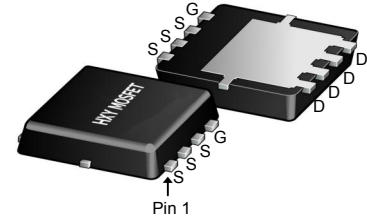




### Description

The BSC066N06NS uses advanced trench technology to provide excellent  $R_{DS(ON)}$ , low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.



DFN5X6-8L

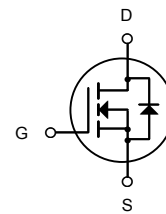
### General Features

$V_{DS} = 60V$   $I_D = 80A$

$R_{DS(ON)} < 7m\Omega$  @  $V_{GS}=10V$

### Application

- Battery protection
- Load switch
- Uninterruptible power supply



N-Channel MOSFET

### Package Marking and Ordering Information

| Product ID  | Pack      | Marking        | Qty(PCS) |
|-------------|-----------|----------------|----------|
| BSC066N06NS | DFN5X6-8L | 80N06 XXX YYYY | 5000     |

### Absolute Maximum Ratings ( $T_C=25^\circ C$ unless otherwise noted)

| Symbol                | Parameter                                     | Rating     | Units        |
|-----------------------|---|------------|--------------|
| $V_{DS}$              | Drain-Source Voltage                          | 60         | V            |
| $V_{GS}$              | Gate-Source Voltage                           | $\pm 25$   | V            |
| $I_D@T_C=25^\circ C$  | Continuous Drain Current, $V_{GS} @ 10V^1$    | 80         | A            |
| $I_D@T_C=100^\circ C$ | Continuous Drain Current, $V_{GS} @ 10V^1$    | 52         | A            |
| $I_{DM}$              | Pulsed Drain Current <sup>2</sup>             | 320        | A            |
| EAS                   | Single Pulse Avalanche Energy <sup>3</sup>    | 169        | mJ           |
| $P_D@T_C=25^\circ C$  | Total Power Dissipation <sup>4</sup>          | 108        | W            |
| $T_{STG}$             | Storage Temperature Range                     | -55 to 150 | $^\circ C$   |
| $T_J$                 | Operating Junction Temperature Range          | -55 to 150 | $^\circ C$   |
| $R_{\theta JC}$       | Thermal Resistance Junction-Case <sup>1</sup> | 1.4        | $^\circ C/W$ |



