



# SPN8668

## N-Channel Enhancement Mode MOSFET

### DESCRIPTION

The SPN8668 is the N-Channel logic enhancement mode power field effect transistors are produced using high cell density, DMOS trench technology.

This high density process is especially tailored to minimize on-state resistance.

These devices are particularly suited for low voltage application, notebook computer power management and other battery powered circuits where high efficiency and fast switching is required.

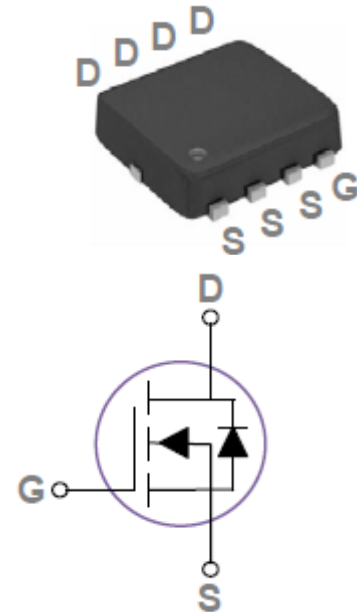
### FEATURES

- ◆ 60V/33A,  $R_{DS(ON)}=21m\Omega@V_{GS}=10V$
- ◆ 60V/8A,  $R_{DS(ON)}=24m\Omega@V_{GS}=4.5V$
- ◆ Super high density cell design for extremely low  $R_{DS(ON)}$
- ◆ Exceptional on-resistance and maximum DC current capability
- ◆ PPAK3x3 package design

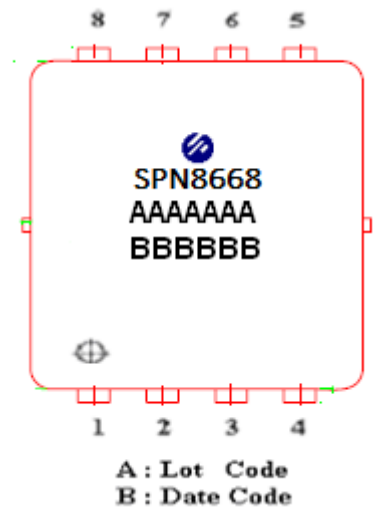
### APPLICATIONS

- Motor Drive
- Power Tools
- LED Lighting

### PIN CONFIGURATION(PPAK3x3)



### PART MARKING





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### PIN DESCRIPTION

Pin	Symbol	Description
1	S	Source
2	S	Source
3	S	Source
4	G	Gate
5	D	Drain
6	D	Drain
7	D	Drain
8	D	Drain

### ORDERING INFORMATION

Part Number	Package	Part Marking
SPN8668DN8RGB	PPAK3x3	SPN8668

※ SPN8668DN8RGB : 13" Tape Reel ; Pb – Free; Halogen - Free

### ABSOLUTE MAXIMUM RATINGS

(TA=25°C Unless otherwise noted)

Parameter	Symbol	Typical	Unit	
Drain-Source Voltage	V <sub>DSS</sub>	60	V	
Gate –Source Voltage	V <sub>GSS</sub>	±20	V	
Continuous Drain Current(T <sub>J</sub> =150°C)	I <sub>D</sub>	T <sub>C</sub> =25°C	12	A
		T <sub>C</sub> =100°C	8.5	
Pulsed Drain Current	I <sub>DM</sub>	132	A	
Continuous Source Current(Diode Conduction)	I <sub>S</sub>	33	A	
Power Dissipation	P <sub>D</sub>	7	W	
Operating Junction Temperature	T <sub>J</sub>	-55/150	°C	
Storage Temperature Range	T <sub>STG</sub>	-55/150	°C	
Thermal Resistance-Junction to Ambient	R <sub>θJA</sub>	62	°C/W	
Thermal Resistance-Junction to Case	R <sub>θJC</sub>	2.8	°C/W	



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### ELECTRICAL CHARACTERISTICS

