

## Product Summary

| $V_{(BR)DSS}$ | $R_{DS(on)TYP}$ | $I_D$ |
|---------------|-----------------|-------|
| 60V           | 1.3mΩ@10V       | 330A  |

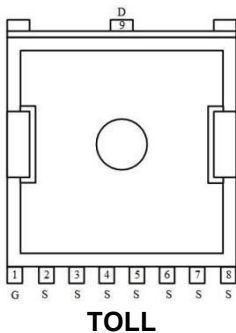
## Feature

- Fast Switching
- Low Gate Charge and Rdson
- 100% Single Pulse avalanche energy Test

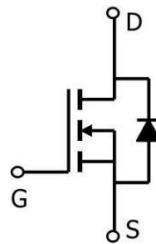
## Applications

- Power switching application
- DC-DC Converter
- Power Management

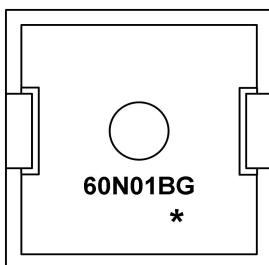
## Package



## Circuit diagram



## Marking



**60N01BG** : Product code  
\* : Month code

**Absolute maximum ratings (Ta=25°C unless otherwise noted)**

| Parameter                                       | Symbol          | Rating     | Units |
|-------------------------------------------------|-----------------|------------|-------|
| Drain-Source Voltage                            | $V_{DS}$        | 60         | V     |
| Gate-Source Voltage                             | $V_{GS}$        | $\pm 20$   | V     |
| Continuous Drain Current <sup>1</sup> (Tc=25°C) | $I_D$           | 330        | A     |
| Pulsed Drain Current <sup>2</sup>               | $I_{DM}$        | 1320       | A     |
| Single Pulse Avalanche Energy <sup>3</sup>      | $E_{AS}$        | 485        | mJ    |
| Total Power Dissipation <sup>4</sup> (Tc=25°C)  | $P_D$           | 355        | W     |
| Thermal Resistance Junction-Case <sup>1</sup>   | $R_{\theta JC}$ | 0.35       | °C/W  |
| Storage Temperature Range                       | $T_{STG}$       | -55 to 150 | °C    |
| Operating Junction Temperature Range            | $T_J$           | -55 to 150 | °C    |

**Electrical characteristics (Ta=25°C, unless otherwise noted)**

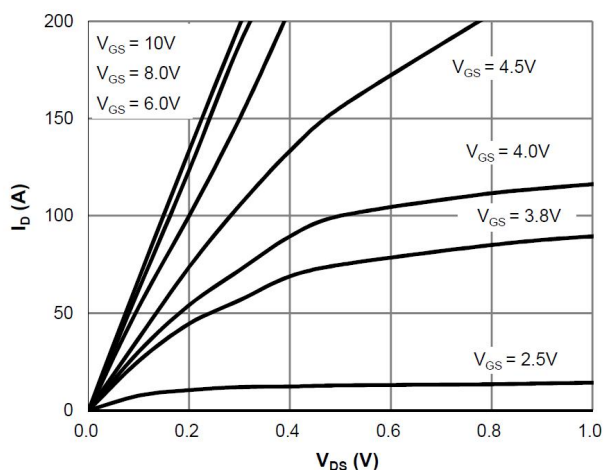
| Parameter                                      | Symbol            | Conditions                        | Min. | Typ. | Max. | Unit |
|------------------------------------------------|-------------------|-----------------------------------|------|------|------|------|
| Static Characteristics                         |                   |                                   |      |      |      |      |
| Drain-Source Breakdown Voltage                 | BV <sub>DSS</sub> | VGS=0V , ID=250uA                 | 60   | ---  | ---  | V    |
| Drain-Source Leakage Current                   | IDSS              | VDS=48V , VGS=0V                  | ---  | ---  | 1    | uA   |
| Gate-Source Leakage Current                    | IGSS              | VGS=±20V , VDS=0V                 | ---  | ---  | ±100 | nA   |
| Gate Threshold Voltage                         | VGS(th)           | VGS=VDS , ID =250uA               | 2.0  | 3.0  | 4.0  | V    |
| Static Drain-Source On-Resistance <sup>2</sup> | RDS(ON)           | VGS=10V , ID=30A                  | ---  | 1.3  | 1.65 | mΩ   |
| Dynamic characteristics                        |                   |                                   |      |      |      |      |
| Input Capacitance                              | Ciss              | VDS=25V , VGS=0V , f=1MHz         | ---  | 6649 | ---  | pF   |
| Output Capacitance                             | Coss              |                                   | ---  | 1281 | ---  |      |
| Reverse Transfer Capacitance                   | Crss              |                                   | ---  | 57.4 | ---  |      |
| Switching Characteristics                      |                   |                                   |      |      |      |      |
| Total Gate Charge                              | Qg                | VDS=48V , VGS=10V , ID=30A        | ---  | 105  | ---  | nC   |
| Gate-Source Charge                             | Qgs               |                                   | ---  | 20   | ---  |      |
| Gate-Drain Charge                              | Qgd               |                                   | ---  | 18   | ---  |      |
| Turn-On Delay Time                             | Td(on)            | VDD=48V , VGS=10V , RG=2Ω, ID=30A | ---  | 32.3 | ---  | ns   |
| Rise Time                                      | Tr                |                                   | ---  | 52.1 | ---  |      |
| Turn-Off Delay Time                            | Td(off)           |                                   | ---  | 91   | ---  |      |
| Fall Time                                      | Tf                |                                   | ---  | 27.8 | ---  |      |
| Diode Characteristics                          |                   |                                   |      |      |      |      |
| Diode Forward Voltage <sup>2</sup>             | VSD               | VGS=0V , IS=1A , TJ=25℃           | ---  | ---  | 1.2  | V    |

