



# SPN8836

## N-Channel Enhancement Mode MOSFET

### DESCRIPTION

The SPN8836 is the N-Channel logic enhancement mode power field effect transistors are produced using high cell density, DMOS trench technology. The SPN8836 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.

### FEATURES

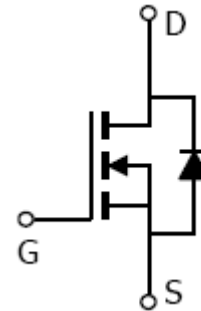
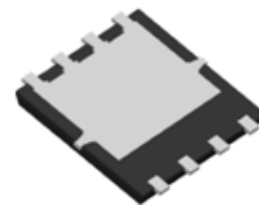
- ◆ 30V/30A,  $R_{DS(ON)} = 4.7m\Omega @ V_{GS} = 10V$
- ◆ 30V/15A,  $R_{DS(ON)} = 7.5m\Omega @ V_{GS} = 4.5V$
- ◆ Super high density cell design for extremely low  $R_{DS(ON)}$
- ◆ Exceptional on-resistance and maximum DC current capability
- ◆ PPAK5x6 package design

### APPLICATIONS

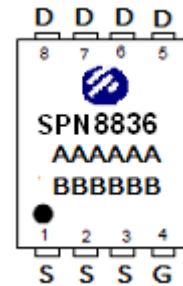
- High Frequency Synchronous Buck Converter
- DC/DC Power System
- Load Switch

### PIN CONFIGURATION

PPAK5x6



### PART MARKING



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



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### PPAK5x6 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
SPN8836DN8RGB	PPAK5x6	SPN8836

※ SPN8836DN8RGB : Tape Reel ; Pb – Free ; Halogen - Free

### ABSOLUTE MAXIMUM RATINGS

( $T_A=25^{\circ}\text{C}$  Unless otherwise noted)

Parameter	Symbol	Typical	Unit
Drain-Source Voltage	$V_{DSS}$	30	V
Gate –Source Voltage	$V_{GSS}$	$\pm 20$	V
Continuous Drain Current	$I_D$	$T_A=25^{\circ}\text{C}$	15
		$T_A=100^{\circ}\text{C}$	10.5
Pulsed Drain Current	$I_{DM}$	160	A
Avalanche Current	$I_{AS}$	50	A
Single Pulse Avalanche Energy	EAS	180	mJ
Power Dissipation	$P_D$	83	W
Operating Junction Temperature	$T_J$	150	$^{\circ}\text{C}$
Storage Temperature Range	$T_{STG}$	-55/150	$^{\circ}\text{C}$
Thermal Resistance-Junction to Ambient ( $t \leq 10\text{s}$ )	$R_{\theta JA}$	46	$^{\circ}\text{C}/\text{W}$
Thermal Resistance-Junction to Case	$R_{\theta JC}$	1.5	



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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	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1.0		2.5	V
Gate Leakage Current	$I_{GSS}$	$V_{DS}=0V, V_{GS}=\pm 20V$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=24V, V_{GS}=0V$			1	uA
		$V_{DS}=24V, V_{GS}=0V, T_J=55^\circ C$			5	
On-State Drain Current	$I_{D(on)}$	$V_{DS}\geq 5V, V_{GS}=10V$			80	A
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=20A$		4.7	6	mΩ
		$V_{GS}=4.5V, I_D=10A$		6.5	9	
Forward Transconductance	$g_{fs}$	$V_{DS}=5V, I_D=30A$		22		S
Diode Forward Voltage	$V_{SD}$	$I_S=1A, V_{GS}=0V$			1	V
<b>Dynamic</b>						
Total Gate Charge	$Q_g$	$V_{DS}=15V, V_{GS}=4.5V$ $I_D=15A$		20	18	nC
Gate-Source Charge	$Q_{gs}$			7.6		
Gate-Drain Charge	$Q_{gd}$			7.2		
Input Capacitance	$C_{iss}$	$V_{DS}=15V, V_{GS}=0V$ $f=1MHz$		2300		pF
Output Capacitance	$C_{oss}$			265		
Reverse Transfer Capacitance	$C_{rss}$			210		
Turn-On Time	$t_{d(on)}$	$V_{DD}=15V,$ $I_D=15A, V_{GEN}=10V$ $R_G=3.3\Omega$		7.8	15	nS
	$t_r$			15	12	
Turn-Off Time	$t_{d(off)}$			37	30	
	$t_f$			10.6	15	



