

185V 2A N-Channel Enhancement Mode Power MOSFET

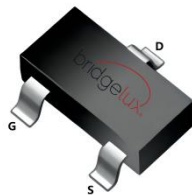
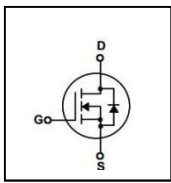
General Description

BXP2N20 is Bridgelux high voltage MOSFET family based on advanced DMOS technology. This advanced MOSFET family has optimized on-state resistance, and also provides superior switching performance and higher avalanche energy strength. This device family is suitable for high efficiency switch mode power supplies.

FEATURES

- $R_{DS(ON)} \leq 1.80 \Omega$ @ $V_{GS}=10V, I_D=1A$
- Excellent $R_{DS(ON)}$ and Low Gate Charge
- Fast switching capability
- Lead free product is acquired

SYMBOL



SOT-23L

ASSEMBLY MESSAGE

| Product Name | Marking | Package | Packaging |
|--------------|---------|---------|-----------|
| BXP2N20L | 2N20 X | SOT-23L | Reel |

ABSOLUTE MAXIMUM RATINGS ($T_C=25^\circ\text{C}$ unless otherwise noted)

| Parameter | Symbol | Rating | Unit |
|-----------------------------------|---|--|------------------|
| | | BXP2N20L | |
| Drain-Source Voltage | V_{DSS} | 185 | V |
| Drain Current | Continuous ($T_C = 25^\circ\text{C}$) | I_D | 2 |
| | | Continuous ($T_C = 100^\circ\text{C}$) | 1.2 |
| Drain Current | Pulsed (Note1) | I_{DM} | 8 |
| Gate-Source Voltage | V_{GSS} | ± 30 | V |
| Avalanche Energy | Single Pulse (Note2) | E_{AS} | 25 |
| Peak Diode Recovery dv/dt (Note3) | dv/dt | 5 | V/ns |
| Power Dissipation (Note 2) | $T_C = 25^\circ\text{C}$ | P_D | 2 |
| | Derate above 25°C | | 0.02 |
| Maximum Junction Temperature | T_J | 150 | $^\circ\text{C}$ |
| Storage Temperature Range | T_{STG} | -55 to 150 | $^\circ\text{C}$ |

- Note:**
1. Repetitive Rating: Pulse width limited by maximum junction temperature
 2. $L=10\text{mH}$, $V_{DD}=50\text{V}$, $R_G=25 \Omega$, Starting $T_J = 25^\circ\text{C}$
 3. $I_{SD} \leq 2.0\text{A}$, $di/dt \leq 300\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^\circ\text{C}$

THERMAL CHARACTERISTICS

| Parameter | Symbol | Max. | Unit |
|---|-----------------|----------|-------------------------------|
| | | BXP2N20L | |
| Thermal Resistance, Junction-to-Ambient | $R_{\theta JA}$ | 100 | $^{\circ}\text{C} / \text{W}$ |

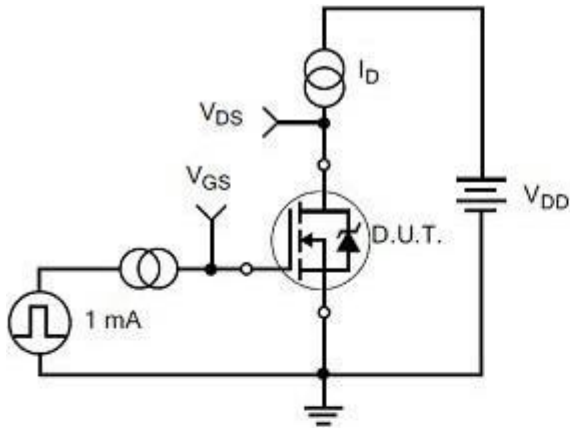
ELECTRICAL CHARACTERISTICS ($T_J=25^{\circ}\text{C}$, unless otherwise Noted)

