

### Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	$I_D$
60V	13mΩ@10V	18A
	16mΩ@4.5V	



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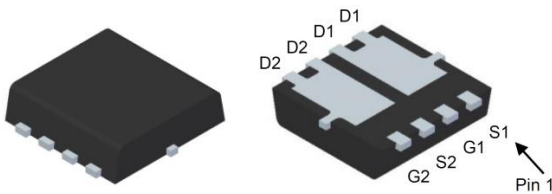
### Feature

- Fast switching speed
- Surface mount package
- Reliable and Rugged
- ROHS Compliant & Halogen-Free

### Applications

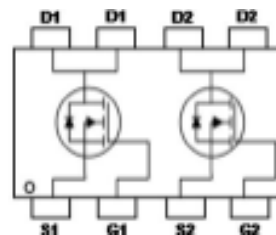
- DC-DC Converters.
- Motor Control.

### Package

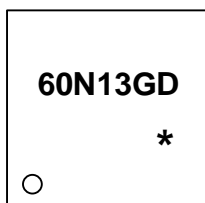


PDFN3×3-8L

### Circuit diagram



### Marking



60N13GD =Device Code  
\* =Month Code

### Order Information

Device	Package	Unite/Tape
SP60N13GDNJ	PDFN3 × 3-8L	5000

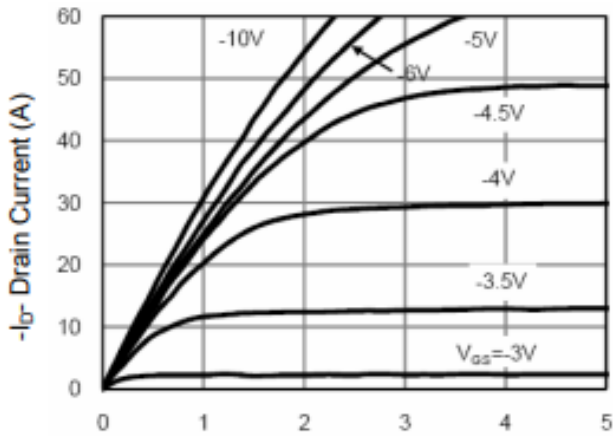
**Absolute maximum ratings (Ta=25°C unless otherwise noted)**

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V <sub>DSS</sub>	60	V
Gate-Source Voltage	V <sub>GSS</sub>	±20	V
Continuous Drain Current(Tc=25°C)	I <sub>D</sub>	18	A
Pulse Drain Current Tested	I <sub>DM</sub>	72	A
Maximum Power Dissipation(Tc=25°C)	P <sub>D</sub>	50	W
Thermal Resistance-Junction to Case	R <sub>θJC</sub>	2.5	°C/W
Maximum Junction Temperature	T <sub>J</sub>	-55 to 150	°C
Storage Temperature Range	T <sub>STG</sub>	-55 to 150	°C

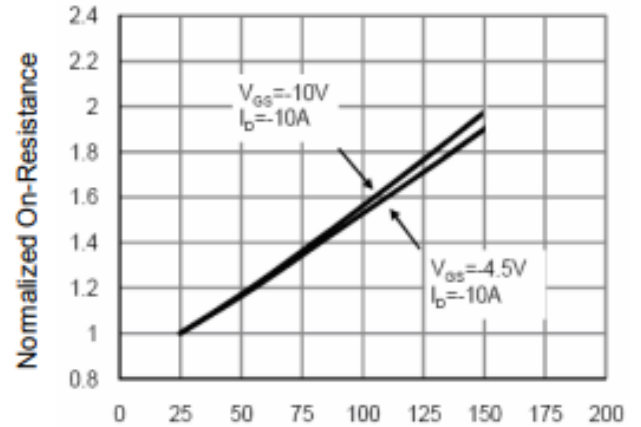
**Electrical characteristics (Ta=25°C, unless otherwise noted)**