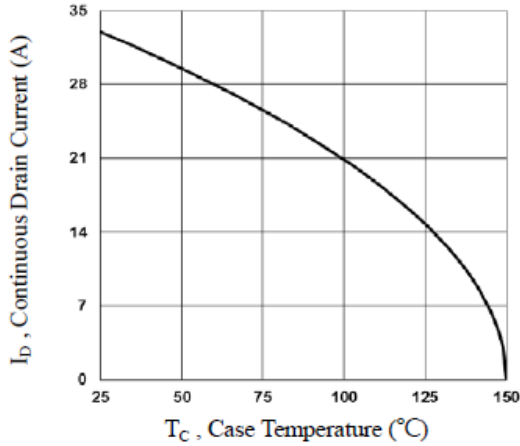
(TA=25°C Unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ	Max.	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250uA	60			V
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>DS</sub> =25uA	1.2	1.8	2.2	
Gate Leakage Current	I <sub>GSS</sub>	V <sub>DS</sub> =0V, V <sub>GS</sub> =±20V			±100	nA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =60V, V <sub>GS</sub> =0V, T <sub>J</sub> =25°C			1	uA
		V <sub>DS</sub> =48V, V <sub>GS</sub> =0V, T <sub>J</sub> =125°C			10	
Drain-Source On-Resistance	R <sub>DSS(on)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =15A		17	21	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =8A		20	24	
Forward Transconductance	g <sub>fs</sub>	V <sub>DS</sub> =10V, I <sub>D</sub> =10A		9		S
Diode Forward Voltage	V <sub>SD</sub>	I <sub>F</sub> =1A, V <sub>GS</sub> =0V			1	V
<b>Dynamic</b>						
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =30V, V <sub>GS</sub> =10V, I <sub>D</sub> =15A		28	42	nC
Gate-Source Charge	Q <sub>gs</sub>			3.5	7	
Gate-Drain Charge	Q <sub>gd</sub>			6.5	10	
Input Capacitance	C <sub>iss</sub>	V <sub>GS</sub> =0V, V <sub>DS</sub> =20V, F=1MHz		1680	2440	pF
Output Capacitance	C <sub>oss</sub>			115	170	
Reverse Transfer Capacitance	C <sub>rss</sub>			85	125	
Turn-On Time	t <sub>d(on)</sub>	(V <sub>DD</sub> =30V, I <sub>D</sub> =-1A, V <sub>GEN</sub> =10V, R <sub>G</sub> =6Ω)		7.2	14	ns
	t <sub>r</sub>			38	72	
Turn-Off Time	t <sub>d(off)</sub>			34	65	
	t <sub>f</sub>			8.2	16	

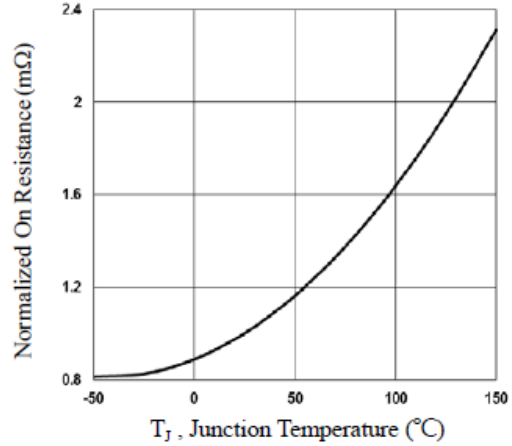


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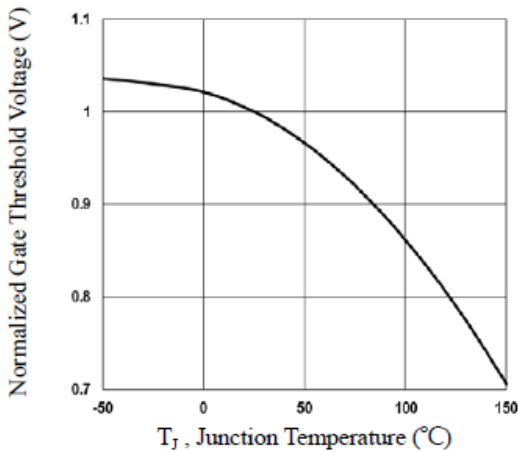
## TYPICAL CHARACTERISTICS