**Note :**

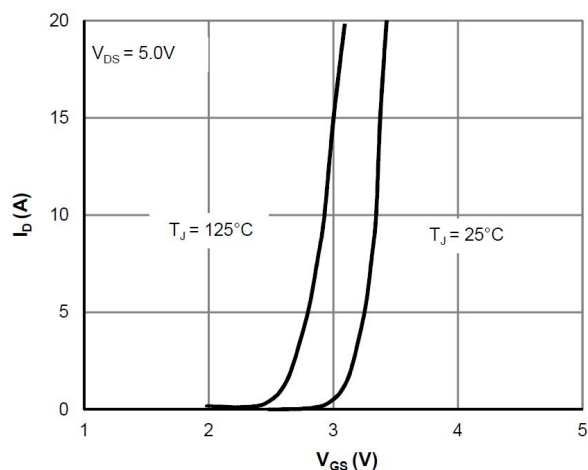
1. The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2OZ copper.
2. The data tested by pulsed , pulse width  $\leq 300\mu s$  , duty cycle  $\leq 2\%$
3. The EAS data shows Max. rating . The test condition is  $V_{DD}=30V$ ,  $V_{GS}=10V$ ,  $L=0.5mH$ ,  $R_G=25\Omega$



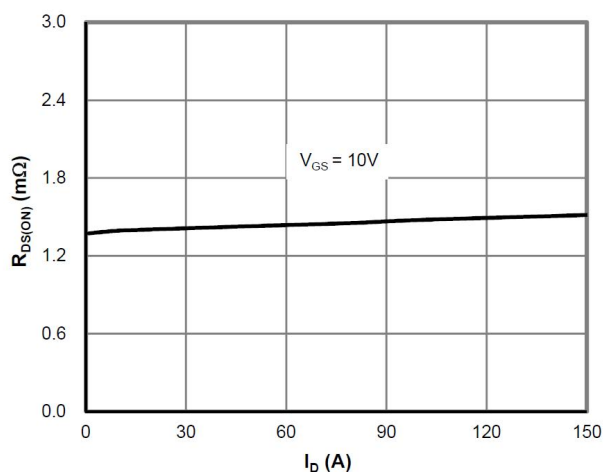
## Typical Characteristics



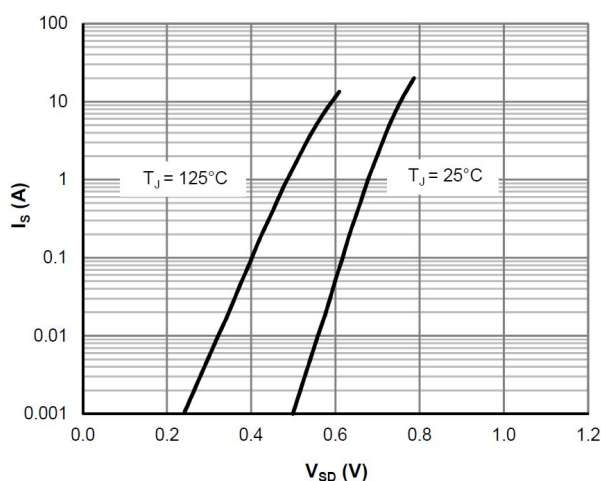
Saturation Characteristics



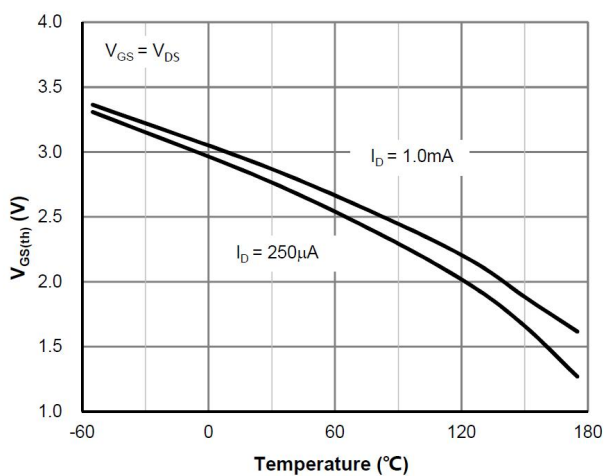
Transfer Characteristics



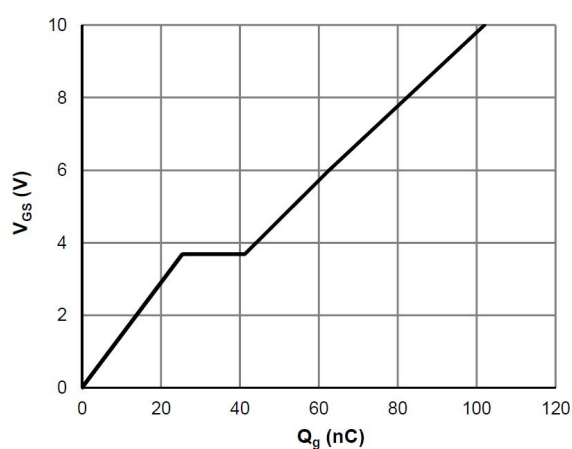