**Electrical Characteristics** ( $T_J=25^{\circ}\text{C}$  unless otherwise specified)

| Symbol  | Parameter   | Test Condition  | Min. | Typ. | Max.      | Units      |
|---|---|---|------|------|-----------|------------|
| <b>Off Characteristic</b>                                     |   |   |      |      |           |            |
| $V_{(BR)DSS}$   | Drain-Source Breakdown Voltage                            | $V_{GS}=0V, I_D=250\mu A$                             | 60   | -    | -         | V          |
| $I_{DSS}$   | Zero Gate Voltage Drain Current                           | $V_{DS}=60V, V_{GS}=0V,$                              | -    | -    | 1.0       | $\mu A$    |
| $I_{GSS}$   | Gate to Body Leakage Current                              | $V_{DS}=0V, V_{GS}=\pm 20V$                           | -    | -    | $\pm 100$ | nA         |
| <b>On Characteristics</b>                                     |   |   |      |      |           |            |
| $V_{GS(th)}$  | Gate Threshold Voltage                                    | $V_{DS}=V_{GS}, I_D=250\mu A$                         | 2    | 3    | 4         | V          |
| $R_{DS(on)}$  | Static Drain-Source on-Resistance<br><small>note3</small> | $V_{GS}=10V, I_D = 30A$                               | -    | 5.3  | 7         | m $\Omega$ |
| <b>Dynamic Characteristics</b>                                |   |   |      |      |           |            |
| $C_{iss}$   | Input Capacitance   | $V_{DS}=30V, V_{GS}=0V,$<br>$f=1.0MHz$                | -    | 4136 | -         | pF         |
| $C_{oss}$   | Output Capacitance  |   | -    | 286  | -         | pF         |
| $C_{rss}$   | Reverse Transfer Capacitance                              |   | -    | 257  | -         | pF         |
| $Q_g$   | Total Gate Charge   | $V_{DS}=30V, I_D=30A,$<br>$V_{GS}=10V$                | -    | 90   | -         | nC         |
| $Q_{gs}$  | Gate-Source Charge  |   | -    | 9    | -         | nC         |
| $Q_{gd}$  | Gate-Drain("Miller") Charge                               |   | -    | 18   | -         | nC         |
| <b>Switching Characteristics</b>                              |   |   |      |      |           |            |
| $t_{d(on)}$   | Turn-on Delay Time  | $V_{DS}=30V, I_D=30A,$<br>$R_G=1.8\Omega, V_{GS}=10V$ | -    | 9    | -         | ns         |
| $t_r$   | Turn-on Rise Time   |   | -    | 7    | -         | ns         |
| $t_{d(off)}$  | Turn-off Delay Time                                       |   | -    | 40   | -         | ns         |
| $t_f$   | Turn-off Fall Time  |   | -    | 15   | -         | ns         |
| <b>Drain-Source Diode Characteristics and Maximum Ratings</b> |   |   |      |      |           |            |
| $I_S$   | Maximum Continuous Drain to Source Diode Forward Current  |   | -    | -    | 80        | A          |
| $I_{SM}$  | Maximum Pulsed Drain to Source Diode Forward Current      |   | -    | -    | 320       | A          |
| $V_{SD}$  | Drain to Source Diode Forward Voltage                     | $V_{GS}=0V, I_S=30A$                                  | -    | -    | 1.2       | V          |
| $t_{rr}$  | Body Diode Reverse Recovery Time                          | $I_F=30A, di/dt=100A/\mu s$                           | -    | 33   | -         | ns         |
| $Q_{rr}$  | Body Diode Reverse Recovery Charge                        |   | -    | 46   | -         | nC         |

Notes:1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

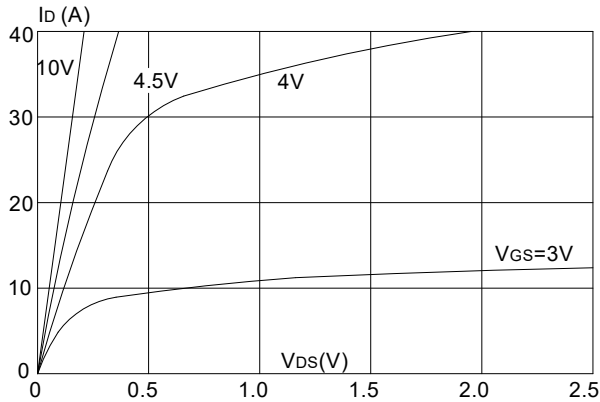
2. EAS condition :  $T_J=25^{\circ}\text{C}, V_{DD}=30V, V_G=10V, L=0.5mH, R_G=25\Omega, I_{AS}=26A$

