





Power MOSFETS

DATASHEET

LM20B30NGB3A

N-Channel
Enhancement Mode MOSFET

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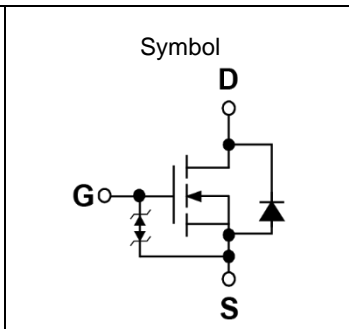
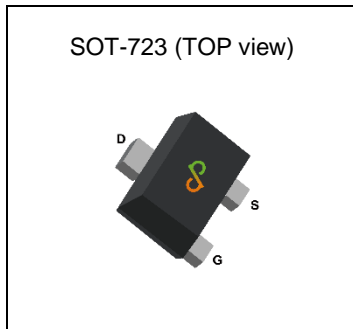


Quality Management Systems

ISO 9001:2015 Certificate

N-Channel Enhancement Mode MOSFET

Pin Description



Ordering Information

| Symbol | N-Channel | Unit |
|------------------|-------------|-----------|
| V_{DSS} | 20 | V |
| $R_{DS(ON)-Max}$ | 240 | mΩ |
| I_D | 0.63 | A |

Feature

- Reliable and Rugged
- ROHS Compliant & Halogen-Free
- ESD Protection

Applications

- Small Signal Switch
- Load Switch

Ordering Information

| Orderable Part Number | Package Type | Form | Shipping | Marking |
|-----------------------|--------------|-------------|--------------------|---------|
| LM20B30NGB3A | SOT-723 | Tape & Reel | 8000 / Tape & Reel | 0□ |

Note : □ = Lot Code

Absolute Maximum Ratings (T_J=25°C Unless Otherwise Noted)

| Symbol | Parameter | | N-Channel | Unit |
|--------------|------------------------------|-------------------|------------|------|
| V_{DSS} | Drain-Source Voltage | | 20 | V |
| V_{GSS} | Gate-Source Voltage | | ±8 | |
| T_J | Maximum Junction Temperature | | 150 | °C |
| T_{STG} | Storage Temperature Range | | -55 to 150 | °C |
| $I_{DM}^{①}$ | Pulse Drain Current Tested | $T_A=25^{\circ}C$ | 1.4 | A |
| I_D | Continuous Drain Current | $T_A=25^{\circ}C$ | 0.63 | A |
| | | $T_A=70^{\circ}C$ | 0.5 | |
| P_D | Maximum Power Dissipation | $T_A=25^{\circ}C$ | 0.15 | W |
| | | $T_A=70^{\circ}C$ | 0.1 | |

Thermal Characteristics

| Symbol | Parameter | | Rating | Unit |
|---------------------|--|--------------|--------|------|
| $R_{\theta JA}^{②}$ | Thermal Resistance-Junction to Ambient | Steady State | 833 | °C/W |

Note ① : Max. current is limited by bonding wire.

Note ② : Surface Mounted on 1in² FR-4 board with 1oz.

N-Channel Electrical Characteristics (T_J=25°C Unless Otherwise Noted)