| Parameter | Symbol | Test Condition | Min. | Typ. | Max. | Unit |
|--|--------------------------------|--|------|------|------|----------------------|
| OFF CHARACTERISTICS | | | | | | |
| Drain-Source Breakdown Voltage | BV_{DSS} | $V_{GS}=0V, I_D=250\mu A$ | 185 | 188 | | V |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS}=180V, V_{GS}=0V$ | | | 1 | μA |
| | | $V_{DS}=140V, T_C = 125^{\circ}\text{C}$ | | | 100 | μA |
| Gate-Body Leakage Current, Forward | I_{GSS} | $V_{GS}=30V$ | | | 100 | nA |
| Gate-Body Leakage Current, Reverse | | $V_{GS}=-30V$ | | | -100 | nA |
| Breakdown Voltage Temperature Coefficient | $\Delta BV_{DSS} / \Delta T_J$ | $I_D = 250 \mu A$ | | 0.25 | | $V/^{\circ}\text{C}$ |
| ON CHARACTERISTICS | | | | | | |
| Gate Threshold Voltage | $V_{GS(TH)}$ | $V_{DS}=V_{GS}, I_D=250\mu A$ | 1 | | 3 | V |
| Drain-Source On-State Resistance | $R_{DS(ON)}$ | $V_{GS}=10V, I_D=1A$ | | 1.15 | 1.80 | Ω |
| DYNAMIC PARAMETERS | | | | | | |
| Input Capacitance | C_{ISS} | $V_{DS}=25V, V_{GS}=0V,$ $f=1.0\text{MHz}$ | | 125 | | pF |
| Output Capacitance | C_{OSS} | | | 30 | | pF |
| Reverse Transfer Capacitance | C_{RSS} | | | 5.6 | | pF |
| SWITCHING PARAMETERS | | | | | | |
| Turn-ON Delay Time | $t_{D(ON)}$ | $V_{DD}=100V, I_D=2A, V_{GS} = 10V, R_G=10\Omega$ (Note4,5) | | 7 | | ns |
| Turn-ON Rise Time | t_R | | | 13 | | ns |
| Turn-OFF Delay Time | $t_{D(OFF)}$ | | | 26 | | ns |
| Turn-OFF Fall-Time | t_F | | | 8 | | ns |
| Total Gate Charge(Note5) | Q_G | $V_{DS} = 160V, V_{GS} = 10V, I_D = 2A$ (Note4,5) | | 4.5 | | nC |
| Gate Source Charge | Q_{GS} | | | 1.5 | | nC |
| Gate Drain Charge | Q_{GD} | | | 2 | | nC |
| SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS | | | | | | |
| Drain-Source Diode Forward Voltage | V_{SD} | $I_S=2A, V_{GS}=0V$ | | | 1.4 | V |
| Diode Continuous Forward Current | I_S | | | | 2 | A |
| Pulsed Drain-Source Current | I_{SM} | | | | 8 | A |
| Reverse Recovery Time | t_{RR} | $V_{GS} = 0V, I_{SD} = 2A$ | | 100 | | ns |
| Reverse Recovery Charge | Q_{RR} | $di/dt=100A/\mu s$ (Note4,5) | | 0.3 | | μC |

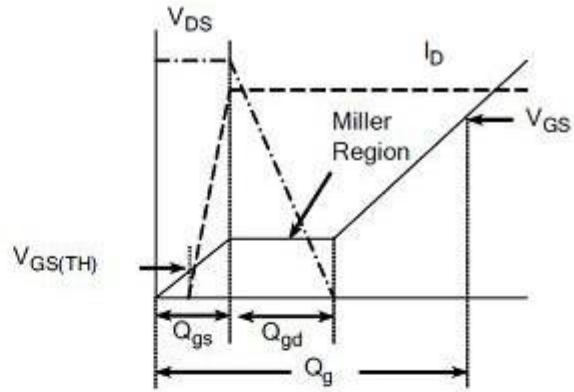
Note: 4. Pulse Test : Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$

