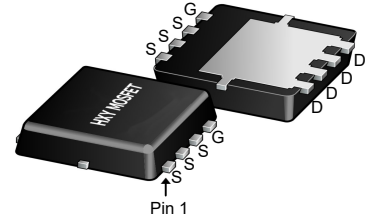




Description

The BSC120N03MS G 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

$V_{DS} = 30V$ $I_D = 70A$

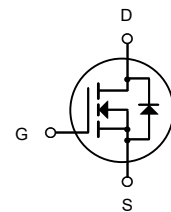
$R_{DS(ON)} < 7\text{ m}\Omega$ $V_{GS} = 10V$

Application

Battery protection

Load switch

Uninterruptible power supply



N-Channel MOSFET

Package Marking and Ordering Information

| Product ID | Pack | Marking | Qty(PCS) |
|---------------|-----------|---------------|----------|
| BSC120N03MS G | DFN5X6-8L | 120N03MS XXXX | 5000 |

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

| Symbol | Parameter | Rating | Units |
|---------------------------------|--|------------|--------------------|
| V_{DS} | Drain-Source Voltage | 30 | V |
| V_{GS} | Gate-Source Voltage | ± 20 | V |
| $I_D @ T_C = 25^\circ\text{C}$ | Continuous Drain Current, $V_{GS} @ 10V^1$ | 70 | A |
| $I_D @ T_C = 100^\circ\text{C}$ | Continuous Drain Current, $V_{GS} @ 10V^1$ | 40 | A |
| I_{DM} | Pulsed Drain Current ² | 140 | A |
| EAS | Single Pulse Avalanche Energy ³ | 115.2 | mJ |
| I_{AS} | Avalanche Current | 48 | A |
| $P_D @ T_C = 25^\circ\text{C}$ | Total Power Dissipation ⁴ | 59 | W |
| $P_D @ T_A = 25^\circ\text{C}$ | Total Power Dissipation ⁴ | 2 | W |
| T_{STG} | Storage Temperature Range | -55 to 150 | $^\circ\text{C}$ |
| T_J | Operating Junction Temperature Range | -55 to 150 | $^\circ\text{C}$ |
| $R_{\theta JA}$ | Thermal Resistance Junction-Ambient ¹ | 62 | $^\circ\text{C/W}$ |
| $R_{\theta JC}$ | Thermal Resistance Junction-Case ¹ | 2.1 | $^\circ\text{C/W}$ |



Electrical Characteristics (T_J=25 °C, unless otherwise noted)