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
<b>Static Electrical Characteristics</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	VGS=0V, ID=250mA	60	-	-	V
Zero Gate Voltage Drain Current	IDSS	VDS=60V, VGS=0V	-	-	1	uA
Gate Leakage Current	IGSS	VGS=±20V, VDS=0V	-	-	±100	nA
Gate Threshold Voltage	VGS(th)	VDS=VGS, ID=250uA	1.0	1.8	2.5	V
Drain-Source On-state Resistance	R <sub>DS(ON)</sub>	VGS=10V, ID=10A	-	13	16	mΩ
		VGS=4.5V, ID=10A	-	16	21	
<b>Dynamic and Switching Characteristics</b>						
Input Capacitance	C <sub>iss</sub>	VGS=0V, VDS=30V, F=1MHz	-	426	-	pF
Output Capacitance	C <sub>oss</sub>		-	103	-	
Reverse Transfer Capacitance	C <sub>rss</sub>		-	8	-	
Turn-on Delay Time	t <sub>d(ON)</sub>	VDD=30V, ID=10A, VGS=10V, R <sub>G</sub> =1.6Ω	-	8	-	nS
Turn-on Rise Time	t <sub>r</sub>		-	5	-	
Turn-off Delay Time	t <sub>d(OFF)</sub>		-	24	-	
Turn-off Fall Time	t <sub>f</sub>		-	3.5	-	
Total Gate Charge	Q <sub>g</sub>	VDS=30V, VGS=10V, ID=10A	-	35	-	nC
Gate-Source Charge	Q <sub>gs</sub>		-	6.4	-	
Gate-Drain Charge	Q <sub>gd</sub>		-	3.5	-	
<b>Source-Drain Characteristics</b>						
Diode Forward Voltage	V <sub>SD</sub>	IS=1A, VGS=0V	-	-	1.2	V