5. Essentially independent of operating temperature

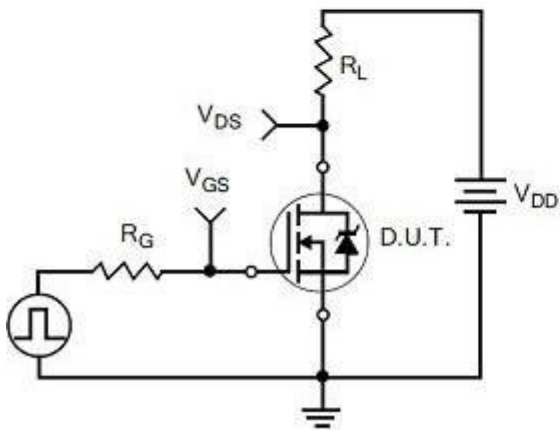
TEST CIRCUITS AND WAVEFORMS



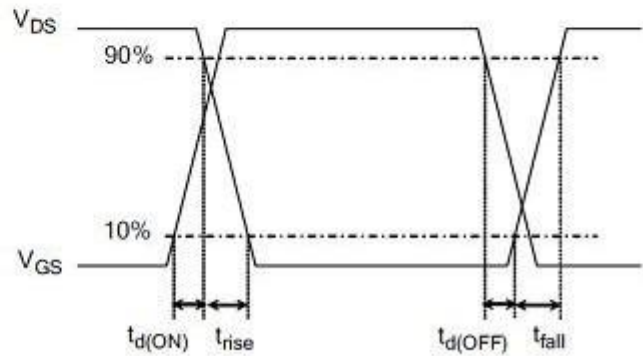
Gate Charge Test Circuit



Gate Charge Waveform

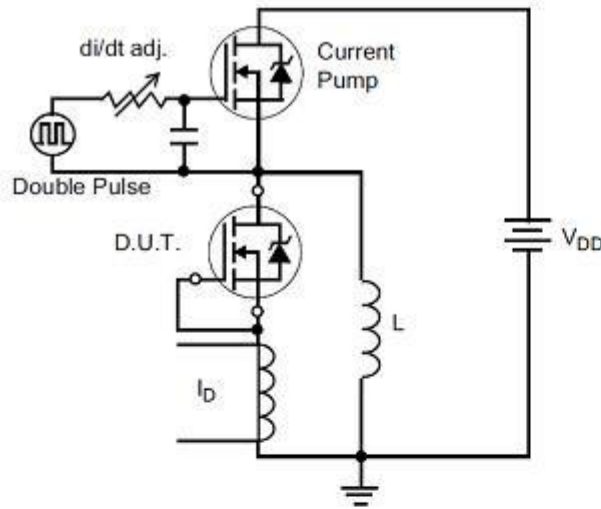


Resistive Switching Test Circuit

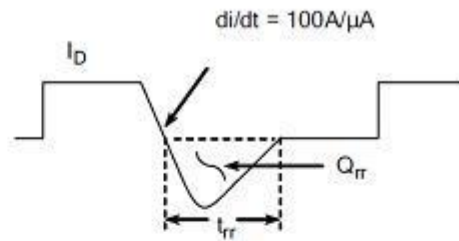


Resistive Switching Waveforms

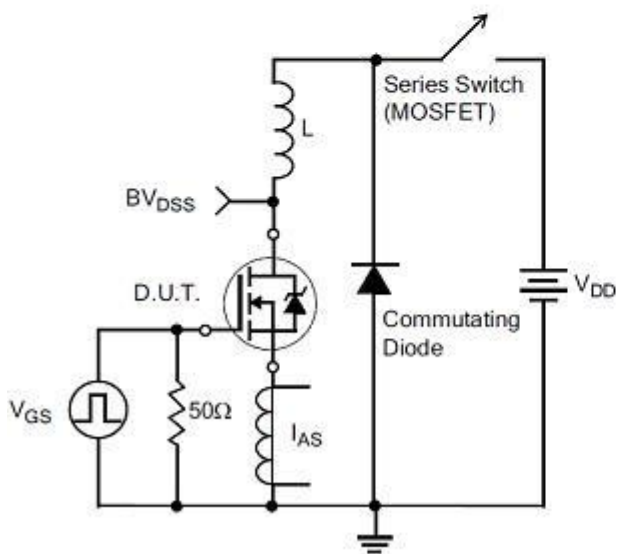
TEST CIRCUITS AND WAVEFORMS(Cont.)