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|---|----------------------------------|--|------|------|------|------|
| Static Electrical Characteristics | | | | | | |
| BV_{DSS} | Drain-Source Breakdown Voltage | V _{GS} =0V, I _{DS} =250uA | 20 | - | - | V |
| I_{DSS} | Zero Gate Voltage Drain Current | V _{DS} =16V, V _{GS} =0V | - | - | 1 | uA |
| V_{GS(th)} | Gate Threshold Voltage | V _{DS} =V _{GS} , I _{DS} =250uA | 0.5 | - | 1 | V |
| I_{GSS} | Gate Leakage Current | V _{GS} =±8V, V _{DS} =0V | - | - | ±10 | uA |
| R_{DS(ON)} ^③ | Drain-Source On-state Resistance | V _{GS} =4.5V, I _{DS} =550mA | - | 200 | 240 | mΩ |
| | | V _{GS} =2.5V, I _{DS} =450mA | - | 240 | 310 | |
| | | V _{GS} =1.8V, I _{DS} =350mA | - | 310 | 465 | |
| | | V _{GS} =1.5V, I _{DS} =100mA | - | 470 | 1500 | |
| gfs | Forward Transconductance | V _{DS} =5V, I _{DS} =550mA | - | 1.7 | - | S |
| Dynamic Characteristics ^④ | | | | | | |
| C_{iss} | Input Capacitance | V _{GS} =0V, V _{DS} =10V, Freq.=1MHz | - | 43 | - | pF |
| C_{oss} | Output Capacitance | | - | 9 | - | |
| C_{rss} | Reverse Transfer Capacitance | | - | 6 | - | |
| t_{d(ON)} | Turn-on Delay Time | V _{GS} =4.5V, V _{DS} =10V, I _D =2A, R _{GEN} =6Ω | - | 1.2 | - | nS |
| t_r | Turn-on Rise Time | | - | 25 | - | |
| t_{d(OFF)} | Turn-off Delay Time | | - | 14 | - | |
| t_f | Turn-off Fall Time | | - | 15 | - | |
| Q_g | Total Gate Charge | V _{GS} =2.5V, V _{DS} =10V I _D =1A | - | 1.1 | - | nC |
| Q_g | Total Gate Charge | V _{GS} =4.5V, V _{DS} =10V, I _D =1A | - | 2 | - | |
| Q_{gs} | Gate-Source Charge | | - | 0.3 | - | |
| Q_{gd} | Gate-Drain Charge | | - | 0.3 | - | |
| Source-Drain Characteristics | | | | | | |
| V_{SD} ^③ | Diode Forward Voltage | I _{SD} =0.35A, V _{GS} =0V | - | 0.75 | 1.1 | V |
| t_{rr} | Reverse Recovery Time | I _F =1A, V _R =0 | - | 9 | - | nS |
| Q_{rr} | Reverse Recovery Charge | dI _F /dt=100A/μs | - | 1 | - | nC |

Note ③ : Pulse test (pulse width≤300us, duty cycle≤2%).

Note ④ : Guaranteed by design, not subject to production testing.