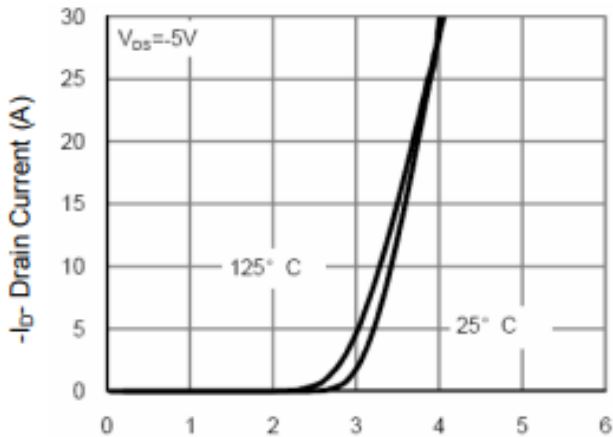
**Typical Characteristics**



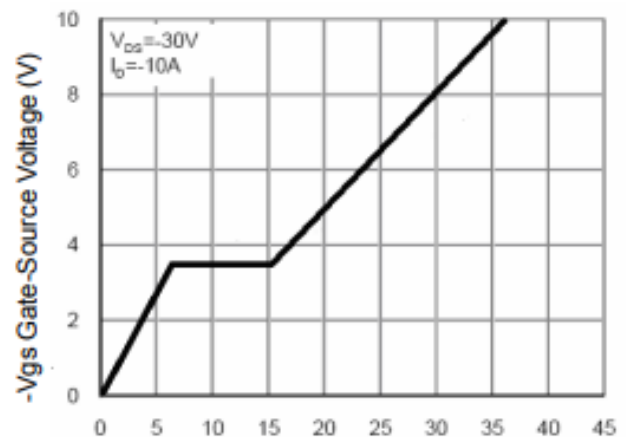
**Output Characteristics**



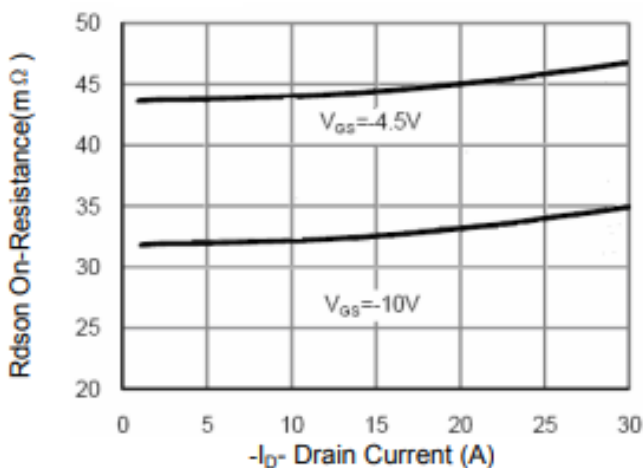
**Rdson-Junction Temperature**



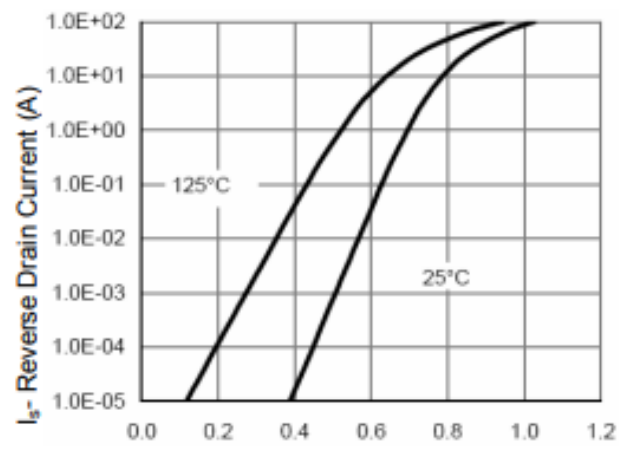
**Transfer Characteristics**



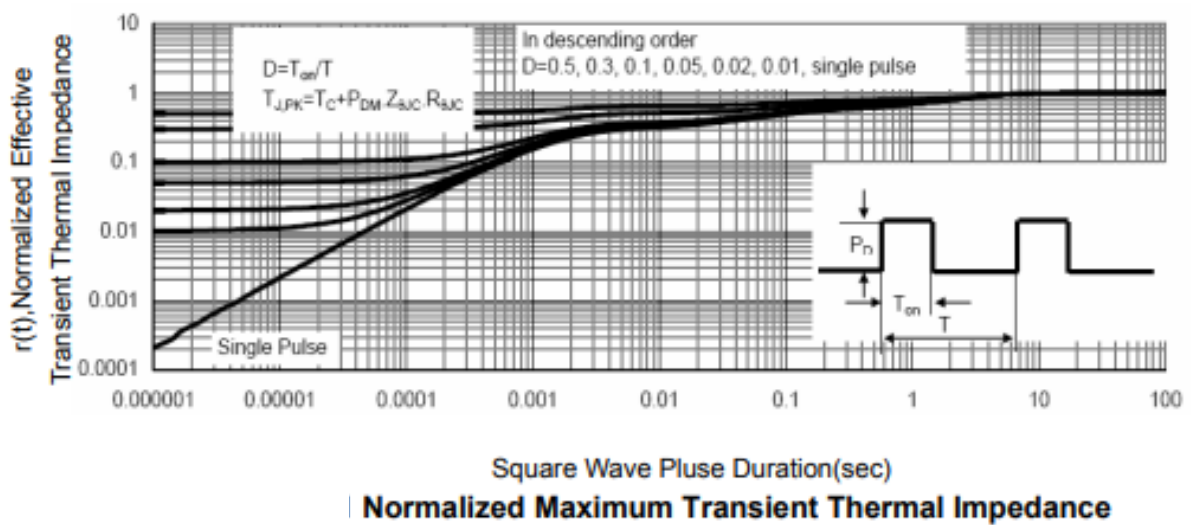
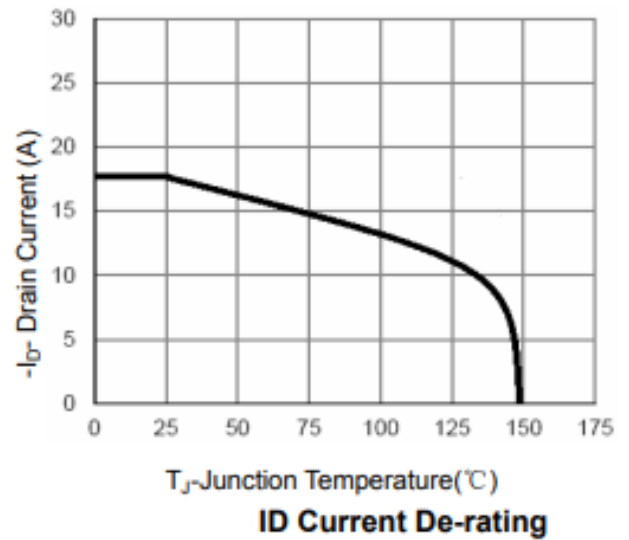
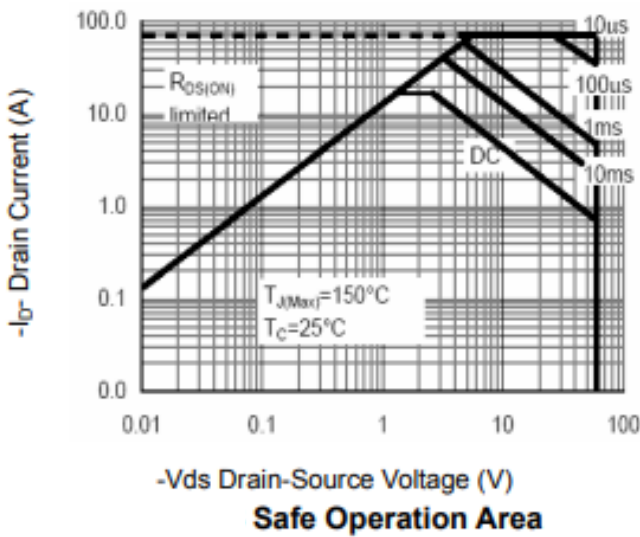
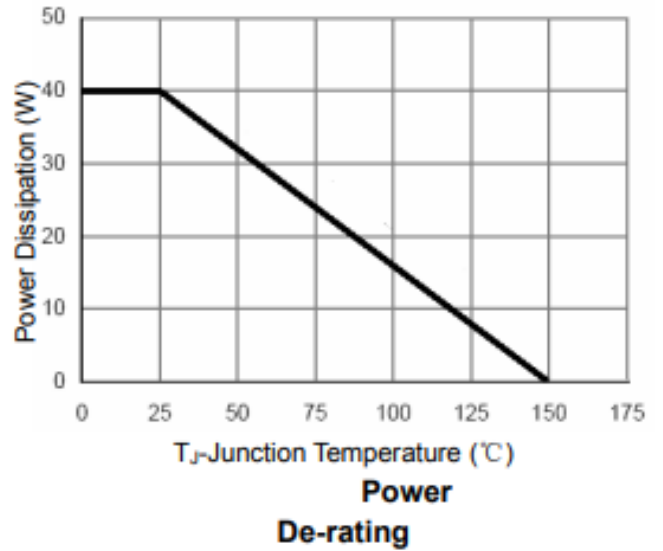
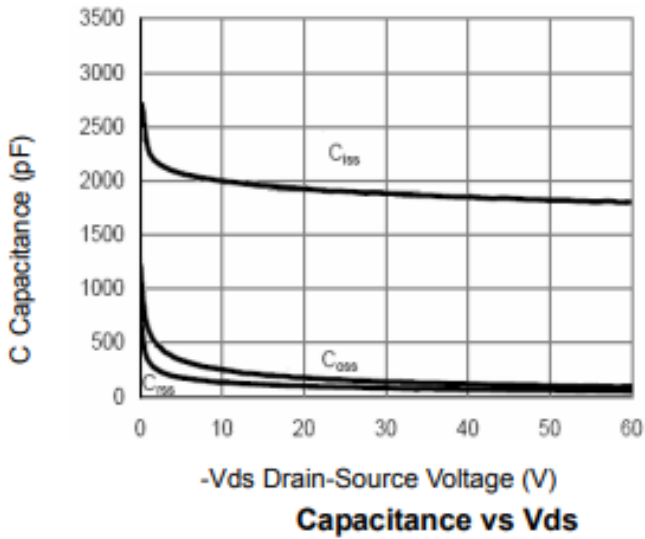
**Gate Charge**