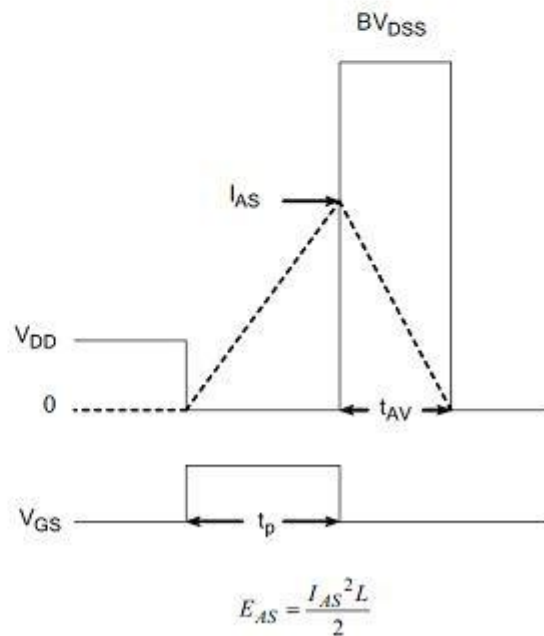
Diode Reverse Recovery Test Circuit



Diode Reverse Recovery Waveform

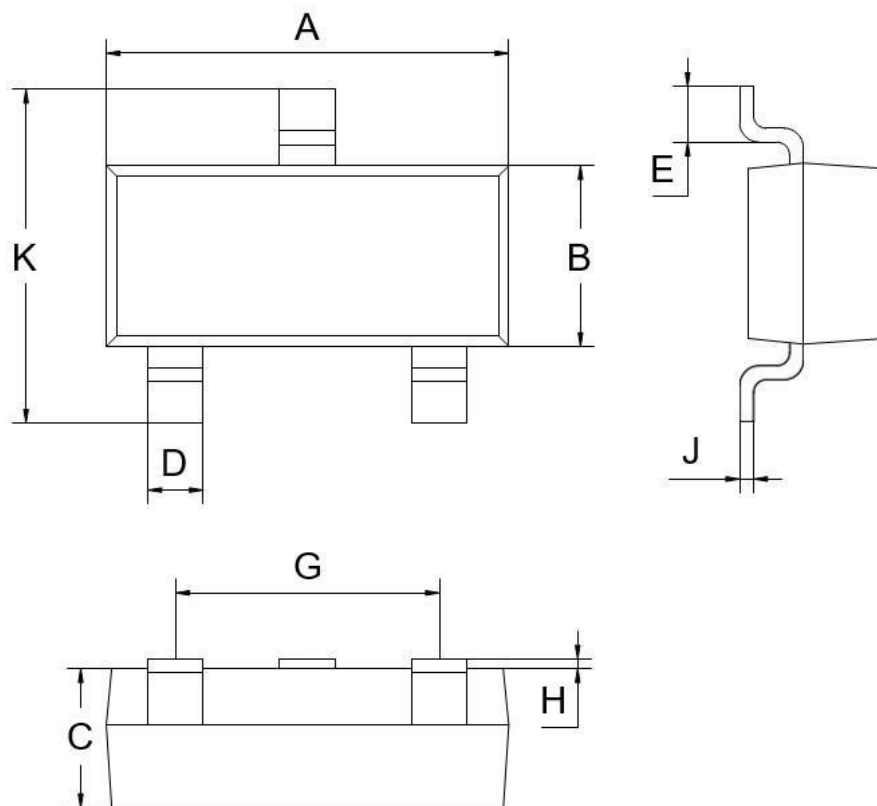


Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

SOT-23L Package



| SOT-23L | | |
|----------------------|------|------|
| Dim | Min | Max |
| A | 2.80 | 3.02 |
| B | 1.50 | 1.70 |
| C | 1.05 | 1.15 |
| D | 0.28 | 0.5 |
| E | 0.28 | 0.6 |
| G | 1.80 | 2.00 |
| H | 0.02 | 0.10 |
| J | 0.1 | 0.2 |
| K | 2.70 | 3.00 |
| All Dimensions in mm | | |

Revision history

Document revision history

| Date | Revision | Changes |
|------------|----------|------------------|
| 1-Sep-2021 | 2.0 | First release |
| 5-Jan-2022 | 2.1 | Update parameter |
| | | |
| | | |

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