3. Pulse Test: Pulse Width $\leq 300\mu s$ , Duty Cycle $\leq 0.5\%$

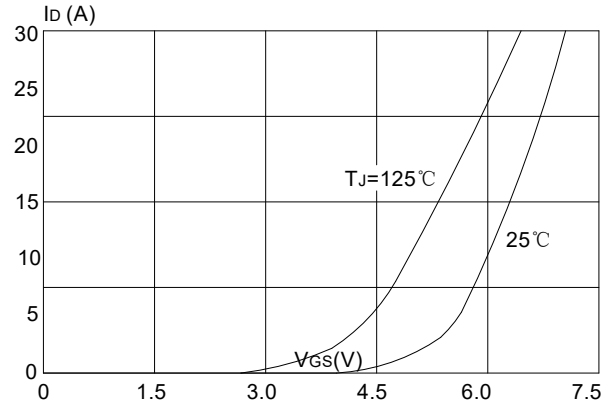


## Typical Performance Characteristics

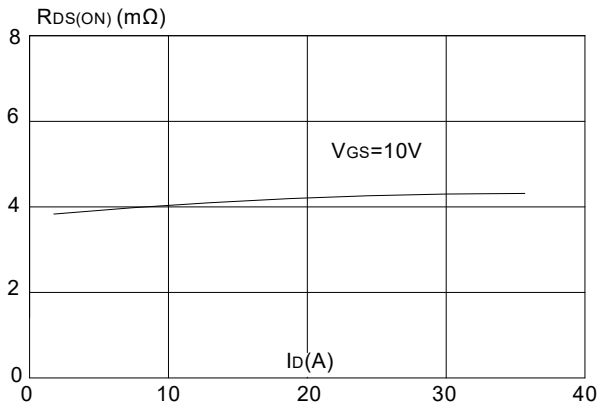
**Figure 1:** Output Characteristics



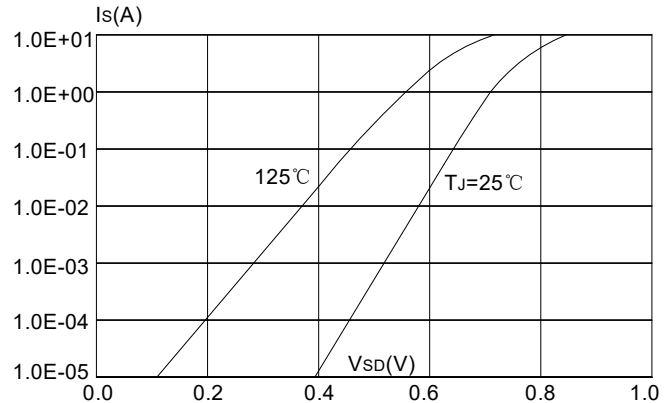
**Figure 2:** Typical Transfer Characteristics



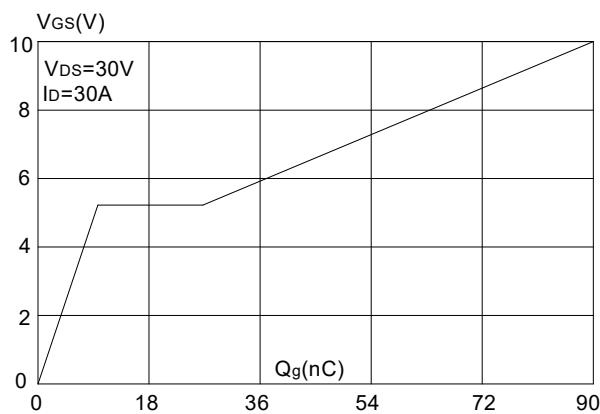
**Figure 3:** On-resistance vs. Drain Current



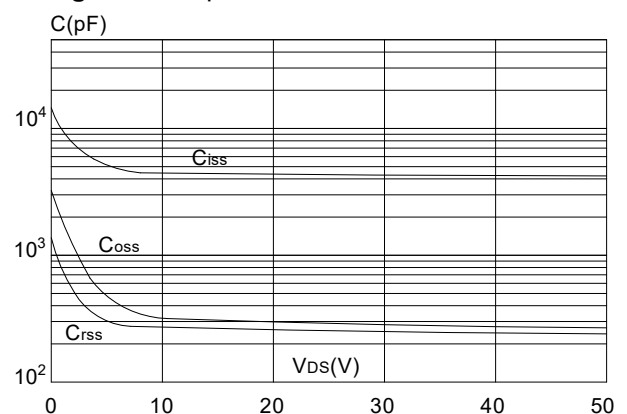
**Figure 4:** Body Diode Characteristics



