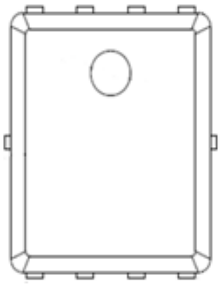
# SPN8860
## N-Channel Enhancement Mode MOSFET

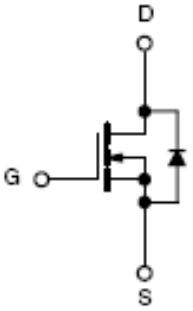
### DESCRIPTION
The SPN8860 is the N-Channel logic enhancement mode power field effect transistors are produced using high cell density, DMOS trench technology. This high density process is especially tailored to minimize on-state resistance. These devices are particularly suited for most of synchronous buck converter applications.

### APPLICATIONS
- DC/DC Converter
- Load Switch
- Synchronous Buck Converter

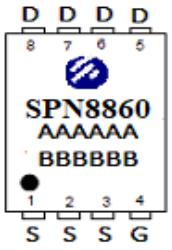
### FEATURES
- 60V/20A, $R_{DS(ON)}$=16mΩ@$V_{GS}$=10V
- 60V/20A, $R_{DS(ON)}$=19mΩ@$V_{GS}$=4.5V
- Super high density cell design for extremely low $R_{DS(ON)}$
- Exceptional on-resistance and maximum DC current capability
- PPAK5x6-8L package design

### PIN CONFIGURATION (PPAK5x6-8L)






### PART MARKING




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

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**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 |
|---|---|---|
| SPN8860DN8RGB | PPAK5x6-8L | SPN8860 |

※ SPN8860DN8RGB: Tape Reel ; Pb – Free; Halogen – Free

**ABSOULTE MAXIMUM RATINGS**

($T_A$=25℃ Unless otherwise noted)

| Parameter | | Symbol | Typical | Unit |
|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DSS}$ | 60 | V |
| Gate –Source Voltage | | $V_{GSS}$ | ±20 | V |
| Continuous Drain Current($T_J$=150℃) | $T_A$=25℃ | $I_D$ | 46 | A |
| | $T_A$=100℃ | | 33 | |
| Pulsed Drain Current | | $I_{DM}$ | 203 | A |
| Avalanche Current | | $I_{AS}$ | 27 | A |
| Power Dissipation | $T_A$=25℃ | $P_D$ | 71 | W |
| Avalanche Energy with Single Pulse ( Tj=25℃, L= 0.1mH , $I_{AS}$ = 38A ) | | $E_{AS}$ | 36 | mJ |
| Operating Junction Temperature | | $T_J$ | -55/150 | ℃ |
| Storage Temperature Range | | $T_{STG}$ | -55/150 | ℃ |
| Thermal Resistance-Junction to Case | | $R_{\theta JC}$ | 2.1 | ℃/W |

# SPN8860
## N-Channel Enhancement Mode MOSFET

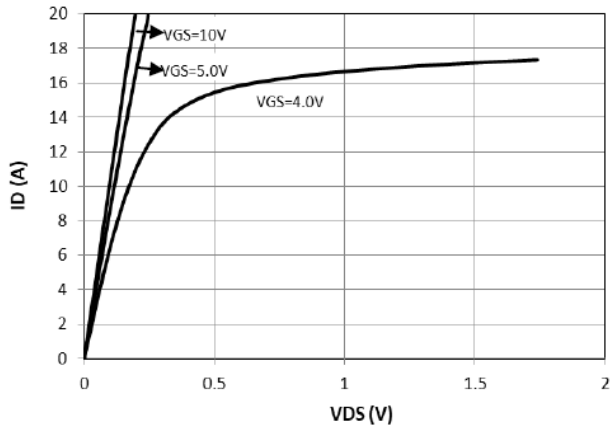
**ELECTRICAL CHARACTERISTICS**

($T_A$=25℃ Unless otherwise noted)