N-Channel Typical Characteristics

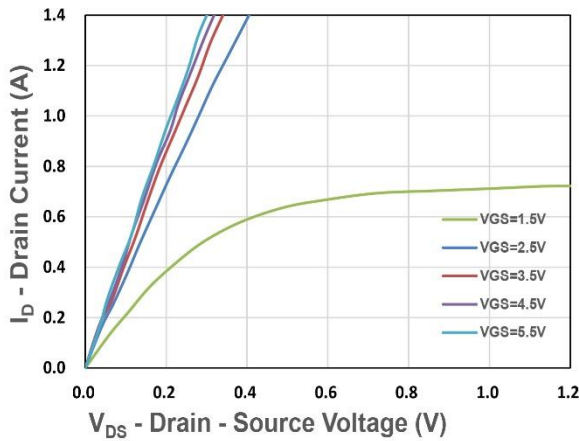


Figure 1. Output Characteristics

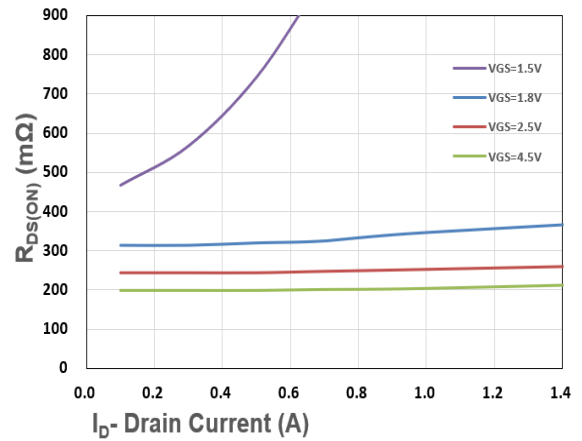


Figure 2. On-Resistance vs. I_D

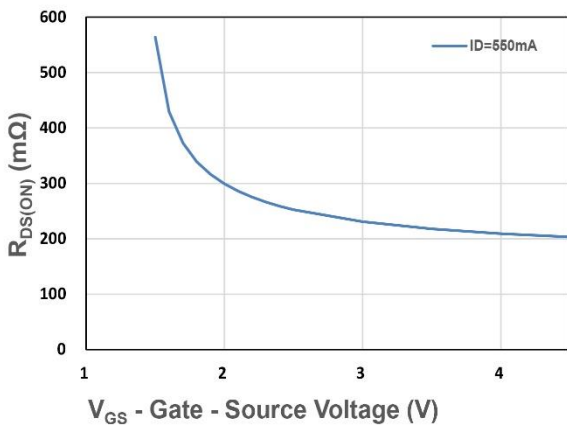


Figure 3. On-Resistance vs. V_{GS}

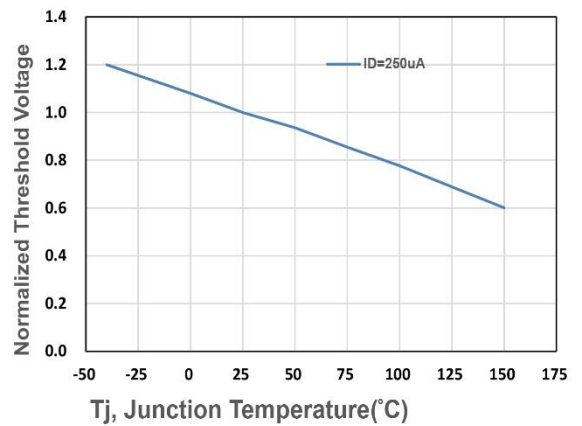


Figure 4. Gate Threshold Voltage

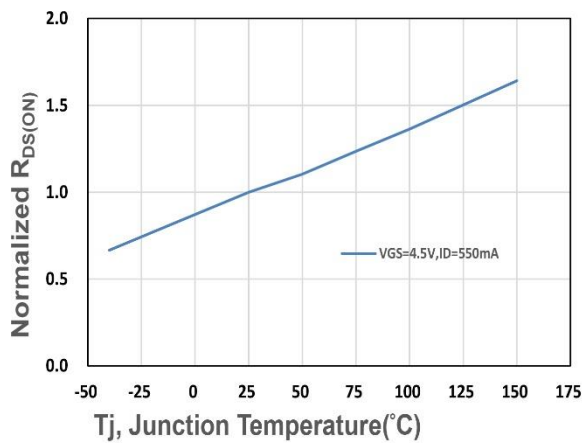


Figure 5. Drain-Source On Resistance

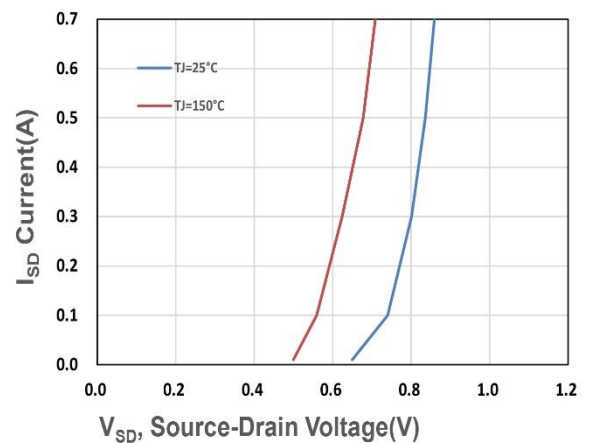