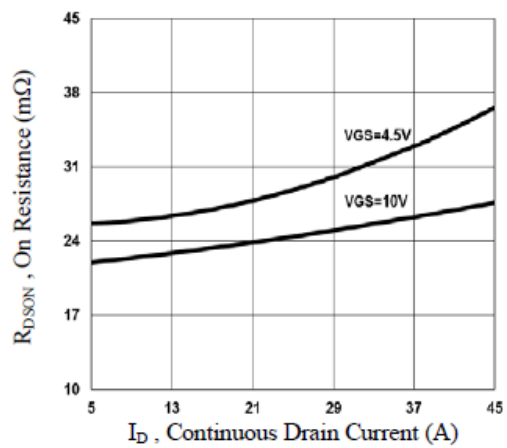
**Fig.1 Continuous Drain Current vs.  $T_C$**



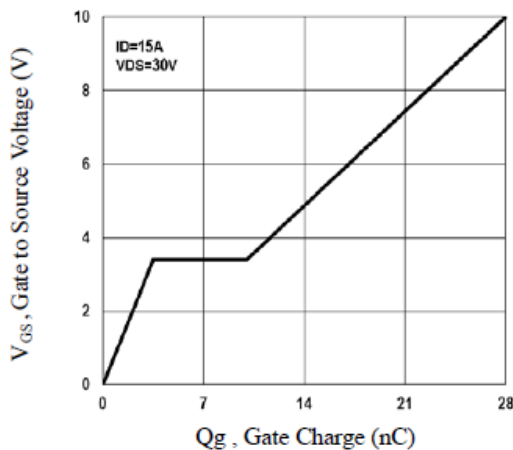
**Fig.2 Normalized  $R_{DSON}$  vs.  $T_J$**



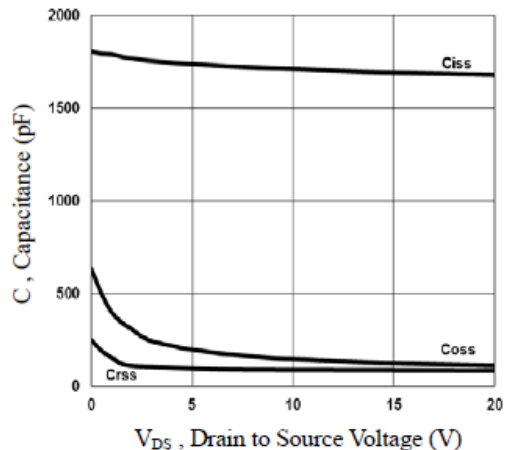
**Fig.3 Normalized  $V_{th}$  vs.  $T_J$**