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## TYPICAL CHARACTERISTICS

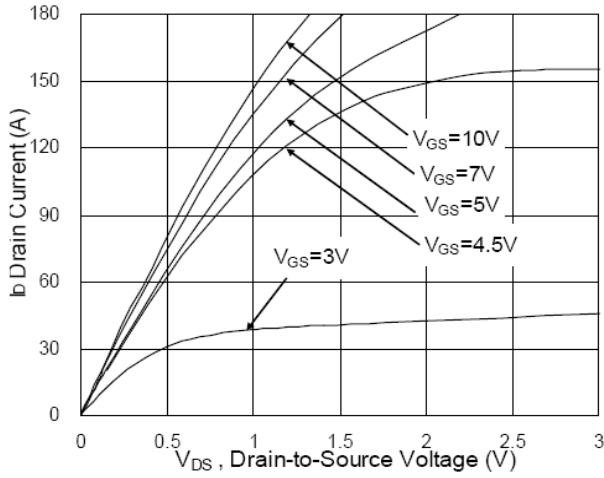


Fig. 1 Typical Output Characteristics

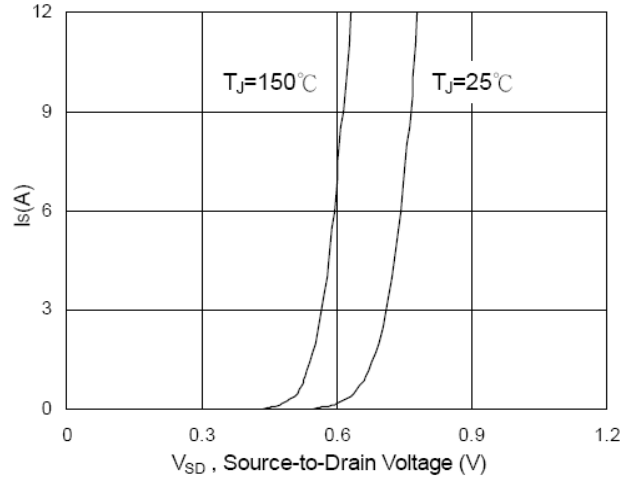


Fig. 2 Transfer Characteristics

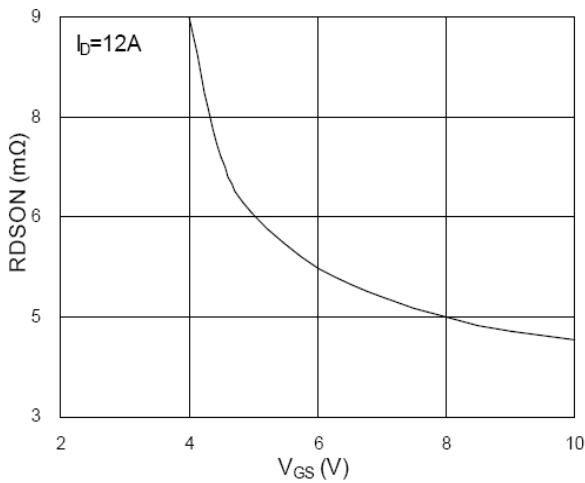


Fig. 3 On-Resistance vs Gate voltage

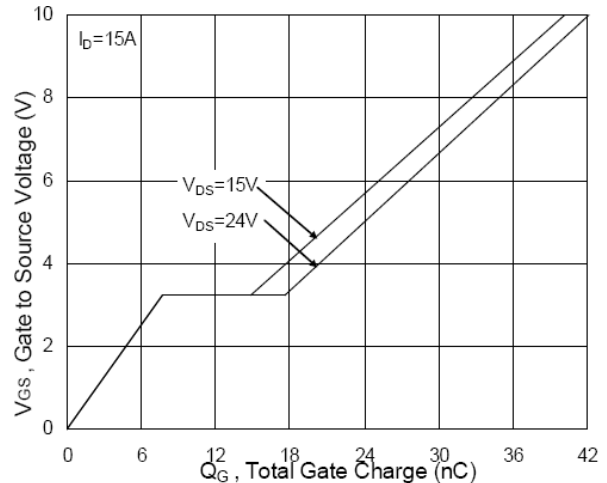


Fig. 4 Gate Charge Characteristics