Figure 6. Source-Drain Diode Forward

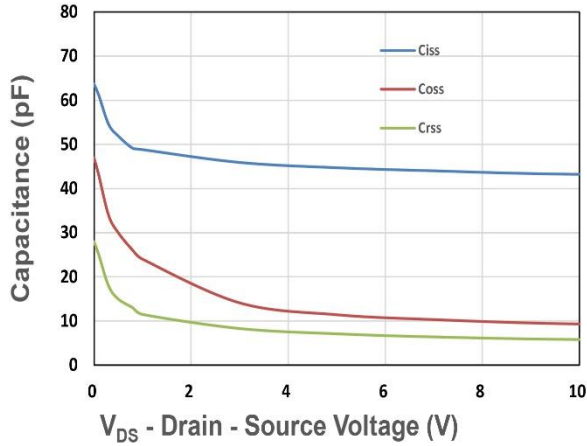


Figure 7. Capacitance

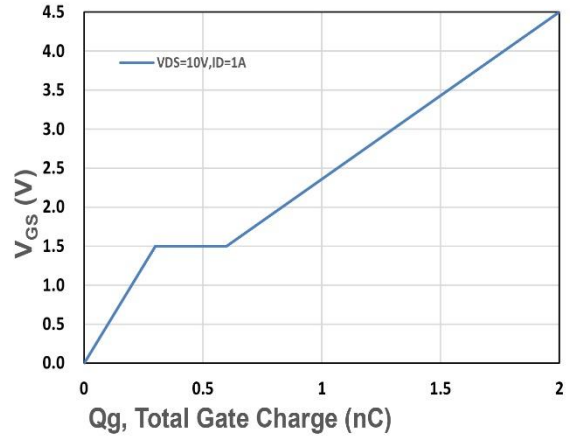


Figure 8. Gate Charge Characteristics

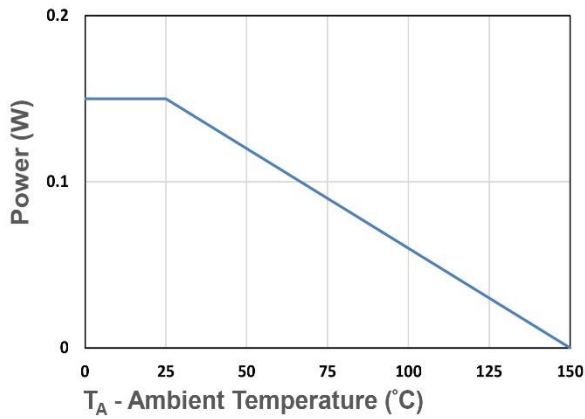


Figure 9. Power Dissipation

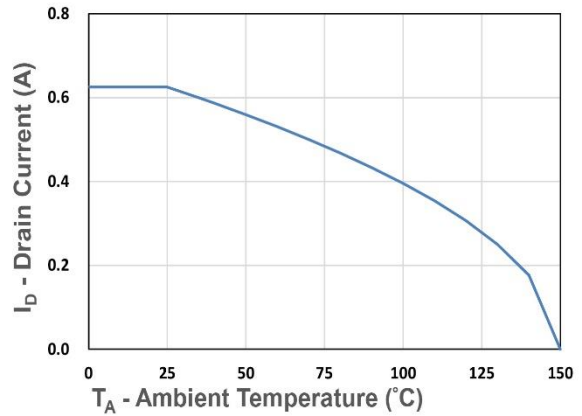


Figure 10. Drain Current

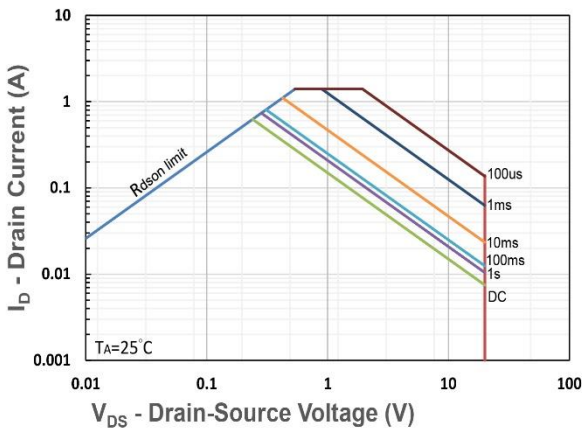


Figure 11. Safe Operating Area

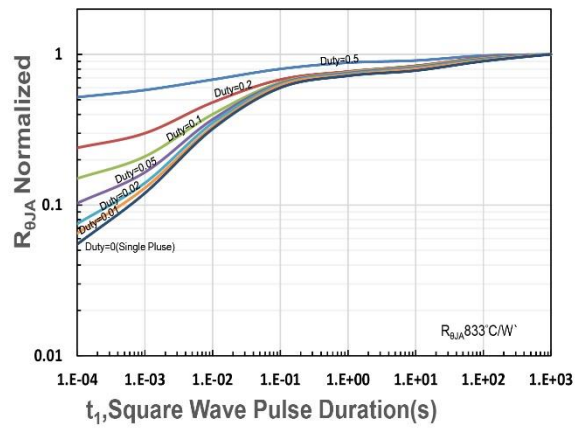


Figure 12. $R_{\theta JA}$ Transient Thermal Impedance