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|-------------------------------------|--|---|------|-------|-------|-------|
| BV _{DSS} | Drain-Source Breakdown Voltage | V _{GS} =0V , I _D =250uA | 30 | --- | --- | V |
| ΔBV _{DSS} /ΔT _J | BVDSS Temperature Coefficient | Reference to 25°C , I _D =1mA | --- | 0.028 | --- | V/°C |
| R _{DS(ON)} | Static Drain-Source On-Resistance ² | V _{GS} =10V , I _D =30A | --- | 5.7 | 7 | mΩ |
| | | V _{GS} =4.5V , I _D =15A | --- | 1.1 | 1.3 | |
| V _{GS(th)} | Gate Threshold Voltage | V _{GS} =V _{DS} , I _D =250uA | 1.2 | --- | 2.5 | V |
| ΔV _{GS(th)} | V _{GS(th)} Temperature Coefficient | | --- | -6.16 | --- | mV/°C |
| I _{DSS} | Drain-Source Leakage Current | V _{DS} =24V , V _{GS} =0V , T _J =25°C | --- | --- | 1 | uA |
| | | V _{DS} =24V , V _{GS} =0V , T _J =55°C | --- | --- | 5 | |
| I _{GSS} | Gate-Source Leakage Current | V _{GS} =± 20V , V _{DS} =0V | --- | --- | ± 100 | nA |
| g _{fs} | Forward Transconductance | V _{DS} =5V , I _D =30A | --- | 43 | --- | S |
| R _g | Gate Resistance | V _{DS} =0V , V _{GS} =0V , f=1MHz | --- | 1.7 | --- | Ω |
| Q _g | Total Gate Charge (4.5V) | V _{DS} =15V , V _{GS} =4.5V , I _D =15A | --- | 20 | --- | nC |
| Q _{gs} | Gate-Source Charge | | --- | 7.6 | --- | |
| Q _{gd} | Gate-Drain Charge | | --- | 7.2 | --- | |
| T _{d(on)} | Turn-On Delay Time | V _{DD} =15V , V _{GS} =10V , R _G =3.3 I _D =15A | --- | 7.8 | --- | ns |
| T _r | Rise Time | | --- | 15 | --- | |
| T _{d(off)} | Turn-Off Delay Time | | --- | 37.3 | --- | |
| T _f | Fall Time | | --- | 10.6 | --- | |
| C _{iss} | Input Capacitance | V _{DS} =15V , V _{GS} =0V , f=1MHz | --- | 2295 | --- | pF |
| C _{oss} | Output Capacitance | | --- | 267 | --- | |
| C _{rss} | Reverse Transfer Capacitance | | --- | 210 | --- | |
| I _S | Continuous Source Current ^{1,5} | V _G =V _D =0V , Force Current | --- | --- | 81 | A |
| I _{SM} | Pulsed Source Current ^{2,5} | | --- | --- | 160 | A |
| V _{SD} | Diode Forward Voltage ² | V _{GS} =0V , I _S =1A , T _J =25°C | --- | --- | 1 | V |
| t _{rr} | Reverse Recovery Time | I _F =30A , dI/dt=100A/μs , T _J =25°C | --- | 14 | --- | nS |
| Q _{rr} | Reverse Recovery Charge | | --- | 5 | --- | nC |

Note :

- 1.The data tested by surface mounted on a 1 inch² FR-4 board with 20Z copper.
- 2.The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%
- 3.The EAS data shows Max. rating . The test condition is V_{DD}=25V,V_{GS}=10V,L=0.1mH,I_{AS}=48A
- 4.The power dissipation is limited by 150°C junction temperature
- 5.The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.