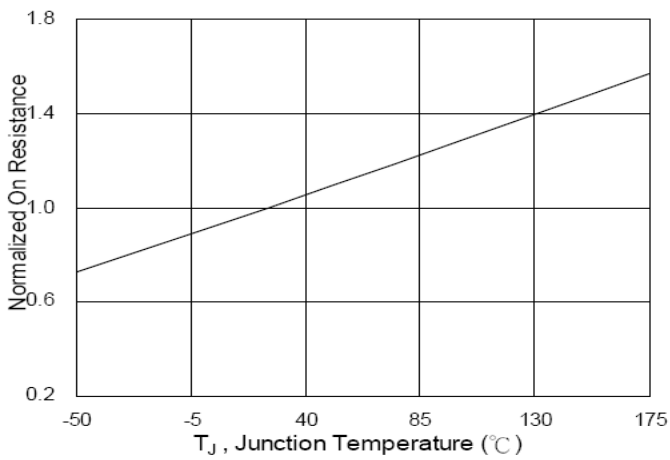


Fig. 5 On-Resistance vs Junction Temp

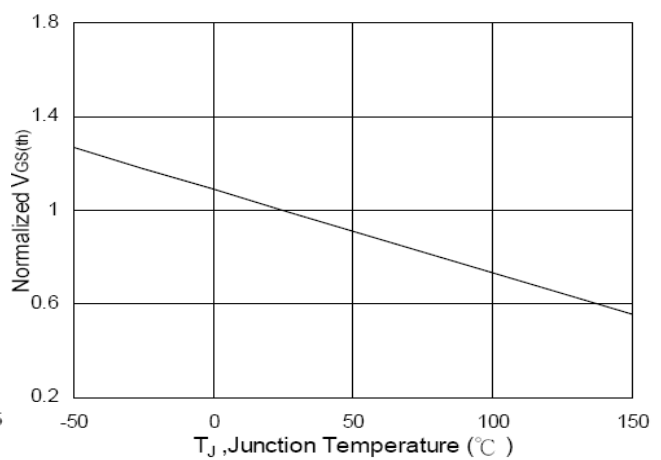


Fig. 6 Vgs vs Junction Temperature



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## TYPICAL CHARACTERISTICS

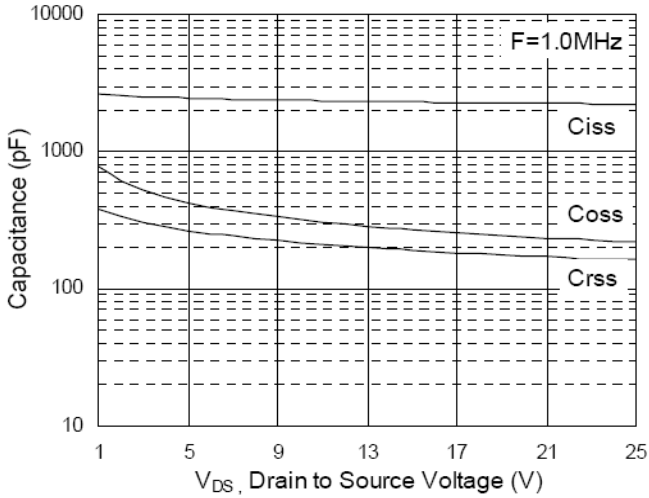


Fig. 7 Typical Capacitance Characteristics

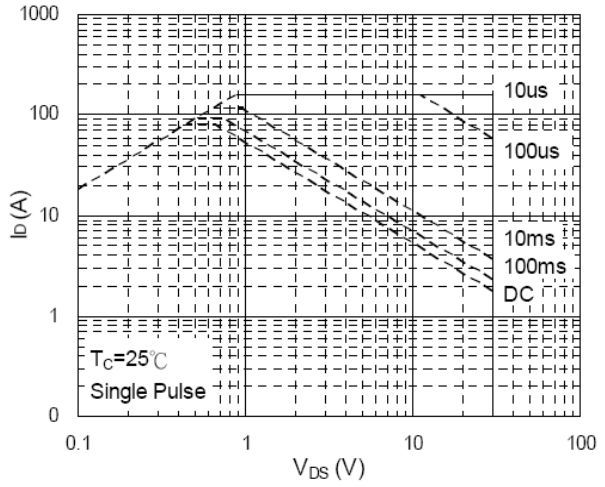


