



# SPN8830

## N-Channel Enhancement Mode MOSFET

### DESCRIPTION

The SPN8830 is the N-Channel logic enhancement mode power field effect transistors are produced using high cell density, DMOS trench technology. The SPN8830 has been designed specifically to improve the overall efficiency of DC/DC converters using either synchronous or conventional switching PWM controllers. It has been optimized for low gate charge, low  $R_{DS(ON)}$  and fast switching speed.

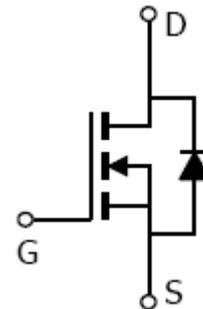
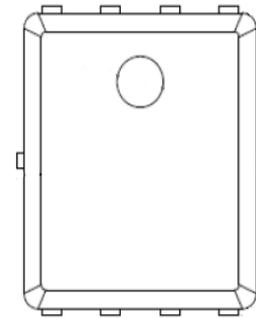
### APPLICATIONS

- High Frequency Synchronous Buck Converter
- DC/DC Power System
- Load Switch

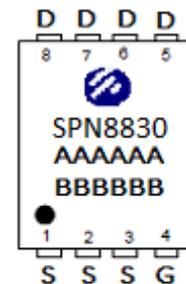
### FEATURES

- ◆ 30V/100A,  $R_{DS(ON)}=1.3m\Omega@V_{GS}=10V$
- ◆ 30V/100A,  $R_{DS(ON)}=2.0m\Omega@V_{GS}=4.5V$
- ◆ Super high density cell design for extremely low  $R_{DS(ON)}$
- ◆ Exceptional on-resistance and maximum DC current capability
- ◆ PPAK5x6-8L package design

### PIN CONFIGURATION(PPAK5x6-8L)



### PART MARKING



A : Lot Code  
 B : Date Code (YY/MM/DD)



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### PPAK5x6-8L 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
SPN8830DN8RGB	PPAK5x6-8L	SPN8830

※ SPN8830DN8RGB : 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>	30	V
Gate –Source Voltage	V <sub>GSS</sub>	±20	V
Continuous Drain Current (Silicon Limited)	I <sub>D</sub>	T <sub>C</sub> =25°C	100
		T <sub>C</sub> =100°C	97
Pulsed Drain Current	I <sub>DM</sub>	350	A
Avalanche Current	I <sub>AS</sub>	25	A
Single Pulse Avalanche Energy (T <sub>C</sub> =25°C, L=0.4mH)	E <sub>AS</sub>	125	mJ
Power Dissipation	P <sub>D</sub>	62.5	W
Operating Junction Temperature	T <sub>J</sub>	-55 to 150	°C
Storage Temperature Range	T <sub>STG</sub>	-55 to 150	°C
Thermal Resistance-Junction to Case	R <sub>θJC</sub>	2.0	°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	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	30			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1.2	1.6	2.2	V
Gate Leakage Current	$I_{GSS}$	$V_{DS}=0V, V_{GS}=\pm 20V$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=24V, V_{GS}=0V, T_J=25^\circ C$			1	uA
		$V_{DS}=24V, V_{GS}=0V, T_J=55^\circ C$			5	
On-State Drain Current	$I_{D(on)}$	$V_{DS}=5V, V_{GS}=10V$			100	A
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=20A$		1.0	1.3	mΩ
		$V_{GS}=4.5V, I_D=20A$		1.7	2.0	
Gate Resistance	$R_G$	$V_{DS}=0V, V_{GS}=0V, f=1MHz$		1.0		Ω
Forward Transconductance	$g_{fs}$	$V_{DS}=5V, I_D=20A$		35		S
Diode Forward Voltage	$V_{SD}$	$I_S=1A, V_{GS}=0V$			1.2	V
<b>Dynamic</b>						
Total Gate Charge(4.5V)	$Q_g$	$V_{DS}=15V, V_{GS}=0V, I_D=20A$		45		
Gate-Source Charge	$Q_{gs}$			9.8		
Gate-Drain Charge	$Q_{gd}$			6.5		
Input Capacitance	$C_{iss}$	$V_{DS}=15V, V_{GS}=0V, f=1MHz$		3420		pF
Output Capacitance	$C_{oss}$			1916		
Reverse Transfer Capacitance	$C_{rss}$			196		
Turn-On Time	$t_{d(on)}$	$V_{DD}=15V, V_{GS}=10V, I_D=20A$ $R_G=3.3\Omega$		10.3		nS
	$t_r$			6.2		
Turn-Off Time	$t_{d(off)}$			56		
	$t_f$			8.4		