Typical Characteristics



Fig.1 Typical Output Characteristics

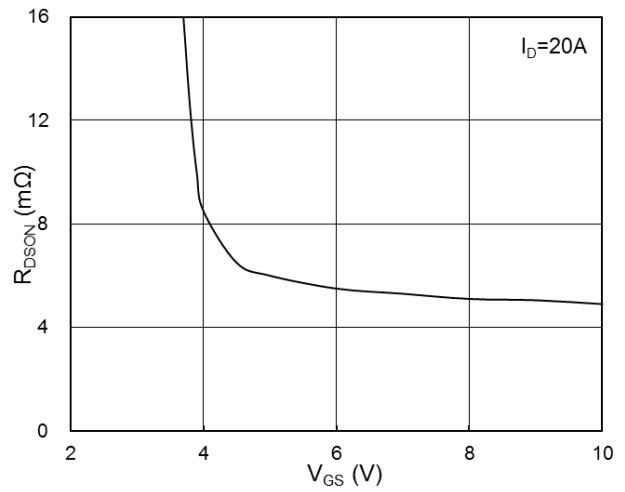


Fig.2 On-Resistance vs. G-S Voltage

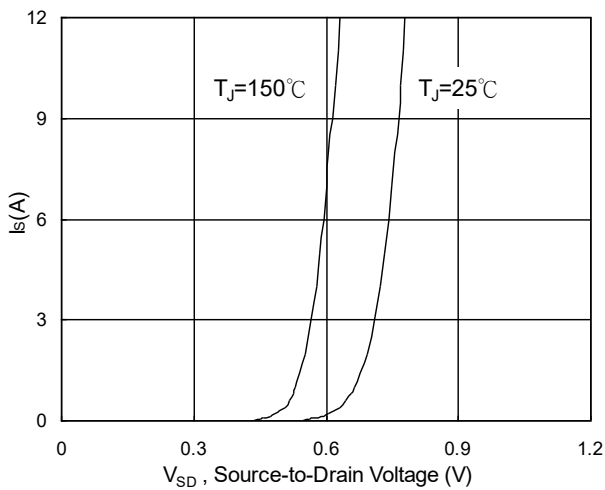


Fig.3 Forward Characteristics of Reverse

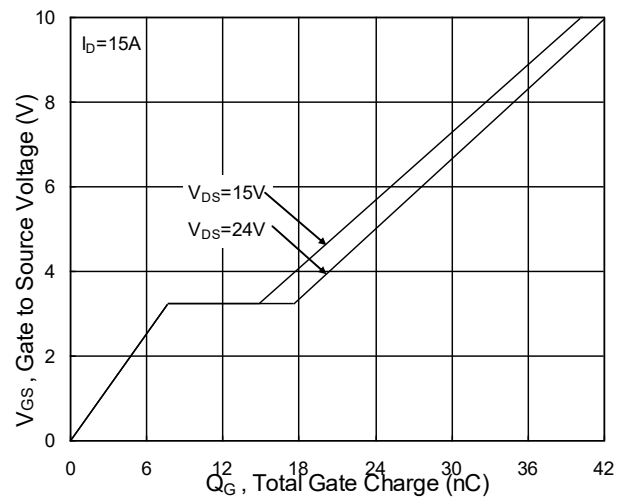


Fig.4 Gate-Charge Characteristics

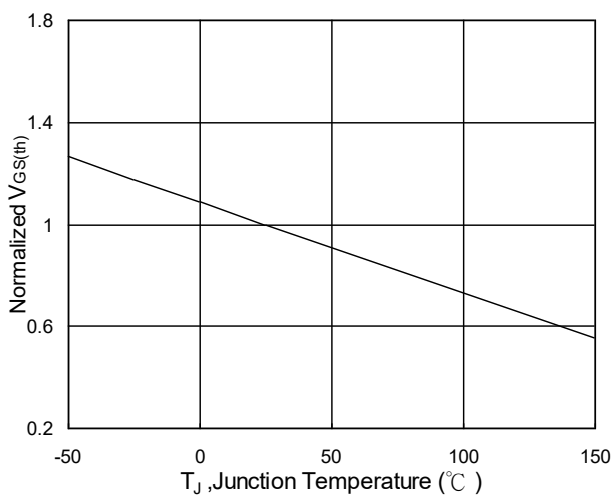


Fig.5 Normalized V_{GS(th)} vs. T_J



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