Fig. 8 Maximum Safe Operation Area

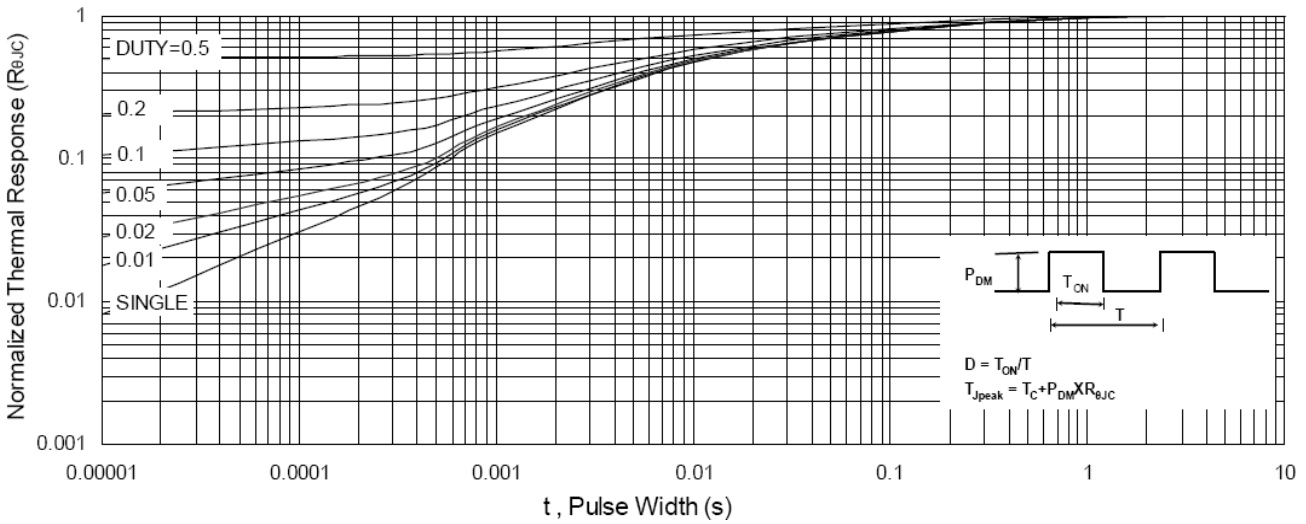


Fig. 9 Effective Transient Thermal Impedance

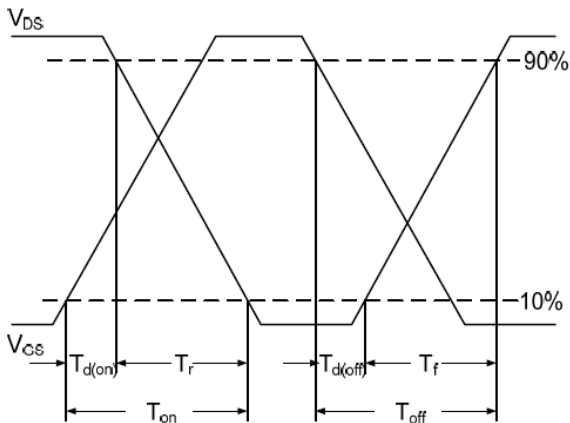


Fig. 10 Switching Time Waveform

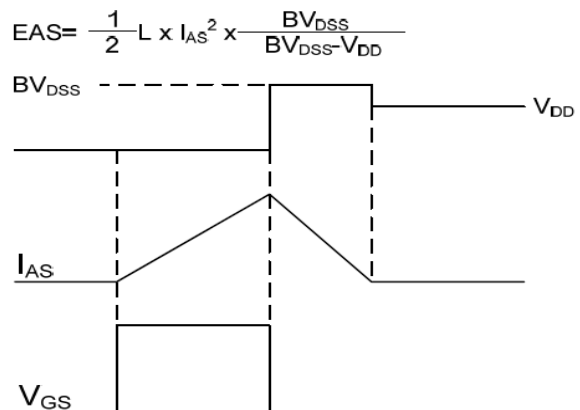
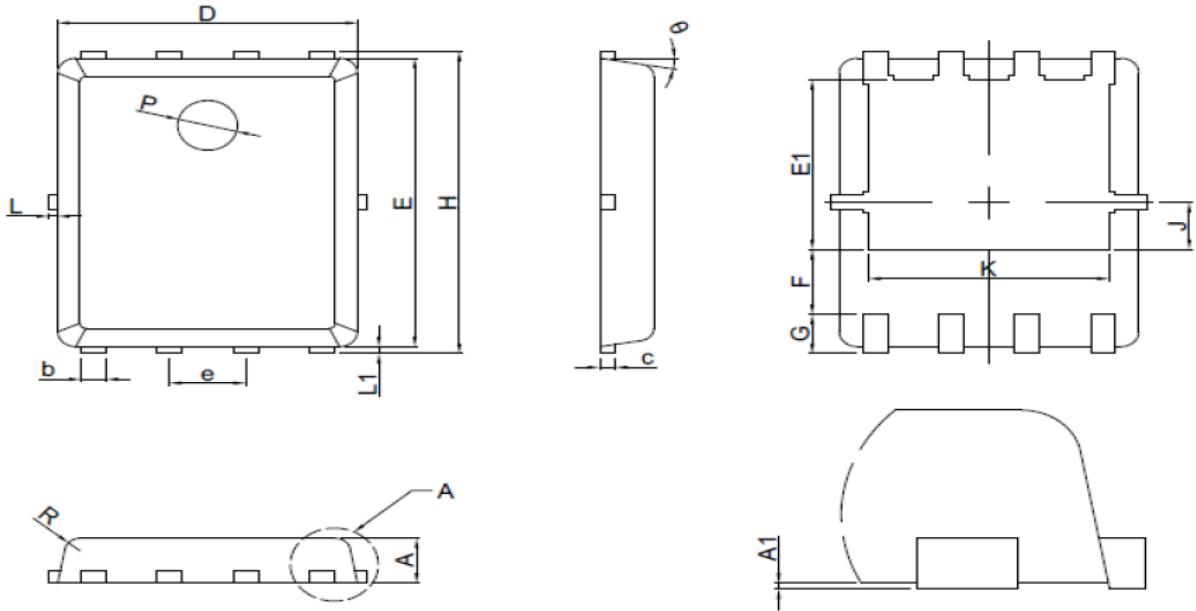


Fig. 11 Unclamped Inductive Waveform



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## PPAK5x6 PACKAGE OUTLINE



SYMBOL	MILLIMETERS		
	MIN	NOM	MAX
A	0.8	0.95	1.1
A1	0.00	0.03	0.05
b	0.33	0.41	0.51
c	0.254 REF		
D	4.80	4.95	5.10
F	1.40 REF		
E	5.70	5.80	5.90
e	1.27 BSC		
H	5.90	6.05	6.20
L1	0.06	0.13	0.20
G	0.60 REF		
J	0.95 BSC		
K	4.00 REF		
L	---	----	0.20
P	1.00 REF		
E1	3.40REF		
E2	0.95 REF		
$\theta$	6°	10°	14°
R	0.25REF		



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