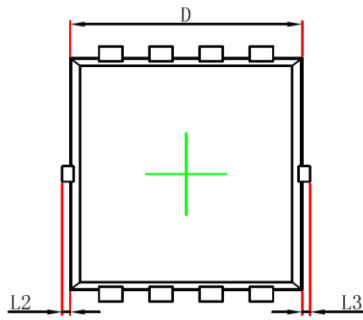
**Rdson- Drain Current**



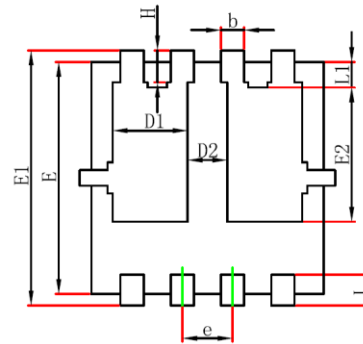
**Source- Drain Diode Forward**



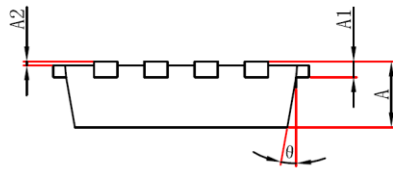
**PDFN3×3-8L Package Information**



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	0.650	0.850	0.026	0.033
A1	0.152 REF.		0.006 REF.	
A2	0~0.05		0~0.002	
D	2.900	3.100	0.114	0.122
D1	0.935	1.135	0.037	0.045
D2	0.280	0.480	0.011	0.019
E	2.900	3.100	0.114	0.122
E1	3.150	3.450	0.124	0.136
E2	1.535	1.935	0.060	0.076
b	0.200	0.400	0.008	0.016
e	0.550	0.750	0.022	0.030
L	0.300	0.500	0.012	0.020
L1	0.180	0.480	0.007	0.019
L2	0~0.100		0~0.004	
L3	0~0.100		0~0.004	
H	0.315	0.515	0.012	0.020
θ	9°	13°	9°	13°

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