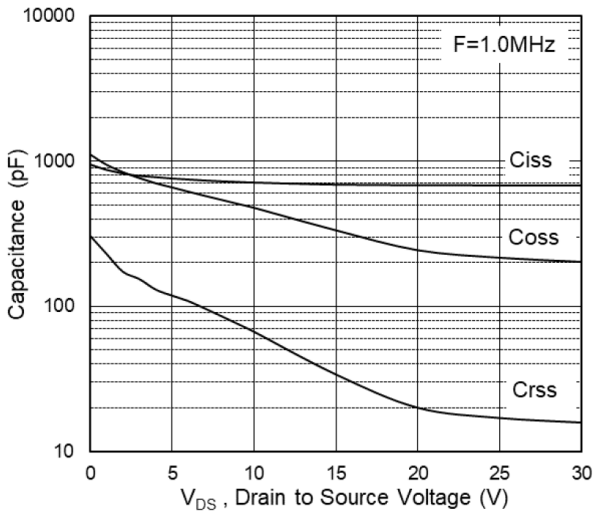
**Gate-Charge Characteristics**



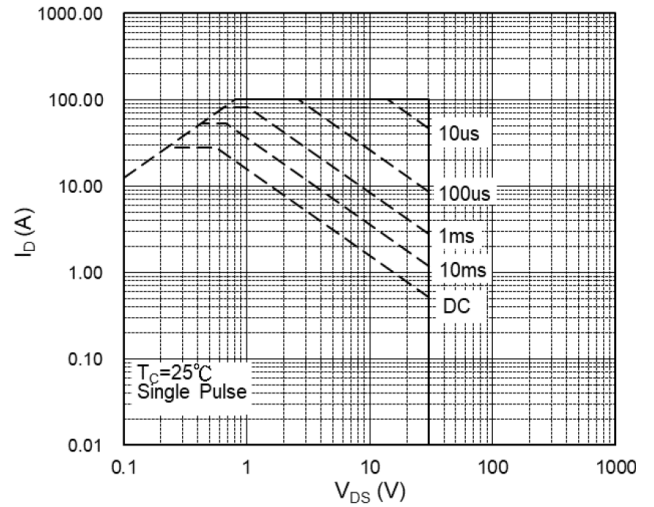
**Normalized  $V_{GS(th)}$  vs  $T_J$**



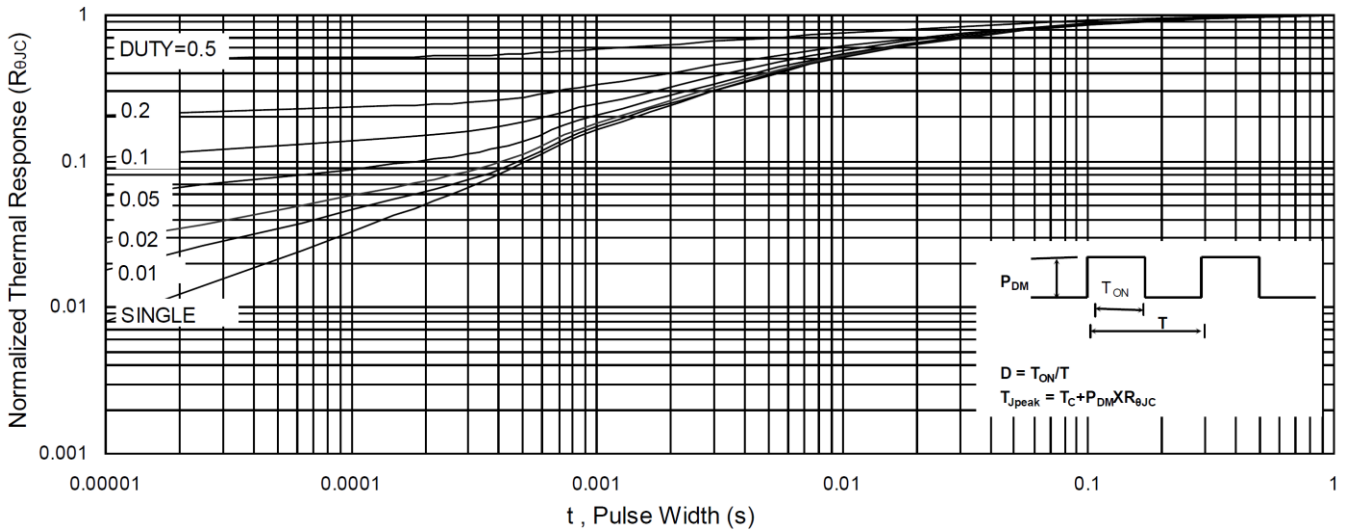
**Normalized  $R_{DS(ON)}$  vs  $T_J$**



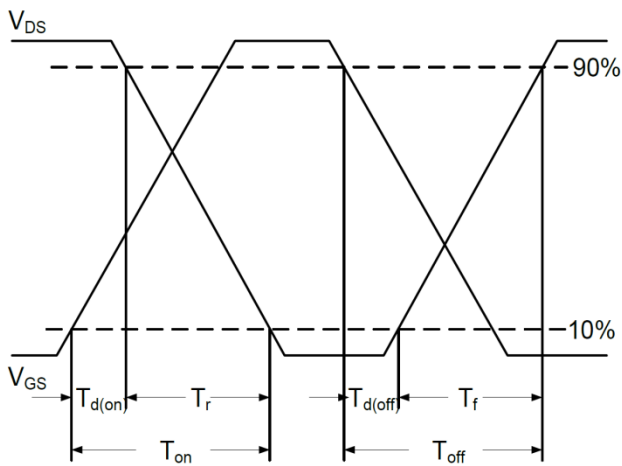
Capacitance



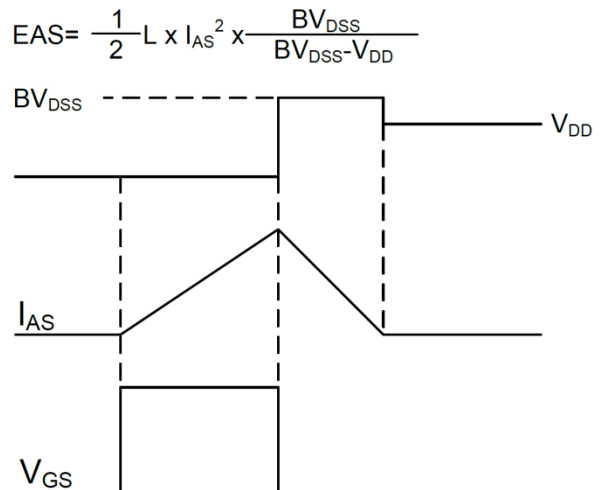
Safe Operating Area



Normalized Maximum Transient Thermal Impedance

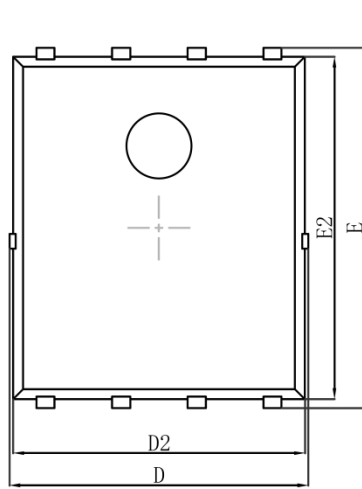


Switching Time Waveform

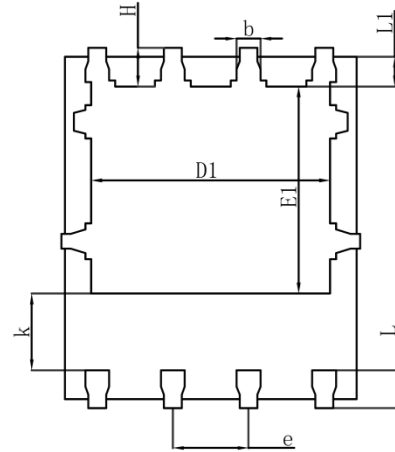


Unclamped Inductive Switching Waveform

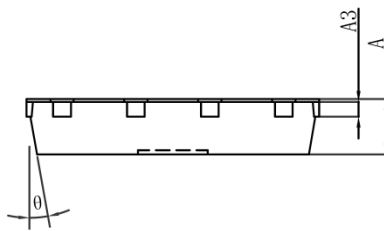
**PDFN5X6-8L Package Information**



Top View  
[顶视图]



Bottom View  
[背视图]



Side View  
[侧视图]

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.000	0.035	0.039
A3	0.254REF.		0.010REF.	
D	4.944	5.096	0.195	0.201
E	5.974	6.126	0.235	0.241
D1	3.910	4.110	0.154	0.162
E1	3.375	3.575	0.133	0.141
D2	4.824	4.976	0.190	0.196
E2	5.674	5.826	0.223	0.229
k	1.190	1.390	0.047	0.055
b	0.350	0.450	0.014	0.018
e	1.270TYP.		0.050TYP.	
L	0.559	0.711	0.022	0.028
L1	0.424	0.576	0.017	0.023
H	0.574	0.726	0.023	0.029
θ	10°	12°	10°	12°

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