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## TYPICAL CHARACTERISTICS

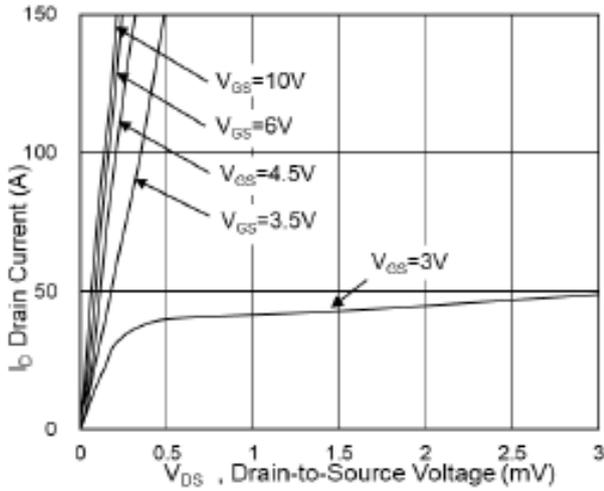


Fig. 1 Typical Output Characteristics

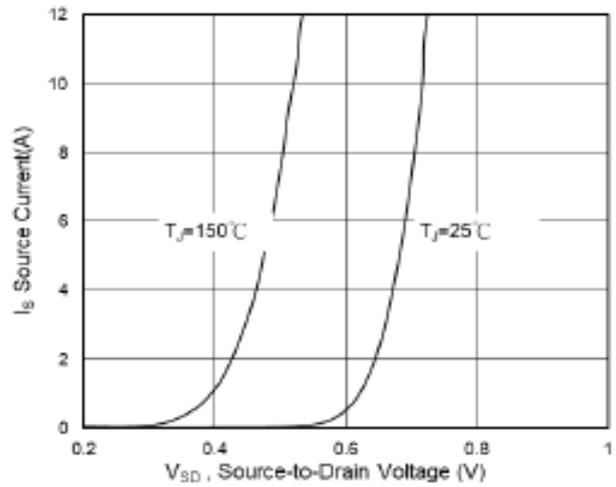


Fig. 2 Source Drain Forward Characteristics

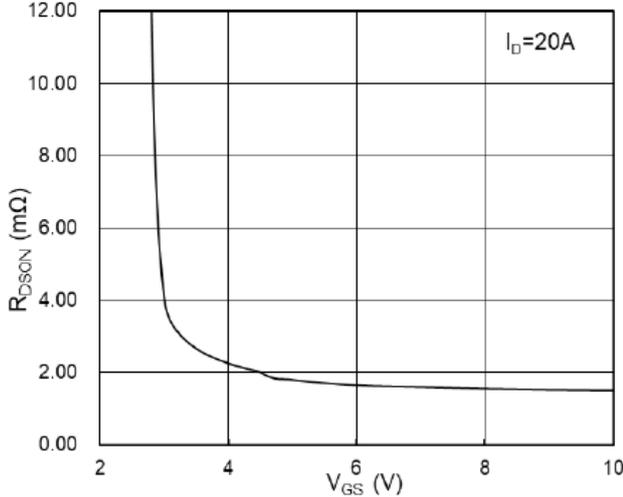


Fig. 3 On-Resistance vs G-S voltage

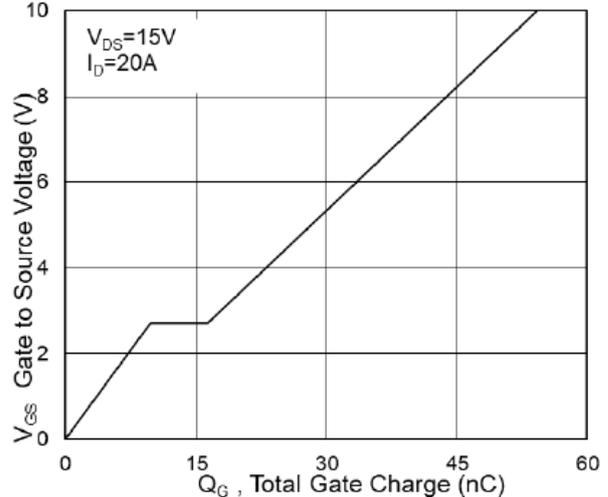