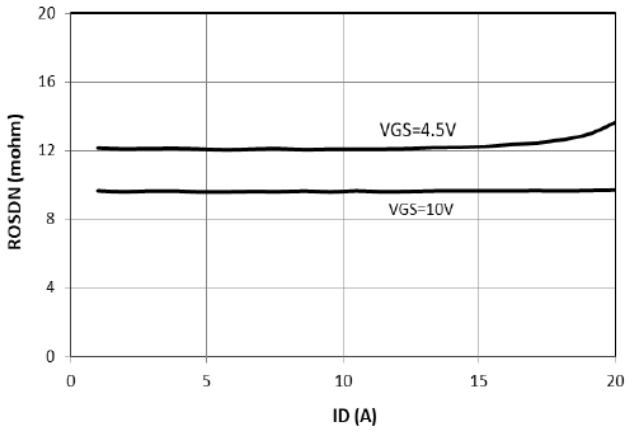
| Parameter | Symbol | Conditions | Min. | Typ | Max. | Unit |
|---|---|---|---|---|---|---|
| **Static** | | | | | | |
| Drain-Source Breakdown Voltage | $V_{(BR)DSS}$ | $V_{GS}$=0V,$I_D$=250uA | 60 | | | V |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$=$V_{GS}$,$I_D$=250uA | 1.0 | | 3.0 | |
| Gate Leakage Current | $I_{GSS}$ | $V_{DS}$=0V,$V_{GS}$=±20V | | | ±100 | nA |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$=48V,$V_{GS}$=0V | | | 1 | uA |
| | | $V_{DS}$=48V,$V_{GS}$=0V $T_J$=150℃ | | | 100 | |
| Drain-Source On-Resistance | $R_{DS(on)}$ | $V_{GS}$=10V,$I_D$=20A | | 13 | 16 | mΩ |
| | | $V_{GS}$=4.5V,$I_D$=20A | | 16 | 19 | |
| Gate Resistance | $R_G$ | | | 1.3 | | Ω |
| Forward Transconductance | gfs | $V_{DS}$=15V,$I_D$=20A | | 15 | | S |
| Diode Forward Voltage | $V_{SD}$ | $I_S$=40A,$V_{GS}$ =0V | | | 1.2 | V |
| **Dynamic** | | | | | | |
| Total Gate Charge | $Q_{g(10V)}$ | $V_{DS}$=48V,$V_{GS}$=10V $I_D$=40A | | 29 | | nC |
| Gate-Source Charge | $Q_{gs}$ | | | 4 | | |
| Gate-Drain Charge | $Q_{gd}$ | | | 8 | | |
| Total Gate Charge | $Q_{g(4.5V)}$ | $V_{DS}$=48V,$V_{GS}$=4.5V $I_D$=40A | | 15 | | |
| Input Capacitance | $C_{iss}$ | $V_{DS}$=25V,$V_{GS}$=0V f=1MHz | | 1400 | | pF |
| Output Capacitance | $C_{oss}$ | | | 137 | | |
| Reverse Transfer Capacitance | $C_{rss}$ | | | 95 | | |
| Turn-On Time | $t_{d(on)}$ | $V_{DD}$=48V, $I_D$=40A, $V_{GEN}$=10V, $R_G$=2.5Ω | | 8.4 | | nS |
| | $t_r$ | | | 12.4 | | |
| Turn-Off Time | $t_{d(off)}$ | | | 26 | | |
| | $t_f$ | | | 4.4 | | |