**Figure 5:** Gate Charge Characteristics

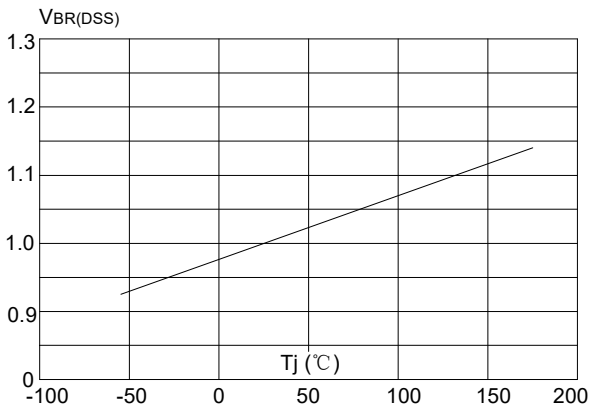


**Figure 6:** Capacitance Characteristics

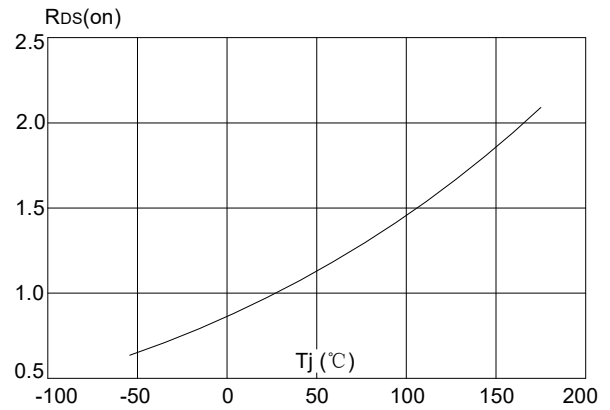




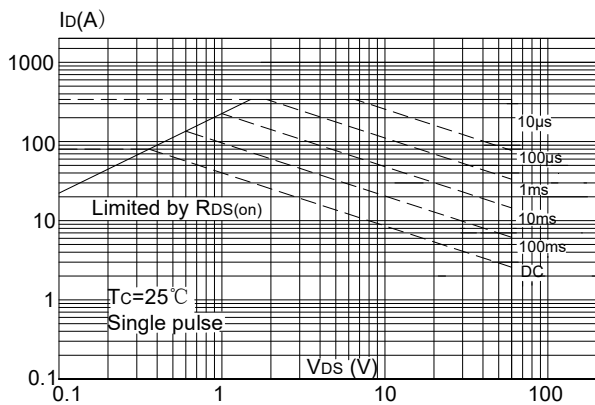
**Figure 7:** Normalized Breakdown Voltage vs. Junction Temperature



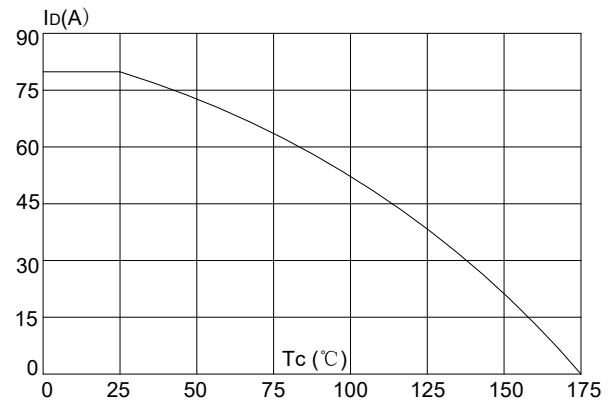
**Figure 8:** Normalized on Resistance vs. Junction Temperature



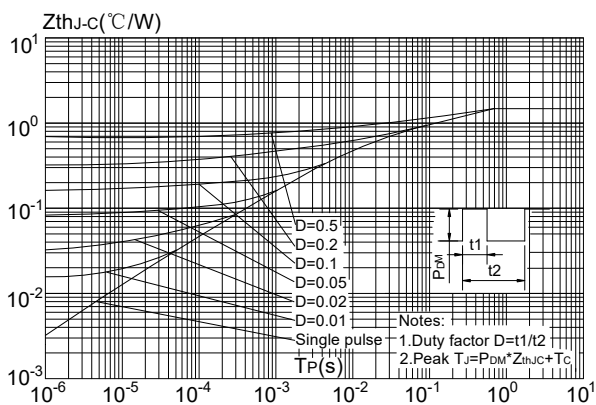
**Figure 9:** Maximum Safe Operating Area