Fig. 4 Gate Charge Characteristics

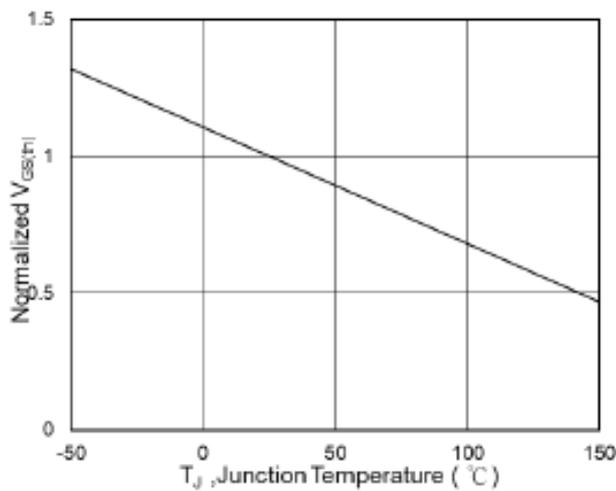


Fig. 5 Normalized  $V_{GS(th)}$  vs  $T_J$

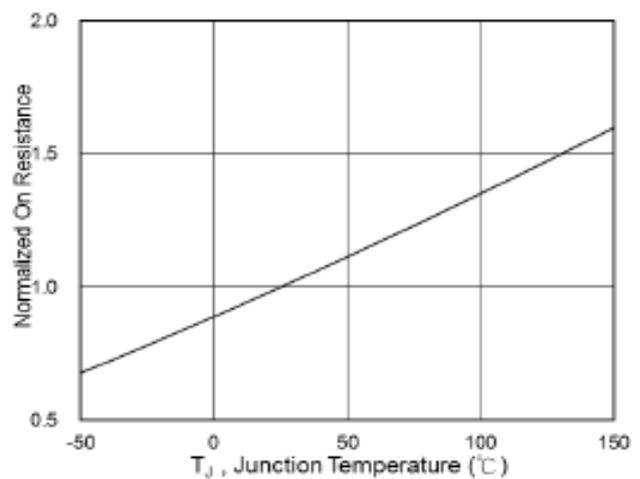


Fig. 6 Normalized  $R_{DS(on)}$  vs  $T_J$



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## TYPICAL CHARACTERISTICS

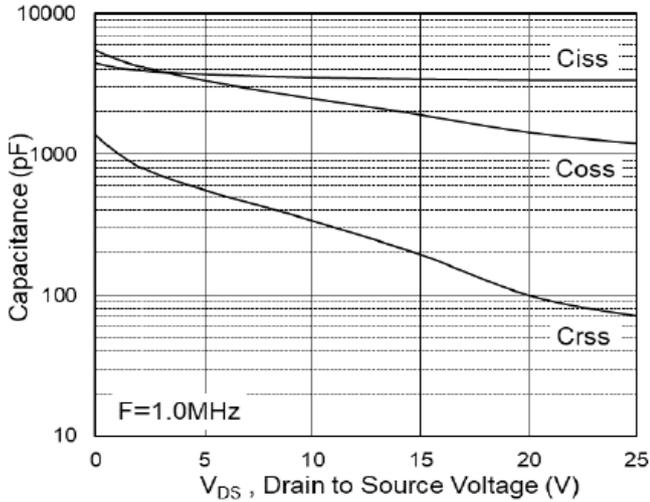


Fig. 7 Typical Capacitance Characteristics