## TYPICAL CHARACTERISTICS

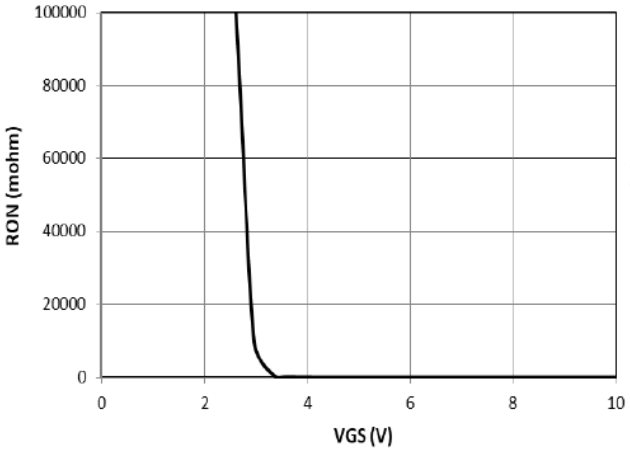
TYPICAL OUTPUT CHARACTERISTICS



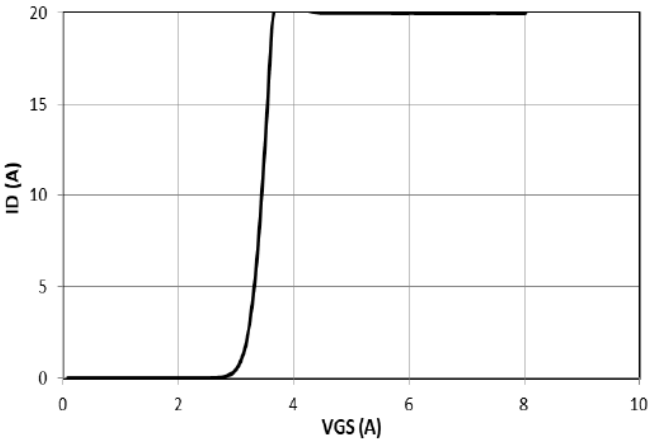

ON-RESISTANCE VS. DRAIN CURRENT ANDGATE VOLTAGE



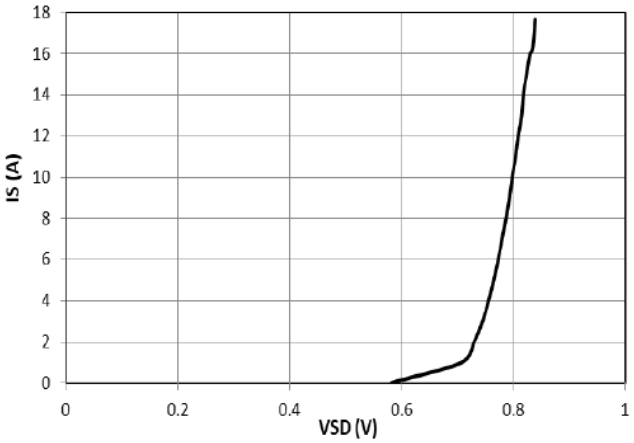

ON-RESISTANCE VS. GATE-SOURCE VOLTAGE



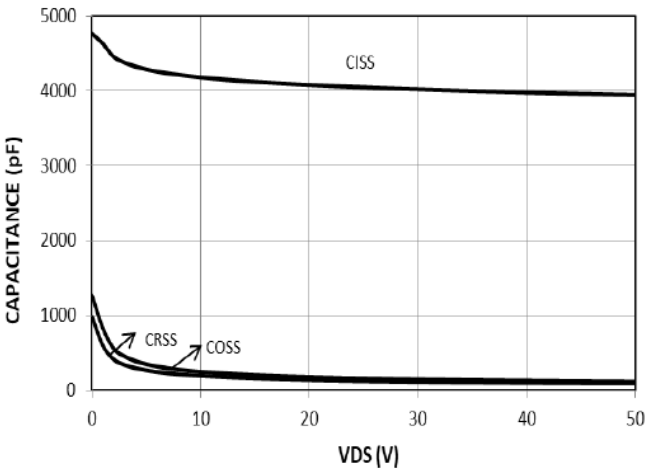

TYPICAL TRANSFER CHARACTERISTICS



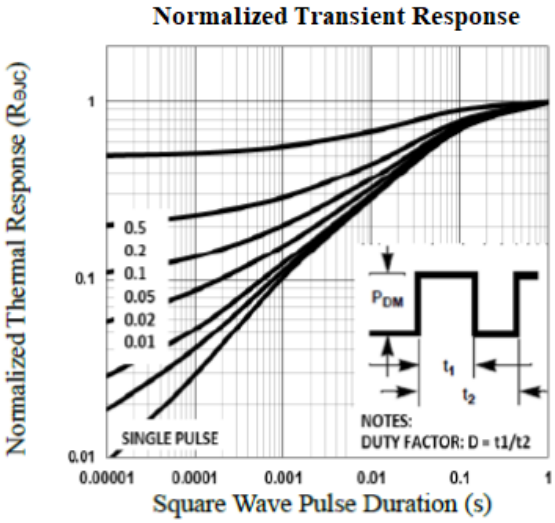

TYPICAL SOURCE-DRAIN DIODE FORWARD VOLTAGE

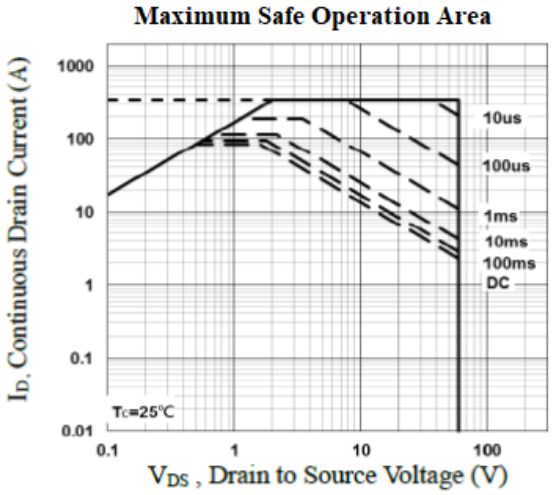



TYPICAL CAPACITANCE VS. DRAIN-SOURCE VOLTAGE



## TYPICAL CHARACTERISTICS



SYNC Power Corporation
7F-2, No.3-1 Park Street
NanKang District (NKSP), Taipei, Taiwan 115
Phone: 886-2-2655-8178
Fax: 886-2-2655-8468
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