**Fig.4  $R_{DSON}$  vs. Continuous Drain Current**



**Fig.5 Gate Charge Waveform**

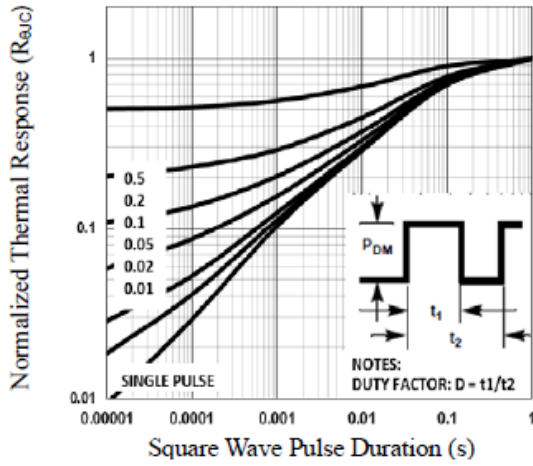


**Fig.6 Capacitance Characteristics**

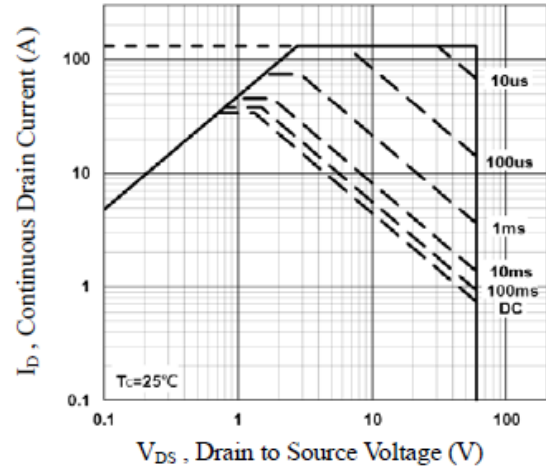


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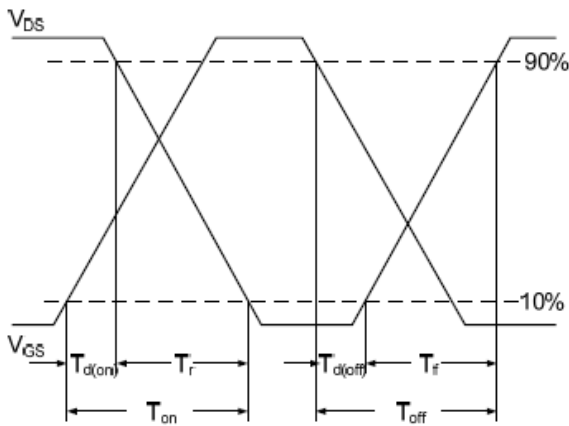
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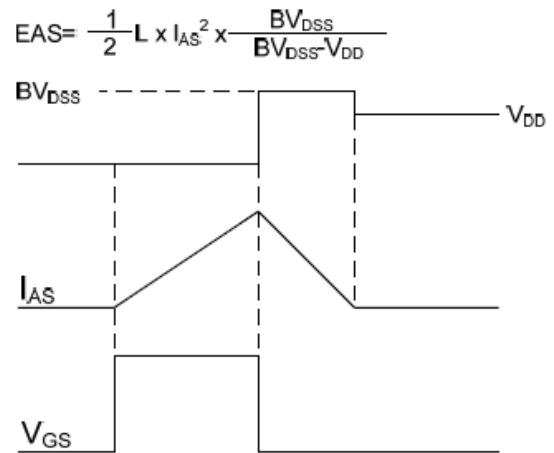
**Fig.7 Normalized Transient Impedance**



**Fig.8 Maximum Safe Operation Area**



**Fig.9 Switching Time Waveform**

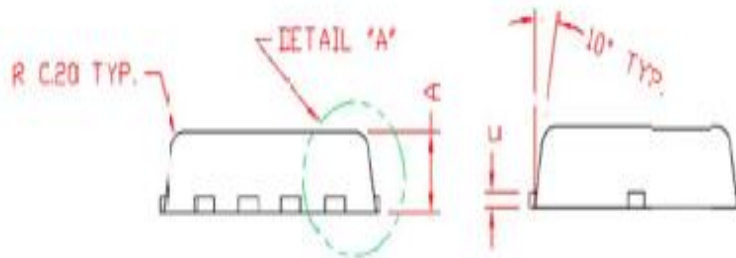
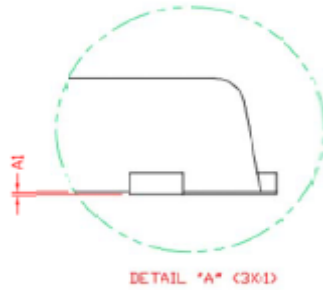
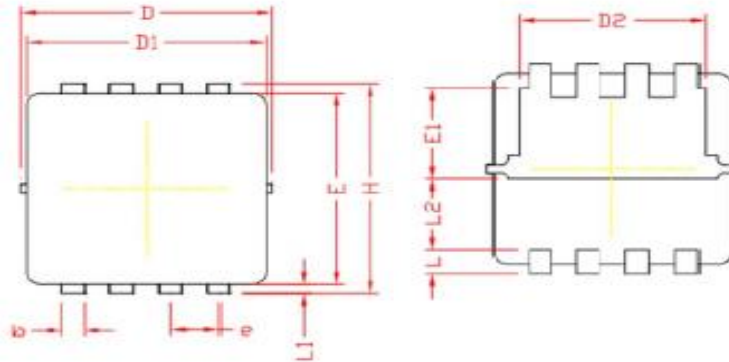


**Fig.10 EAS Waveform**



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## PPAK3x3 PACKAGE OUTLINE



### COMMON DIMENSIONS

(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	0.70	0.80	0.90
A1	0.00	0.03	0.05
b	0.24	0.30	0.35
c	0.10	0.15	0.20
D	3.25	3.32	3.40
D1	3.05	3.15	3.25
D2	2.40	2.50	2.60
E	3.00	3.10	3.20
E1	1.35	1.45	1.55
e	0.65 BSC.		
H	3.20	3.30	3.40
L	0.30	0.40	0.50
L1	0.10	0.15	0.20
L2	1.13 REF.		



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