**Figure 10:** Maximum Continuous Drain Current vs. Case Temperature

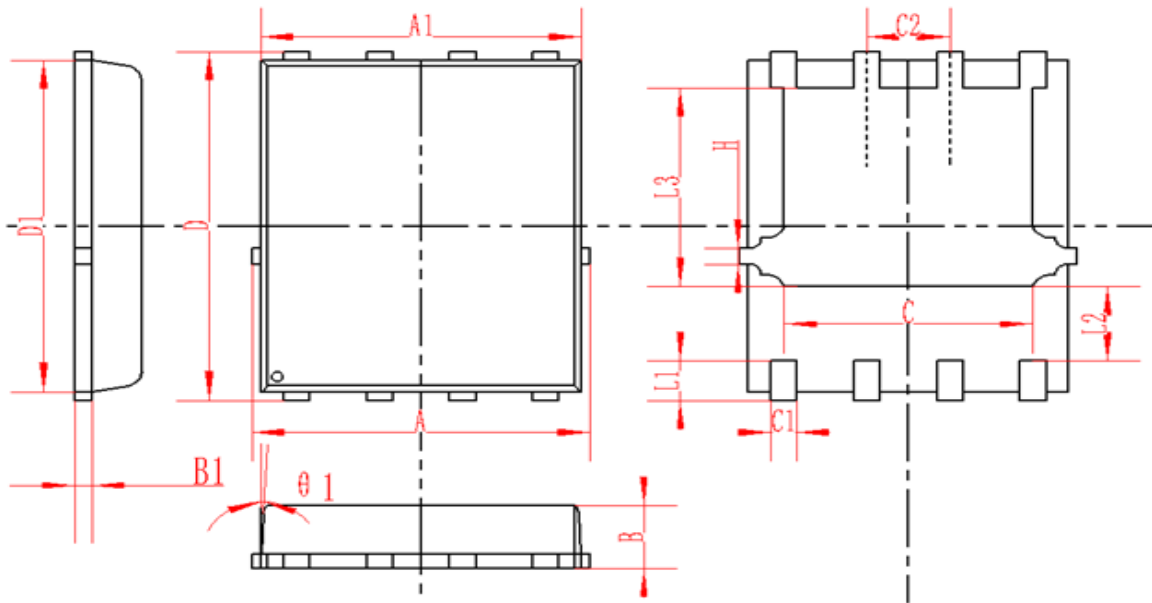


**Figure.11:** Maximum Effective Transient Thermal Impedance, Junction-to-Case





### DFN5X6-8L Package Information



| SYMBOL | MM       |      |       | INCH     |       |       |
|--------|----------|------|-------|----------|-------|-------|
|        | MIN      | NOM  | MAX   | MIN      | NOM   | MAX   |
| A      | 4.95     | 5    | 5.05  | 0.195    | 0.197 | 0.199 |
| A1     | 4.82     | 4.9  | 4.98  | 0.190    | 0.193 | 0.196 |
| D      | 5.98     | 6    | 6.02  | 0.235    | 0.236 | 0.237 |
| D1     | 5.67     | 5.75 | 5.83  | 0.223    | 0.226 | 0.230 |
| B      | 0.9      | 0.95 | 1     | 0.035    | 0.037 | 0.039 |
| B1     | 0.254REF |      |       | 0.010REF |       |       |
| C      | 3.95     | 4    | 4.05  | 0.156    | 0.157 | 0.159 |
| C1     | 0.35     | 0.4  | 0.45  | 0.014    | 0.016 | 0.018 |
| C2     | 1.27TYP  |      |       | 0.5TYP   |       |       |
| θ1     | 8°       | 10°  | 12°   | 8°       | 10°   | 12°   |
| L1     | 0.63     | 0.64 | 0.65  | 0.025    | 0.025 | 0.026 |
| L2     | 1.2      | 1.3  | 1.4   | 0.047    | 0.051 | 0.055 |
| L3     | 3.415    | 3.42 | 3.425 | 0.134    | 0.135 | 0.135 |
| H      | 0.24     | 0.25 | 0.26  | 0.009    | 0.010 | 0.010 |



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