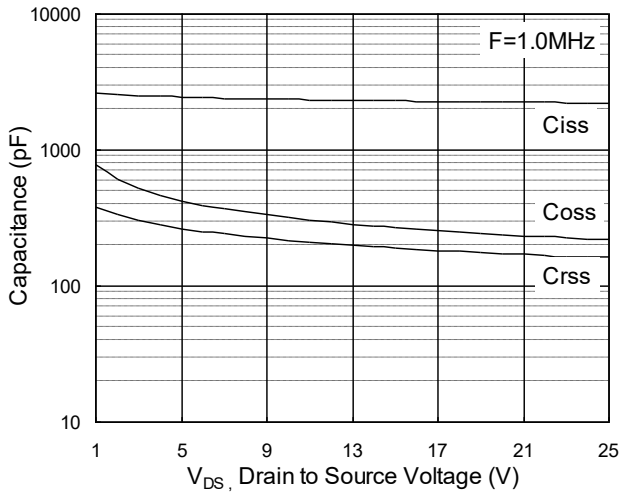


Fig.7 Capacitance

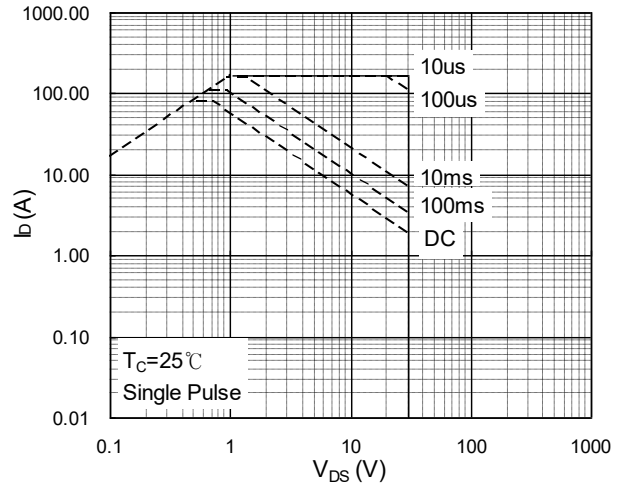


Fig.8 Safe Operating Area

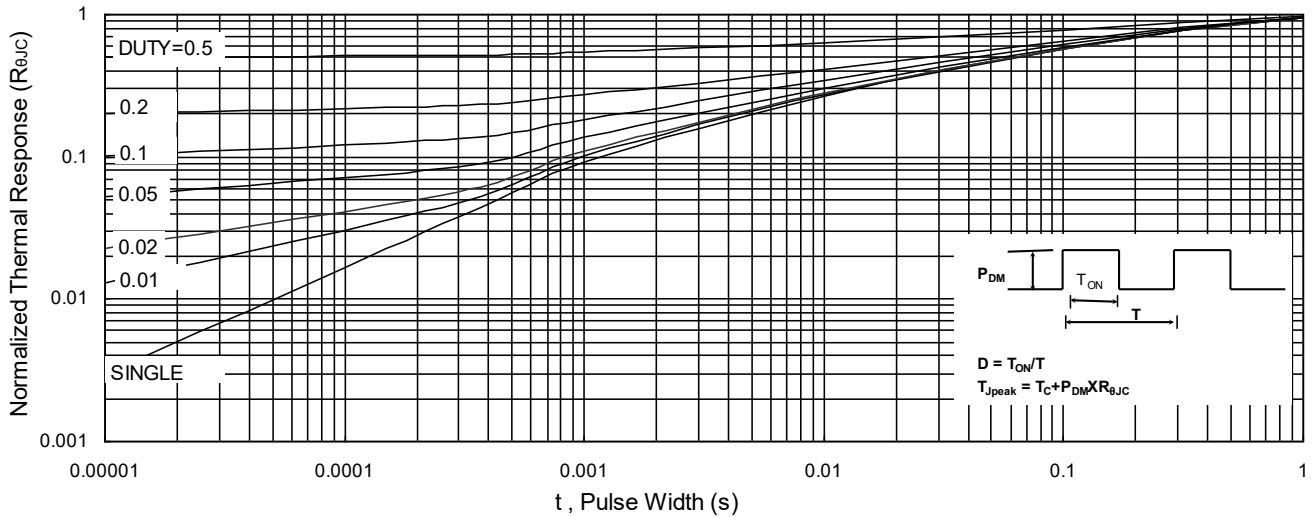


Fig.9 Normalized Maximum Transient Thermal Impedance



Fig.10 Switching Time Waveform

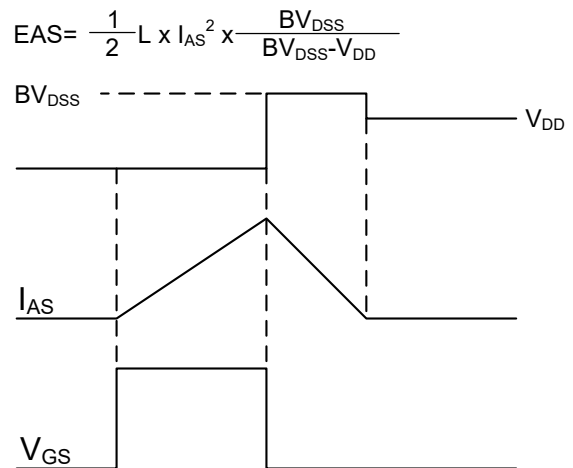


Fig.11 Unclamped Inductive Switching Waveform



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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