$R_{DS(on)}$  vs. Drain Current



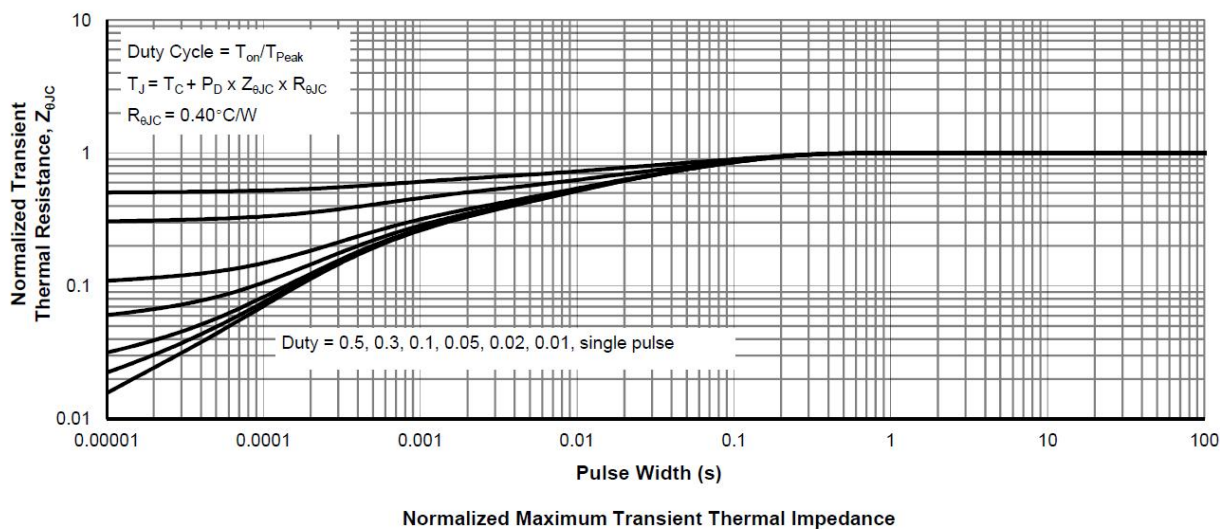
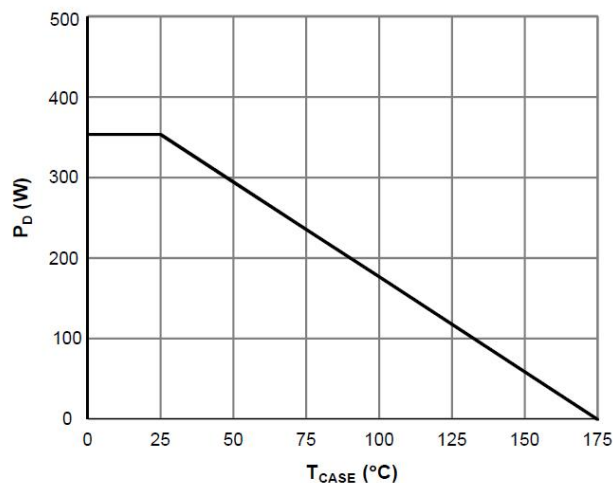
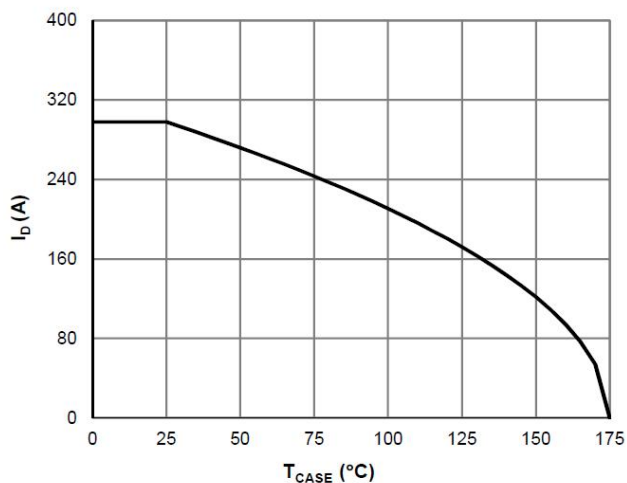
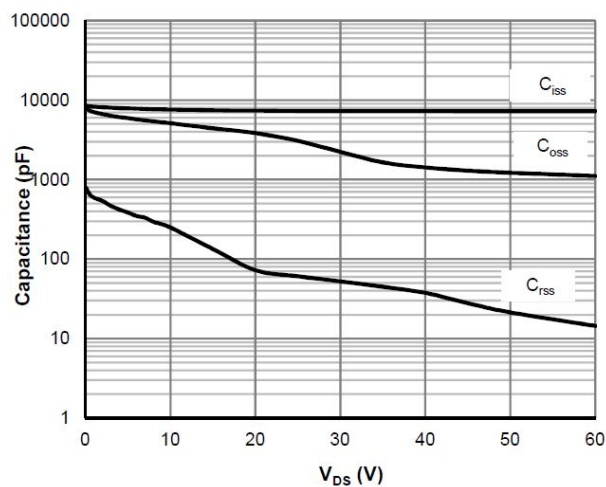
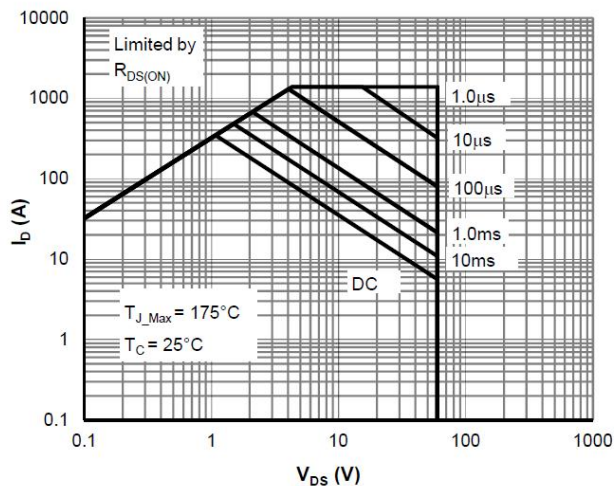
Body-Diode Characteristics