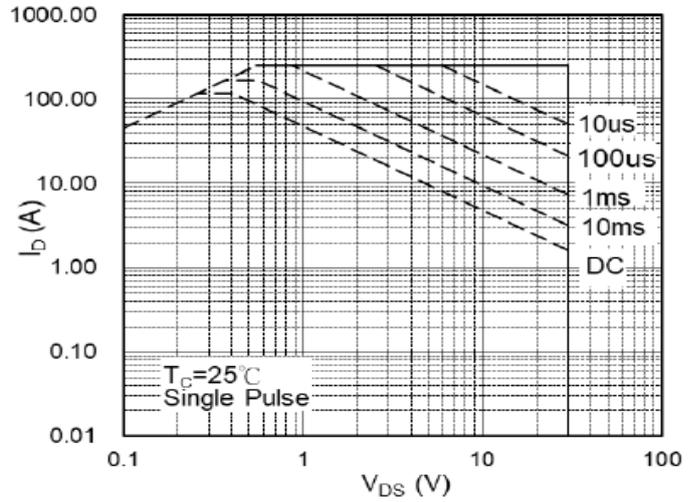


Fig. 8 Maximum Safe Operation Area

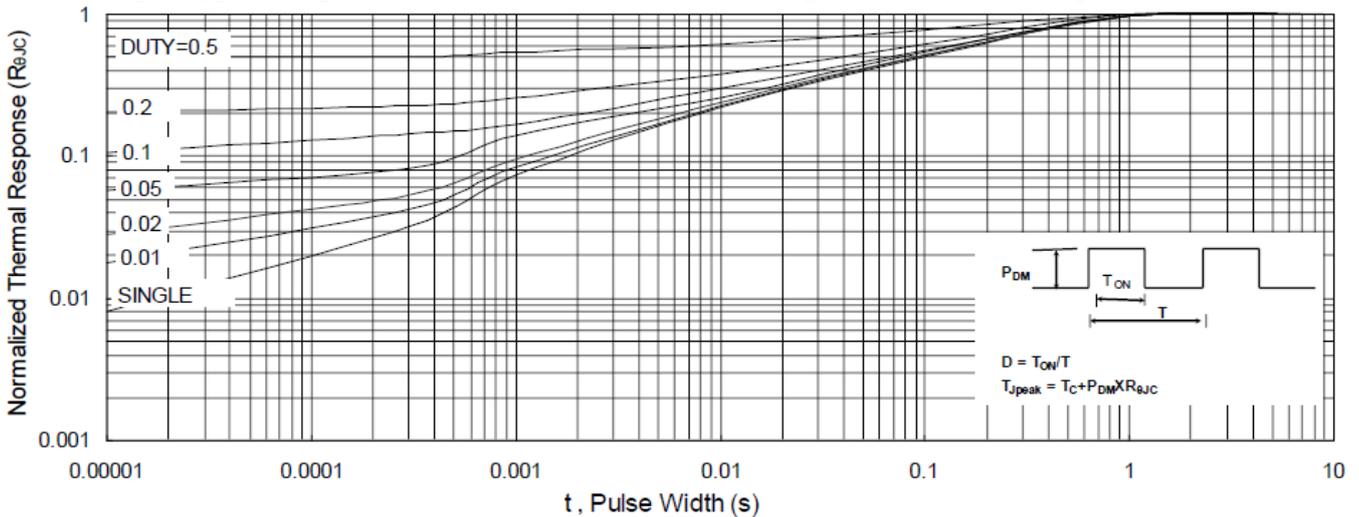


Fig. 9 Normalized Maximum Transient Thermal Impedance

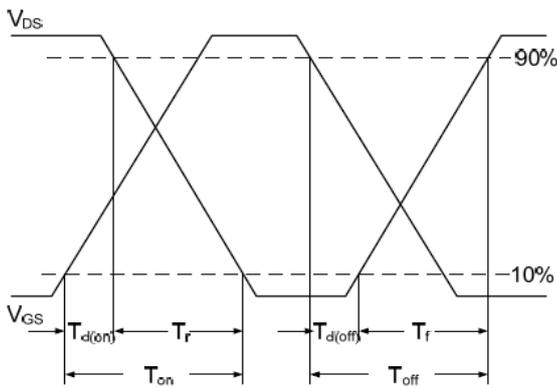


Fig. 10 Switching Time Waveform

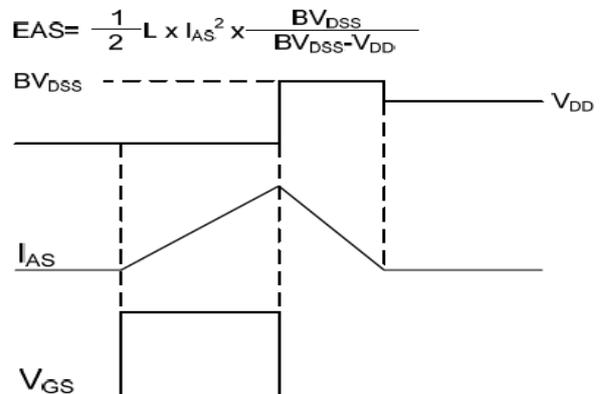


Fig. 11 Unclamped Inductive Switching Waveform



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