$V_{GS(th)}$  vs. Junction Temperature

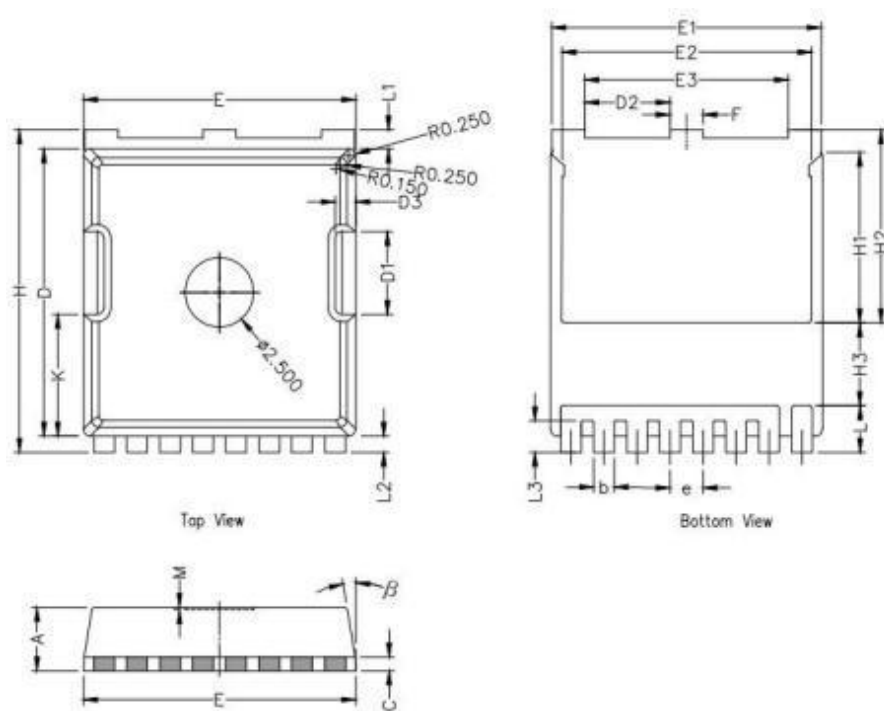


Gate Charge





## TOLL Package Information



| Symbol  | Dimensions In Millimeters |       |       |
|---------|---------------------------|-------|-------|
|         | Min.                      | Nom.  | Max.  |
| A       | 2.20                      | 2.30  | 2.40  |
| b       | 0.65                      | 0.75  | 0.85  |
| C       | 0.508 REF                 |       |       |
| D       | 10.25                     | 10.40 | 10.55 |
| D1      | 2.85                      | 3.00  | 3.15  |
| E       | 9.75                      | 9.90  | 10.05 |
| E1      | 9.65                      | 9.80  | 9.95  |
| E2      | 8.95                      | 9.10  | 9.25  |
| E3      | 7.25                      | 7.40  | 7.55  |
| e       | 1.20 BSC                  |       |       |
| F       | 1.05                      | 1.20  | 1.35  |
| H       | 11.55                     | 11.70 | 11.85 |
| H1      | 6.03                      | 6.18  | 6.33  |
| H2      | 6.85                      | 7.00  | 7.15  |
| H3      | 3.00 BSC                  |       |       |
| L       | 1.55                      | 1.70  | 1.85  |
| L1      | 0.55                      | 0.7   | 0.85  |
| L2      | 0.45                      | 0.6   | 0.75  |
| M       | 0.08 REF.                 |       |       |
| $\beta$ | 8°                        | 10°   | 12°   |
| K       | 4.25                      | 4.40  | 4.55  |